SURGE ABSORBERS

Varistors

Surface Mount

Package		 5.0 × 2.5 × 2.0(mm)	 5.0 × 5.0 × 3.7(mm)	Remarks
		1F (DO-214AC similar)	1Y	
		Fig.14-1	Fig.21 *1	
V_{F2}(V)	2.75 ± 0.25	VR-61F1	VRYA6	
	6.875 ± 0.625		VRYA15	

*1:Only SMD package

■ 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.

Thyristor Surge Suppressors

Surface Mount

Package		 5.0 × 2.5 × 2.0(mm)	 5.1 × 3.75 × 2.0(mm)	 7.6 × 4.0 × 2.8(mm)	Remarks
		1F (DO-214AC similar)	M2F (DO-214AA similar)	2F	
		Fig.14-3	Fig.15-2	Fig.16-4	
Series		KL series	KU series	KP series	
Off-state Voltage (V)	5	KL3Z07			
	15	KL3Z18			
	58	KL3L07			
	63		KU10L08		
	90		N KU10NU11		
	92			N KP40NU11	
	100		KU4F8 KU4F12		
	120	KL3N14	KU10N14 KU15N14		
	175	KL3R20			
	180			N KP40RU22	
	190		KU10R23NS		
	220		KU10R27NS		
	250		KU10R29NS		
	275		KU5S31NS KU10S31NS KU10S35NS		

■ 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.	Spec. Code	Absolute Maximum Ratings				Electrical Characteristics						Remarks
		Io [mA]	IFSM [A]	Tstg [℃]	Tj [℃]	VF1 [V]	Conditions IF1 [mA]	VF2 [V]	Conditions IF2 [mA]	VF3 [V]	Conditions IF3 [mA]	
VR-61F1 *2	-5053	370	7.5	-55 to 150	150	2.3±0.25	1	2.75±0.25	10	3.1±0.25	70	
VRYA6 *3	-7072	310	8	-30 to 125	125	2.3±0.25	1	2.75±0.25	10	3.1±0.25	70	
VRYA15 *3	-7072	140	6.5	-30 to 125	125	5.75±0.62	1	6.875±0.625	10	7.75±0.62	70	

*2: On alumina substrate.
*3: On alumina substrate, 1 element operation. 2 elements in parallel.

Surge absorbers are semiconductor devices of the Thyristor type that turns on when triggered by their rated voltage.
They are commonly used for lightning surge protection in communications equipment.

Surface Mount

Type No.	Spec. Code	Absolute Maximum Ratings					Electrical Characteristics							Remarks
		ITSM [A]	Conditions [μs]	VDRM [V]	Tstg [℃]	Tj [℃]	VBO (min) [V]	VCL (max) [V]	IDRM (max) [μA]	IDSM (max) [μA]	Conditions VD [V]	IH (min) [mA]	Cj (max) [pF]	
KL3Z07	-5053	30	10/1000	5	-40 to 125	125	5.5 *1	–	10	–	5	50	–	
KL3Z18	-5053	30	10/1000	15	-40 to 125	125	15.5 *1	–	10	–	15	50	–	
KL3L07	-5053	30	10/1000	58	-40 to 125	125	65	80	10	–	58	100(150) *2	90	
KL3N14	-5053	30	10/1000	120	-40 to 125	125	130	195	10	–	120	100(150) *2	50	
KL3R20	-5053	30	10/1000	175	-40 to 125	125	180	250	10	–	175	100(150) *2	30	
KU10L08	-5063	100	10/1000	63	-40 to 125	125	70	100	5	–	63	100(150) *2	180	Ⓡ
N KU10NU11	-5063	100	10/1000	60	-40 to 125	125	100	125	–	5	90	150	–	
KU4F8	-5063	40	10/1000	70	-40 to 125	125	75	–	10	–	70	100	100	
KU4F12	-5063	40	10/1000	100	-40 to 125	125	110	–	10	–	100	100	100	
KU10N14	-5063	100	10/1000	120	-40 to 125	125	125	195	5	–	120	100(150) *2	140	Ⓡ
KU15N14	-5063	150	10/1000	120	-40 to 125	125	125	195	5	–	120	100(150) *2	110	Ⓡ
KU10R23NS	-5063	100	10/1000	190	-40 to 125	125	–	290	5	–	190	100(150) *2	90	
KU10R27NS	-5063	100	10/1000	220	-40 to 125	125	–	320	5	–	220	100(150) *2	70	Ⓡ
KU10R29NS	-5063	100	10/1000	250	-40 to 125	125	–	400	5	–	250	100(150) *2	70	Ⓡ
KU5S31NS	-5063	50	10/1000	275	-40 to 125	125	–	420	5	–	275	150	70	
KU10S31NS	-5063	100	10/1000	275	-40 to 125	125	–	420	5	–	275	100(150) *2	90	Ⓡ
KU10S35NS	-5063	100	10/1000	275	-40 to 125	125	–	450	5	–	275	100(150) *2	90	
N KP40NU11	-5073	500	10/700	60	-40 to 125	125	100	130	–	5	92	150	485 *3	
N KP40RU22	-5073	500	10/700	60	-40 to 125	125	195	250	–	5	180	100	285 *3	

