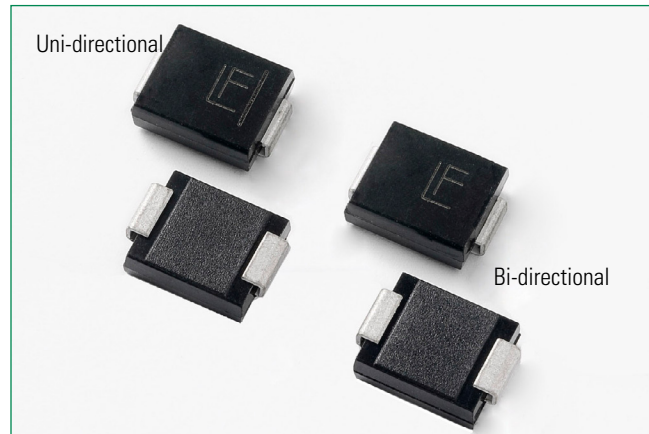


SZ3KASMC Series

Automotive, Surface Mount 3000 W in DO-214AB



Web Resources



Download ECAD models, order samples, and find technical resources at www.littelfuse.com

Agency Approvals

Agency	Agency File Number
	E128662

Maximum Ratings & Thermal Characteristics

Parameter	Symbol	Value	Unit
Peak Power Dissipation (Note 1) @ $T_L = 25^\circ\text{C}$, Pulse Width = 1 ms	P_{PPM}	3000	W
DC Power Dissipation @ $T_L = 75^\circ\text{C}$ Measured Zero Lead Length (Note 2) Derate Above 75°C	P_D	5.4 54.6	W $\text{mW}/^\circ\text{C}$
DC Power Dissipation (Note 3) @ $T_A = 25^\circ\text{C}$ Derate Above 25°C	P_D	2.0 13.3	W $\text{mW}/^\circ\text{C}$
Forward Surge Current (Note 4) @ $T_A = 25^\circ\text{C}$	I_{FSM}	200	A
Operating and Storage Temperature Range	T_J T_{stg}	-65 to +175	$^\circ\text{C}$
Thermal Resistance from Junction-to-Lead	$R_{\theta JL}$	75	$^\circ\text{C}/\text{W}$
Thermal Resistance from Junction-to-Ambient	$R_{\theta JA}$	18.3	$^\circ\text{C}/\text{W}$

Stresses exceeding maximum ratings may damage the device. Maximum ratings are stress ratings only. Functional operation above the recommended operating conditions is not implied. Extended exposure to stresses above the recommended operating conditions may affect device reliability.

1. 10 x 1000 μs , non-repetitive.
2. 1 in square copper pad, FR-4 board.
3. FR-4 board, using Littelfuse minimum recommended footprint
4. 1/2 sine wave (or equivalent square wave), PW = 8.3 ms, duty cycle = 4 pulses per minute maximum.

Description

The SZ3KASMC series is designed to protect voltage sensitive components from high voltage, high energy transients. They have excellent clamping capability, high surge capability, low zener impedance and fast response time. The SZ3KASMC series is supplied in cost-effective, highly reliable DO-214AB package and it is ideal for use in automotive electronic applications.

