

CAT.No.F072-4

# ▶ **Semiconductor Short Form Catalog**



⚠ Although we are constantly making every effort to improve the quality and reliability of our products, there nevertheless remains a certain probability that the semiconductor products may occasionally fail or malfunction. Please take careful precautions against product failures or malfunctions to avoid any injuries, fire accidents or social loss by implementing safety designs such as redundancy designs, designs for fire spread prevention, and designs for preventing malfunctions.

⚠ Our semiconductor products listed in this document are not designed or manufactured to be used in devices or systems requiring extremely high levels of quality and reliability, or the failure or malfunction of which may directly threaten human lives or cause injury. In the cases where the products are to be used in devices or systems for special applications or devices or systems for specialized applications shown below, always make sure to consult us in advance.

**Special Applications**

Transportation device (automotive, marine, etc), communication devices for core network, traffic signal devices, fire prevention/anticrime devices, various safety devices, medical devices, etc.

**Specialized Applications**

Nuclear power control systems, aircraft and aerospace devices, submarine relay devices, and systems for preserving life, etc.

Even if it is not for a special or specialized application, when IC products are to be used for devices or systems that are desired to last for a long period under continuous operation, please make sure to consult us in advance.



**RECTIFIER DIODES**  
.....

**SCHOTTKY BARRIER DIODES**  
.....

**SUPER FAST RECOVERY DIODES**  
.....

**POWER MOSFETs**  
.....

**SIDAC**  
.....

**SURGE ABSORBERS**  
.....

**POWER ICs**  
.....

# Semiconductor Short Form Catalog

## CONTENTS

---



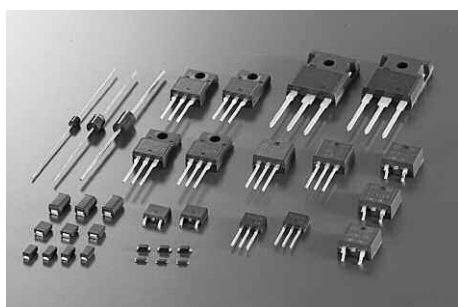
### **1. RECTIFIER DIODES** **7**

---

Rectifier Diodes .....7

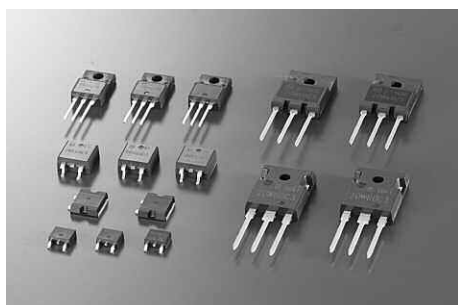
Schottky Barrier Diodes .....12

Super Fast Recovery Diodes .....17



### **2. POWER MOSFETS** **21**

---



**3. SIDAC (Silicon Diode for Alternating Current) 22**

---

**4. SURGE ABSORBERS 24**

---

- Varistors .....24
- Trankillers .....24
- Power Clampers .....25
- Thyristor Surge Suppressors .....25

**5. POWER ICs 27**

---

- Stepper Motor Driver ICs .....27
- Power ICs for Interface .....27
- DC-DC Converter Power ICs .....28
- Partial Resonance Power Supply ICs .....29

**6. Outline Dimensions 30**

---

**7. Naming/Outline of Packing Form 44**

---

**8. Ordering Quantity and Packing Form 46**

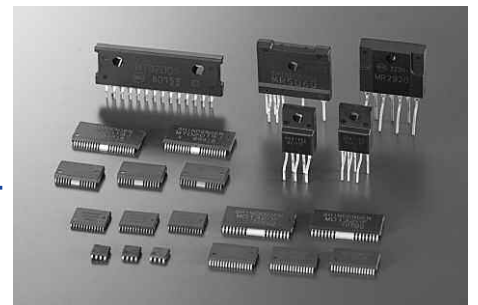
---

**9. Code No. (Taping) 48**

---

**10. Lead Forming 50**

---



# ALPHANUMERIC PRODUCT INDEX

Part No.	Page	Part No.	Page	Part No.	Page	Part No.	Page
D10SBS4	16	D20LC20U	19	D3S6M	12	DE5VE40	7
D10XB60	8	D20LC40	19	D3SB60	8	DF10L60	17
D10XB60H	8	D20SC9M	14	D3SB80	8	DF10LC20U	18
D10XB80	8	D20XB60	8	D3SBA60	8	DF10LC30	18
D120LC40	19	D20XB80	8	D45XT160	11	DF10NC15	13
D120LC40B	19	D20XBS6	16	D45XT80	11	DF10SC4M	13
D120SC4M	14	D240LC40	19	D4F60	7	DF10SC6	13
D120SC6M	14	D240SC4M	14	D4SB60L	8	DF10SC9	13
D15XB60	8	D240SC6M	14	D4SB80	8	DF15JC10	13
D15XB60H	8	D25SC6M	14	D4SBL20U	20	DF15NC15	13
D15XB80	8	D25SC6MR	15	D4SBL40	20	DF15SC4M	13
D15XB100	8	D25XB60	8	D4SBN20	16	DF15VD60	7
D15XBN20	16	D25XB80	8	D4SBS4	16	DF20JC10	13
D15XBS6	16	D25XB100	8	D4SBS6	16	DF20L60	17
D180SC4M	14	D2F60	7	D50XB80	8	DF20L60U	17
D180SC6M	14	D2FK60	17	D5SB60	8	DF20LC20US	18
D1F60	7	D2FL20U	17	D5SB80	8	DF20LC30	18
D1F60A	7	D2FL40	17	D5SBA60	8	DF20NC15	13
D1FH3	12	D2FS4	12	D6SB60L	8	DF20PC3M	13
D1FJ10	12	D2FS6	12	D6SB80	8	DF20SC4M	13
D1FJ4	12	D2L20U	17	D6SBN20	16	DF20SC9M	13
D1FK60	17	D2L40	17	DE10P3	12	DF25SC6M	13
D1FK70	17	D2S4M	12	DE10PC3	13	DF25V60	7
D1FL20U	17	D2S6M	12	DE10S3L	12	DF30JC10	13
D1FL40	17	D2SB60	8	DE10SC3L	13	DF30JC4	13
D1FL40U	17	D2SB60A	8	DE10SC4	13	DF30JC6	13
D1FM3	12	D2SBA60	8	DE3L20U	17	DF30NC15	13
D1FP3	12	D30L60	18	DE3L40	17	DF30PC3M	13
D1FS4	12	D30SC4M	14	DE3S4M	12	DF30SC3ML	13
D1FS4A	12	D30VC60	11	DE3S6M	12	DF30SC4M	13
D1FS6	12	D30XBN20	16	DE5L60	17	DF40PC3	13
D1N60	7	D30XT80	11	DE5L60U	17	DF40SC3L	13
D1NF60	17	D360SC4M	14	DE5LC20U	18	DF40SC4	13
D1NK60	17	D360SC6M	14	DE5LC40	18	DF5VD60	7
D1NL20U	17	D3F60	7	DE5PC3	13	DF8L60US	17
D1NL40	17	D3FJ10	12	DE5S4M	12	DL04-18F1	24
D1NS4	12	D3FP3	12	DE5S6M	12	F11F60C3M	21
D1NS6	12	D3FS4A	12	DE5SC3ML	13	F11F80C3M	21
D1UBA80	9	D3FS6	12	DE5SC4M	13	F11S60C3	21
D200LC40B	19	D3S4M	12	DE5SC6M	13	F11S80C3	21

Part No.	Page	Part No.	Page	Part No.	Page	Part No.	Page
F15F60C3M	21	K1V36(W)	22	M1FS4	12	MTD1120	27
F15S60C3	21	K1V38(W)	22	M1FS6	12	MTD1120F	27
F15W60C3	21	K1V5	22	M2F60	7	MTD1361	27
F20F60C3M	21	K1V6	22	M2FH3	12	MTD1361F	27
F20S60C3	21	KL3L07	25	M2FL20U	17	MTD2002F	27
F20W60C3	21	KL3N14	25	M2FM3	12	MTD2003F	27
F24W60C3	21	KL3R20	25	M3F60	7	MTD2005	27
F35W60C3	21	KL3Z07	25	M3FE40	7	MTD2005F	27
F47W60C3	21	KL3Z18	25	M3FL20U	17	MTD2006F	27
F7F60C3M	21	KP10L06	25	MD1222N	28	MTD2007F	27
FP11W60C3	21	KP10L08	25	MD1320F	28	MTD2009J	27
FP15W60C3	21	KP10LU07	26	MD1320N	28	S10VB60	10
FP20W60C3	21	KP10N14	25	MD1322F	28	S10VT60	11
FP35W60C3	21	KP15L08	25	MD1322N	28	S10VT80	11
G1V(A)10C	23	KP15N14	25	MD1323R	28	S10VTA60	11
G1V(A)12C	23	KP15R25	25	MD1324R	28	S10VTA80	11
G1V(A)14C	23	KP4L07	25	MD1333N	28	S10WB60	10
G1V(A)15C	23	KP4N12	25	MD1421N	28	S15VB60	10
G1V(A)20C	23	KU10L08	25	MD1422N	28	S15VT60	11
G1V(A)8C	23	KU10LU07	26	MD1423N	28	S15VT80	11
G1V(B)20C	23	KU10N14	25	MD1423R	28	S15VTA60	11
G1V(B)22C	23	KU15N14	25	MD1424R	28	S15VTA80	11
G1V(B)24C	23	LL15XB60	9	MD1620F	28	S15WB60	10
G1VL10C	23	LL25XB60	9	MD3221N	28	S1NAD80	7
G1VL22C	23	LN15XB60	9	MD3221R	28	S1NB60	9
G1VL8C	23	LN15XB60H	9	MD3222N	28	S1NB80	9
K1V(A)10	22	LN1VB60	9	MD5001T	28	S1NBB80	9
K1V(A)11	22	LN1WBA60	9	MR4010	29	S1NBC60	9
K1V(A)12	22	LN25XB60	9	MR4020	29	S1NBC80	9
K1V(A)16	22	LN4SB60	9	MR4030	29	S1VB60	8
K1V10	22	LN6SB60	9	MR4040	29	S1VB80	8
K1V11	22	M1F60	7	MR4500	29	S1VBA60	8
K1V12	22	M1F80	7	MR4510	29	S1WB(A)60	9
K1V14	22	M1FE40	7	MR4520	29	S1WB(A)60B	9
K1V22	22	M1FH3	12	MR4530	29	S1WB(A)80	9
K1V22(W)	22	M1FJ4	12	MR4710	29	S1YB60	9
K1V24	22	M1FL20U	17	MR4720	29	S1ZAS4	16
K1V24(W)	22	M1FL40	17	MTA001M	27	S1ZB60	9
K1V26	22	M1FM3	12	MTA002	27	S1ZB80	9
K1V26(W)	22	M1FP3	12	MTA011	27	S20LC20UST	19

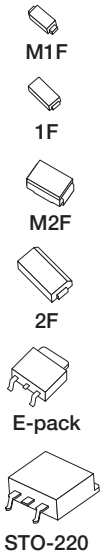
# ALPHANUMERIC PRODUCT INDEX

Part No.	Page	Part No.	Page	Part No.	Page	Part No.	Page
S20LC30	19	SG10SC4M	14	US20KB80R	8		
S20LC60US	19	SG10SC6M	14	US30KB80R	8		
S20VT60	11	SG10SC9M	14	US4KB80R	8		
S20VT80	11	SG10TC15M	14	US6KB80R	8		
S20VTA60	11	SG20LC20USM	19	US8KB80R	8		
S20VTA80	11	SG20SC6M	14	VR-51B	24		
S20WB60	10	SG20TC10M	14	VR-60B(A)	24		
S20WB80	10	SG20TC12M	14	VR-60BP(A)	24		
S25VB60	10	SG20TC15M	14	VR-61B(A)	24		
S25VB80	10	SG30SC6M	14	VR61F1	24		
S2L20U	17	SG30TC10M	14	VR YA15	24		
S2L40	17	SG30TC12M	14	VR YA6	24		
S2L60	17	SG30TC15M	14				
S2V60	7	SG40TC10M	14				
S2VB60	10	SG40TC12M	14				
S30SC4MT	14	SG5LC20USM	19				
S30VT60	11	ST02D-140	25				
S30VT80	11	ST02D-170	25				
S30VTA160	11	ST02D-170F2	25				
S30VTA60	11	ST02D-200	25				
S30VTA80	11	ST02D-82	25				
S3K60	17	ST03-58F1	24				
S3L20U	17	ST03-68F1	24				
S3L40	17	ST03D-140	25				
S3L60	17	ST03D-170	25				
S3V60	7	ST03D-200	25				
S3WB60	10	ST03D-82	25				
S4VB60	10	ST04-14F1	24				
S50VB60	10	ST04-16F1	24				
S50VB80	10	ST04-18F1	24				
S5VB60	10	ST04-27	24				
S60SC4MT	14	ST04-27F1	24				
S60SC6MT	14	ST70-27F	24				
SF10L60U	18	ST70-27MF	24				
SF20L60U	18	ST80-14MF	24				
SF20LC30	19	UD2KB80	8				
SF3L60U	18	UD3KB80	8				
SF5L60U	18	UD4KB80	8				
SF8L60USM	18	US10KB80R	8				
SG10LC20USM	19	US15KB80R	8				



## Single

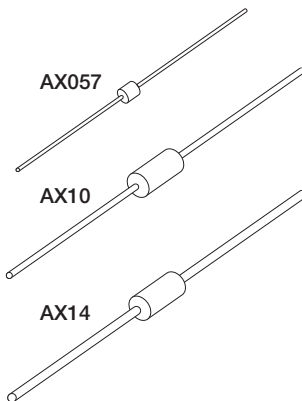
### Surface Mount



Type No.	Absolute Maximum Ratings						Electrical Characteristics						Outline	
	I <sub>o</sub> [A]	Conditions T <sub>a</sub> [°C]	I <sub>FSM</sub> [A]	V <sub>RM</sub> [V]	T <sub>stg</sub> [°C]	T <sub>j</sub> [°C]	V <sub>F</sub> (max) [V]	Conditions I <sub>F</sub> [A]	I <sub>R</sub> (max) V <sub>R</sub> =V <sub>RM</sub> [μA]	θ <sub>j</sub> (max) [°C/W]	θ <sub>ja</sub> (max) [°C/W]	θ <sub>jc</sub> (max) [°C/W]	Package	Fig.
M1FE40	2	103*2	25	400	-55 to 150	150	1.1	1	10	20	80	18	M1F	12
M1F60	1	25	25	600	-55 to 150	150	1.1	1	10	20	108	—		
M1F80			800	-55 to 150										
D1F60	1	25	25	600	-55 to 150	150	1.1	1	10	23	108	—	1F	13-1
D1F60A	1.2		45	600			0.97	1.2						
D2F60	1.4	25	60	600	-55 to 150	150	1.05	1.4	10	24	90	—	2F	16-1
M2F60	1.2	51	50	600	-55 to 150	150	0.97	1.2	10	33	90	—	M2F	15-1
M3FE40*3	3	76*1	75	400	-55 to 150	150	1.1	3	10	25	110	25		
M3F60	3	100*1	90	600	-55 to 150	150	1.05	3	10	16	55	—		
D3F60	3	80*1	150	600	-55 to 150	150	1.05	3	10	23	80	—	2F	16-1
D4F60	4	68*1	200	600	-55 to 150	150	0.95	4	10	23	80	—		
☆DE5VE40*3	5	130*2	80	400	-55 to 150	150	1	5	10	—	—	4	E-pack	31-5
DF25V60	25	136*2	400	600	-55 to 150	150	1.1	25	10	—	—	0.5	STO-220	36-2

☆: New product \* 1: T<sub>I</sub> \* 2: T<sub>c</sub> \* 3: High ESD Capability

### Axial



Type No.	Absolute Maximum Ratings						Electrical Characteristics						Outline		
	I <sub>o</sub> [A]	Conditions T <sub>a</sub> [°C]	I <sub>FSM</sub> [A]	V <sub>RM</sub> [V]	T <sub>stg</sub> [°C]	T <sub>j</sub> [°C]	V <sub>F</sub> (max) [V]	Conditions I <sub>F</sub> [A]	I <sub>R</sub> (max) V <sub>R</sub> =V <sub>RM</sub> [μA]	θ <sub>j</sub> (max) [°C/W]	θ <sub>ja</sub> (max) [°C/W]	Package	Color Code	Fig.	
D1N60*2	1	25	30	600	-55 to 150	150	1.05	1	10	10	113	AX057	—	1	
S2V60*2	1.7	40	60	600	-55 to 150	150	1.05	1.7	10	8	—	AX10	Blue	6-1	
S3V60*2	3.5	40	120	600	-55 to 150	150	1.05	2.6	10	6.5	—	AX14	Blue	8	

\* 1: Spec Code 7□□□ \* 2: Spec Code 5□□□ (See page 46 for the last 3 digits of the Spec Code)

### Twin

### Array



Type No.	Absolute Maximum Ratings						Electrical Characteristics						Outline	
	I <sub>o</sub> [A]	Conditions T <sub>a</sub> [°C]	I <sub>FSM</sub> [A]	V <sub>RM</sub> [V]	T <sub>stg</sub> [°C]	T <sub>j</sub> [°C]	V <sub>F</sub> (max) [V]	Conditions I <sub>F</sub> [A]	I <sub>R</sub> (max) V <sub>R</sub> =V <sub>RM</sub> [μA]	θ <sub>j</sub> (max) [°C/W]	θ <sub>ja</sub> (max) [°C/W]	Package	Fig.	
S1NAD80	3	102	110	800	-55 to 150	150	1.05	0.75	10	15	84	1NA	27-2	



### Doubler



Type No.	Absolute Maximum Ratings						Electrical Characteristics						Outline	
	I <sub>o</sub> [A]	Conditions T <sub>a</sub> [°C]	I <sub>FSM</sub> [A]	V <sub>RM</sub> [V]	T <sub>stg</sub> [°C]	T <sub>j</sub> [°C]	V <sub>F</sub> (max) [V]	Conditions I <sub>F</sub> [A]	I <sub>R</sub> (max) V <sub>R</sub> =V <sub>RM</sub> [μA]	θ <sub>jc</sub> (max) [°C/W]	Package	Fig.		
DF5VD60	5	140	140	600	-40 to 150	150	1.05	2.5	10	2	STO-220	36-5		
DF15VD60	15	127	190	600	-40 to 150	150	1.05	7.5	10	1.6				

# Rectifier Diodes

## SIP Bridge Diodes

Type No.	Absolute Maximum Ratings						Electrical Characteristics						Remarks	Outline							
	I <sub>o</sub> [A]	Conditions T <sub>c</sub> [°C]	IFSM [A]	VRM [V]	Tstg [°C]	Tj [°C]	VF (max) [V]	Conditions IF [A]	IR (max) V <sub>R</sub> =V <sub>RM</sub> [μA]	θ <sub>j</sub> (max) [°C/W]	θ <sub>ja</sub> (max) [°C/W]	θ <sub>jc</sub> (max) [°C/W]		Package	Fig.						
																Package	Fig.				
S1VB60	1	25*1	30	600	-40 to 150	150	1.05	0.5	10	16	62	—	—	1V	55						
S1VB80				800																	
S1VBA60	1	25*1	50	600	-40 to 150	150	1.05	0.5	10	16	62	—	Large IFSM	1V	55						
D2SBA60	1.5	25*1	60	600	-40 to 150	150	1.05	0.75	10	10	47	—	—	2S	56						
D2SB60	1.5	25*1	80	600	-40 to 150	150	1.05	0.75	10	10	47	—	—	2S	56						
D2SB60A				2												115*2	120	600	0.95	1	
☆UD2KB80	2	143	62	800	-55 to 150	150	1.05	1	10	15	55	1.5	UL <sup>®</sup>	D3K	54						
☆UD3KB80	3	140	90	800	-55 to 150	150	1.05	1.5	10	15	55	1.5	UL <sup>®</sup>	D3K	54						
D3SBA60	4	108	80	600	-40 to 150	150	1.05	2	10	6	30	5.5	UL <sup>®</sup>	3S	57						
D3SB60	4	108	120	600	-40 to 150	150	1.05	2	10	6	30	5.5	UL <sup>®</sup>	3S	57						
D3SB80				800																	
D4SB60L	4	111	150	600	-40 to 150	150	0.95	2	10	6	30	5.5	UL <sup>®</sup>	3S	57						
D4SB80		108		800																	
☆UD4KB80	4	138	135	800	-55 to 150	150	1.00	2	10	15	55	1.5	UL <sup>®</sup>	D3K	54						
D5SBA60	6	111	120	600	-40 to 150	150	1.05	3	10	5	26	3.4	UL <sup>®</sup>	5S	58						
D5SB60	6	110	170	600	-40 to 150	150	1.05	3	10	5	26	3.4	UL <sup>®</sup>	5S	58						
D5SB80				800																	
D6SB60L	6	112	170	600	-40 to 150	150	1.05	3	10	5	26	3.4	UL <sup>®</sup>	5S	58						
D6SB80		110		800																	
D10XB60	10	100	120	600	-40 to 150	150	1.1	5	10	6	26	2.3	UL <sup>®</sup>	3S	57						
D10XB80				800																	
D10XB60H	10	112	170	600	-40 to 150	150	1.05	5	10	6	26	1.9	UL <sup>®</sup> Large IFSM	3S	57						
D15XB60	15	100	200	600	-40 to 150	150	1.1	7.5	10	5	22	1.5	UL <sup>®</sup>	5S	58						
D15XB80				800																	
☆D15XB100				110												200	1000	-55 to 150	1.05	23	1.2
D15XB60H				107												240	600	-40 to 150	1.05	22	1.5
D20XB60	20	87	240	600	-40 to 150	150	1.1	10	10	5	22	1.5	UL <sup>®</sup>	5S	58						
D20XB80	20	87	240	600	-40 to 150	150	1.1	10	10	5	22	1.5	UL <sup>®</sup>	5S	58						
D25XB60				800																	
D25XB80	25	98	350	600	-40 to 150	150	1.05	12.5	10	5	22	1	UL <sup>®</sup>	5S	58						
D25XB100				800												1000	-55 to 150	23	0.8		
☆D25XB100	25	106	350	1000	-55 to 150	150	1.05	12.5	10	5	22	1	UL <sup>®</sup>	5S	58						
☆D50XB80	50	95	600	800	-40 to 150	150	1.05	25	10	—	16	0.5	UL <sup>®</sup>	TSB(4PIN)	59						
☆US4KB80R	4	125	150	800	-55 to 150	150	1.0	2	10	5	35	3.5	UL <sup>®</sup>	D6K	53						
☆US6KB80R	6	116	175	800	-55 to 150	150	1.0	3	10	5	35	3.0	UL <sup>®</sup>	D6K	53						
☆US8KB80R	8	108	200	800	-55 to 150	150	1.0	4	10	5	35	2.8	UL <sup>®</sup>	D6K	53						
☆US10KB80R	10	100	150	800	-55 to 150	150	1.10	5	10	5	35	2.5	UL <sup>®</sup>	D6K	53						
☆US15KB80R	15	101	200	800	-55 to 150	150	1.10	7.5	10	5	35	1.5	UL <sup>®</sup>	D6K	53						
☆US20KB80R	20	97	240	800	-55 to 150	150	1.10	10	10	5	35	1.2	UL <sup>®</sup>	D6K	53						
☆US30KB80R	30	97	350	800	-55 to 150	150	1.10	15	10	5	35	0.8	UL <sup>®</sup>	D6K	53						

