

1.5KE SERIES

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1.5KE SERIES

1500W Axial Lead Transient Voltage Suppressors - 6.8V-440V

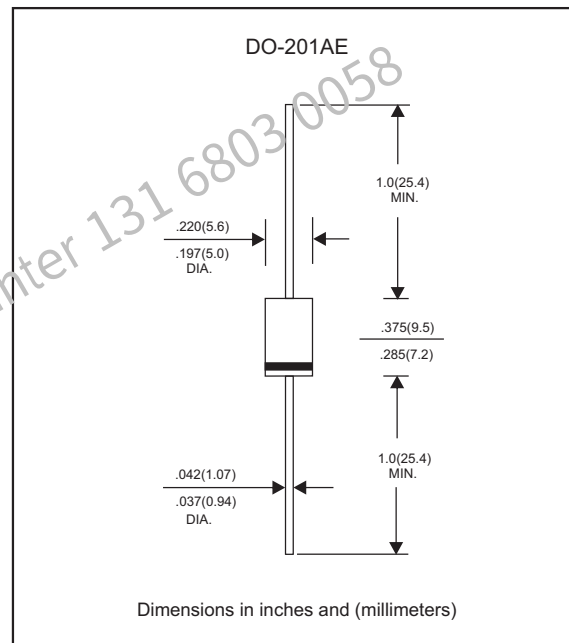
Features

- Axial lead type devices for through hole design.
- 1500W peak pulse power capability with a 10/1000us waveform, repetition rate (duty cycle): 0.05%.
- Excellent clamping capability.
- Low incremental surge resistance.
- Fast response time from 0V to VBR, typically less than 1pS for uni-directional & 5 nS for bi-directional types.
- Ultra high-speed switching.
- Glass passivated chip junction.
- Lead-free parts meet environmental standards of MIL-STD-19500 /228
- Suffix "-H" indicates Halogen free parts, ex: 1.5KE6.8A-H

Mechanical data

- Epoxy : UL94-V0 rated flame retardant
- Case : Molded plastic, DO-201AE
- Lead : Axial leads, solderable per MIL-STD-202, Method 208 guaranteed
- Polarity: Color band denotes cathode end
- Mounting Position : Any
- Weight : Approximated 1.20 gram

Package outline



Maximum ratings (AT $T_A=25^\circ\text{C}$ unless otherwise noted)

PARAMETER	CONDITIONS	Symbol	1.5KE series	UNIT
Peak power dissipation	with a 10/1000us waveform, note 1 & fig.1	P_{PPM}	1500	W
Peak pulse current	with a 10/1000us waveform, note 1 & fig.1	I_{PPM}	See Table 1	A
Steady state power dissipation	at $T_L=75^\circ\text{C}$, lead length 0.375"(9.5mm)	$P_{M(AV)}$	6.5	W
Peak forward surge current	8.3ms single half sine-wave superimposed on rated load(JEDEC Mthod), note 2	I_{FSM}	200	A
Maximum instantaneous forward voltage	at 100A for Uni-Directional types only, note 3	V_F	3.5/5.0	V
Operating temperature		T_J	-55~+150	$^\circ\text{C}$
Storage temperature		T_{STG}	-65~+175	$^\circ\text{C}$

Note 1. Non-repetitive current pulse, per Fig. 3 and derated above $T_A=25^\circ\text{C}$ per Fig. 2

2. Measured on 8.3 mS single half sine-wave or equivalent square wave, duty cycle=4 pulses per minute maximum

3. $V_F=3.5\text{V}$ max. for devices of $V_{BR}<200\text{V}$, and $V_F=5.0\text{V}$ max. for devices of $V_{BR}>201\text{V}$

Electrical characteristics (at T_A=25°C unless otherwise noted)