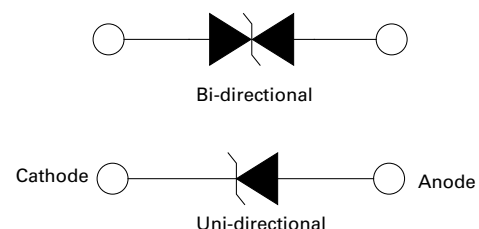
Features

- Automotive grade, AEC-Q101 qualified and PPAP capable
- Peak power – 3000 W @ 1 ms
- Working peak reverse voltage range – 5.0 V to 78 V for uni-directional and 10 V to 78 V for bi-directional
- Standard zener breakdown voltage range – 6.4 V to 95.8 V for uni-directional and 11.1 V to 95.8 V for bi-directional
- Compact design in DO-214AB package
- ESD protection of data lines in accordance with IEC 61000-4-2 30 kV (Air), 30 kV (Contact)
- ESD rating of class 3 (>16 kV) per human body model
- Zener transient overvoltage suppressors
- Excellent clamping capability
- $V_{BR} @ T_J = V_{BR} @ 25^\circ\text{C} \times (1 + \alpha T \times (T_J - 25))$ (αT : Temperature coefficient, typical value is 0.1%)
- Planar chip design with low leakage current performance
- Maximum temperature coefficient specified
- Response time is typically < 1 ns
- These components are Pb-free and are ROHS compliant
- UL recognized as an isolated loop circuit protector to UL 497B
- UL recognized compound meeting flammability rating V-0

Applications

TVS devices are ideal for the protection of I/O Interfaces, V_{CC} bus and other vulnerable circuits used in automotive application.

