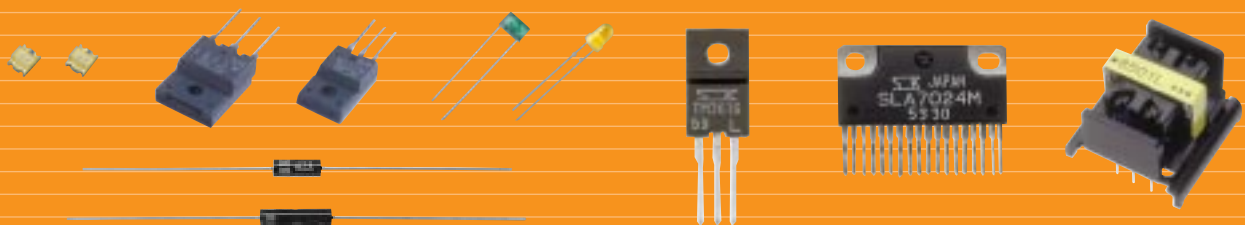
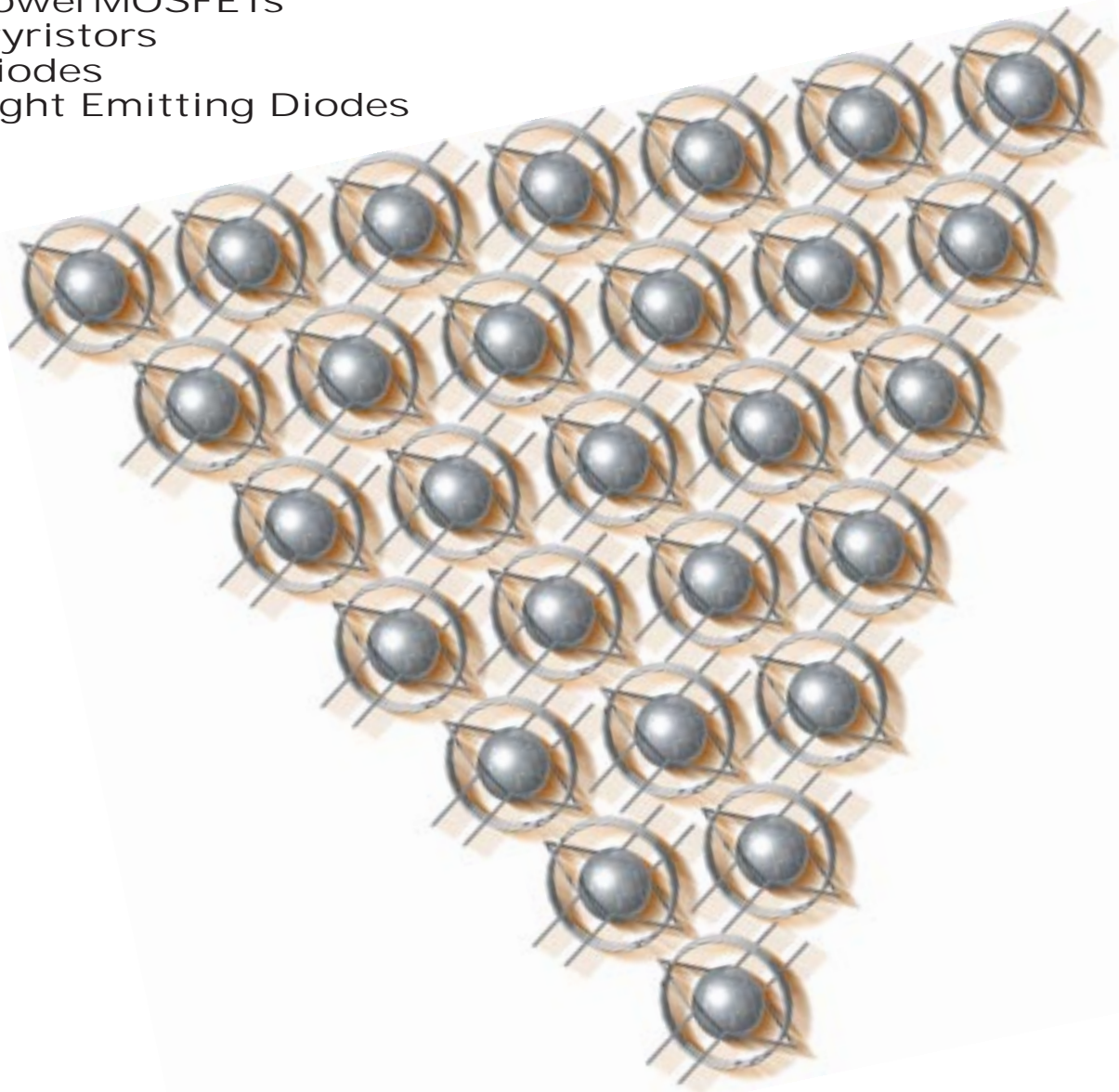


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SEMICONDUCTORS SHORT FORM CATALOG

Power ICs
Power Transistors
PowerMOSFETs
Thyristors
Diodes
Light Emitting Diodes



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Index (Type No. Order)

*This catalog gives an overview of SANKEN semiconductors. Contact a representative for details.

1

ICs

1-1. IC Regulators

- Switching Type
- Dropper Type

1-2. Stepper Motor Driver ICs

- Unipolar Driver ICs
- Bipolar Driver ICs

1-3. Other ICs

- Voltage Doubler/Bridge Rectifier Automatic Switch ICs
- Error Amplifier ICs
- Variable Voltage Detection Type Error Amplifier ICs

1-1. IC Regulators (Refer to the individual specifications for measurement requirements of the electrical characteristics.)

■ Surface Mount Switching Type IC Regulators

Type No.	Absolute Maximum Ratings		Recommended Operating Conditions			Electrical Characteristics (Ta = 25°C)			Fig. No.	Remarks
	DC Input Voltage VIN (V)	Storage Temperature Tstg (°C)	DC Input Voltage Range VIN (V)	Output Current Range Io (A)	Operating Temperature Top (°C)	Output Voltage Vo (V)	Efficiency η (%) typ	Switching Frequency f (kHz) typ		
SAI01	35	-40 to +125	7 to 33	0 to 0.5	-30 to +125	5.0 ± 0.20	80	60	1	Built-in over current and thermal protection circuits
02			5.3 to 33			3.3 ± 0.13	75			
03			15 to 33	12.0 ± 0.60		88				
04			18 to 33	15.0 ± 0.75		89				
06			12 to 33	9.0 ± 0.45		86				

■ Switching Type IC Regulators

Type No.	Absolute Maximum Ratings		Recommended Operating Conditions			Electrical Characteristics (Ta = 25°C)			Fig. No.	Remarks
	DC Input Voltage VIN (V)	Storage Temperature Tstg (°C)	DC Input Voltage Range VIN (V)	Output Current Range Io (A)	Operating Temperature Top (°C)	Output Voltage Vo (V)	Efficiency η (%) typ	Switching Frequency f (kHz) typ		
SI-8033S	35	-40 to +125	5.3 to 28	0 to 3.0	-30 to +125	3.3 ± 0.13	79	60	2	Built-in over current and thermal protection Soft start circuits
-8050S			7 to 40			5.0 ± 0.20	84			
-8090S			12 to 40			9.0 ± 0.45	88			
-8120S			15 to 40			12.0 ± 0.50	90			
-8150S			18 to 40			15.0 ± 0.75	91			

Type No.	Absolute Maximum Ratings (Ta = 25°C)				Electrical Characteristics (Ta = 25°C)				Fig. No.	Remarks
	DC Input Voltage VIN (V)	Output Current Io (A)	Operating Temperature (Tc) Top (°C)	Storage Temperature Tstg (°C)	DC Input Voltage Range VIN (V)	Output Voltage Vo (V)	Efficiency η (%) typ	Switching Frequency f (kHz) typ		
STR2005	45	2.0	-20 to +100	-20 to +125	11 to 40	5.1 ± 0.1	72	25	3	Variable output voltage
2012					18 to 45	12.0 ± 0.2	85			
2013					19 to 45	13.0 ± 0.2				
2015					21 to 45	15.0 ± 0.2				
2024					30 to 50	24.0 ± 0.3				
20005	45				8 to 40	5.1 ± 0.1	72	30	4	

■ Switching Type/2-Pack Type IC Regulators

Combination Line-up		
Control Section (SI-8020 series)	Power Section (STR7000 and STR7100 series)	
	Io = 6A	Io = 12A
SI-8020 (Vo = 5.1V)	STR7001	STR7101
SI-8021 (Vo = 12V)	STR7002	STR7102
SI-8022 (Vo = 15V)	STR7002	STR7102
SI-8023 (Vo = 24V)	STR7003	STR7103

Type No.	Maximum Ratings of Power Section (Ta = 25°C)			Fig. No.
	Power Transistor Breakdown Voltage V4-1 (V)	Operating Temperature (Tc) Top (°C)	Storage Temperature Tstg (°C)	
STR7001	60	-30 to +125	-30 to +125	3
7002				
7003				
STR7101	60	-30 to +125	-30 to +125	3
7102				
7103				

Type No.	Maximum Ratings of Control Section (Ta = 25°C)			Fig. No.
	DC Input Voltage VIN (V)	Operating Temperature Top (°C)	Storage Temperature Tstg (°C)	
SI-8020	55	-20 to +85	-20 to +100	5
8021				
8022				
8023				

Combined Type No.	Total Characteristics (Ta = 25°C)					Remarks
	DC Input Voltage Range VIN (V)	Output Voltage Vo (V)	Output Current Range Io (A)	Efficiency η (%) typ	Switching Frequency f (kHz) typ	
STR7001 -SI-8020	11 to 40	5.1 ± 0.1	0 to 6.0	72	35	Built-in over current protection circuit output ON/OFF control Variable output voltage
STR7002 -SI-8021	18 to 50	12.0 ± 0.2		84		
STR7002 -SI-8022	21 to 50	15.0 ± 0.2		86		
STR7003 -SI-8023	30 to 50	24.0 ± 0.3		90		
STR7101 -SI-8020	11 to 40	5.1 ± 0.1	0 to	70		
STR7102 -SI-8021	18 to 50	12.0 ± 0.2		82		
STR7102 -SI-8022	21 to 50	15.0 ± 0.2		84		
STR7103 -SI-8023	30 to 50	24.0 ± 0.3		87		

Switching Type IC Regulators with Coil

Type No.	Absolute Maximum Ratings (Ta = 25°C)		Recommended Operating Conditions			Electrical Characteristics (Ta = 25°C)			Fig. No.	Remarks
	DC Input Voltage V _{IN} (V)	Storage Temperature Tstg (°C)	DC Input Voltage Range V _{IN} (V)	Output Current Range I _o (A)	Operating Temperature Top (°C)	Output Voltage V _o (V)	Efficiency η (%) typ	Switching Frequency f (kHz)		
SI-8201L	45	-25 to +85	10 to 40	0 to 0.4	-10 to +65	5.0 ±0.10	73	25min	6	
-8202L			11 to 40	0 to 0.35		6.0 ±0.10	74			
-8203L			16 to 40			12.0 ±0.20	79			
-8204L			10 to 40	0 to 0.4		5.2 ±0.10	73			
-8221L	40		8 to 35		5.0 ±0.15	80	7			
-8211L	60		15 to 55	0 to 0.3	-20 to +85	5.0 ±0.10	63	25typ	8	
-8213L			22 to 55	0 to 0.28		12.0 ±0.20	78			
-8301L	45		8 to 40	0 to 1	-10 to +70	5.1 ±0.10	73	50typ	9	
-8303L			8.5 to 40			5.4 ±0.10				
-8811L	35		12 to 30	0.05 to 0.45 0 to -0.05	-10 to +60	5.0 ±0.25 -5.0 ±0.25	72	68typ	10	
-8911L	60	24 to 55	0.02 to 0.3 0 to -0.1	-10 to +65	5.0 ±0.25 -5.0 ±0.25	65				
-8921L		24 to 55	0 to 0.6	-20 to +85	5.1 ^{+0.1} -0.15	72				
-8922L		20 to 55								
-8401L	35	7 to 33	0 to 0.5	-20 to +85	5.0 ±0.20	80	60typ	7		
-8402L		15 to 33	0 to 0.4		12.0 ±0.60	88				
-8403L		5.3 to 33	0 to 0.5		3.3 ±0.13	75				
-8405L		18 to 33	0 to 0.4		15.0 ±0.75	89				
-8406L		10 to 33		8.0 ±0.40	85					
-8501L		7 to 33	0 to 1	-20 to +85	5.0 ±0.20	83	60typ	9		
-8502L		15 to 33			12.0 ±0.60	89				
-8503L		5.3 to 33			3.3 ±0.13	79				
-8504L		12 to 33			9.0 ±0.45	87				
-8505L		18 to 33			15.0 ±0.75	90				

■ Dropper Type IC Regulators

Type No.	Absolute Maximum Ratings (Ta = 25°C)				Electrical Characteristics (Ta = 25°C)			Fig. No.	Remarks	
	DC Input Voltage	Output Current	Operating Temperature	Storage Temperature	Recommended Input Voltage	Output Voltage Vo (V)				Input-Output Differential Voltage V _{DIF} (V) max
	V _{IN} (V)	I _O (A)	Top (°C)	Tstg (°C)		V _{IN} (V)	3000F*			
SI-3050F	25	1.0	-30 to +100	-40 to +125	6.0 to 15	5.0 ±0.20	5.0 ±0.10	1.0	2	Low power dissipation type Remote sensing possible Built-in over current, input over voltage and thermal protection circuits
-3090F	30				10.0 to 20	9.0 ±0.36	9.0 ±0.18			
-3120F					13.0 to 25	12.0 ±0.48	12.0 ±0.24			
-3150F	35				16.0 to 27	15.0 ±0.60	15.0 ±0.30			
-3157F					16.7 to 27	15.7 ±0.78	—			
-3025F	30				6.0 to 25	3 to 24 (Variable)				

* "A" may be marked on the right side of marking.

Type No.	Absolute Maximum Ratings (Ta = 25°C)				Electrical Characteristics (Ta = 25°C)			Fig. No.	Remarks	
	DC Input Voltage	Output Current	Operating Temperature	Storage Temperature	Recommended Input Voltage	Output Voltage Vo (V)				Input-Output Differential Voltage V _{DIF} (V) max
	V _{IN} (V)	I _O (A)	Top (°C)	Tstg (°C)		V _{IN} (V)	3000N*			
SI-3050N	25	1.0	-30 to +100	-40 to +125	6 to 15	5.0 ±0.20	5.0 ±0.10	1.0	12	Low power dissipation type Built-in over current, input over voltage and thermal protection circuits
-3090N	30				10 to 20	9.0 ±0.36	9.0 ±0.18			
-3120N					13 to 25	12.0 ±0.48	12.0 ±0.24			
-3150N	35				16 to 27	15.0 ±0.60	15.0 ±0.30			
					15.0 ±0.30	15.0 ±0.30	15.0 ±0.30			

* "A" may be marked on the right side of marking.

Type No.	Absolute Maximum Ratings (Ta = 25°C)				Electrical Characteristics (Ta = 25°C)			Fig. No.	Remarks	
	DC Input Voltage	Output Current	Operating Temperature	Storage Temperature	Recommended Input Voltage	Output Voltage Vo (V)				Input-Output Differential Voltage V _{DIF} (V) max
	V _{IN} (V)	I _O (A)	Top (°C)	Tstg (°C)		V _{IN} (V)	3000C*			
SI-3033C	20	1.5	-30 to +100	-40 to +125	4.5 to 15	3.3 ±0.132	3.3 ±0.066	1.0	2	Low power dissipation type Remote sensing possible Built-in over current, input over voltage and thermal protection circuits
-3050C	35				6.0 to 30	5.0 ±0.200	5.0 ±0.100			
-3090C					10.0 to 30	9.0 ±0.360	9.0 ±0.180			
-3120C	35				13.0 to 30	12.0 ±0.480	12.0 ±0.240			
-3150C					16.0 to 30	15.0 ±0.600	15.0 ±0.300			
-3240C	45				25.0 to 40	24.0 ±0.960	24.0 ±0.480			

* "A" may be marked on the right side of marking.

Type No.	Absolute Maximum Ratings (Ta = 25°C)				Electrical Characteristics (Ta = 25°C)			Fig. No.	Remarks	
	DC Input Voltage	Output Current	Operating Temperature	Storage Temperature	Recommended Input Voltage	Output Voltage Vo (V)				Input-Output Differential Voltage V _{DIF} (V) max
	V _{IN} (V)	I _O (A)	Top (°C)	Tstg (°C)		V _{IN} (V)	3001N*			
SI-3051N	35	1.5	-30 to +100	-40 to +125	6 to 30	5.0 ±0.20	5.0 ±0.10	1.0	11	Low power dissipation type Built-in over current, input overvoltage and thermal protection circuits
-3091N					10 to 30	9.0 ±0.36	9.0 ±0.18			
-3121N					13 to 30	12.0 ±0.48	12.0 ±0.24			
-3151N					16 to 30	15.0 ±0.60	15.0 ±0.30			
-3241N					45	25 to 40	24.0 ±0.96			

* "A" may be marked on the right side of marking.

Type No.	Absolute Maximum Ratings (Ta = 25°C)				Electrical Characteristics (Ta = 25°C)			Fig. No.	Remarks
	DC Input Voltage	Output Current	Operating Temperature	Storage Temperature	Recommend Input Voltage	Output Voltage	Input-Output Differential Voltage V _{DIF} (V) max		
	V _{IN} (V)	I _O (A)	Top (°C)	Tstg (°C)	V _{IN} (V)	Vo (V)	V _{DIF} (V) max		
SI-3050J	25	2.0	-30 to +100	-40 to +125	6 to 15	5.0 ±0.10	1.0	2	Low power dissipation type Remote sensing possible Built-in over current, input over voltage and thermal protection circuits
-3090J	30				10 to 25	9.0 ±0.18			
-3120J	35				13 to 27	12.0 ±0.24			
-3150J					16 to 27	15.0 ±0.30			

Type No.	Absolute Maximum Ratings (Ta = 25°C)				Electrical Characteristics (Ta = 25°C)			Fig. No.	Remarks
	Input Voltage	Output Current	Operating Temperature	Storage Temperature	Recommend Input Voltage	Output Voltage	Input-Output Differential Voltage V _{DIF} (V) max		
	V _{IN} (V)	I _O (A)	Top (°C)	Tstg (°C)	V _{IN} (V)	Vo (V)	V _{DIF} (V) max		
SI-3052N	25	2.0	-30 to +100	-40 to +125	6 to 15	5.0 ±0.10	1.0	11	Low power dissipation type Built-in over current, input over voltage and thermal protection circuits
-3092N	30				10 to 25	9.0 ±0.18			
-3122N	35				13 to 27	12.0 ±0.24			
-3152N					16 to 27	15.0			

Type No.	Absolute Maximum Ratings (Ta = 25°C)				Electrical Characteristics (Ta = 25°C)				Fig. No.	Remarks
	DC Input Voltage	Output Current	Operating Temperature	Storage Temperature	Recommended Input Voltage	Output Voltage	Input-Output Differential Voltage	Reset Detection Voltage Level		
	V _{IN} (V)	I _O (A)	Top (°C)	Tstg (°C)	V _{IN} (V)	V _O (V)	V _{DIF} (V) max	V _{oh} /V _o (%)		
SI-3050R	35	1.5	-30 to +100	-30 to +125	6 to 30	5.0 ± 0.2	1.0	90 to 94	2	Reset function Low power dissipation type Built-in over current, input over voltage and thermal protection circuits

Type No.	Absolute Maximum Ratings (Ta = 25°C)				Electrical Characteristics (Ta = 25°C)		Fig. No.	Remarks
	DC Input Voltage	Output Current	Operating Temperature	Storage Temperature	Output Voltage	Input-Output Differential Voltage		
	V _{IN} (V)	I _O (A)	Top (°C)	Tstg (°C)	V _O (V)	V _{DIF} (V) max		
SI-3052V	25	2.0	-20 to +100 (T _C)	-30 to +125	5.0 ± 0.1	1.0	12	Low power dissipation type Built-in over current protection circuits
-3122V	30				12.0 ± 0.2			
-3152V	30				15.0 ± 0.2			
SI-3052P	45	2.0	-20 to +80	-30 to +125	5.0 ± 0.1	3.0	12	Built-in over current protection circuits
-3122P					12.0 ± 0.2			
-3152P					15.0 ± 0.2			
-3242P					24.0 ± 0.2			
STR9005	25	4.0	-20 to +100 (T _C)	-30 to +125	5.0 ± 0.1	1.0	3	Low power dissipation type Built-in over current protection circuits Output ON/OFF control and fine-adjustment of output voltage possible
9012	30				12.0 ± 0.2			
9015	30				15.0 ± 0.2			

3-Output IC Regulators

Type No.	Absolute Maximum Ratings (Ta = 25°C)					Electrical Characteristics (Ta = 25°C)					Fig. No.	Remarks
	DC Input Voltage	Output Current	Power Dissipation (All Output ON)	Operating Temperature	Storage Temperature	DC Input Voltage Range	Output Voltage	Minimum Input-Output Differential Voltage	Efficiency	Regulator Type		
	V _{IN} (V)	I _O (A)	P _D (W)	Top (°C)	Tstg (°C)	V _{IN} (V)	V _O (V)	V _{DIF} (V) max	η (%) typ			
SLA 3001M	Reg1	1.5	40	-30 to +85	-40 to +125	13 to 25	12.0 ± 0.48	1.0	-	Dropper type	13	Low power dissipation type Remote sensing possible Built-in overcurrent, input overvoltage and thermal protection circuits
	Reg2					6 to 15	5.0 ± 0.15					
	Reg3					10 to 20	9.0 ± 0.36					
SLA 3002M	Reg1	0.5	37.5	-30 to +85	-40 to +150	7 to 33	5.0 ± 0.25	3.0	80	Switching type	13	Low power dissipation type Remote sensing possible (Reg 2 only) Built-in overcurrent and thermal protection circuits
	Reg2	1.0				17 to 30	15.7 ± 0.78	1.0	-	Dropper type		
	Reg3	0.4				12 to 33	9.0 ± 0.45	3.0	85	Switching type		
SLA 3004M	Reg1	0.5	37.5	-30 to +85	-40 to +150	7 to 33	5.0 ± 0.25	3.0	80	Switching type	13	Built-in overcurrent and thermal protection circuits
	Reg2	0.4				12 to 33	9.0 ± 0.45		85			
	Reg3	0.4				12 to 33	9.0 ± 0.36		85			

1.2 Stepper Motor Driver ICs

■ Unipolar Driver ICs

● SLA package product (Heat sink attachable type)

Type No.	Output Current I _o (A)	Control Supply Voltage (= Motor Supply Voltage) (V)	Step sequence mode	Package	Fig. No.	Remarks	
SLA7026M	3.0 max	46 max	1-2 phase excitation enabled	ZIP18pin	14		
SLA7024M	1.5 max						
SLA7027MU	1.0 max		2-phase excitation only	ZIP15pin	15		
SLA7029M	1.5 max						
SLA7022MU	1.0 max						
SLA7044M (PG001M)	3.0 max		Micro-step enabled	ZIP18pin (DIP16pin)	14		Driver + Pulse generator
SLA7042M (PG001M)	1.2 max				(16)		
				14 (16)			

● SMA package (Compact type)

Type No.	Output Current I _o (A)	Control Supply Voltage (= Motor Supply Voltage) (V)	Step sequence mode	Package	Fig. No.	Remarks
SMA7029M	1.5 max	46 max	2-phase excitation only	ZIP15pin	17	
SMA7022MU	1.0 max					

● SDK package (Surface mount type)

Type No.	Output Current I _o (A)	Control Supply Voltage (= Motor Supply Voltage) (V)	Step sequence mode	Package	Fig. No.	Remarks
SDK03M	1.0 max	46 max	1-2 phase excitation enabled	SMD16pin	18	1 motor driven by 2 packages

■ Bipolar Driver ICs

Type No.	Output Current I _o (A)	Supply Voltage Range (V)	Step sequence mode	Package	Fig. No.	Remarks
SI-7230M	±3.0 max	15 to 45	1-2 phase excitation enabled	SIP20pin	19	Open air package
SI-7502 (SLA5011) (SLA6503)	1.5max *Per 1 phase of motor coil	15 to 45	Pentagonal 4-phase excitation	ZIP27pin (Powder coating) (SIP12pin) (SIP12pin)	20 21	1 set of 3 products

1-3. Other ICs

Voltage Doubler/Bridge Rectifier Automatic Switch ICs

Type No.	Absolute Maximum Ratings (Ta = 25°C)					Electrical Characteristics (Ta = 25°C)				Fig. No.	Remarks	
	Repetitive Peak Off-state Voltage	RMS On-state Current	Surge On-state Current	Operating Temperature	Storage Temperature	Voltage Doubler Function Turn-on Voltage Vs (V)	Setting Switchover Voltage		OFF-state Current			ON-state Voltage
							Vc1 (V)	Vc2 (V(AC))*				
STR 80145A	500	5.0	50	-10 to +100 (Tc)	-30 to +125	AC80 max	196 ±5	145	100 max	1.8 max	22	
81145A		10.0	100				215 ±5	159				
81159A		5.0	50				DC100 max	205 ±5				
STR 82145	500	10.0	100	-20 to +100 (Tc)	-40 to +125	225 ±5		159	100 max	1.8 max	22	With latching capability
83145		5.0	50									
83159		10.0	100									

*Reference value

Error Amplifier ICs (SE series)

