CAT.No.F072-4

Semiconductor Short Form Catalog

新電元
SHINDENGEN

⚠ 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.

SHINDENGEN

RECTIFIER DIODES

SCHOTTKY BARRIER DIODES

SUPER FAST RECOVERY DIODES

POWER MOSFETs

SIDAC

SURGE ABSORBERS

POWER ICs

Semiconductor Short Form Catalog

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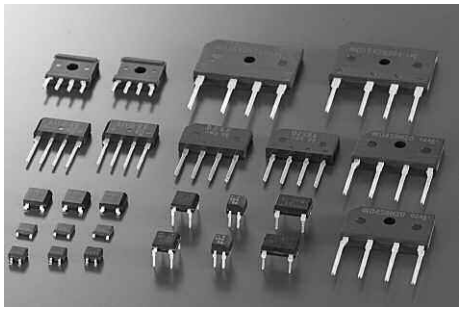

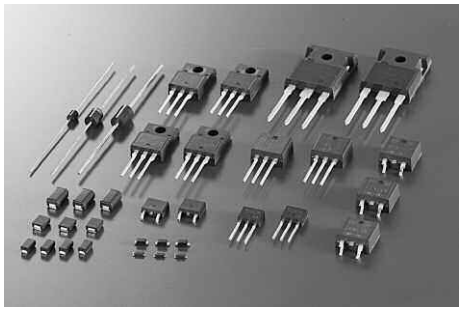

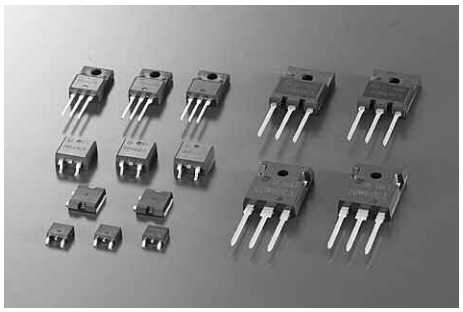

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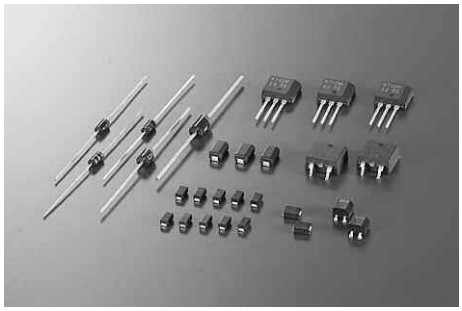

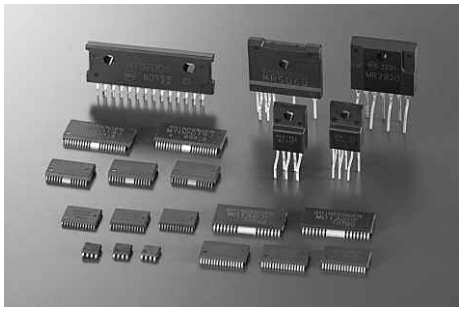

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Rectifier Diodes

Low frequency rectifying

Single

Surface Mount

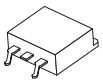
M1F

1F

M2F

2F

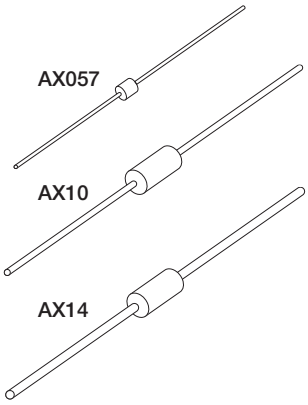
E-pack


STO-220

Type No.	Absolute Maximum Ratings						Electrical Characteristics						Outline	
	Io [A]	Conditions Ta [°C]	IFSM [A]	VRM [V]	Tstg [°C]	Tj [°C]	VF (max) [V]	Conditions IF [A]	IR (max) VR=VRM [μA]	θj-l (max) [°C/W]	θja (max) [°C/W]	θjc (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: Tl　　*2: Tc　　*3: High ESD Capability

Axial



Type No.	Absolute Maximum Ratings						Electrical Characteristics					Outline		
	Io [A]	Conditions Ta [°C]	IFSM [A]	VRM [V]	Tstg [°C]	Tj [°C]	VF (max) [V]	Conditions IF [A]	IR (max) VR=VRM [μA]	θj-l (max) [°C/W]	θja (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

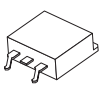
Array

1NA (SMD)

Type No.	Absolute Maximum Ratings						Electrical Characteristics					Outline	
	Io [A]	Conditions Ta [°C]	IFSM [A]	VRM [V]	Tstg [°C]	Tj [°C]	VF (max) [V]	Conditions IF [A]	IR (max) VR=VRM [μA]	θj-l (max) [°C/W]	θja (max) [°C/W]	Package	Fig.
S1NAD80	3	102	110	800	-55 to 150	150	1.05	0.75	10	15	84	1NA	27-2

Array type　1NA

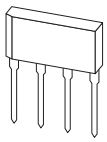
Doubler


STO-220 (SMD)

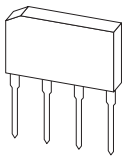
Type No.	Absolute Maximum Ratings						Electrical Characteristics				Outline	
	Io [A]	Conditions Ta [°C]	IFSM [A]	VRM [V]	Tstg [°C]	Tj [°C]	VF (max) [V]	Conditions IF [A]	IR (max) VR=VRM [μA]	θjc (max) [°C/W]	Package	Fig.
DF5VD60	5	140	140	600	-40 to 150	150	1.05	2.5	10	2	STO-220	36-5
DF15VD60	15	127	190	600	-40 to 150	150	1.05	7.5	10	1.6		

Rectifier Diodes

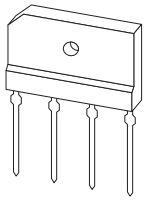
SIP Bridge Diodes



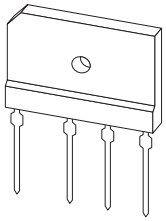
1V



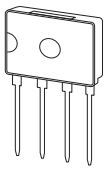
2S



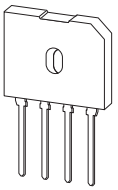
3S



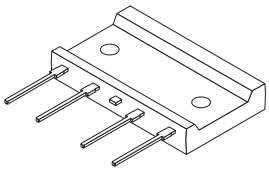
5S



D3K



D6K



TSB(4PIN)

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]	θj/ (max) [°C/W]	θja (max) [°C/W]	θjc (max) [°C/W]		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®	D3K	54
☆UD3KB80	3	140	90	800	-55 to 150	150	1.05	1.5	10	15	55	1.5			
D3SBA60	4	108	80	600	-40 to 150	150	1.05	2	10	6	30	5.5	UL®	3S	57
D3SB60	4	108	120	600	-40 to 150	150	1.05	2	10	6	30	5.5	UL®	3S	57
D3SB80				800											
D4SB60L	4	111	150	600	-40 to 150	150	0.95	2	10	6	30	5.5	UL®	3S	57
D4SB80		108		800											
☆UD4KB80	4	138	135	800	-55 to 150	150	1.00	2	10	15	55	1.5	UL®	D3K	54
D5SBA60	6	111	120	600	-40 to 150	150	1.05	3	10	5	26	3.4	UL®	5S	58
D5SB60	6	110	170	600	-40 to 150	150	1.05	3	10	5	26	3.4	UL® Large IFSM	5S	58
D5SB80				800											
D6SB60L	6	112	170	600	-40 to 150	150	1.05	3	10	5	26	3.4	UL®	5S	58
D6SB80		110		800											
D10XB60	10	100	120	600	-40 to 150	150	1.1	5	10	6	26	2.3	UL®	3S	57
D10XB80				800											
D10XB60H		112	170	600			1.05					1.9	UL® Large I FSM		
D15XB60	15	100	200	600	-40 to 150	150	1.1	7.5	10	5	22	1.5	UL®	5S	58
D15XB80				800											
☆D15XB100		110	200	1000	-55 to 150						23	1.2			
D15XB60H		107	240	600	-40 to 150		1.05				22	1.5	UL® Large I FSM		
D20XB60	20	87	240	600	-40 to 150	150	1.1	10	10	5	22	1.5	UL®	5S	58
D20XB80				800											
D25XB60	25	98	350	600	-40 to 150	150	1.05	12.5	10	5	22	1	UL®	5S	58
D25XB80				800											
☆D25XB100		106	350	1000	-55 to 150						23	0.8			
☆D50XB80	50	95	600	800	-40 to 150	150	1.05	25	10	–	16	0.5	UL®	TSB(4PIN)	59
☆US4KB80R	4	125	150	800	-55 to 150	150	1.0	2	10	5	35	3.5	UL®	D6K	53
☆US6KB80R	6	116	175					3				3.0			
☆US8KB80R	8	108	200					4				2.8			
☆US10KB80R	10	100	150	800	-55 to 150	150	1.10	5	10	5	35	2.5	UL®	D6K	53
☆US15KB80R	15	101	200					7.5				1.5			
☆US20KB80R	20	97	240					10				1.2			
☆US30KB80R	30	97	350					15				0.8			

☆: New product　　*1: Ta　　*2: Tl　　UL®: UL recognized (UL File No.E142422)

DIP Bridge Diodes

1Z (SMD)

1Z (THD)

1N/1NA (SMD)

1N/1NA (THD)

1W (SMD)

1W (THD)

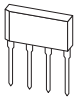
1Y (THD)

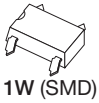
Type No.	Absolute Maximum Ratings						Electrical Characteristics					Remarks	Outline	
	Io [A]	Conditions Ta [°C]	IFSM [A]	VRM [V]	Tstg [°C]	Tj [°C]	VF (max) [V]	Conditions IF [A]	IR (max) VR=VRM [μA]	θj-l (max) [°C/W]	θja (max) [°C/W]		Package	Fig.
S1YB60	0.4	40	30	600	-40 to 150	150	1.05	0.2	10	20	150	–	1Y	22-1
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								Large IFSM		
S1NBC60	1.5	105＊5	60	600	-55 to 150	150	1.05	0.75	10	15	68	Large IFSM	1NA	＊3
S1NBC80				800										

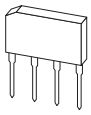
＊1: SMD Package Fig.23-1; THD Package Fig.24　＊2: SMD Package Fig.25; THD Package Fig.26
＊3: SMD Package Fig.27-1; THD Package Fig.28　＊4: SMD Package Fig.29; THD Package Fig.30　＊5：T*l*

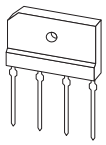
Low Noise Bridge Diodes

1W (THD)


1V


1W (SMD)

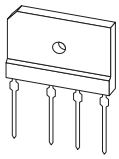

2S


3S

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]	trr (max) [μs]	θj-l (max) [°C/W]	θja (max) [°C/W]	θjc (max) [°C/W]		Package	Fig.
LN1WBA60	1.1	25＊1	50	600	-40 to 150	150	1.0	0.55	10	5	10	65	–	–	1W	＊2
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	®1	3S	57
LN6SB60	6	111	170				1.05	3			5	26	3.4	®1	5S	58
LN15XB60	15	100	200		-55 to 150	150	1.1	7.5			5	23	1.5	–	5S	58
LN15XB60H		106	290				1.05							Large IFSM		
LN25XB60	25	85	350		-55 to 150	150	1.05	12.5			5	23	1.3	–	5S	58

＊1: Ta　＊2: SMD Package Fig.29; THD Package Fig.30　®1: UL recognized (UL File No. E142422)

Low V_F Bridge Diodes

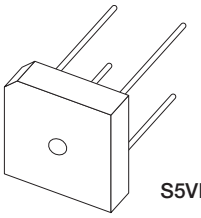

5S

Type No.	Absolute Maximum Ratings								Electrical Characteristics								Remarks	Outline	
	Io [A]	Conditions Tc [°C]	IFSM [A]	IFSM1＊ [A]	I2t [A]	VRM [V]	Tstg [°C]	Tj [°C]	VF (max) [V]	VF (typ) [V]	Conditions IF [A]	IR (max) VR=VRM [μA]	trr (max) [μs]	θj-l (max) [°C/W]	θja (max) [°C/W]	θjc (max) [°C/W]		Package	Fig.
LL15XB60	15	124	200	630	200	600	-55 to 150	150	0.90	0.86	7.5	10	3	5	25	1	®1	5S	58
LL25XB60	25	113	300	945	450	600	-55 to 150	150	0.92	0.87	12.5	10	3	5	25	0.8			

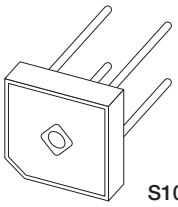
＊: IFSM1: Pulse width 1ms　®1: UL recognized (UL File No. E142422)

Rectifier Diodes

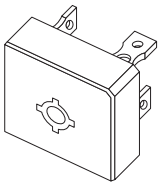
SQIP Bridge Diodes



S5VB



S10VB

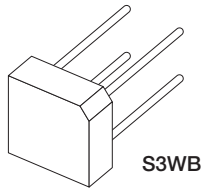


S15VB

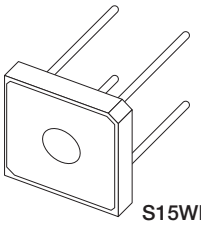
Type No.	Absolute Maximum Ratings						Electrical Characteristics					Outline	
	I_O [A]	Conditions Ta [°C]	I_{FSM} [A]	V_{RM} [V]	Tstg [°C]	Tj [°C]	V_F (max) [V]	Conditions I_F [A]	I_R (max) $V_R=V_{RM}$ [μA]	$\theta j l$ (max) [°C/W]	θjc (max) [°C/W]	Package	Fig.
S2VB60	2	40	40	600	-40 to 150	150	1.05	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: Tc

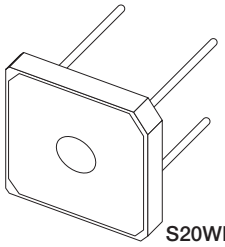
Input/Output In-line Terminal Type



S3WB



S15WB

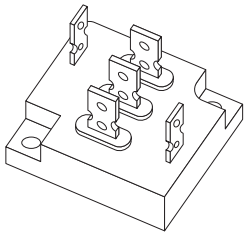


S20WB

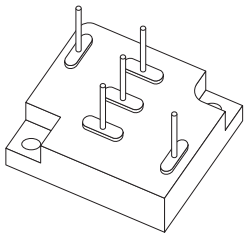
Type No.	Absolute Maximum Ratings						Electrical Characteristics					Outline	
	I_O [A]	Conditions Tc [°C]	I_{FSM} [A]	V_{RM} [V]	Tstg [°C]	Tj [°C]	V_F (max) [V]	Conditions I_F [A]	I_R (max) $V_R=V_{RM}$ [μA]	$\theta j l$ (max) [°C/W]	θjc (max) [°C/W]	Package	Fig.
S3WB60	2.3	40*	120	600	-40 to 150	150	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									

* : Ta

3 Phase Bridge Diode Modules



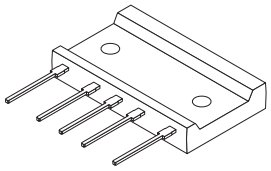
SVT



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]	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	ᴿᵁᴸ®	TSB (5PIN)	60
☆D45XT80	45	101	400	800	-40 to 150	150	1.05	15	10	16	0.5	ᴿᵁᴸ®		
☆D45XT160	45	97	330	1600	-40 to 150	150	1.05	15	100	16	0.5	ᴿᵁᴸ®		

