

Description

The 1.5KE Automotive Series is designed specifically to protect sensitive electronic equipment from voltage transients induced by lightning and other transient voltage events.

Features

- Halogen-free
- Rohs compliant
- Typical maximum temperature coefficient
 $\Delta V_{BR} = 0.1\% \times V_{BR}@25^{\circ}\text{C} \times \Delta T$
- Glass passivated Chip junction in DO-201 package
- 1500W peak pulse capability at 10x1000µs waveform, repetition rate (duty cycles):0.01%
- Fast response time: typically less than 1.0ps from 0 Volts to BV min
- Excellent clamping capability
- Low incremental surge resistance
- Typical I_R less than 1µA above 11V
- High temperature soldering guaranteed: 260°C/40 seconds / 0.375", (9.5mm) lead length, 5lbs., (2.3kg) tension
- Plastic package has underwriters laboratory flammability classification 94v-0
- Matte Tin Lead-free plated

Applications

TVS devices are ideal for the protection of I/O interfaces, V_{CC} bus and other vulnerable circuits used in telecom, computer, industrial and consumer electronic applications.

Maximum Ratings And Characteristics ($T_A=25^{\circ}\text{C}$ unless otherwise noted)

Rating	Symbol	Value	Units
Peak Pulse Power Dissipation by 10x1000µs test waveform (Fig.1)(Note 1)	P_{PPM}	1500	Watts
Steady State Power Dissipation on infinite heat sink at $T_L=75^{\circ}\text{C}$ (Fig. 5)	P_D	6.5	Watts
Peak Forward Surge Current, 8.3ms Single Half Sine Wave Unidirectional only (Note 2)	I_{FSM}	200	Amps
Maximum Instantaneous Forward Voltage at 25A for Unidirectional only (Note 3)	V_F	3.5/5.0	V
Operating junction and Storage Temperature Range.	T_J, T_{STG}	-55°C to 175°C	°C
Typical Thermal Resistance Junction to Lead	R_{UJL}	15	°C/W
Typical Thermal Resistance Junction to Ambient	R_{UJA}	75	°C/W

Notes:

1. Non-repetitive current pulse, per Fig. 3 and derated above $T_A = 25^{\circ}\text{C}$ per Fig. 2.
2. Measured on 8.3ms single half sine wave or equivalent square wave, duty cycle=4 per minute maximum.
3. $V_F < 3.5\text{V}$ for devices of $V_{BR_} < 200\text{V}$ and $V_F < 5.0\text{V}$ for devices of $V_{BR_} > 201\text{V}$.