Type No.	Absolute Maximum Ratings (Ta = 25°C)			Electrical Characteristics (Ta = 25°C)	Fig. No.	Remarks
	Collector-Ground Voltage	Collector Current	Operating Temperature	Output Detection Voltage		
	VcGo (V)	Ic (mA)	Top (°C)	Vs (V)		
SE005N	12	20	-20 to +125 (Tc)	5.0 ±0.1	23	Low Vs
012N	50			12.0 ±0.2		
015N				15.0 ±0.2		
024N				24.0 ±0.2		
034N				34.0 ±0.3		
040N				40.0 ±0.4		
070N				70.2 ±0.8		High Vs
080N	80.2 ±0.8					
090N	90.0 ±0.8					
105N	105.2 ±0.8					
110N	110.2 ±0.8					
115N	115.2 ±0.8					
120N	120.2 ±0.8					
125N	125.2 ±0.8					
130N	130.2 ±0.8					
135N	135.2 ±0.8					
140N	141.2 ±0.8					

Variable Voltage Detection Type Error Amplifier ICs

Type No.	Absolute Maximum Ratings (Ta = 25°C)			Electrical Characteristics (Ta = 25°C)	Fig. No.	Remarks
	Collector-Ground Voltage	Collector Current	Operating Temperature	Output Detection Voltage		
	VcGo (V)	Ic (mA)	Top (°C)	Vs (V)		
SE-B3	150	20	-20 to +125 (Tc)	141.2 ± 0.6 Condition $I_{IN} = 4\text{mA}, R_C = 9.1\text{k}\Omega$ $R_S = 88.7\text{k}\Omega$	23	Variable voltage detection Gain adjustment possible

● External Dimensions (unit: mm)

Fig. 1

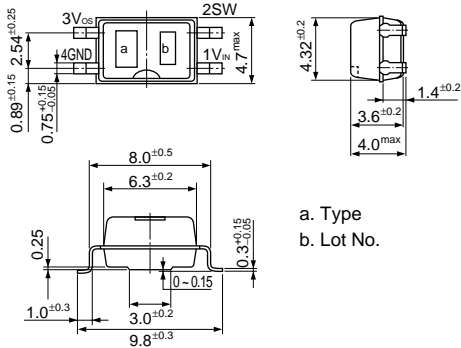
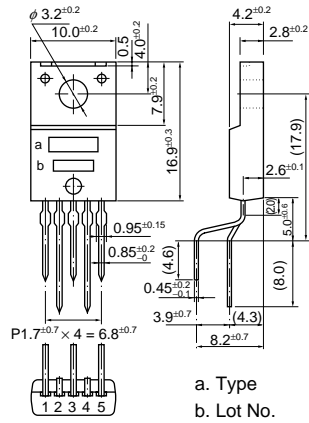


Fig. 2



Forming No. 1101

Fig. 3

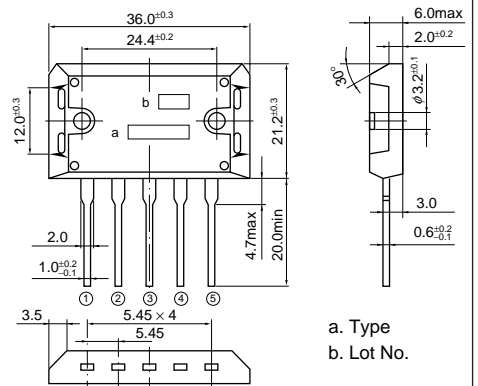


Fig. 4

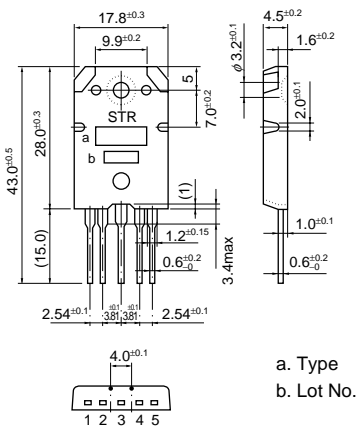


Fig. 5

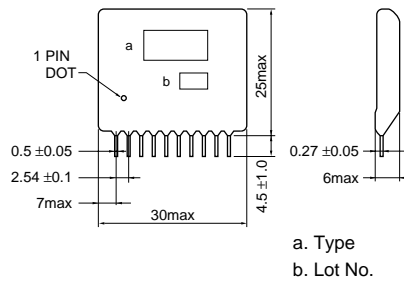


Fig. 6

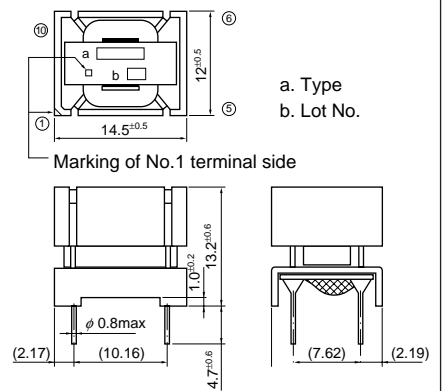


Fig. 7

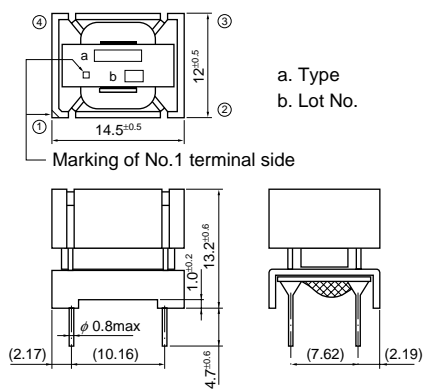


Fig. 8

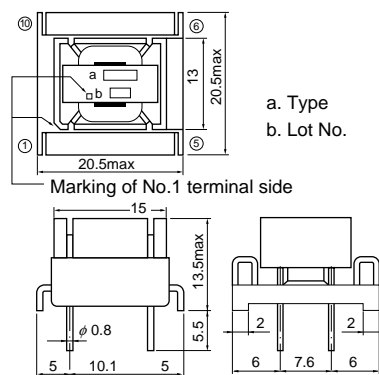


Fig. 9

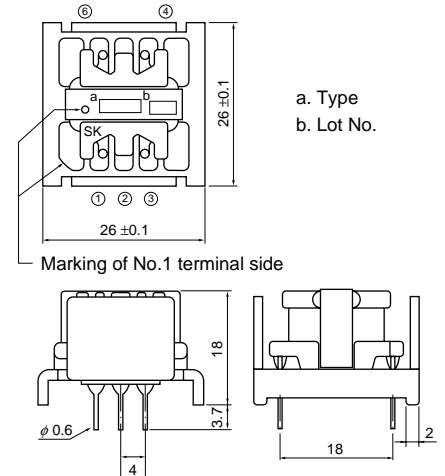


Fig. 10

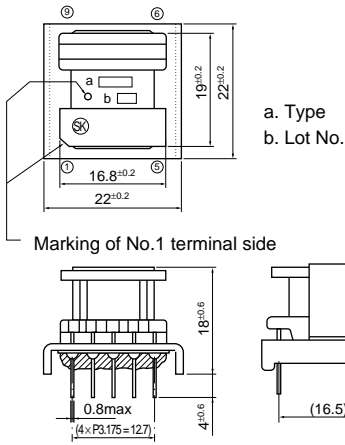


Fig. 11

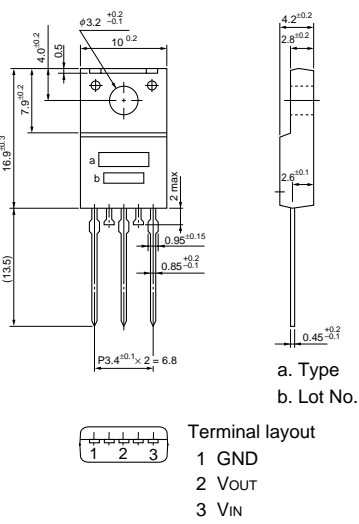


Fig. 12

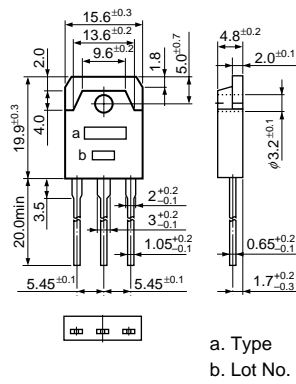


Fig. 13

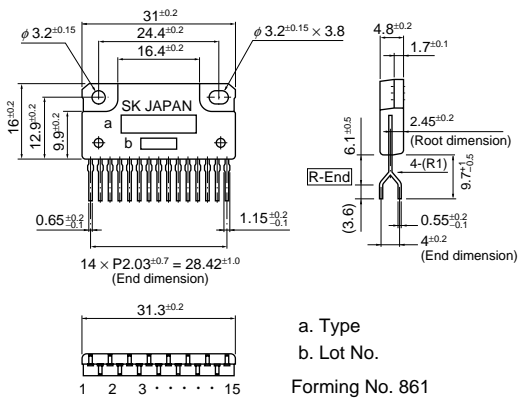


Fig. 14

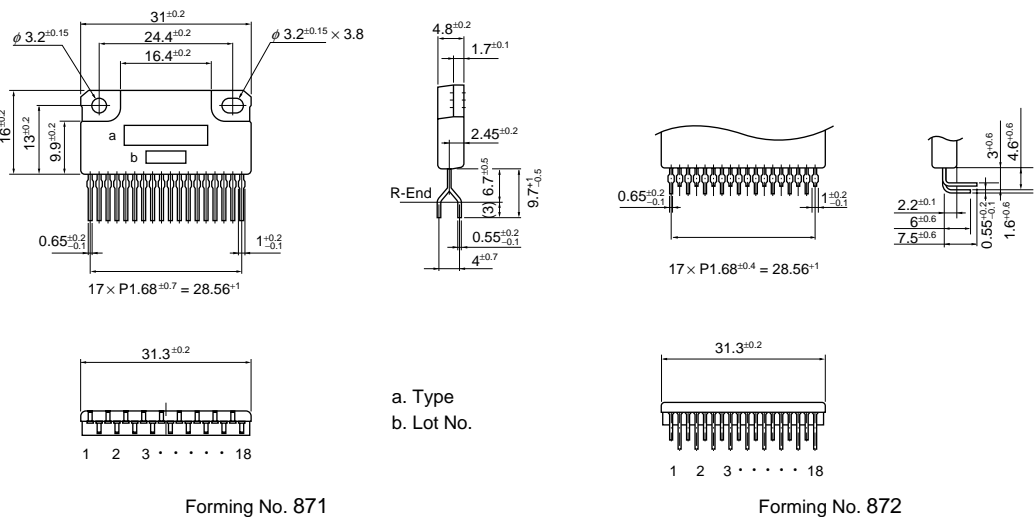
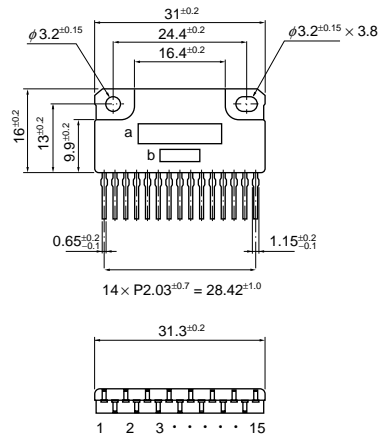
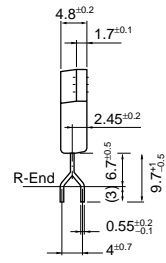


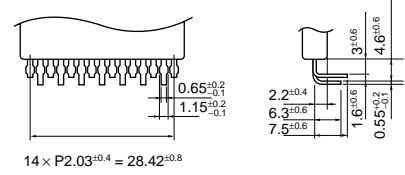
Fig. 15



Forming No. 853

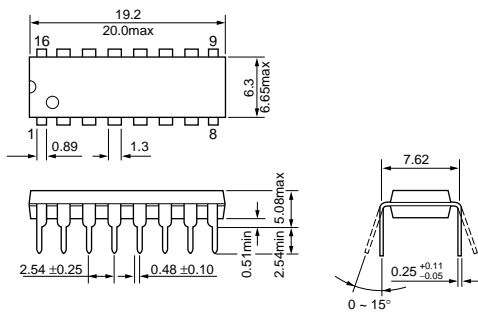


a. Type
b. Lot No.



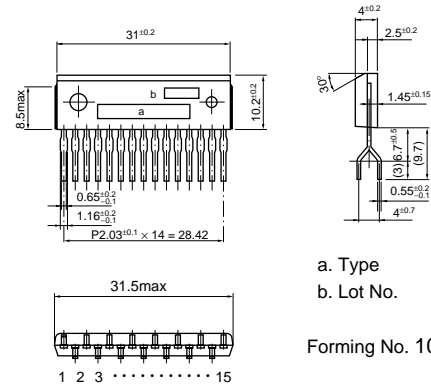
Forming No. 855

Fig. 16



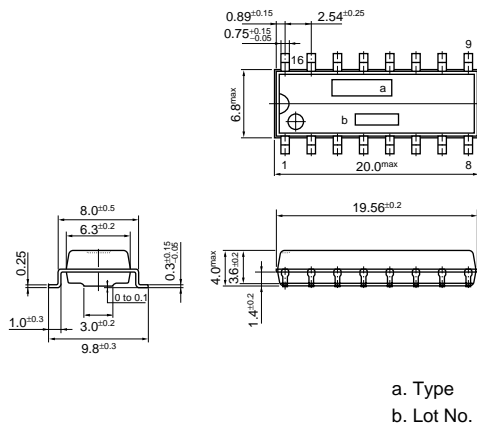
Forming No. 1054

Fig. 17



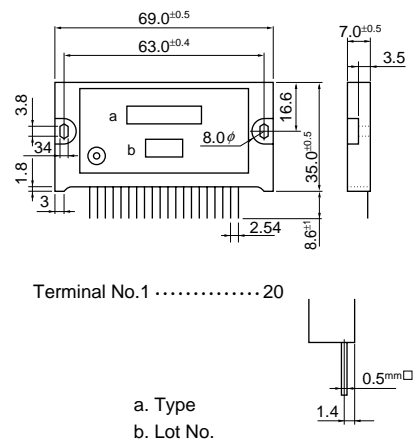
a. Type
b. Lot No.

Fig. 18



a. Type
b. Lot No.

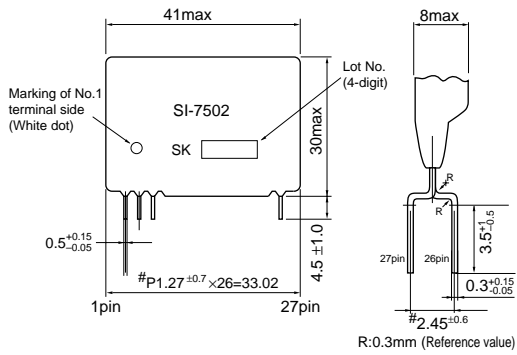
Fig. 19



Terminal No.1 20

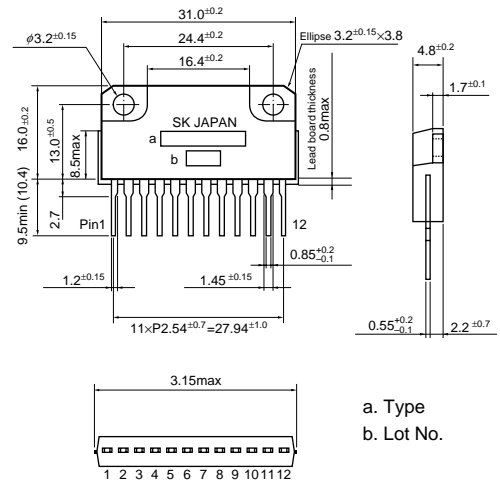
a. Type
b. Lot No.

Fig. 20



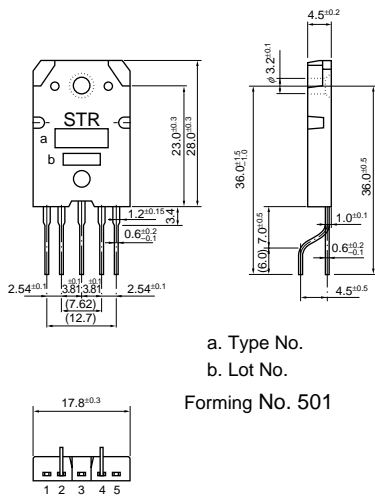
Note) Symbol # indicates the dimension of the lead end.

Fig. 21



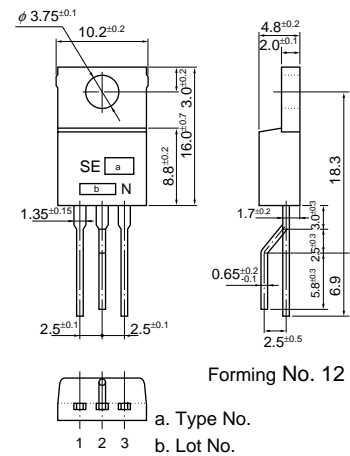
a. Type
b. Lot No.

Fig. 22



a. Type No.
b. Lot No.
Forming No. 501

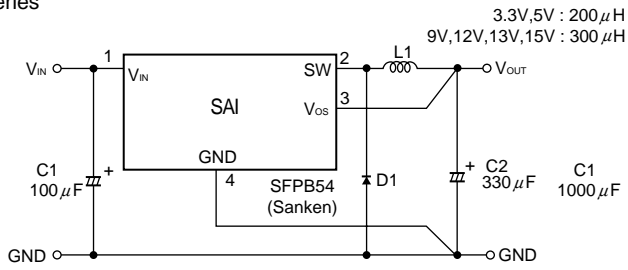
Fig. 23 MT-25 (TO-220)



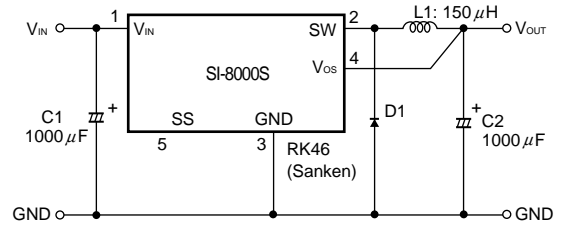
a. Type No.
b. Lot No.

Standard Connection Diagrams

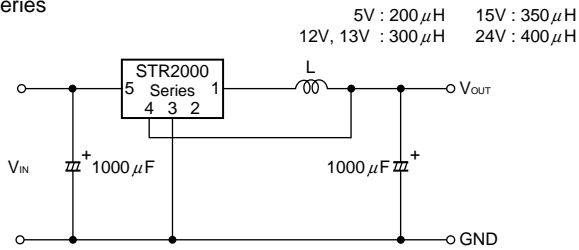
SAI Series



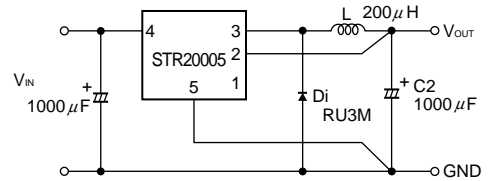
SI-8000S Series



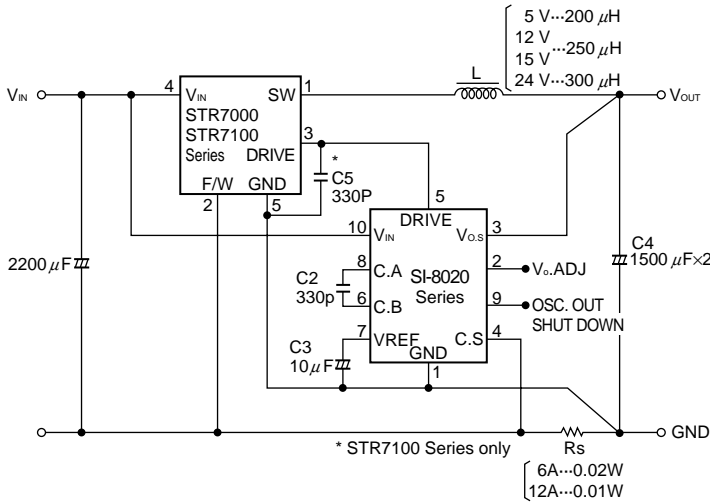
STR2000 Series



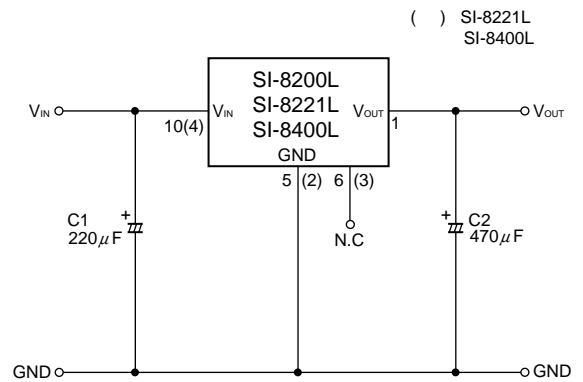
STR20005



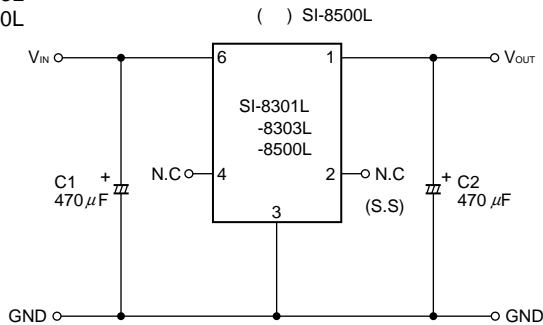
STR7000, 7100/SI-8020 Series



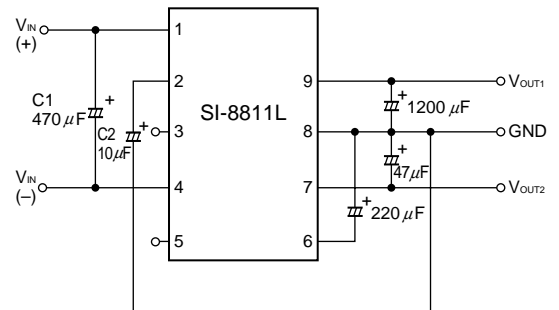
SI-8200L/8400L Series



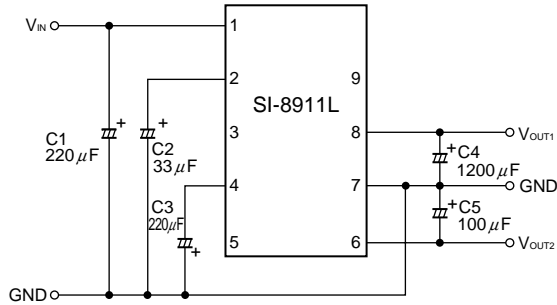
SI-8301L -8303L -8500L



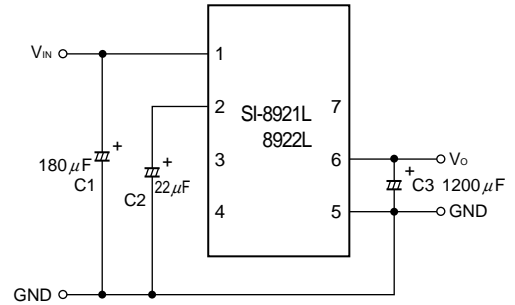
SI-8811L



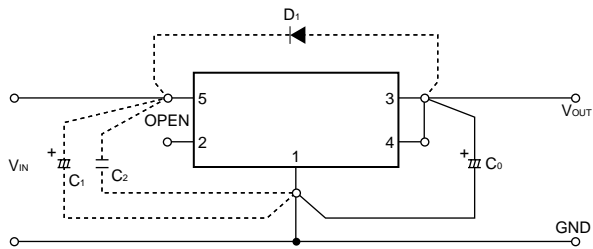
SI-8911L



SI-8921L
8922L

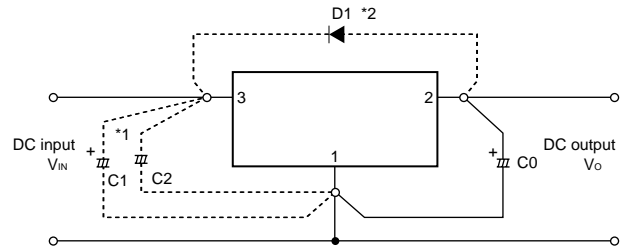


SI-3000F/3000C/3000J Series



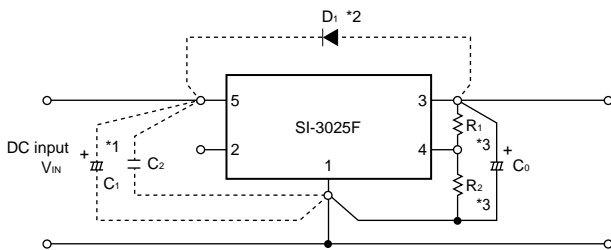
- C₀ : Output capacitor 47 to 100 µF
- *1 C₁, C₂ : Oscillation prevention capacitor (C₁ : Approx. 47 µF, C₂ : Approx. 0.33 µF)
- *2 D₁ : Diode for protection against the occurrence of a reverse bias condition between the input and the output.

SI-3000N/3001N/3002N Series



- C₀ : Output capacitor (47 to 100 µF, 50V)
- *1 C₁ : Oscillation prevention capacitor (C₁ : Approx. 47 µF, C₂ : Approx. 0.33 µF)
- *2 D₁ : Diode for protection against the occurrence of a reverse bias condition between the input and the output.

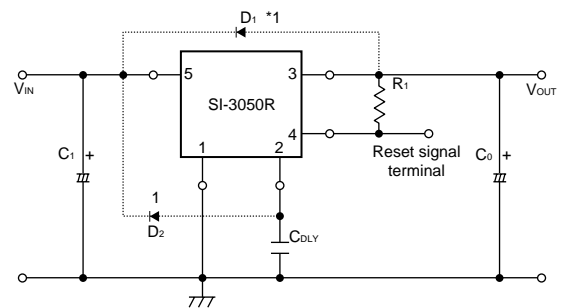
SI-3025F



- C₀ : Output capacitor (47 to 100 µF, 50V)
- *1 C₁, C₂ : Oscillation prevention capacitor (C₁ : Approx. 47 µF, C₂ : Approx. 0.33 µF)
- *2 D₁ : Diode for protection against the occurrence of a reverse bias condition between the input and the output.
- *3 R₁, R₂ : External resistor for output voltage setting
The equation (1) is applied to output voltage V_o and external resistor R₁ & R₂
$$V_o = V_{REF} \cdot \left(1 + \frac{R_1}{R_2}\right) \quad (1) \quad (V_{REF} = 2.55V \text{ (typ.)})$$

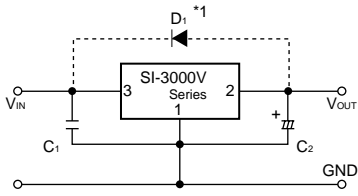
R₂ should be 2.55 kΩ for stable operation.