☆: New product

ᴿᵁᴸ®: 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

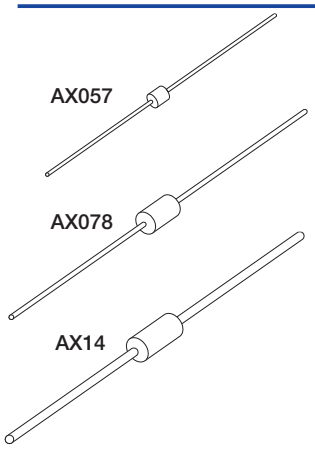
2F

E-pack

Type No.	Absolute Maximum Ratings						Electrical Characteristics							Outline	
	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]	θj-l (max) [°C/W]	θja (max) [°C/W]	θjc (max) [°C/W]	Package	Fig.
M1FP3	30	1.29	25*2	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*1	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*1	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	40	1.1	51*2	30	-55 to 150	150	0.55	1.1	1	65	23	108	–	1F	13-1
M1FS4		1.33	25*2	30	-55 to 150	150	0.55	1.1	0.8	50	20	108	–	M1F	12
M1FJ4		1.5	31*2	30	-55 to 150	150	0.57	1	0.05	65	20	108	–	M1F	12
D1FS4A		1.5	28*2	60	-55 to 150	150	0.45	1.1	2	95	23	108	–	1F	13-1
D2FS4		1.6	34*2	60	-55 to 150	150	0.55	1.6	2.5	150	24	90	–	2F	16-1
D1FJ4		2.0	117*1	50	-55 to 150	150	0.57	1.5	0.2	96	23	108	–	1F	13-1
D3FS4A		2.6	34*2	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	60	1.1	25*2	40	-55 to 150	150	0.58	1.1	1	50	23	108	–	1F	13-1
M1FS6		1.2	25*2	40	-55 to 150	150	0.58	1.1	1	53	20	108	–	M1F	12
D2FS6		1.5	31*2	60	-40 to 150	150	0.58	2	2	120	24	90	–	2F	16-1
D3FS6		3	87*1	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	100	1.0	52*2	50	-55 to 150	150	0.72	1	0.2	63	23	108	–	1F	13-1
D3FJ10		3	92*1	100	-55 to 150	150	0.74	3	0.4	143	23	115	–	2F	16-1

☆: New product ★: Under development ＊1: TI ＊2: Ta

Axial



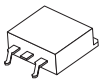
Type No.	Absolute Maximum Ratings						Electrical Characteristics						Outline		
	VRM [V]	Io [A]	Conditions Ta [°C]	IFSM [A]	Tstg [°C]	Tj [°C]	VF (max) [V]	Conditions IF [A]	IR (max) VR=VRM [mA]	Cj (typ) [pF]	θj-l (max) [°C/W]	θja (max) [°C/W]	Package	Color Code	Fig.
D1NS4*2	40	1	59	30	-55 to 150	150	0.55	1	0.8	50	10	113	AX057	–	1
D2S4M*2		2	122*1	60	-40 to 150	150	0.55	2	2	95	17	105	AX078	Silver	5-1
D3S4M*2		3	63	80	-40 to 150	150	0.55	3	3.5	150	6.5	36	AX14	Silver	8
D1NS6*2	60	1	46	30	-55 to 150	150	0.58	1	1	53	10	113	AX057	–	1
D2S6M*2		2	119*1	60	-40 to 150	150	0.58	2	2	120	17	105	AX078	Blue	5-1
D3S6M*2		3	133*1	80	-40 to 150	150	0.58	3	2.5	130	6.5	62	AX14	Blue	8

＊1: TI ＊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



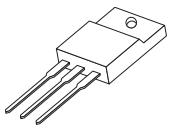
STO-220

Type No.	Absolute Maximum Ratings						Electrical Characteristics					Outline	
	V_{RM} [V]	I_O [A]	Conditions Tc [°C]	I_{FSM} [A]	Tstg [°C]	Tj [°C]	V_F (max) [V]	Conditions I_F [A]	I_R (max) $V_R=V_{RM}$ [mA]	Cj (typ) [pF]	θjc (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

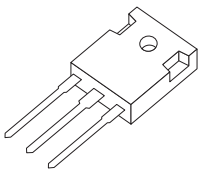
Center-tap

Schottky Barrier Diodes

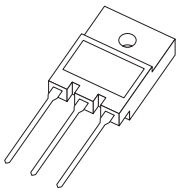
Three Terminal Type



FTO-220
FTO-220A
FTO-220G



MTO-3P/MTO-3PT



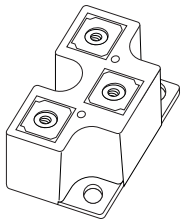
ITO-3P

Type No.	Absolute Maximum Ratings						Electrical Characteristics					Outline	
	V_{RM} [V]	I_O [A]	Conditions Tc [°C]	I_{FSM} [A]	Tstg [°C]	Tj [°C]	V_F (max) [V]	Conditions I_F [A]	I_R (max) $V_R=V_{RM}$ [mA]	Cj (typ) [pF]	θjc (max) [°C/W]	Package	Fig.
☆SG10SC4M	40	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	60	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	90	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	100	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	120	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	150	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

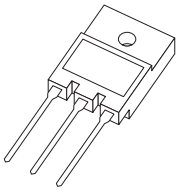
Type No.	Absolute Maximum Ratings						Electrical Characteristics					Remarks	Outline	
	V_{RM} [V]	I_O [A]	Conditions Tc [°C]	I_{FSM} [A]	Tstg [°C]	Tj [°C]	V_F (max) [V]	Conditions I_F [A]	I_R (max) $V_R=V_{RM}$ [mA]	Cj (typ) [nF]	θjc (max) [°C/W]		Package	Fig.
D120SC4M	40	120	90	800	-40 to 125	125	0.58	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	60	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_{RM} [V]	I_O [A]	Conditions Tc [°C]	I_{FSM} [A]	Tstg [°C]	Tj [°C]	V_F (max) [V]	Conditions I_F [A]	I_R (max) $V_R=V_{RM}$ [mA]	Cj (typ) [pF]	θjc (max) [°C/W]	Package	Fig.
D25SC6MR	60	25	117	300	-40 to 150	150	0.58	12.5	10	490	1.5	ITO-3P	44-2

Center-tap (R)

Schottky Barrier Diodes

High frequency rectifying

Array

Surface Mount

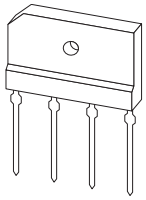
1Z

Type No.	Absolute Maximum Ratings						Electrical Characteristics						Outline	
	V_{RM} [V]	I_O [A]	Conditions Ta [°C]	I_{FSM} [A]	Tstg [°C]	Tj [°C]	V_F (max) [V]	Conditions I_F [A]	I_R (max) $V_R=V_{RM}$ [mA]	Cj (typ) [pF]	$\theta j l$ (max) [°C/W]	θja (max) [°C/W]	Package	Fig.
S1ZAS4	40	1.2	49	40	-40 to 150	150	0.55	1	1	65	25	93	1Z	23-2

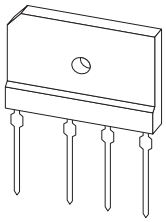
★: Under development Array type ∗1: Per diode at two elements operation

Schottky Barrier Diode Bridges

Single Inline Package



3S



5S

Type No.	Absolute Maximum Ratings						Electrical Characteristics					Outline	
	V_{RM} [V]	I_O [A]	Conditions Tc [°C]	I_{FSM} [A]	Tstg [°C]	Tj [°C]	V_F (max) [V]	Conditions I_F [A]	I_R (max) $V_R=V_{RM}$ [mA]	Cj (typ) [pF]	θjc (max) [°C/W]	Package	Fig.
D4SBS4	40	4	116	60	-55 to 150	150	0.55	2	2	95	5.5	3S	57
D4SBS6	60	4	114	60	-40 to 150	150	0.62	2	2	180	5.5		
D10SBS4	40	10	67	100	-55 to 150	150	0.55	5	3.5	180	5.5		
D15XBS6	60	15	59	150	-55 to 150	150	0.63	7.5	6	410	3.5		
☆**D20XBS6**	60	20	100	200	-55 to 150	150	0.63	10	8	370	1.5	5S	58
☆**D4SBN20**	200	4	103	60	-55 to 150	150	0.9	2	0.0015	60	6	3S	57
☆**D6SBN20**	200	6	110	120	-55 to 150	150	0.9	3	0.002	85	3.4	5S	58
☆**D15XBN20**	200	15	106	200	-55 to 150	150	0.9	7.5	0.005	190	1.5		
☆**D30XBN20**	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

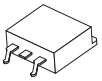
M1F

1F

M2F

2F

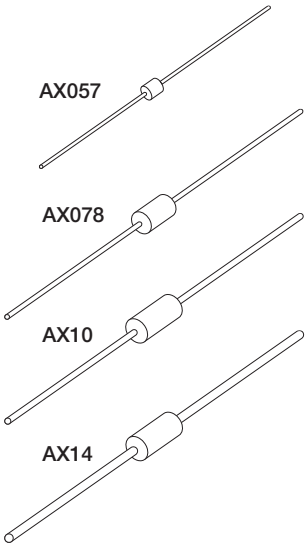
E-pack


STO-220

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-l (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	600	0.8	29*1	20	-55 to 150	150	1.3	0.8	10	75	23	108	–	1F	13-1
D2FK60		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: Tl

Axial

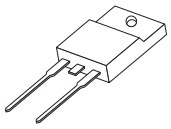


Type No.	Absolute Maximum Ratings						Electrical Characteristics						Outline		
	VRM [V]	Io [A]	Conditions Ta [°C]	IFSM [A]	Tstg [°C]	Tj [°C]	VF (max) [V]	Conditions IF [A]	IR (max) VR=VRM [μA]	trr (max) [ns]	θj-l (max) [°C/W]	θja (max) [°C/W]	Package	Color Code	Fig.
D1NL20U*2	200	1	25	25	-55 to 150	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	400	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		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	600	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

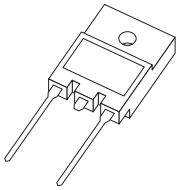
☆: New product ＊1: Tl ＊2: Spec Code 5□□□ ＊3: Spec Code 7□□□
(See page 46 for the last 3 digits of the Spec Code)

Super Fast Recovery Diodes

Two Terminal Type



FTO-220



ITO-3P

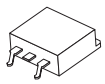
Type No.	Absolute Maximum Ratings						Electrical Characteristics					Outline	
	V_{RM} [V]	I_O [A]	Conditions Tc [°C]	I_{FSM} [A]	Tstg [°C]	Tj [°C]	V_F (max) [V]	Conditions I_F [A]	I_R (max) $V_R=V_{RM}$ [μA]	trr (max) [ns]	θjc (max) [°C/W]	Package	Fig.
SF3L60U	600	3	115	40	-55 to 150	150	3.00	3	25	20	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

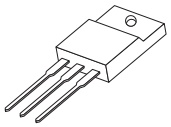


STO-220

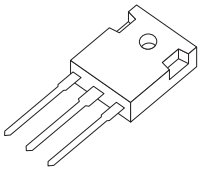
Type No.	Absolute Maximum Ratings						Electrical Characteristics						Outline	
	V_{RM} [V]	I_O [A]	Conditions Tc [°C]	I_{FSM} [A]	Tstg [°C]	Tj [°C]	V_F (max) [V]	Conditions I_F [A]	I_R (max) $V_R=V_{RM}$ [μA]	trr (max) [ns]	θja (max) [°C/W]	θjc (max) [°C/W]	Package	Fig.
DE5LC20U	200	5	81	50	-55 to 150	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

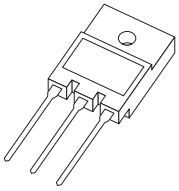
Three Terminal Type



FTO-220



MTO-3P

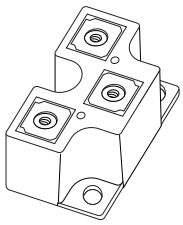


ITO-3P

Type No.	Absolute Maximum Ratings						Electrical Characteristics					Outline	
	V_{RM} [V]	I_O [A]	Conditions Tc [°C]	I_{FSM} [A]	Tstg [°C]	Tj [°C]	V_F (max) [V]	Conditions I_F [A]	I_R (max) $V_R=V_{RM}$ [μA]	trr (max) [ns]	θjc (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		20	112	150	-40 to 150	150	0.98	10	10	35	1.7	ITO-3P	44-1
SF20LC30	300	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 Center-tap

Super FRD Module



Module

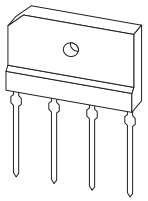
Type No.	Absolute Maximum Ratings						Electrical Characteristics					Outline	
	V_{RM} [V]	I_O [A]	Conditions Tc [°C]	I_{FSM} [A]	Tstg [°C]	Tj [°C]	V_F (max) [V]	Conditions I_F [A]	I_R (max) $V_R=V_{RM}$ [μA]	trr (max) [ns]	θjc (max) [°C/W]	Package	Fig.
D120LC40	400	120	95	650	-40 to 150	150	1.3	60	25	100	0.31	Module	79-2
D120LC40B			60								0.5		78
D200LC40B		200	52	1400				100	50	150	0.35		
D240LC40		240	77					120			0.2		79-2

Super Fast Recovery Diodes

High frequency rectifying

Super Fast Recovery Diode Bridges

Single Inline Package



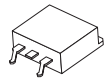
3S

Type No.	Absolute Maximum Ratings						Electrical Characteristics							Outline	
	V_{RM} [V]	Io [A]	Conditions Tc [°C]	I_{FSM} [A]	Tstg [°C]	Tj [°C]	V_F (max) [V]	Conditions I_F [A]	I_R (max) $V_R=V_{RM}$ [μA]	trr (max) [ns]	θjl (max) [°C/W]	θja (max) [°C/W]	θjc (max) [°C/W]	Package	Fig.
D4SBL20U	200	4	108	80	-55 to 150	150	0.98	2	10	35	6	30	5.5	3S	57
D4SBL40	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

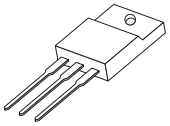


STO-220

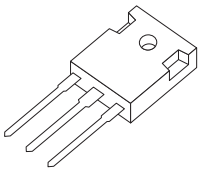
Type No.	Absolute Maximum Ratings					Electrical Characteristics									Outline	
	VDSS [V]	ID [A]	PT [W]	VGSS [V]	Tch [°C]	RDS(ON) (max) [Ω]	Ciss (typ) [pF]	Coss (typ) [pF]	Crss (typ) [pF]	Qg (typ) [nC]	td(on) (typ) [ns]	tr (typ) [ns]	td(off) (typ) [ns]	tf (typ) [ns]	Package	Fig.
★F11S60C3	600	11	40	± 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	35		

★: Under development

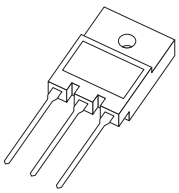
Three Terminal Type



FTO-220A



MTO-3P



ITO-3P

Type No.	Absolute Maximum Ratings					Electrical Characteristics									Outline	
	VDSS [V]	ID [A]	PT [W]	VGSS [V]	Tch [°C]	RDS(ON) (max) [Ω]	Ciss (typ) [pF]	Coss (typ) [pF]	Crss (typ) [pF]	Qg (typ) [nC]	td(on) (typ) [ns]	tr (typ) [ns]	td(off) (typ) [ns]	tf (typ) [ns]	Package	Fig.
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	ITO-3P	44-3
★FP15W60C3		15	60			0.28	1600	510	40	56	26	42	240	36		
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)

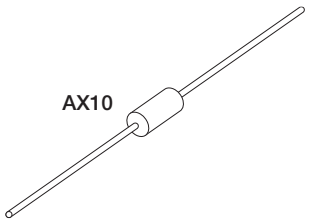
■ **Features**

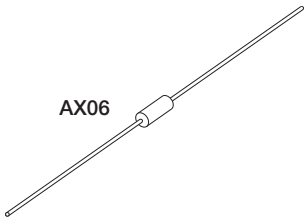
1. Symmetrical characteristics.
2. Operating directly from the AC mains, and can be used in all kinds of pulse generating circuits.
3. The glass passivation ensures high reliability.