Table 1

Part No.	Absolute Maximum Rating(T _A = 25°C)					Electricity Characteristics(T _A = 25°C)		
	V _{RWM}	V _{BR Min}	V _{BR Max}	I _T	I _{FSM}	Max. V _C @I _{PPM}		Max. I _R @V _{RWM}
	Volts	Volts	Volts	mA	(A)@8.3ms	Volts	I _{PPM} (A)	
1.5KE6.8(C)A	5.80	6.45	7.14	10	200	10.8	139.0	1000
1.5KE7.5(C)A	6.40	7.13	7.88	10	200	11.3	132.0	500
1.5KE8.2(C)A	7.02	7.79	8.61	10	200	12.1	124.0	200
1.5KE9.1(C)A	7.78	8.65	9.55	1.0	200	13.4	112.0	50
1.5KE10(C)A	8.55	9.50	10.5	1.0	200	14.5	103.0	10
1.5KE11(C)A	9.40	10.5	11.6	1.0	200	15.6	96.0	5
1.5KE12(C)A	10.2	11.4	12.6	1.0	200	16.7	90.0	5
1.5KE13(C)A	11.1	12.4	13.7	1.0	200	18.2	82.0	5
1.5KE15(C)A	12.8	14.3	15.8	1.0	200	21.2	71.0	5
1.5KE16(C)A	13.6	15.2	16.8	1.0	200	22.5	67.0	5
1.5KE18(C)A	15.3	17.1	18.9	1.0	200	25.5	59.5	5
1.5KE20(C)A	17.1	19.0	21.0	1.0	200	27.7	54.0	5
1.5KE22(C)A	18.8	20.9	23.1	1.0	200	30.6	49.0	5
1.5KE24(C)A	20.5	22.8	25.2	1.0	200	33.2	45.0	5
1.5KE27(C)A	23.1	25.7	28.4	1.0	200	37.5	40.0	5
1.5KE30(C)A	25.6	28.5	31.5	1.0	200	41.4	36.0	5
1.5KE33(C)A	28.2	31.4	34.7	1.0	200	45.7	33.0	5
1.5KE36(C)A	30.8	34.2	37.8	1.0	200	49.9	30.0	5
1.5KE39(C)A	33.3	37.1	41.0	1.0	200	53.9	28.0	5
1.5KE43(C)A	36.8	40.9	45.2	1.0	200	59.3	25.3	5
1.5KE47(C)A	40.2	44.7	49.4	1.0	200	64.8	23.2	5
1.5KE51(C)A	43.6	48.5	53.6	1.0	200	70.1	21.4	5
1.5KE56(C)A	47.8	53.2	58.8	1.0	200	77.0	19.5	5
1.5KE62(C)A	53.0	58.9	65.1	1.0	200	85.0	17.7	5
1.5KE68(C)A	58.1	61.6	71.4	1.0	200	92.0	16.3	5
1.5KE75(C)A	64.1	71.3	78.8	1.0	200	103.0	14.6	5
1.5KE82(C)A	70.1	77.9	86.1	1.0	200	113.0	13.3	5
1.5KE91(C)A	77.8	86.5	95.5	1.0	200	125.0	12.0	5
1.5KE100(C)A	85.5	95.0	105.0	1.0	200	137.0	11.0	5
1.5KE110(C)A	94.0	105.0	116.0	1.0	200	152.0	9.9	5
1.5KE120(C)A	102.0	114.0	126.0	1.0	200	165.0	9.1	5
1.5KE130(C)A	111.0	124.0	137.0	1.0	200	179.0	8.4	5
1.5KE150(C)A	128.0	143.0	158.0	1.0	200	207.0	7.2	5
1.5KE160(C)A	136.0	152.0	168.0	1.0	200	219.0	6.8	5
1.5KE170(C)A	145.0	162.0	179.0	1.0	200	234.0	6.4	5
1.5KE180(C)A	154.0	171.0	189.0	1.0	200	246.0	6.1	5
1.5KE200(C)A	171.0	190.0	210.0	1.0	200	274.0	5.5	5
1.5KE220(C)A	185.0	209.0	231.0	1.0	200	328.0	4.6	5
1.5KE250(C)A	214.0	237.0	263.0	1.0	200	344.0	4.4	5
1.5KE300(C)A	256.0	285.0	315.0	1.0	200	414.0	3.6	5
1.5KE350(C)A	300.0	332.0	368.0	1.0	200	482.0	3.1	5
1.5KE400(C)A	342.0	380.0	420.0	1.0	200	548.0	2.7	5
1.5KE440(C)A	376.0	418.0	462.0	1.0	200	600.0	2.5	5