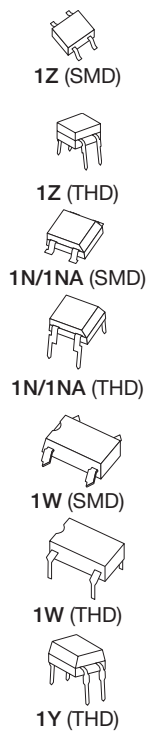
☆: New product

\* 1: Ta

\* 2: Tj

UL<sup>®</sup>: UL recognized (UL File No.E142422)

## DIP Bridge Diodes



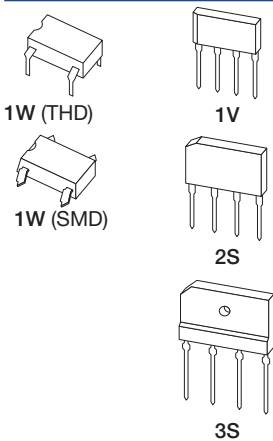
Type No.	Absolute Maximum Ratings						Electrical Characteristics						Remarks	Outline	
	I <sub>o</sub> [A]	Conditions	I <sub>FSM</sub> [A]	V <sub>RM</sub> [V]	T <sub>stg</sub> [°C]	T <sub>j</sub> [°C]	V <sub>F</sub> (max) [V]	Conditions	I <sub>R</sub> (max) [μA]	θ <sub>j</sub> (max) [°C/W]	θ <sub>ja</sub> (max) [°C/W]	Package		Fig.	
		T <sub>a</sub> [°C]						I <sub>F</sub> [A]							V <sub>R=V<sub>RM</sub></sub> [μA]
S1YB60	0.4	40	30	600	-40 to 150	150	1.05	0.2	10	20	150		—		1Y
S1ZB60	0.8	25	30	600	-40 to 150	150	1.05	0.4	10	20	76	—	1Z	* 1	
S1ZB80				800											
D1UBA80	1	25	30	800	-55 to 150	150	0.95	0.4	10	25	62.5	—	SOPA-4	33	
S1NB60	1	25	30	600	-40 to 150	150	1.05	0.5	10	15	68	—	1N	* 2	
S1NB80				800											
S1NBB80	1	26	50	800	-40 to 150	150	1.05	0.5	10	15	68	—	1NA	* 3	
S1WB(A)60	1	25	30	600	-40 to 150	150	1.0	0.5	10	10	65	—	1W	* 4	
S1WB(A)80				800											
S1WB(A)60B				50											600
S1NBC60	1.5	105*5	60	600	-55 to 150	150	1.05	0.75	10	15	68	Large I <sub>FSM</sub>	1NA	* 3	
S1NBC80				800											

\* 1: SMD Package Fig.23-1; THD Package Fig.24  
\* 3: SMD Package Fig.27-1; THD Package Fig.28

\* 2: SMD Package Fig.25; THD Package Fig.26  
\* 4: SMD Package Fig.29; THD Package Fig.30

\* 5 : T1

## Low Noise Bridge Diodes



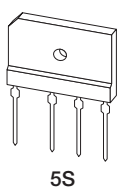
Type No.	Absolute Maximum Ratings						Electrical Characteristics						Remarks	Outline		
	I <sub>o</sub> [A]	Conditions	I <sub>FSM</sub> [A]	V <sub>RM</sub> [V]	T <sub>stg</sub> [°C]	T <sub>j</sub> [°C]	V <sub>F</sub> (max) [V]	Conditions	I <sub>R</sub> (max) [μA]	trr (max) [μs]	θ <sub>j</sub> (max) [°C/W]	θ <sub>ja</sub> (max) [°C/W]		θ <sub>jc</sub> (max) [°C/W]	Package	Fig.
		T <sub>c</sub> [°C]						I <sub>F</sub> [A]								
LN1WBA60	1.1	25*1	50	600	-40 to 150	150	1.0	0.55	10	5	10	65	—	1W		
LN1VB60	1.2	25*1	50				1.0	0.6			16	62	—	1V	55	
LN4SB60	4	111	150				0.95	2			6	30	5.5	UL <sup>®</sup>	3S	57
LN6SB60	6	111	170				1.05	3			5	26	3.4	UL <sup>®</sup>	5S	58
LN15XB60	15	100	200	600	-55 to 150	150	1.1	7.5	10	5	5	23	1.5	—	5S	58
LN15XB60H		106	290				Large I <sub>FSM</sub>									
LN25XB60	25	85	350	600	-55 to 150	150	1.05	12.5	10	5	23	1.3	—	5S	58	

\* 1: T<sub>a</sub>

\* 2: SMD Package Fig.29; THD Package Fig.30

UL<sup>®</sup>: UL recognized (UL File No. E142422)

## Low V<sub>F</sub> Bridge Diodes



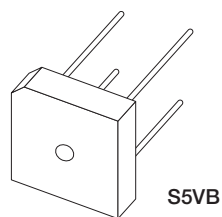
Type No.	Absolute Maximum Ratings						Electrical Characteristics						Remarks	Outline					
	I <sub>o</sub> [A]	Conditions	I <sub>FSM</sub> [A]	I <sub>FSM1</sub> [A]	I <sub>2t</sub> [A]	V <sub>RM</sub> [V]	T <sub>stg</sub> [°C]	T <sub>j</sub> [°C]	V <sub>F</sub> (max) [V]	V <sub>F</sub> (typ) [V]	Conditions	I <sub>R</sub> (max) [μA]		trr (max) [μs]	θ <sub>j</sub> (max) [°C/W]	θ <sub>ja</sub> (max) [°C/W]	θ <sub>jc</sub> (max) [°C/W]	Package	Fig.
											T <sub>c</sub> [°C]								
LL15XB60	15	124	200	630	200	600	-55 to 150	150	0.90	0.86	7.5	10	3	5	25	1	—		
LL25XB60	25	113	300	945	450	600	-55 to 150	150	0.92	0.87	12.5	10	3	5	25	0.8	UL <sup>®</sup>	5S	58

\* : I<sub>FSM1</sub>: Pulse width 1ms

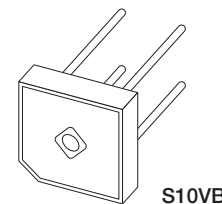
UL<sup>®</sup>: UL recognized (UL File No. E142422)

# Rectifier Diodes

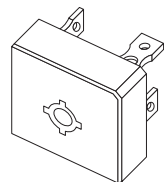
## SQIP Bridge Diodes



S5VB



S10VB



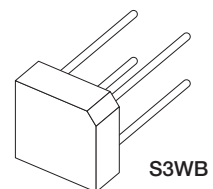
S15VB

Type No.	Absolute Maximum Ratings						Electrical Characteristics						Outline	
	I <sub>o</sub> [A]	Conditions T <sub>a</sub> [°C]	IFSM [A]	VRM [V]	Tstg [°C]	T <sub>j</sub> [°C]	V <sub>F</sub> (max) [V]	Conditions I <sub>F</sub> [A]	I <sub>R</sub> (max) V <sub>R</sub> =V <sub>RM</sub> [μA]	θ <sub>j</sub> (max) [°C/W]	θ <sub>jc</sub> (max) [°C/W]	Package	Fig.	
		[A]						[μA]						
S2VB60	2	40	40	600	-40 to 150	150	1.05	1	10	7	—	S2VB	61	
S4VB60	4*1	40	80	600	-40 to 150	150	1.05	2	10	4.5	—	S4VB	62	
S5VB60	6*1	40	200	600	-40 to 150	150	1.05	3	10	3	—	S5VB	63	
S10VB60	10*1	40	200	600	-40 to 150	150	1.05	5	10	2.8	—	S10VB	64	
S15VB60	15*1	83*2	200	600	-40 to 150	150	1.05	7.5	10	—	2.3	S15VB	65	
S25VB60	25*1	85*2	400	600	-40 to 150	150	1.05	12.5	10	—	1.5	S25VB	66	
S25VB80				800										
S50VB60	50*1	95*2	500	600	-40 to 150	150	1.05	25	10	—	0.5	S50VB	67	
S50VB80				800										

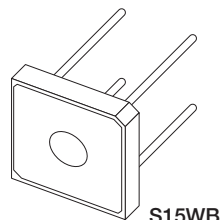
\* 1: With heatsink

\* 2: T<sub>c</sub>

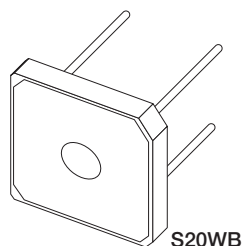
## Input/Output In-line Terminal Type



S3WB



S15WB

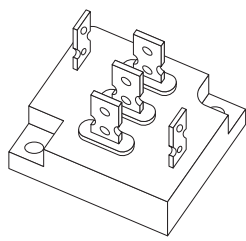


S20WB

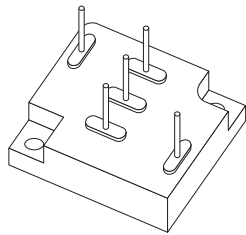
Type No.	Absolute Maximum Ratings						Electrical Characteristics						Outline	
	I <sub>o</sub> [A]	Conditions T <sub>c</sub> [°C]	IFSM [A]	VRM [V]	Tstg [°C]	T <sub>j</sub> [°C]	V <sub>F</sub> (max) [V]	Conditions I <sub>F</sub> [A]	I <sub>R</sub> (max) V <sub>R</sub> =V <sub>RM</sub> [μA]	θ <sub>j</sub> (max) [°C/W]	θ <sub>jc</sub> (max) [°C/W]	Package	Fig.	
		[A]						[A]						
S3WB60	2.3	40*	120	600	-40 to 150	150	1.05	2	10	5.5	—	S3WB	68	
S10WB60	10	74	170	600	-40 to 150	150	1.05	5	10	4	3.9	S10WB	69	
S15WB60	15	77	200	600	-40 to 150	150	1.05	7.5	10	2	2.5	S15WB	70	
S20WB60	20	76	500	600	-40 to 150	150	1.05	10	10	2	2	S20WB	71	
S20WB80				800										

\* : T<sub>a</sub>

### 3 Phase Bridge Diode Modules



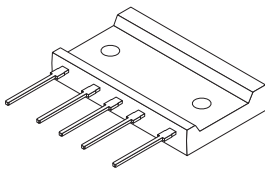
SVT



SVTA

Type No.	Absolute Maximum Ratings						Electrical Characteristics					Outline	
	Io [A]	Conditions Tc [°C]	IFSM [A]	VRM [V]	Tstg [°C]	Tj [°C]	Vf (max) [V]	Conditions IF [A]	IR (max) VR=VRM [μA]	θja (max) [°C/W]	θjc (max) [°C/W]	Package	Fig.
S10VT60	10	137	170	600	-40 to 150	150	1.05	3.5	10	0.65	SVT	74	
S10VTA60		137	170	600	-40 to 150	150	1.05	3.5	10	0.65	SVTA	73	
S10VT80		137	150	800	-40 to 150	150	1.05	3.5	10	0.65	SVT	74	
S10VTA80		137	150	800	-40 to 150	150	1.05	3.5	10	0.65	SVTA	73	
S15VT60	15	132	200	600	-40 to 150	150	1.05	5	10	0.6	SVT	74	
S15VTA60		132	200	600	-40 to 150	150	1.05	5	10	0.6	SVTA	73	
S15VT80		132	200	800	-40 to 150	150	1.05	5	10	0.6	SVT	74	
S15VTA80		132	200	800	-40 to 150	150	1.05	5	10	0.6	SVTA	73	
S20VT60	20	128	300	600	-40 to 150	150	1.05	7	10	0.55	SVT	74	
S20VTA60		128	300	600	-40 to 150	150	1.05	7	10	0.55	SVTA	73	
S20VT80		128	300	800	-40 to 150	150	1.05	7	10	0.55	SVT	74	
S20VTA80		128	300	800	-40 to 150	150	1.05	7	10	0.55	SVTA	73	
S30VT60	30	121	400	600	-40 to 150	150	1.05	10	10	0.5	SVT	74	
S30VTA60		121	400	600	-40 to 150	150	1.05	10	10	0.5	SVTA	73	
S30VT80		121	400	800	-40 to 150	150	1.05	10	10	0.5	SVT	74	
S30VTA80		121	400	800	-40 to 150	150	1.05	10	10	0.5	SVTA	73	
S30VTA160		116	350	1600	-40 to 150	150	1.05	10	100	0.5	SVTA	73	

### 3 Phase SIP Bridge Diodes



TSB (5PIN)

Type No.	Absolute Maximum Ratings						Electrical Characteristics					Remarks	Outline	
	Io [A]	Conditions Tc [°C]	IFSM [A]	VRM [V]	Tstg [°C]	Tj [°C]	Vf (max) [V]	Conditions IF [A]	IR (max) VR=VRM [μA]	θja (max) [°C/W]	θjc (max) [°C/W]		Package	Fig.
☆ D30XT80	30	117	300	800	-40 to 150	150	1.05	10	10	16	0.5	UL <sup>®</sup>	TSB (5PIN)	60
☆ D45XT80	45	101	400	800	-40 to 150	150	1.05	15	10	16	0.5	UL <sup>®</sup>		
☆ D45XT160	45	97	330	1600	-40 to 150	150	1.05	15	100	16	0.5	UL <sup>®</sup>		

☆: New product

UL<sup>®</sup>: UL recognized (UL File No. E142422)

### Twin Diode Modules

Type No.	Absolute Maximum Ratings						Electrical Characteristics				Remarks	Outline	
	Io [A]	Conditions Tc [°C]	IFSM [A]	VRM [V]	Tstg [°C]	Tj [°C]	Vf (max) [V]	Conditions IF [A]	IR (max) VR=VRM [μA]	θjc (max) [°C/W]		Package	Fig.
D30VC60	30	124	300	600	-40 to 150	150	1.05	15	10	0.9	*	D30VC	76

\*: Center-tap 

# Schottky Barrier Diodes

## Single

### Surface Mount



1F



M1F



M2F



2F



E-pack

Type No.	Absolute Maximum Ratings						Electrical Characteristics							Outline	
	V <sub>RM</sub> [V]	I <sub>o</sub> [A]	Conditions T <sub>c</sub> [°C]	I <sub>FSM</sub> [A]	T <sub>stg</sub> [°C]	T <sub>j</sub> [°C]	V <sub>F</sub> (max) [V]	Conditions I <sub>F</sub> [A]	I <sub>R</sub> (max) V <sub>R</sub> =V <sub>RM</sub> [mA]	C <sub>j</sub> (typ) [pF]	θ <sub>j</sub> / (max) [°C/W]	θ <sub>ja</sub> (max) [°C/W]	θ <sub>jc</sub> (max) [°C/W]	Package	Fig.
M1FP3	1.29	25 <sup>*2</sup>	30	-55 to 125	125	0.40	1.1	2.5	90	20	108	—	M1F	12	
M1FH3	1.5	105	30	-55 to 125	125	0.36	1.5	1.0	80	20	80	18	M1F	12	
D1FP3	2	98 <sup>*1</sup>	60	-55 to 125	125	0.40	2	4.5	130	23	108	—	1F	13-1	
D1FH3	3	95	60	-55 to 125	125	0.36	3.0	2.0	130	18	65	16	1F	13-1	
D3FP3	3	74 <sup>*1</sup>	150	-55 to 125	125	0.40	4	10	300	24	90	—	2F	16-1	
M1FM3	3	100	30	-55 to 150	150	0.46	1.5	0.05	80	20	80	18	M1F	12	
D1FM3	5	83	90	-55 to 150	150	0.46	3.0	0.1	130	18	65	16	1F	13-1	
M2FH3	6	70	110	-55 to 125	125	0.36	6	4	240	16	55	14	M2F	15-1	
M2FM3	6	99	120	-55 to 150	150	0.46	6	0.2	240	16	55	14	M2F	15-1	
DE10P3	10	95	200	-55 to 125	125	0.40	8	25	600	—	—	4	E-pack	31-4	
DE10S3L	10	124	250	-55 to 150	150	0.45	8	10	640	—	—	4	E-pack	31-4	
D1FS4	1.1	51 <sup>*2</sup>	30	-55 to 150	150	0.55	1.1	1	65	23	108	—	1F	13-1	
M1FS4	1.33	25 <sup>*2</sup>	30	-55 to 150	150	0.55	1.1	0.8	50	20	108	—	M1F	12	
M1FJ4	1.5	31 <sup>*2</sup>	30	-55 to 150	150	0.57	1	0.05	65	20	108	—	M1F	12	
D1FS4A	1.5	28 <sup>*2</sup>	60	-55 to 150	150	0.45	1.1	2	95	23	108	—	1F	13-1	
D2FS4	1.6	34 <sup>*2</sup>	60	-55 to 150	150	0.55	1.6	2.5	150	24	90	—	2F	16-1	
D1FJ4	2.0	117 <sup>*1</sup>	50	-55 to 150	150	0.57	1.5	0.2	96	23	108	—	1F	13-1	
D3FS4A	2.6	34 <sup>*2</sup>	150	-55 to 150	150	0.45	2.6	5	340	23	80	—	2F	16-1	
DE3S4M	3	121	70	-40 to 150	150	0.55	3	2.5	150	—	55	12	E-pack	31-2	
DE5S4M	5	101	80	-40 to 150	150	0.55	5	3.5	180	—	55	12	E-pack	31-2	
D1FS6	1.1	25 <sup>*2</sup>	40	-55 to 150	150	0.58	1.1	1	50	23	108	—	1F	13-1	
M1FS6	1.2	25 <sup>*2</sup>	40	-55 to 150	150	0.58	1.1	1	53	20	108	—	M1F	12	
D2FS6	1.5	31 <sup>*2</sup>	60	-40 to 150	150	0.58	2	2	120	24	90	—	2F	16-1	
D3FS6	3	87 <sup>*1</sup>	80	-55 to 150	150	0.58	3	2.5	130	24	90	—	2F	16-1	
DE3S6M	3	117	80	-40 to 150	150	0.58	3	2.5	130	—	55	12	E-pack	31-2	
DE5S6M	5	96	90	-40 to 150	150	0.58	5	4.5	200	—	55	12	E-pack	31-2	
D1FJ10	1.0	52 <sup>*2</sup>	50	-55 to 150	150	0.72	1	0.2	63	23	108	—	1F	13-1	
D3FJ10	3	92 <sup>*1</sup>	100	-55 to 150	150	0.74	3	0.4	143	23	115	—	2F	16-1	

☆: New product ★: Under development \* 1: T/ \* 2: Ta

### Axial

AX057

AX078

AX14

Type No.	Absolute Maximum Ratings						Electrical Characteristics							Outline		
	V <sub>RM</sub> [V]	I <sub>o</sub> [A]	Conditions T <sub>a</sub> [°C]	I <sub>FSM</sub> [A]	T <sub>stg</sub> [°C]	T <sub>j</sub> [°C]	V <sub>F</sub> (max) [V]	Conditions I <sub>F</sub> [A]	I <sub>R</sub> (max) V <sub>R</sub> =V <sub>RM</sub> [mA]	C <sub>j</sub> (typ) [pF]	θ <sub>j</sub> / (max) [°C/W]	θ <sub>ja</sub> (max) [°C/W]	Package	Color Code	Fig.	
D1NS4 <sup>*2</sup>	1	59	30	-55 to 150	150	0.55	1	0.8	50	10	113	—	AX057	—	1	
D2S4M <sup>*2</sup>	2	122 <sup>*1</sup>	60	-40 to 150	150	0.55	2	2	95	17	105	—	AX078	Silver	5-1	
D3S4M <sup>*2</sup>	3	63	80	-40 to 150	150	0.55	3	3.5	150	6.5	36	—	AX14	Silver	8	
D1NS6 <sup>*2</sup>	1	46	30	-55 to 150	150	0.58	1	1	53	10	113	—	AX057	—	1	
D2S6M <sup>*2</sup>	2	119 <sup>*1</sup>	60	-40 to 150	150	0.58	2	2	120	17	105	—	AX078	Blue	5-1	
D3S6M <sup>*2</sup>	3	133 <sup>*1</sup>	80	-40 to 150	150	0.58	3	2.5	130	6.5	62	—	AX14	Blue	8	

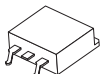
\* 1: T/ \* 2: Spec Code 5□□□ \* 3: Spec Code 7□□□  
(See page 46 for the last 3 digits of the Spec Code)