■ **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_{DRM} [V]	I_T [A]	Conditions T_j [°C]	I_{TSM} [A]	I_{TRM} [A]	Conditions f [kHz]	di_T/dt [A/μs]	Tstg [°C]	Tj [°C]	V_{BO} [V]	I_{DRM} (max) [μA]	Conditions V_D [V]	I_{BO} (max) [mA]	I_H (typ) [mA]	V_T (max) [V]	Conditions I_T [A]	R_S (min) [kΩ]	$\theta j l$ (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	90	1	112	20	25	1	80	-40 to 125	125	95 to 113	10	90	0.5	50	1.5	1	0.1	15		
K1V11										104 to 118										
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	180	1	108	20	25	1	80	-40 to 125	125	200 to 230	10	180	0.5	20	1.5	1	0.1	15		
K1V24										220 to 250										
K1V26										240 to 270										
K1V22(W)	180	1	91	16	17	1	80	-40 to 125	125	200 to 230	10	180	0.5	50	3	1	0.1	15	AX10	7
K1V24(W)										220 to 250										
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	90	1	109	16	15	1	50	-40 to 125	125	95 to 113	10	90	0.5	50	1.6	1	0.1	20	AX06	2-1
K1V(A)11										104 to 118										
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.

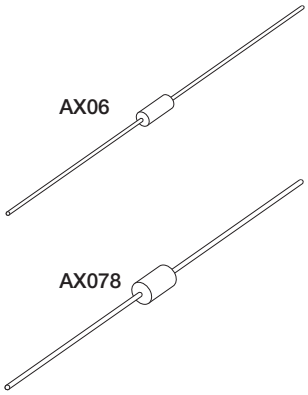
Surface Mount

1F

Type No.	Absolute Maximum Ratings								Electrical Characteristics									Outline	
	$V_{DRM(A)}$ [V]	I_T [A]	Conditions T/ [°C]	I_{TRM} [A]	Conditions f [Hz]	di_T/dt [A/μs]	Tstg [°C]	Tj [°C]	$V_{BO(A)}$ [V]	$I_{DRM(A)}$ (max) [μA]	Conditions V_D [V]	$I_{BO(A)}$ (max) [mA]	$I_{H(A)}$ $I_{H(K)}$ (max) [mA]	$V_{T(A)}$ $V_{T(K)}$ (max) [V]	Conditions I_T [A]	$R_{S(A)}$ (min) [kΩ]	$\theta j l$ (max) [°C/W]	Package	Fig.
☆**G1VL8C**	70	1	98	80	60	150	-40 to 125	125	75 to 90	10	70	1.0	100	1.5	1	0.1	23	1F	13-3
☆**G1VL10C**	90			150					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	
	$V_{DRM(A)}$ [V]	I_T [A]	Conditions T/ [°C]	I_{TRM} [A]	Conditions f [Hz]	di_T/dt [A/μs]	Tstg [°C]	Tj [°C]	$V_{BO(A)}$ [V]	$I_{DRM(A)}$ (max) [μA]	Conditions V_D [V]	$I_{BO(A)}$ (max) [mA]	$I_{H(A)}$ $I_{H(K)}$ (max) [mA]	$V_{T(A)}$ $V_{T(K)}$ (max) [V]	Conditions I_T [A]	$R_{S(A)}$ (min) [kΩ]	$\theta j l$ (max) [°C/W]	Package	Fig.
G1V(A)8C	70	1	98	80	60	80	-40 to 125	125	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		98	80		80			142 to 157	10	115	0.5	60	1.5	1	0.1	20		
G1V(A)20C	170			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

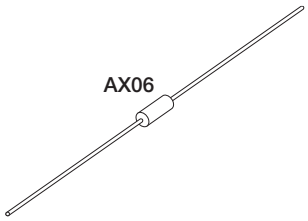
1F

1Y

Type No.	Absolute Maximum Ratings				Electrical Characteristics (Ta=25°C)						Outline	
	Io	IFSM	Tstg	Tj	VF1	IF1	VF2	IF2	VF3	IF3	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



AX06

Type No.	Absolute Maximum Ratings				Electrical Characteristics (Ta=25°C)						Outline	
	Io	IFSM	Tstg	Tj	VF1	IF1	VF2	IF2	VF3	IF3	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	70		
VR-61B(A)	150	7.5			2.3 ± 0.25		2.75 ± 0.25		3.1 ± 0.25			

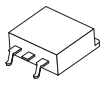
Spec Code 5□□□ (See page 46 for the last 3 digits of the Spec Code)

Trankillers

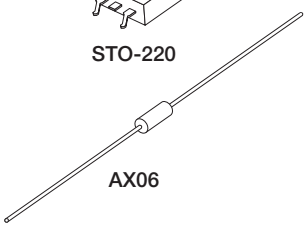
■ **Features**
1. High speed response.
2. Absorption energy tolerance capacity.
3. Narrow clamping voltage width.

■ **Applications**
1. IC protection for telephones.
2. IC protection against abnormal voltage.
3. Protection for load dump noise.

1F



STO-220



AX06

MCP

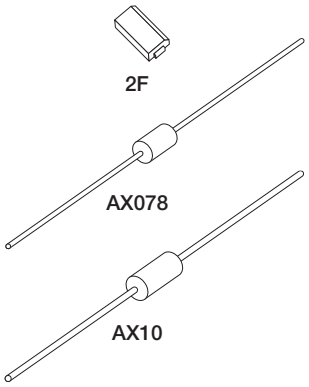
Type No.	Absolute Maximum Ratings				Electrical Characteristics							Outline	
	PRSM	Tstg	Tj	VRM (max)	VBR (typ)	Conditions IR	IR (max)	Conditions VR	rz (max)	VCL * (max)	Conditions IPP	Package	Fig.
	[W]	[°C]	[°C]	[V]	[V]	[mA]	[μA]	[V]	[%/°C]	[V]	[A]		
ST03-58F1	300	-55 to 150	150	45	58	1	5	45	–	80	4	1F	13-2
ST03-68F1		-40 to 150		58	68			58	–	95	3		
ST04-14F1	400	-40 to 150		12.8	14			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			12	14		10	12	0.08	–	–		
DL04-18F1◎	400	-55 to 150		13	18	5	5	13	–	27	15	1F	14-2
ST04-27		-40 to 150		23	27	1		23	0.09	37	10	AX06	2-2

☆: New product ◎: Bi-directional type Spec Code 4□□□ (See page 46 for the last 3 digits of the Spec Code)
*: VCL 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		
	P_{RSM} [W]	Tstg [°C]	Tj [°C]	V_{RM} (max) [V]	V_{BR} (typ) [V]	Conditions I_R [mA]	I_R (max) [μA]	Conditions V_R [V]	V_{CL} (max) [V]	Conditions I_{PP} [A]	Package	Color Code	Fig.
ST02D-170F2	200	-40 to 150	150	145	170	1	5	145	280	0.75	2F	–	16-3
ST02D-82				67	82			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	300			67	82			67	118	2.5	AX10	Silver	6-2
☆ST03D-140				120	145			120	200	0.75		Blue	
ST03D-170				145	170			145	280	1.1		Red	
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

1F

M2F

2F

Type No.	Absolute Maximum Ratings					Electrical Characteristics						Remarks	Outline	
	I_{TSM} [A]	Conditions [μs]	V_{DRM} [V]	Tstg [°C]	Tj [°C]	V_{BO} (min) [V]	V_{CL} (max) [V]	I_{DRM} (max) [μA]	Conditions V_D [V]	I_H (min) [mA]	Cj (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		58			65	80	10	58	100	90	–	2F	16-2
KP4N12			100			110	135	10	100	100	50			
KP10L06	100		48			55	70	10	48	100	235	–	2F	16-2
KU10L08			63			70	100	10	63	100	180	UL®	M2F	15-2
KP10L08			63			70	100	10	63	100	180	–	2F	16-2
KU10N14			120			125	195	5	120	100	140	UL®	M2F	15-2
KP10N14			120			130	195	10	100	100	140	–	2F	16-2
KP15L08	150		63			70	100	10	63	100	320	–	2F	16-2
KU15N14			120			125	195	5	120	100	110	UL®	M2F	15-2
KP15N14			120			125	195	10	120	100	200	–	2F	16-2
KP15R25			190			220	290	10	190	100	150			

☆: New product　　*: V_{BR}　　UL®: UL497B recognized File No. E183905

Surge Absorbers

Surface Mount (Uni-Directional Type)

M2F

2F

Type No.	Absolute Maximum Ratings					Electrical Characteristics						Remarks	Outline	
	I_{TSM}	Conditions	V_{DRM}	Tstg	Tj	V_{BR} (min)	V_{CL} (max)	I_{DRM} (max)	Conditions V_D	I_H (min)	Cj (max)		Package	Fig.
	[A]	[μs]	[V]	[°C]	[°C]	[V]	[V]	[μA]	[V]	[mA]	[pF]			
KU10LU07	100	10/1000	58	-40 to125	125	62	100	10	58	100	200	®L	M2F	15-3
KP10LU07	100		60			62	100	10	60	100	180	—	2F	16-4

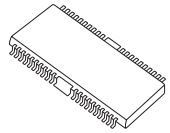
®L: UL497B recognized File No. E183905

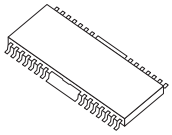
Power ICs

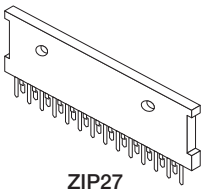
Stepper Motor Driver ICs

■ **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.


HSOP40


HSOP28


ZIP27

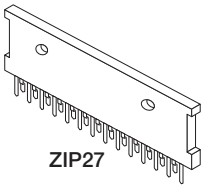
Type No.	Operation	Absolute Maximum Ratings (Ta=25°C)			Characteristics		Outline	
		V_{CEO} [V]	I_O [A]	P_D [W]			Package	Fig.
MTD1120	Unipolar	80	1.2	5	Constant-Current chopping function (4-Phase Input)		ZIP27	89
MTD1120F				3			HSOP28	81
MTD1361		68	1.5	5			ZIP27	89
MTD1361F			1.2	3			HSOP28	81
MTD2002F	Bipolar	35	0.8	3	Constant-Current chopping function	Dual Full Bridge Current levels can be selected by 2 bit digital signal	HSOP28	81
MTD2003F		30	1.2	3			HSOP28	81
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.

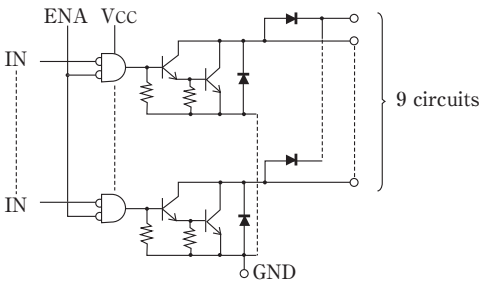
■ **Features**
1. The input is TTL and CMOS compatible
2. Large output Ic=2A, V_{CE}=60V or 80V
3. Insulated type single in-line packaging with heatsink installed

■ **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.)


ZIP27

Type No.	Absolute Maximum Ratings(Ta=25°C)			Operation			Outline	
	V_{CEO} [V]	I_O [A]	P_D [W]	Input	Output	Circuits	Package	Fig.
MTA001M	80	2	5	L Active	NPN Darlington	9	ZIP27	89
MTA011				H Active				
MTA002	60			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.

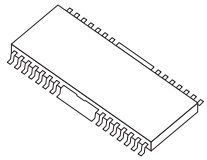
DC-DC Converter Power ICs

■ **Outline**

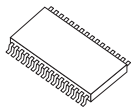
The MD Series is a non-isolated, PWM control stepdown DC-DC converter power IC whose MOSFET and drive circuit IC chip integration eliminates the complexity of power supply circuit design.
Two rectification systems are available: flywheel Schottky diode type and highly efficient synchronous rectification 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**

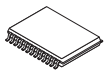
1. High-efficiency
The MD Series consists of a matched control IC and main switching MOSFET in a single package, which allows the construction of a highly efficient power supply with little switching loss and wiring loss.
2. Switching Frequency
Choose the switching frequency matched to the usage conditions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



HSOP28



SSOP32



LSSOP26

SOP8

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 *2	0 to 1	100 to 500 *4	-40 to 85	Fly wheel SBD	SOP8	90
MD3221N	4.5 to 20	2.5/3.3 *1 0.8 to 14 *2	0 to 3	100/300 *3	-30 to 85	Synchronous	SSOP32	83
MD3221R		0.8 to 14 *2					LSSOP26	84
MD3222N		2.5/3.3 *1 0.8 to 14 *2	0 to 6				SSOP32	83
MD1222N	8 to 20	2.5 to 12 *2	0 to 5	250	-10 to 80	Fly wheel SBD	HSOP28	81
MD1320F	12 to 30	3.3/5 *1	0 to 3					
MD1322F	8 to 30	2.5 to 12 *2						
MD1320N		3.3/5 *1	0 to 1.5		-30 to 85		SSOP32	83
MD1322N		2.5 to 12 *2	0 to 1.8					
MD1323R				100 to 500 *4			LSSOP26	84
MD1324R		0.8 to 12 *2						
MD1333N		2.5 to 12 *2	0 to 5			Synchronous	SSOP32	83
MD1421N	8 to 40	3.3/5 *1	0 to 3	250				
MD1422N		2.5 to 12 *2						
MD1423N		2.5 to 12 *2		100 to 500 *4				
MD1423R							LSSOP26	84
MD1424R		0.8 to 12 *2						
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 from100k to 500kHz

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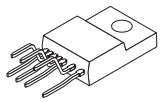
Partial Resonance Power Supply ICs : MR series

■ **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_{DS} [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)		700		
MR4720		50(Peak 80)	25(Peak 40)				
MR4010		65	45	2 nd Generation High Speed IGBT	900		
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.
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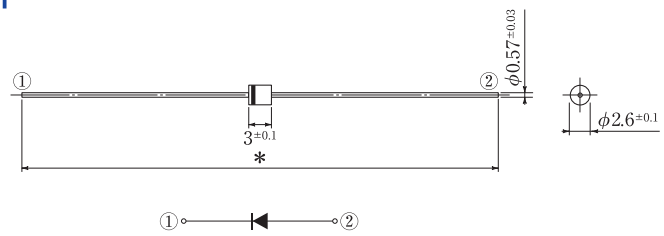
Outline Dimensions