SI-3050R



- C₀ : Output capacitor (Approx. 200 µF, 50V)
- C₁ : Oscillation prevention capacitor (C₁ : Approx. 47 µF)
Wirings between 5 (V_{in}) and 1 (GND) terminals should be the shortest distance as much as possible. When the input line is inductive or if a long wire is used, add a capacitor with good high frequency characteristics and a capacitance of Approx. 0.33 µF in parallel with the C₁. Tantalum capacitors are recommended for C₁ and C₀ when operating in low temperature environments.
- C_{DLY} : Delay capacitor (reset output)
- R₁ : Pull-up resistor (more than 300Ω)
- *1 D₁, D₂ : Diode for protection against the occurrence of a reverse bias condition between the input and the output.

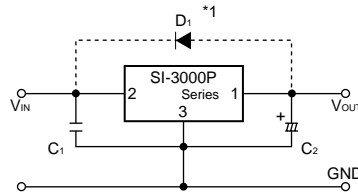
SI-3000V



C₁: Oscillation prevention capacitor (0.33 μF)
C₂: Output capacitor (47 to 100 μF)

*1 D₁: Diode for protection against the occurrence of a reverse bias condition between the input and the output.

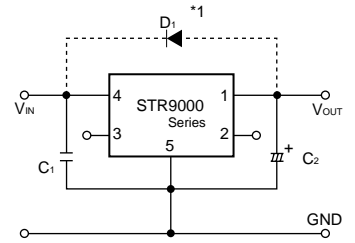
SI-3000P



C₁: Oscillation prevention capacitor (0.33 μF)
C₂: Output capacitor (47 to 100 μF)

*1 D₁: Diode for protection against the occurrence of a reverse bias condition between the input and the output.

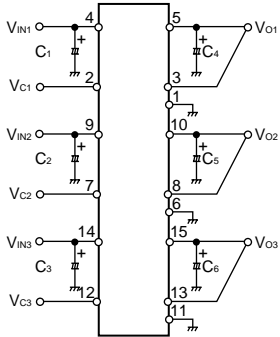
STR9000



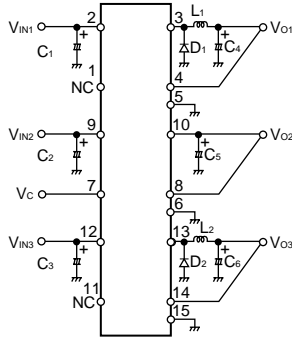
C₁: Oscillation prevention capacitor (0.33 μF)
C₂: Output capacitor (47 to 100 μF)

*1 D₁: Diode for protection against the occurrence of a reverse bias condition between the input and the output.

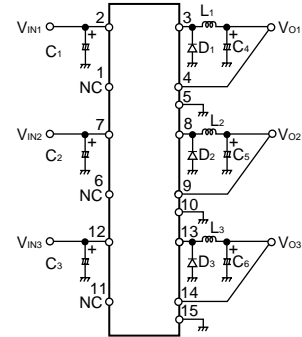
SLA3001M



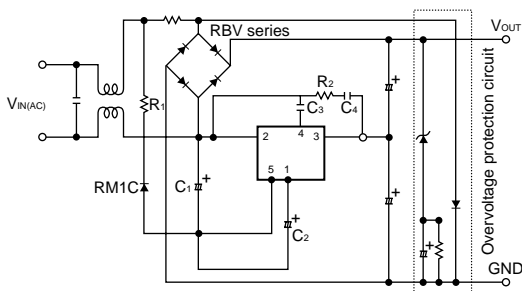
SLA3002M



SLA3004M

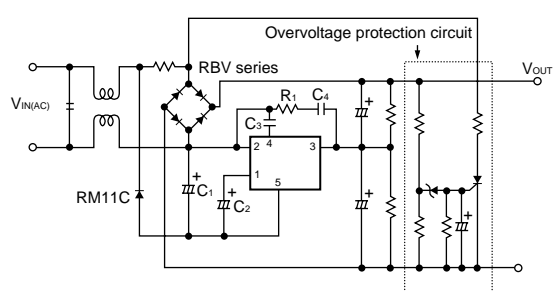


STR80000A Example of application circuit



R₁: 2.2Ω R₂: 4.7Ω
C₁: 2.2 μF/400V C₂: 100 μF/10V C₃: 0.1 μF
C₄: 0.047 μF

STR82000/83000 Example of application circuit



C₁: 4.7 μF/400V, C₂: 1 μF/50V, C₃: 0.047 μF/50V
C₄: 0.047 μF/250V, R₁: 4.7Ω

2

Power Transistors

2-1. Power Transistors

Transistors for Audio Amplifier

- Transistors for Switch Mode Power Supply
- Transistors for Humidifier
- Transistor for Display Horizontal Deflection Output
- Darlington Transistors
- Low $V_{CE(sat)}$ · High h_{FE} Transistors
- General Purpose Transistors
- Surface Mount Transistors

2-2. Transistor Arrays

- Sink Drive Transistor Arrays
- Source Drive Transistor Arrays
- H-Bridge Transistor Arrays
- 3-Phase Motor Driver Transistor Arrays
- Stepper Motor Dual Power Supply Drive Transistor Arrays
- Surface Mount Transistor Arrays

2-1. Power Transistors

■ Transistors for Audio Amplifier

● Single emitter

Type No.	P _c (W)	V _{CE0} (V)	I _c (A)	h _{FE} (min)	f _T (MHz)	Package
2SA1725/2SC4511	30	80	6	50	20	FM20 (T0220F)
2SA1726/2SC4512	50					MT-25 (T0220)
2SA1693/2SC4466	60					MT-100 (T03P)
2SA1907/2SC5099						FM100 (T03PF)
2SA1908/2SC5100	75	120	8			MT-100 (T03P)
2SA1694/2SC4467	80					140
2SA1909/2SC5101		85	180			15
2SA1673/2SC4388	100	140	10			
2SA1695/2SC4468	130	180	15			MT200 (2-screw mount)
2SA1492/2SC3856	150	200	17			
2SA1493/2SC3857	200					
2SA1494/2SC3858	200					

● LAPT (Multi-emitter for high-frequency transistor)

Type No.	P _c (W)	V _{CE0} (V)	I _c (A)	h _{FE} (min)	f _T (MHz)	Package
2SA1860/2SC4886	80	150	14	50	50	FM100 (T03PF)
2SA1186/2SC2837	100		10		60	MT-100 (T03P)
2SA1303/2SC3284	125		14		50	
2SA1386/2SC3519	130	160	40			
2SA1386A/2SC3519A		180	35			
2SA1294/2SC3263		230	50			
2SA1215/2SC2921	150	160	17		40	MT200 (2-screw mount)
2SA1216/2SC2922	200	180			35	
2SA1295/2SC3264		230				

● Darlington

Type No.	P _c (W)	V _{CE0} (V)	I _c (A)	h _{FE} (min)	f _T (MHz)	Package		
2SB1626/2SD2495	30	110	6	5000	100/60	FM20 (T0220F)		
2SB1659/2SD2589	50					MT-25 (T0220)		
2SB1624/2SD2493	60					MT-100 (T03P)		
2SB1625/2SD2494						FM100 (T03PF)		
2SB1587/2SD2438	75	150	8		65/80	MT-100 (T03P)		
2SB1559/2SD2389	80						10	50/55
2SB1588/2SD2439						15		
2SB1649/2SD2562	85					10	50/55	
2SB1560/2SD2390	100	150	10		45/70	MT-100 (T03P)		
2SB1647/2SD2560	130						12	50/55
2SB1570/2SD2401	150					17		
2SB1648/2SD2561	200							

● Temperature compensation/driver

Type No.	P _c (W)	V _{CE0} (V)	I _c (A)	h _{FE} (min)	f _T (MHz)	Package	Remarks
2SC4495	25	50	3	500	40	FM20 (T0220F)	Temperature compensation
2SA1859/2SC4883	20	150	2	60	60/120		Driver
2SA1859A/2SC4883A		180					

■ Transistors for Switch Mode Power Supply

● For AC 80 to 130V input

Specifications			Package			
V _{CB0} (V)	V _{CE0} (V)	I _c (A)	MT-25 (T0220)	FM20 (T0220F)	MT-100 (T03P)	FM100 (T03PF)
250	200	5		2SC5271		
500	400	5		2SC4073		
				2SC4418		
				2SC4662		
		7	2SC3832	2SC3890		
				2SC4130		
		10			2SC4138	2SC4296
		12			2SC3833	2SC4297
					2SC5071	
15			2SC4139	2SC4298		
			2SC4434			
600	400	5		2SC5130		
		7		2SC4546		
	500	6	2SC3830	2SC4907		
		10			2SC3831	
	600				2SC5249	
		3				

● For AC 180 to 280V input

Specifications			Package			
V _{CB0} (V)	V _{CE0} (V)	I _c (A)	MT-25 (T0220)	FM20 (T0220F)	MT-100 (T03P)	FM100 (T03PF)
900 (1000)	550	3	2SC5239	2SC4517 (A)		
		5		2SC4518 (A)	2SC5287	
		10			2SC3927	2SC4557
	600	14			2SC4706	
900	800	3	2SC4020	2SC4908		
					2SC3678	2SC4299
		5		2SC4304		2SC4445
					2SC3679	2SC4300
	7			2SC3680	2SC4301	

■ Transistors for Humidifier

Type No.	P _c (W)	V _{CB0} (V)	V _{CE0} (V)	I _c (A)	h _{FE} (min)	f _r (MHz)	Package
2SC4153	30	200	120	7 (14)	70	30	FM20 (T0220F)
2SC3834	50						MT-25 (T0220)
2SC3835	70						MT-100 (T03P)

Note: I_c in parentheses is pulse current.

■ Transistors for Display Horizontal Deflection Output

Type No.	V _{CB0} (V)	V _{CE0} (V)	I _c (A)	P _c (W)	Package	Remarks
2SC5002	1500	800	7 (14)	80	FM100 (T03PF)	
2SC5003						Built-in damper diode.
2SC5124						
			10 (20)	100		

Note: I_c in parentheses is pulse current.

Darlington Transistors

Type No.	V _{CB0} (V)	V _{CE0} (V)	I _c (A)	P _c (W)	Complementary	Package	Remarks
2SB1257	-60	-60	-4 (-6)	25	2SD2014	FM20 (T0220F)	Surge voltage absorption
2SB1258	-100	-100	-6 (-10)	30	2SD1785		
2SB1259	-120	-120	-10 (-15)		2SD2081		
2SB1351	-60	-60	-12 (-20)	60		FM100 (T03PF)	
2SB1352							
2SB1382	-120	-120	-16 (-26)	75	2SD2082	MT-100 (T03P)	
2SB1420				80			
2SB1383			-25 (-40)	120	2SD2083		
2SD1796	60±10	60±10	4	25		FM20 (T0220F)	
2SD2014	120	80					
2SD2015	150	120					
2SD2016	200	200	3	30		FM20 (T0220F)	
2SD1785	120	120	6 (10)				2SB1258
2SD2081			10 (15)				2SB1259
2SD2017	300	250	6	35		FM20 (T0220F)	
2SD2141	380±50	380±50					
2SD1769	120	120	6 (10)	50		MT-25 (T0220)	
2SD2045						FM100 (T03PF)	
2SD2557	200	200	5	70		MT-100(T03P)	
2SD2558						FM-100 (T03PF)	
2SD2082	120	120	16 (26)	75	2SB1382	MT-100 (T03P)	
2SD2083			25 (40)	120	2SB1383		

Note: I_c in parentheses is pulse current.

Low V_{CE} (sat) - High h_{FE} Transistors

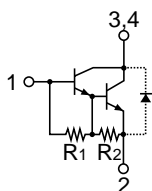
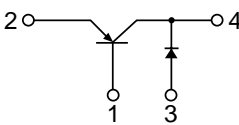
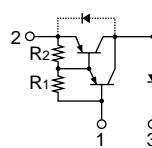
Type No.	V _{CE} (Sat) max (V)	h _{FE} min	V _{CE0} (V)	I _c (A)	P _c (W)	Complementary	Package	Remarks
2SA1567	-0.35	50	-50	-12	35	2SC4064	FM20 (T0220F)	Built-in diode at C-E
2SA1568			-60	±12		2SC4065		
2SA1746	-0.50		-50	-12 (-20)	60		FM100 (T03PF)	
2SC3852	0.50	500	60	3	25		FM20 (T0220F)	High h _{FE}
2SC3852A			80					High h _{FE}
2SC4495			50					High h _{FE}
2SC5370	0.30	70	40	12	30		FM20 (T0220F)	High h _{FE}
2SC4024	0.50	300	50	10	35			
2SC4064	0.35	50	60	12		2SA1567		
2SC4065				±12	2SA1568	Built-in diode at C-E		
2SC4131	0.50	60	50	10 (25)	60		FM100 (T03PF)	

Note: I_c in parentheses is pulse current.

General Purpose Transistors

Type No.	V _{CB0} (V)	V _{CE0} (V)	I _c (A)	P _c (W)	Complementary	Package
2SA1667	-150	-150	-2	25	2SC4381	FM20 (T0220F)
2SA1668	-200	-200			2SC4382	
2SA1488	-60	-60	2SC3851			
2SA1488A	-80	-80			2SC3851A	
2SA1262	-60	-60	-4	30	2SC3179	MT-25 (T0220)
2SC4381	150	150	2	25	2SA1667	FM20 (T0220F)
2SC4382	200	200			2SA1668	
2SC3851	80	60	4		2SA1488	
2SC3851A	100	80			2SA1488A	
2SC3179	80	60	-	30	2SA1262	MT-25 (T0220)
2SC5333	300	300	2	35	-	FM20 (T0220F)
2SC2023				40	-	MT-25 (T0220)

Surface Mount Transistors (SA Series)

Type No.	Equivalent Circuit	Breakdown voltage (V)	Current (A)	h _{FE} and others	V _{CE} (sat) and others (V)	Functions/Applications	Fig. No.
SAC02	 <p>R₁: 4kΩ typ R₂: 200Ω typ</p>	100	1.2 (2.0A pulse)	2000 ~ 12000	1.3max	NPN darlington transistor o Pulse motors o Solenoids o Relays	6
SAH02		Tr: -30 Di: 30	-2.0 (-3.0A pulse) 1.5	1000min trr 15ns typ	-0.3max V _F 0.55max	PNP transistor with built-in schottky barrier diode o Power component for chopper regulator o 5V output component for portable equipment - Video cameras - Word processor - CD radio cassettes - Personal computers	
SAH03	 <p>R₁: 4kΩ typ R₂: 100Ω typ</p>	-60	-1.2	2000 ~ 12000	-1.4max	PNP darlington transistor with built-in fast-recovery diode o Power switching in constant voltage stepper motors - Printers - Plain paper copiers	

Pulse Ratings: t ≤ 1ms, duty ≤ 10%

2-2. Transistor Arrays

■ Sink Drive

● With Built-in avalanche diode at Collector-base

Type No.	Ratings			Equivalent Circuit	Package
	V _{CEO} (V)	I _C (A)	h _{FE} (min)		
STA481A	60 ±10	1	2000	①	STA10Pin
STA471A		2			
STA401A		4	1000		
STA406A		6	2000		
STA435A	65 ±15	4	1000	②	STA8Pin
STA301A	60 ±10	4		③	
STA485A	100 ±15	1	2000	①	STA10Pin
STA475A		2			
STA407A		4			
STA413A	35 ±5	3	500	④	SLA12Pin
STA460C	60 ±10	6	700	⑤	
SLA4010		4	2000	⑥	

● With built-in flywheel diode

Type No.	Ratings			Equivalent Circuit	Package
	V _{CEO} (V)	I _C (A)	h _{FE} (min)		
SMA4033	100	2	2000	⑦	SMA12Pin
SMA4032		3			
SLA4031	120	4			
SLA4061		5	SLA12Pin		
SLA4041		3			1000

● General purpose

Type No.	Ratings			Equivalent Circuit	Package
	V _{CEO} (V)	I _C (A)	h _{FE} (min)		
STA312A	60	3	300	⑧	STA8Pin
STA303A	100	4	1000	⑨	
STA412A	60	3	300	⑩	STA10Pin
STA473A	100	2	2000	⑪	
STA403A		4			
STA404A	200	3	1000	⑫	SMA12Pin
SMA4030	100				4
SLA4060	120	5			

■ Source Drive

● With built-in flywheel diode

Type No.	Ratings			Equivalent Circuit	Package
	V _{CEO} (V)	I _C (A)	h _{FE} (min)		
SMA4021	-60	-3	2000	⑬	SMA12Pin
SLA4071	-100	-5			SLA12Pin

● General purpose

Type No.	Ratings			Equivalent Circuit	Package
	V _{CEO} (V)	I _C (A)	h _{FE} (min)		
STA302A	-60	-4	1000	⑭	STA8Pin
STA322A	-50		100	⑮	
STA421A	-60		40	⑯	STA10Pin
STA472A		-2	2000	⑰	
STA402A		-4	1000	⑱	
STA408A	-100	-4	2000	⑲	STA10Pin
SMA4020	-60			⑳	SMA12Pin
SLA4070	-100	-5			SLA12Pin

■ H-Bridge

Type No.	Ratings			Equivalent Circuit	Package
	V _{CEO} (V)	I _C (A)	h _{FE} (min)		
STA431A	±60	±3	40	㉑	STA10Pin
STA458C	±30	±5			
STA434A	±60	±4	1000	㉒	
STA457C			2000	㉓	
SLA4310			80	㉔	
SLA4313	±35	±5	50	㉕	SLA12Pin
SLA4340	±60	±4	2000	㉖	
SLA4390	±100	±5			
SLA4391			50	㉘	
SLA8001	±60	±12	50	㉙	

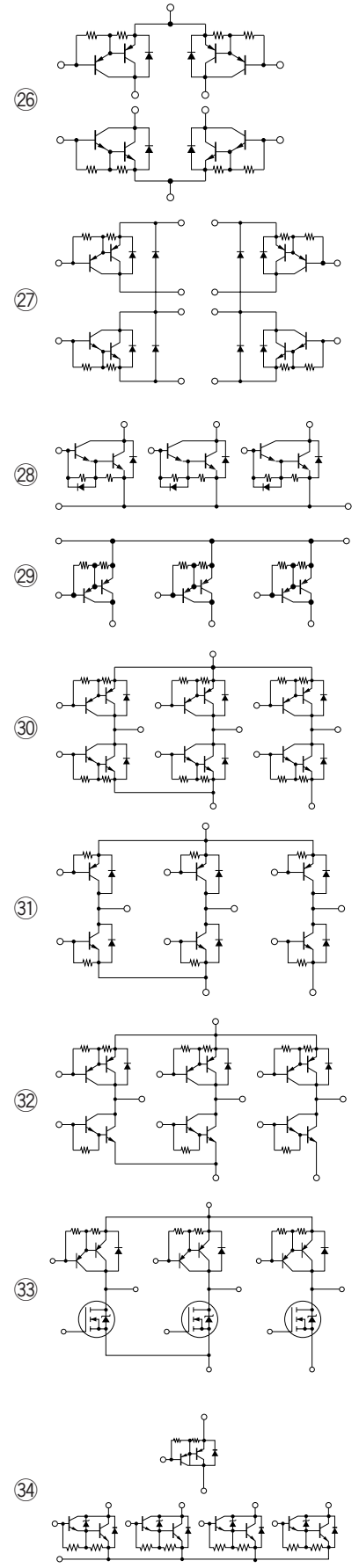
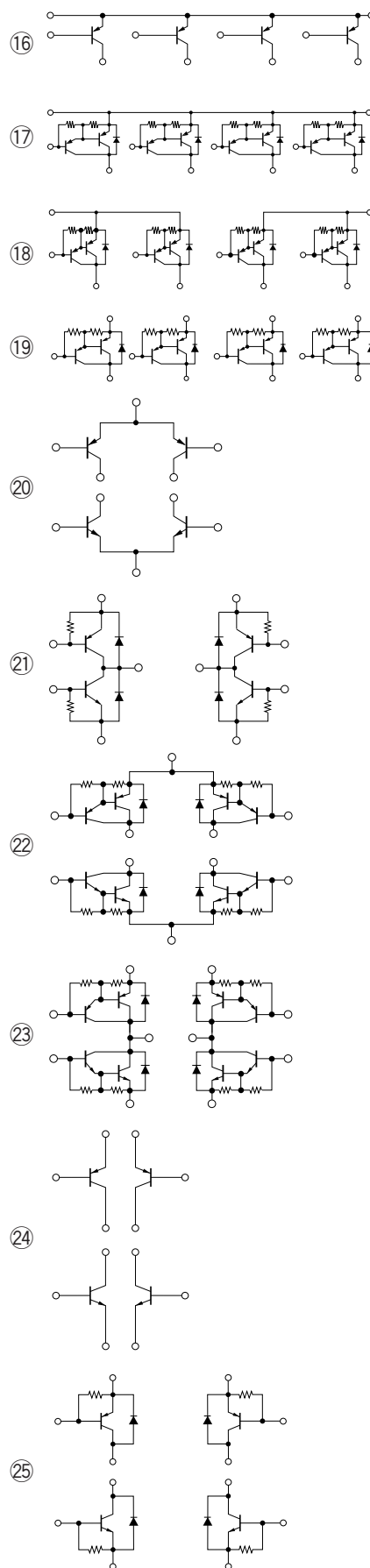
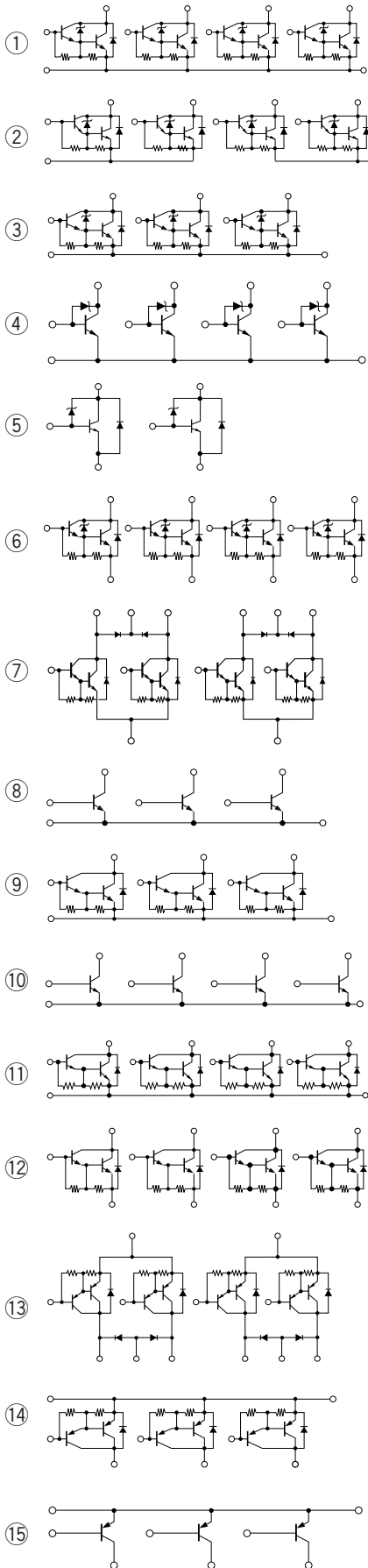
■ 3-Phase Motor Driver

Type No.	Ratings			Equivalent Circuit	Package
	V _{CEO} (V)	I _C (A)	h _{FE} (min)		
STA302A	-60	-4	1000	⑭	STA8Pin
STA303A	100	4		⑨	
STA304A	550	1	200	㉘	
STA305A	-550	-1		㉙	SMA12Pin
SMA6010	±60	±4	2000	⑳	
SMA6014		±2	1500/2000	㉚	
SLA6020	±100	±5	2000	㉛	SLA12Pin
SLA6030	±35	±4	70	㉜	
SLA6012	±60			2000	
SLA6022	±80	±5			
SLA6023	±60	±6	MOS/2000	㉞	
SLA5022					

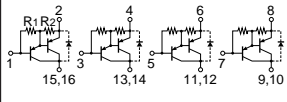
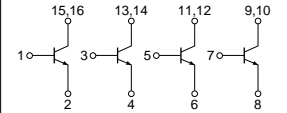
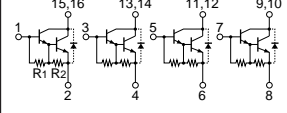
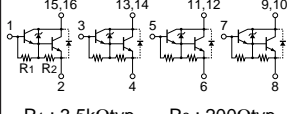
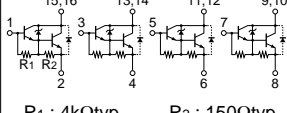
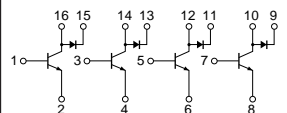
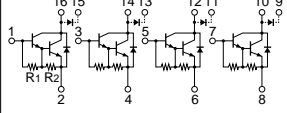
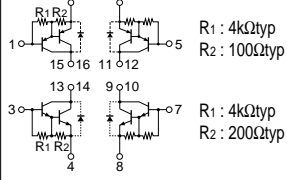
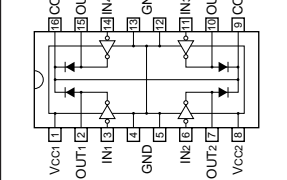
■ Stepper Motor Dual Power Supply Driver

Type No.	Ratings			Equivalent Circuit	Package
	V _{CEO} (V)	I _C (A)	h _{FE} (min)		
SMA6511	60 ±10	1.5	2000	㉟	SMA12Pin
SMA6512	100 ±15				