## Center Tap, Common Cathode

### Surface Mount



E-pack



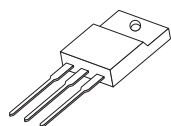
STO-220

Type No.	Absolute Maximum Ratings						Electrical Characteristics					Outline	
	V <sub>RM</sub> [V]	I <sub>o</sub> [A]	Conditions T <sub>c</sub> [°C]	I <sub>FSM</sub> [A]	T <sub>stg</sub> [°C]	T <sub>j</sub> [°C]	V <sub>F</sub> (max) [V]	Conditions I <sub>F</sub> [A]	I <sub>R</sub> (max) V <sub>R</sub> =V <sub>RM</sub> [mA]	C <sub>j</sub> (typ) [pF]	θ <sub>jc</sub> (max) [°C/W]	Package	Fig.
DE5PC3	30	5	90	90	-55 to 125	125	0.4	2.5	6	180	12	E-pack	31-1
DE5SC3ML		5	110	90	-55 to 150	150	0.45	2.5	3.5	190	12	E-pack	31-1
DE10PC3		10	97	80	-55 to 125	125	0.4	4	10	290	4	E-pack	31-1
DE10SC3L		10	124	100	-55 to 150	150	0.45	4	5	290	4	E-pack	31-1
DF20PC3M		20	105	200	-55 to 125	125	0.4	8	35	560	1.6	STO-220	36-1
DF30PC3M		30	97	300	-55 to 125	125	0.4	10	50	840	1.6	STO-220	36-1
DF30SC3ML		30	119	350	-55 to 150	150	0.45	12.5	10	820	1.6	STO-220	36-1
DF40PC3		40	105	350	-55 to 125	125	0.4	15	45	1160	0.8	STO-220	36-1
DF40SC3L		40	112	400	-55 to 150	150	0.45	15	17	1200	1.5	STO-220	36-1
DE5SC4M	40	5	101	80	-40 to 150	150	0.55	2.5	3.5	150	12	E-pack	31-1
DE10SC4		10	132	100	-55 to 150	150	0.55	5	3.5	210	4	E-pack	31-1
DF10SC4M		10	125	100	-40 to 150	150	0.55	5	3.5	180	3	STO-220	36-1
DF15SC4M		15	129	150	-40 to 150	150	0.55	7.5	5	340	1.7	STO-220	36-1
DF20SC4M		20	122	230	-40 to 150	150	0.55	10	7.5	390	1.7	STO-220	36-1
DF30JC4		30	115	250	-55 to 150	150	0.61	15	0.7	560	1.6	STO-220	36-1
DF30SC4M		30	112	360	-40 to 150	150	0.55	15	10	590	1.6	STO-220	36-1
DF40SC4		40	106	350	-55 to 150	150	0.55	20	14	860	1.5	STO-220	36-1
DE5SC6M	60	5	92	80	-40 to 150	150	0.58	2.5	2.5	130	12	E-pack	31-1
DF10SC6		10	132	150	-55 to 150	150	0.58	5	4.5	260	2.0	STO-220	36-1
DF25SC6M		25	115	300	-40 to 150	150	0.58	12.5	10	490	1.6	STO-220	36-1
DF30JC6		30	108	250	-55 to 150	150	0.69	15	0.7	490	1.6	STO-220	36-1
DF10SC9	90	10	131	150	-55 to 150	150	0.75	5	3	185	1.2	STO-220	36-1
DF20SC9M		20	111	200	-40 to 150	150	0.75	10	10	370	1.6	STO-220	36-1
DF15JC10	100	15	126	150	-55 to 150	150	0.86	7.5	0.6	200	1.8	STO-220	36-1
DF20JC10		20	121	200	-55 to 150	150	0.86	10	0.7	260	1.6	STO-220	36-1
DF30JC10		30	116	300	-55 to 150	150	0.86	15	1.0	390	1.3	STO-220	36-1
DF10NC15	150	10	123	100	-55 to 150	150	0.88	5	0.2	110	3.0	STO-220	36-1
DF15NC15		15	126	150	-55 to 150	150	0.88	7.5	0.3	155	1.8	STO-220	36-1
DF20NC15		20	121	200	-55 to 150	150	0.88	10	0.4	200	1.6	STO-220	36-1
DF30NC15		30	115	300	-55 to 150	150	0.88	15	0.5	300	1.3	STO-220	36-1

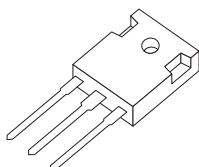


# Schottky Barrier Diodes

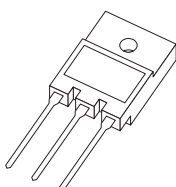
## Three Terminal Type



FTO-220  
FTO-220A  
FTO-220G



MTO-3P/MTO-3PT



ITO-3P

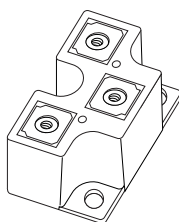
Type No.	Absolute Maximum Ratings						Electrical Characteristics					Outline	
	V <sub>RM</sub> [V]	I <sub>o</sub> [A]	Conditions T <sub>c</sub> [°C]	I <sub>FSM</sub> [A]	T <sub>stg</sub> [°C]	T <sub>j</sub> [°C]	V <sub>F</sub> (max) [V]	Conditions I <sub>F</sub> [A]	I <sub>R</sub> (max) V <sub>R</sub> =V <sub>RM</sub> [mA]	C <sub>j</sub> (typ) [pF]	θ <sub>jc</sub> (max) [°C/W]	Package	Fig.
☆SG10SC4M	10	150	150	-55 to 175	175	0.52	5	0.5	157	3.0	FTO-220G	52	
☆S30SC4MT	30	132	300	-55 to 150	150	0.55	15	1.5	410	0.8	MTO-3PT	96	
D30SC4M	30	112	300	-40 to 150	150	0.55	15	10	590	1.6	ITO-3P	44-1	
☆S60SC4MT	60	127	500	-55 to 150	150	0.55	30	3	790	0.5	MTO-3PT	96	
☆SG10SC6M	10	145	140	-55 to 175	175	0.56	5	0.5	165	3.0	FTO-220G	52	
☆SG20SC6M	20	107	200	-55 to 150	150	0.61	10	0.8	250	2.5	FTO-220G	52	
D25SC6M	25	117	300	-40 to 150	150	0.58	12.5	10	490	1.5	ITO-3P	44-1	
☆SG30SC6M	30	100	300	-55 to 150	150	0.61	15	1.2	385	2.0	FTO-220G	52	
☆S60SC6MT	60	121	470	-55 to 150	150	0.67	30	2	640	0.5	MTO-3PT	96	
☆SG10SC9M	10	139	150	-55 to 175	175	0.75	5	0.5	140	3.0	FTO-220G	52	
D20SC9M	20	111	200	-40 to 150	150	0.75	10	10	370	1.6	ITO-3P	44-1	
☆SG20TC10M	20	140	200	-55 to 175	175	0.86	10	0.03	185	2.2	FTO-220G	52	
☆SG30TC10M	30	126	300	-55 to 175	175	0.86	15	0.04	242	2.0	FTO-220G	52	
☆SG40TC10M	40	116	350	-55 to 175	175	0.86	20	0.06	362	1.8	FTO-220G	52	
☆SG20TC12M	20	137	200	-55 to 175	175	0.87	10	0.03	175	2.2	FTO-220G	52	
☆SG30TC12M	30	122	300	-55 to 175	175	0.87	15	0.04	228	2.0	FTO-220G	52	
☆SG40TC12M	40	112	350	-55 to 175	175	0.87	20	0.06	336	1.8	FTO-220G	52	
☆SG10TC15M	10	153	120	-55 to 175	175	0.88	5	0.015	92	2.5	FTO-220G	52	
☆SG20TC15M	20	136	200	-55 to 175	175	0.88	10	0.03	159	2.2	FTO-220G	52	
☆SG30TC15M	30	122	300	-55 to 175	175	0.88	15	0.04	209	2.0	FTO-220G	52	

☆: New product

Center-tap



## SBD Module



Module

Type No.	Absolute Maximum Ratings						Electrical Characteristics					Remarks	Outline	
	V <sub>RM</sub> [V]	I <sub>o</sub> [A]	Conditions T <sub>c</sub> [°C]	I <sub>FSM</sub> [A]	T <sub>stg</sub> [°C]	T <sub>j</sub> [°C]	V <sub>F</sub> (max) [V]	Conditions I <sub>F</sub> [A]	I <sub>R</sub> (max) V <sub>R</sub> =V <sub>RM</sub> [mA]	C <sub>j</sub> (typ) [nF]	θ <sub>jc</sub> (max) [°C/W]		Package	Fig.
D120SC4M	120	90	800	-40 to 125	125	0.58	60	40	2.1	0.34	*1	Module	77	
D180SC4M	180	83	800	-40 to 125	125	0.58	60	40	2.1	0.25	*2	Module	79-1	
D240SC4M	240	77	1600	-40 to 125	125	0.60	120	80	4.2	0.23	*1	Module	77	
D360SC4M	360	64	1600	-40 to 125	125	0.60	120	80	4.2	0.18	*2	Module	79-1	
D120SC6M	120	85	800	-40 to 125	125	0.67	60	40	2.2	0.34	*1	Module	77	
D180SC6M	180	78	800	-40 to 125	125	0.67	60	40	2.2	0.25	*2	Module	79-1	
D240SC6M	240	71	1600	-40 to 125	125	0.67	120	80	4.4	0.23	*1	Module	77	
D360SC6M	360	58	1600	-40 to 125	125	0.67	120	80	4.4	0.18	*2	Module	79-1	

\*1



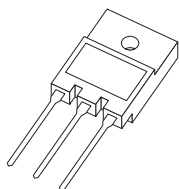
\*2





## Center Tap, Common Anode

### Three Terminal Type



ITO-3P

Type No.	Absolute Maximum Ratings						Electrical Characteristics					Outline	
	V <sub>RM</sub> [V]	I <sub>o</sub> [A]	Conditions	I <sub>FSM</sub> [A]	T <sub>stg</sub> [°C]	T <sub>j</sub> [°C]	V <sub>F</sub> (max) [V]	Conditions	I <sub>R</sub> (max) V <sub>R</sub> =V <sub>RM</sub> [mA]	C <sub>j</sub> (typ) [pF]	θ <sub>jc</sub> (max) [°C/W]	Package	Fig.
			T <sub>c</sub> [°C]										
<b>D25SC6MR</b>	60	25	117	300	-40 to 150	150	0.58	12.5	10	490	1.5	ITO-3P	44-2

Center-tap (R) 

## Array

### Surface Mount



1Z

Type No.	Absolute Maximum Ratings						Electrical Characteristics						Outline	
	VRM [V]	Io [A]	Conditions Ta [°C]	IFSM [A]	Tstg [°C]	Tj [°C]	VF (max) [V]	Conditions IF [A]	IR (max) VR=VRM [mA]	Cj (typ) [pF]	θj/ (max) [°C/W]	θja (max) [°C/W]	Package	Fig.
<b>S1ZAS4</b>	40	1.2	49	40	-40 to 150	150	0.55	1	1	65	25	93	1Z	23-2

★: Under development

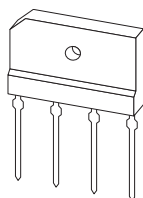
Array type



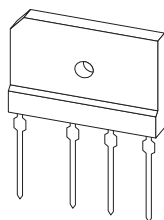
\* 1: Per diode at two elements operation

## Schottky Barrier Diode Bridges

### Single Inline Package



3S



5S

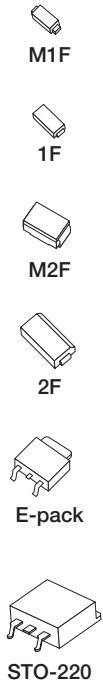
Type No.	Absolute Maximum Ratings						Electrical Characteristics						Outline	
	VRM [V]	Io [A]	Conditions Tc [°C]	IFSM [A]	Tstg [°C]	Tj [°C]	VF (max) [V]	Conditions IF [A]	IR (max) VR=VRM [mA]	Cj (typ) [pF]	θjc (max) [°C/W]	Package	Fig.	
<b>D4SBS4</b>	40	4	116	60	-55 to 150	150	0.55	2	2	95	5.5	3S	57	
<b>D4SBS6</b>	60	4	114	60	-40 to 150	150	0.62	2	2	180	5.5			
<b>D10SBS4</b>	40	10	67	100	-55 to 150	150	0.55	5	3.5	180	5.5			
<b>D15XBS6</b>	60	15	59	150	-55 to 150	150	0.63	7.5	6	410	3.5			
☆ <b>D20XBS6</b>	60	20	100	200	-55 to 150	150	0.63	10	8	370	1.5	5S	58	
☆ <b>D4SBN20</b>	200	4	103	60	-55 to 150	150	0.9	2	0.0015	60	6	3S	57	
☆ <b>D6SBN20</b>	200	6	110	120	-55 to 150	150	0.9	3	0.002	85	3.4	5S	58	
☆ <b>D15XBN20</b>	200	15	106	200	-55 to 150	150	0.9	7.5	0.005	190	1.5			
☆ <b>D30XBN20</b>	200	30	91	350	-55 to 150	150	0.9	15	0.01	360	1			

☆: New product

# Super Fast Recovery Diodes High frequency rectifying

## Single

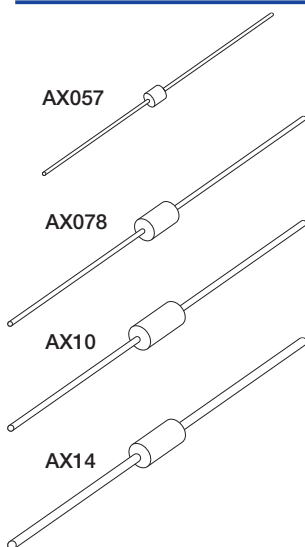
### Surface Mount



Type No.	Absolute Maximum Ratings						Electrical Characteristics							Outline	
	VRM [V]	Io [A]	Conditions Tc [°C]	IFSM [A]	Tstg [°C]	Tj [°C]	VF (max) [V]	Conditions IF [A]	IR (max) VR=VRM [μA]	trr (max) [ns]	θj/ (max) [°C/W]	θja (max) [°C/W]	θjc (max) [°C/W]	Package	Fig.
M1FL20U	200	1.1	25*1	30	-55 to 150	150	0.98	1.1	10	35	20	108	—	M1F	12
D1FL20U		1.1	25*1	20	-55 to 150	150	0.98	1.1	10	35	23	108	—	1F	13-1
☆M2FL20U		1.5	31*1	50	-55 to 150	150	0.92	1.5	10	35	33	90	—	M2F	15-1
☆M3FL20U		3	75*2	75	-55 to 150	150	0.95	3	10	35	25	110	—	M2F	15-1
D2FL20U		1.5	25*1	50	-55 to 150	150	0.98	1.5	10	35	24	90	—	2F	16-1
DE3L20U		3	113	60	-55 to 150	150	0.98	3	10	35	—	55	12	E-pack	31-2
M1FL40	400	1.0	25*1	25	-55 to 150	150	1.3	1	10	50	20	80	18	M1F	12
D1FL40		0.8	25*1	25	-55 to 150	150	1.3	0.8	10	50	23	108	—	1F	13-1
☆D1FL40U		1.5	103	30	-55 to 150	150	1.2	1	10	25	23	157	—	1F	13-1
D2FL40		1.3	25*1	40	-40 to 150	150	1.3	1.3	10	50	24	90	—	2F	16-1
DE3L40		3	99	50	-55 to 150	150	1.3	3	10	50	—	55	12	E-pack	31-2
D1FK60		0.8	29*1	20	-55 to 150	150	1.3	0.8	10	75	23	108	—	1F	13-1
D2FK60	600	1.5	101*2	40	-55 to 150	150	1.3	1.5	10	75	24	90	—	2F	16-1
DE5L60		5	57	60	-55 to 150	150	2.0	5	10	50	—	—	12	E-pack	31-2
☆DE5L60U		5	91	60	-55 to 150	150	3	5	25	25	—	—	4	E-pack	31-2
☆DF8L60US		8	66	60	-55 to 150	150	3.6	8	50	25	—	—	2.3	STO-220	36-2
DF10L60		10	105	100	-55 to 150	150	1.9	10	10	50	—	—	2	STO-220	36-2
DF20L60		20	84	170	-55 to 150	150	1.9	20	25	70	—	—	1.5	STO-220	36-2
DF20L60U	20	93	160	-55 to 150	150	3.0	20	25	35	—	—	0.9	STO-220	36-2	
D1FK70	700	0.8	32*1	25	-55 to 150	150	1.3	0.8	10	400	23	108	—	1F	13-1

☆: New product ★: Under development \* 1: Ta \* 2: Tj

### Axial

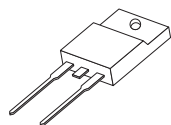


Type No.	Absolute Maximum Ratings						Electrical Characteristics						Outline		
	VRM [V]	Io [A]	Conditions Ta [°C]	IFSM [A]	Tstg [°C]	Tj [°C]	VF (max) [V]	Conditions IF [A]	IR (max) VR=VRM [μA]	trr (max) [ns]	θj/ (max) [°C/W]	θja (max) [°C/W]	Package	Color Code	Fig.
D1NL20U*2	200	1	25	25	-55 to 150	150	0.98	1	10	35	10	113	AX057	—	1
D2L20U*2		1.5	125*1	40	-40 to 150	150	0.98	1.5	10	35	17	105	AX078	Red	5-1
S2L20U*2		1.5	25	50	-40 to 150	150	0.98	1.5	10	35	12	83	AX10	Red	6-1
S3L20U*2		3	128*1	60	-40 to 150	150	0.98	2.1	10	35	6.5	60	AX14	Red	8
D1NL40*2		1	25	25	-55 to 150	150	1.3	0.9	10	50	10	113	AX057	—	1
S2L40*2		2	25	40	-55 to 150	150	1.3	1.1	10	50	12	83	AX10	Yellow	6-1
D2L40*3	400	2	108*1	40	-55 to 150	150	1.3	1.1	10	50	17	105	AX078	Yellow	5-1
S3L40*2		3	123*1	60	-55 to 150	150	1.3	3	10	50	6.5	60	AX14	Yellow	8
D1NF60*2		0.8	25	50	-55 to 150	150	1.3	0.8	10	400	10	113	AX057	—	1
☆D1NK60*2		0.8	26	35	-55 to 150	150	1.3	0.8	10	75	10	113	AX057	—	1
S2L60*2		1.5	125*1	50	-55 to 150	150	1.5	1.5	10	50	12	83	AX10	Blue	6-1
S3K60*2		3	123*1	120	-55 to 150	150	1.3	3	10	100	6.5	60	AX14	Blue	8
S3L60*2	2.2	132*1	60	-55 to 150	150	1.5	2.2	10	50	6.5	60	AX14	Blue	8	

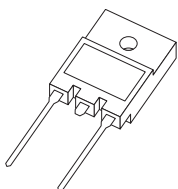
☆: New product \* 1: Tj \* 2: Spec Code 5□□□ \* 3: Spec Code 7□□□  
(See page 46 for the last 3 digits of the Spec Code)

# Super Fast Recovery Diodes .....

## Two Terminal Type



FTO-220



ITO-3P

Type No.	Absolute Maximum Ratings						Electrical Characteristics					Outline	
	V <sub>RM</sub> [V]	I <sub>o</sub> [A]	Conditions T <sub>c</sub> [°C]	I <sub>FSM</sub> [A]	T <sub>stg</sub> [°C]	T <sub>j</sub> [°C]	V <sub>F</sub> (max) [V]	Conditions I <sub>F</sub> [A]	I <sub>R</sub> (max) V <sub>R</sub> =V <sub>RM</sub> [μA]	t <sub>rr</sub> (max) [ns]	θ <sub>jc</sub> (max) [°C/W]	Package	Fig.
SF3L60U	600	3	115	40	-55 to 150	150	3.00	3	25	20	3.8	FTO-220	47
SF5L60U		5	96	60	-55 to 150	150	3.00	5	25	25	3.6	FTO-220	47
☆SF8L60USM		8	58	60	-55 to 150	150	3.6	8	50	25	2.5	FTO-220A	49
SF10L60U		10	85	120	-55 to 150	150	3.00	10	25	25	2.0	FTO-220	47
SF20L60U		20	68	180	-55 to 150	150	3.00	20	25	35	1.3	FTO-220	47
D30L60		30	85	600	-55 to 150	150	1.5	30	25	150	1.4	ITO-3P	43

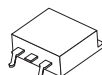
☆: New product

## Center Tap, Common Cathode

### Surface Mount



E-pack

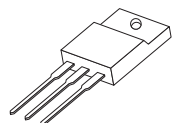


STO-220

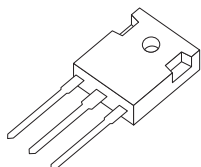
Type No.	Absolute Maximum Ratings						Electrical Characteristics						Outline	
	V <sub>RM</sub> [V]	I <sub>o</sub> [A]	Conditions T <sub>c</sub> [°C]	I <sub>FSM</sub> [A]	T <sub>stg</sub> [°C]	T <sub>j</sub> [°C]	V <sub>F</sub> (max) [V]	Conditions I <sub>F</sub> [A]	I <sub>R</sub> (max) V <sub>R</sub> =V <sub>RM</sub> [μA]	t <sub>rr</sub> (max) [ns]	θ <sub>ja</sub> (max) [°C/W]	θ <sub>jc</sub> (max) [°C/W]	Package	Fig.
DE5LC20U	200	5	81	50	-55 to 150	150	0.98	2.5	10	35	55	12	E-pack	31-1
DF10LC20U		10	127	80	-40 to 150	150	0.98	5	10	35	—	2	STO-220	36-1
DF20LC20US		20	125	180	-55 to 150	150	0.96	10	10	25	—	1.3	STO-220	36-1
DF10LC30	300	10	124	80	-55 to 150	150	1.3	5	25	30	—	2.0	STO-220	36-1
DF20LC30		20	124	180	-55 to 150	150	1.3	10	25	30	—	1.0	STO-220	36-1
DE5LC40	400	5	61	50	-55 to 150	150	1.3	2.5	10	50	55	12	E-pack	31-1

Center-tap

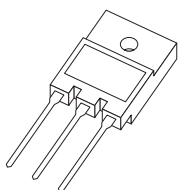
### Three Terminal Type



FTO-220



MTO-3P



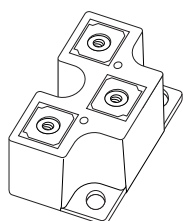
ITO-3P

Type No.	Absolute Maximum Ratings						Electrical Characteristics					Outline	
	V <sub>RM</sub> [V]	I <sub>o</sub> [A]	Conditions T <sub>c</sub> [°C]	I <sub>FSM</sub> [A]	T <sub>stg</sub> [°C]	T <sub>j</sub> [°C]	V <sub>F</sub> (max) [V]	Conditions I <sub>F</sub> [A]	I <sub>R</sub> (max) V <sub>R</sub> =V <sub>RM</sub> [μA]	t <sub>rr</sub> (max) [ns]	θ <sub>jc</sub> (max) [°C/W]	Package	Fig.
☆SG5LC20USM	200	5	134	70	-55 to 150	150	0.96	2.5	10	25	3.1	FTO-220G	52
☆SG10LC20USM		10	122	90	-55 to 150	150	0.96	5	10	25	2.8	FTO-220G	52
☆SG20LC20USM		20	95	150	-55 to 150	150	0.96	10	10	25	2.8	FTO-220G	52
☆S20LC20UST		20	126	120	-55 to 150	150	0.96	10	10	25	1.2	MTO-3PT	96
D20LC20U	300	20	112	150	-40 to 150	150	0.98	10	10	35	1.7	ITO-3P	44-1
SF20LC30		20	112	180	-55 to 150	150	1.3	10	25	30	1.5	FTO-220	48-1
S20LC30		20	119	180	-55 to 150	150	1.3	10	25	30	1.2	MTO-3P	46-1
D20LC40	400	20	102	120	-40 to 150	150	1.3	10	10	50	1.7	ITO-3P	44-1
☆S20LC60US	600	20	63	60	-55 to 150	150	3.6	10	50	25	1.0	MTO-3P	46-1

☆: New product



### Super FRD Module



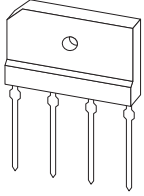
Module

Type No.	Absolute Maximum Ratings						Electrical Characteristics					Outline	
	V <sub>RM</sub> [V]	I <sub>o</sub> [A]	Conditions T <sub>c</sub> [°C]	I <sub>FSM</sub> [A]	T <sub>stg</sub> [°C]	T <sub>j</sub> [°C]	V <sub>F</sub> (max) [V]	Conditions I <sub>F</sub> [A]	I <sub>R</sub> (max) V <sub>R</sub> =V <sub>RM</sub> [μA]	t <sub>rr</sub> (max) [ns]	θ <sub>jc</sub> (max) [°C/W]	Package	Fig.
D120LC40	400	120	95	650	-40 to 150	150	1.3	60	25	100	0.31	Module	79-2
D120LC40B			60								0.5		78
D200LC40B		200	52	1400							0.35		79-2
D240LC40		240	77								0.2		