[*Unit : mm*]

Fig.1 Package: AX057



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

Fig.2 Package: AX06

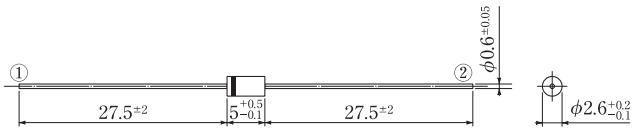


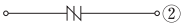
Fig. 2-1 

Fig. 2-2

Fig. 2-3

Fig.3 Package: AX06

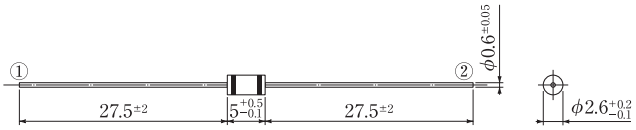


Fig.5 Package: AX078

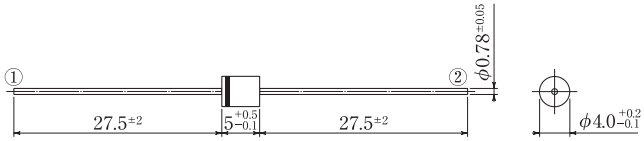


Fig. 5-1

Fig. 5-2

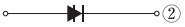
Fig. 5-3 

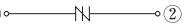
Fig. 5-4 

Fig.6 Package: AX10

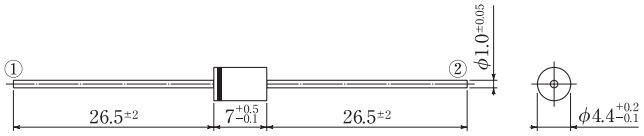


Fig. 6-1

Fig. 6-2

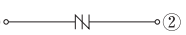
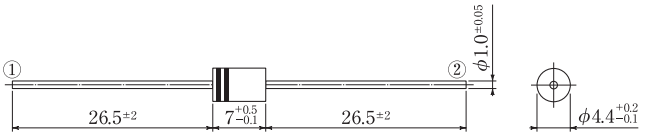
Fig. 6-3 

Fig.7 Package: AX10



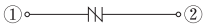
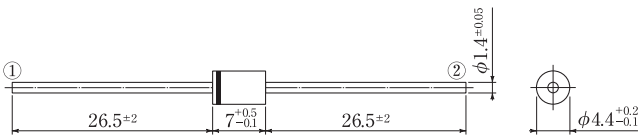


Fig.8 Package : AX14



[*Unit* : *mm*]

Fig.12 Package: M1F

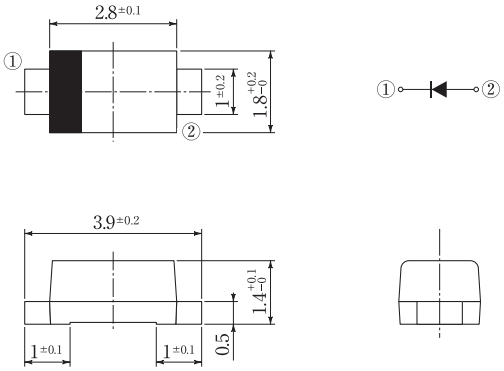


Fig.13 Package: 1F

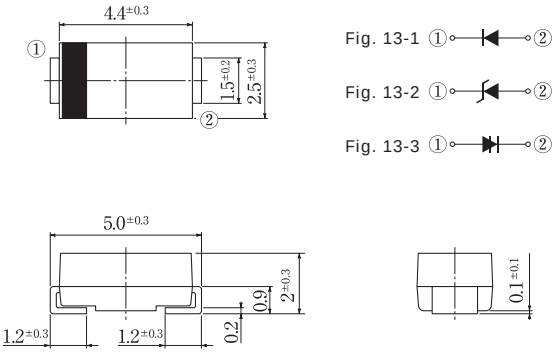


Fig.14 Package: 1F

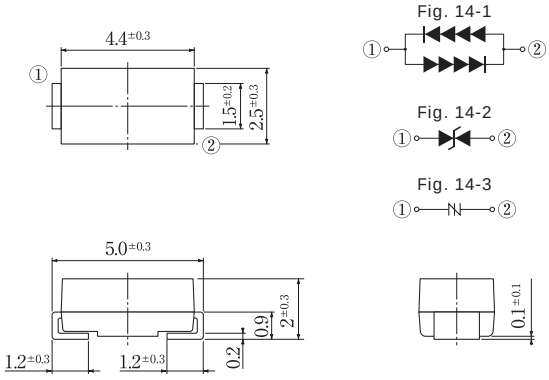


Fig.15-1 Package: M2F

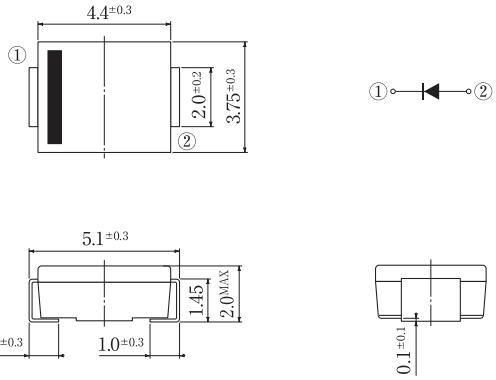


Fig.15-2 Package: M2F

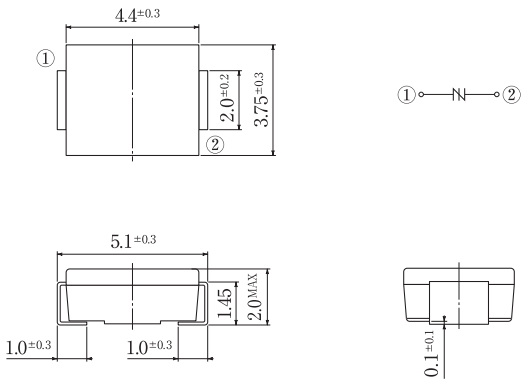
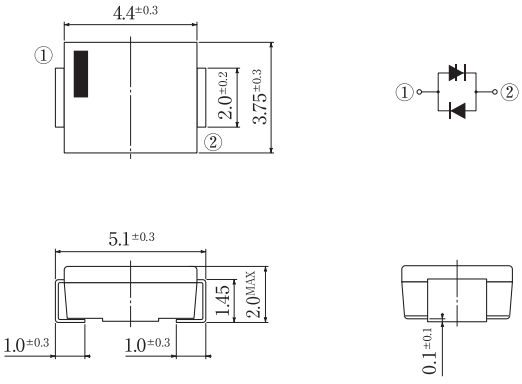


Fig.15-3 Package: M2F



Outline Dimensions

[*Unit : mm*]

Fig.16 Package: 2F

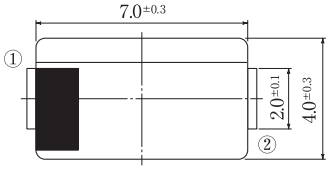


Fig. 16-1

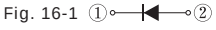


Fig. 16-2

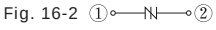


Fig. 16-3

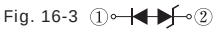
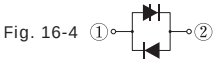
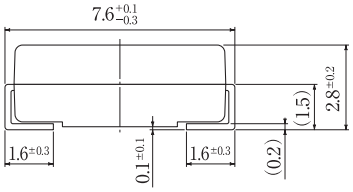


Fig. 16-4





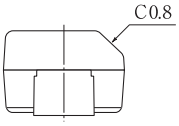
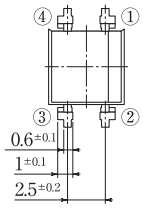
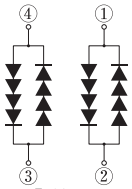
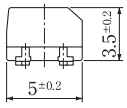
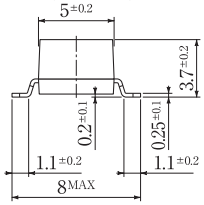


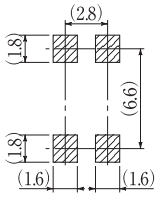
Fig.21 Package: 1Y











Standard Soldering Pad

Fig.22 Package: 1Y

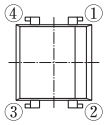


Fig. 22-1

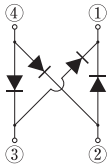
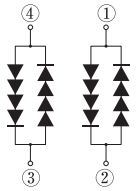
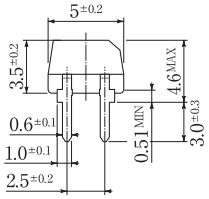


Fig. 22-2





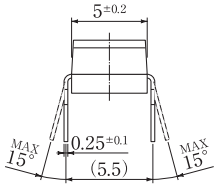


Fig.23 Package: 1Z

Fig. 23-1

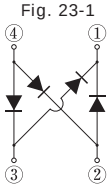
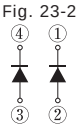
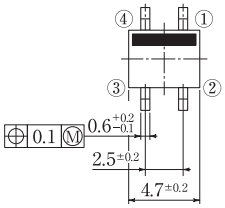
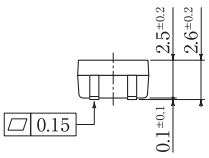


Fig. 23-2







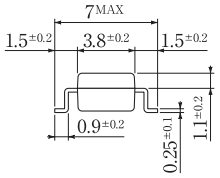
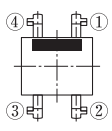
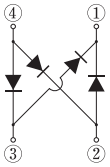
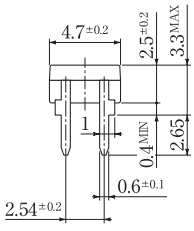


Fig.24 Package: 1Z







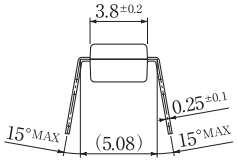
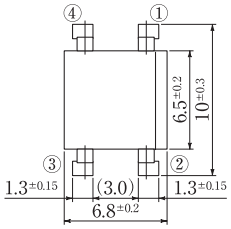
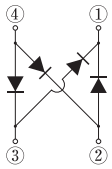
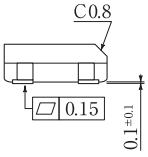
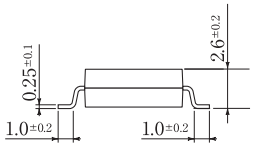


Fig.25 Package: 1N









[*Unit : mm*]

Fig.26 Package: 1N

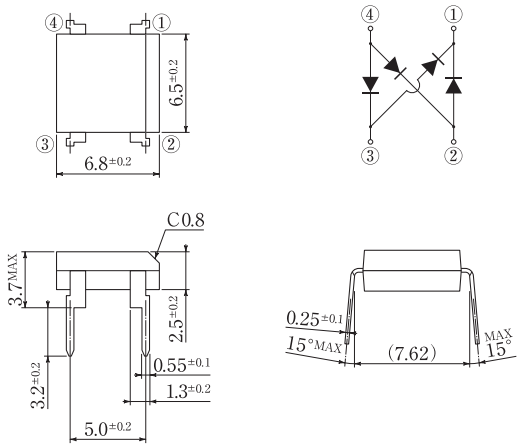


Fig.27 Package: 1NA

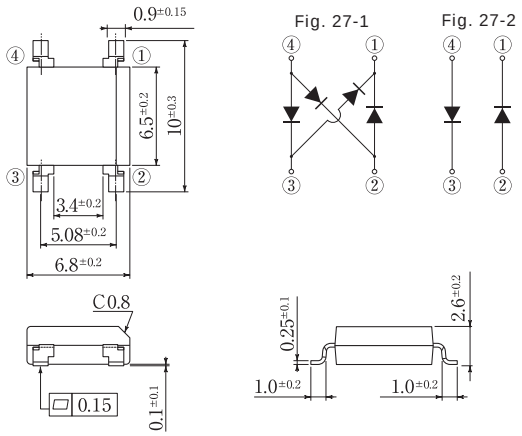


Fig.28 Package: 1NA

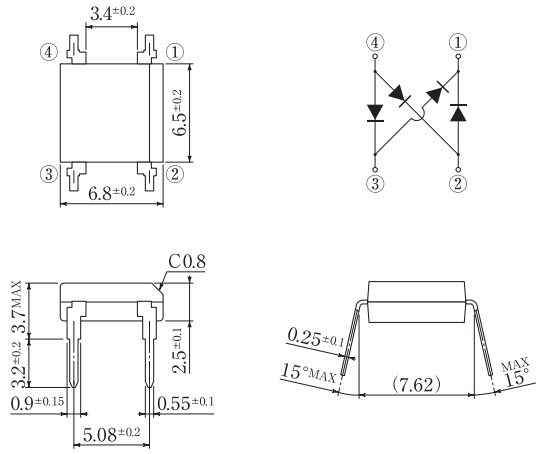


Fig.29 Package: 1W

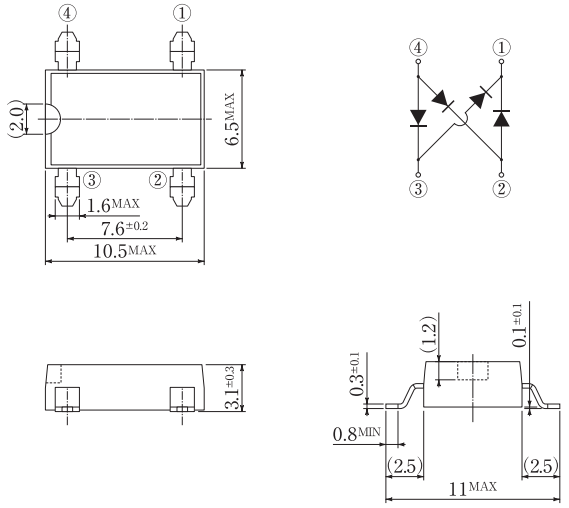


Fig.30 Package: 1W

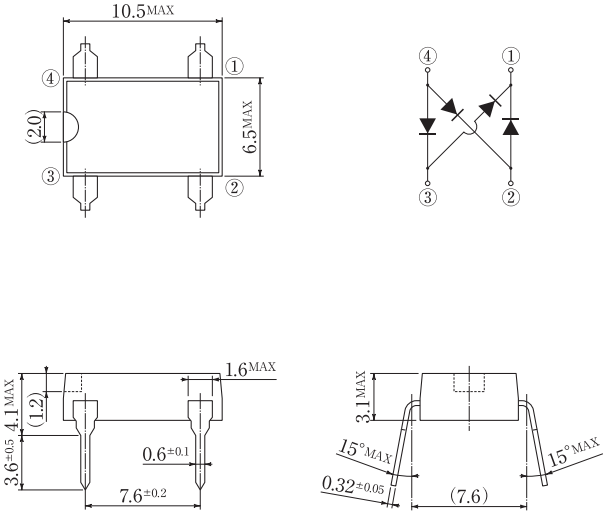


Fig.31 Package: E-pack

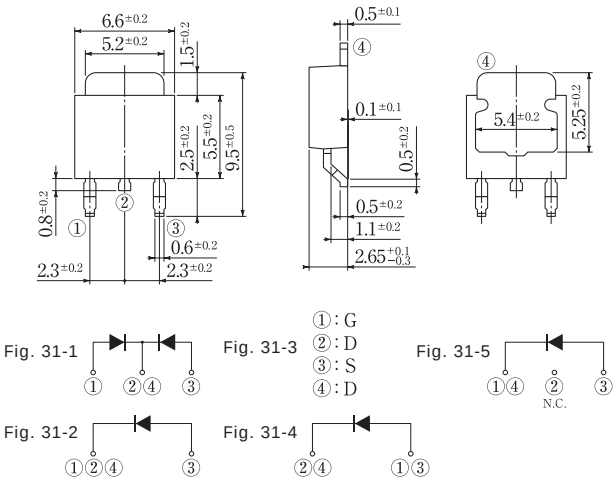


Fig. 31-1

Fig. 31-2

Fig. 31-3

①：G
②：D
③：S
④：D

Fig. 31-4

Fig. 31-5

Outline Dimensions

[*Unit : mm*]