N : New product *1 : VBR *2 : 150mA available *3 : typ.
Ⓡ : UL497B recognized (UL File No. E183905)

THYRISTOR

Thyristor

Surface Mount

Package		 10.0 × 6.6 × 2.3(mm)		Remarks
		FB (TO-252AA)		
		Fig.99-2		
IT(AV)(A)		3	5	
VDRM(V)	400	N KC3FB40H	N KC5FB40H	
	600		N KC5FB60H N KC5FB60HR	

SIDAC K1V series (Bi-directional)

Package		 5.0 × 2.5 × 2.0(mm)	5.0 × ϕ 2.6(mm)	 7.0 × ϕ 4.4(mm)		Remarks
		1F (DO-214AC similar)	AX06	AX10		
		Fig.14-3	Fig.2-1	Fig.6-3	Fig.7	
VDRM(V)	5	K1VZL09				
	15	K1VZL20				
	40			K1V5 K1V6		
	90		K1V(A)10 K1V(A)11 K1V(A)12	K1V10 K1V11 K1V12		
	115		K1V(A)16	K1V14		
	180			K1V22 K1V24 K1V26	K1V22(W) K1V24(W) K1V26(W)	
	270				K1V36(W) K1V38(W)	

■ 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.

The Thyristor, in its normal state, will block an applied voltage in either direction, but when an appropriate current pulse is applied to the gate, current will flow through the anode to the cathode thus turning on power to the load circuit.
The Thyristor has a planar passivation, and is available in both the general reverse-blocking type and the type without reverse voltage.
The Thyristor without reverse voltage is suitable for a circuit limiting inrush current.

Surface Mount

Type No.	Spec. Code	Absolute Maximum Ratings								Electrical Characteristics										Remarks
		V_{DRM} [V]	V_{RRM} [V]	$I_{T(AV)}$ [A]	Conditions Tc [℃]	I_{TSM} *1 [A]	Conditions f [Hz]	Tstg [℃]	Tj [℃]	I_{DRM} (max) [μA]	Conditions V_D [V]	I_{RRM} (max) [μA]	Conditions V_R [V]	V_{TM} (max) [V]	Conditions I_{TM} [A]	V_{GT} (max) [V]	I_{GT} (max) [μA]	IH [mA]	θjc (max) [℃/W]	
N KC3FB40H	-5071	400	400	3	111	40	50	-55 to 150	-40 to 125	50	400	50	400	1.4	4	0.8	100	max 5	3	
N KC5FB40H	-5071	400	400	5	101	65	50	-55 to 150	-40 to 125	100	400	100	400	1.6	10	0.8	200	typ 1	3	
N KC5FB60H	-5071	600	600	5	98	90	60	-55 to 150	-40 to 125	10	600	10	600	1.8	15	0.8	100	max 5	3	
N KC5FB60HR	-5071	600	–	5	98	90	60	-40 to 125	125	10	600	–	–	1.8	15	0.8	100	max 5	3	

N : New product *1 : non-repetitive

SIDACs are semiconductor devices energized by the addition of a specific voltage.
They are commonly used for switching devices or pulse generating devices.