● Equivalent Circuit



Surface Mount Transistor Arrays (SD Series)

Type No.	Equivalent Circuit	Breakdown Voltage (V)	Current (A)	hFE and other	V _{CE(sat)} and other (V)	Functions/Applications	Fig. No.
SDA01	 <p>R₁ : 4kΩtyp R₂ : 100Ωtyp</p>	-60	-1.5 (-2.5A pulse)	2000 to 12000	-1.4 max	PNP darlington transistor array (Surface mount type of STA472A) o Pulse motors o Relays o Solenoids	11
SDC01		50	2.0 (3.0A pulse)	500 to 2000	0.4 max	NPN high hFE transistor array (Surface mount type of STA412A) o Solenoids o Relays o Lamps o Switches	
SDC02	 <p>R₁ : 4kΩtyp R₂ : 200Ωtyp</p>	100	1.5 (2.5A pulse)	2000 to 12000	1.3 max	NPN darlington transistor array (Surface mount type of STA473A) o Pulse motors o Solenoids o Relays	
SDC03	 <p>R₁ : 3.5kΩtyp R₂ : 200Ωtyp</p>	60 ±10	1.5 (2.5A pulse)	2000 to 12000	1.4 max	NPN darlington transistor array with built-in surge absorption feature (Surface mount type of STA471A) o Pulse motors o Solenoids o Relays	
SDC04	 <p>R₁ : 4kΩtyp R₂ : 150Ωtyp</p>	100 ±15	1.5 (2.5A pulse)	2000 to 12000	1.3 max	NPN darlington transistor array with built-in surge absorption feature (Surface mount type of STA475A) o Pulse motors o Solenoids o Relays	
SDH01		Tr: 50 Di: 120	2.0 (3.0A pulse) 1.5	500 to 2000 trr 100ns typ	0.4 max V _F 1.6 max	NPN high hFE transistor array o Pulse motors o Solenoids o Relays o Lamps o Switches	
SDH02	 <p>R₁ : 2.5kΩtyp R₂ : 200Ωtyp</p>	Tr: 100 Di: 120	-1.5 (-2.5A pulse) 1.5	2000 to 12000 trr 100ns typ	1.3 max V _F 1.6 max	NPN darlington transistor array o Pulse motors o Solenoids o Relays	
SDH03	 <p>R₁ : 4kΩtyp R₂ : 100Ωtyp R₁ : 4kΩtyp R₂ : 200Ωtyp</p>	PNP: -60 NPN: 100	-1.5 (-2.5A pulse) 1.5 (2.5A pulse)	2000 to 12000 2000 to 12000	-1.4 max 1.3 max	H-bridge transistor array (Surface mount type of STA434A) o DC motors o Pulse motors	
SDI01		80	1.2	Active Low V _{IL} < 1.4V	1.6 max	Four circuit array with buffers (Surface mount type of SIB1044D) o Pulse motors o Solenoids o Relays	

Pulse Ratings: t ≤ 1ms, duty ≤ 10%

3

Power MOSFETs

3-1. MOSFETs

3-2. MOSFET Arrays

3-1. MOSFETs

Nch

Parameter Type No.	Absolute Maximum Ratings				Electrical Characteristics (Ta = 25°C)		Package	Remarks		
	V _{DSS}	I _D	P _D (T _C = 25°C)	E _{AS}	R _{DS(ON)} max (V _{GS} = 10V)	C _{ISS} (typ)				
	(V)	(A)	(W)	(mJ)	(Ω)	(pF)				
2SK1188	60	10.0	25	2.1	0.200	300	FM20			
2SK1189		15.0	30	6.2	0.100	640				
* 2SK2419		22.0	35	17.0	0.037	1300				
2SK1190					0.050					
2SK2420		30.0	40	38.0	0.028	2200				
2SK1191					2500					
2SK2421		40.0	90	38.0	0.020	2400				
2SK1192					0.028	2500				
2SK1712		15.0	30	6.2	0.100	820			FM100	
2SK1185		100	5.0	25	16.0	0.540			180	FM20
2SK1186	9.0		30	32.0	0.270	350				
2SK1187	12.0		35	58.0	0.160	650				
2SK2778			30	70.0	0.175	740				
2SK2779	20.0		35	200.0	0.080	1630				
2SK1183	200		3.0	25	36.0	1.500	140	FM20		
2SK1184			5.0	30	67.0	0.800	260			
2SK2803	450		3.0	35	30.0	2.800	340	FM100		
2SK2804			5.0		90.0	1.500	580			
2SK2701			7.0	130.0	1.100	720				
2SK2702		10.0	75	300.0	0.800	1000				
2SK2703			40	400.0	0.570	1300				
2SK2704		13.0	75							
2SK2705										
2SK2805		15.0	80	550.0	0.380	2100	FM100			
2SK2706		18.0	85	700.0	0.300	2500				
2SK1177		500	2.5	30	200.0	3.000	350			FM20
2SK1178	4.0		35	260.0	1.500	610				
2SK1179	8.5		85	400.0	0.850	1300				
2SK1180	10.0			500.0	0.600	1800				
2SK1181	13.0			660.0	0.400	2700				
2SK2848	600		2.0	30	10.0	3.800	290	FM20		
2SK2707		4.5	35	50.0	1.850	560				
2SK2708		7.0	40	150.0	1.100	950				
2SK2709		8.5	85	300.0	0.850	1200				
2SK2710		12.0		400.0	0.550	1900				
2SK2207		3.0		35	280.0	5.000	630			
2SK2208	900	5.0	75	400.0	3.000	1000	FM100			

Pch

Parameter Type No.	Absolute Maximum Ratings				Electrical Characteristics (Ta = 25°C)		Package	Remarks
	V _{DSS}	I _D	P _D (T _C = 25°C)	E _{AS}	R _{DS(ON)} max (V _{GS} = 10V)	C _{ISS} (typ)		
	(V)	(A)	(W)	(mJ)	(Ω)	(pF)		
* 2SJ424	-60	-5.0	25	-	0.50	270	FM20	
2SJ425		-8.0	30	-	0.28	580		

* Under development

3-2. MOSFET Arrays

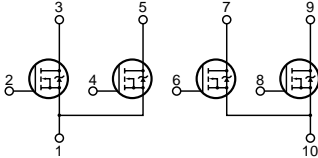
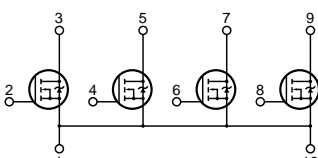
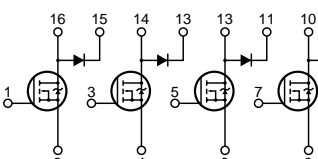
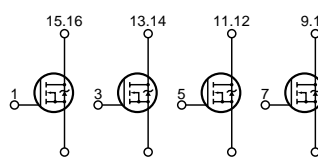
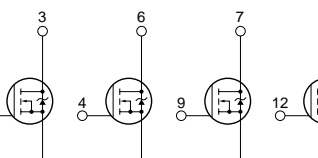
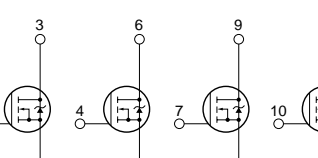
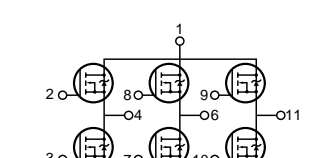
Parameter Type No.		Absolute Maximum Ratings				Electrical Characteristics (Ta = 25°C)		Equivalent circuit No.	Package	
		V _{DSS}	I _D	P _D (T _C = 25°C)	E _{AS}	R _{DS(ON)} max (V _{GS} = 10V)	C _{ISS} (typ)			
		(V)	(A)	(W)	(mJ)	(Ω)	(pF)			
SLA5001	N-Channel	100	5	35	30	0.300	350	A	SLA	
SLA5002		200			60	0.900	260	B		
SLA5003					P-Channel	-60	0.300	570		A
SLA5004	-100	-	0.700	300		B				
SLA5005		-				2	0.220	270		D
SLA5006	-	4	-	0.550	180		D			
SLA5007	N-Channel		60	3		35	2	0.220		300
SLA5008	P-Channel	-60	16		0.600		180			
SLA5009	N-Channel	100	4	35	-	1.300	270	E		
SLA5010	P-Channel	-100			2	0.220				300
SLA5011	N-Channel	60	5	35	16	0.600	180	E		
SLA5012	P-Channel	-60			2	0.220	300			
SLA5013	N-Channel	100	5	35	-	0.300	570	C		
SLA5015	P-Channel	-100			30	0.300	350			
SLA5017	N-Channel	60	4	35	-	0.700	300	D		
SLA5018	P-Channel	-60			2	0.220	270			
SLA5021	N-Channel	60	4	35	-	0.550	270	C		
SLA5024	P-Channel	-60			2	0.300	400			
SLA5029	N-Channel	100	5	35	-	0.550	270	E		
SLA5031	P-Channel	-100			2	0.300	270			
SLA5037	N-Channel	60	10	40	1	0.450	120	C		
SLA5038	P-Channel	-60			2	0.300	400			
SLA5040	N-Channel	100	4	35	-	0.550	270	C		
SLA5041	P-Channel	-100			16	0.600	180			
SLA5042	N-Channel	200	10	40	2	0.300	400	B		
SLA5044	P-Channel	-200			120	0.175	850			
SLA5047	N-Channel	100	5	35	70	0.185	740	C		
SMA5101	P-Channel	-100			120	0.250	850			
SMA5102	N-Channel	150	10	40	280	0.085	2000	K		
SMA5103	P-Channel	-150			2	0.300	400			
SMA5104	N-Channel	60	5	28	16	0.600	180	A	SMA	
SMA5105	P-Channel	-60			2	0.220	300			
SMA5106	N-Channel	60	5	28	-	0.550	270	D		
SMA5112	P-Channel	-60			2	0.220	300			
STA501A	N-Channel	100	4	20	32	0.410	470	B		
*STA504A	P-Channel	-100			16	0.780	230			
*STA505A	N-Channel	250	7	40	55	0.520	450	L		
STA506A	P-Channel	-250			2	0.220	300			
SDK02	N-Channel	60	5	20	-	0.200	400	F		STA
SDK04	P-Channel	-60			2	0.300	120			
SDK02	N-Channel	100	3	20	-	0.450	240	F		
SDK04	P-Channel	-100			2	0.500	240			
SDK02	N-Channel	60	2	* 3	-	0.800	150	H	SDK	
SDK04	P-Channel	-60			2	0.240	400			
SDK04	N-Channel	100	2	* 3	-	0.800	160	I		
SDK04	P-Channel	-100			2	0.800	160			

* Under development

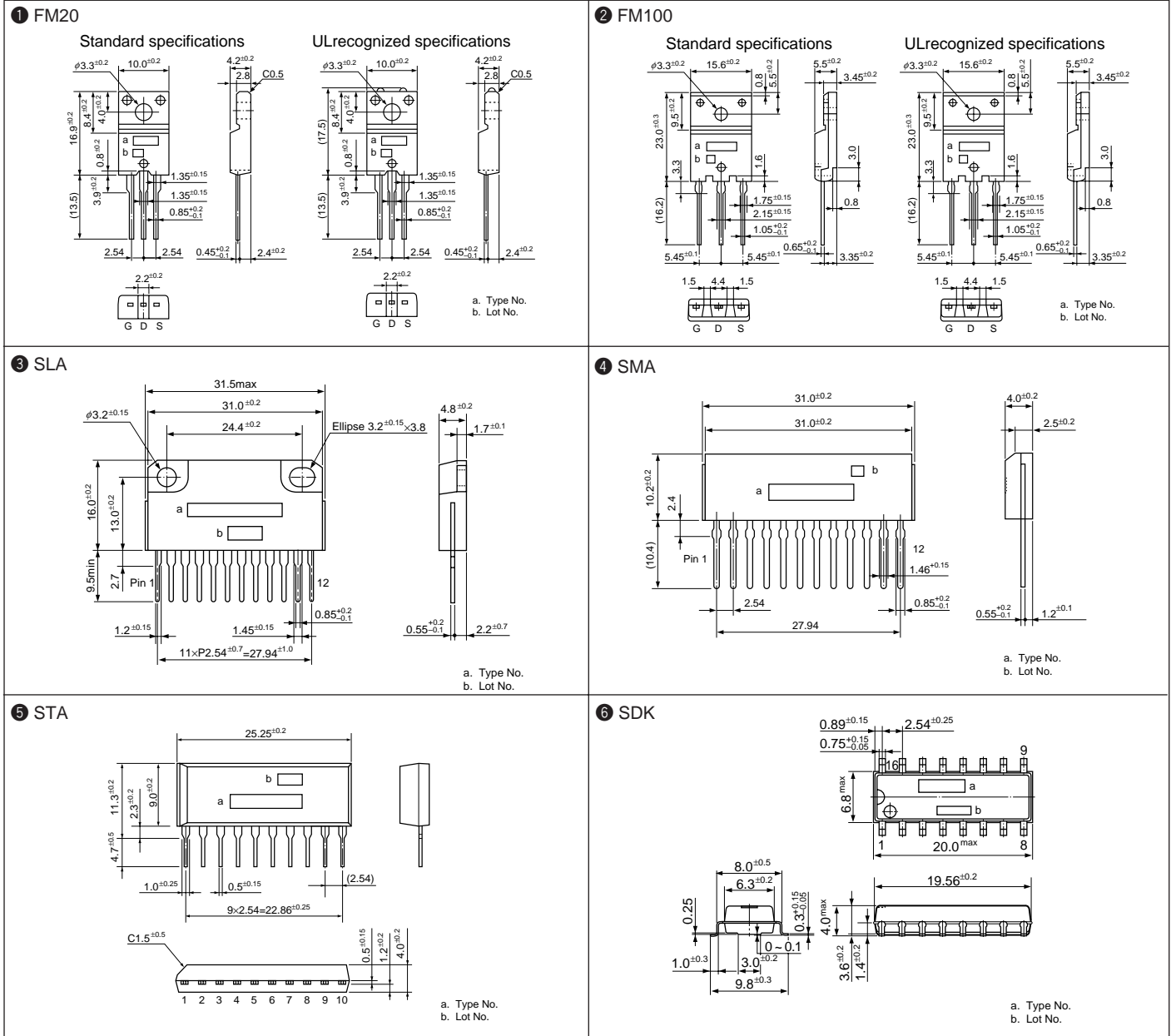
* Ta = 25°C

MOSFET Array Equivalent circuit and Selection Chart

Equivalent circuit		V _{DSS} (V)	60	100	150	200	250	Application
A	Nch			SLA5001 (5A) SMA5101 (4A)				Stepper motor and solenoid driving
	Pch		SLA5024 (4A) SLA5004 (5A)	SLA5005 (5A)				
B	Nch		SLA5031 (5A)	SLA5040 (4A) SMA5102 (4A) SMA5106 (4A) SLA5002 (5A) SMA5105 (5A)		SLA5003 (5A)		Stepper motor and solenoid driving
	Pch			SLA5006 (5A)				
C	Nch		SLA5029 (4A) SLA5011 (5A)	*SLA5021 (5A) *SLA5042 (5A)	*SLA5038 (7A)			5-phase motor driving * "S" Shape Correction Circuit Switch for CRT Display
	Pch		SLA5015 (4A) SLA5012 (5A)					
D	<p>Pch</p> <p>Nch</p>	SLA5007 SLA5018 SMA5103 (Nch5A) (Pch4A)	SLA5008 (Nch4A) (Pch3A) SLA5013 (Nch5A) (Pch5A)				Stepper motor and DC motor driving	
E	<p>Pch</p> <p>Nch</p>	SLA5009 SLA5017 SMA5104 (Nch5A) (Pch4A)	SLA5010 (Nch4A) (Pch3A)				DC motor driving	

Equivalent circuit		Vdss (V)	60	100	150	200	250	Application
F	Nch		STA501A (5A)	STA505A (3A) STA506A (2A)				Stepper motor and solenoid driving
G	Nch		STA504A (4A)					
H	Nch		SDK02 (2A)					
I	Nch			SDK04 (2A)				
J	Nch			SLA5037 (10A)		SLA5041 (10A)	SLA5044 (10A)	"S" Shape Correction Circuit Switch for CRT Display
K	Nch				SLA5047 (10A)			
L	Nch						SMA5112 (7A)	3-Phase high voltage DC motor driving

External Dimensions (unit: mm)



4

Thyristors

- 4-1. Thyristors
- 4-2. Triacs
- 4-3. PNP Switch

4-1. Thyristors

Thyristors

Parameter	Absolute Maximum Ratings					Electric Characteristics				Fig. No.
	Repetitive Peak Off-state voltage	Non-repetitive Peak Off-state voltage	Mean On-state Current	Surge On-state Current	Junction Temperature	On-state Voltage	Gate Trigger Voltage	Gate Trigger Current	Thermal Resistance	
	T _J = -40 to T _{Jmax} R _{GK} = 1kΩ		50Hz Half-cycle Sinewave Continuous Current	Non-repetitive 50Hz Half-cycle Sinewave Single Shot T _J = T _{Jmax}		T _C = 25°C	V _D = 6V R _L = 10Ω T _C = 25°C		Junction to Case	
	Type No.	V _{DRM} (V)	V _{DSM} (V)	I _{T(AV)} (A)	I _{TSM} (A)	T _J (°C)	V _{TM} (V) max	V _{GT} (V) max	I _{GT} (mA)	
TF321S	200	300	3.0 (T _C = 93°C)	60	-40 to +125	1.4 (I _{TM} = 5A)	0.7 typ 1.5 max	3.0 typ 15 max	5.0	1
TF341S	400	500								
TF361S	600	700								
TF521S	200	300	5.0 (T _C = 87°C)	80	-40 to +125	1.4 (I _{TM} = 10A)	1.5	3.0 typ 15 max	4.0	
* TF541S	400	500								
* TF561S	600	700								
TF821S	200	300	8.0 (T _C = 74°C)	120	-40 to +125	1.4 (I _{TM} = 15A)	1.5	5.0 typ 15 max	3.6	
* TF841S	400	500								
* TF861S	600	700								
TF541S-A	400	500 (R _{GK} = 470Ω)	5.0 (T _C = 88°C)	80	-40 to +125	1.4 (I _{TM} = 10A)	1.5	0.03 typ 0.2 max	4.0	
TF561S-A	600	700 (R _{GK} = 470Ω)								
TF321M	200	300	3.0 (T _C = 102°C)	60	-40 to +125	1.4 (I _{TM} = 5A)	1.5	2.0 typ 10 max	3.0	2
TF341M	400	500								
TF361M	600	700								
TF521M	200	300	5.0 (T _C = 96°C)	80	-40 to +125	1.4 (I _{TM} = 10A)	1.5	3.0 typ 15 max	3.0	
TF541M	400	500								
TF561M	600	700								
TF821M	200	300	8.0 (T _C = 83°C)	120	-40 to +125	1.4 (I _{TM} = 15A)	1.5	5.0 typ 15 max	2.7	
TF841M	400	500								
TF861M	600	700								
TF321M-A	200	300	3.0 (T _C = 102°C)	60	-40 to +110	1.4 (I _{TM} = 5A)	1.0	0.1 max	3.0	
TF341M-A	400	500								
TF361M-A	600	700								

* The devices are available in UL recognized and standard specifications. The markings and shapes of UL recognized device are slightly different from standard devices.

Thyristors (with built-in Avalanche Diode)

Parameter	Absolute Maximum Ratings					Electrical Characteristics							Fig. No.		
	Repetitive Peak Off-state Voltage	Mean On-state Current	Surge On-state Current	Junction Temperature	Breakover Voltage			Breakover Current		On-state Voltage	Gate Trigger Voltage	Gate Trigger Current		Thermal Resistance	
	T _J = -10 to +125°C R _{EK} = 1kΩ	Half-cycle Sinewave (180°C) Continuous Current (T _C = 92°C)	Non-Repetitive Half-cycle Sinewave Single Shot 50Hz T _J = 125°C		V _{BO} (V)			I _{BO} (mA)		I _{TM} = 5A T _J = 25°C	V _D = 6V R _L = 10Ω T _J = 25°C			Junction to Case	
	Type No.	V _{DRM} (V)	I _{T(AV)} (A)	I _{TSM} (A)	T _J (°C)	min	typ	max	min	max	V _{TM} (V) max	V _{GT} (V) max		I _{GT} (mA)	
TFD312S-C	20	3.0	60	-10 to +125	27.0	30.0	33.0	0.2	15	1.4	1.0	0.2	10	5.0	1
TFD312S-F	35				50.0	55.0	60.0								
TFD312S-G	45				60.0	65.0	70.0								
TFD312S-J	80				90.0	100.0	110.0								
TFD312S-K	100				115.0	125.0	135.0								
TFD312S-L	120				140.0	150.0	160.0								
TFD312S-M	145				163.0	175.0	187.0								
TFD312S-N	170				185.0	200.0	215.0								
TFD312S-O	190				210.0	225.0	240.0								

4-2. Triacs

Triacs

Parameter Type No.	Absolute Maximum Ratings				Electrical Characteristics									Fig. No.	
	Repetitive Peak Off-state Volage V_{DRM} (V)	RMS On-state Current Conduction angle = 360° $I_{T(RMS)}$ (A)	Surge On-state Current 50Hz Full-cycle Sinewave Non-repetitive Peak Value $T_J = 125^\circ\text{C}$ I_{TSM} (A)	Junction Temperature T_J (°C)	On-state Voltage Test by Pulse $T_J = 25^\circ\text{C}$ V_{TM} (V)	Gate Trigger Voltage $V_D = 6V, R_L = 10\Omega, T_C = 25^\circ\text{C}$ V_{GT} (V)				Gate Trigger Current $V_D = 6V, R_L = 10\Omega, T_C = 25^\circ\text{C}$ I_{GT} (mA)					Thermal Resistance Junction to Case $R_{th(j-c)}$ (°C/W)
						T_2^+, G^+	T_2^+, G^-	T_2^-, G^+	T_2^-, G^-	T_2^+, G^+	T_2^+, G^-	T_2^-, G^+	T_2^-, G^-		max
						max		typ		max		typ			
*TM341S-L	400	3.0	30	-40 to +125	1.6 ($I_{TM} = 5A$)	2.0	2.0	0.8	2.0	20	20	15	20	5.0	1
*TM361S-L	600	($T_C = 109^\circ\text{C}$)													
*TM541S-L	400	5.0	50	-40 to +125	1.6 ($I_{TM} = 7A$)	2.0	2.0	0.8	2.0	20	20	15	20	4.0	
*TM561S-L	600	($T_C = 104^\circ\text{C}$)													
*TM841S-L	400	8.0	80	-40 to +125	1.6 ($I_{TM} = 10A$)	2.0	2.0	0.9	2.0	30	30	30	30	3.6	
*TM861S-L	600	($T_C = 90^\circ\text{C}$)													
*TM1041S-L	400	10	100	-40 to +125	1.6 ($I_{TM} = 14A$)	2.0	2.0	0.9	2.0	30	30	30	30	3.3	
*TM1061S-L	600	($T_C = 90^\circ\text{C}$)													
*TM1241S-L	400	12	120	-40 to +125	1.6 ($I_{TM} = 16A$)	2.0	2.0	1.0	2.0	30	30	70	30	3.0	
*TM1261S-L	600	($T_C = 85^\circ\text{C}$)													
*TM1641S-L	400	16	150	-40 to +125	1.6 ($I_{TM} = 20A$)	2.0	2.0	1.0	2.0	30	30	70	30	3.0	
*TM1661S-L	600	($T_C = 74^\circ\text{C}$)													
TM341M-L	400	3.0	30	-40 to +125	1.6 ($I_{TM} = 5A$)	2.0	2.0	0.8	2.0	20	20	15	20	3.0	2
TM361M-L	600	($T_C = 115^\circ\text{C}$)													
TM541M-L	400	5.0	50	-40 to +125	1.6 ($I_{TM} = 7A$)	2.0	2.0	0.8	2.0	20	20	15	20	2.7	
TM561M-L	600	($T_C = 111^\circ\text{C}$)													
TM841M-L	400	8.0	80	-40 to +125	1.6 ($I_{TM} = 10A$)	2.0	2.0	0.9	2.0	30	30	30	30	1.8	
TM861M-L	600	($T_C = 108^\circ\text{C}$)													
STA203A (Triac array)	400	1.2 ($T_C = 97^\circ\text{C}$)	10	-40 to +125	1.6 ($I_{TM} = 1.6A$)	3.5	1.2	2.0	1.2	3	3.0	13	3.0	20	4
TM341S-R	400	3.0	30	-40 to +125	1.6 ($I_{TM} = 5A$)	1.8	1.2	3.0	1.2	12	12	70	12	5.0	1
TM361S-R	600	($T_C = 109^\circ\text{C}$)				$(V_D = 20V, R_L = 40\Omega, T_C = 25^\circ\text{C})$									
TM541S-R	400	5.0	50	-40 to +125	1.6 ($I_{TM} = 7A$)	1.8	1.2	3.1	1.2	12	12	70	12	4.0	
TM561S-R	600	($T_C = 104^\circ\text{C}$)				$(V_D = 20V, R_L = 40\Omega, T_C = 25^\circ\text{C})$									
TM1041S-R	400	10.0	80	-40 to +125	1.6 ($I_{TM} = 14A$)	2.0	1.2	2.4	1.2	7.0	7.0	25	7.0	3.3	
TM1061S-R	600	($T_C = 90^\circ\text{C}$)				$(V_D = 20V, R_L = 40\Omega, T_C = 25^\circ\text{C})$									
TM1241S-R	400	12.0	110	-40 to +125	1.6 ($I_{TM} = 16A$)	1.8	1.2	2.1	1.2	8	8	25	8	3.0	
TM1261S-R	600	($T_C = 84^\circ\text{C}$)				$(V_D = 20V, R_L = 40\Omega, T_C = 25^\circ\text{C})$									
TM1641P-L (L)	400	16	160	-40 to +125	1.6 ($I_{TM} = 20A$)	1.5	1.5	1.0	1.5	30	30	70	30	1.2	3
TM1661P-L (L)	600	($T_C = 103^\circ\text{C}$)													

* The devices are available in UL recognized and standard specifications. The markings and shapes of UL recognized device are slightly different from standard devices.