Fig.32 Package: E-pack

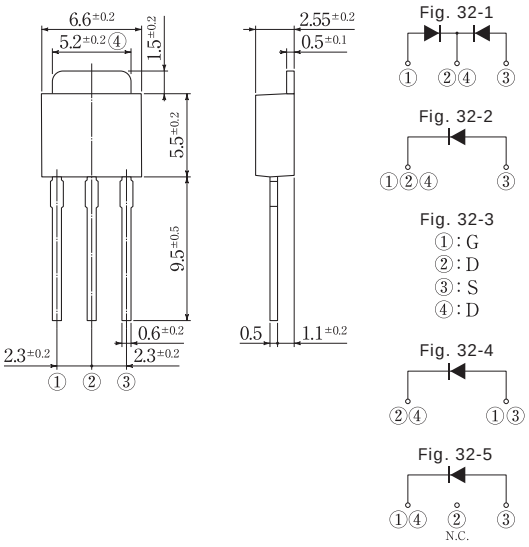


Fig.33 Package: SOPA-4

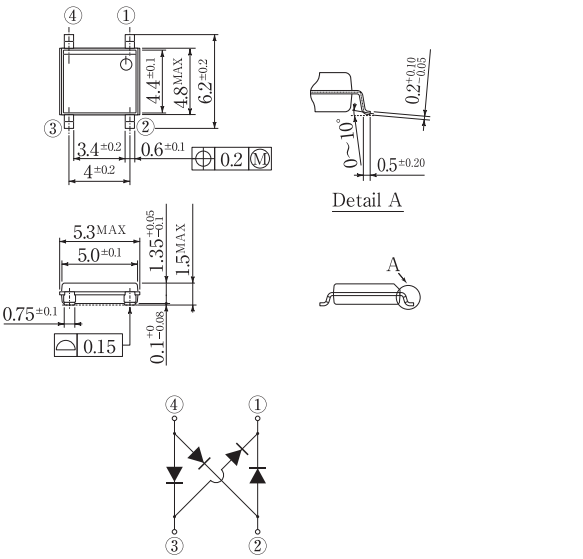


Fig.36 Package: STO-220

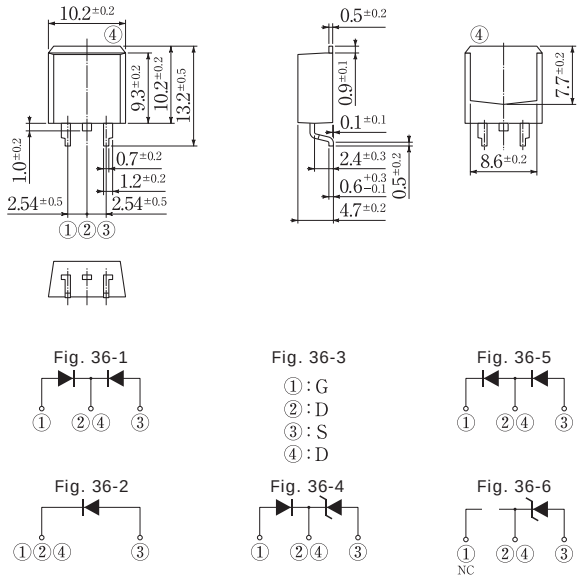


Fig.43 Package: ITO-3P

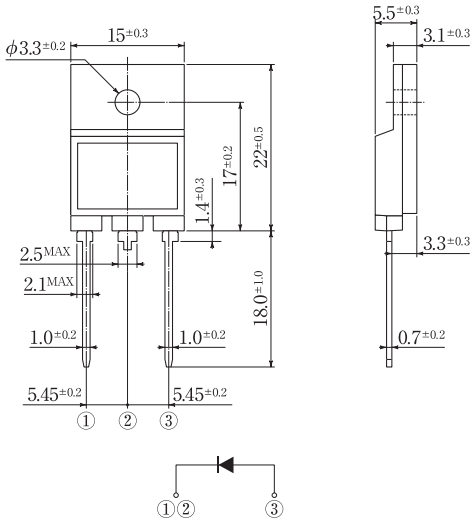


Fig.44 Package: ITO-3P

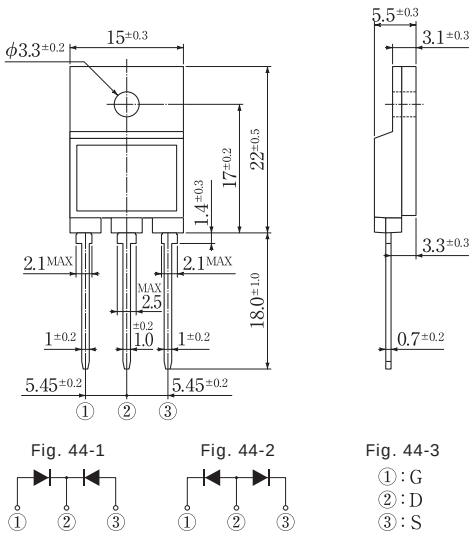
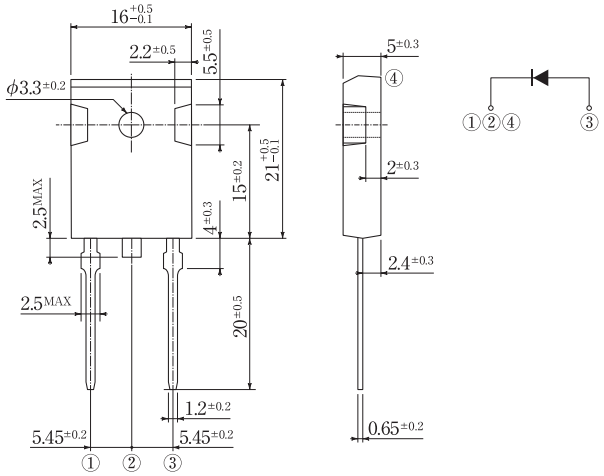


Fig.45 Package: MTO-3P



[*Unit* : *mm*]

Fig.46 Package: MTO-3P

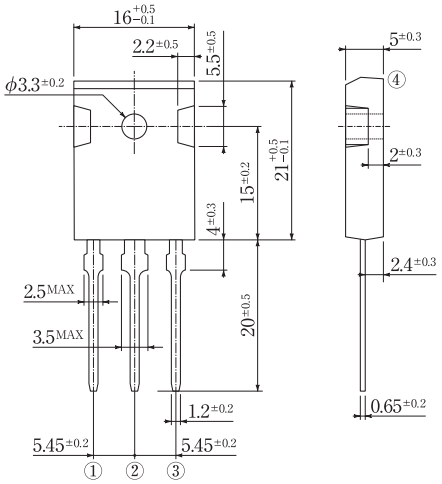


Fig. 46-1

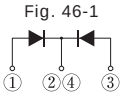


Fig. 46-2

①: G
②: D
③: S
④: D

Fig. 46-3

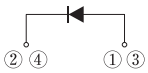


Fig.47 Package: FTO-220

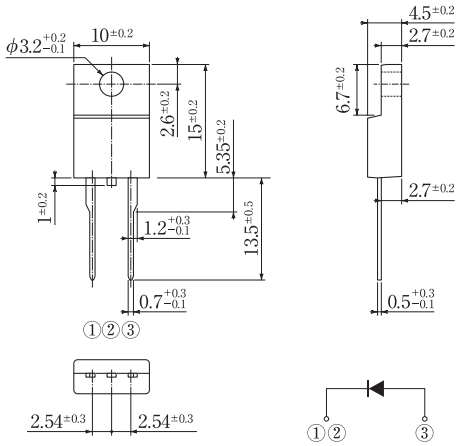


Fig.48 Package: FTO-220

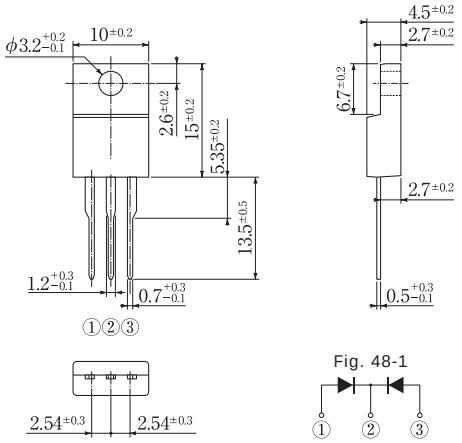


Fig. 48-1

Fig. 48-2

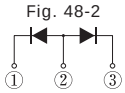


Fig. 48-3

①: G
②: D
③: S

Fig.49 Package: FTO-220A

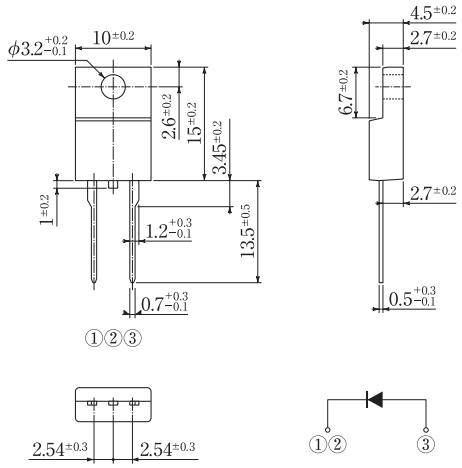


Fig.50 Package: FTO-220A

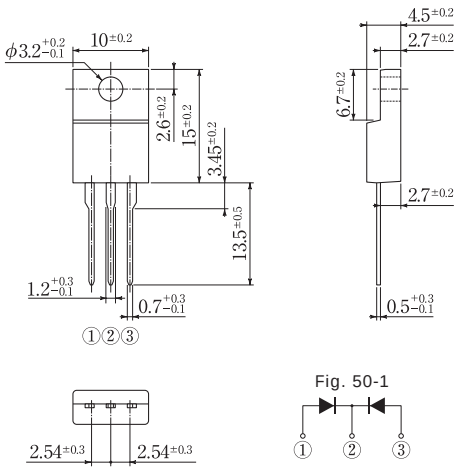


Fig. 50-1

Fig. 50-2

①: G
②: D
③: S

Fig. 50-3

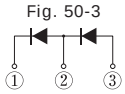
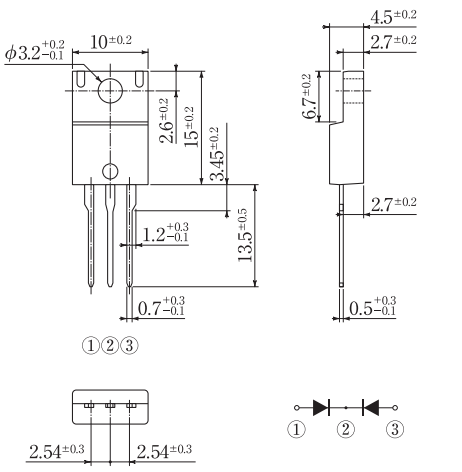


Fig.52 Package: FTO-220G



Outline Dimensions

[*Unit : mm*]

Fig.53 Package: D6K

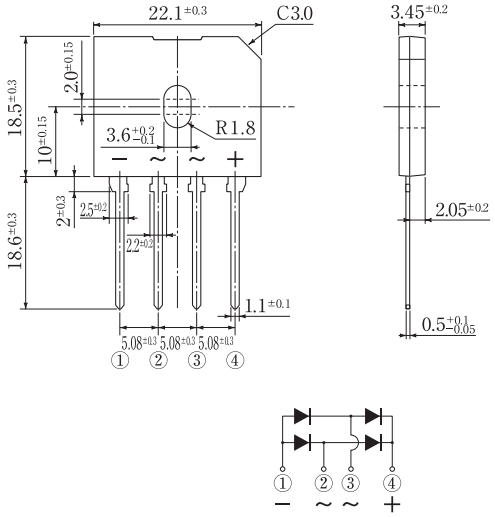


Fig.54 Package: D3K

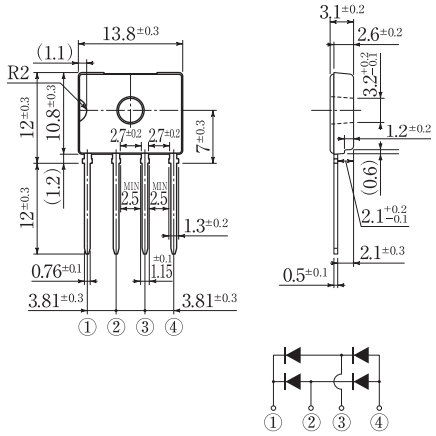


Fig.55 Package: 1V

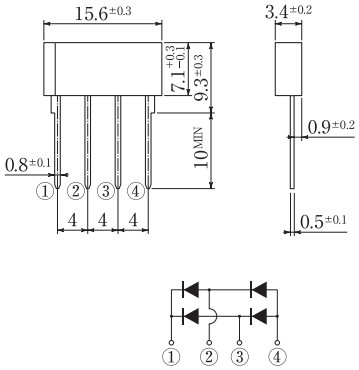


Fig.56 Package: 2S

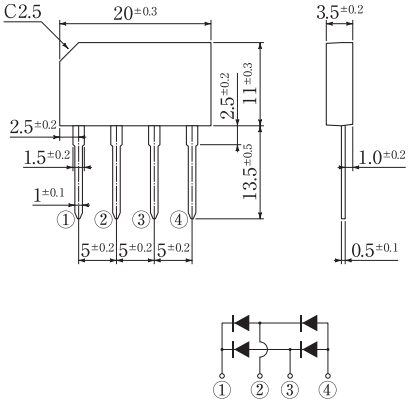


Fig.57 Package: 3S

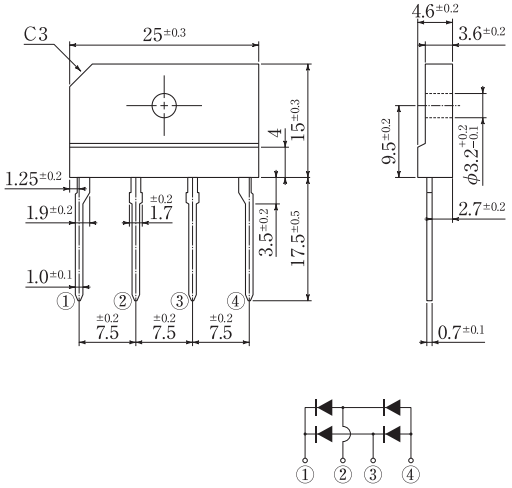
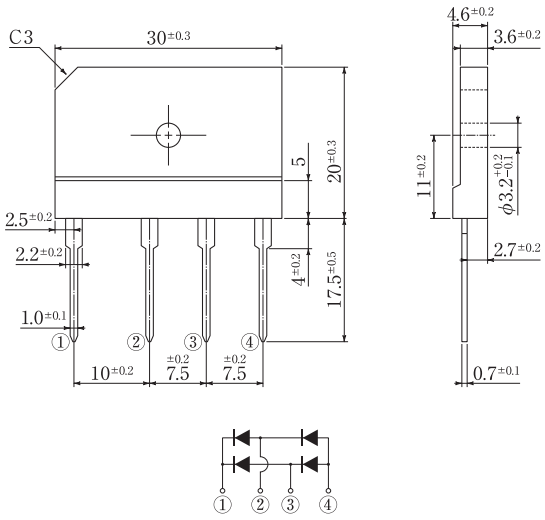