# Super Fast Recovery Diodes High frequency rectifying

## Super Fast Recovery Diode Bridges

### Single Inline Package



3S

Type No.	Absolute Maximum Ratings						Electrical Characteristics							Outline	
	V <sub>RM</sub>	I <sub>o</sub>	Conditions T <sub>c</sub> [°C]	I <sub>FSM</sub>	T <sub>stg</sub>	T <sub>j</sub>	V <sub>F</sub> (max)	Conditions I <sub>F</sub> [A]	I <sub>R</sub> (max) V <sub>R</sub> =V <sub>RM</sub>	t <sub>rr</sub> (max)	θ <sub>j</sub> (max)	θ <sub>ja</sub> (max)	θ <sub>jc</sub> (max)	Package	Fig.
	[V]	[A]		[A]	[°C]	[°C]	[V]		[μA]	[ns]	[°C/W]	[°C/W]	[°C/W]		
<b>D4SBL20U</b>	200	4	108	80	-55 to 150	150	0.98	2	10	35	6	30	5.5	3S	57
<b>D4SBL40</b>	400	4	91	50	-55 to 150	150	1.3	2.5	10	50	6	30	5.5		

# Power MOSFETs .....

## CoolMOS C3 series

### Surface Mount

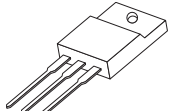


STO-220

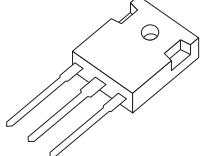
Type No.	Absolute Maximum Ratings					Electrical Characteristics								Outline		
	V <sub>DSS</sub>	I <sub>D</sub>	P <sub>T</sub>	V <sub>GSS</sub>	T <sub>ch</sub>	R <sub>DS(ON)</sub> (max)	C <sub>iss</sub> (typ)	C <sub>oss</sub> (typ)	Cr <sub>ss</sub> (typ)	Q <sub>g</sub> (typ)	t <sub>d(on)</sub> (typ)	t <sub>r</sub> (typ)	t <sub>d(off)</sub> (typ)	t <sub>f</sub> (typ)	Package	Fig.
	[V]	[A]	[W]	[V]	[°C]	[Ω]	[pF]	[pF]	[pF]	[nC]	[ns]	[ns]	[ns]	[ns]		
★F11S60C3	600	11	40	± 30	150	0.38	1200	390	30	45	18	30	190	32	STO-220	36-3
★F15S60C3		15	45			0.28	1600	510	40	56	26	42	240	36		
F20S60C3		20	50			0.19	2400	780	50	87	32	60	355	60		
F11S80C3		800	11			50	0.45	1690	740	22	54	21	30	225		

★: Under development

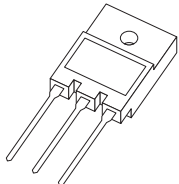
### Three Terminal Type



FTO-220A



MTO-3P



ITO-3P

Type No.	Absolute Maximum Ratings					Electrical Characteristics								Outline		
	V <sub>DSS</sub>	I <sub>D</sub>	P <sub>T</sub>	V <sub>GSS</sub>	T <sub>ch</sub>	R <sub>DS(ON)</sub> (max)	C <sub>iss</sub> (typ)	C <sub>oss</sub> (typ)	Cr <sub>ss</sub> (typ)	Q <sub>g</sub> (typ)	t <sub>d(on)</sub> (typ)	t <sub>r</sub> (typ)	t <sub>d(off)</sub> (typ)	t <sub>f</sub> (typ)	Package	Fig.
	[V]	[A]	[W]	[V]	[°C]	[Ω]	[pF]	[pF]	[pF]	[nC]	[ns]	[ns]	[ns]	[ns]		
F7F60C3M	600	7	30	± 30	150	0.60	760	250	20	28	14	15	124	18	FTO-220A	50-2
F11F60C3M		11	45			0.38	1200	390	30	45	18	30	190	32		
F15F60C3M		15	55			0.28	1600	510	40	56	26	42	240	36		
F20F60C3M		20	65			0.19	2400	780	50	87	32	60	355	60		
★F15W60C3		15	65			0.28	1600	510	40	56	26	42	240	36	MTO-3P	46-2
F20W60C3		20	75			0.19	2400	780	50	87	32	60	355	60		
F24W60C3		24	90			0.16	3000	1000	60	105	35	60	415	65		
F35W60C3		35	100			0.10	4500	1500	100	155	60	96	640	90		
F47W60C3		47	120			0.07	7000	2200	145	235	80	140	1000	140		
FP11W60C3		11	45			0.38	1200	390	30	45	18	30	190	32		
★FP15W60C3	15	60	0.28	1600	510	40	56	26	42	240	36	ITO-3P	44-3			
FP20W60C3	20	45	0.19	2400	780	50	87	32	60	355	60					
★FP35W60C3	35	75	0.10	4500	1500	100	155	60	96	640	90					
F11F80C3M	800	11	40	0.45	1690	740	22	54	21	30	225	35	FTO-220A	50-2		

★: Under development

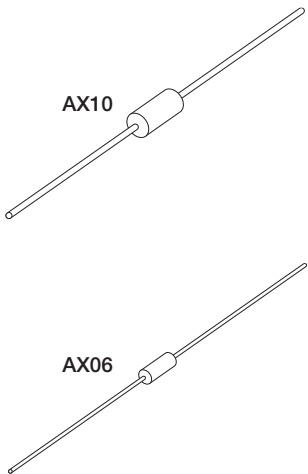
\* CoolMOS is a trademark of Infineon Technologies AG.

# SIDAC (Silicon Diode for Alternating Current)

## SIDAC (Bi-Directional Device)

- **Features**
  1. Symmetrical characteristics.
  2. Operating directly from the AC mains, and can be used in all kinds of pulse generating circuits.
  3. The glass passivation ensures high reliability.
- **Applications**
  1. Pulse generation: gas igniters, HID(high intensity discharge) lamp drive circuit, etc.
  2. AC switching: drive circuit for switching power supplies, voltage detecting circuits, etc.
  3. Over voltage protection: AC line surge protection, capacitor rupture prevention, etc.

## Axial



Type No.	Absolute Maximum Ratings									Electrical Characteristics								Outline				
	V <sub>DRM</sub> [V]	I <sub>T</sub> [A]	Conditions T <sub>J</sub> [°C]	I <sub>TSM</sub> [A]	I <sub>TRM</sub> [A]	Conditions f [kHz]	di <sub>r</sub> /dt [A/μs]	T <sub>stg</sub> [°C]	T <sub>j</sub> [°C]	V <sub>BO</sub> [V]	I <sub>DRM</sub> (max) [μA]	Conditions V <sub>D</sub> [V]	I <sub>BO</sub> (max) [mA]	I <sub>H</sub> (typ) [mA]	V <sub>T</sub> (max) [V]	Conditions I <sub>T</sub> [A]	R <sub>s</sub> (min) [kΩ]	θ <sub>J</sub> /θ <sub>C</sub> (max) [°C/W]	Package	Fig.		
K1V5	40	1	107	13	25	1	80	-40 to 125	125	45 to 60	10	40	0.5	50	1.5	1	0.1	15	AX10	6-3		
K1V6										55 to 65												
K1V10										95 to 113												
K1V11	90	1	112	20	25	1	80	-40 to 125	125	104 to 118	10	90	0.5	50	1.5	1	0.1	15				
K1V12										110 to 125												
K1V14	115	1	109	20	25	1	80	-40 to 125	125	125 to 150	10	115	0.5	30	1.5	1	0.1	15				
K1V22										200 to 230												
K1V24	180	1	108	20	25	1	80	-40 to 125	125	220 to 250	10	180	0.5	20	1.5	1	0.1	15				
K1V26										240 to 270												
K1V22(W)										200 to 230												
K1V24(W)	180	1	91	16	17	1	80	-40 to 125	125	220 to 250	10	180	0.5	50	3	1	0.1	15	AX10	7		
K1V26(W)										240 to 265												
K1V36(W)	270	1	92	13	15	1	50	-40 to 125	125	340 to 380	10	270	0.5	50	3	1	0.1	15				
K1V38(W)							80			360 to 400												
K1V(A)10										95 to 113												
K1V(A)11	90	1	109	16	15	1	50	-40 to 125	125	104 to 118	10	90	0.5	50	1.6	1	0.1	20	AX06	2-1		
K1V(A)12										110 to 125												
K1V(A)16	115	1	98	16	15	1	50	-40 to 125	125	145 to 170	10	115	0.5	50	1.6	1	0.1	20				

Spec Code 4□□□ (See page 46 for the last 3 digits of the Spec Code)



## SIDAC (Uni-Directional Device)

- **Features**
  1. Uni-directional characteristics.
  2. Smaller package than bi-directional SIDAC.
  3. Switching operation from DC power for pulse generation.
  4. The glass passivation ensures high reliability.
- **Applications**
  1. Pulse generation: gas igniters, negative ion generators, HID (high intensity discharge) lamp drive circuit, etc.
  2. Over voltage protection: DC line surge protection.

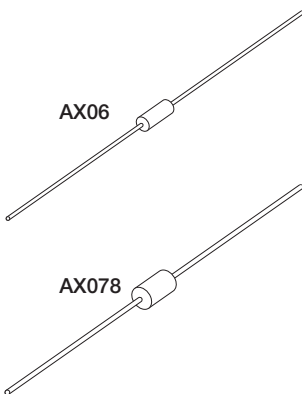
### Surface Mount



Type No.	Absolute Maximum Ratings							Electrical Characteristics								Outline		
	V <sub>DRM(A)</sub> [V]	I <sub>T</sub> [A]	I <sub>TRM</sub> Conditions T/ [°C]		dir/dt Conditions f [Hz]	T <sub>stg</sub> [A/μs]	T <sub>J</sub> [°C]	V <sub>BO(A)</sub> [V]	I <sub>DRM(A)</sub> (max) [μA]	Conditions V <sub>D</sub> [V]	I <sub>BO(A)</sub> (max) [mA]	I <sub>H(A)</sub> (max) [mA]	V <sub>T(A)</sub> (max) [V]	Conditions I <sub>T</sub> [A]	R <sub>S(A)</sub> (min) [kΩ]	θ <sub>J</sub> / (max) [°C/W]	Package	Fig.
☆G1VL8C	70		80	60				75 to 90	10	70	1.0	100	1.5	1	0.1	23	1F	13-3
☆G1VL10C	90	1	98	150	150	-40 to 125	125	95 to 110	10	90	0.5	100	1.5	1	0.1	23		
☆G1VL22C	190		280	5				210 to 230	10	190	0.5	60	1.5	1	0.1	23		

☆: New product

### Axial



Type No.	Absolute Maximum Ratings							Electrical Characteristics								Outline		
	V <sub>DRM(A)</sub> [V]	I <sub>T</sub> [A]	I <sub>TRM</sub> Conditions T/ [°C]		dir/dt Conditions f [Hz]	T <sub>stg</sub> [A/μs]	T <sub>J</sub> [°C]	V <sub>BO(A)</sub> [V]	I <sub>DRM(A)</sub> (max) [μA]	Conditions V <sub>D</sub> [V]	I <sub>BO(A)</sub> (max) [mA]	I <sub>H(A)</sub> (max) [mA]	V <sub>T(A)</sub> (max) [V]	Conditions I <sub>T</sub> [A]	R <sub>S(A)</sub> (min) [kΩ]	θ <sub>J</sub> / (max) [°C/W]	Package	Fig.
G1V(A)8C	70		98	80	80			75 to 90	10	70	1.0	100	1.5	1	0.1	20	AX06	2-3
G1V(A)10C	90		98	80	80			95 to 110	10	90	0.5	60	1.5	1	0.1	20		
☆G1V(A)12C	100		98	80	80			110 to 130	10	100	0.5	60	1.5	1	0.1	20		
☆G1V(A)14C	120		98	80	80			130 to 150	10	120	0.5	60	1.5	1	0.1	20		
G1V(A)15C	115	1	98	80	60			142 to 157	10	115	0.5	60	1.5	1	0.1	20		
G1V(A)20C	170		98	80	80			190 to 210	10	170	0.5	60	1.5	1	0.1	20		
G1V(B)20C	170		102	120	220	-40 to 150	150	190 to 210	10	170	0.5	60	1.5	1	0.1	17	AX078	5-3
G1V(B)22C	190		102	160	220	-40 to 125	125	210 to 230	10	190	0.5	60	1.5	1	0.1	17		
☆G1V(B)24C	210		102	120	220	-40 to 150	150	230 to 250	10	210	0.5	60	1.5	1	0.1	17		

☆: New product

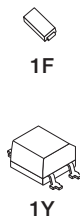
Spec Code 4□□□ (See page 46 for the last 3 digits of the Spec Code)

# Surge Absorbers

## Varistors

- **Features**
  1. Bi-directional surge absorption is possible.
  2. Low junction capacitance.
- **Applications**
  1. Telephone set surge absorption.
  2. Digital communications circuit surge absorption.
  3. ISDN terminal surge absorption.

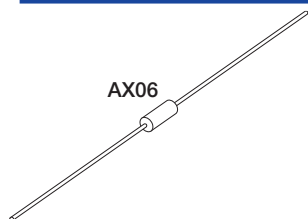
## Surface Mount



Type No.	Absolute Maximum Ratings				Electrical Characteristics (Ta=25°C)						Outline	
	I <sub>o</sub>	I <sub>FSM</sub>	T <sub>stg</sub>	T <sub>j</sub>	V <sub>F1</sub>	I <sub>F1</sub>	V <sub>F2</sub>	I <sub>F2</sub>	V <sub>F3</sub>	I <sub>F3</sub>	Package	Fig.
	[mA]	[V]	[°C]	[°C]	[V]	[mA]	[V]	[mA]	[V]	[mA]		
VR61F1*1	370	7.5	-55 to 150	150	2.3 ± 0.25	1	2.75 ± 0.25	10	3.1 ± 0.25	70	1F	14-1
VRYA6*2	310	8	-30 to 125	125	2.3 ± 0.25	1	2.75 ± 0.25	10	3.1 ± 0.25	70	1Y	*3
VRYA15*2	140	6.5		125	5.75 ± 0.62	1	6.875 ± 0.625	10	7.75 ± 0.62	70		

\* 1: On alumina substrate      \* 2: On alumina substrate, 1 element operation. 2 elements in parallel  
 \* 3: SMD package Fig. 21; THD package Fig. 22-2

## Axial

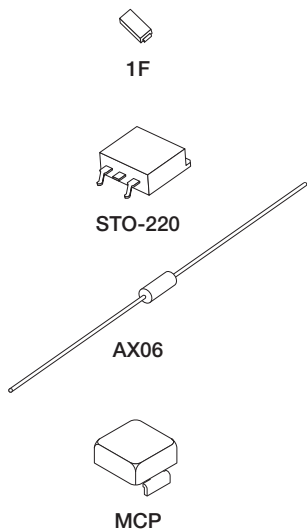


Type No.	Absolute Maximum Ratings				Electrical Characteristics (Ta=25°C)						Outline	
	I <sub>o</sub>	I <sub>FSM</sub>	T <sub>stg</sub>	T <sub>j</sub>	V <sub>F1</sub>	I <sub>F1</sub>	V <sub>F2</sub>	I <sub>F2</sub>	V <sub>F3</sub>	I <sub>F3</sub>	Package	Fig.
	[mA]	[V]	[°C]	[°C]	[V]	[mA]	[V]	[mA]	[V]	[mA]		
VR-60B(A)	500	16	-30 to 125	125	1.5	1000	—	—	0.2	0.02	AX06	3
VR-60BP(A)	500	16			1.5		0.58 ± 0.03	1	0.2			
VR-51B	150	7.5			1.8 ± 0.25	1	2.1 ± 0.25	10	2.4 ± 0.25			
VR-61B(A)	150	7.5			2.3 ± 0.25		2.75 ± 0.25		3.1 ± 0.25	70		

Spec Code 5□□□ (See page 46 for the last 3 digits of the Spec Code)

## Trankillers

- **Features**
  1. High speed response.
  2. Absorption energy tolerance capacity.
  3. Narrow clamping voltage width.
- **Applications**
  1. IC protection for telephones.
  2. IC protection against abnormal voltage.
  3. Protection for load dump noise.



Type No.	Absolute Maximum Ratings				Electrical Characteristics							Outline	
	PRSM	T <sub>stg</sub>	T <sub>j</sub>	V <sub>RM</sub> (max)	V <sub>BR</sub> (typ)	I <sub>R</sub> (max)	r <sub>Z</sub> (max)	V <sub>CL</sub> * (max)	Package	Fig.			
	[W]	[°C]	[°C]	[V]	[V]	Conditions I <sub>R</sub> [mA]	Conditions V <sub>R</sub> [V]	[%/°C]			[V]	Conditions I <sub>PP</sub> [A]	
ST03-58F1	300	-55 to 150	150	45	58	1	5	45	—	80	4	1F	13-2
ST03-68F1		-40 to 150		58	68			58	—	95	3		
ST04-14F1	400	-40 to 150		12.8	14	5	10	12.8	—	22	18		
ST04-16F1		-55 to 175		13.6	16			13.6	—	23	15		
ST04-18F1				15.3	18			15.3	—	26	15		
ST04-27F1		23		27	23			—	37	10			
ST70-27F	7000	-40 to 150	150	23	27	1	5	23	0.09	40	180	STO-220	36-6
ST70-27MF	7000			23	27			23	0.09	40	180	MCP	80
ST80-14MF	8000	-55 to 150		12	14	5	5	12	0.08	—	—	1F	14-2
DL04-18F1◎	400			-40 to 150	13			18	13	—	27		
ST04-27		400		-40 to 150	23	27	1	5	23	0.09	37	10	AX06

☆: New product      ◎: Bi-directional type      Spec Code 4□□□ (See page 46 for the last 3 digits of the Spec Code)  
 \*: V<sub>CL</sub> 10/1000 μs

# Power Clampers

- **Features**
  1. High speed response.
  2. Absorption energy tolerance capacity.
  3. Narrow clamping voltage width.
  4. Reverse blocking type.
- **Applications**
  1. Snubber circuit in the primary side of switch-mode power supplies.

Type No.	Absolute Maximum Ratings				Electrical Characteristics						Outline		
	PRSM [W]	Tstg [°C]	Tj [°C]	V <sub>RM</sub> (max) [V]	V <sub>BR</sub> (typ) [V]	Conditions I <sub>R</sub> [mA]	I <sub>R</sub> (max) [μA]	Conditions V <sub>R</sub> [V]	V <sub>CL</sub> (max) [V]	Conditions I <sub>PP</sub> [A]	Package	Color Code	Fig.
2F				145	170			145	280	0.75	2F	—	16-3
AX078	200	-40 to 150	150	67	82	1	5	67	118	1.7	AX078	Silver	5-2
☆ST02D-140				120	145			120	200	0.75		Blue	
ST02D-170				145	170			145	280	0.75		Red	
ST02D-200				170	200			170	300	0.75		Yellow	
ST03D-82				67	82			67	118	2.5		Silver	
AX10	300	-40 to 150	150	120	145	1	5	120	200	0.75	AX10	Blue	6-2
☆ST03D-140				145	170			145	280	1.1		Red	
ST03D-170				170	200			170	300	1.0		Yellow	
ST03D-200				170	200			170	300	1.0		Yellow	

☆: New product

Spec Code 4□□□ (See page 46 for the last 3 digits of the Spec Code)

# Thyristor Surge Suppressors

- **Features**
  1. Bi-directional or uni-directional characteristics.
  2. High speed response.
  3. Large surge current capacity.
  4. Repetitive use against surges is possible.
- **Applications**
  1. Lightning surge adsorption for communications circuits.
  2. Lightning surge adsorption for transmitters and switchboards.
  3. Surge protection for ISDN terminals.

# Surface Mount



Type No.	Absolute Maximum Ratings				Electrical Characteristics							Remarks	Outline					
	I <sub>TSM</sub> [A]	Conditions [μs]	V <sub>DRM</sub> [V]	Tstg [°C]	Tj [°C]	V <sub>BO</sub> (min) [V]	V <sub>CL</sub> (max) [V]	I <sub>DRM</sub> (max) [μA]	Conditions V <sub>D</sub> [V]	I <sub>H</sub> (min) [mA]	C <sub>J</sub> (max) [pF]		Package	Fig.				
KL3Z07	30	10/1000	5	-40 to 125	125	5.5*	—	10	5	50	—	—	1F	14-3				
KL3Z18			15			15.5*	—	10	15	50	—							
KL3L07			58			65	80	10	58	100	90							
KL3N14			120			130	195	10	120	100	50							
KL3R20			175			180	250	10	175	100	30							
KP4L07	40	10/1000	58	-40 to 125	125	65	80	10	58	100	90	—	2F	16-2				
KP4N12			100			110	135	10	100	100	50							
KP10L06	100	10/1000	48	-40 to 125	125	55	70	10	48	100	235	—	2F	16-2				
KU10L08			63			70	100	10	63	100	180	RU <sup>®</sup>	M2F	15-2				
KP10L08			63			70	100	10	63	100	180	—	2F	16-2				
KU10N14			120			125	195	5	120	100	140	RU <sup>®</sup>	M2F	15-2				
KP10N14			120			130	195	10	100	100	140	—	2F	16-2				
KP15L08			150			10/1000	63	-40 to 125	125	70	100	10	63	100	320	—	2F	16-2
KU15N14							120			125	195	5	120	100	110	RU <sup>®</sup>	M2F	15-2
KP15N14							120			125	195	10	120	100	200	—	2F	16-2
KP15R25							190			220	290	10	190	100	150	—	2F	16-2
KU15R25							190			220	290	10	190	100	150	—	2F	16-2

☆: New product

\*: V<sub>BR</sub>

RU<sup>®</sup>: UL497B recognized File No. E183905

# Surge Absorbers.....

## Surface Mount (Uni-Directional Type)



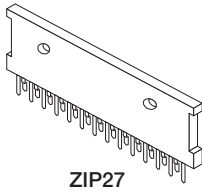
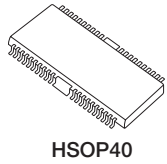
Type No.	Absolute Maximum Ratings					Electrical Characteristics							Remarks	Outline	
	ITSM [A]	Conditions [μs]	VDRM [V]	Tstg [°C]	Tj [°C]	VBR (min) [V]	VCL (max) [V]	IDRM (max) [μA]	Conditions VD [V]	IH (min) [mA]	Cj (max) [pF]	Package		Fig.	
KU10LU07	100	10/1000	58	-40 to 125	125	62	100	10	58	100	200	UL <sup>®</sup>	M2F	15-3	
KP10LU07	100		60			62	100	10	60	100	180	—	2F	16-4	

UL<sup>®</sup>: UL497B recognized File No. E183905

## Stepper Motor Driver ICs

- **Outline** The MTD series is monolithic power ICs that, with fewer external components, can directly drive any motors.
- **Applications**
  1. Stepper motor drive for office equipment products.
  2. Stepper motor drive for industrial robots, automatic equipments.