4-3. PNP Switch

PNPN Switch

Parameter Type No.	Absolute Maximum Ratings				Electrical Characteristics				Fig. No.
	Repetitive Peak Off-state Volage V_{DRM} (V)	RMS On-state Current DC $T \leq 112^\circ\text{C}$ $I_{T(RMS)}$ (A)	Surge On-state Current $T_a = 25^\circ\text{C}, W_p = 10\mu\text{s}$ Full-cycle Sinewave 1 Cycle Peak Value $f = 50\text{Hz}$ I_{TSM} (A)	On-state Current Ascent Rate di/dt (A/ μsec)	Junction Temperature T_J (°C)	Breakover Voltage V_{BO} (V)	Breakover Current I_{BO} (μA)	On-state Voltage $I_T = \pm 10A$ V_T (V)	
ET020	170	0.6	80	30	-40 to +125	190 to 210	100 max	± 2.5	5

External Dimensions (unit: mm)

Fig. 1 Full-Mold type (FM20)

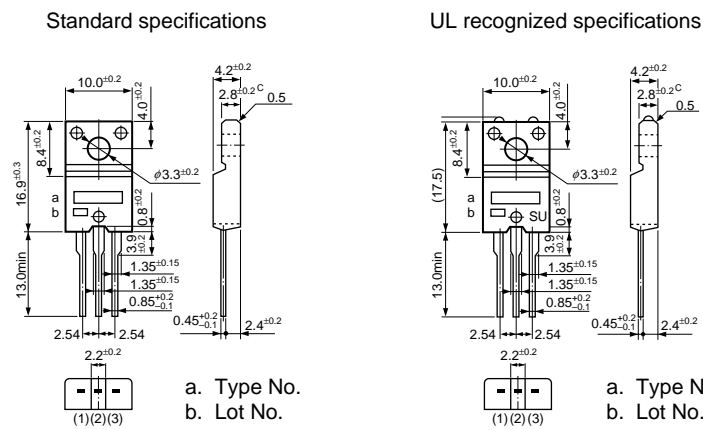
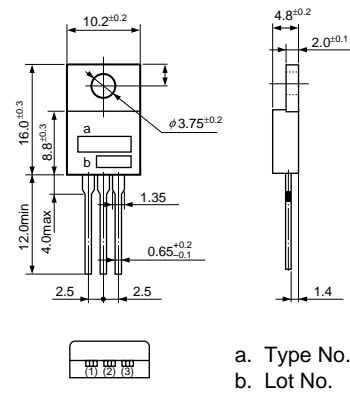


Fig. 2 MT-25 (TO-220)



Terminal No.	Thyristor	Triac
(1)	Cathode (K)	Terminal 1 (T ₁)
(2)	Anode (A)	Terminal 2 (T ₂)
(3)	Gate (G)	Gate (G)

Fig. 3 MT-100 (TO-3P)

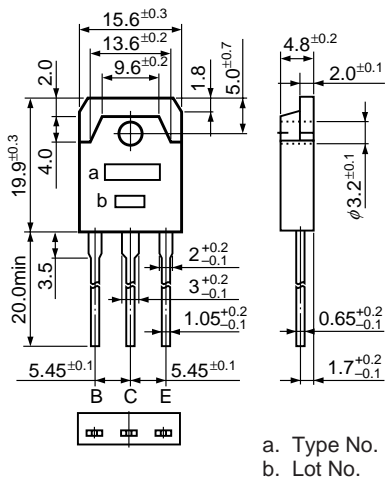


Fig. 4

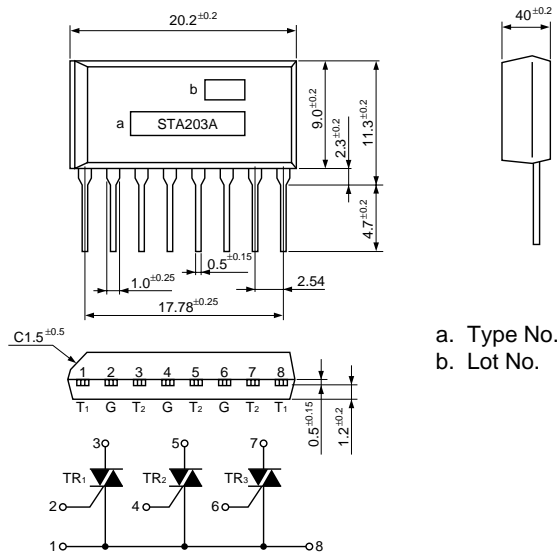
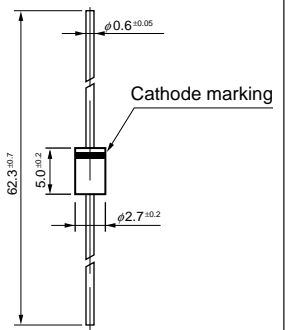


Fig. 5



5

Diodes

- 5-1. Rectifier Diodes
- 5-2. Fast Recovery Rectifier Diodes
- 5-3. Ultra-Fast Recovery Rectifier Diodes
- 5-4. Damper Diodes
- 5-5. Schottky Barrier Diodes
- 5-6. Avalanche Diodes
- 5-7. Power Zener Diodes
- 5-8. Silicon Varistors
- 5-9. High Voltage Rectifier Diodes
- 5-10. High Voltage Rectifier Diodes For Microwave Oven
- 5-11. GaAs Schottky Barrier Diodes (GSC series)

5-1. Rectifier Diodes

■ Surface Mount Type

(Ta = 25°C)

Type No.	Absolute Maximum Ratings				Electrical Characteristics			Fig. No.	
	VRM (V)	IF (AV) (A)	IFSM (A)	Tj	Tstg	VF			IR (μA)
						(V)	Condition		
SFPM-52	200	0.9	30	-40 to +150	1.00	1.0	10	1	
-54	400								
SFPM-62	200	1.0	45		0.98	1.0	10		
-64	400								

(Ta = 25°C)

Type No.	Absolute Maximum Ratings				Electrical Characteristics			Fig. No.	
	VRM (V)	IF (AV) (A)	IFSM (A)	Tj	Tstg	VF			IR (μA)
						(V)	Condition		
RM 4Y	100	3.0	200	-40 to +150	0.95	3.0	10	8	
4Z	200								
4	400								
4A	600								
4B	800								
4C	1000								
4AM	600	3.2	350	0.92	3.5				

■ Axial Type

(Ta = 25°C)

Type No.	Absolute Maximum Ratings				Electrical Characteristics			Fig. No.	
	VRM (V)	IF (AV) (A)	IFSM (A)	Tj	Tstg	VF			IR (μA)
						(V)	Condition		
AM01Z	200	1.0	35	-40 to +150	0.98	1.0	10	2	
01	400								
01A	600								
EM01Z	200	1.0	45	-40 to +150	0.97	1.0	10	3	
01	400								
01A	600								
EM 1Y	100	1.0	45	-40 to +150	0.97	1.0	10	4	
1Z	200								
1	400								
1A	600								
1B	800								
1C	1000								
EM 2	400	1.2	80	-40 to +150	0.92	1.2	10	5	
2A	600								
2B	800								
RM 1Z	200	1.0	50	-40 to +150	0.95	1.0	5		
1	400								
1A	600								
1B	800								
1C	1000								
RM 11A	600	1.2	100	-40 to +150	0.92	1.5	10	5	
11B	800								
11C	1000								
RM 10Z	200	1.5	120	-40 to +150	0.91	1.5	10	6	
10	400								
10A	600								
10B	800								
RM 2Z	200	1.2	100	-40 to +150	0.91	1.5	10	6	
2	400								
2A	600								
2B	800								
2C	1000								
RO 2Z	200								1.2
2	400								
2A	600								
2B	800								
2C	1000								
RM 3	400	2.5	150	-40 to +150	0.95	2.5	10	7	
3A	600								
3B	800								
3C	1000								

■ Center Tap Type

(Ta = 25°C)

Type No.	Absolute Maximum Ratings				Electrical Characteristics			Fig. No.	
	VRM (V)	IF (AV) (A)	IFSM (A)	Tj	Tstg	VF			IR (μA)
						(V)	Condition		
FMM-22S,R	200	10.0	100	-40 to +150	1.1	5.0	10	9	
-24S,R	400								
-26S,R	600								
FMM-31S,R	100	20.0	120	-40 to +150	1.1	10.0	10	10	
-32S,R	200								
-34S,R	400								
-36S,R	600								

■ Bridge Type

(Ta = 25°C)

Type No.	Absolute Maximum Ratings				Electrical Characteristics			Fig. No.						
	VRM (V)	IF (AV) (A)	IFSM (A)	Tj	Tstg	VF			IR (μA)					
						(V)	Condition							
RBV-401	100	4.0	80	-40 to +150	1.05	2.0	10	11						
-402	200													
-404	400													
-406	600													
-408	800													
-40C	1000													
-406M	600													
-406H	600													
RBV-601	100				6.0				120	-40 to +150	1.00	3.0	10	12
-602	200													
-604	400													
-606	600													
-608	800													
-606H	600													
RBV-1306	600	13.0	80	-40 to +150	1.20	6.5	10	12						
-1506S	600													
-1506	600													
-2506	600													

5-2. Fast Recovery Rectifier Diodes

■ Axial Type

(Ta = 25°C)

Type No.	Absolute Maximum Ratings				Electrical Characteristics				Fig. No.	
	VRM (V)	IF (AV) (A)	IFSM (A)	Tj	Tstg	VF (V)	IR (μA)	trr1 (μs)		trr2 (μs)
				(°C)		max	max	max		max
RC 2	2000	0.20	20	-40 to +150	2.00	10	4.0	1.30	5	
EH 1Z	200									
1	400	0.60	30	-40 to +150	1.35	10	4.0	1.30	4	
1A	600									
RH 1Z	200									
1	400									
1A	600	0.60	35	-40 to +150	1.30	5	4.0	1.30	5	
1B	800									
1C	1000									
AS01Z	200									
01	400	0.60	20	-40 to +150	1.50	10	1.5	0.60	2	
01A	600									
ES01Z	200									
01	400	0.70	30	-40 to +150	2.50	10	1.5	0.60	3	
01A	600									
01F	1500	0.50	20		2.00					
ES 1Z	200									
1	400	0.70	30	-40 to +150	2.50	10	1.5	0.60	4	
1A	600									
1F	1500	0.50	20		2.00					
RS 1A	600									
1B	800	0.70	30	-40 to +150	2.50	10	1.5	0.60	5	
AU01Z	200									
01	400	0.50	15	-40 to +150	1.70	10	0.4	0.18		
01A	600								2	
AU02Z	200									
02	400	0.80	25	-40 to +150	1.30	10	0.4	0.18		
02A	600									
RU 1	400									
1A	600	0.25	15	-40 to +150	2.50	10	0.4	0.18	5	
1B	800									
1C	1000	0.20			3.00					
EU01Z	200									
01	400	0.25	15	-40 to +150	2.50	10	0.4	0.18	3	
01A	600									
EU 1Z	200									
1	400	0.25	15	-40 to +150	2.50	10	0.4	0.18	4	
1A	600									
RF 1Z	200									
1	400	0.60	15	-40 to +150	2.00	10	0.4	0.18		
1A	600									
1B	800									
RU 2Z	200								5	
2	600	1.00	20	-40 to +150	1.50	10	0.4	0.18		
2B	800									
2C	1000	0.80								
EU02Z	200									
02	400	1.00	15	-40 to +150	1.40	10	0.4	0.18	3	
02A	600									
EU 2Z	200									
2	400	1.00	15	-40 to +150	1.40	10	0.4	0.18	4	
2A	600									
2YX	100	1.20	25		0.90		0.2	0.08		

● trr1 = IF/IRP = 1:1, trr2 = IF/IRP = 1:2

(Ta = 25°C)

Type No.	Absolute Maximum Ratings				Electrical Characteristics				Fig. No.	
	VRM (V)	IF (AV) (A)	IFSM (A)	Tj	Tstg	VF (V)	IR (μA)	trr1 (μs)		trr2 (μs)
				(°C)		max	max	max		max
RU 2M	400									
2AM	600	1.10	20	-40 to +150	1.20	10	0.4	0.18	5	
2YX	100	1.50	30		0.95		0.2	0.08		
RU 20A	600	1.50	50		1.10		0.4	0.18		
RU 3	400									
3A	600	1.50	20	-40 to +150	1.50	10	0.4	0.18	6	
3B	800	1.10								
3C	1000	1.50			2.00					
3M	400									
3AM	600	1.50	50		1.10					
3YX	100	2.00			0.95		0.2	0.08		
RU 30Y	100	3.50	100	-40 to +150	0.89	10	0.2	0.08	7	
30Z	200		80		0.97					
30	400	2.00	200		0.95		0.4	0.18		
30A	600									
RU 4Y	100									
4Z	200	3.50	70	-40 to +150	1.30	10	0.4	0.18	8	
4	400									
4A	600	3.00	50		1.50					
4B	800									
4C	1000	2.50			1.60	50				
4M	400									
4AM	600	3.50	70		1.30	10				
4YX	100	4.00	100		0.85		0.2	0.08		

● trr1 = IF/IRP = 1:1, trr2 = IF/IRP = 1:2

■ 1-Chip Frame Type

(Ta = 25°C)

Type No.	Absolute Maximum Ratings				Electrical Characteristics				Fig. No.	
	VRM (V)	IF (AV) (A)	IFSM (A)	Tj	Tstg	VF (V)	IR (μA)	trr1 (μs)		trr2 (μs)
				(°C)		max	max	max		max
FMU-G2YXS	100	10.0	100	-40 to +150	1.00	50	0.2	0.08	13	
-G16S	600	5.0	30		1.25		0.4	0.18		
-G26S	600	10.0	40		1.35					

● trr1 = IF/IRP = 1:1, trr2 = IF/IRP = 1:2

■ Center Tap Type

(Ta = 25°C)

Type No.	Absolute Maximum Ratings				Electrical Characteristics				Fig. No.	
	VRM (V)	IF (AV) (A)	IFSM (A)	Tj	Tstg	VF (V)	IR (μA)	trr1 (μs)		trr2 (μs)
				(°C)		max per element	max per element	max		max
FMU-12S,R	200									
-14S,R	400	5.0	30	-40 to +150	1.5	50	0.4	0.18	9	
-16S,R	600									
FMU-21S,R	100									
-22S,R	200	10.0	40	-40 to +150	1.5	50	0.4	0.18	9	
-24S,R	400									
-26S,R	600									
FMU-32S,R	200									
-34S,R	400	20.0	80	-40 to +150	1.5	50	0.4	0.18	10	
-36S,R	600									

● trr1 = IF/IRP = 1:1, trr2 = IF/IRP = 1:2

5-3. Ultra-Fast Recovery Rectifier Diodes

■ Surface Mount Type

(Ta = 25°C)

Type No.	Absolute Maximum Ratings				Electrical Characteristics				Fig. No.	
	VRM (V)	IF (AV) (A)	IFSM (A)	Tj	Tstg	VF (V)	IR (μA)	trr1 (ns)		trr2 (ns)
				(°C)		max per element	max per element	max		max
SFPL-52	200	0.9	25	-40 to +150	0.98	10	50	35	1	
-62		1.0								
SPX-G32S		3.0	50							25
-62S*		6.0	80							

*Center tap

■ Axial Type

(Ta = 25°C)

Type No.	Absolute Maximum Ratings				Electrical Characteristics				Fig. No.		
	VRM (V)	IF (AV) (A)	IFSM (A)	Tj	Tstg	VF (V)	IR (μA)	trr1 (ns)		trr2 (ns)	
				(°C)		max	max	max		max	
AG01Y	70	1.0	25	-40 to +150	1.20	100	100	50	2		
01Z	200	0.7	15								
01	400										
01A	600	0.5									
EG01Y	70	1.0	30	-40 to +150	1.20	100	100	50	3		
01Z	200	0.7	15								
01	400										
01A	600	0.5	10								
01C	1000	1.1	30	-40 to +150	1.20	100	100	50	4		
EG 1Y	70										
1Z	200									0.8	15
1	400										
1A	600	0.6	10								
RG 1C	1000	0.7	10	-40 to +150	1.10	50	100	50	5		
RG 10Y	70	1.5	50								
10	400										
10A	600	1.0									
RG 2Y	70	1.5	50	-40 to +150	1.10	50	100	50	6		
2Z	200	1.2								50	
2	400										
2A	600	1.0									
RG 4Y	70	3.5	100	-40 to +150	1.30	100	100	50	8		
4Z	200	3.0	80								
4	400										
4A	600	2.0	50								
4C	1000	2.0	60	-40 to +150	2.00	50	100	50	7		
EN01Z	200									1.0	50
RN 1Z										1.5	60
RN 2Z										2.0	70
RN 3Z		3.0	80								
RN 4Z	3.5	120	8								
AP01C	1000	0.2	5	-40 to +150	4.00	100	200	80	2		
EP01C	2000									0.1	10
RP 1H											
RU 1P	1000									0.4	10
AL01Z	200	1.0	25	-40 to +150	0.98	100	50	50	3		
EL 1Z	400	1.5	25								
EL 1										20	
EL02Z	200	2.0	30								
RL 10Z	350			40							
RL 2Z					50						
2	100										
2A	600	1.1	30	-40 to +150	1.30	10	50	35	6		
RL 3Z	200	3.5	80								
3	350										
3A	600	2.0	60								
RL 4Z	200	3.5	80	-40 to +150	0.95	150	50	50	8		
4A	600	3.0	80								
RX 3Z	200									3.0	80

■ 1-Chip Frame Type

(Ta = 25°C)

Type No.	Absolute Maximum Ratings				Electrical Characteristics				Fig. No.	
	VRM (V)	IF (AV) (A)	IFSM (A)	Tj	Tstg	VF (V)	IR (μA)	trr1 (ns)		trr2 (ns)
				(°C)		max	max	max		max
FMG-G26S	600	4.0	50	-40 to +150	2.50	500	100	50	13	
-G36S		8.0	80							
-G2CS		3.0	30							
-G3CS	1000	5.0	60	-40 to +150	4.00	50	150	70	15	
FMP-G12S	200	5.0	65							
FMN-G12S	200	5.0	100							
FML-G12S	200	5.0	70	-40 to +150	0.98	250	40	35	13	
-G13S	300									
-G14S	400									
-G16S	600									
-G22S	200	10.0	150	-40 to +150	0.98	500	40	30	13	
-G26S	600									
FMX-G12S	200	5.0	65	-40 to +150	0.98	100	30	25	13	
-G22S		10.0	150							

■ Center Tap Type

(Ta = 25°C)

Type No.	Absolute Maximum Ratings				Electrical Characteristics				Fig. No.	
	VRM (V)	IF (AV) (A)	IFSM (A)	Tj	Tstg	VF (V)	IR (mA)	trr1 (ns)		trr2 (ns)
				(°C)		max per element	max per element	max		max
FMG-12S,R	200	5.0	35	-40 to +150	1.80	0.50	100	50	9	
-13S,R	300									
-14S,R	400									
FMG-22S,R	200	10.0	65	-40 to +150	1.80	0.50	100	50	9	
-23S,R	300									
-24S,R	400									
-26S,R	600	6.0	50	-40 to +150	2.20	1.00	100	50	10	
FMG-32S,R	200	20.0	150							
-33S,R	300									
-34S,R	400			16.0	100					
-36S,R	600	15.0	80	-40 to +150	2.20	1.00	100	50	10	
FMC-26U	600	6.0	50							
FML-12S	200	5.0	35							-40 to +150
-13S	300									
-14S	400									
FML-22S	200	10.0	70	-40 to +150	0.98	0.25	40	30	9	
-23S	300									
-24S	400									
FML-32S	200	20.0	100	-40 to +150	1.30	0.20	50	35	10	
-33S	300									
-34S	400									
-36S	600									
FMX-12S	200	5.0	35	-40 to +150	0.98	0.05	30	25	9	
-22S		10.0	65							
-22SL		15.0	100							
-32S		20.0	150							
		0.20								

■ Bridge Type

(Ta = 25°C)

Type No.	Absolute Maximum Ratings				Electrical Characteristics				Fig. No.	
	VRM (V)	IF (AV) (A)	IFSM (A)	Tj	Tstg	VF (V)	IR (mA)	trr1 (ns)		trr2 (ns)
				(°C)		max per element	max per element	max		max
RBA-402L	200	4.0	80	-40 to +150	0.98	0.05	40	30	16	
RBV-602L	200	6.0	100							

5-4. Damper Diodes

■ For TV

(Ta = 25°C)

Type No.	Absolute Maximum Ratings			Electrical Characteristics				Fig. No.	Remarks		
	VRM (V)	IF (AV) (A)	IFSM (A)	Tj	Tstg	VF (V)	IR (μA)			trr1 (μs)	trr2 (μs)
				(°C)		max per element	max per element			max	max
RH 10F	1500	0.8	60	-40 to +150	1.0	10	4.0	1.30	5		
2D	1300	1.0							6		
2F	1500		50		7						
3F	1500	8									
3G	1600	1.1			50	2.0	0.80	7			
4F	1500	1.5			10	1.0	0.40	8			
RS 3FS	1500	2.0	-40 to +150		1.5	50	2.0	0.80	17		For DM damper
4FS		2.5							1.5		
FMV-G5FS	1500	10.0		50	1.4	50	4.0	1.30	18		
FMR-G5HS	1800				1.3	0.4	0.18				
FMV-3FU	1500	5.0		50	1.5	50	2.0	0.80	18		
	600				1.3	0.4	0.18				
FMV-3GU	1700	5.0		50	1.5	50	2.0	0.80	18		
	600				1.3	0.4	0.18				

■ For CRT Display

(Ta = 25°C)

Type No.	Absolute Maximum Ratings			Electrical Characteristics				Fig. No.	Remarks			
	VRM (V)	IF (AV) (A)	IFSM (A)	Tj	Tstg	VF (V)	IR (μA)			trr1 (μs)	trr2 (μs)	
				(°C)		max per element	max per element			max	max	
RP 3F	1500	2.0	50	-40 to +150	1.7	50	0.70	0.30	7			
RU 4D	1300	1.5							1.8	0.40	0.18	8
4DS		2.5										
FMP-G2FS	1500	5.0	50	-40 to +150	2.0	50	0.70	0.30	13			
FMQ-G2FLS		10.0								1.8	1.20	0.40
-G2FS										2.8		
FMQ-G5FMS		1500								2.4	0.50	0.20
-G5GS	1700	2.7	100	17								
FMP-G5HS	1800	2.0	25		1.00	0.40						
RG 2A2	1300	0.5	5	-40 to +150	3.5	100	0.10	0.05	6	For compensation		
RC 3B2	1600	1.0	20		3.6	0.07	0.04	7				
FMP-3FU	1500	5.0	50	-40 to +150	2.0	50	0.70	0.30	18	For DM damper		
	600				2.5		0.10	0.05				
FMQ-3GU	1700	5.0	50	-40 to +150	2.0	500	0.70	0.30				
	800				4.0	100	0.07	0.04				

5-5. Schottky Barrier Diodes

Surface Mount Type

Type No.	Absolute Maximum Ratings					Electrical Characteristics			Fig. No.
	V _{RM} (V)	I _{F(AV)} (A)	I _{FSM} (A)	T _J	T _{stg}	V _F (V) Condition = I _F	I _R (mA)	H-I _R (mA) T _a = 100°C	
				(°C)		max per element	max per element	max per element	
SFPA-51	10		60	-40 to +125		0.34	1.00	30	1
SFPB-52		1.0	30			0.47	0.25	10	1
SFPB-62	20	2.0	60			0.50	20		
SFPB-72		3.0		1.00					
SFPA-53		1.0	30	-40 to +125		0.36	1.50	70	
SFPA-63		2.0	40			3.00	140		
SFPA-73		3.0	50			4.50	210		
SFPE-63		2.0	40	-40 to +150		0.55	0.20	20	1
SFPJ-53		1.0	30	-40 to +125		0.45	1.00	10(T _a =125°C)	
SFPJ-63		2.0	40				2.00	20(T _a =125°C)	
SFPJ-73		3.0	50				3.00	30(T _a =125°C)	
SPJ-63S*		6.0							14
SSB-14		0.5	4	-40 to +125		0.58	0.10	5	19
SFPB-54		1.0	30			0.55	1.00	50	1
SFPB-64		1.5	60			0.50	5.00		
SFPB-74		2.0		0.60	0.20	20			
SFPE-64		2.0	40	-40 to +150		0.60	0.20	20	
SPB-G34S		3.0	50	-40 to +125		0.55	30.00	50	14
SPB-G54S		5.0	60				50.00	50	
SPB-64S*		6.0	50				30.00	50	
MPE-24H*		15.0	100	-40 to +150		0.60	0.75	50(T _a =150°C)	20
SFPB-56		0.7	10	-40 to +125		0.62	1.00	7.5	1
SFPB-66		1.5	25				2.00	20	
SFPB-76		2.0	40				0.70	35.00	
SPB-G56S		5.0	60			0.81	1.00	5	1
SFPB-59	90	0.7	10	2.00	10				
SFPB-69		1.5	40						

*Center tap

Axial Type

Type No.	Absolute Maximum Ratings					Electrical Characteristics			Fig. No.	
	V _{RM} (V)	I _{F(AV)} (A)	I _{FSM} (A)	T _J	T _{stg}	V _F (V)	I _R (mA)	H-I _R (mA) T _a = 100°C		
				(°C)		max	max	max		
RK 42	20	3.0	100	-40 to +125		0.47	1.00	20	8	
AK 03			25	-40 to +125		0.55	1.00	50(T _J =100°C)	2	
EA 03		1.0	30			0.36	1.50	70	3	
EK 03		1.5	40			0.55	5.00	50	4	
EK 13		2.0		-40 to +125		0.36	3.00	140	5	
RA 13		1.7	60				0.55	5.00	50	6
RK 13		2.5	50				0.45	3.00	30(T _J =125°C)	8
RK 33		3.0	80	0.55	5.00	50				
RJ 43				-40 to +125		0.55	1.00	50(T _J =100°C)	2	
RK 04		1.0	25				5.00	50	3	
EK 04		1.5	40							4
EK 14		1.7	60				5			
RK 14		2.5	50				6			
RK 34		3.0	80				8			
RK 44										
AK 06		0.7	10	-40 to +125		0.62	1.00	7.5	2	
EK 06		1.5	25				2.00	25	6	3
EK 16		2.0	40				3.00	35	8	4
RK 16		3.5	70							