Fig.58 Package: 5S



[*Unit : mm*]

Fig.59 Package: TSB(4PIN)

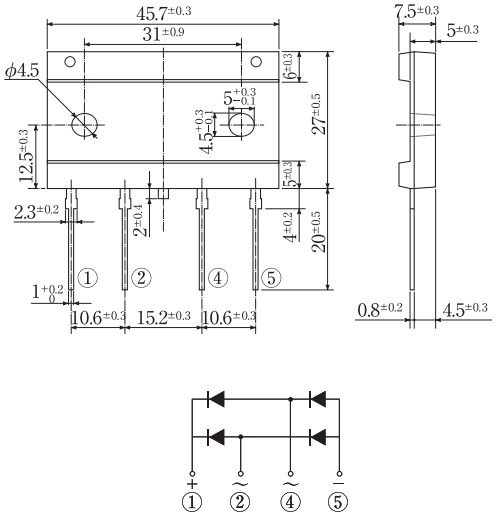


Fig.60 Package: TSB(5PIN)

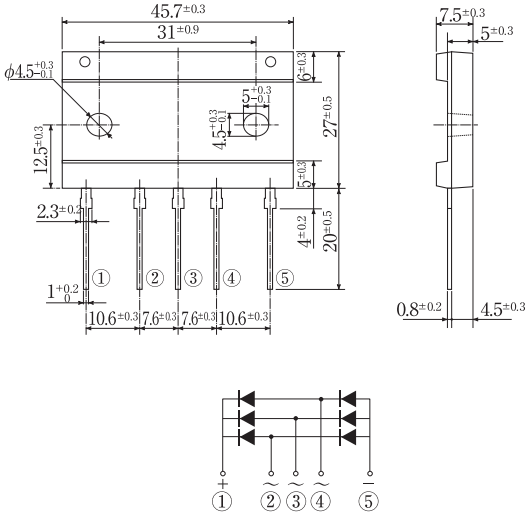


Fig.61 Package: S2VB

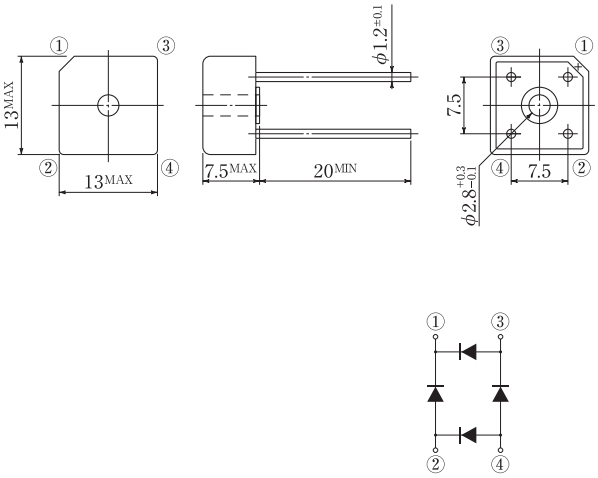


Fig.62 Package: S4VB

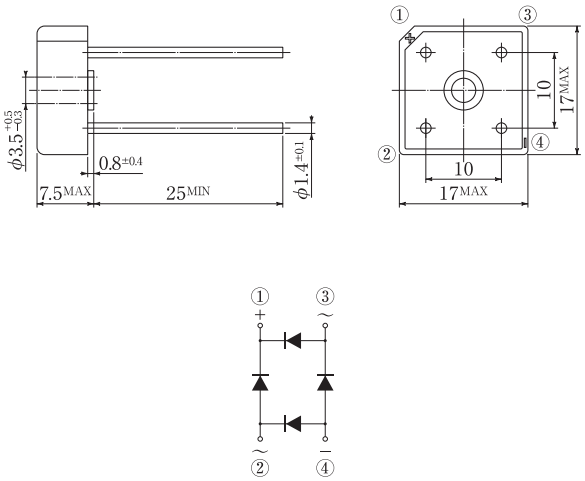


Fig.63 Package: S5VB

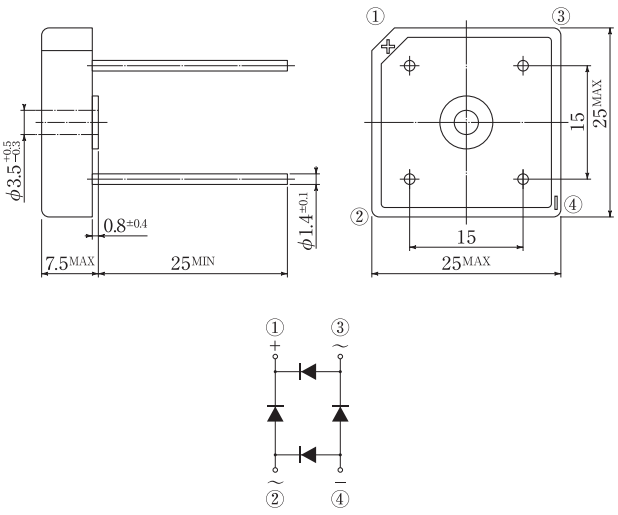
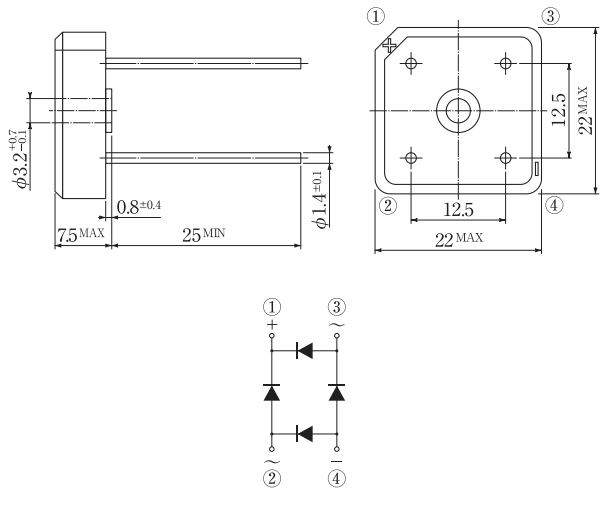


Fig.64 Package: S10VB



Outline Dimensions

[*Unit : mm*]

Fig.65 Package: S15VB

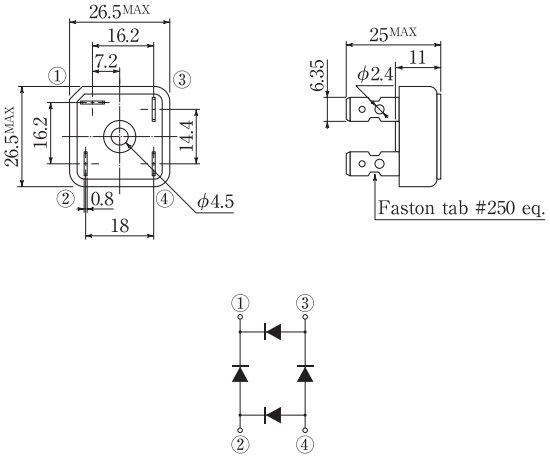


Fig.66 Package: S25VB

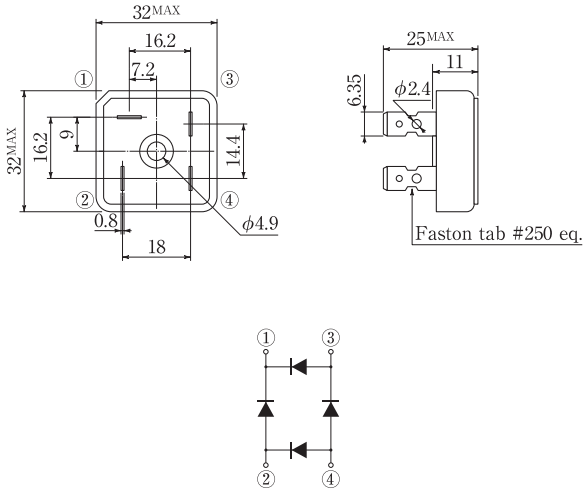


Fig.67 Package: S50VB

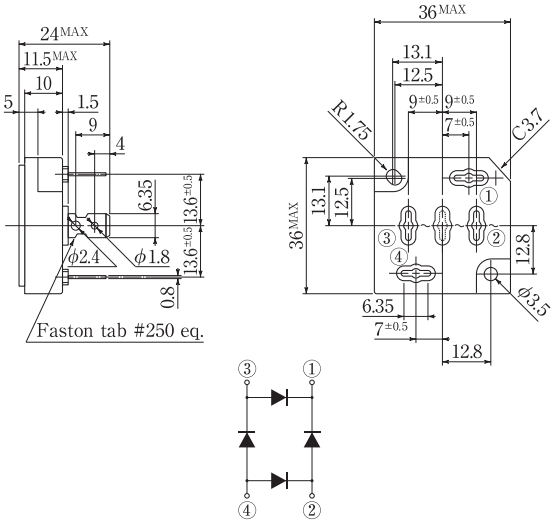


Fig.68 Package: S3WB

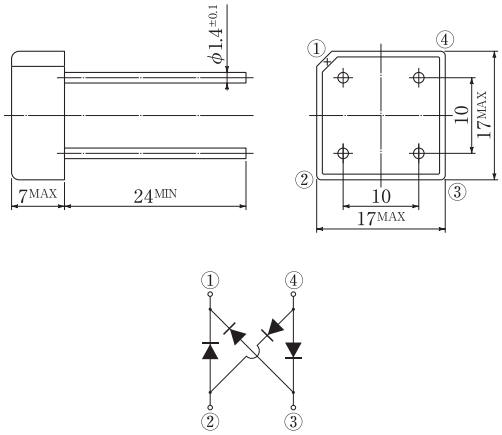


Fig.69 Package: S10WB

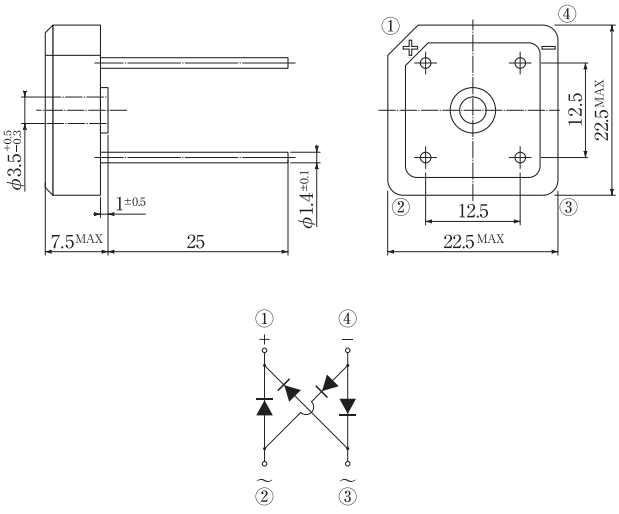
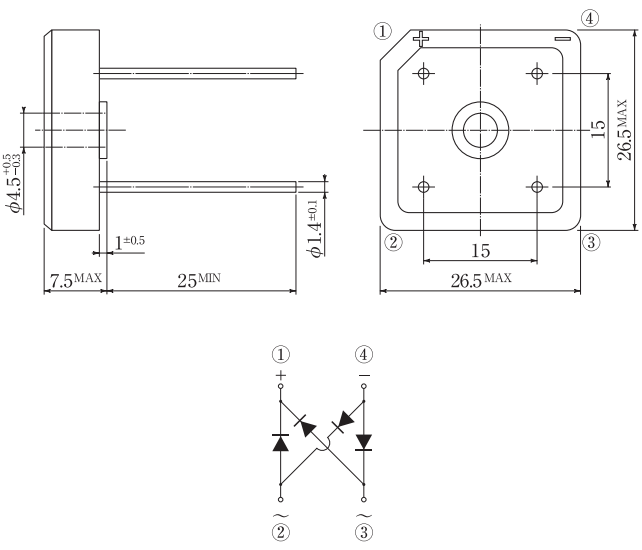


Fig.70 Package: S15WB



[*Unit : mm*]

