

# 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	
	I <sub>o</sub>	I <sub>FSM</sub>	T <sub>stg</sub>	T <sub>j</sub>	V <sub>F1</sub>	I <sub>F1</sub>	V <sub>F2</sub>	I <sub>F2</sub>	V <sub>F3</sub>	I <sub>F3</sub>	Package	Fig.
	[mA]	[V]	[°C]	[°C]	[V]	[mA]	[V]	[mA]	[V]	[mA]		
VR-61F1 *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		
	I <sub>o</sub>	I <sub>FSM</sub>	T <sub>stg</sub>	T <sub>j</sub>	V <sub>F1</sub>	I <sub>F1</sub>	V <sub>F2</sub>	I <sub>F2</sub>	V <sub>F3</sub>	I <sub>F3</sub>	Package	Color Code	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	Orange	3
VR-60BP(A)	500	16			1.5		0.58±0.03	1	0.2			Orange	
VR-51B	150	7.5			1.8±0.25	1	2.1±0.25	10	2.4±0.25	70		*1	4
VR-61B(A)	150	7.5			2.3±0.25	1	2.75±0.25	10	3.1±0.25	70		*2	

\* 1: Silver-Silver      \* 2: Orange-Red  
 Spec Code 5□□□ (See page 44 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.

### Surface Mount



1F



2F



STO-220

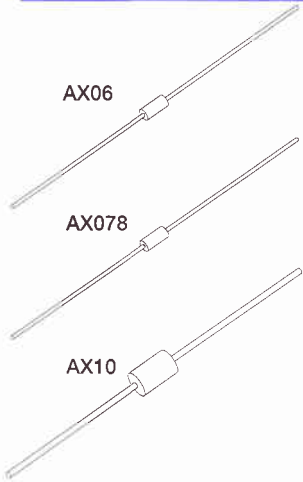
Type No.	Absolute Maximum Ratings				Electrical Characteristics						Outline				
	P <sub>PRSM</sub>	T <sub>stg</sub>	T <sub>j</sub>	V <sub>RM</sub> (max)	V <sub>BR</sub> (typ)	Conditions: I <sub>R</sub> [mA]	I <sub>R</sub> (max) [μA]	Conditions: V <sub>R</sub> [V]	r <sub>z</sub> (max) [%/°C]	V <sub>CL</sub> (max) [V]	Conditions: I <sub>PP</sub> [A]	Package	Fig.		
	[W]	[°C]	[°C]	[V]	[V]										
ST02D-170F2*	200	-40 to 150	150	145	170	1	5	145	—	280	0.75	2F	16-3		
ST03-58F1	300	-55 to 150	150	45	58			45	—	—	—	1F	13-2		
☆ST03-68F1		-55 to 175	175	58	68			58	—	100	3				
☆ST04-14F1	400	-55 to 175	175	12.4	14			12.4	—	22	16				
ST04-16F1	400	-55 to 175	175	13.6	16			13.6	—	23	15				
☆ST04-18F1	400	-55 to 175	175	15.3	18			15.3	—	26	15				
ST04-27F1	400	-55 to 175	175	23	27			23	—	37	10				
ST50V-27F	5000	-40 to 150	150	23	27			23	0.09	40	130			STO-220	36-4
ST70-27F	7000	-40 to 150	150	23	27			23	0.09	40	180			STO-220	36-6
DL04-18F1◎	400	-55 to 150	150	13	18			13	—	26	15			1F	14-2

☆: New product

◎: Bi-directional type

\*: Reverse blocking type

# Axial



Type No.	Absolute Maximum Ratings			Electrical Characteristics								Outline		
	PRSM [W]	Tstg [°C]	Tj [°C]	VRM (max) [V]	VBR (typ) [V]	IR		rz		VCL (max) [V]	Conditions IPP [A]	Package	Color Code	Fig.
						Conditions IR [mA]	(max) [μA]	Conditions VR [V]	(max) [%/°C]					
ST02D-82*	200	-40 to 150	150	67	82	1	5	67	—	118	1.7	AX078	Silver	5-2
☆ST02D-140*				120	145			120	—	200	0.75		Blue	
ST02D-170*				145	170			145	—	280	0.75		Red	
ST02D-200*				170	200			170	—	300	0.75		Yellow	
ST03D-82*	300	-40 to 150	150	67	82	1	5	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		Yellow	
ST04-16	400	-40 to 150	150	13.6	16	1	5	13.6	0.09	23	15	AX06	Silver	2-2
ST04-27				23	27			23	0.09	37	10			

☆: New product  
\*: Reverse blocking type

Spec Code 4□□□ (See page 44 for the last 3 digits of the Spec Code)

# Thyristor Surge Suppressors

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

# Surface Mount



Type No.	Absolute Maximum Ratings				Electrical Characteristics							Outline	
	ITSM [A]	Conditions [μS]	VDRM [V]	Tstg [°C]	Tj [°C]	VBO (min) [V]	VCL (max) [V]	IDRM (max) [μA]	IH		Cj (max) [pF]	Package	Fig.
									(min) [mA]	(max) [mA]			
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	40	10/1000	175	-40 to 125	125	180	250	10	175	100	30	2F	16-2
KP4L07			58			65	80	10	58	100	90		
KP4N12			100			110	135	10	100	100	50		
KU5N12			100			110	135	5	100	100	90		
KU5R29N	50	10/1000	250	-40 to 125	125	275	400	5	250	100	70	M2F	15-2
KP10L06			48			55	70	10	48	100	235		
KP10L07			58			65	80	10	58	100	180		
KU10L08			63			70	100	5	63	100	180		
KP10L08	100	10/1000	63	-40 to 125	125	75	100	10	63	100	180	M2F	15-2
KU10N14			120			125	195	5	120	100	140		
KP10N14			120			130	195	10	120	100	140		
☆KU10N16			140			145	200	5	140	100	150		
☆KU10R23N	150	10/1000	190	-40 to 125	125	200	260	5	190	100	90	M2F	15-2
KP10R25			190			220	290	10	190	100	90		
☆KU10R27N			220			230	300	5	220	100	70		
KU10R29N			250			275	400	5	250	100	90		
☆KU10S35N	150	10/1000	275	-40 to 125	125	310	450	5	275	100	90	M2F	15-2
KU10S40N			300			350	500	5	300	100	60		
KP15L08			63			70	100	10	63	100	180		
KU15N14			120			125	195	5	120	100	110		
KP15N14	150	10/1000	120	-40 to 125	125	125	195	10	120	100	200	2F	16-2
KP15R25			190			220	290	10	190	100	150		

☆: New product      \*: VBR  
KU: UL497B recognized File No. E183905