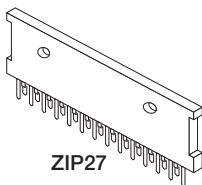
Type No.	Operation	Absolute Maximum Ratings (Ta=25°C)			Characteristics	Outline		
		V <sub>CEO</sub> [V]	I <sub>O</sub> [A]	P <sub>D</sub> [W]		Package	Fig.	
MTD1120	Unipolar	80	1.2	5	Constant-Current chopping function (4-Phase Input)	ZIP27	89	
MTD1120F				3		HSOP28	81	
MTD1361		68	1.5	5		ZIP27	89	
MTD1361F			1.2	3		HSOP28	81	
MTD2002F	Bipolar	35	0.8	3		Dual Full Bridge Current levels can be selected by 2 bit digital signal	HSOP28	81
MTD2003F				30			1.2	3
MTD2005		60	1.3	5		Dual Full Bridge Selectable slow/fast current decay for microstepping	ZIP27	89
MTD2005F			1.0	3			HSOP28	81
MTD2006		35	1.3	5	Dual Full Bridge Selectable slow/fast current decay for microstepping	ZIP27	89	
MTD2006F				3		HSOP28	81	
MTD2007F		50	1.0	3	Dual Full Bridge Current levels can be selected by 2 bit digital signal	HSOP28	81	
MTD2009J		35	1.2	2.9	Two Stepper Motor Drivers Selectable slow/fast current decay for microstepping	HSOP40	82	



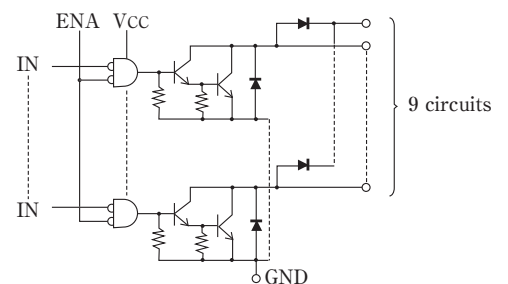
## Power ICs for Interface

- **Outline** The MTA Series is monolithic power ICs best fit for use as needle print head drivers of dot matrix printers, and as stepping motor drivers.
- **Features**
  1. The input is TTL and CMOS compatible
  2. Large output I<sub>C</sub>=2A, V<sub>CE</sub>=60V or 80V
  3. Insulated type single in-line packaging with heatsink installed
- **Applications**
  1. Head driver for dot matrix printers, ECR and time recorders
  2. Stepping motor drive for printers, typewriters, FAX, PPC and XY plotters
  3. Driver for all types of solenoids, and displays (LED, etc.)

Type No.	Absolute Maximum Ratings (Ta=25°C)			Operation			Outline	
	V <sub>CEO</sub> [V]	I <sub>O</sub> [A]	P <sub>D</sub> [W]	Input	Output	Circuits	Package	Fig.
MTA001M	80	2	5	L Active	NPN Darlington	9	ZIP27	89
MTA011				H Active				
MTA002				L Active	PNP Darlington			



Equivalent circuit (MTA001M)



We are happy to provide circuit design support for safe use of our IC products. Please consult our sales representatives or marketing sector.

## DC-DC Converter Power ICs

### Outline

The MD Series is a non-isolated, PWM control stepdown DC-DC converter power IC whose MOSFET and drive circuit IC chip integration eliminates the complexity of power supply circuit design. Two rectification systems are available: flywheel Schottky diode type and highly efficient synchronous rectification MOSFET type. A high-performance power supply can be easily realized by choosing a suitable MD chip. The MD Series is available in SMD type HSOP28, SSOP32, LSSOP26, and SOP8 packages.

### Features

- High-efficiency**  
The MD Series consists of a matched control IC and main switching MOSFET in a single package, which allows the construction of a highly efficient power supply with little switching loss and wiring loss.
- Switching Frequency**  
Choose the switching frequency matched to the usage conditions from among 250kHz fixed type, 100kHz/300kHz switched type, and 100kHz to 500kHz adjustable type.
- Protection Functions**  
The MD Series has overcurrent protection, thermal shutdown, undervoltage lockout (UVLO) and etc.

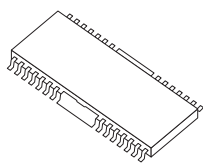
Type No.	Input Voltage [V]	Output Voltage [V]	Output Current [A]	Frequency [kHz]	Operation Temp [°C]	Rectification System	Outline	
							Package	Fig.
MD5001T	4.5 to 14	0.8 to 12 <sup>*2</sup>	0 to 1	100 to 500 <sup>*4</sup>	-40 to 85	Fly wheel SBD	SOP8	90
MD3221N	4.5 to 20	2.5/3.3 <sup>*1</sup> 0.8 to 14 <sup>*2</sup>	0 to 3	100/300 <sup>*3</sup>	-30 to 85	Synchronous	SSOP32	83
MD3221R		0.8 to 14 <sup>*2</sup>					LSSOP26	84
MD3222N	8 to 20	2.5/3.3 <sup>*1</sup> 0.8 to 14 <sup>*2</sup>	0 to 6	250	-10 to 80	Fly wheel SBD	SSOP32	83
MD1222N		2.5 to 12 <sup>*2</sup>	0 to 5				HSOP28	81
MD1320F	12 to 30	3.3/5 <sup>*1</sup>	0 to 3	100 to 500 <sup>*4</sup>	-30 to 85	Synchronous	SSOP32	83
MD1322F	8 to 30	2.5 to 12 <sup>*2</sup>					0 to 1.5	LSSOP26
MD1320N		8 to 30	3.3/5 <sup>*1</sup>	0 to 1.8	250	-10 to 80	Fly wheel SBD	SSOP32
MD1322N	2.5 to 12 <sup>*2</sup>		0 to 5					LSSOP26
MD1323R	8 to 30	0.8 to 12 <sup>*2</sup>	0 to 5	100 to 500 <sup>*4</sup>	-30 to 85	Synchronous	SSOP32	83
MD1324R		2.5 to 12 <sup>*2</sup>					0 to 3	LSSOP26
MD1333N	8 to 40	3.3/5 <sup>*1</sup>	0 to 3	100 to 500 <sup>*4</sup>	-10 to 80	Fly wheel SBD	SSOP32	83
MD1421N		2.5 to 12 <sup>*2</sup>					0 to 2	HSOP28
MD1422N	8 to 40	2.5 to 12 <sup>*2</sup>	0 to 3	100 to 500 <sup>*4</sup>	-30 to 85	Synchronous	SSOP32	83
MD1423N		2.5 to 12 <sup>*2</sup>					0 to 3	LSSOP26
MD1423R	8 to 40	0.8 to 12 <sup>*2</sup>	0 to 3	100 to 500 <sup>*4</sup>	-10 to 80	Fly wheel SBD	SSOP32	83
MD1424R		2.5 to 12 <sup>*2</sup>					0 to 3	LSSOP26
MD1620F	12 to 57	5	0 to 2	250	-10 to 80	Fly wheel SBD	HSOP28	81

\* 1: Selectable output voltage 3.3V/5V

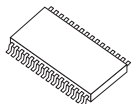
\* 2: Adjustable output voltage

\* 3: Selectable 100k/300kHz

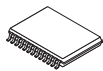
\* 4: Adjustable from 100k to 500kHz



HSOP28



SSOP32



LSSOP26

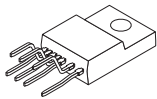


SOP8

We are happy to provide circuit design support for safe use of our IC products.  
Please consult our sales representatives or marketing sector.

## Partial Resonance Power Supply ICs : MR series

- **Outline**      The MR series is Partial Resonance Power Supply IC modules featuring standby mode operation for very low power consumption. A main switching device and a control circuit are incorporated in a single package. Highly efficient and low noise power supplies can easily be designed with a minimum number of external components using the MR series IC.
- **Features**
  1. Burst mode operation for very low standby power  
Ex. MR1521 in 100V AC main, 12V, 3.5A power supply: Pin=0. 1W at no-load
  2. High efficiency, low noise
  3. No start-up resistance is required
  4. Over current protection
  5. Over voltage protection
  6. Thermal shutdown



FTO-7P

Type No.	Maximum Output[W] *			Main Switch		Outline	
	90 to 132V AC	180 to 276V AC	90 to 276V AC	Device	V <sub>bs</sub> [V]	Package	Fig.
MR4500	12 (Peak 20)	—	—	MOSFET	500	FTO-7P	86
MR4510	25 (Peak 40)						
MR4520	50 (Peak 80)						
MR4530	80 (Peak 100)						
MR4710	—	25 (Peak 40)	12 (Peak 20)	2 <sup>nd</sup> Generation High Speed IGBT	900	FTO-7P	86
MR4720		50 (Peak 80)	25 (Peak 40)				
MR4010		65	45				
MR4020		105	70				
MR4030		135	90				
MR4040		180	120				

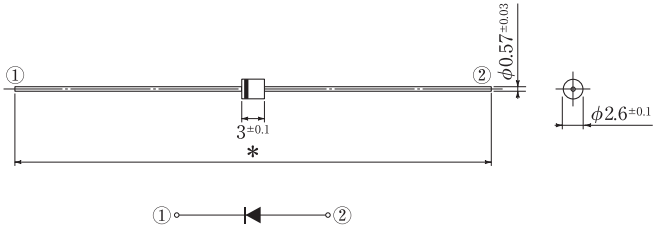
\* : The value is for reference. Maximum output power varies with power supply design.

We are happy to provide circuit design support for safe use of our IC products.  
Please consult our sales representatives or marketing sector.

# Outline Dimensions

[Unit : mm]

Fig.1 Package: AX057



\* Please see the [Code No.(Taping)] or [Quantity and Packing Form]

Fig.2 Package: AX06

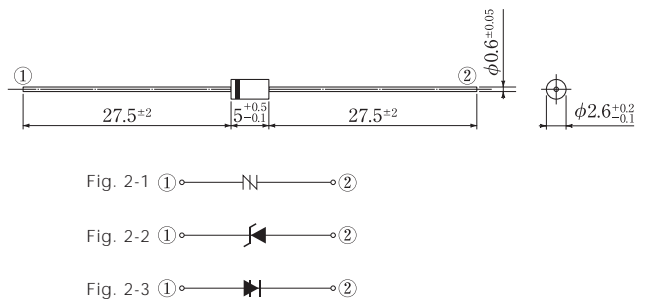


Fig.3 Package: AX06

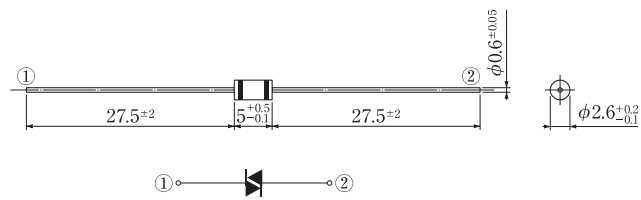


Fig.5 Package: AX078

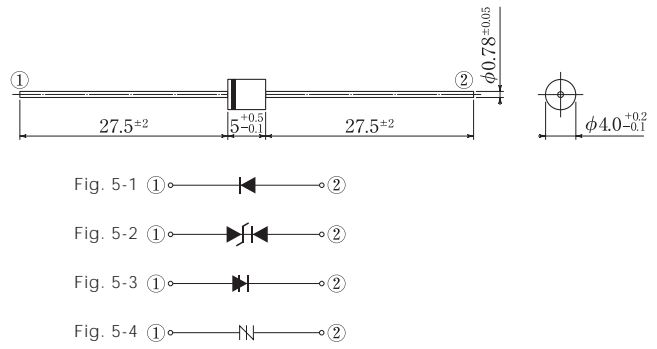


Fig.6 Package: AX10

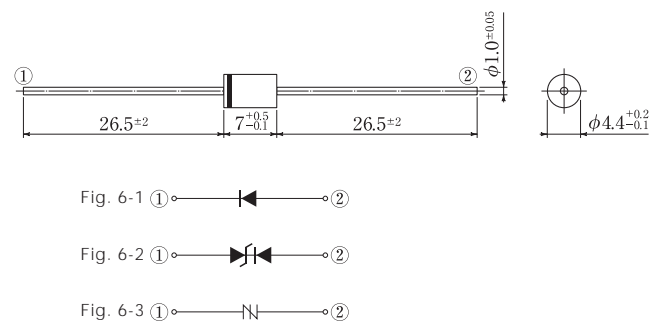


Fig.7 Package: AX10

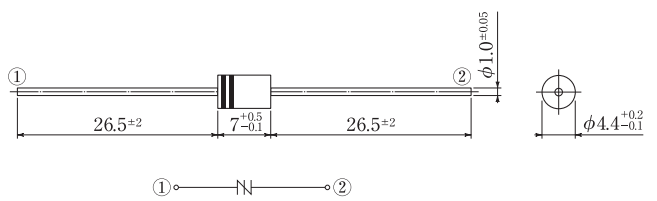


Fig.8 Package : AX14

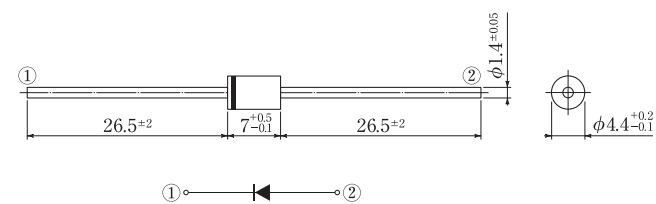




Fig.12 Package: M1F

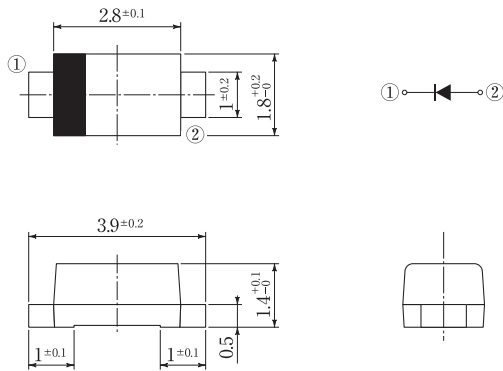


Fig.13 Package: 1F

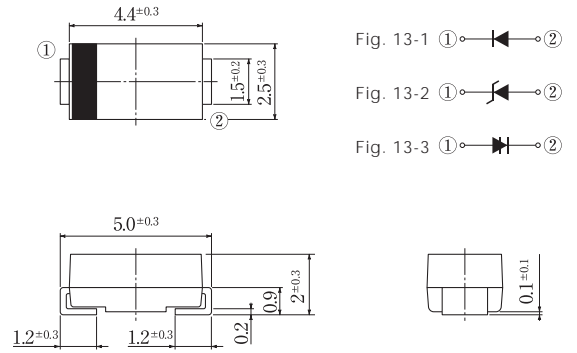


Fig. 13-1

Fig. 13-2

Fig. 13-3

Fig.14 Package: 1F

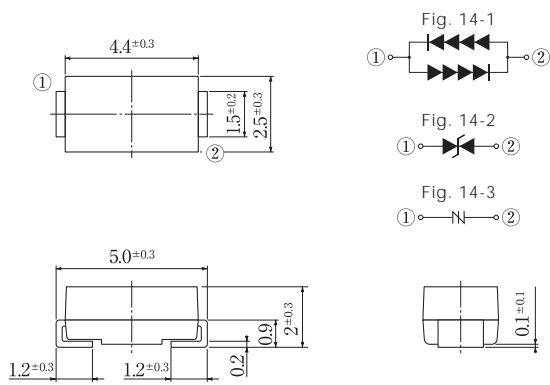


Fig. 14-1

Fig. 14-2

Fig. 14-3

Fig.15-1 Package: M2F

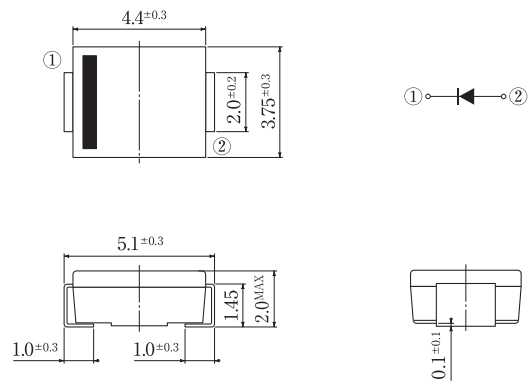


Fig.15-2 Package: M2F

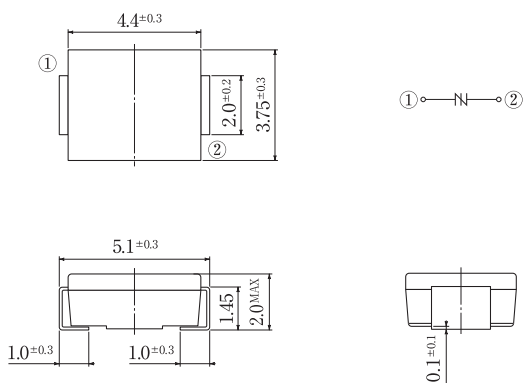
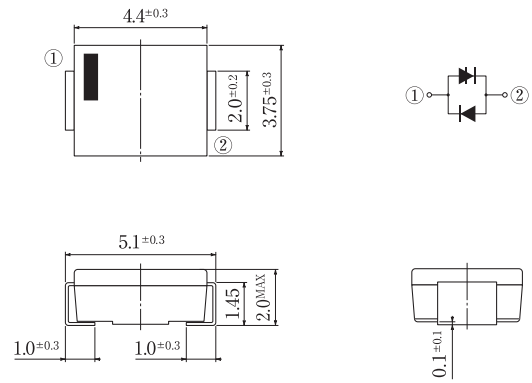


Fig.15-3 Package: M2F



# Outline Dimensions

[Unit : mm]