Electrical Characteristics

Type Number		Reverse Stand-Off Voltage	Breakdown Voltage Min. @I _T		Test Current	Maximum Clamping Voltage@I _{PP}	Peak Pulse Current	Reverse Leakage @V _{RWM}
(UNI)	(BI)		V _{RWM} (V)	V _{BR MIN.} (V)				
1.5KE6.8A	1.5KE6.8CA	5.80	6.45	7.14	10	10.5	144.8	1000
1.5KE7.5A	1.5KE7.5CA	6.40	7.13	7.88	10	11.3	134.5	500
1.5KE8.2A	1.5KE8.2CA	7.02	7.79	8.61	10	12.1	125.6	200
1.5KE9.1A	1.5KE9.1CA	7.78	8.65	9.50	1	13.4	113.4	50
1.5KE10A	1.5KE10CA	8.55	9.50	10.50	1	14.5	104.8	10
1.5KE11A	1.5KE11CA	9.40	10.50	11.60	1	15.6	97.4	1
1.5KE12A	1.5KE12CA	10.20	11.40	12.60	1	16.7	91.0	1
1.5KE13A	1.5KE13CA	11.10	12.40	13.70	1	18.2	83.5	1
1.5KE15A	1.5KE15CA	12.80	14.30	15.80	1	21.2	71.7	1
1.5KE16A	1.5KE16CA	13.60	15.20	16.80	1	22.5	67.6	1
1.5KE18A	1.5KE18CA	15.30	17.10	18.90	1	25.2	60.3	1
1.5KE20A	1.5KE20CA	17.10	19.00	21.00	1	27.7	54.9	1
1.5KE22A	1.5KE22CA	18.80	20.90	23.10	1	30.6	49.7	1
1.5KE24A	1.5KE24CA	20.50	22.80	25.20	1	33.2	45.8	1
1.5KE27A	1.5KE27CA	23.10	25.70	28.40	1	37.5	40.5	1
1.5KE30A	1.5KE30CA	25.60	28.50	31.50	1	41.4	36.7	1
1.5KE33A	1.5KE33CA	28.20	31.40	34.70	1	45.7	33.3	1
1.5KE36A	1.5KE36CA	30.80	34.20	37.80	1	49.9	30.5	1
1.5KE39A	1.5KE39CA	33.30	37.10	41.00	1	53.9	28.2	1
1.5KE43A	1.5KE43CA	36.80	40.90	45.20	1	59.3	25.6	1
1.5KE47A	1.5KE47CA	40.20	44.70	49.40	1	64.8	23.5	1
1.5KE51A	1.5KE51CA	43.60	48.50	53.60	1	70.1	21.7	1
1.5KE56A	1.5KE56CA	47.80	53.20	58.80	1	77.0	19.7	1
1.5KE62A	1.5KE62CA	53.00	58.90	65.10	1	85.0	17.9	1
1.5KE68A	1.5KE68CA	58.10	64.60	71.40	1	92.0	16.5	1
1.5KE75A	1.5KE75CA	64.10	71.30	78.80	1	103.0	14.8	1
1.5KE82A	1.5KE82CA	70.10	77.90	86.10	1	113.0	13.5	1
1.5KE91A	1.5KE91CA	77.80	86.50	95.50	1	125.0	12.2	1
1.5KE100A	1.5KE100CA	85.50	95.00	105.00	1	137.0	11.1	1
1.5KE110A	1.5KE110CA	94.00	105.00	116.00	1	152.0	10.0	1
1.5KE120A	1.5KE120CA	102.00	114.00	126.00	1	165.0	9.20	1
1.5KE130A	1.5KE130CA	111.00	124.00	137.00	1	179.0	8.50	1
1.5KE150A	1.5KE150CA	128.00	143.00	158.00	1	207.0	7.30	1
1.5KE160A	1.5KE160CA	136.00	152.00	168.00	1	219.0	6.60	1
1.5KE170A	1.5KE170CA	145.00	162.00	179.00	1	234.0	6.50	1
1.5KE180A	1.5KE180CA	154.00	171.00	189.00	1	246.0	6.20	1
1.5KE200A	1.5KE200CA	171.00	190.00	210.00	1	274.0	5.50	1
1.5KE220A	1.5KE220CA	185.00	209.00	231.00	1	328.0	4.60	1
1.5KE250A	1.5KE250CA	214.00	237.00	263.00	1	344.0	4.40	1
1.5KE300A	1.5KE300CA	256.00	285.00	315.00	1	414.0	3.70	1
1.5KE350A	1.5KE350CA	300.00	332.00	368.00	1	482.0	3.20	1
1.5KE400A	1.5KE400CA	342.00	380.00	420.00	1	548.0	2.80	1
1.5KE440A	1.5KE440CA	376.00	418.00	462.00	1	602.0	2.50	1
1.5KE480A	1.5KE480CA	408.00	456.00	504.00	1	658.0	2.30	1
1.5KE510A	1.5KE510CA	434.00	485.00	535.00	1	698.0	2.10	1
1.5KE530A	1.5KE530CA	450.00	503.50	556.50	1	725.0	2.10	1
1.5KE540A	1.5KE540CA	459.00	513.00	567.00	1	740.0	2.00	1
1.5KE550A	1.5KE550CA	467.00	522.50	577.50	1	760.0	2.00	1

For bidirectional type having V_R of 10 volts and less, the I_R limit is double.
 For parts without A, the V_{BR} is +10% and V_C is 5% higher than with A parts.

Ratings and Characteristic Curves ($T_A=25^\circ\text{C}$ unless otherwise noted)