Fig.71 Package: S20WB

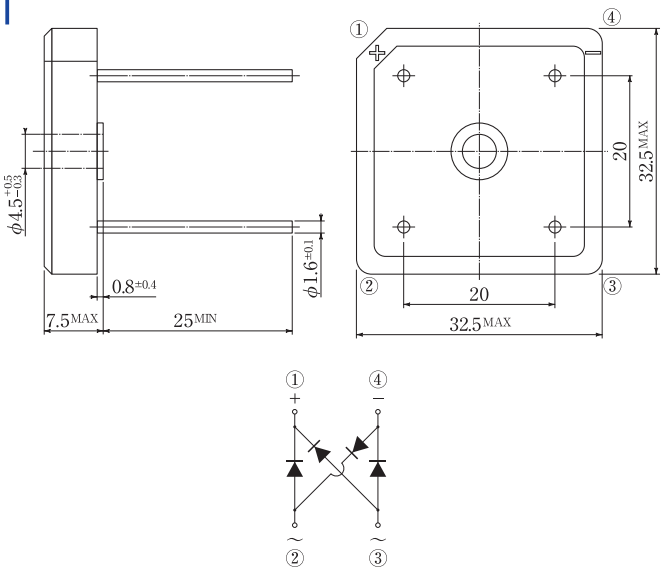


Fig.73 Package: SVTA

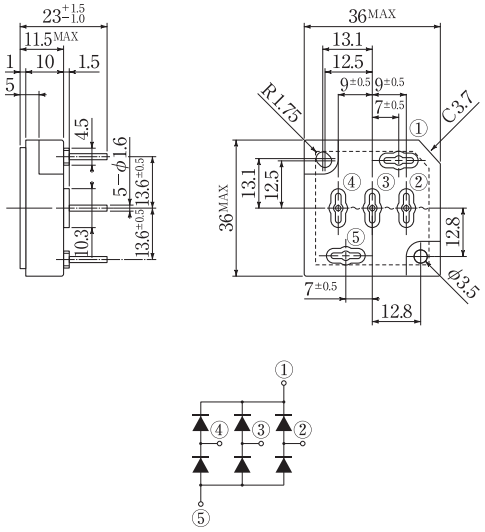


Fig.74 Package: SVT

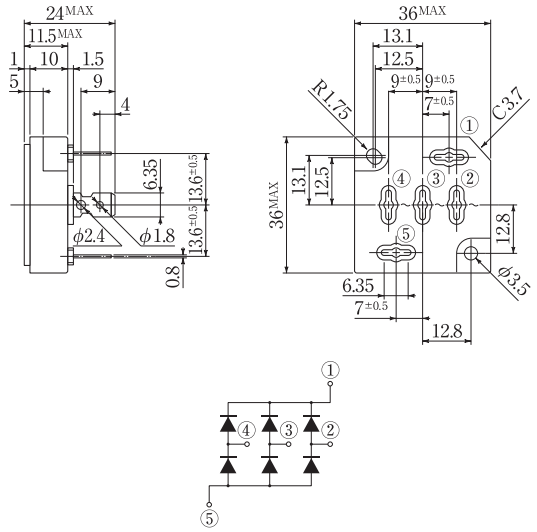


Fig.76 Package: D30VC

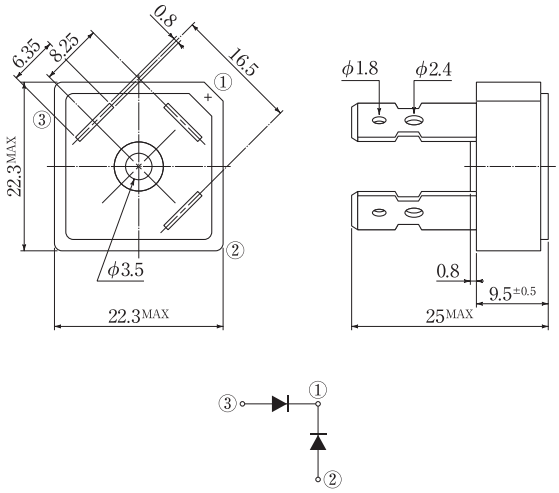


Fig.77 Package: Module

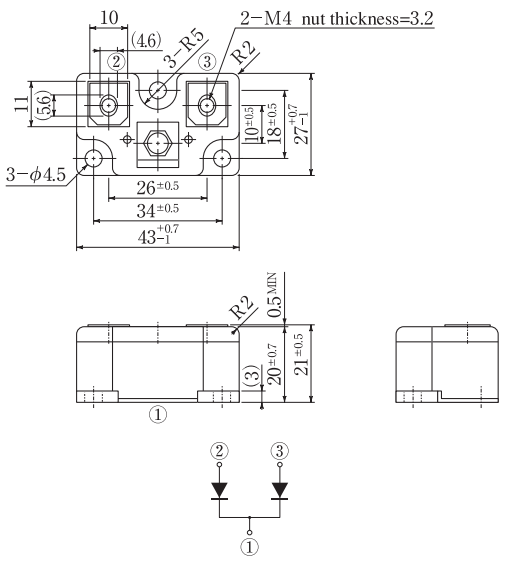
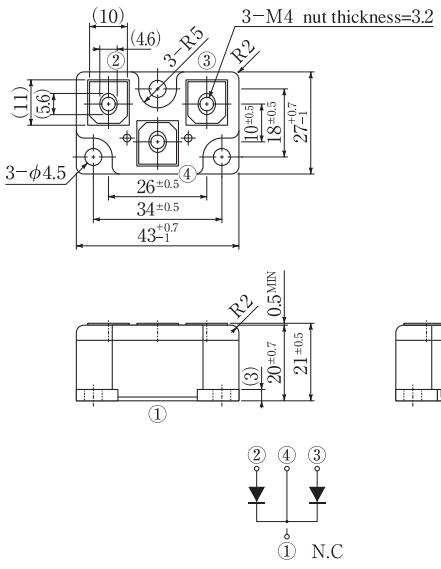


Fig.78 Package: Module



Outline Dimensions

[*Unit : mm*]

Fig.79 Package: Module

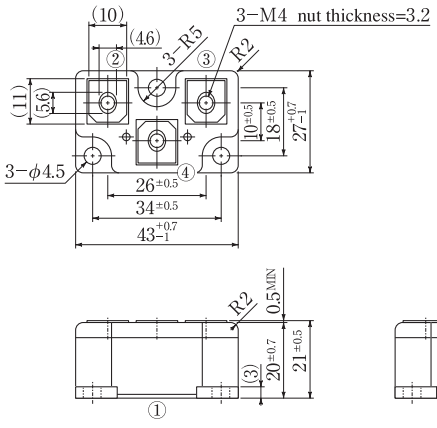


Fig. 79-1

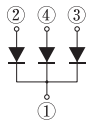


Fig. 79-2

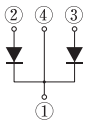


Fig.80 Package: MCP

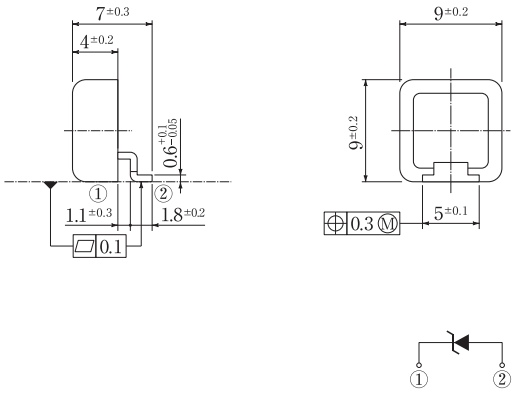


Fig.81 Package: HSOP28

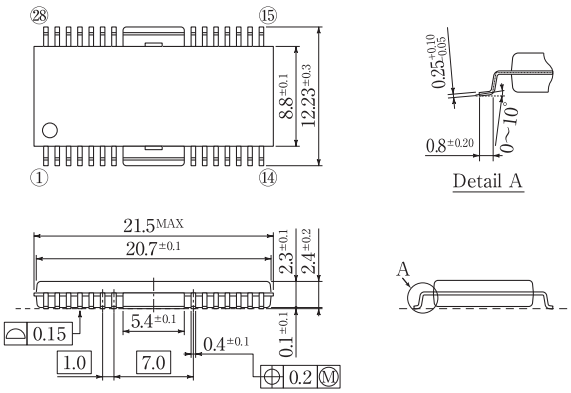


Fig.82 Package: HSOP40

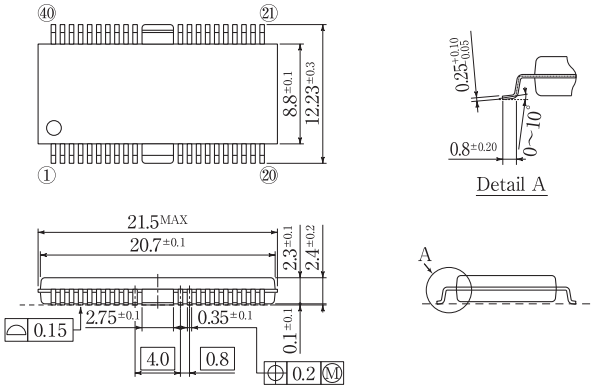


Fig.83 Package: SSOP32

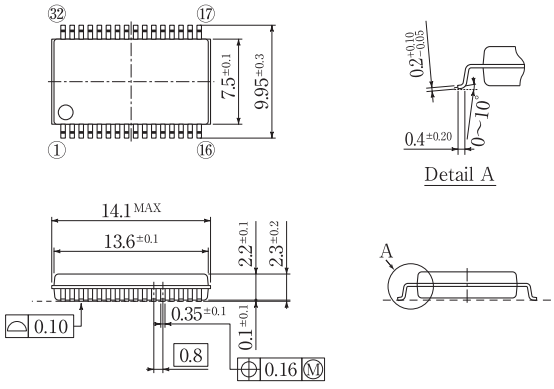
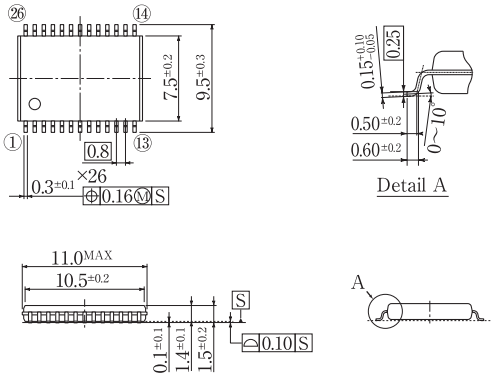


Fig.84 Package: LSSOP26



[*Unit : mm*]

Fig.86 Package: FTO-7P

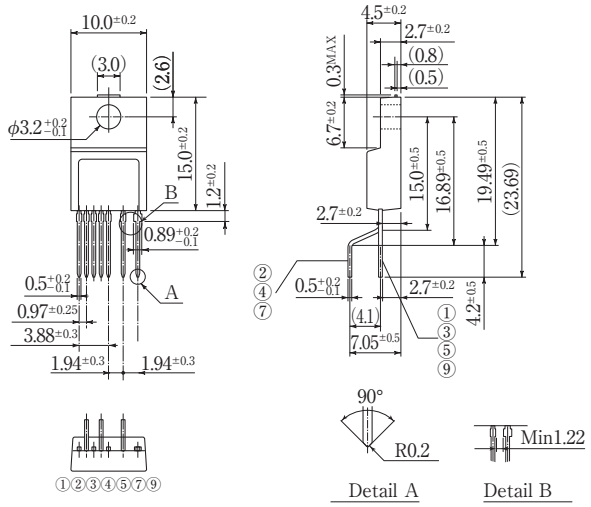


Fig.89 Package: ZIP27

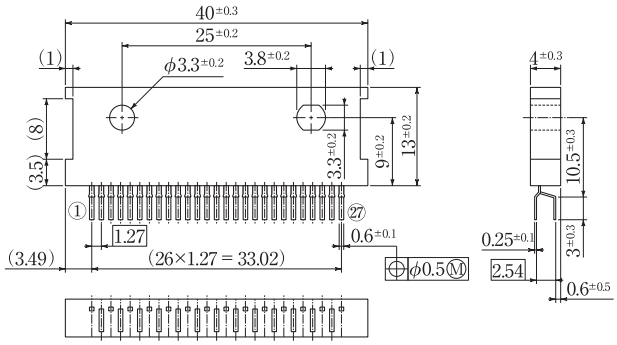


Fig.90 Package: SOP8

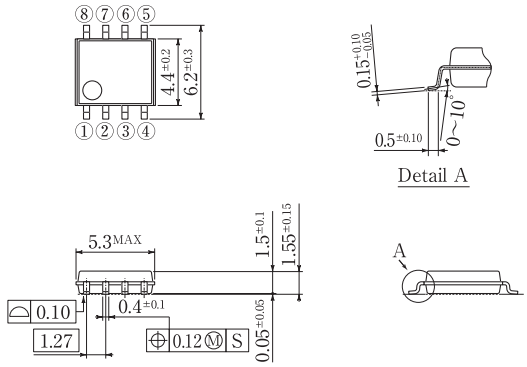


Fig.96 Package: MTO-3PT

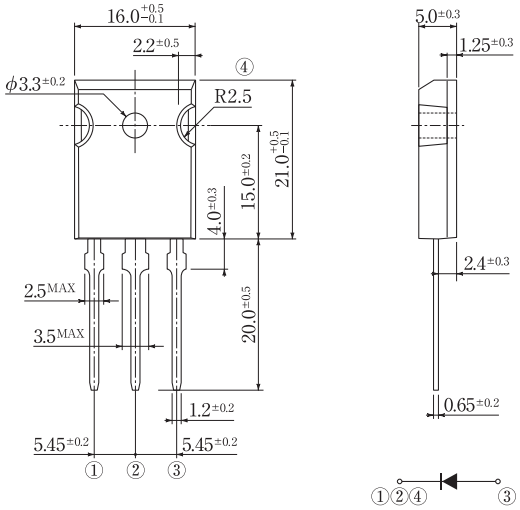
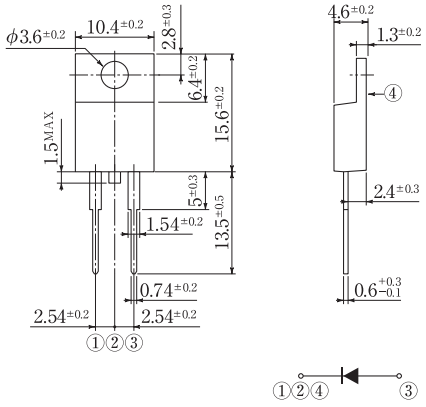


Fig.97 Package: TO-220



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 No.

JEITA Classification
2SK: MOSFET

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

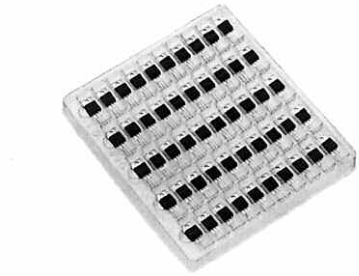
Minimum packing unit
0 : Bulk, tray or taping
1 : Magazine

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.

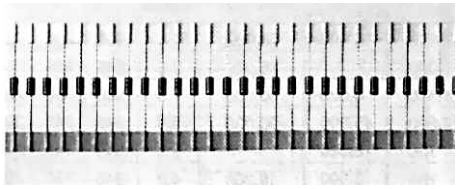
■ **Tray**: The form in which parts are inserted into containers made of resin.



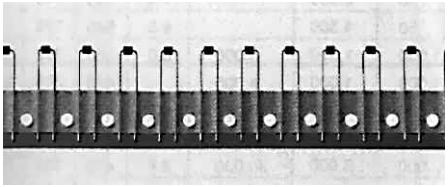
■ **Magazine**: The form in which parts are inserted into resin cartridges designated for automatic inserters.