Type No.	Absolute Maximum Ratings					Electrical Characteristics			Fig. No.
	V _{RM} (V)	I _{F(AV)} (A)	I _{FSM} (A)	T _J	T _{stg}	V _F (V)	I _R (mA)	H-I _R (mA) T _a = 100°C	
				(°C)		max	max	max	
AK 09		0.7	10	-40 to +125		0.81	1.00	5	2
EK 09		1.5	40				2.00	10	4
EK 19		2.0	50				3.00	15	6
RK 19		3.5	60	5.00	30	8			
RK 39									
RK 49									

1-Chip Frame Type

Type No.	Absolute Maximum Ratings					Electrical Characteristics			Fig. No.
	V _{RM} (V)	I _{F(AV)} (A)	I _{FSM} (A)	T _J	T _{stg}	V _F (V)	I _R (mA)	H-I _R (mA) T _a = 100°C	
				(°C)		max	max	max	
FMB-G12L	20	5.0	100	-40 to +125		0.47	2.00	35	13
FMB-G22H		10.0	200				5.00	65	
FMB-G14		3.0	60				5.00	100	
FMB-G14L	40	5.0	150			0.55	10.00	65	
FMB-G24H		10.0	150			0.62	5.00	50	
FMB-G16L	60	6.0	50			0.81	5.00	35	
FMB-G19L	90	4.0	60						

Center Tap Type

Type No.	Absolute Maximum Ratings					Electrical Characteristics			Fig. No.	
	V _{RM} (V)	I _{F(AV)} (A)	I _{FSM} (A)	T _J	T _{stg}	V _F (V)	I _R (mA)	H-I _R (mA) T _a = 100°C		
				(°C)		max per element	max per element	max per element		
FMB-22L	20	10.0	100	-40 to +125		0.47	2.00	35	9	
FMB-22H		15.0	150				3.00	50		
FMB-32		20.0	200				5.00	65		
FMB-32M		30.0	300	10.00	100	10				
FME-24L		10.0	80	-40 to +150		0.60	0.50	30		
FME-24H		15.0	100				0.75	50		
FMB-24		4.0	50				5.00	35		9
FMB-24M		6.0	60							
FMB-24L		10.0	60							
FMB-24H		15.0	100				7.50	50		
FMB-34S	40	12.0	75	-40 to +125		0.58	5.00	35	10	
FMB-34		15.0	150				10.00	65		
FMB-34M		30.0	300				20.00	100		
CTB-24		4.0	60	-40 to +125		0.55	5.00	35	21	
CTB-24L		10.0	150				10.00	65	22	
CTB-34M		30.0	300				20.00	100		
FMB-26	60	4.0	40	-40 to +125		0.62	1.00	25	9	
FMB-26L		10.0	50				2.50	50		
FMB-36		15.0	100				5.00	75		10
FMB-36M		30.0	150	10.00	150					
FMB-29	90	4.0	50	-40 to +125		0.81	3.00	15	9	
FMB-29L		8.0	60				5.00	35		10
FMB-39		15.0	150				10.00	50		10
FMB-39M		20.0	150	15.00	60					

Bridge Type

Type No.	Absolute Maximum Ratings					Electrical Characteristics			Fig. No.
	V _{RM} (V)	I _{F(AV)} (A)	I _{FSM} (A)	T _J	T _{stg}	V _F (V)	I _R (mA)	H-I _R (mA) T _a = 100°C	
				(°C)		max per element	max per element	max per element	
RBA-404B	40	4.0	40	-40 to +125		0.55	2.0	20	16
-1004B		10.0	60				5.0	35(T _J =125°C)	
-406B	60	4.0	40				0.62	2.0	

5-6. Avalanche Diodes

(Ta = 25°C)

Type No.	Absolute Maximum Ratings				Electrical Characteristics			Fig. No.
	VRM (V)	IzSM (A) Instantaneous	Tj	Tstg	Vz (V) 1mA Instantaneous	IR (μ A) max	IR (H) (μ A) max	
			(°C)					
RM 25	40	3.0	-40 to +130		50 to 61.5	5	20	5
RM 26	50				60 to 70.0			
R 2M	130	1.0	-40 to +150		135 to 180.0	10	50	
RY 23	200	0.1	-40 to +130		250 to 400.0	10	50	
RY 24	400				400 to 450.0			

With Built-in Thyristor

(Ta = 25°C)

Type No.	Absolute Maximum Ratings				Electrical Characteristics			Fig. No.
	VRDC (-10°C) (V)	ITSM (A) 50Hz Half-cycle Sinewave Single Shot	Tj	Tstg	Vz (V) 1mA Instantaneous	IR (μ A) max	H-IR (μ A) max	
			(°C)					
RZ1030	20	30	-10 to +125	-40 to +150	27 to 33	10	50	5
1040	28				34 to 40			
1055 *	40				50 to 60			
1065 *	50				60 to 70			
1100 *	80				90 to 110			
1125	105				115 to 135			
1150	125				140 to 160			
1175	150				165 to 185			
1200	180				195 to 215			
1225 *	190				210 to 240			
1250	180				235 to 265			
EZ0150	125				140 to 160			

* Under development

5-7. Power Zener Diodes

(Ta = 25°C)

Type No.	Absolute Maximum Ratings				Electrical Characteristics			Fig. No.	
	PR (W)	VDC (V)	IzSM (A) Instantaneous	Tj	Tstg	Vz (V) 1mA Instantaneous	IR (μ A) max		IR (H) (mA) max
				(°C)					
PZ 127	150	20	4	-40 to +150		27±5.0	50	1.0	5
227	300		8						6
427	450		9						8
628	1500		65						23
SFPZ-68	50		2						1
SPZ-G36	450	30	11	36±3.6	5	0.1	14		

5-8. Silicon Varistors

Type No.	Absolute Maximum Ratings (Ta = 25°C)				Electrical Characteristics (Ta = 25°C)								Fig. No.	
	IF (mA)	IFSM (A)	Tj	Tstg	VF1		VF2		VF3		IF (μ A) max	VF (V)		
			(°C)		(V)	IF1 (mA)	(V)	IF2 (mA)	(V)	IF3 (mA)				
VR-60SS	400	15.0	-40 to +100		1.5 max	1000	-	-	-	-	20	0.2	24	
-61SS	150	7.5			2.30 ±0.25	1	2.75 ±0.25	10	3.1 ±0.25	70	-	-		
SV-2SS	150	-			4.0 max	100	-	-	-	-	50	1.2		
-3SS	250	-	2.0 max	-	-		-	-	50	0.6				
-4SS	150	-	-40 to +130		1.80 ±0.20	1	2.15 ±0.20	10	2.4 ±0.25	30	50	0.9	3	
SV 02YS	200	30.0			1.20 ±0.20	1	1.50 ±0.25	70	-	-	10	100 (IR)		100 (VR)
03YS	150	16.0			1.80 ±0.20		2.30 ±0.25							
04YS	100	12.0			2.35 ±0.25		3.00 ±0.30							
05YS	80	10.0			3.00 ±0.30		3.80 ±0.40							
06YS	70	8.0	3.50 ±0.35	4.50 ±0.45										

5-9. High Voltage Rectifier Diodes

(Ta = 25°C)

Type No.	Absolute Maximum Ratings					Electrical Characteristics				Fig. No.	
	V _{RM} (kV)	I _F (AV) (mA)	I _{FSM} (A)	T _C (°C)	T _J (°C)	T _{stg} (°C)	V _F		I _R (μA)		t _{rr} (μs)
							(V)	Condition			
SHV-02	2	2.0	0.3	100	-40 to +120		16	10	1.0	0.18	25
SHV-03S	3						16				
SHV-03	3						16				
-10	10						40				
-12	12						45				
-14	14						55				
-16	16						60				
-20	20						75				
-24	24						75				
SHV-06EN	6						2.0				
-08EN	8	32									
-10EN	10	42									
-12EN	12	48									
SHV-08DN	8	30									
-10DN	10	38									
-12DN	12	45									

* Load C for FBT high voltage current

5-10. High Voltage Rectifier Diodes for Microwave Oven

(Ta = 25°C)

Type No.	Absolute Maximum Ratings				Electrical Characteristics				Fig. No.
	V _{RM} (kV)	I _F (AV) (mA)	I _{FSM} (A)	T _{stg} (°C)	V _F		I _R (μA)	t _{rr} (μs)	
					(V)	Condition			
HVR-1X-40B	9	350	20	-40 to +130	9.0	350	10	-	31
UX-C2B	8	350	15	-30 to +130	13.5	350	10	0.10	32

5-11. GaAs Schottky Barrier Diodes (GSC series)

(Ta = 25°C)

Type No.	Absolute Maximum Ratings					Electrical Characteristics							Fig. No.		
	V _{RM} (V)	I _F (AV) (A)	I _{FSM} * (A)	I ² t* (A ² s)	T _J (°C)	T _{stg} (°C)	V _F * (V)		I _R * (mA)	I _{R(H)} * (mA)	t _{rr} * (ns)	C _t * (pF)		R _{thj-c} (°C/W)	
							Rectangular Wave duty = 1/2 average	T _C (°C)							50Hz Half-cycle Sinewave Peak Value
GSC215	150	5	114	20	2.0	-40 to +150	0.90	2.5	1.0	10	7	2	150	5.0	21
GSC218	180									15					
GSC315	150	14	80	50	18.0	-40 to +150	0.90	7.0	3.0	30	10	6	450	3.5	22
GSC318	180									45					
GSF18R	180	7	35										7.0	9	

* per element

External Dimensions (unit: mm)

Fig. 1

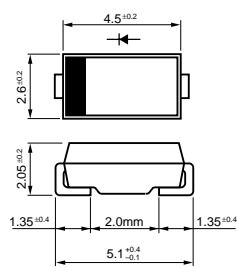


Fig. 2

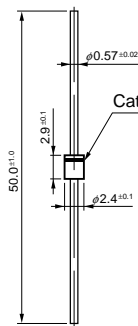


Fig. 3

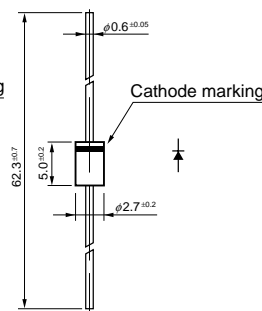


Fig. 4

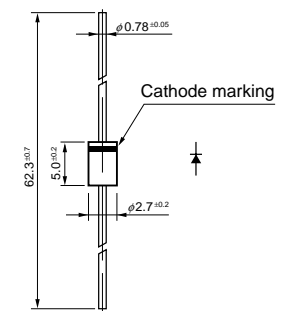


Fig. 5

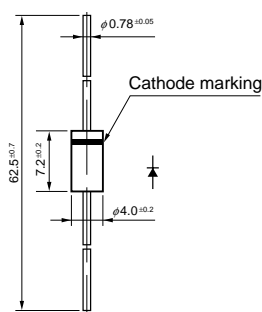


Fig. 6

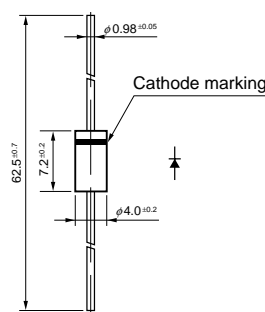


Fig. 7

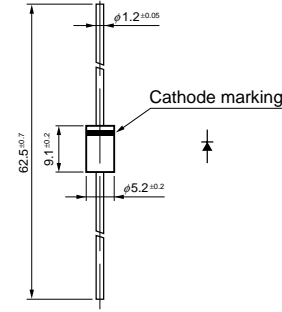


Fig. 8

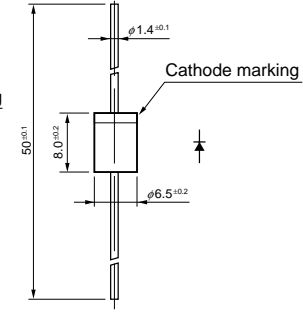


Fig. 9

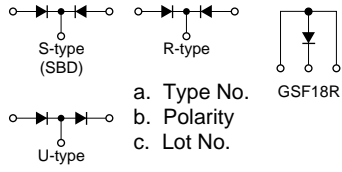
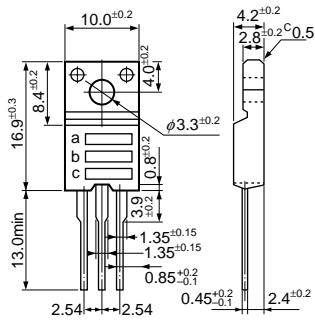


Fig. 10

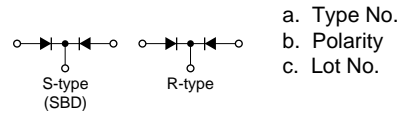
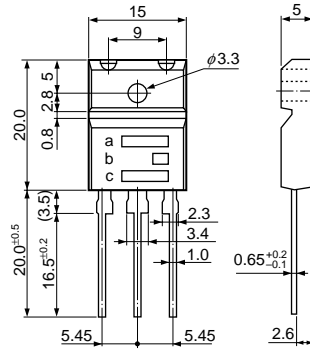
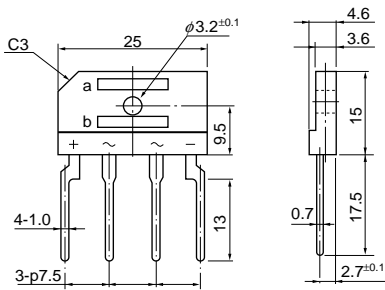
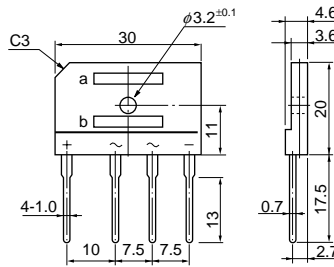


Fig. 11



a. Type No.
b. Lot No.

Fig. 12



a. Type No.
b. Lot No.

Fig. 13 Full-Mold

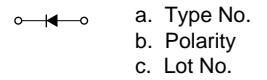
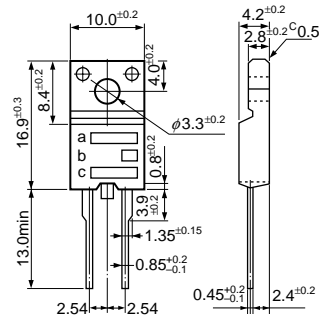
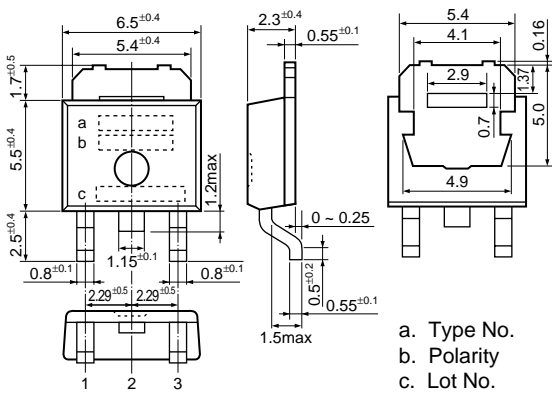


Fig. 14



a. Type No.
b. Polarity
c. Lot No.

Fig. 15 Full-Mold

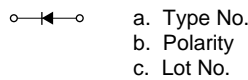
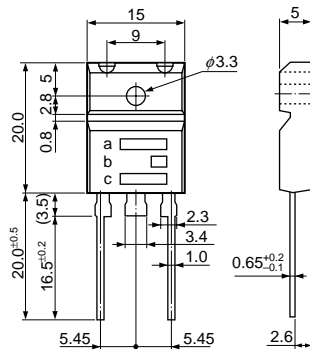
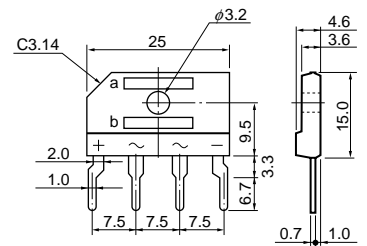
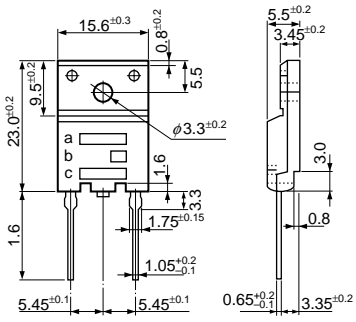


Fig. 16



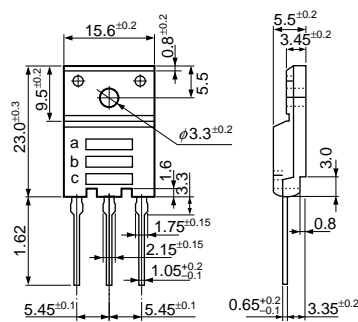
a. Type No.
b. Lot No.

Fig. 17 Full-Mold



a. Type No.
 b. Polarity
 c. Lot No.

Fig. 18 Full-Mold



a. Type No.
 b. Polarity
 c. Lot No.

Fig. 19 SSB-14

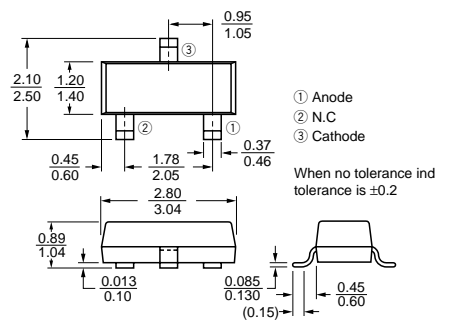


Fig. 20 MPE-24H

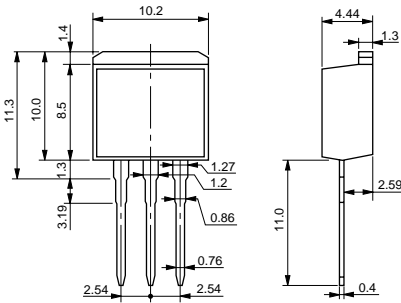


Fig. 23

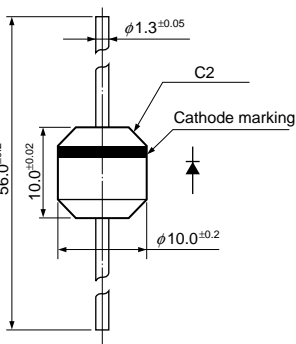


Fig. 21 MT-25 (TO-220)

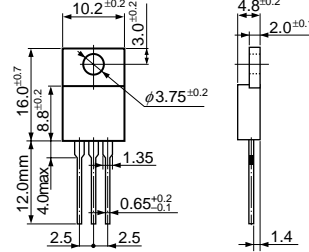


Fig. 24

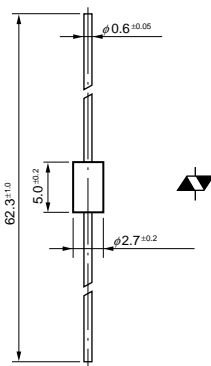


Fig. 25

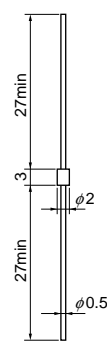


Fig. 22 MT-100 (TO-3P)

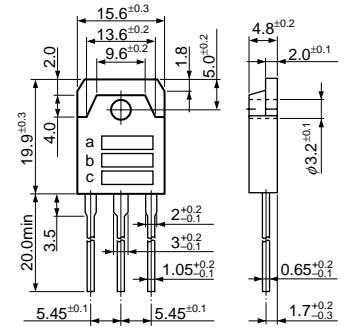


Fig. 26

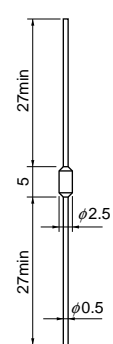


Fig. 27

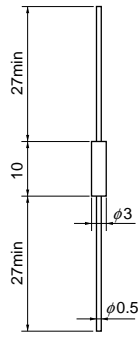


Fig. 28

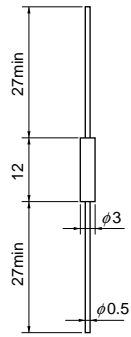


Fig. 29

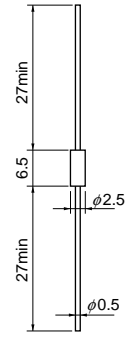


Fig. 30

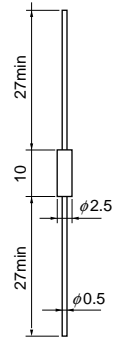


Fig. 31

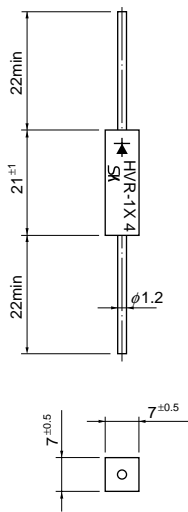
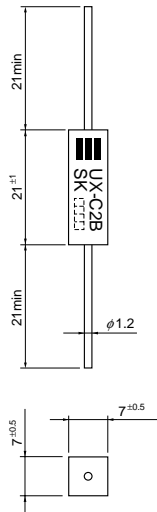


Fig. 32



6

Light Emitting Diodes

- 6-1. Standard LEDs
- 6-2. LEDs for Surface Illumination
- 6-3. Ultra-High Intensity LEDs
- 6-4. Contact Mount LEDs for Automatic Insertion
- 6-5. Bicolor LEDs
- 6-6. Infrared LEDs
- 6-7. Chip LEDs
- 6-8. AlGaInP Ultra-High Intensity LEDs
- 6-9. Blue LEDs

6-1. Standard LEDs

● Absolute Maximum Ratings (Ta = 25°C)

Parameter	Unit	Ratings
IF	mA	30
IFP	mA	100
VR	V	3
Top	°C	-30 to +85
Tstg	°C	-30 to +100

VF Condition IF = 10 mA
IR Condition VR = 3 V

Type No.	Type of Lens	Emitting Color	Electro-Optical Characteristics (Ta = 25°C)						Fig. No.
			VF (V)		IR (μA)	IV (mcd)	Condition IF (mA)	λp (nm)	
			typ	max	max	typ			
5φ round type									
SEL1110R	Diffused red	Red	2.0	2.5	50	3.0	5	700	①
SEL1110S	Tinted red								
SEL1110W	Diffused								
SEL1210R	Diffused red	Red	1.9	2.5	30.0	630	20	560	
SEL1210S	Tinted red								
SEL1410G	Diffused green	Green	2.0	2.5	40.0	555	10	610	
SEL1410E	Tinted green								
SEL1510C	Un-tinted	Pure green	2.0	2.5	30.0	570	10	587	
SEL1710Y	Diffused yellow								
SEL1710K	Tinted yellow	Yellow	1.9	2.5	12.0	610	20	560	
SEL1810D	Diffused orange								
SEL1810A	Tinted orange	Amber	1.9	2.5	25.0	570	10	610	
SEL1910D	Diffused orange								
SEL1910A	Tinted orange	Orange	1.9	2.5	3.0	587	10	587	
SEL1910A	Tinted orange								
4φ round type									
SEL4110R	Diffused red	Red	2.0	2.5	50	2.0	5	700	②
SEL4110S	Tinted red								
SEL4110W	Diffused								
SEL4210R	Diffused red	Red	1.9	2.5	15.0	630	20	560	
SEL4210S	Tinted red								
SEL4410G	Diffused green	Green	2.0	2.5	25.0	555	10	610	
SEL4410E	Tinted green								
SEL4510C	Un-tinted	Pure green	2.0	2.5	30.0	570	10	587	
SEL4710Y	Diffused yellow								
SEL4710K	Tinted yellow	Yellow	1.9	2.5	14.0	610	20	560	
SEL4810D	Diffused orange								
SEL4810A	Tinted orange	Amber	1.9	2.5	18.0	587	10	587	
SEL4910D	Diffused orange								
SEL4910A	Tinted orange	Orange	1.9	2.5	8.0	587	10	587	
SEL4910A	Tinted orange								

Type No.	Type of Lens	Emitting Color	Electro-Optical Characteristics (Ta = 25°C)						Fig. No.
			VF (V)		IR (μA)	IV (mcd)	Condition IF (mA)	λp (nm)	
			typ	max	max	typ			
3φ round type									
SEL2110R	Diffused red	Red	2.0	2.5	50	1.1	10	700	③
SEL2110S	Tinted red								
SEL2110W	Diffused								
SEL2210R	Diffused red	Red	1.9	2.5	10.0	630	20	560	
SEL2210S	Tinted red								
SEL2210W	Diffused	Green	2.0	2.5	20.0	555	10	610	
SEL2410G	Diffused green								
SEL2410E	Tinted green	Pure green	2.0	2.5	3.7	570	10	587	
SEL2510G	Diffused green								
SEL2510C	Un-tinted	Yellow	1.9	2.5	25.0	570	10	587	
SEL2710Y	Diffused yellow								
SEL2710K	Tinted yellow	Amber	2.0	2.5	4.4	610	20	560	
SEL2810D	Diffused orange								
SEL2810A	Tinted orange	Orange	1.9	2.5	10.0	587	10	587	
SEL2910D	Diffused orange								
SEL2910A	Tinted orange	Red	1.9	2.5	1.6	630	20	560	
SEL2215R	Diffused red								
SEL2215S	Tinted red	Green	2.0	2.5	8.0	570	10	587	
SEL2415G	Diffused green								
SEL2415E	Tinted green	Yellow	1.9	2.5	70.0	570	10	587	
SEL2715Y	Diffused yellow								
SEL2715K	Tinted yellow	Amber	2.0	2.5	120.0	610	20	560	
SEL2815D	Diffused orange								
SEL2815A	Tinted orange	Orange	1.9	2.5	70.0	587	10	587	
SEL2915D	Diffused orange								
SEL2915A	Tinted orange	Red	2.0	2.5	50.0	700	10	560	
SEL1111R	Diffused red								
SEL1411G	Diffused green	Green	2.5	50	1.3	560	10	570	
SEL1711Y	Diffused yellow								
SEL1811D	Diffused orange	Amber	1.9	2.5	5.5	610	10	587	
SEL1911D	Diffused orange								
SEL2111R	Diffused red	Red	2.0	2.5	1.2	700	10	560	
SEL2111W	Diffused								
SEL2411G	Diffused green	Green	2.5	50	3.0	560	10	570	
SEL4117R	Diffused red								
SEL4417G	Diffused green	Yellow	1.9	2.5	10.0	560	10	610	
SEL4717Y	Diffused yellow								
SEL4817D	Diffused orange	Amber	1.9	2.5	4.5	587	10	587	
SEL4917D	Diffused orange								
Round-type special configuration									
SEL4117R	Diffused red	Red	2.0	2.5	50	1.0	10	700	⑦
SEL4417G	Diffused green								
SEL4717Y	Diffused yellow	Green	2.5	50	10.0	560	10	570	
SEL4817D	Diffused orange								
SEL4917D	Diffused orange	Orange	1.9	2.5	4.5	610	10	587	
SEL4917D	Diffused orange								