Fig.16 Package: 2F

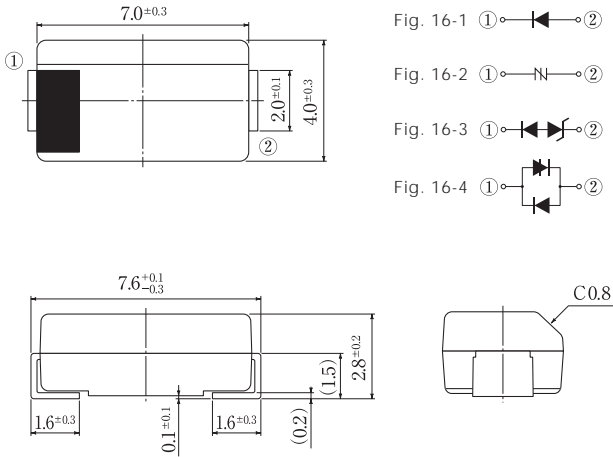


Fig.21 Package: 1Y

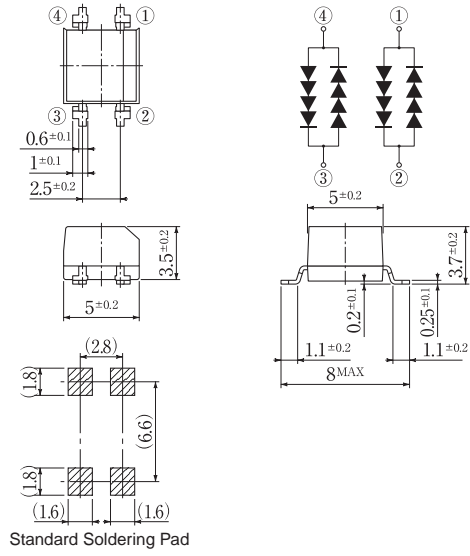


Fig.22 Package: 1Y

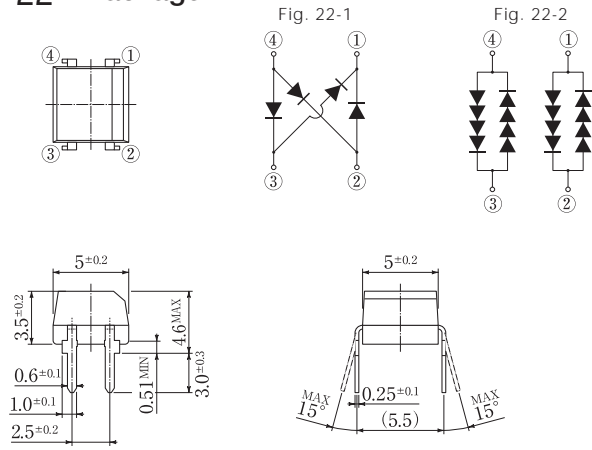


Fig.23 Package: 1Z

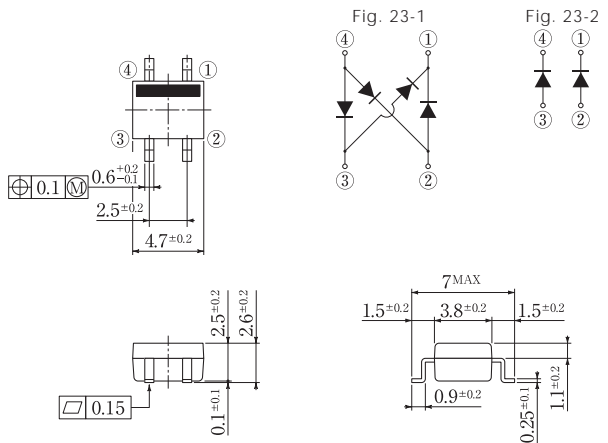


Fig.24 Package: 1Z

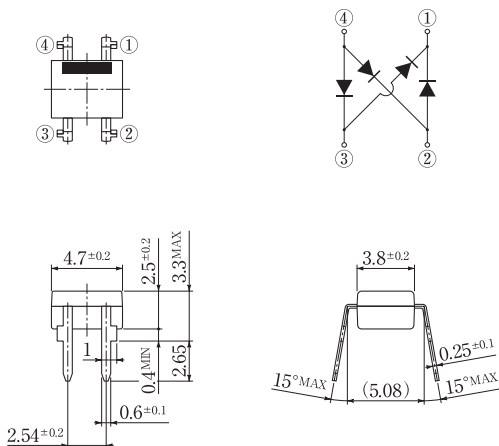


Fig.25 Package: 1N

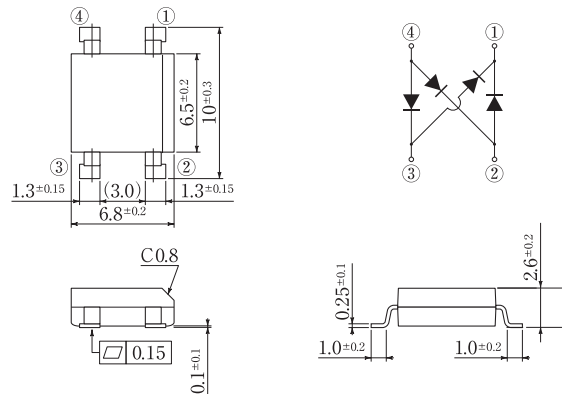


Fig.26 Package: 1N

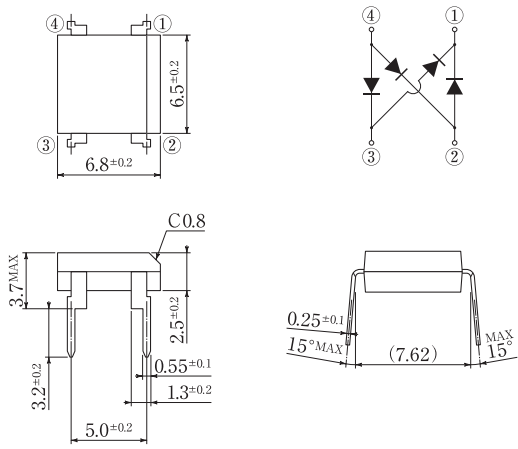


Fig.27 Package: 1NA

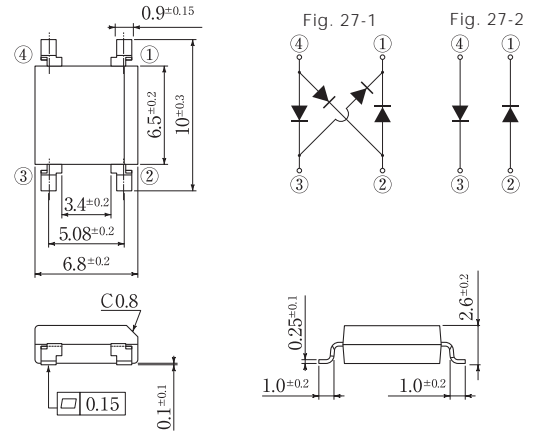


Fig.28 Package: 1NA

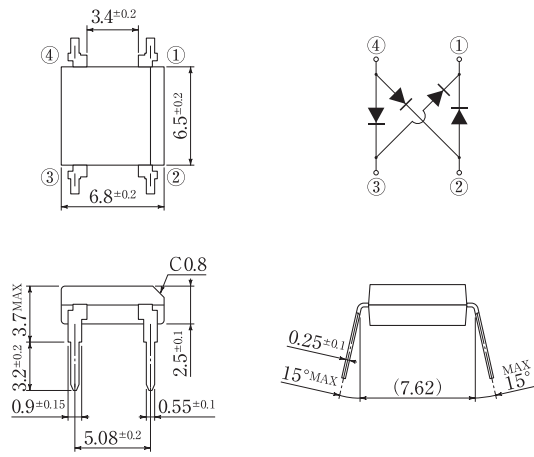


Fig.29 Package: 1W

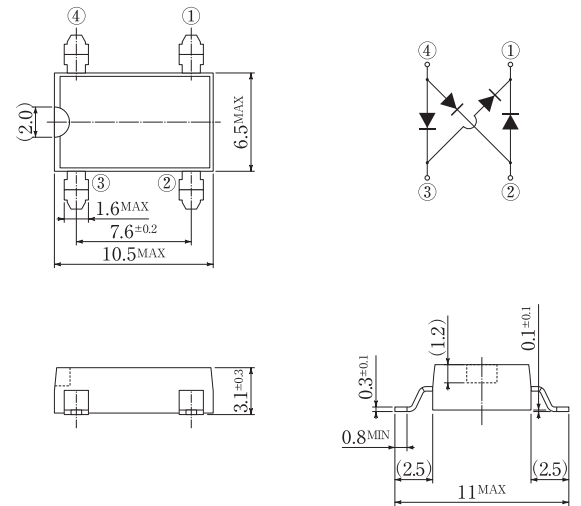


Fig.30 Package: 1W

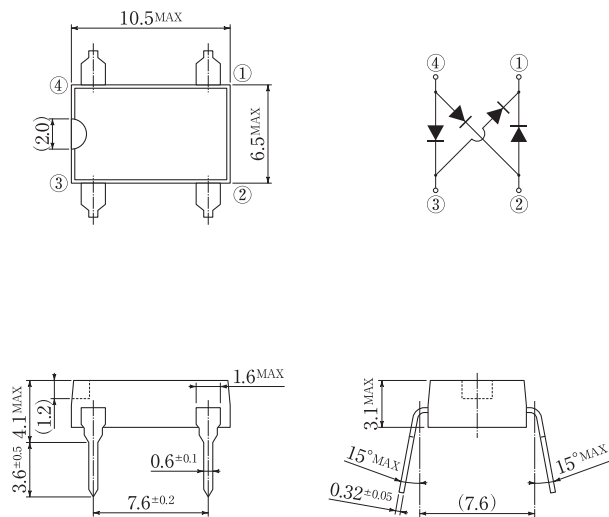
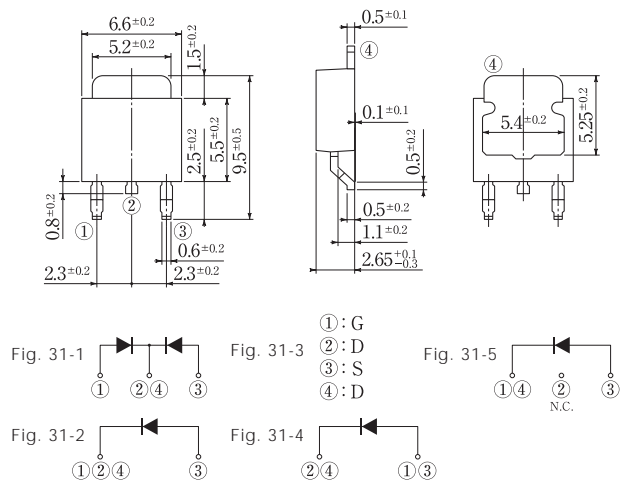


Fig.31 Package: E-pack



# Outline Dimensions

[Unit : mm]

Fig.32 Package: E-pack

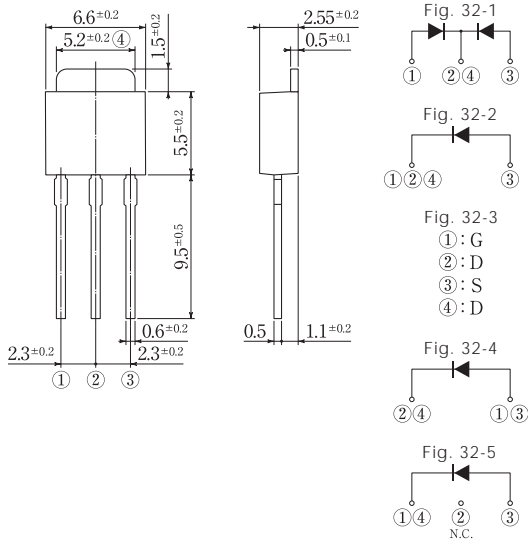


Fig.33 Package: SOPA-4

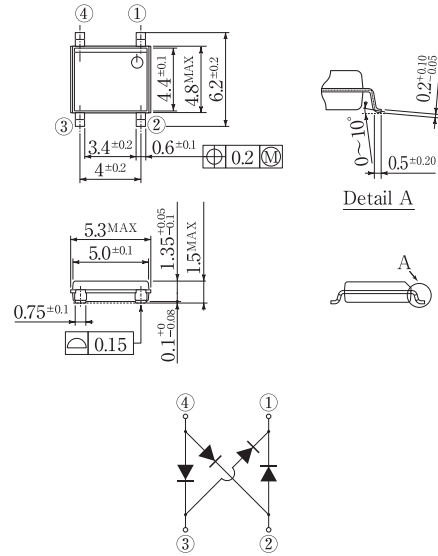


Fig.36 Package: STO-220

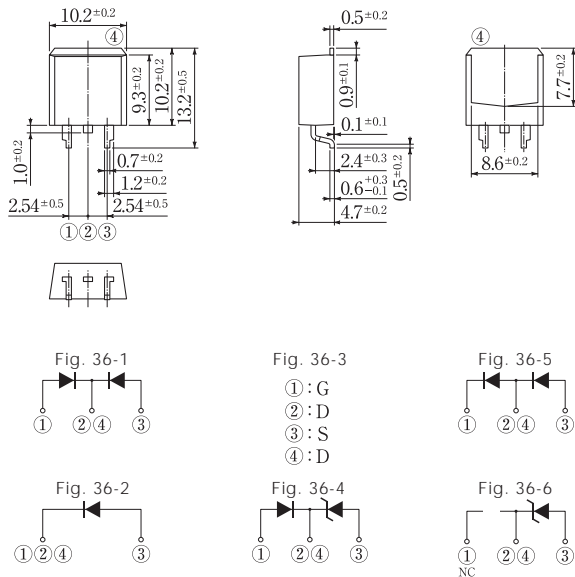


Fig.43 Package: ITO-3P

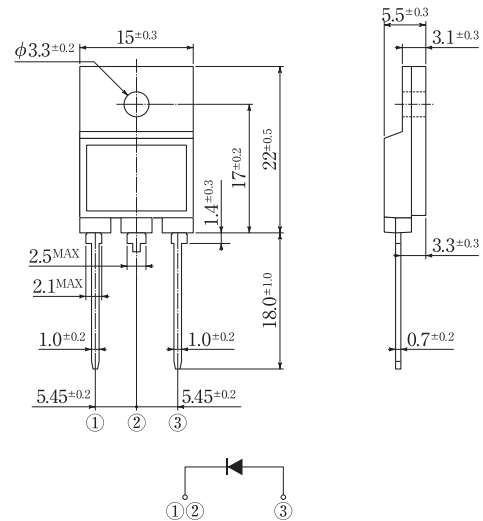


Fig.44 Package: ITO-3P

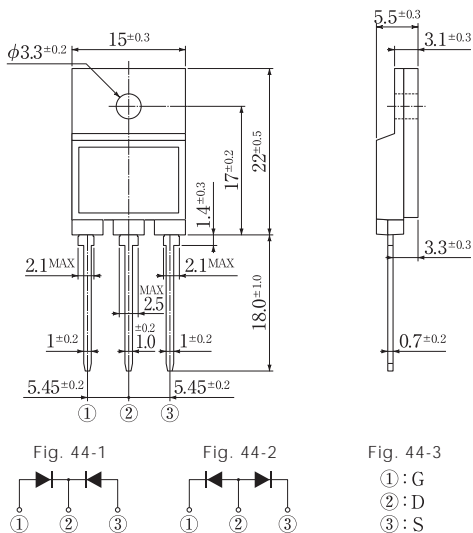


Fig.45 Package: MTO-3P

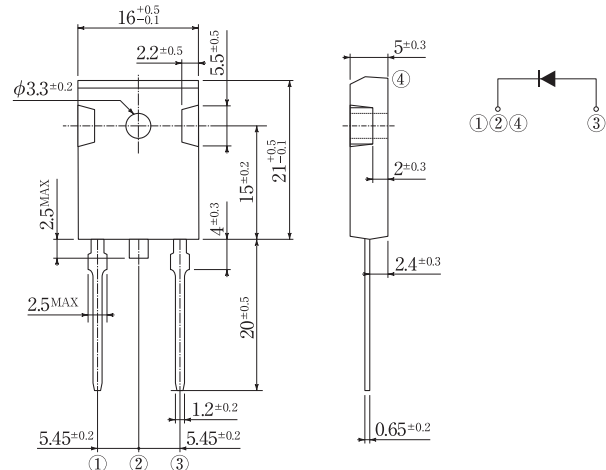


Fig.46 Package: MTO-3P

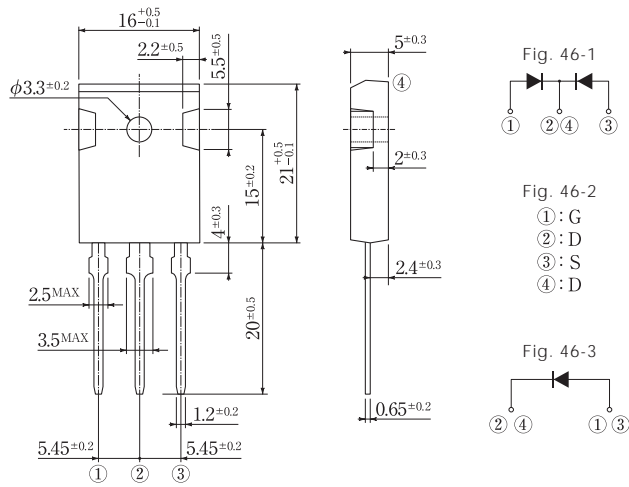


Fig.47 Package: FTO-220

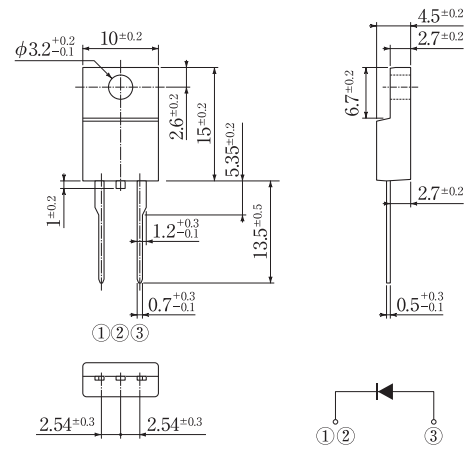


Fig.48 Package: FTO-220

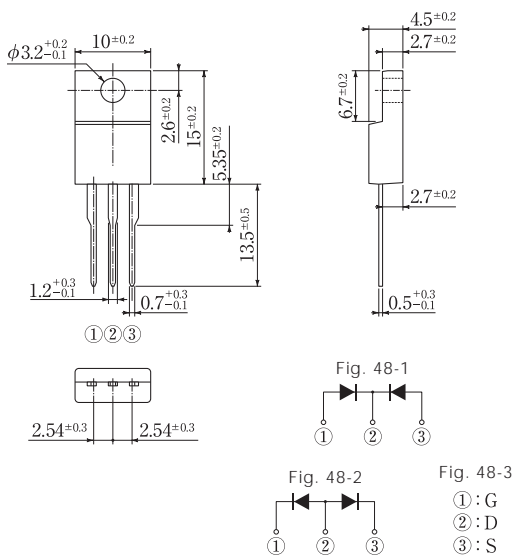


Fig.49 Package: FTO-220A

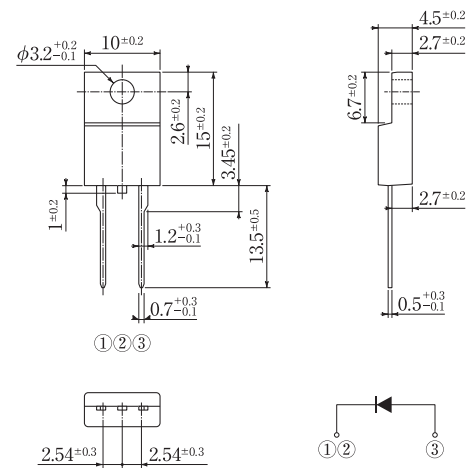


Fig.50 Package: FTO-220A

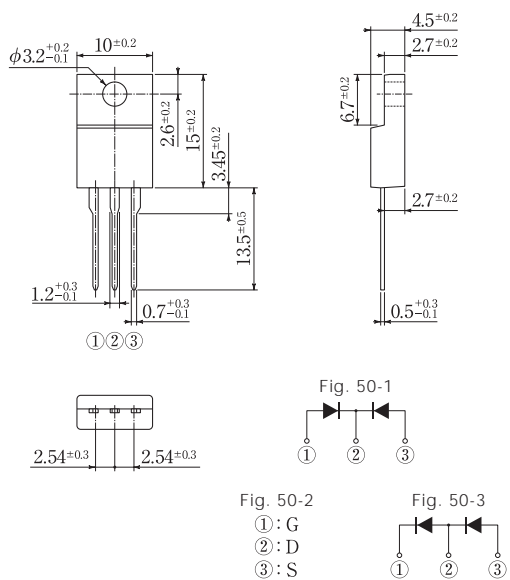
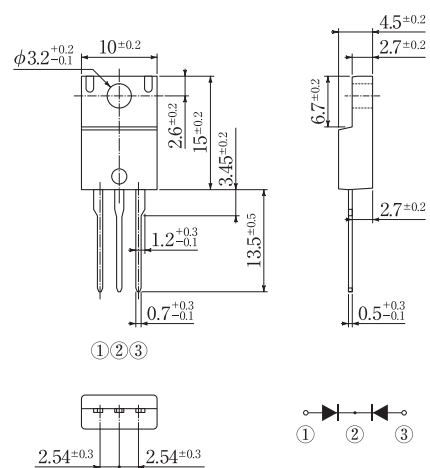


Fig.52 Package: FTO-220G



# Outline Dimensions

[Unit : mm]

Fig.53 Package: D6K

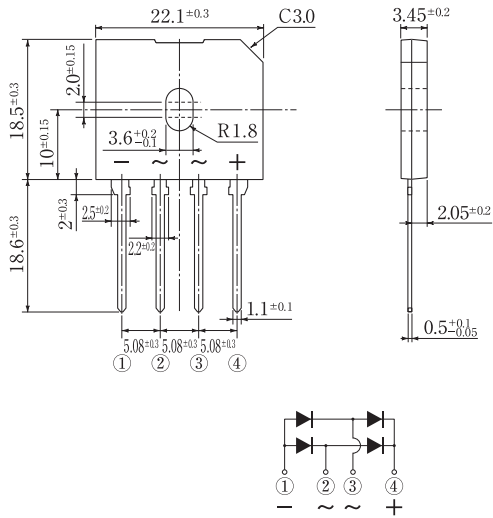


Fig.54 Package: D3K

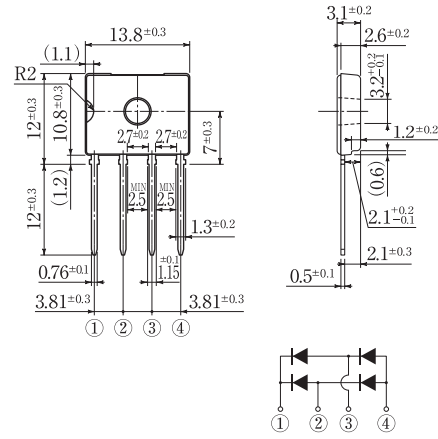


Fig.55 Package: 1V

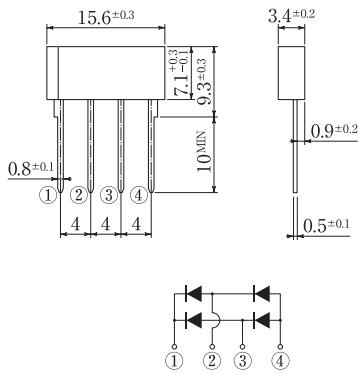


Fig.56 Package: 2S

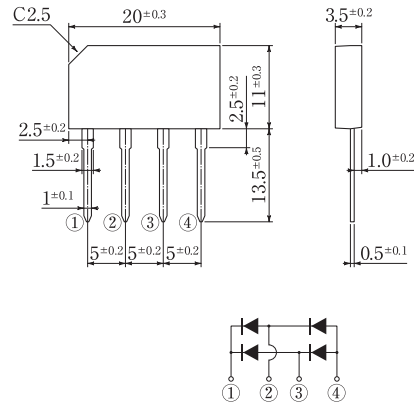


Fig.57 Package: 3S

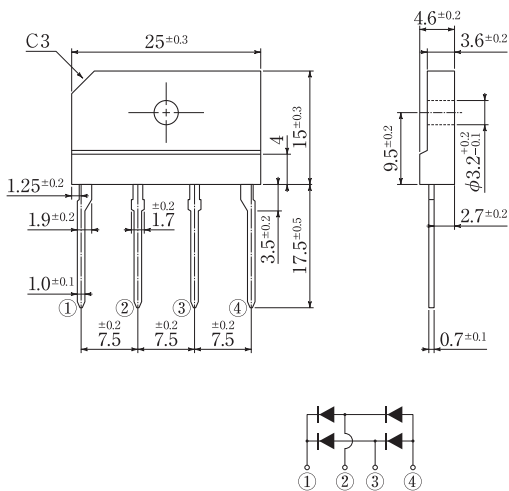


Fig.58 Package: 5S

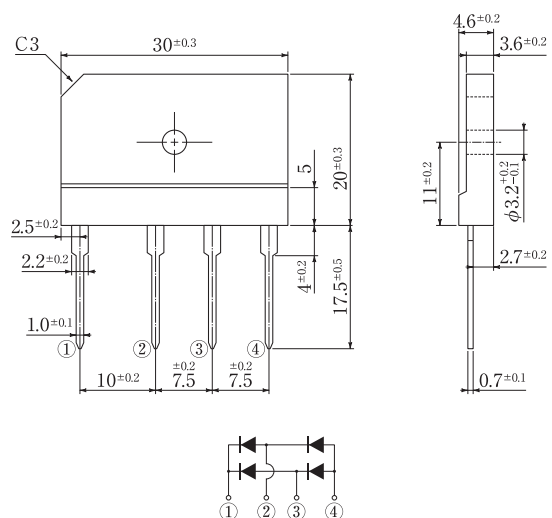


Fig.59 Package: TSB(4PIN)

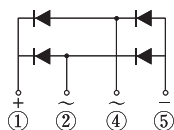
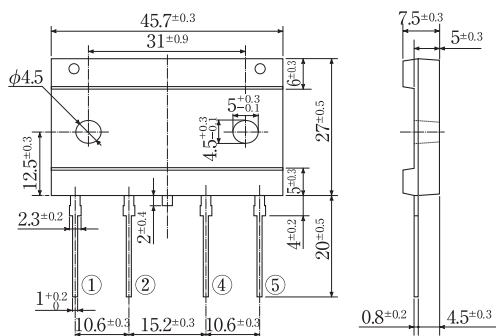


Fig.60 Package: TSB(5PIN)

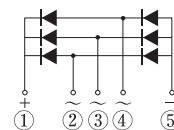
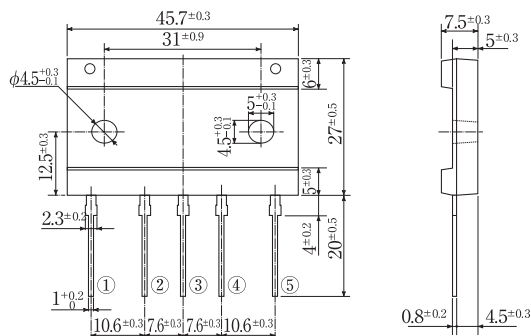