■ **Tape & Reel**

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



■ **Taping:** Radial Taping

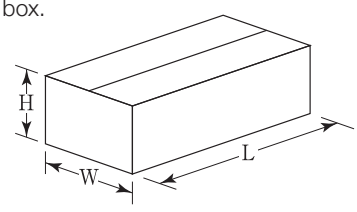


5. Packing Quantities

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		□060	4,000	4,000	Tape, Ammo-Pack 52mm	4,000	40,000	10.0	400	270	240
			□070	3,000	3,000	Tape, Ammo-Pack 26mm	3,000	60,000	10.5	530	270	220
		w/o Kink	□083	3,000	3,000	Tape, Radial	3,000	30,000	8.6	370	350	245
		w/ Kink	□084	3,000	3,000	Tape, Radial	3,000	30,000	8.6	370	350	245
AX06	THD		□000	200	200	Bulk		5,000	1.5	340	190	115
			□060	4,000	4,000	Tape, Ammo-Pack 52mm	4,000	64,000	14.0	325	325	420
			□070	3,000	3,000	Tape, Ammo-Pack 26mm	3,000	72,000	15.7	325	325	420
			□061	4,000	4,000	Tape & Reel, Diameter 300 ϕ	4,000	20,000	4.9	325	325	420
			□081	5,000	5,000	Tape, Radial	5,000	20,000	8.3	350	200	335
AX078	THD		□000	200	200	Bulk	2,000	16,000	7.9	480	355	230
			□060	2,000	2,000	Tape, Ammo-Pack 52mm	2,000	32,000	14.7	325	325	420
			□070	1,500	1,500	Tape, Ammo-Pack 26mm	1,500	18,000	10.0	325	325	260
AX10	THD		□000	200	200	Bulk	2,000	12,000	8.3	336	245	370
			□060	1,200	1,200	Tape, Ammo-Pack 52mm	1,200	18,000	14.4	325	325	420
			□061	2,500	2,500	Tape & Reel, Diameter 300 ϕ	2,500	12,500	10.8	331	331	432
AX14	THD		□000	200	200	Bulk	2,000	12,000	13.1	336	245	370
			□060	1,200	1,200	Tape, Ammo-Pack 52mm	1,200	19,200	14.4	325	325	420
			□061	2,500	2,500	Tape & Reel, Diameter 300 ϕ	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 ϕ	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 ϕ		40,000	4.1	340	195	205
			5073	7,500	7,500	Tape & Reel, Diameter 330 ϕ	45,000	90,000	10.8	395	245	395
M2F	SMD		5063	1,000	1,000	Tape & Reel, Diameter 180 ϕ	4,000	20,000	3.4	340	195	205
			5073	4,000	4,000	Tape & Reel, Diameter 330 ϕ	24,000	48,000	8.6	395	245	395
2F	SMD		5103	120	60	Magazine		18,000	5.2	545	145	110
			5063	750	750	Tape & Reel, Diameter 180 ϕ	3,000	15,000	4.2	340	195	205
			5073	3,000	3,000	Tape & Reel, Diameter 330 ϕ	18,000	36,000	9.2	395	245	395
1Y	THD		7101	100	100	Magazine		10,000	5.0	536	141	117
	SMD		7102	100	100	Magazine		10,000	5.0	536	141	117
			7062	1,000	1,000	Tape & Reel, Diameter 250 ϕ	4,000	8,000	5.3	274	219	291
			7072	2,000	2,000	Tape & Reel, Diameter 330 ϕ	8,000	16,000	8.8	349	244	361
1Z	THD		7101 *1	100	100	Magazine		10,000	2.1	545	145	110
	SMD		7102	100	100	Magazine		15,000	3.2	545	145	110
			7062	750	750	Tape & Reel, Diameter 180 ϕ	3,000	15,000	4.0	340	195	205
			7072	3,000	3,000	Tape & Reel, Diameter 330 ϕ		15,000	4.6	340	340	120
SOPA-4	SMD		7062	1,000	1,000	Tape & Reel, Diameter 180 ϕ	1,000	20,000	3.6	340	195	205
1N/1NA	THD		7101	70	70	Magazine		5,600	4.1	545	145	100
	SMD		7102	70	70	Magazine		5,600	4.1	545	145	100
			7062	1,000	1,000	Tape & Reel, Diameter 250 ϕ	2,000	10,000	5.5	275	285	295
1W	THD		7101	100	50	Magazine		4,000	4.4	545	145	110
	SMD		7102	100	50	Magazine		4,000	4.4	545	145	110
			7062	1,000	1,000	Tape & Reel, Diameter 330 ϕ	3,000	6,000	5.9	395	245	395
			7072	2,000	2,000	Tape & Reel, Diameter 380 ϕ		10,000	7.8	395	245	395
E-pack	THD		7100	80	80	Magazine		10,000	6.9	560	130	109
	SMD		7101 *2	80	80	Magazine		10,000	6.9	560	130	109
			7061 *2	1,500	1,500	Tape & Reel, Diameter 250 ϕ		6,000	2.9	260	260	99
			7071 *2	3,000	3,000	Tape & Reel, Diameter 330 ϕ		12,000	5.5	335	335	99
STO-220	SMD		7102	50	50	Magazine		4,500	9.5	555	145	110
			7072	1,000	1,000	Tape & Reel, Diameter 330 ϕ	1,000	3,000	6.0	362	362	160
TO-220	THD		7100	50	50	Magazine	2,000	2,000	6.1	545	145	110
TO-221	THD		7100	50	50	Magazine		3,000	4.2	545	145	110
ZP	SMD		7072	1,500	1,500	Tape & Reel, Diameter 330 ϕ	1,500	7,500	8.0	345	345	154
									8.6	363	363	160
MCP	SMD		4062	300	300	Tape & Reel, Diameter 255 ϕ	1,500	1,500	5.0	281	281	205
			4072	600	600	Tape & Reel, Diameter 330 ϕ	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			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		＊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			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
								2,000	9.7	362	332	121
		Formed	7112	40	40	Magazine		1,200	7.7	635	160	168
1V			7000	100	100	Bulk	2,000	8,000	9.7	395	350	235
		Formed	7101	120	30	Magazine		3,600	5.7	508	141	99
2S			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
5S			7000	50	250	Bulk	250	2,000	14.5	330	330	205
		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)												
S2VB			5000	100	100	Tray		1,000	3.6	265	255	170
S4VB			5000	50	100	Tray		1,000	5.9	315	285	220
S5VB			5000	50	100	Tray		1,000	10.4	415	285	300
S10VB			5000	50	100	Tray		1,000	9.3	375	285	270
S15VB	Faston		4000	50	100	Tray		500	9.0	415	285	180
S25VB			4000	60	60	Bulk		300	7.0	335	205	165
S50VB			4000	50	50	Tray	200	200	6.2	335	205	165
S3WB	THD		5000	50	100	Tray		1,000	6.1	315	285	220
S10WB			5000	50	100	Tray		1,000	9.3	375	285	270
S15WB			5000	50	100	Tray		1,000	15.1	415	285	300
S20WB			5000	50	100	Tray		700	15.0	415	285	300
D30VC	Faston		4000	50	100	Tray		500	7.0	375	285	160
SVT			4000	(45)	200	Bulk	200	200	6.2	335	205	165
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

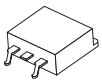
＊1: MOSFETs　　＊2: Diodes

Code No. (Taping)

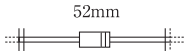
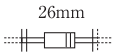
SMD

Spec Code	Outline		Reel diameter (ϕ)	Quantity
3072	HSOP28		330	1,000
	HSOP40		330	1,000
	SSOP32		330	2,000
	LSSOP26		330	3,000

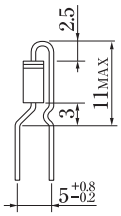
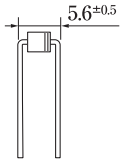
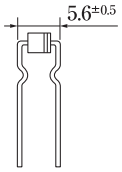
Spec Code	Outline		Reel diameter (ϕ)	Quantity
4062	MCP		255	300
4072			330	600
5063	1F		180	1,500
	2F		180	750
	M2F		180	1,000
5073	1F		330	7,500
	2F		330	3,000
	M2F		330	4,000
6063	M1F		180	2,500

Spec Code	Outline		Reel diameter (ϕ)	Quantity
7061	E-pack		250	1,500
7062	1Z		180	750
	1Y		250	1,000
	1N		250	1,000
	SOPA-4		180	1,000
	1W		330	1,000
	SOP8		180	1,000
7071	E-pack		330	3,000
7072	1Z		330	3,000
	1Y		330	2,000
	1W		380	2,000
	STO-220		330	1,000
	ZP		330	1,500

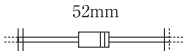
AX Ammo-Pack

Spec Code	Outline		Quantity
□060	AX057		4,000
	AX06		4,000
	AX078		2,000
	AX10		1,200
	AX14		1,200
□070	AX057		3,000
	AX06		3,000
	AX078		1,500

AX Radial-Taping

Spec Code	Outline		Quantity
□081	AX06		5,000
□083	AX057		3,000
□084	AX057		3,000

AX Reel

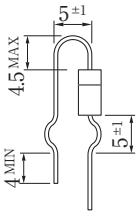
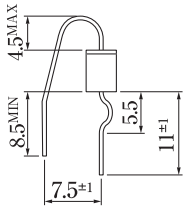
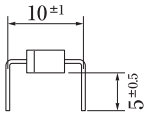
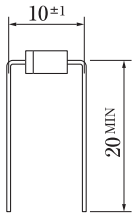
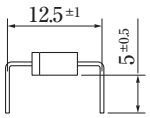
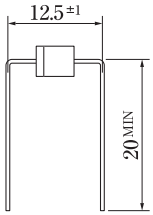
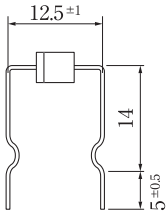
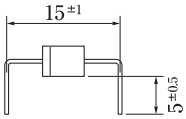
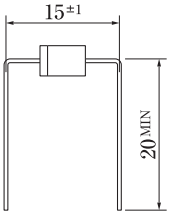
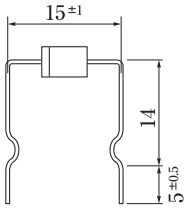
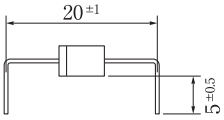
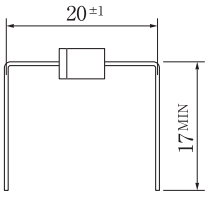
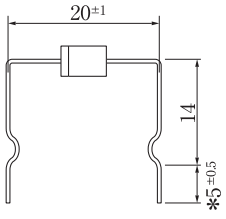
Spec Code	Outline		Reel diameter (ϕ)	Quantity
□061	AX06		300	4,000
	AX10		300	2,500
	AX14		300	2,500

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

Lead Forming

Axial type diode

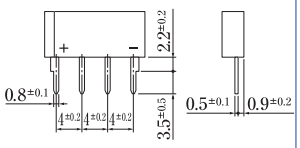
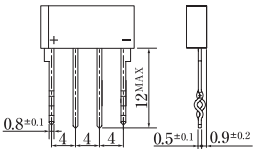
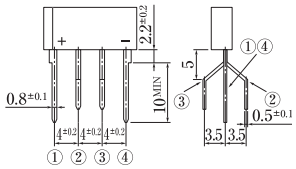
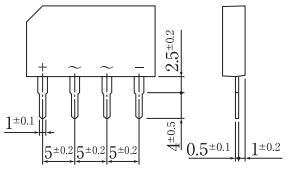
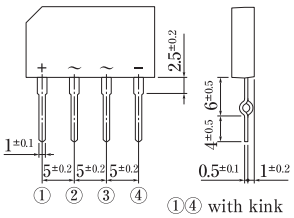
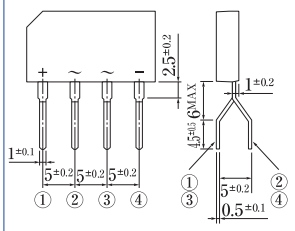
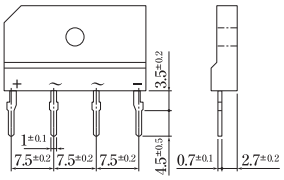
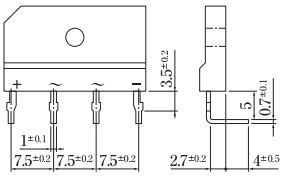
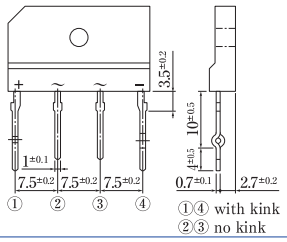
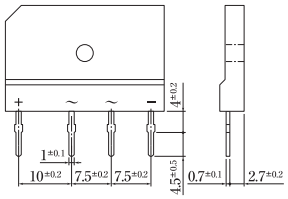
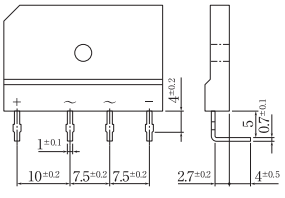
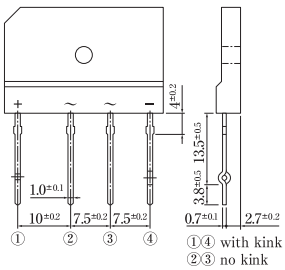
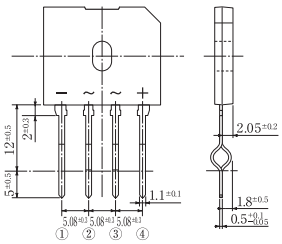
Standard forming types are configured using two codes, a spec code first and then the forming code.
Complete code example would be 5002P5. (As for details, please refer to the outline dimensions in each specification sheet.) [*Unit*:*mm*]

Forming Code \ Spec Code	Package	□001	□002	□003	□004
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 $5^{+0.5}_{-1.0}$ for AX14 products (ϕ 1.4mm)
The initial digit of the Spec Code varies. See the remarks to each product.

SIP Bridge Diodes

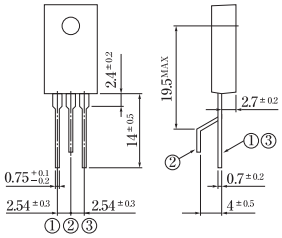
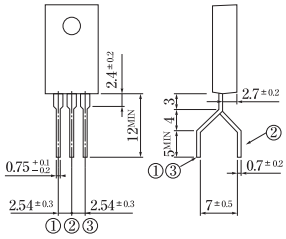
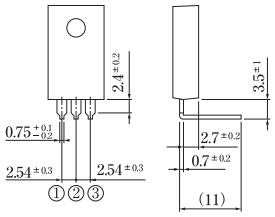
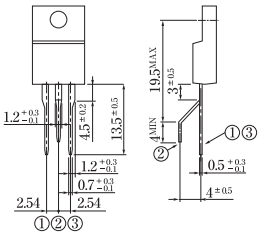
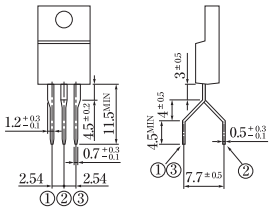
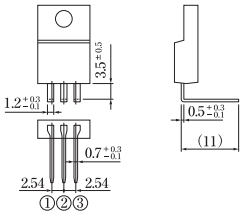
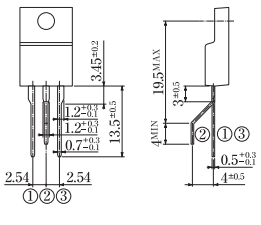
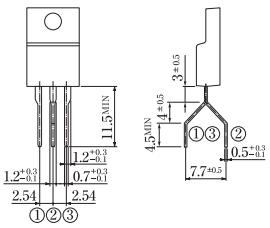
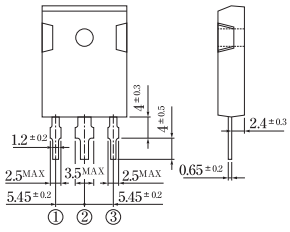
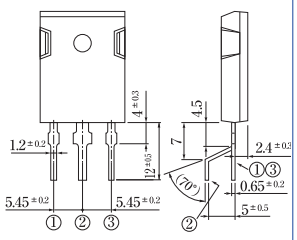
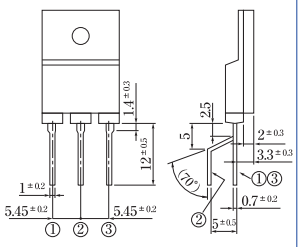
(As for details, please refer to the outline dimensions in each specification sheet.) [*Unit*:*mm*]

Spec Code / Package	7001 Short Lead	7002 L-Type Lead	7003 Outside Kink	7004 Zig-Zag Lead
1V				
2S				
3S				
5S				
D6K				

Lead Forming

Three Terminal diodes / MOSFETs

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

Spec Code / Package	7001	7012	7015	7022
ITO-220				
FTO-220				
FTO-220A				
MTO-3P				
ITO-3P				

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