Surface Mount

Type No.	Spec. Code	Absolute Maximum Ratings						Electrical Characteristics								Remarks
		V_{DRM} [V]	I_T [A]	Conditions Tl [℃]	Tstg [℃]	Tj [℃]	V_{BO} [V]	I_{DRM} (max) [μA]	Conditions V_D [V]	I_{BO} (max) [mA]	I_H (max) [mA]	V_T (max) [V]	Conditions I_T [A]	θjl (max) [℃/W]		
K1VZL09	-5053	5	0.5	110	-40 to 125	125	8 to 12	5	5	20	20	1.2	0.5	23		
K1VZL20	-5053	15	0.5	110	-40 to 125	125	18 to 22	5	15	20	20	1.2	0.5	23		

Axial

Type No.	Spec. Code	Absolute Maximum Ratings									Electrical Characteristics										Remarks
		V_{DRM} [V]	I_T [A]	Conditions Tl [℃]	I_{TSM} [A]	I_{TRM} [A]	Conditions f [Hz]	diT/dt [A/μs]	Tstg [℃]	Tj [℃]	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]	Rs (min) [kΩ]	θjl (max) [℃/W]	
K1V(A)10	-7061	90	1	109	16	60	60	50	-40 to 125	125	95 to 113	10	90	0.5	50	1.6	1	0.1	20	
K1V(A)11	-7061	90	1	109	16	60	60	50	-40 to 125	125	104 to 118	10	90	0.5	50	1.6	1	0.1	20	
K1V(A)12	-7061	90	1	109	16	60	60	50	-40 to 125	125	110 to 125	10	90	0.5	50	1.6	1	0.1	20	
K1V(A)16	-7061	115	1	98	16	60	60	50	-40 to 125	125	145 to 170	10	115	0.5	50	1.6	1	0.1	20	
K1V5	-7061	40	1	107	13	80	60	80	-40 to 125	125	45 to 60	10	40	0.5	50	1.5	1	0.1	15	
K1V6	-7061	40	1	107	13	80	60	80	-40 to 125	125	55 to 65	10	40	0.5	50	1.5	1	0.1	15	
K1V10	-7061	90	1	112	20	80	60	80	-40 to 125	125	95 to 113	10	90	0.5	50	1.5	1	0.1	15	
K1V11	-7061	90	1	112	20	80	60	80	-40 to 125	125	104 to 118	10	90	0.5	50	1.5	1	0.1	15	
K1V12	-7061	90	1	112	20	80	60	80	-40 to 125	125	110 to 125	10	90	0.5	50	1.5	1	0.1	15	
K1V14	-7061	115	1	109	20	80	60	80	-40 to 125	125	125 to 150	10	115	0.5	30	1.5	1	0.1	15	
K1V22	-7061	180	1	108	20	50	60	80	-40 to 125	125	200 to 230	10	180	0.5	20	1.5	1	0.1	15	
K1V24	-7061	180	1	108	20	50	60	80	-40 to 125	125	220 to 250	10	180	0.5	20	1.5	1	0.1	15	
K1V26	-7061	180	1	108	20	50	60	80	-40 to 125	125	240 to 270	10	180	0.5	20	1.5	1	0.1	15	
K1V22(W)	-7061	180	1	. 91	16	50	60	80	-40 to 125	125	200 to 230	10	180	0.5	50	3	1	0.1	15	
K1V24(W)	-7061	180	1	91	16	50	60	80	-40 to 125	125	220 to 250	10	180	0.5	50	3	1	0.1	15	
K1V26(W)	-7061	180	1	91	16	50	60	80	-40 to 125	125	240 to 265	10	180	0.5	50	3	1	0.1	15	
K1V36(W)	-7061	270	1	92	13	40	60	50	-40 to 125	125	340 to 380	10	270	0.5	50	3	1	0.1	15	
K1V38(W)	-7061	270	1	92	13	40	60	80	-40 to 125	125	360 to 400	10	270	0.5	50	3	1	0.1	15	

THYRISTOR

SIDAC G1V series (Uni-directional)

Package		 5.0 × 2.5 × 2.0(mm)	 5.0 × ϕ 2.6(mm)	 5.0 × ϕ 4.0(mm)	Remarks
		1F (DO-214AC similar)	AX06	AX078	
		Fig.13-3	Fig.2-3	Fig.5-3	
$V_{DRM(A)}$ (V)	70	G1VL8C	G1V(A)8C		
	90	G1VL10C	G1V(A)10C		
	100		G1V(A)12C		
	110		G1V(A)13C		
	115		G1V(A)15C		
	120	G1VL15C	G1V(A)14C		
	170	G1VL20C	G1V(A)20C	G1V(B)20C	
	190	G1VL22C G1VL24C		G1V(B)22C	
	210			G1V(B)24C	

■ 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.