Fig.61 Package: S2VB

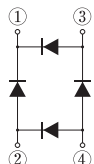
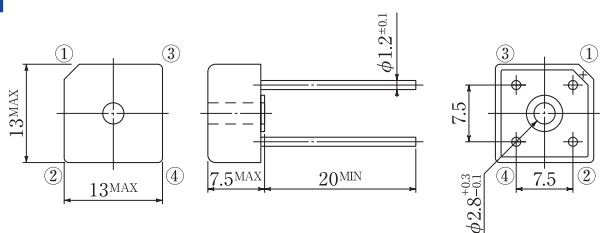


Fig.62 Package: S4VB

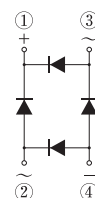
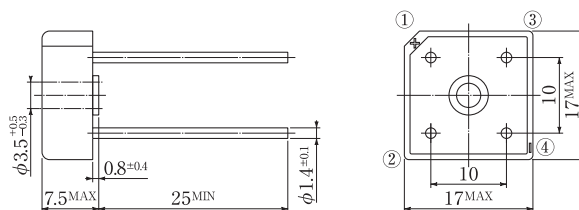


Fig.63 Package: S5VB

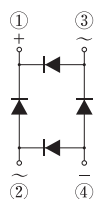
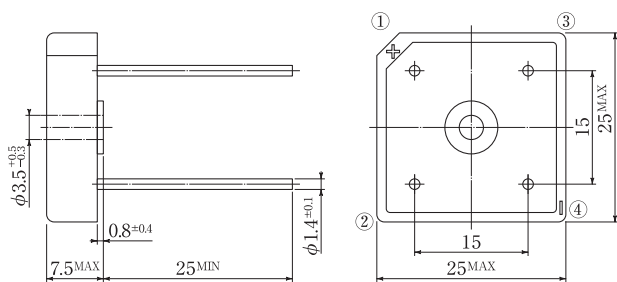
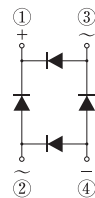
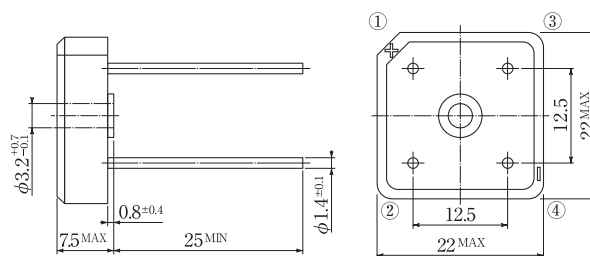


Fig.64 Package: S10VB



# Outline Dimensions

[Unit : mm]

Fig.65 Package: S15VB

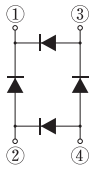
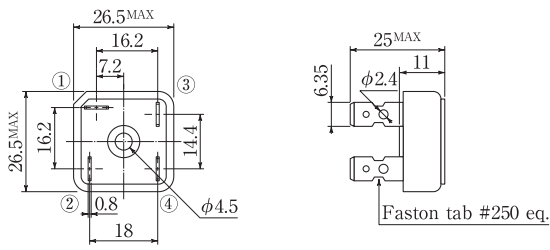


Fig.66 Package: S25VB

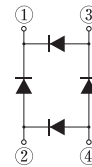
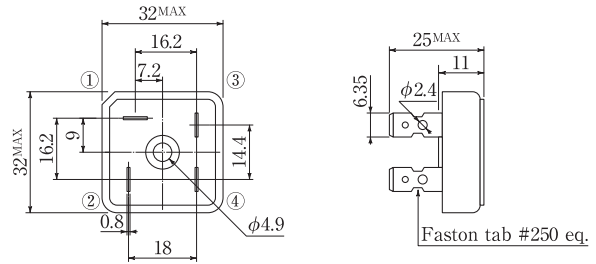


Fig.67 Package: S50VB

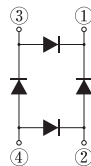
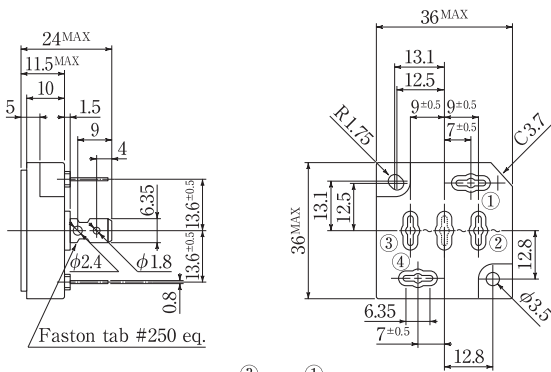


Fig.68 Package: S3WB

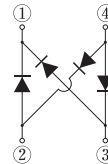
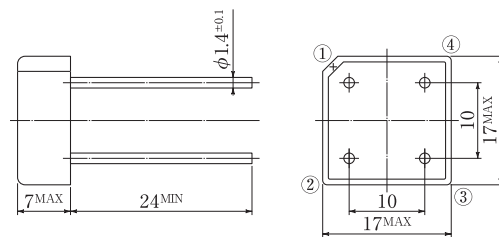


Fig.69 Package: S10WB

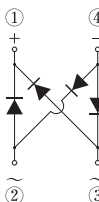
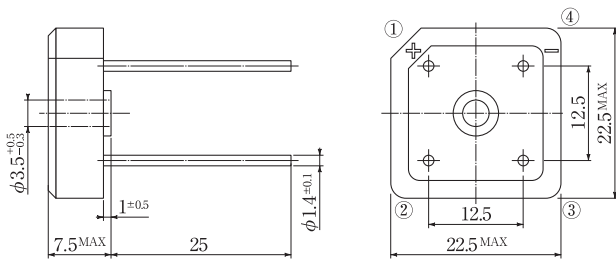


Fig.70 Package: S15WB

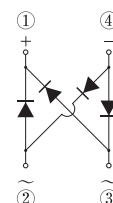
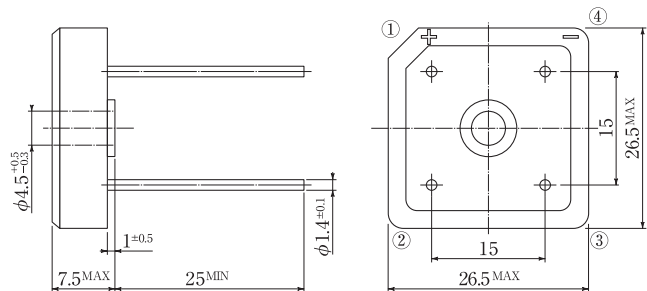




Fig.71 Package: S20WB

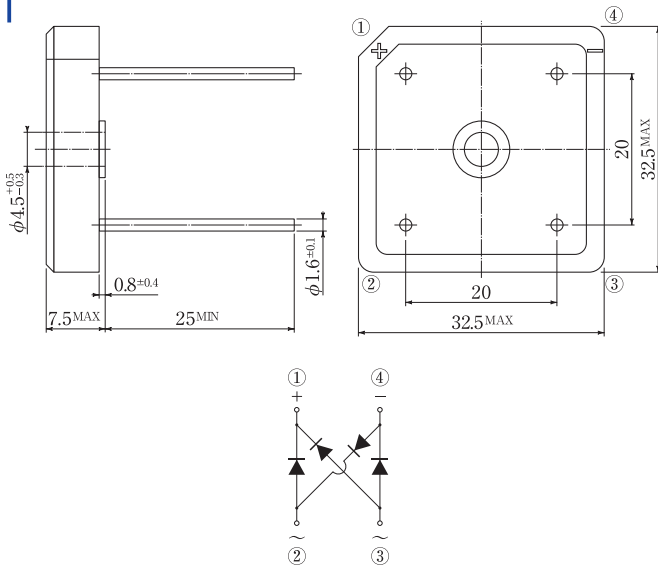


Fig.73 Package: SVTA

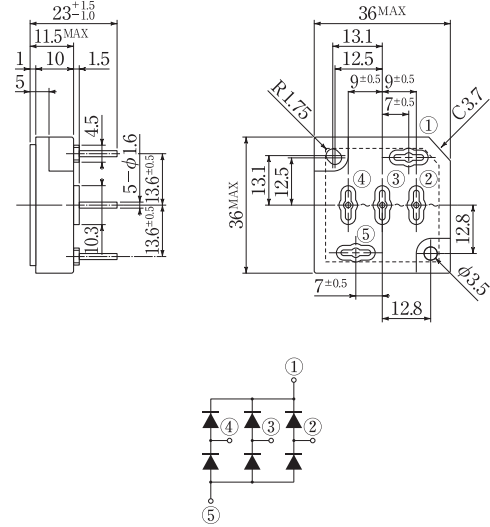


Fig.74 Package: SVT

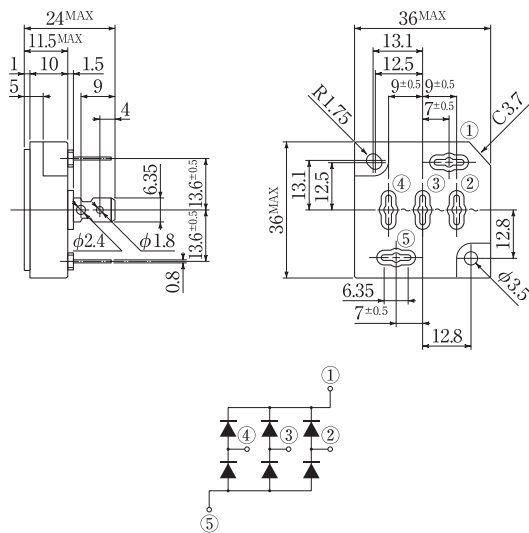


Fig.76 Package: D30VC

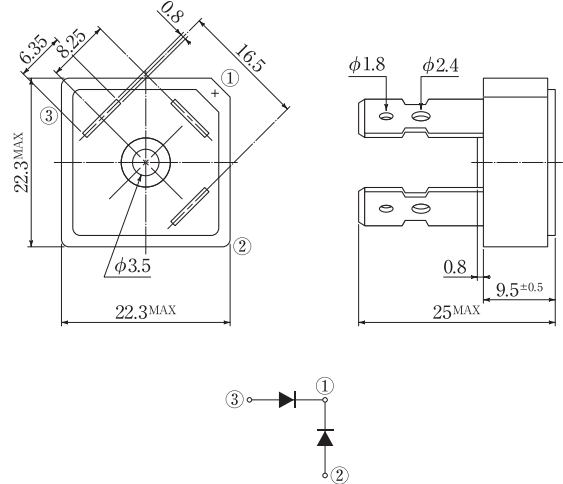


Fig.77 Package: Module

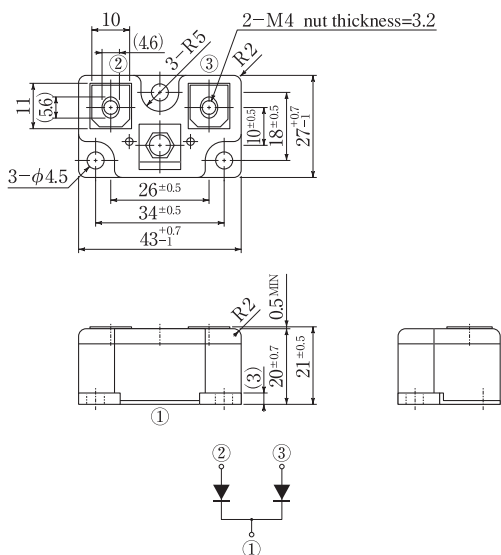
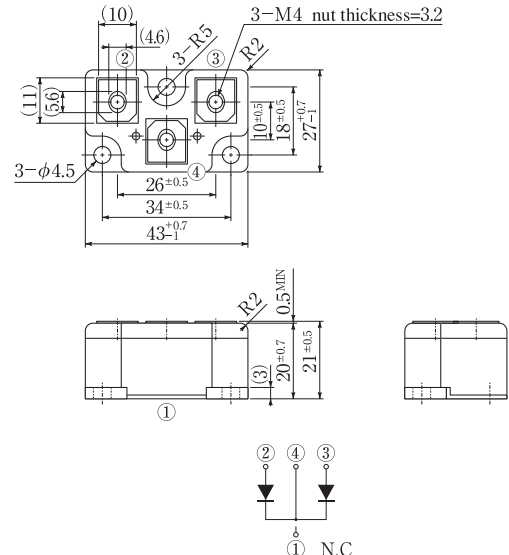


Fig.78 Package: Module



# Outline Dimensions

[Unit : mm]

Fig.79 Package: Module

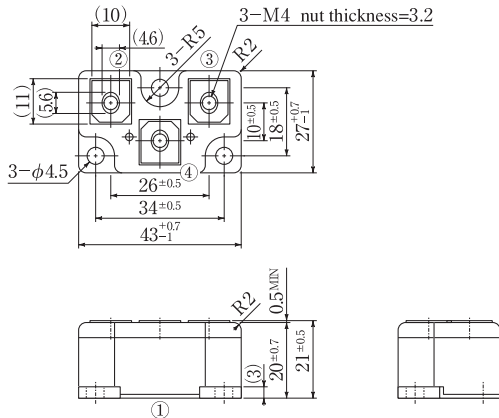


Fig. 79-1

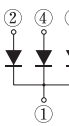


Fig. 79-2

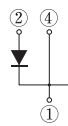


Fig.80 Package: MCP

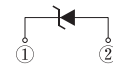
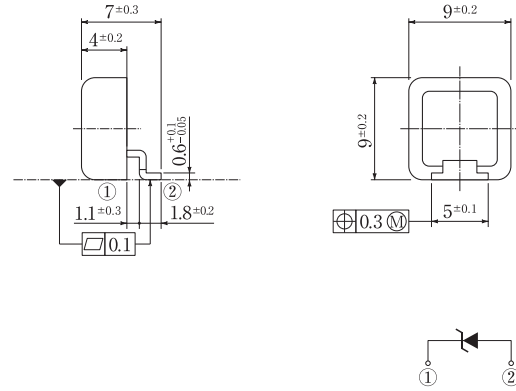
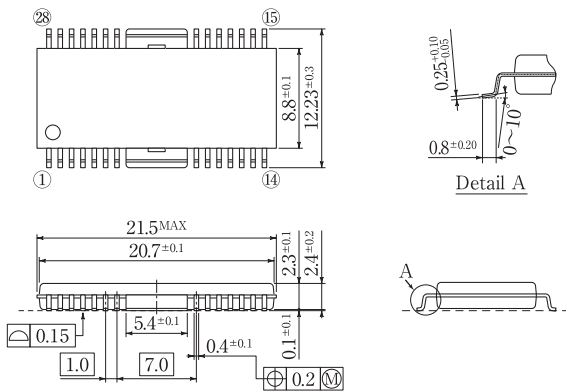


Fig.81 Package: HSOP28



Detail A

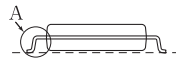
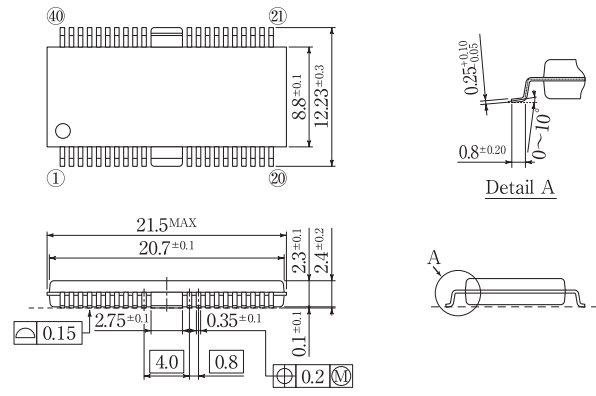


Fig.82 Package: HSOP40



Detail A

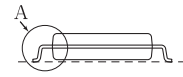
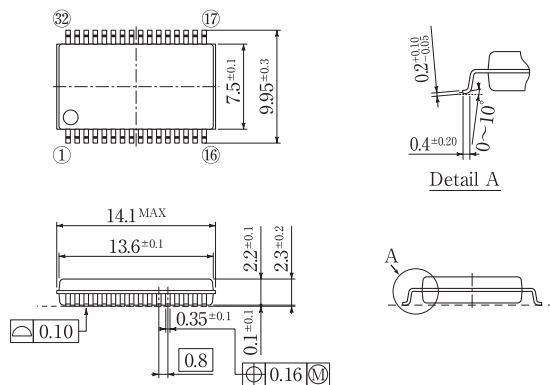


Fig.83 Package: SSOP32



Detail A

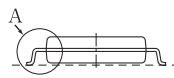
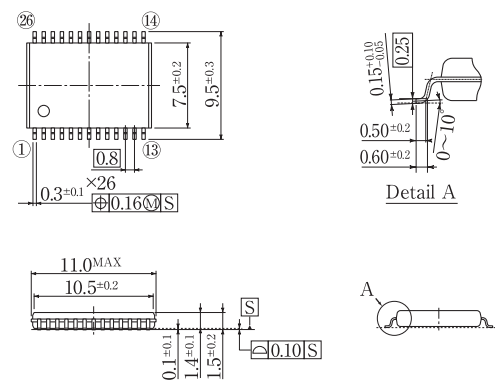


Fig.84 Package: LSSOP26



Detail A

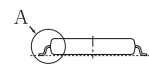


Fig.86 Package: FTO-7P

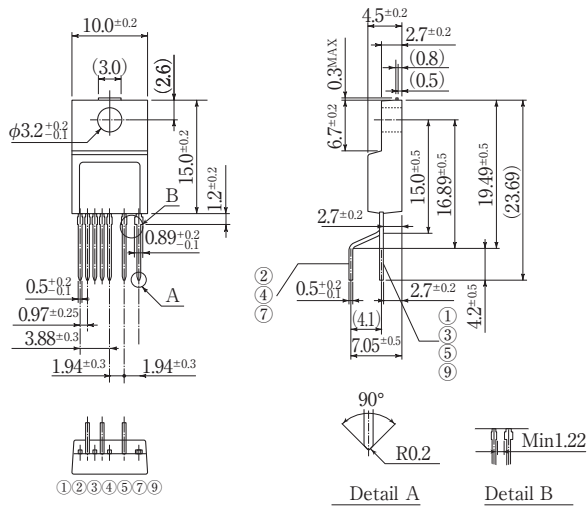


Fig.89 Package: ZIP27

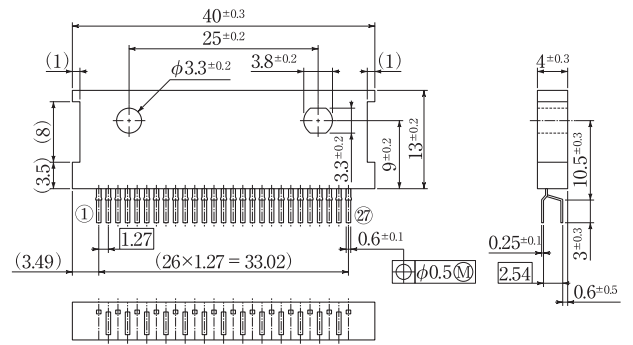


Fig.90 Package: SOP8

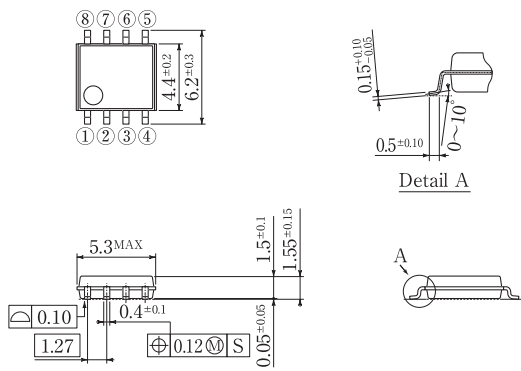


Fig.96 Package: MTO-3PT

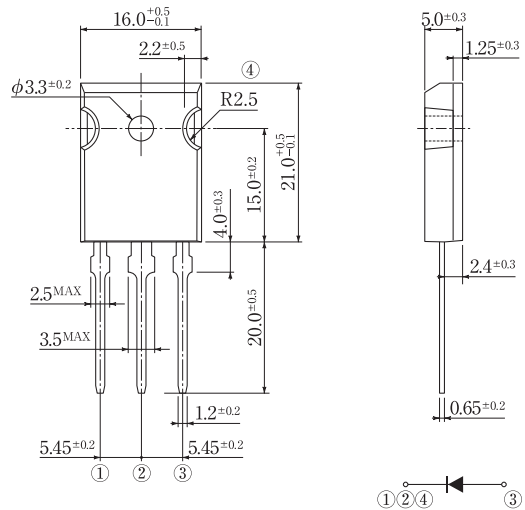
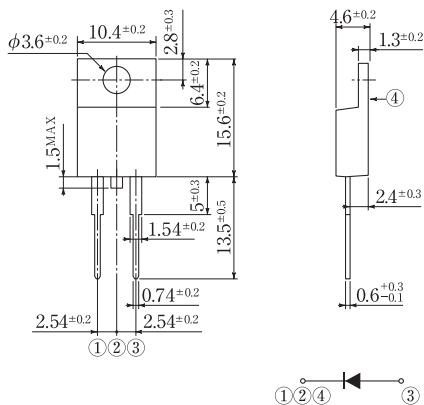


Fig.97 Package: TO-220





**NAMING/OUTLINE OF PACKING FORM**

**ORDERING QUANTITY AND PACKING FORM**

**CODE NO. (TAPING)**

**LEAD FORMING**

# Naming/Outline of Packing Form .....

## 1. Indication of Spec Codes when ordering

Please specify the Spec Code (& the Forming Code) when ordering semiconductors.

**Example 1** Ordering 7001 (short lead) type of S1VB60  
S1VB60-7001

**Example 2** Ordering 7002P5 (5mm pitch, w/kink) type of D2L20U  
D2L20U-7002P5

## 2. Type No.

**Example 1** D 1 N    
Reverse voltage divided by 10

**Example 2** 2 S K 2 6 6 3  
JEITA Classification  
2SK: MOSFET  
JEITA No.

## 3. Spec Code

The code specifies each packing form, lead forming and terminal plate material.

### Example

5 0 0 0

Terminal forming  
0 : Straight terminal  
1 to 9 : Each number shows type of form

In case of surface mounting devices  
6 : Small reel  
7 : Large reel

In case of axial devices  
6 : Lead length 52mm (T52)  
7 : Lead length 26mm (T26)  
8 : Radial taping

Minimum packing unit  
0 : Bulk, tray or taping  
1 : Magazine

Terminal plate material  
3 : Ni/Pd/Au  
4 : Ni or Ag  
5 : Sn-Ag-Cu, Sn, Ag, Sn-Cu  
6 : Sn  
7 : Sn-Bi

## 4. Minimum packing unit

- **Bulk:** The form in which parts are inserted into plastic bags or cardboard boxes.
- **Tray:** The form in which parts are inserted into containers made of resin.



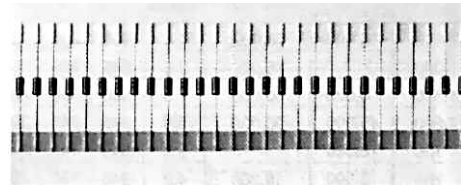
- **Magazine:** The form in which parts are inserted into resin cartridges designated for automatic inserters.