Figure 1 - Peak Pulse Power Rating Curve

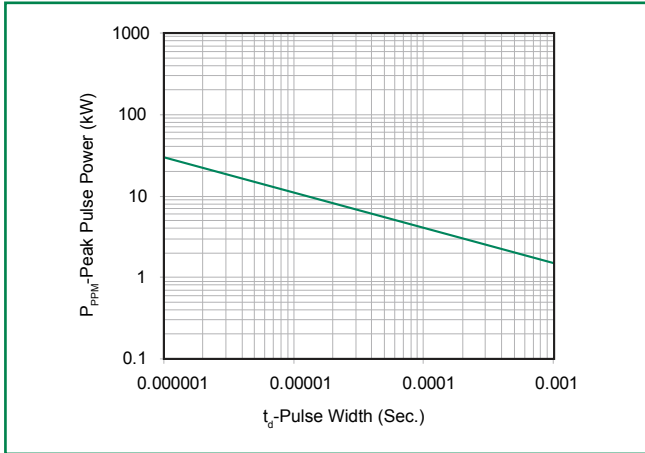


Figure 2 - Pulse Derating Curve

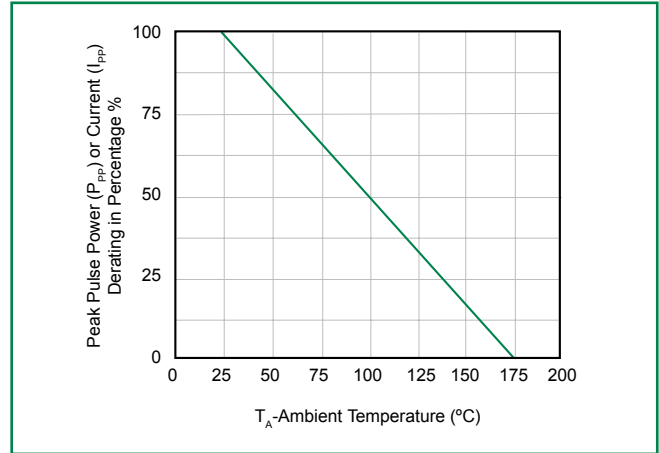


Figure 3 - Pulse Waveform

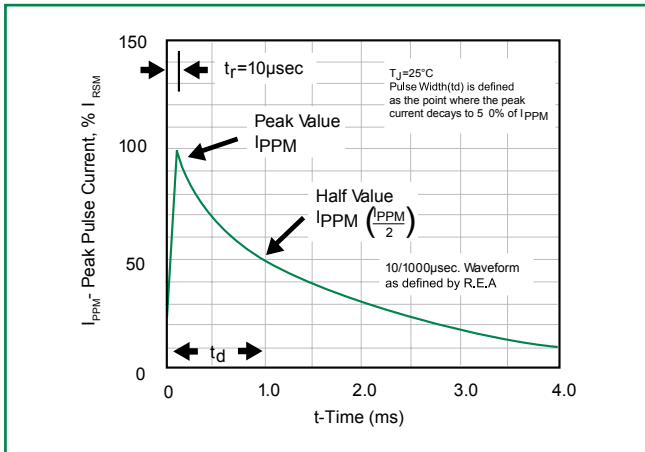


Figure 4 - Typical Junction Capacitance

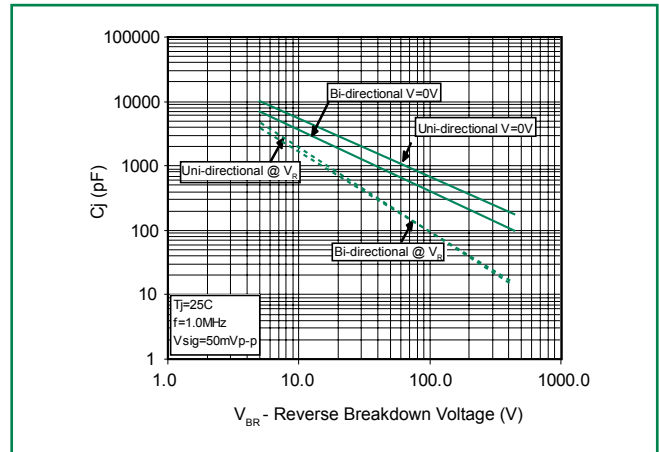


Figure 5 - Steady State Power Derating Curve

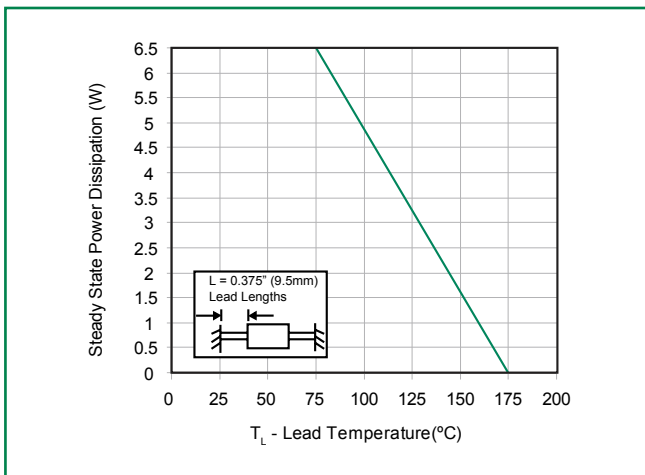
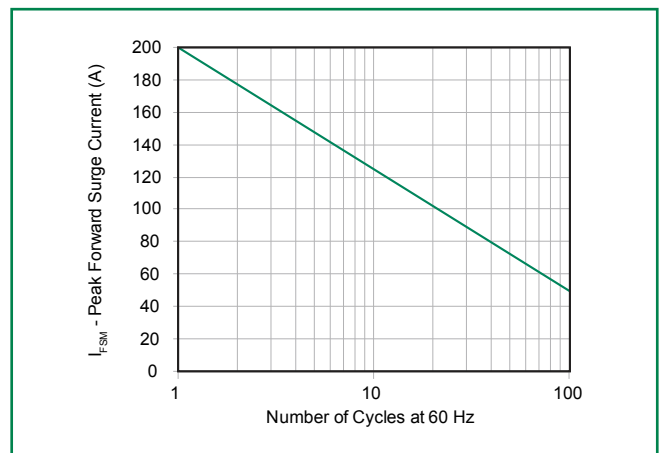
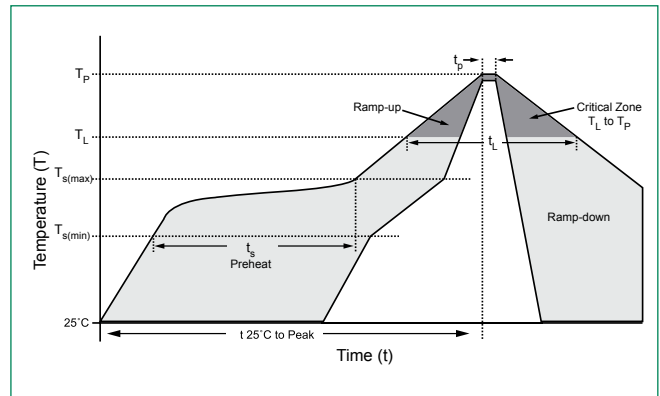