SIDACs are semiconductor devices energized by the addition of a specific voltage.
They are commonly used for switching devices or pulse generating devices.

Surface Mount

Type No.	Spec. Code	Absolute Maximum Ratings								Electrical Characteristics									Remarks
		$V_{DRM(A)}$ [V]	I_T [A]	Conditions Tl [℃]	I_{TRM} [A]	Conditions f [Hz]	diT/dt [A/μs]	Tstg [℃]	Tj [℃]	$V_{BO(A)}$ [V]	$I_{DRM(A)}$ (max) [μA]	Conditions V_D [V]	$I_{BO(A)}$ (max) [mA]	$I_{H(A)}$ $I_{H(K)}$ (typ) [mA]	$V_{T(A)}$ $V_{T(K)}$ (max) [V]	Conditions I_T [A]	$R_{S(A)}$ (min) [kΩ]	θjl (max) [℃/W]	
G1VL8C	-5053	70	1	98	80	60	150	-40 to 125	125	75 to 90	10	70	1	100	1.5	1	0.1	23	
G1VL10C	-5053	90	1	98	150	60	150	-40 to 125	125	95 to 110	10	90	0.5	100	1.5	1	0.1	23	
G1VL15C	-5053	120	1	98	120	60	150	-40 to 125	125	142 to 157	10	120	0.5	60	1.5	1	0.1	23	
G1VL20C	-5053	170	1	98	120	60	150	-40 to 125	125	190 to 210	10	170	0.5	60	1.5	1	0.1	23	
G1VL22C	-5053	190	1	98	280	5	150	-40 to 125	125	210 to 230	10	190	0.5	60	1.5	1	0.1	23	
G1VL24C	-5053	190	1	98	280	5	150	-40 to 150	150	230 to 250	10	190	0.5	60	1.5	1	0.1	23	

Axial

Type No.	Spec. Code	Absolute Maximum Ratings								Electrical Characteristics									Remarks
		$V_{DRM(A)}$ [V]	I_T [A]	Conditions Tl [℃]	I_{TRM} [A]	Conditions f [Hz]	diT/dt [A/μs]	Tstg [℃]	Tj [℃]	$V_{BO(A)}$ [V]	$I_{DRM(A)}$ (max) [μA]	Conditions V_D [V]	$I_{BO(A)}$ (max) [mA]	$I_{H(A)}$ $I_{H(K)}$ (typ) [mA]	$V_{T(A)}$ $V_{T(K)}$ (max) [V]	Conditions I_T [A]	$R_{S(A)}$ (min) [kΩ]	θjl (max) [℃/W]	
G1V(A)8C	-7061	70	1	98	80	60	80	-40 to 125	125	75 to 90	10	70	1	100	1.5	1	0.1	20	
G1V(A)10C	-7061	90	1	98	80	60	80	-40 to 125	125	95 to 110	10	90	0.5	60	1.5	1	0.1	20	
G1V(A)12C	-7061	100	1	98	80	60	80	-40 to 125	125	110 to 130	10	100	0.5	60	1.5	1	0.1	20	
G1V(A)13C	-7061	110	1	98	80	60	80	-40 to 125	125	120 to 138	10	110	0.5	60	1.5	1	0.1	20	
G1V(A)14C	-7061	120	1	98	80	60	80	-40 to 125	125	130 to 150	10	120	0.5	60	1.5	1	0.1	20	
G1V(A)15C	-7061	115	1	98	80	60	80	-40 to 125	125	142 to 157	10	115	0.5	60	1.5	1	0.1	20	
G1V(A)20C	-7061	170	1	98	80	60	80	-40 to 125	125	190 to 210	10	170	0.5	60	1.5	1	0.1	20	
G1V(B)20C	-7060	170	1	102	120	60	220	-40 to 150	150	190 to 210	10	170	0.5	60	1.5	1	0.1	17	
G1V(B)22C	-7060	190	1	102	160	60	220	-40 to 125	125	210 to 230	10	190	0.5	60	1.5	1	0.1	17	
G1V(B)24C	-7060	210	1	102	120	60	220	-40 to 150	150	230 to 250	10	210	0.5	60	1.5	1	0.1	17	