Functional Diagram



SZ3KASMC Series

Automotive, Surface Mount 3000 W in DO-214AB

Electrical Characteristics

Part Number (Uni)	Part Number (Bi)	Marking		Working Peak Reverse Voltage V_{RWM} (V) (note5)	Breakdown Voltage V_{BR} (V) @ I_T (note6)		Test Current I_T (mA)	Maximum Clamping Voltage V_C @ I_{PP} (note 7) (V)	Maximum Peak Pulse Current I_{PP} (A)	Maximum Reverse Leakage I_R @ V_R (μ A)	Agency Approval 
					Min	Max					
		Uni	Bi								
SZ3KASMC5.0AT3G		3DE		5.0	6.40	7.00	10	9.2	326.1	100	x
SZ3KASMC6.0AT3G		3DG		6.0	6.67	7.37	10	10.3	291.3	100	x
SZ3KASMC6.5AT3G		3DK		6.5	7.22	7.98	10	11.2	267.9	80	x
SZ3KASMC7.0AT3G		3DL		7.0	7.78	8.60	10	12.0	250.0	80	x
SZ3KASMC7.5AT3G		3DP		7.5	8.33	9.21	1	12.9	232.6	50	x
SZ3KASMC8.0AT3G		3DR		8.0	8.89	9.83	1	13.6	220.6	10	x
SZ3KASMC8.5AT3G		3DS		8.5	9.44	10.40	1	14.4	208.4	10	x
SZ3KASMC9.0AT3G		3DV		9.0	10.00	11.10	1	15.4	194.8	5	x
SZ3KASMC10AT3G	SZ3KASMC10CAT3G	3DX	3DXC	10	11.10	12.30	1	17.0	176.5	5	x
SZ3KASMC11AT3G	SZ3KASMC11CAT3G	3DZ	3DZC	11	12.20	13.50	1	18.2	164.8	5	x
SZ3KASMC12AT3G	SZ3KASMC12CAT3G	3EE	3EEC	12	13.30	14.70	1	19.9	150.8	2	x
SZ3KASMC13AT3G	SZ3KASMC13CAT3G	3EG	3EGC	13	14.40	15.90	1	21.5	139.5	2	x
SZ3KASMC14AT3G	SZ3KASMC14CAT3G	3EK	3EKC	14	15.60	17.20	1	23.2	129.3	1	x
SZ3KASMC15AT3G	SZ3KASMC15CAT3G	3EM	3EMC	15	16.70	18.50	1	24.4	123.0	1	x
SZ3KASMC16AT3G	SZ3KASMC16CAT3G	3EP	3EPC	16	17.80	19.70	1	26.0	115.4	1	x
SZ3KASMC17AT3G	SZ3KASMC17CAT3G	3ER	3ERC	17	18.90	20.90	1	27.6	108.7	1	x
SZ3KASMC18AT3G	SZ3KASMC18CAT3G	3ET	3ETC	18	20.00	22.10	1	29.2	102.8	1	x
SZ3KASMC20AT3G	SZ3KASMC20CAT3G	3EV	3EVC	20	22.20	24.50	1	32.4	92.6	1	x
SZ3KASMC22AT3G	SZ3KASMC22CAT3G	3EX	3EXC	22	24.40	26.90	1	35.5	84.5	1	x
SZ3KASMC24AT3G	SZ3KASMC24CAT3G	3EZ	3EZC	24	26.70	29.50	1	38.9	77.1	1	x
SZ3KASMC26AT3G	SZ3KASMC26CAT3G	3FE	3FEC	26	28.90	31.90	1	42.1	71.3	1	x
SZ3KASMC28AT3G	SZ3KASMC28CAT3G	3FG	3FGC	28	31.10	34.40	1	45.4	66.1	1	x
SZ3KASMC30AT3G	SZ3KASMC30CAT3G	3FK	3FKC	30	33.30	36.80	1	48.4	62.0	1	x
SZ3KASMC33AT3G	SZ3KASMC33CAT3G	3FM	3FMC	33	36.70	40.60	1	53.3	56.3	1	x
SZ3KASMC36AT3G	SZ3KASMC36CAT3G	3FP	3FPC	36	40.00	44.20	1	58.1	51.7	1	x
SZ3KASMC40AT3G	SZ3KASMC40CAT3G	3FR	3FRC	40	44.40	49.10	1	64.5	46.5	1	x
SZ3KASMC43AT3G	SZ3KASMC43CAT3G	3FT	3FTC	43	47.80	52.80	1	69.4	43.2	1	x
SZ3KASMC45AT3G	SZ3KASMC45CAT3G	3FV	3FVC	45	50.00	55.30	1	72.7	41.3	1	x
SZ3KASMC48AT3G	SZ3KASMC48CAT3G	3FX	3FXC	48	53.30	58.90	1	77.4	38.8	1	x
SZ3KASMC51AT3G	SZ3KASMC51CAT3G	3FZ	3FZC	51	56.70	62.70	1	82.4	36.4	1	x
SZ3KASMC54AT3G	SZ3KASMC54CAT3G	3GE	3GEC	54	60.00	66.30	1	87.1	34.4	1	x
SZ3KASMC58AT3G	SZ3KASMC58CAT3G	3GG	3GGC	58	64.40	71.20	1	93.6	32.1	1	x
SZ3KASMC60AT3G	SZ3KASMC60CAT3G	3GK	3GKC	60	66.70	73.70	1	96.8	31.0	1	x
SZ3KASMC64AT3G	SZ3KASMC64CAT3G	3GM	3GMC	64	71.10	78.60	1	103.0	29.2	1	x
SZ3KASMC70AT3G	SZ3KASMC70CAT3G	3GP	3GPC	70	77.80	86.00	1	113.0	26.6	1	x
SZ3KASMC75AT3G	SZ3KASMC75CAT3G	3GR	3GRC	75	83.30	92.10	1	121.0	24.8	1	x
SZ3KASMC78AT3G	SZ3KASMC78CAT3G	3GT	3GTC	78	86.70	95.80	1	126.0	23.8	1	x

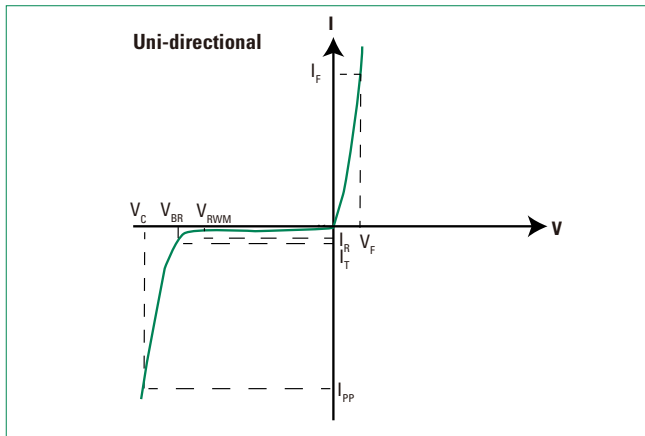
5. A transient suppressor is normally selected according to the maximum working peak reverse voltage (V_{RWM}), which should be equal to or greater than the DC or continuous peak operating voltage level.