- Note 1. V_{BR} measured after I_T applied for 300iS, I_T=square wave pulse or equivalent
2. Surge current waveform per Fig. 3 and derated per Fig. 2
3. For bi-directional types having V_{RWM} of 10 volts and less, the I_R limit is doubled
4. Suffix 'C' denotes bi-directional devices. Suffix 'A' denotes 5% tolerance devices, no suffix denotes 10% tolerance devices.
5. All terms and symbols are consistent with ANS/IEEE C62.35

Rating and characteristic curves (1.5KE SERIES)

FIG.1 - PEAK PULSE POWER RATING CURVE

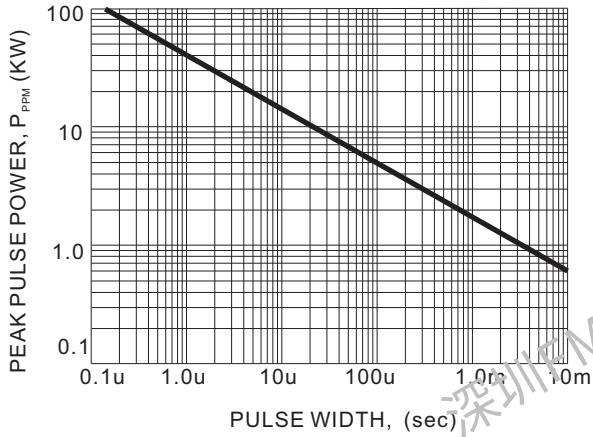


FIG.2 - PULSE DERATING CURVE

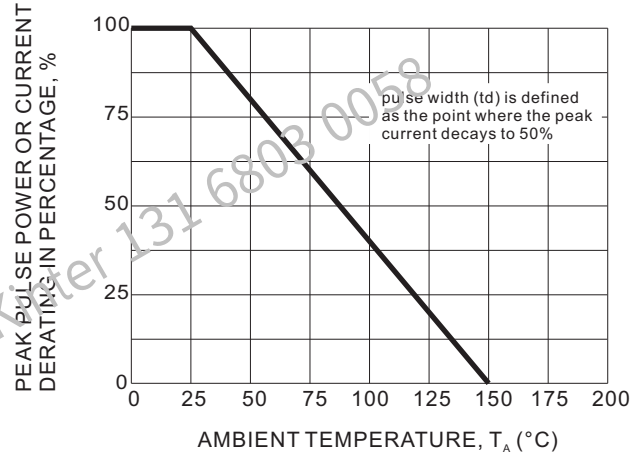


FIG.3 - PULSE WAVEFORM

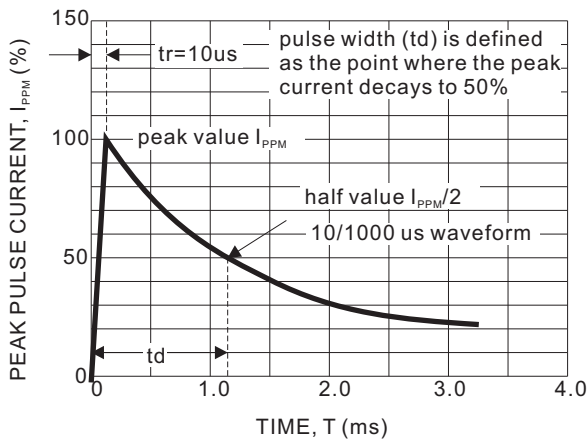


FIG.4 - TYPICAL JUNCTION CAPACITANCE

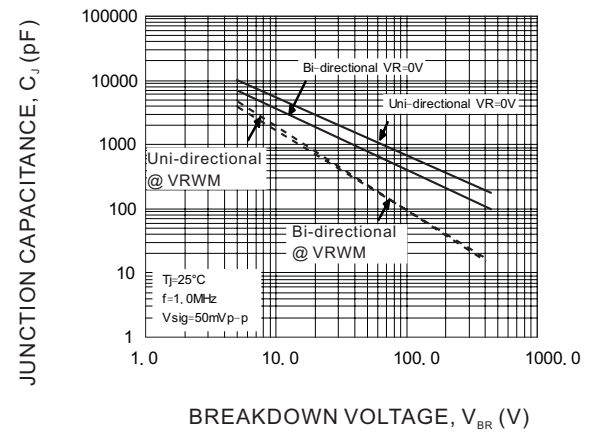


FIG.5 - STEADY STATE POWER DERATING CURVE

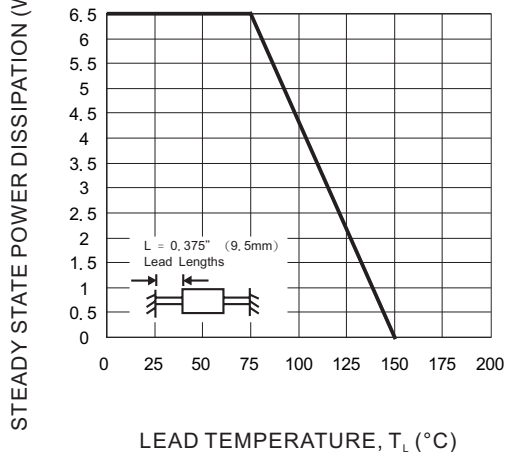
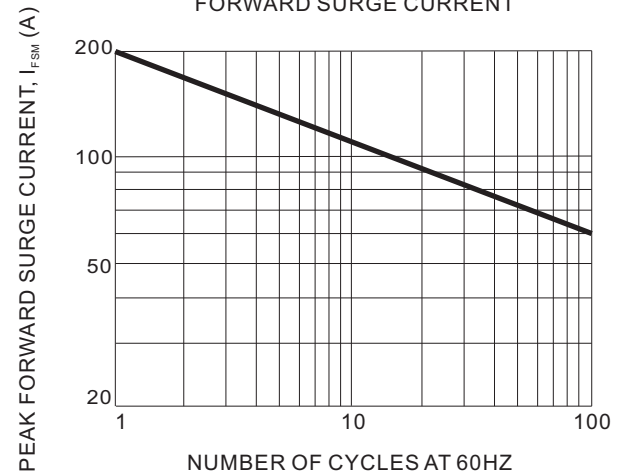