Figure 6 - Maximum Non-Repetitive Peak Forward Surge Current Uni-Directional Only



Soldering Parameters

Reflow Condition		Lead-free assembly
Pre Heat	- Temperature Min ($T_{s(min)}$)	150°C
	- Temperature Max ($T_{s(max)}$)	200°C
	- Time (min to max) (t_s)	60 – 180 secs
Average ramp up rate (Liquidus T_L to peak)		3°C/second max
$T_{s(max)}$ to T_L - Ramp-up Rate		3°C/second max
Reflow	- Temperature (T_L) (Liquidus)	217°C
	- Time (min to max) (t_s)	60 – 150 seconds
Peak Temperature (T_p)		260 ^{+0/-5} °C
Time within 5°C of actual peak Temperature (t_p)		20 – 40 seconds
Ramp-down Rate		6°C/second max
Time 25°C to peak Temperature (T_p)		8 minutes Max.
Do not exceed		280°C



Flow/Wave Soldering (Solder Dipping)

Peak Temperature :	265°C
Dipping Time :	10 seconds
Soldering :	1 time

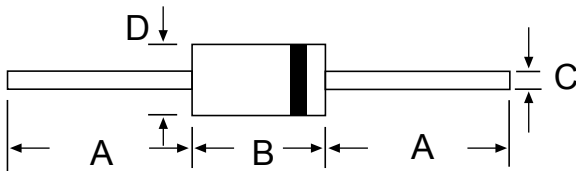
Physical Specifications

Weight	0.045oz., 1.2g
Case	JEDEC DO-201 molded plastic body over passivated junction.
Polarity	Color band denotes the cathode except Bipolar.
Terminal	Matte Tin axial leads, solderable per JESD22-B102D.

Environmental Specifications

Temperature Cycle	JESD22-A104
Pressure Cooker	JESD 22-A102
High Temp. Storage	JESD22-A103
HTRB	JESD22-A108
Thermal Shock	JESD22-A106

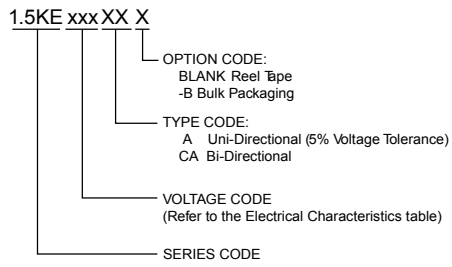
Dimensions



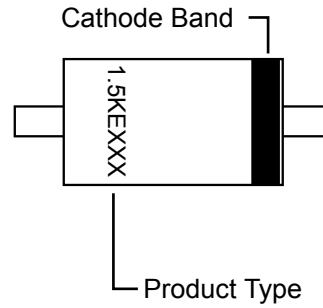
DO-201

Dimensions	Inches		Millimeters	
	Min	Max	Min	Max
A	1.000	-	25.40	-
B	0.285	0.375	7.20	9.50
C	0.038	0.042	0.96	1.07
D	0.190	0.210	4.80	5.30

Part Numbering System



Part Marking System



Packaging

Part Number	Component Package	Quantity	Packaging Option	Packaging Specification
1.5KExxxXX	DO-201	1000	Tape & Reel	EIA STD RS-296E
1.5KExxxXX-B	DO-201	500	BULK	Littelfuse Concord Packing Spec. DM-0016

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