6-2. LEDs for Surface Illumination

● Absolute Maximum Ratings (Ta = 25°C)

Parameter	Unit	Ratings
I _F	mA	30
I _{FP}	mA	100
V _R	V	3
Top	°C	-30 to +85
Tstg	°C	-30 to +100

V_F Condition I_F = 10 mA
I_R Condition V_R = 3 V

Type No.	Type of Lens	Emitting Color	Electro-Optical Characteristics (Ta = 25°C)					Fig. No.	
			V _F (V)		I _R (μA)	I _v (mcd)	λ _p (nm)		
			typ	max	max	typ	typ		
SEL1213C	Un-tinted	Red	1.9	2.5	50	20	3.5	20	630
SEL1413E	Tinted green	Green	2.0				8.0		560
SEL1713K	Tinted yellow	Yellow	1.9	2.5	50	10	8.0	20	570
SEL1813A	Tinted orange	Amber	1.9				5.0		610
SEL1913K	Tinted orange	Orange	1.9	2.5	50	10	5.0	20	587
SEL2213C	Un-tinted	Red	1.9				3.0		630
SEL2413E	Tinted green	Green	2.0	2.5	50	20	7.0	20	560
SEL2713K	Tinted yellow	Yellow	1.9				17.0		570
SEL2813A	Tinted orange	Amber	1.9	2.5	50	10	5.7	20	610
SEL2913K	Tinted orange	Orange	1.9				6.6		587

6-3. Ultra-High Intensity LEDs

● Absolute Maximum Ratings (Ta = 25°C)

Parameter	Unit	Ratings
I _F	mA	30
I _{FP}	mA	100
V _R	V	3
Top	°C	-30 to +85
Tstg	°C	-30 to +100

V_F Condition I_F = 10 mA
I_R Condition V_R = 3 V

Type No.	Type of Lens	Emitting Color	Electro-Optical Characteristics (Ta = 25°C)					Fig. No.	
			V _F (V)		I _R (μA)	I _v (mcd)	λ _p (nm)		
			typ	max	max	typ	typ		
SEL1610C	Un-tinted	Red	1.75	2.2	100	800	30	660	①
SEL1615C									⑦
SEL1650CM									⑧

Type No.	Type of Lines	Emitting Color	Electro-Optical Characteristics (Ta = 25°C)					Fig. No.	
			V _F (V)		I _R (μA)	I _v (mcd)	λ _p (nm)		
			typ	max	max	typ	typ		
SEL1120R	Diffused red	Red	2.0	2.5	50	10	0.7	20	700
SEL1420G	Diffused green	Green					2.0		560
SEL1720Y	Diffused yellow	Yellow	1.9	2.5	50	10	0.7	20	570
SEL1820D	Diffused orange	Amber					2.0		610
SEL1920D	Diffused orange	Orange	1.9	2.5	50	10	0.7	20	587
SEL1121R	Diffused red	Red	2.0				0.7		700
SEL1421G	Diffused green	Green	1.9	2.5	50	10	2.0	20	560
SEL1721Y	Diffused yellow	Yellow					0.7		570
SEL1821D	Diffused orange	Amber	1.9	2.5	50	10	1.5	20	610
SEL1921D	Diffused orange	Orange					0.7		587
SEL1222R	Diffused red	Red	2.0	2.5	50	10	5.0	20	630
SEL1422G	Diffused green	Green					4.0		560
SEL1722Y	Diffused yellow	Yellow	1.9	2.5	50	10	4.0	20	570
SEL1822D	Diffused orange	Amber					2.5		610
SEL1922D	Diffused orange	Orange	1.9	2.5	50	10	3.0	20	587
SEL1124R	Diffused red	Red	2.0				0.7		700
SEL1424G	Diffused green	Green	1.9	2.5	50	10	2.0	20	560
SEL1724Y	Diffused yellow	Yellow					0.7		570
SEL1824D	Diffused orange	Amber	1.9	2.5	50	10	2.1	20	610
SEL1924D	Diffused orange	Orange					0.7		587
SEL4225R	Diffused red	Red	1.9	2.5	50	20	5.0	20	630
SEL4225C	Un-tinted						10.0		560
SEL4425G	Diffused green	Green	2.0	2.5	50	10	10.0	20	570
SEL4425E	Tinted green						15.0		610
SEL4725Y	Diffused yellow	Yellow	1.9	2.5	50	10	6.0	20	587
SEL4725K	Tinted yellow						10.6		630
SEL4825D	Diffused orange	Amber	1.9	2.5	50	10	3.0	20	560
SEL4825A	Tinted orange						5.0		570
SEL4925D	Diffused orange	Orange	1.9	2.5	50	10	3.0	20	610
SEL4925A	Tinted orange						5.0		587
SEL4227C	Un-tinted	Red	2.0	2.5	50	20	10.0	20	630
SEL4427E	Tinted green	Green					20.0		560
SEL4527C	Un-tinted	Pure green	1.9	2.5	50	10	5.0	20	555
SEL4228C	Un-tinted	Red	18.0				630		
SEL4428E	Tinted green	Green	1.9	2.5	50	10	40.0	20	560
SEL4528C	Un-tinted	Pure green					15.0		555
SEL4728K	Tinted yellow	Yellow	1.9	2.5	50	10	16.0	20	570
SEL4828A	Tinted orange	Amber					9.0		610
SEL4928A	Tinted orange	Orange	1.9	2.5	50	10	7.0	20	587

6-4. Contact Mount LEDs for Automatic Insertion

● Absolute Maximum Ratings (Ta = 25°C)

Parameter	Unit	Ratings
I _F	mA	30
I _{FP}	mA	100
V _R	V	3
Top	°C	-30 to +85
Tstg	°C	-30 to +100
V _F Condition I _F = 10 mA		
I _R Condition V _R = 3 V		

Type No.	Type of Lens	Emitting Color	Electro-Optical Characteristics (Ta = 25°C)						Fig. No.				
			V _F (V)		I _R (μA)	I _V (mcd)	Condition I _F (mA)	λ _p (nm)					
			typ	max	max	typ							
5φ Round type	SEL1250SM	Tinted red	Red	1.9	2.5	50	34.0	20	630	18			
	SEL1450EKM	Tinted green	Green	2.0			95.0		560				
	SEL1550CM	Un-tinted	Pure green	2.0			36.0		555				
	SEL1950KM	Tinted yellow	Orange	1.9			64.0		587				
4φ Round type	SEL4114R	Diffused red	Red	2.0	2.5	50	2.0	10	700	19			
	SEL4114S	Tinted red					3.0		630				
	SEL4214R	Diffused red					1.9		12.0		630		
	SEL4214S	Tinted red					1.9		25.0		630		
	SEL4414G	Diffused green	Green	2.0			2.5	50	24.0		20	560	19
	SEL4414E	Tinted green							30.0			570	
	SEL4714Y	Diffused yellow	Yellow	2.0			2.5	50	13.0		10	570	19
	SEL4714K	Tinted yellow							17.0			610	
	SEL4814D	Diffused orange	Amber	1.9			2.5	50	4.5		10	610	19
	SEL4814A	Tinted orange							7.5			587	
	SEL4914D	Diffused orange							5.5			587	
	SEL4914A	Tinted orange							16.0			587	
Round type	SEL6210R	Diffused red	Red	1.9	2.5	50	12.0	20	630	20			
	SEL6210S	Tinted red					25.0		560				
	SEL6410G	Diffused green	Green	2.0			2.5	50	15.0		10	560	20
	SEL6410E	Tinted green							45.0			555	
	SEL6510G	Diffused green	Pure green	2.0			2.5	50	5.0		10	555	20
	SEL6510C	Un-tinted							16.0			570	
	SEL6710Y	Diffused yellow	Yellow	2.0			2.5	50	5.0		10	570	20
	SEL6710K	Tinted yellow							15.0			610	
	SEL6810D	Diffused orange	Amber	1.9			2.5	50	4.0		10	610	20
	SEL6810A	Tinted orange							10.0			587	
	SEL6910D	Diffused orange	Orange	1.9			2.5	50	6.5		10	587	20
	SEL6910A	Tinted orange							14.0			587	
	SEL6214S	Tinted red	Red	1.9			2.5	50	10.0		20	630	21
	SEL6414E	Tinted green	Green	2.0					12.0			560	
	SEL6514C	Un-tinted	Pure green	2.0					6.0			555	
	SEL6814A	Tinted orange	Amber	1.9					5.0			610	
SEL6914A	Tinted orange	Orange	1.9	5.0	587								

Type No.	Type of Lens	Emitting Color	Electro-Optical Characteristics (Ta = 25°C)						Fig. No.					
			V _F (V)		I _R (μA)	I _V (mcd)	Condition I _F (mA)	λ _p (nm)						
			typ	max	max	typ								
Round type	SEL6215S	Tinted red	Red	1.9	2.5	50	30.0	20	630	22				
	SEL6415E	Tinted green	Green	2.0			50.0		560					
	SEL6515C	Un-tinted	Pure green	2.0			18.0		555					
	SEL6815A	Tinted orange	Amber	1.9			30.0		610					
	SEL6915A	Tinted orange	Orange	1.9			40.0		587					
Bow type	SEL4229R	Diffused red	Red	1.9	2.5	50	10.0	20	630	23				
	SEL4429E	Tinted green	Green	2.5			28.0		560					
	SEL4829A	Tinted orange	Amber	1.9			8.0		610					
	SEL6427EP	Tinted green	Green	2.0			20.0		560					
Square display type	SEL4226R	Diffused red	Red	1.9	2.5	50	5.0	20	630	25				
	SEL4226C	Un-tinted					10.0		560					
	SEL4426G	Diffused green	Green	2.0			2.5	50	10.0		10	560	25	
	SEL4426E	Tinted green							15.0			570		
	SEL4726Y	Diffused yellow	Yellow	1.9			2.5	50	6.0		10	570	25	
	SEL4726K	Tinted orange							10.6			610		
	SEL4826D	Diffused orange	Amber	1.9			2.5	50	3.0		10	610	25	
	SEL4826A	Tinted yellow							5.0			587		
	SEL4926D	Diffused orange	Orange	1.9			2.5	50	3.0		10	587	25	
	SEL4926A	Tinted orange							5.0			587		
5mm pitch lead type	SEL5220S	Tinted red	Red	1.9	2.5	50	2.8	20	630	26				
	SEL5420E	Tinted green	Green	2.0			6.8		560					
	SEL5520C	Un-tinted	Pure green	2.0			2.4		555					
	SEL5820A	Tinted orange	Amber	1.9			6.0		610					
	SEL5920A	Tinted orange	Orange	1.9			4.4		587					
	SEL5221S	Tinted red	Red	1.9			2.5		50		14.0	20	630	27
	SEL5421E	Tinted green	Green	2.0							36.0		560	
	SEL5521C	Un-tinted	Pure green	2.0							14.0		555	
	SEL5821A	Tinted orange	Amber	1.9							22.0		610	
	SEL5921A	Tinted orange	Orange	1.9							22.0		587	
SEL5223S	Tinted red	Red	1.9	2.5	50	6.0	20	630	28					
SEL5423E	Tinted green	Green	2.0			14.0		560						
SEL5823A	Tinted orange	Amber	1.9			9.0		610						
SEL5923A	Tinted orange	Orange	1.9			9.0		587						

6-5. Bicolor LEDs

● Absolute Maximum Ratings (Ta = 25°C)

Parameter	Unit	Ratings
PD	mW	75
IF	mA	30
IFP	mA	100
VR	V	4
Top	°C	-30 to +85
Tstg	°C	-30 to +100

V_F Condition I_F = 10 mA
I_R Condition V_R = 4 V

Type No.	Emitting Color	Electro-Optical Characteristics (Ta = 25°C)						Fig. No.	
		V _F (V)		I _R (μA)	I _V (mcd)	Condition I _F (mA)	λ _p (nm)		
		typ	max	max	typ		typ		
SML1016 series	SML1216W	High intensity red	1.9	2.5	10	40	20	630	②⑨
		Green	2.0					560	
	SML1816W	Amber	1.9					610	
		Green	2.0					560	
	SML19416W	Orange	1.9					587	
		Green	2.0					560	
SML10060 series	SML12460C	High intensity red	1.9	2.5	10	10	20	630	③⑩
		Green	2.0					560	
	SML19460C	Orange	1.9					587	
		Green	2.0					560	
SML10051 series	SML12451W	High intensity red	1.9	2.5	10	40	20	630	③①
		Green	2.0					560	
	SML18451W	Amber	1.9					610	
		Green	2.0					560	
Anode common series	SML16760CN	UltraHigh intensity red	1.7	2.2	10	20	20	660	③②
		Yellow green	2.4					570	
	SML16751WN	UltraHigh intensity red	1.7					660	
		Yellow green	2.4					570	
Contact mount SML70020 series	SML72420C	High intensity red	1.9	2.5	10	10	20	630	③③
		Green	2.0					560	
	SML78420C	Amber	1.9					610	
		Green	2.0					560	
	SML79420C	Orange	1.9					587	
		Green	2.0					560	
Contact mount SML70023 series	SML72423C	High intensity red	1.9	2.5	10	10	20	630	③③
		Green	2.0					560	
	SML78423C	Amber	1.9					610	
		Green	2.0					560	
	SML79423C	Orange	1.9					587	
		Green	2.0					560	

6-6. Infrared LEDs

● Absolute Maximum Ratings (Ta = 25°C)

Parameter	Unit	Ratings
P _d	mW	150
I _F	mA	100
ΔI _F	mA/°C	-1.33 (more than 25°C)
I _{FP}	mA	1000 (f = 1 kHz, T _w ≤ 10 μs)
V _R	V	3
Top	°C	-30 to +85
Tstg	°C	-30 to +100

V_F Condition I_F = 50 mA

I_R Condition V_R = 5 V

I_e Condition (Constant voltage) V_{CC} = 3 V
R = 2.2 Ω

Type No.	Electro-Optical Characteristics (Ta = 25°C)					Fig. No.	
	V _F (V)		I _R (μA)	I _e (mW/sr)	λ _p (nm)		
	typ	max	max	min	typ		
SID1010CXM	1.25	1.5	10	40	940	③④	
SID1010CM				85			
SID1K10CXM	1.20	1.5	10	75	940	③④	
SID1K10CM				140			
SID303C	1.25	1.4	10	100	940	③⑥	
SID303BR				220			
SID303BS							210
SID307BR							
SID313BP							170
SID1003BQ				1.45			

6-7. Chip LEDs

● Absolute Maximum Ratings (Ta = 25°C)

Parameter	Unit	Ratings
I _F	mA	30
I _{FP}	mA	70
V _R	V	4
Top	°C	-30 to +85
Tstg	°C	-30 to +90

V_F Condition I_F = 10 mA
I_R Condition V_R = 4 V

Type No.	Emitting Color	Electro-Optical Characteristics (Ta = 25°C)						Fig. No.						
		V _F (V)		I _R (μA)	I _V (mcd)	Condition I _F (mA)	λ _p (nm)							
		typ	max	max	typ									
SEC1101C	Red	2.0	2.5	100	1.2	20	700	③⑦						
SEC1201C	High intensity red	1.9			7.0		630							
SEC1601C	Ultra-High intensity red	1.7	2.2		60.0		660							
SEC1401C	Green	2.0	2.5		15.0		560							
SEC1501C	Pure green	1.9	2.5		6.5		555							
SEC1801C	Amber				14.5		610							
SEC1901C	Orange				10.0		587							
SEC2422C	① Green	2.0	2.5		100		15.0		20	560	③⑧			
	② High intensity red	1.9					9.0			630				
SEC2462C	① Green	2.0	2.2				15.0			560				
	② Ultra-High intensity red	1.7		14.0		660								
SEC1203C	High intensity red	1.9	2.5	100		18.0	20	630		③⑨				
SEC1403C	Green	2.0				20.0		560						
SEC1603C	Ultra-High intensity red	1.7	2.2			120.0		660						
SEC1703C	High intensity yellow green	2.0	2.5			30.0		570						
SEC2424C	① Green	2.0	2.5			100		20.0				20	560	④⑩
	② High intensity red	1.9						20.0					630	
SEC2464C	① Green	2.0	2.2		20.0			560						
	② Ultra-High intensity red	1.7			30.0			660						
SEC2764C	① High intensity yellow green	2.0	2.5		30.0			570						
	② Ultra-High intensity red	1.7	2.2		30.0			660						

6-8. AlGaInP Ultra-High Intensity LEDs

● Absolute Maximum Ratings (Ta = 25°C)

Parameter	Unit	Ratings
I _F	mA	30
I _{FP}	mA	100
V _R	V	3
Top	°C	-30 to +85
Tstg	°C	-30 to +100

V_F Condition I_F = 10 mA
I_R Condition V_R = 3 V

Type No.	Type of Lens	Emitting Color	Electro-Optical Characteristics (Ta = 25°C)						Fig. No.
			V _F (V)		I _R (μA)	I _V (mcd)	Condition I _F (mA)	λ _p (nm)	
			typ	max	max	typ			
SELU1250CM	Un-tinted	Red	2.0	2.5	100	600	20	635	①⑧
SELU1210CXM						400		③④	
SELU1253CM						300		③⑤	
SELU1750CM		Yellow green	2.0	2.5	100	500	20	570	①⑨
SELU1710CXM						300		③④	
SELU1753CM						200		③⑥	
SELU1850CM		Amber	2.0	2.5	100	1000	20	615	①⑩
SELU1810CXM						700		③④	
SELU1853CM						500		③⑤	
SELU1950CM		Orange	2.0	2.5	100	900	20	590	①⑪
SELU1910CXM						600		③④	
SELU1953CM						400		③⑥	

6-9. Blue LEDs

● Absolute Maximum Ratings (Ta = 25°C)

Parameter	Unit	Ratings
I _F	mA	30
I _{FP}	mA	100
V _R	V	3
Top	°C	-30 to +85
Tstg	°C	-30 to +100

V_F Condition I_F = 20 mA
I_R Condition V_R = 3 V

Type No.	Type of Lens	Emitting Color	Electro-Optical Characteristics (Ta = 25°C)						Fig. No.
			V _F (V)		I _R (μA)	I _V (mcd)	Condition I _F (mA)	λ _p (nm)	
			typ	max	max	typ			
SELU1E53BMKT	Tinted blue	Blue	3.5	4.0	50	600	20	470	④①

● External Dimensions (unit : mm)