FIG.6 - MAXIMUM NON-REPETITIVE FORWARD SURGE CURRENT



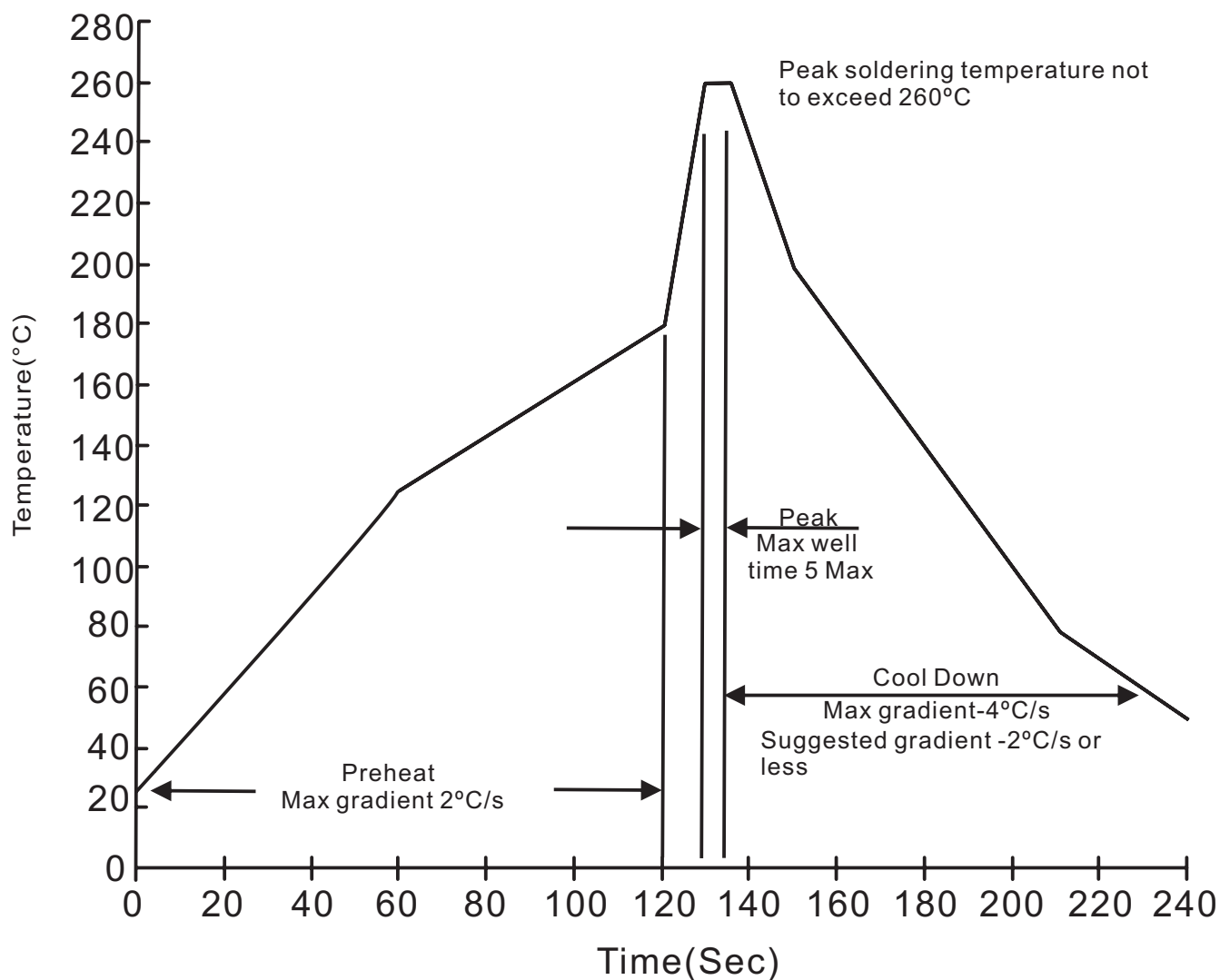
1.5KE SERIES

Pinning information

Pin	Simplified outline	Symbol
Uni-Directional Pin1 cathode Pin2 anode	1  2	
Bi-Directional		

Suggested thermal profiles for soldering processes

1. Lead free temperature profile wave-soldering



1.5KE SERIES

High reliability test capabilities

Item Test	Conditions	Reference
1. Solder Resistance	at $260\pm5^{\circ}\text{C}$ for $10\pm2\text{sec.}$ immerse body into solder $1/16''\pm1/32''$	MIL-STD-750D METHOD-2031
2. Solderability	at $245\pm5^{\circ}\text{C}$ for 5 sec.	MIL-STD-202F METHOD-208
3. Pull Test	1.5kg in axial lead direction for 10 sec.	MIL-STD-750D METHOD-2036
4. Bend Lead	1.5kg weight applied to each lead bending arc $90^{\circ}\pm5^{\circ}$ for 3 times.	MIL-STD-750D METHOD-2036
5. High Temperature Reverse Bias	V_{RWM} = 80% rate at $T_J=150^{\circ}\text{C}$ for 168 hrs.	MIL-STD-750D METHOD-1038
8. Pressure Cooker	$15P_{\text{SIG}}$ at $T_A=121^{\circ}\text{C}$ for 4 hrs.	JESD22-A102
7. Temperature Cycling	-55°C to $+125^{\circ}\text{C}$ dwelled for 30 min. and transferred for 5min. total 10 cycles.	MIL-STD-750D METHOD-1051
8. Thermal Shock	0°C for 5 min. rise to 100°C for 5 min. total 10 cycles.	MIL-STD-750D METHOD-1056
9. Humidity	at $T_A=85^{\circ}\text{C}$, RH=85% for 1000hrs.	MIL-STD-750D METHOD-1021
10. High Temperature Storage Life	at 175°C for 1000 hrs.	MIL-STD-750D METHOD-1031