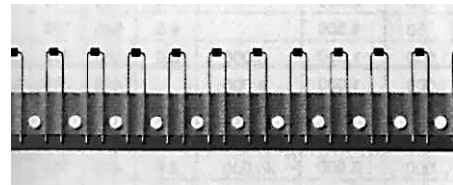
## ■ Tape & Reel



## ■ Taping: Horizontal Taping(T52, T26)



## ■ Taping: Radial Taping

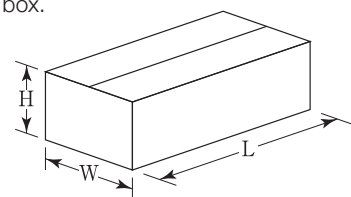


## 5. Packing Quantities

See the following pages for the quantity and the weight of each standard packing unit.

## 6. Packing Box Dimensions

See the following pages for the dimensions of each cardboard box.



# Ordering Quantity and Packing Form .....

Package	Terminal Type	Terminal Forming	Spec Code	Ordering Unit (Pcs.)	Minimum Packing Unit		Inner Box Quantity (Pcs./Box)	Standard Packing Unit		Packing Box (mm)		
					Quantity	Packing Method		Pcs./Box	Weight (kg)	L	W	H
AX057	THD		<input type="checkbox"/> 060	4,000	4,000	Tape, Ammo-Pack 52mm	4,000	40,000	10.0	400	270	240
			<input type="checkbox"/> 070	3,000	3,000	Tape, Ammo-Pack 26mm	3,000	60,000	10.5	530	270	220
		w/o Kink	<input type="checkbox"/> 083	3,000	3,000	Tape, Radial	3,000	30,000	8.6	370	350	245
		w/ Kink	<input type="checkbox"/> 084	3,000	3,000	Tape, Radial	3,000	30,000	8.6	370	350	245
AX06	THD		<input type="checkbox"/> 000	200	200	Bulk		5,000	1.5	340	190	115
			<input type="checkbox"/> 060	4,000	4,000	Tape, Ammo-Pack 52mm	4,000	64,000	14.0	325	325	420
			<input type="checkbox"/> 070	3,000	3,000	Tape, Ammo-Pack 26mm	3,000	72,000	15.7	325	325	420
			<input type="checkbox"/> 061	4,000	4,000	Tape & Reel, Diameter 300 $\phi$	4,000	20,000	4.9	325	325	420
			<input type="checkbox"/> 081	5,000	5,000	Tape, Radial	5,000	20,000	8.3	350	200	335
AX078	THD		<input type="checkbox"/> 000	200	200	Bulk	2,000	16,000	7.9	480	355	230
			<input type="checkbox"/> 060	2,000	2,000	Tape, Ammo-Pack 52mm	2,000	32,000	14.7	325	325	420
			<input type="checkbox"/> 070	1,500	1,500	Tape, Ammo-Pack 26mm	1,500	18,000	10.0	325	325	260
AX10	THD		<input type="checkbox"/> 000	200	200	Bulk	2,000	12,000	8.3	336	245	370
			<input type="checkbox"/> 060	1,200	1,200	Tape, Ammo-Pack 52mm	1,200	18,000	14.4	325	325	420
			<input type="checkbox"/> 061	2,500	2,500	Tape & Reel, Diameter 300 $\phi$	2,500	12,500	10.8	331	331	432
AX14	THD		<input type="checkbox"/> 000	200	200	Bulk	2,000	12,000	13.1	336	245	370
			<input type="checkbox"/> 060	1,200	1,200	Tape, Ammo-Pack 52mm	1,200	19,200	14.4	325	325	420
			<input type="checkbox"/> 061	2,500	2,500	Tape & Reel, Diameter 300 $\phi$	2,500	12,500	15.0	325	325	420
The initial digit of the Spec Code varies. See the remarks to each product.												
M1F	SMD		5063	2,500	2,500	Tape & Reel, Diameter 180 $\phi$	15,000	75,000	4.5	405	210	220
1F	SMD		5103	300	100	Magazine		15,000	2.3	545	145	110
			5053	2,000	2,000	Tape & Reel, Diameter 180 $\phi$		40,000	4.1	340	195	205
M2F	SMD		5073	7,500	7,500	Tape & Reel, Diameter 330 $\phi$	45,000	90,000	10.8	395	245	395
			5063	1,000	1,000	Tape & Reel, Diameter 180 $\phi$	4,000	20,000	3.4	340	195	205
2F	SMD		5073	4,000	4,000	Tape & Reel, Diameter 330 $\phi$	24,000	48,000	8.6	395	245	395
			5103	120	60	Magazine		18,000	5.2	545	145	110
			5063	750	750	Tape & Reel, Diameter 180 $\phi$	3,000	15,000	4.2	340	195	205
1Y	SMD		5073	3,000	3,000	Tape & Reel, Diameter 330 $\phi$	18,000	36,000	9.2	395	245	395
			7101	100	100	Magazine		10,000	5.0	536	141	117
			7102	100	100	Magazine		10,000	5.0	536	141	117
1Z	SMD		7062	1,000	1,000	Tape & Reel, Diameter 250 $\phi$	4,000	8,000	5.3	274	219	291
			7072	2,000	2,000	Tape & Reel, Diameter 330 $\phi$	8,000	16,000	8.8	349	244	361
			7101 *1	100	100	Magazine		10,000	2.1	545	145	110
SOPA-4	SMD		7102	100	100	Magazine		15,000	3.2	545	145	110
			7062	750	750	Tape & Reel, Diameter 180 $\phi$	3,000	15,000	4.0	340	195	205
			7072	3,000	3,000	Tape & Reel, Diameter 330 $\phi$		15,000	4.6	340	340	120
1N/1NA	SMD		7062	1,000	1,000	Tape & Reel, Diameter 180 $\phi$	1,000	20,000	3.6	340	195	205
			7101	70	70	Magazine		5,600	4.1	545	145	100
			7102	70	70	Magazine		5,600	4.1	545	145	100
1W	SMD		7062	1,000	1,000	Tape & Reel, Diameter 250 $\phi$	2,000	10,000	5.5	275	285	295
			7101	100	50	Magazine		4,000	4.4	545	145	110
			7102	100	50	Magazine		4,000	4.4	545	145	110
E-pack	SMD		7062	1,000	1,000	Tape & Reel, Diameter 330 $\phi$	3,000	6,000	5.9	395	245	395
			7072	2,000	2,000	Tape & Reel, Diameter 380 $\phi$		10,000	7.8	395	245	395
			7100	80	80	Magazine		10,000	6.9	560	130	109
STO-220	SMD		7101 *2	80	80	Magazine		10,000	6.9	560	130	109
			7061 *2	1,500	1,500	Tape & Reel, Diameter 250 $\phi$		6,000	2.9	260	260	99
			7071 *2	3,000	3,000	Tape & Reel, Diameter 330 $\phi$		12,000	5.5	335	335	99
TO-220	THD		7102	50	50	Magazine		4,500	9.5	555	145	110
			7072	1,000	1,000	Tape & Reel, Diameter 330 $\phi$	1,000	3,000	6.0	362	362	160
TO-221	THD		7100	50	50	Magazine	2,000	2,000	6.1	545	145	110
ZP	SMD		7100	50	50	Magazine		3,000	4.2	545	145	110
			7072	1,500	1,500	Tape & Reel, Diameter 330 $\phi$	1,500	7,500	8.0	345	345	154
MCP	SMD		7072	1,500	1,500	Tape & Reel, Diameter 330 $\phi$	1,500	7,500	8.6	363	363	160
			4062	300	300	Tape & Reel, Diameter 255 $\phi$	1,500	1,500	5.0	281	281	205
		4072	600	600	Tape & Reel, Diameter 330 $\phi$	1,800	1,800	5.5	362	362	150	

\* 1: Only for S1ZB type  
 \* 2: DE5VE40 Spec Code 5

THD: Through Hole Device  
 SMD: Surface Mount Device

Please make your orders:  
 - more than inner box quantities  
 - a multiple of each ordering unit
























Package	Terminal Type	Terminal Forming	Spec Code	Ordering Unit (Pcs.)	Minimum Packing Unit		Inner Box Quantity (Pcs./Box)	Standard Packing Unit		Packing Box (mm)			
					Quantity	Packing Method		Pcs./Box	Weight (kg)	L	W	H	
ITO-220	THD		7000	50	50	Tray		2,000	5.2	350	205	210	
		Formed	7012	50	50	Tray		2,000	5.2	350	205	210	
			7100	50	50	Magazine		2,000	6.7	530	145	110	
FTO-220	THD		7600	1000	100	Bulk	2,000	4,000	8.3	422	244	133	
FTO-220A		Formed	7112	300	50	Magazine		1,400	4.3	526	141	102	
FTO-220G			5600	100	2,000	Bulk	2,000	4,000	8.3	422	244	133	
MTO-3P	THD	* 1	7100	30	30	Magazine		900	7.6	530	145	110	
		* 2	7000	100	500	Bulk	500	1,000	6.8	351	176	123	
		Formed	7112	35	35	Magazine		1,050	9.3	635	160	168	
MTO-3PT	THD		5000	500	500	Bulk	500	1,000	6.8	351	176	123	
ITO-3P		* 1	7100	40	40	Magazine		1,200	8.0	624	151	92	
		* 2	7000	100	500	Bulk	500	1,000	4.9	332	188	121	
	Formed	7112	40	40	Magazine		1,200	7.7	635	160	168		
1V	THD		7000	100	100	Bulk	2,000	8,000	9.7	395	350	235	
2S		Formed	7101	120	30	Magazine		3,600	5.7	508	141	99	
			7000	100	500	Bulk	500	6,000	14.4	410	380	170	
	3S		7000	50	250	Bulk	250	1,000	4.6	283	155	183	
2,000		9.5						305	280	183			
2,000		14.5						330	330	205			
5S	THD	Formed	7101	40	20	Magazine		1,000	8.2	670	185	95	
D3K			7000	100	500	Bulk	500	2,500	4.0	210	188	200	
		TSB(4PIN)		7000	100	100	Bulk	100	400	9.8	351	269	164
	TSB(5PIN)			5000	100	100	Tray		1,000	3.6	265	255	170
S2VB				5000	50	100	Tray		1,000	5.9	315	285	220
		S4VB		5000	50	100	Tray		1,000	10.4	415	285	300
	S5VB			5000	50	100	Tray		1,000	9.3	375	285	270
S10VB				4000	50	100	Tray		500	9.0	415	285	180
		S15VB	Faston		4000	60	60	Bulk		300	7.0	335	205
				4000	50	50	Tray	200	200	6.2	335	205	165
	5000			50	100	Tray		1,000	6.1	315	285	220	
S3WB	THD		5000	50	100	Tray		1,000	9.3	375	285	270	
			5000	50	100	Tray		1,000	15.1	415	285	300	
			5000	50	100	Tray		700	15.0	415	285	300	
S10WB	Faston		4000	50	100	Tray		500	7.0	375	285	160	
			4000	(45)	200	Bulk	200	200	6.2	335	205	165	
			5000	50	50	Tray		250	250	7.6	400	260	255
SVTA	THD		5000	50	50	Tray		250	250	7.6	400	260	255
Module	M4 nut		4000	(3)	25	Bulk	100	200	13.4	480	330	210	
ZIP27 (MTA·MTD)	THD		7101	15	15	Magazine		450	5.3	640	180	105	
		Formed	7102	15	15	Magazine		450	5.3	640	180	105	
		Formed	7103	15	15	Magazine		450	5.3	640	180	105	
HSOP28 (MD□F·MTD□F)	SMD		3072	1,000	1,000	Tape & Reel, Diameter 330 φ	1,000	3,000	7.6	362	362	160	
HSOP40 (MTD□J)	SMD		3072	1,000	1,000	Tape & Reel, Diameter 330 φ	1,000	3,000	7.6	362	362	160	
SSOP32	SMD		3072	2,000	2,000	Tape & Reel, Diameter 330 φ	2,000	6,000	7.6	362	362	160	
			3062	500	500	Tape & Reel, Diameter 180 φ	500	2,000	2.9	226	243	260	
LSSOP26	SMD		3072	3,000	3,000	Tape & Reel, Diameter 330 φ	3,000	9,000	5.5	363	363	160	
			3062	700	700	Tape & Reel, Diameter 180 φ	700	2,800	2.5	243	226	260	
SOP8	SMD		7062	1,000	1,000	Tape & Reel, Diameter 180 φ	1,000	18,000	4.5	442	202	205	
							1,000	10,000	2.6	260	200	210	
FTO-5P (MR1000 Series)	THD	Formed	7101	50	50	Magazine		1,400	4.3	526	141	104	
FTO-7P (MR4000 Series)	THD	Formed	7101	50	50	Magazine		1,400	4.3	526	141	104	
MIH7 (MR2000 Series)	THD	Formed	7109F12	30	30	Magazine		960	6.8	655	170	105	
MZIP7 (MR5000 Series)	THD	Formed	7101	20	20	Magazine		560	4.4	530	150	110	
D6K	THD		7000	50	500	Bulk	500	2,000	8.0	260	220	222	

\* 1: MOSFETs

\* 2: Diodes

# Code No. (Taping).....

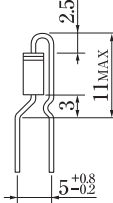
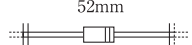
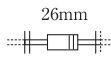
## SMD

Spec Code	Outline		Reel diameter (φ)	Quantity	Spec Code	Outline		Reel diameter (φ)	Quantity	Spec Code	Outline		Reel diameter (φ)	Quantity
3072	HSOP28		330	1,000	4062	MCP		255	300	7061	E-pack		250	1,500
	HSOP40		330	1,000	4072		330	600	7062	1Z		180	750	
	SSOP32		330	2,000	5063	1F		180		1,500	1Y		250	1,000
	LSSOP26		330	3,000		2F		180		750	1N		250	1,000
						M2F		180		1,000	SOPA-4		180	1,000
					1F		330	7,500		1W		330	1,000	
	5073		330	3,000	6063	M1F	180	2,500		7071	E-pack		330	3,000
											1Z		330	3,000
											1Y		330	2,000
											1W		380	2,000
STO-220												330	1,000	
7072		330	1,500						ZP		330	1,500		

### AX Ammo-Pack

### AX Radial-Taping

### AX Reel

Spec Code	Outline	Quantity	Spec Code	Outline	Quantity	Spec Code	Outline	Reel diameter (φ)	Quantity	
□060	AX057	4,000	□081		5,000	□061	AX06		300	4,000
	AX06	4,000					AX10		300	2,500
	AX078	2,000					AX14		300	2,500
	AX10	1,200								
	AX14	1,200								
□070		AX057	3,000	□083	AX057	3,000				
		AX06	3,000							
		AX078	1,500	□084	AX057	3,000				

The initial digit of the Spec Code varies. See the remarks to each product.

# Lead Forming

## Axial type diode

Standard forming types are configured using two codes, a spec code first and then the forming code.

Complete code example would be 5002P5. (As for details, please refer to the outline dimensions in each specification sheet.) [Unit: mm]

Spec Code		□001	□002	□003	□004
Forming Code	Package				
P5	AX06 AX078 AX10				
P7.5	AX10 AX14				
P10	AX06 AX078				
P12.5	AX06 AX078 AX10				
P15	AX06 AX078 AX10 AX14				
P20	AX10 AX14				

\* Tolerance is  $5 \begin{smallmatrix} +0.5 \\ -1.0 \end{smallmatrix}$  for AX14 products ( $\phi$  1.4mm)

The initial digit of the Spec Code varies. See the remarks to each product.

# SIP Bridge Diodes

(As for details, please refer to the outline dimensions in each specification sheet.) [Unit: mm]

Spec Code	7001 Short Lead	7002 L-Type Lead	7003 Outside Kink	7004 Zig-Zag Lead
Package				
1V	<p>0.8±0.1, 4±0.2, 4±0.2, 4±0.2, 3.5±0.5, 2.2±0.2, 0.5±0.1, 0.9±0.2</p>		<p>0.8±0.1, 4, 4, 4, 12 MAX, 0.5±0.1, 0.9±0.2</p>	<p>0.8±0.1, 4±0.2, 4±0.2, 4±0.2, 2.2±0.2, 10 MIN, 5, 3.5, 3.5, 0.5±0.1</p> <p>① ② ③ ④</p>
2S	<p>1±0.1, 5±0.2, 5±0.2, 5±0.2, 2.5±0.2, 4±0.5, 0.5±0.1, 1±0.2</p>		<p>1±0.1, 5±0.2, 5±0.2, 5±0.2, 2.5±0.2, 4±0.5, 6±0.5, 0.5±0.1, 1±0.2</p> <p>① ② ③ ④</p> <p>① ④ with kink ② ③ no kink</p>	<p>1±0.1, 5±0.2, 5±0.2, 5±0.2, 2.5±0.2, 4±0.5, 6 MAX, 1±0.2, 5±0.2, 0.5±0.1</p> <p>① ② ③ ④</p> <p>① ④ with kink ② ③ no kink</p>
3S	<p>1±0.1, 7.5±0.2, 7.5±0.2, 7.5±0.2, 3.5±0.2, 4.5±0.5, 0.7±0.1, 2.7±0.2</p>	<p>1±0.1, 7.5±0.2, 7.5±0.2, 7.5±0.2, 3.5±0.2, 15, 0.7±0.1, 4±0.5, 2.7±0.2</p>	<p>1±0.1, 7.5±0.2, 7.5±0.2, 7.5±0.2, 3.5±0.2, 10±0.5, 0.7±0.1, 2.7±0.2</p> <p>① ② ③ ④</p> <p>① ④ with kink ② ③ no kink</p>	
5S	<p>1±0.1, 10±0.2, 7.5±0.2, 7.5±0.2, 4±0.2, 4.5±0.5, 0.7±0.1, 2.7±0.2</p>	<p>1±0.1, 10±0.2, 7.5±0.2, 7.5±0.2, 4±0.2, 15, 0.7±0.1, 4±0.5, 2.7±0.2</p>	<p>1±0.1, 10±0.2, 7.5±0.2, 7.5±0.2, 4±0.2, 13.5±0.5, 0.7±0.1, 2.7±0.2</p> <p>① ② ③ ④</p> <p>① ④ with kink ② ③ no kink</p>	
D6K			<p>5±0.5, 12±0.5, 2±0.3, 1.1±0.1, 1.8±0.5, 2.05±0.2, 0.5±0.05</p> <p>① ② ③ ④</p>	





# Sales Offices.....

## U.S.A.

### **Shindengen America, Inc.**

[www.shindengen.com/](http://www.shindengen.com/)

#### **Head Office**

2333 Waukegan Road Suite 170, Bannockburn, IL.60015 U.S.A.  
Phone: +1-847-444-1363 FAX: +1-847-444-0654

#### **Sales Office**

21 S. California St. Suite 408, Ventura, CA. 93001 U.S.A.  
Phone: +1-805-563-0823 FAX: +1-805-830-1706

## Europe

### **Shindengen UK Ltd.**

[www.shindengen.co.uk/](http://www.shindengen.co.uk/)

#### **Head Office**

Suite 4 Marquis House, 68 Great North Road, Hatfield Hertfordshire, AL9 5ER U.K.  
Phone: +44-1707-252550 FAX: +44-1707-252551

#### **German Branch**

Willstaetter Strasse 1, 40549, Dusseldorf, Germany  
Phone: +49-211-4919680 FAX: +49-211-4986499

## Asia

### **Shindengen Singapore PTE Ltd.**

750D, Chai Chee Road, #05-01, Technopark @Chai Chee, Singapore 469004  
Phone: +65-6445-0082 FAX: +65-6445-6089

### **Shindengen (H.K.) Co., Ltd.**

#### **Head Office**

Suite 3206, 32/F, Tower 1, The Gateway, 25 Canton Road, TST, Kowloon, Hong Kong.  
Phone: +852-2317-1884 FAX: +852-2314-8561

#### **Taiwan Representative Office**

20FL, No. 85, Sec 1, Jhongsiao East Road, Taipei, 10049 Taiwan, R.O.C  
Phone : +886-2-2321-3990 Fax: +886-2-2358-3991

#### **Shanghai Liaison Office**

W504, Sun Plaza, No. 88 Xian xia Road, Shanghai, 200336, China  
Phone: +86-21-6270-8000 FAX: +86-21-6270-0419

### **Shindengen Electric Mfg. Co., Ltd.**

#### **Seoul Office**

#2507 Trade Tower, World Trade Center, 159-1, Samsung-Dong, Kangnam-ku, Seoul, Korea  
Phone: +82-2-551-1431 FAX: +82-2-551-1432



---

## Japan

**Shindengen Electric Mfg. Co., Ltd.**

[www.shindengen.co.jp/](http://www.shindengen.co.jp/)

**Head Office**

New-Ohtemachi Bldg., 2-1 Ohtemachi 2-chome, Chiyoda-ku,  
Tokyo 100-0004, Japan  
Phone: +81-3-3279-4545, 4546, 4547 FAX: +81-3-3279-4519

**Osaka Branch Office**

Minami Senba Heart Bldg., 3-2, Minami Senba 2-chome,  
Chuo-ku, Osaka City, Osaka 542-0081, Japan  
Phone: +81-6-6264-7770 FAX: +81-6-6260-1222

**Nagoya Branch Office**

Nagoya-Daiichi Bldg., 1-19-24 Nishiki, Naka-ku, Nagoya City,  
Aichi 460-0003, Japan  
Phone: +81-52-221-1361 FAX: +81-52-201-4780

- All specifications are subject to change without notice.
- Please consult us for the latest specifications before you order.
- Please use this products after reading manual well.

This catalog includes the products which might be subject to the foreign exchange and foreign trade laws.





Компания «ЭлектроПласт» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

Наши преимущества:

- Оперативные поставки широкого спектра электронных компонентов отечественного и импортного производства напрямую от производителей и с крупнейших мировых складов;
- Поставка более 17-ти миллионов наименований электронных компонентов;
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- Лицензия ФСБ на осуществление работ с использованием сведений, составляющих государственную тайну;
- Поставка специализированных компонентов (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Aeroflex, Peregrine, Syfer, Eurofarad, Texas Instrument, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits, General Dynamics и др.);

Помимо этого, одним из направлений компании «ЭлектроПласт» является направление «Источники питания». Мы предлагаем Вам помощь Конструкторского отдела:

- Подбор оптимального решения, техническое обоснование при выборе компонента;
- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



#### Как с нами связаться

**Телефон:** 8 (812) 309 58 32 (многоканальный)

**Факс:** 8 (812) 320-02-42

**Электронная почта:** [org@eplast1.ru](mailto:org@eplast1.ru)

**Адрес:** 198099, г. Санкт-Петербург, ул. Калинина, дом 2, корпус 4, литера А.