Fig. 1

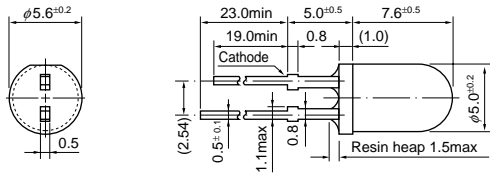


Fig. 2

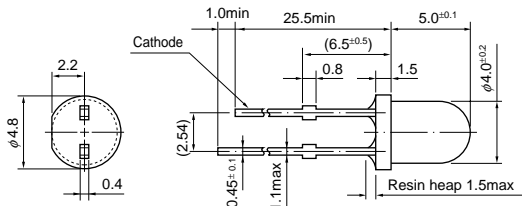


Fig. 3

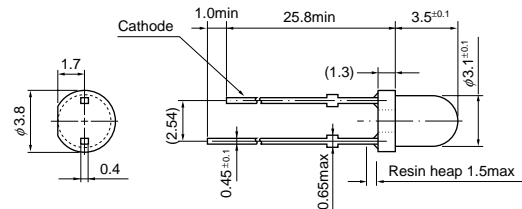


Fig. 4

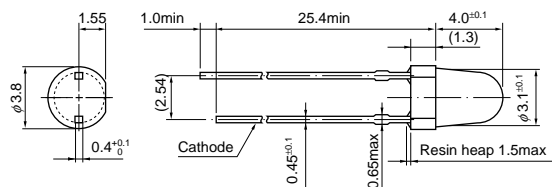


Fig. 5

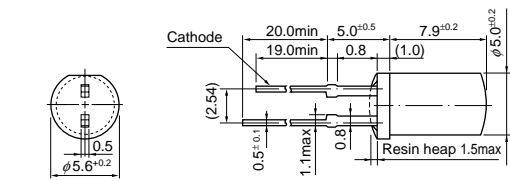


Fig. 6

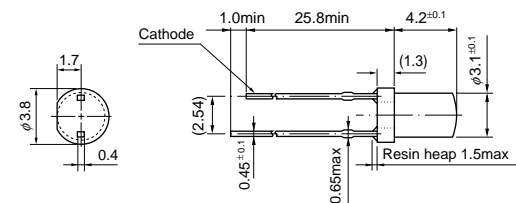


Fig. 7

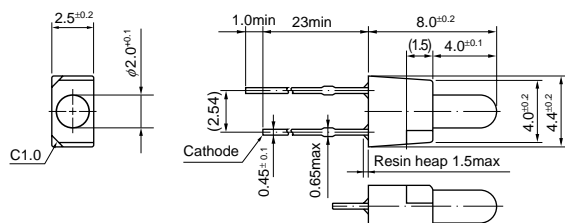


Fig. 8

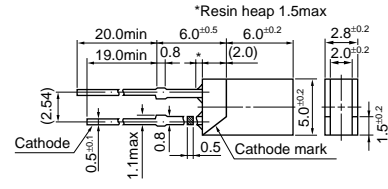


Fig. 9

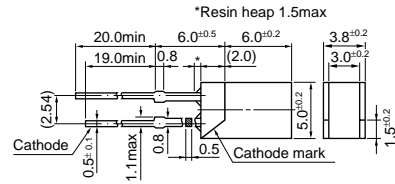


Fig. 10

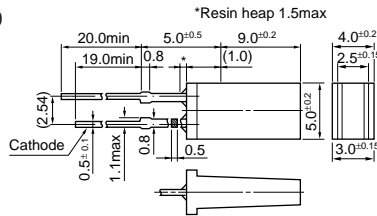


Fig. 11

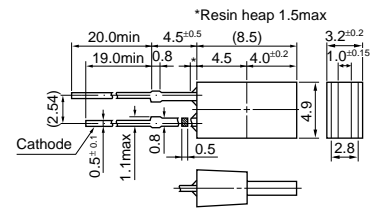


Fig. 12

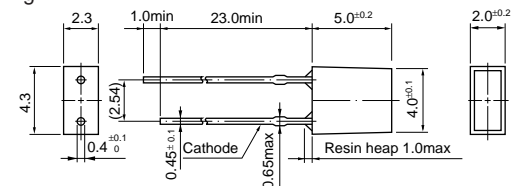


Fig. 13

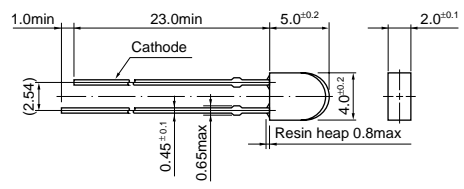


Fig. 14

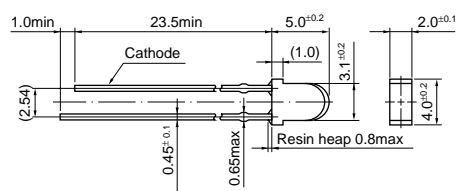


Fig. 15

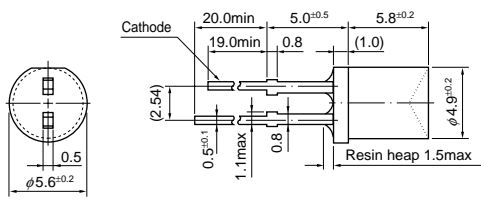


Fig. 16

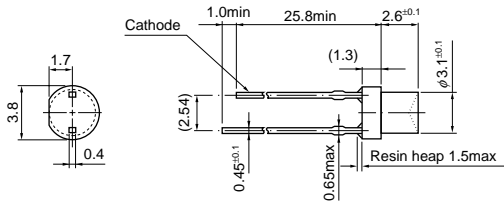


Fig. 17

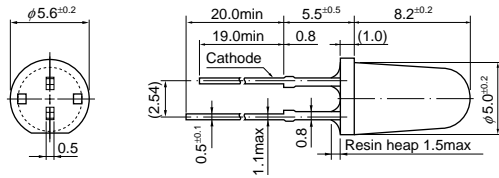


Fig. 18

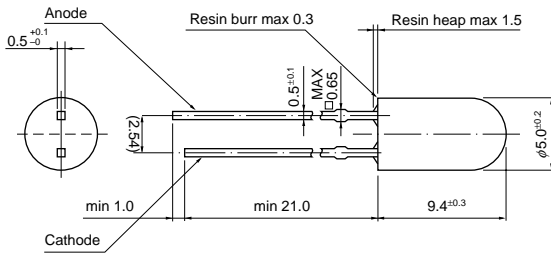


Fig. 19

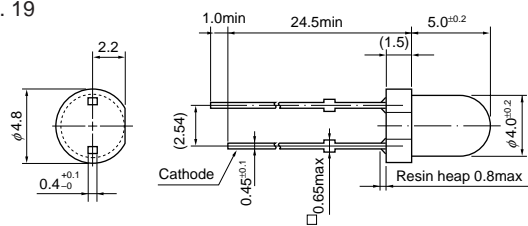


Fig. 20

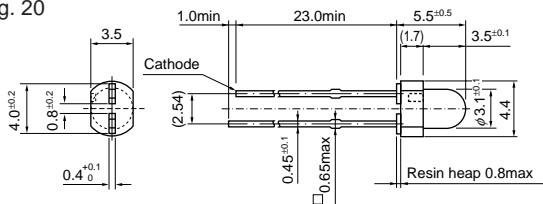


Fig. 21

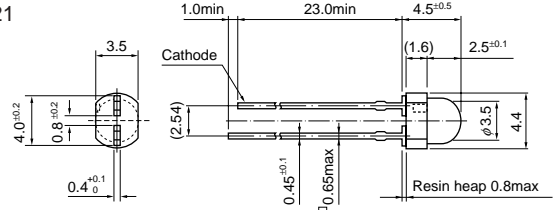


Fig. 22

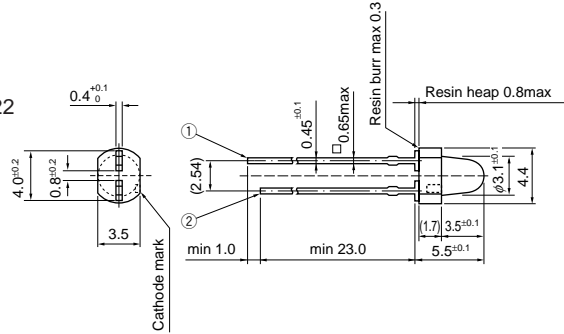


Fig. 23

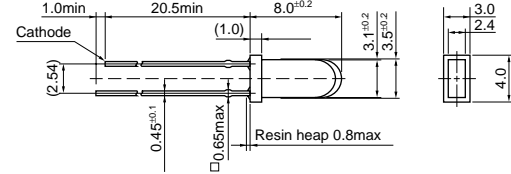


Fig. 24

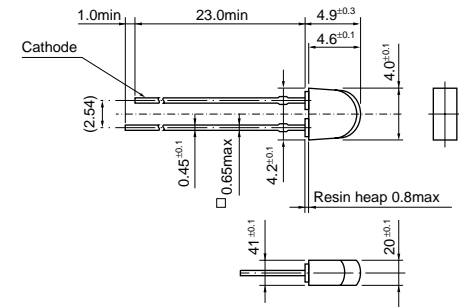


Fig. 25

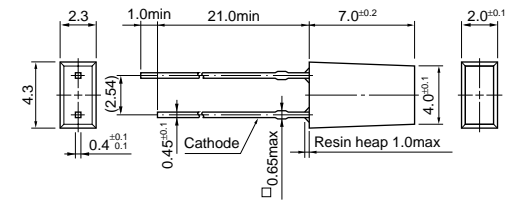


Fig. 26

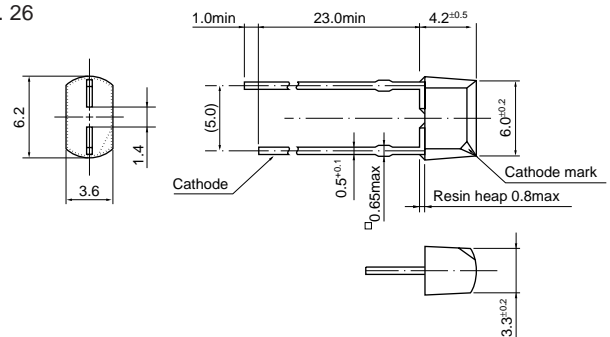


Fig. 27

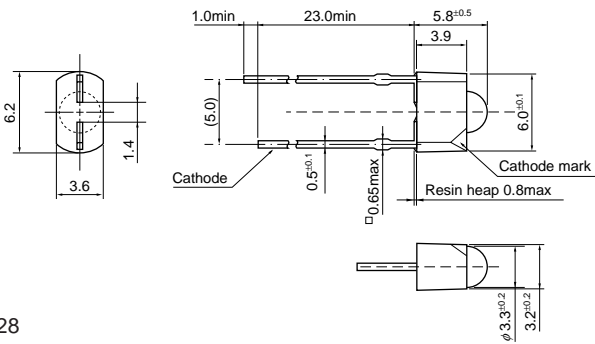


Fig. 28

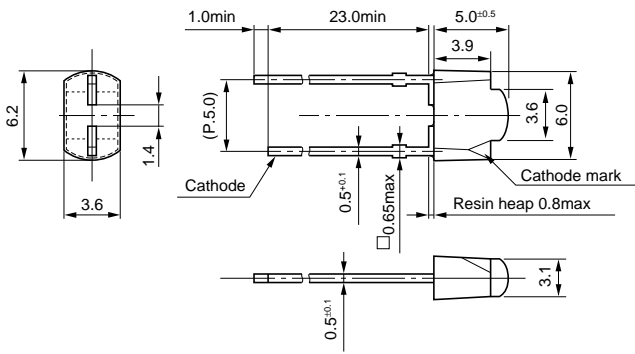


Fig. 29

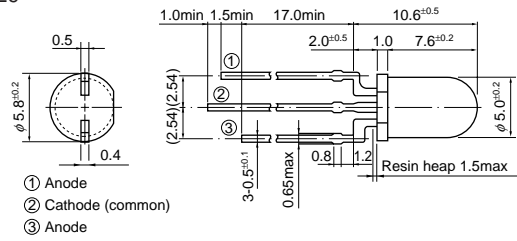


Fig. 30

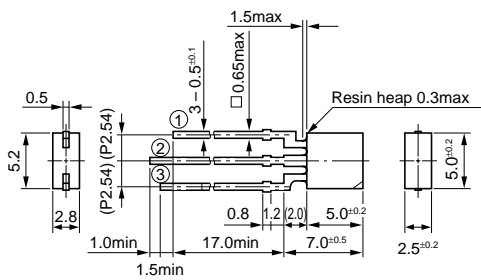


Fig. 31

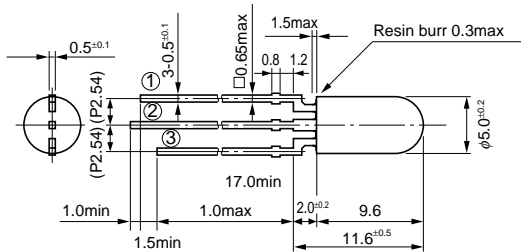


Fig. 32

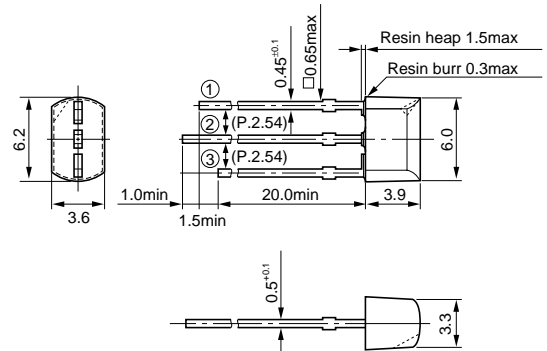


Fig. 33

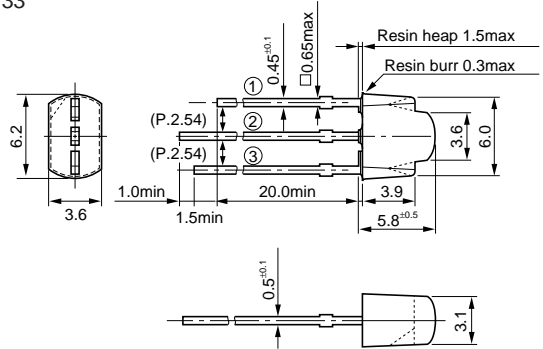


Fig. 34

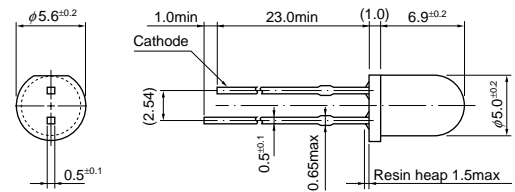


Fig. 35

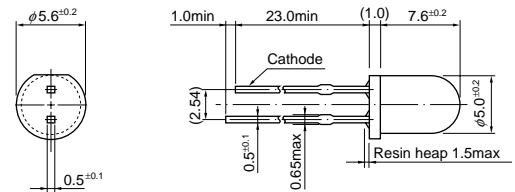


Fig. 36

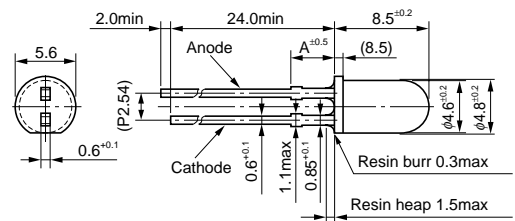


Fig. 37

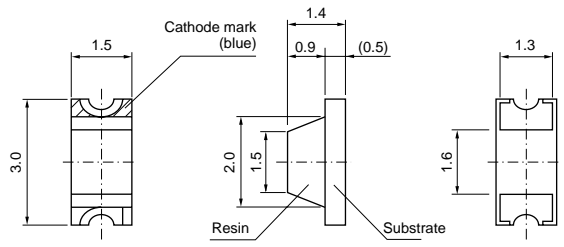


Fig. 40

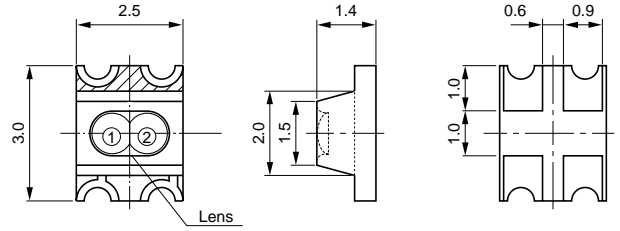


Fig. 38

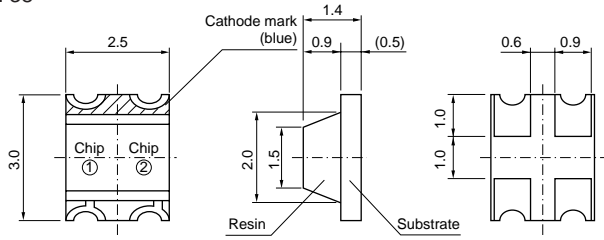


Fig. 41

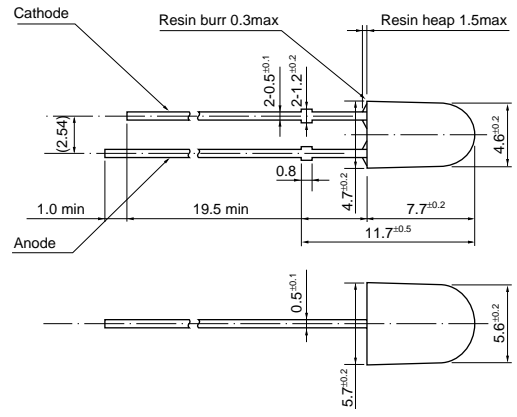
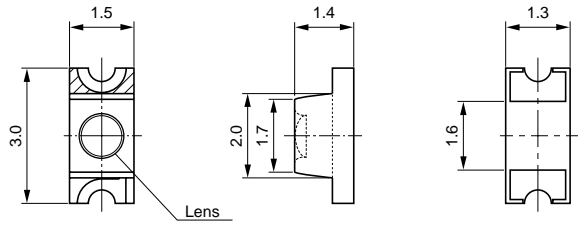


Fig. 39



Index (Type No. Order)

Index (Type No. Order)

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2SA1186		2SC3830	
2SA1215	Transistors for Audio Amplifier (LAPT)	2SC3831	Transistors for Switch Mode Power Supply (For AC 80 to 130V input)
2SA1216		2SC3832	
2SA1262	General Purpose Transistor	2SC3833	
2SA1294		2SC3834	Transistors for Humidifier
2SA1295	Transistors for Audio Amplifier (LAPT)	2SC3835	
2SA1303		2SC3851	General Purpose Transistor
2SA1386		2SC3852	Low $V_{CE(sat)}$ · High h_{FE} Transistor
2SA1488	General Purpose Transistor	2SC3856	
2SA1492		2SC3857	Transistors for Audio Amplifier (Single Emitter)
2SA1493	Transistors for Audio Amplifier (Single Emitter)	2SC3858	
2SA1494		2SC3890	Transistors for Switch Mode Power Supply (For AC 80 to 130V input)
2SA1567	Low $V_{CE(sat)}$ · High h_{FE} Transistor	2SC3927	Transistors for Switch Mode Power Supply (For AC 180 to 280V input)
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2SA1667	General Purpose Transistor	2SC4024	
2SA1668		2SC4064	Low $V_{CE(sat)}$ · High h_{FE} Transistor
2SA1673		2SC4065	
2SA1693		2SC4073	Transistors for Switch Mode Power Supply (For AC 80 to 130V input)
2SA1694	Transistors for Audio Amplifier (Single Emitter)	2SC4130	
2SA1695		2SC4131	Low $V_{CE(sat)}$ · High h_{FE} Transistor
2SA1725		2SC4138	
2SA1726		2SC4139	Transistors for Switch Mode Power Supply (For AC 80 to 130V input)
2SA1746	Low $V_{CE(sat)}$ · High h_{FE} Transistor	2SC4140	
2SA1859	Transistors for Audio Amplifier (Temperature Compensation Driver)	2SC4153	Transistors for Humidifier
2SA1860	Transistors for Audio Amplifier (LAPT)	2SC4296	
2SA1907		2SC4297	Transistors for Switch Mode Power Supply (For AC 80 to 130V input)
2SA1908	Transistors for Audio Amplifier (Single Emitter)	2SC4298	
2SA1909		2SC4299	
2SB1257		2SC4300	Transistors for Switch Mode Power Supply (For AC 180 to 280V input)
2SB1258		2SC4301	
2SB1259		2SC4304	
2SB1351	Darlington Transistor	2SC4381	General Purpose Transistor
2SB1352		2SC4382	
2SB1382		2SC4388	Transistors for Audio Amplifier (Single Emitter)
2SB1383		2SC4418	Transistors for Switch Mode Power Supply (For AC 80 to 130V input)
2SB1420		2SC4434	
2SB1559		2SC4445	Transistors for Switch Mode Power Supply (For AC 180 to 280V input)
2SB1560		2SC4466	
2SB1570		2SC4467	Transistors for Audio Amplifier (Single Emitter)
2SB1587		2SC4468	
2SB1588		2SC4495	Low $V_{CE(sat)}$ · High h_{FE} Transistor
2SB1624	Transistors for Audio Amplifier (Darlington)	2SC4495	Transistors for Audio Amplifier (Temperature Compensation/Driver)
2SB1625		2SC4511	Transistors for Audio Amplifier (Single Emitter)
2SB1626		2SC4512	
2SB1647		2SC4517	Transistors for Switch Mode Power Supply (For AC 180 to 280V input)
2SB1648		2SC4518	
2SB1649		2SC4546	Transistors for Switch Mode Power Supply (For AC 80 to 130V input)
2SB1659		2SC4557	Transistors for Switch Mode Power Supply (For AC 180 to 280V input)
2SC2023	General Purpose Transistor	2SC4662	Transistors for Switch Mode Power Supply (For AC 80 to 130V input)
2SC2837		2SC4706	Transistors for Switch Mode Power Supply (For AC 180 to 280V input)
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2SC2922		2SC4886	Transistors for Audio Amplifier (LAPT)
2SC3179	General Purpose Transistor	2SC4907	Transistors for Switch Mode Power Supply (For AC 80 to 130V input)
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2SC3284		2SC5003	Transistors for Display Horizontal Deflection Output (With Built-in damper diode)
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2SC3678		2SC5099	Transistors for Audio Amplifier (Single Emitter)
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2SK1181		26
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2SK1191		26
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2SK2779		26
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FMB-36M		40
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FMB-G16L	Schottky Barrier Diode (1-Chip Frame)	40
FMB-G19L		40
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FMQ-G2FLS	Damper Diode (For CRT Display)	39
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FMU-14S, R	Fast Recovery Rectifier Diode (Center Tap)	37

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FMU-32S, R		37
FMU-34S, R		37
FMU-36S, R		37
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FMU-G2YXS		37
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RM 26		RU 4D	Damper Diode (For CRT Display)
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RM 2C		RU 4Y	Fast Recovery Rectifier Diode (Axial)
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RM 4B		RZ1065	
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SEL4228C		49

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SEL4410E	Standard LEDs	48	SEL6210R		50
SEL4410G		48	SEL6210S		50
SEL4414E	Contact Mount LEDs for Automatic Insertion	50	SEL6214S		50
SEL4414G		50	SEL6215S		50
SEL4417G	Standard LEDs	48	SEL6410E		50
SEL4425E		49	SEL6410G		50
SEL4425G		49	SEL6414E		50
SEL4426E	Contact Mount LEDs for Automatic Insertion	50	SEL6415E		50
SEL4426G		50	SEL6427EP		50
SEL4427E	Standard LEDs	49	SEL6510C		50
SEL4428E		49	SEL6510G	Contact Mount LEDs for Automatic Insertion	50
SEL4429E	Contact Mount LEDs for Automatic Insertion	50	SEL6514C		50
SEL4510C	Standard LEDs	48	SEL6515C		50
SEL4527C		49	SEL6710K		50
SEL4528C		49	SEL6710Y		50
SEL4710K	Standard LEDs	48	SEL6810A		50
SEL4710Y		48	SEL6810D		50
SEL4714K	Contact Mount LEDs for Automatic Insertion	50	SEL6814A		50
SEL4714Y		50	SEL6815A		50
SEL4717Y	Standard LEDs	48	SEL6910A		50
SEL4725K		49	SEL6910D		50
SEL4725Y		49	SEL6914A		50
SEL4726K	Contact Mount LEDs for Automatic Insertion	50	SEL6915A		50
SEL4726Y		50	SELU1210CXM		52
SEL4728K	Standard LEDs	49	SELU1250CM		52
SEL4810A		48	SELU1253CM		52
SEL4810D		48	SELU1710CXM		52
SEL4814A	Contact Mount LEDs for Automatic Insertion	50	SELU1750CM		52
SEL4814D		50	SELU1753CM	AlGaInP Ultra-High Intensity LEDs	52
SEL4817D	Standard LEDs	48	SELU1810CXM		
SEL4825A		49	SELU1850CM		52
SEL4825D		49	SELU1853CM		52
SEL4826A	Contact Mount LEDs for Automatic Insertion	50	SELU1910CXM		52
SEL4826D		50	SELU1950CM		52
SEL4828A	Standard LEDs	49	SELU1953CM		52
SEL4829A	Contact Mount LEDs for Automatic Insertion	50	SELU1E53BMKT	Blue LEDs	52
SEL4910A	Standard LEDs	48	SFPA-51		40
SEL4910D		48	SFPA-53		40
SEL4914A	Contact Mount LEDs for Automatic Insertion	50	SFPA-63		40
SEL4914D		50	SFPA-73		40
SEL4917D	Standard LEDs	48	SFPB-52		40
SEL4925A		49	SFPB-54		40
SEL4925D		49	SFPB-56		40
SEL4926A	Contact Mount LEDs for Automatic Insertion	50	SFPB-59		40
SEL4926D		50	SFPB-62		40
SEL4928A	Standard LEDs	49	SFPB-64	Schottky Barrier Diode (Surface Mount)	40
SEL5220S		50	SFPB-66		40
SEL5221S		50	SFPB-69		40
SEL5223S		50	SFPB-72		40
SEL5420E	Standard LEDs	50	SFPB-74		40
SEL5421E		50	SFPB-76		40
SEL5423E		50	SFPE-63		40
SEL5520C	Contact Mount LEDs for Automatic Insertion	50	SFPE-64		40
SEL5521C		50	SFPJ-53		40
SEL5820A		50	SFPJ-63		40
SEL5821A		50	SFPJ-73		40
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SI-3033C		4
SI-3050C		4
SI-3050F		4
SI-3050J		4
SI-3050N		4
SI-3050R		5
SI-3051N		4
SI-3052N		4
SI-3052P		5
SI-3052V		5
SI-3090C		4
SI-3090F		4
SI-3090J		4
SI-3090N		4
SI-3091N		4
SI-3092N		4
SI-3120C		4
SI-3120F		4
SI-3120J	Dropper Type IC Regulator	4
SI-3120N		4
SI-3121N		4
SI-3122N		4
SI-3122P		5
SI-3122V		5
SI-3150C		4
SI-3150F		4
SI-3150J		4
SI-3150N		4
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SI-3152N		4
SI-3152P		5
SI-3152V		5
SI-3157F		4
SI-3240C		4
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SI-8033S		2
SI-8050S		2
SI-8090S	Switching Type IC Regulator	2
SI-8120S		2
SI-8150S		2
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SI-8202L		3
SI-8203L		3
SI-8204L		3
SI-8211L		3
SI-8213L		3
SI-8221L		3
SI-8301L		3
SI-8303L		3
SI-8401L		3
SI-8402L		3
SI-8403L	Switching Type IC Regulator with Coil	3
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SLA4030	Sink Drive Transistor Array (General Purpose)	20
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SLA4041	Sink Drive Transistor Array with Built-in Flywheel Diode	20
SLA4060	Sink Drive Transistor Array (General Purpose)	20
SLA4061	Sink Drive Transistor Array with Built-in Flywheel Diode	20
SLA4070	Source Drive Transistor Array (General Purpose)	20
SLA4071	Source Drive Transistor Array with Built-in Flywheel Diode	20
SLA4310		20
SLA4313		20
SLA4340	H-Bridge Transistor Array	20
SLA4390		20
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SLA5007		27
SLA5008	MOSFET Array (Stepper Motor and DC Motor Driving)	27
SLA5009		27
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SLA5012	MOSFET Array (5-Phase Motor Driving)	27
SLA5013	MOSFET Array (Stepper Motor and DC Motor Driving)	27
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SLA5017	MOSFET Array (DC Motor Driving)	27
SLA5018	MOSFET Array (Stepper Motor and DC Motor Driving)	27
SLA5021	MOSFET Array ("S" Shape Correction Circuit Switch for CRT Display)	27
SLA5022	Transistor Array (3-Phase Motor Driver)	20
SLA5024	MOSFET Array (Stepper Motor and Solenoid Driving)	27
SLA5029	MOSFET Array (5-Phase Motor Driving)	27
SLA5031	MOSFET Array (Stepper Motor and Solenoid Driving)	27
SLA5037		27
SLA5038	MOSFET Array ("S" Shape Correction Circuit Switch for CRT Display)	27
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SLA5041		27
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SLA5047		27
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SLA6020		20
SLA6022	Transistor Array (3-Phase Motor Driver)	20
SLA6023		20
SLA6030		20
SLA6503	Stepper Motor Driver IC (Bipolar Driver)	6
SLA7022MU		6
SLA7024M		6
SLA7026M		6
SLA7027MU	Stepper Motor Driver IC (Unipolar Driver)	6
SLA7029M		6
SLA7042M		6
SLA7044M		6
SLA8001	H-Bridge Transistor Array	20
SMA4020	Source Drive Transistor Array (General Purpose)	20
SMA4021	Source Drive Transistor Array with Built-in Flywheel Diode	20
SMA4030	Sink Drive Transistor Array (General Purpose)	20
SMA4032		20
SMA4033	Sink Drive Transistor Array with Built-in Flywheel Diode	20
SMA5101		27
SMA5102	MOSFET Array (Stepper Motor and Solenoid Driving)	27
SMA5103	MOSFET Array (Stepper Motor and DC Motor Driving)	27
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SMA6511		20
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STA303A	Sink Drive Transistor Array (General Purpose and 3-Phase Motor Driver)	20
STA304A		20
STA305A	Transistor Array (3-Phase Motor Driver)	20
STA312A	Sink Drive Transistor Array (General Purpose)	20
STA322A	Source Drive Transistor Array (General Purpose)	20
STA401A	Sink Drive Transistor Array with Avalanche Diode	20
STA402A	Source Drive Transistor Array (General Purpose)	20
STA403A		20
STA404A	Sink Drive Transistor Array (General Purpose)	20
STA406A		20
STA407A	Sink Drive Transistor Array with Avalanche Diode	20
STA408A	Source Drive Transistor Array (General Purpose)	20
STA412A	Sink Drive Transistor Array (General Purpose)	20
STA413A	Sink Drive Transistor Array with Avalanche Diode	20
STA414A	Sink Drive Transistor Array (General Purpose)	20
STA421A	Source Drive Transistor Array (General Purpose)	20
STA431A		20
STA434A	H-Bridge Transistor Array	20
STA435A	Sink Drive Transistor Array with Avalanche Diode	20
STA457C		20
STA458C	H-Bridge Transistor Array	20
STA460C		20
STA471A	Sink Drive Transistor Array with Avalanche Diode	20
STA472A	Source Drive Transistor Array (General Purpose)	20
STA473A	Sink Drive Transistor Array (General Purpose)	20
STA475A		20
STA481A	Sink Drive Transistor Array with Avalanche Diode	20
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TF361M			
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TF521M			
TF521S			
TF541M	Thyristors		
TF541S			
TF541S-A			
TF561M			
TF561S			
TF561S-A			
TF821M			
TF821S			
TF841M			
TF841S			
TF861M			
TF861S			
TFD312S-C			
TFD312S-F			
TFD312S-G			
TFD312S-J			
TFD312S-K	Thyristors (with built-in Avalanche Diode)		
TFD312S-L			
TFD312S-M			
TFD312S-N			
TFD312S-O			
TM1041S-L	Triacs		
TM1041S-R			

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