6. V_{BR} measured at pulse test current I_T at an ambient temperature of 25 °C.

7. Surge current waveform per figure 2 and derate per figure 4 of the general data - 3000 watt at the beginning of this group.

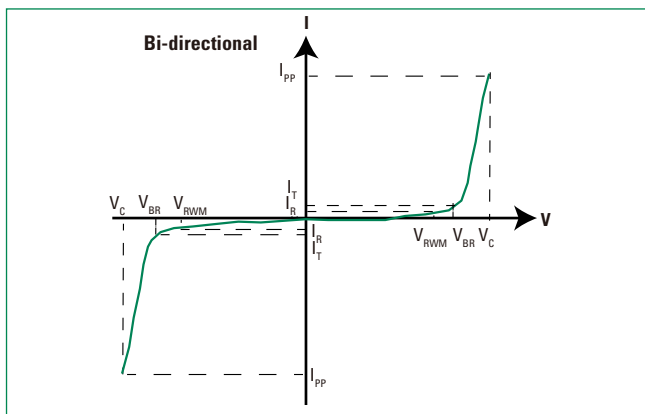
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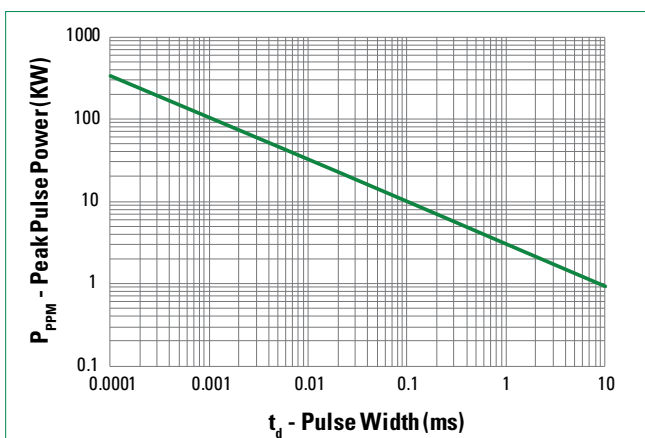
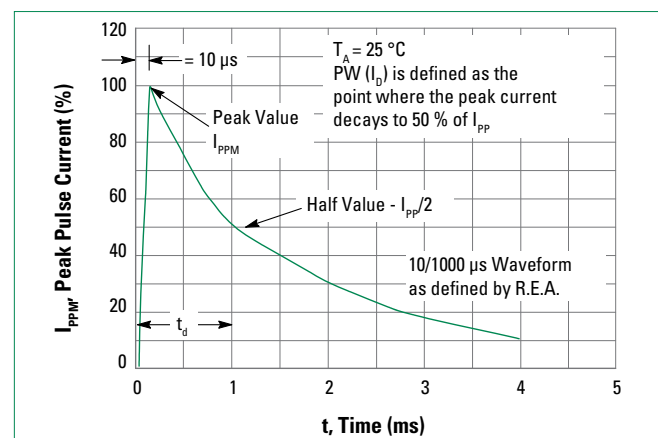
I-V Curve Characteristics ($T_A = 25^\circ\text{C}$ unless otherwise noted, $V_F = 3.5\text{ V Max. @ } I_F = 100\text{ A}$)* For Uni-directional

Symbol	Parameter
I_{PP}	Maximum Reverse Peak Pulse Current
V_C	Clamping Voltage @ I_{PP}
V_{RWM}	Working Peak Reverse Voltage
I_R	Maximum Reverse Leakage Current @ V_{RWM}
V_{BR}	Breakdown Voltage @ I_T
I_T	Breakdown Current
V_F	Forward Voltage @ I_F
I_F	Forward Current

*1/2 sine wave (or equivalent square wave), PW = 8.3 ms, non-repetitive duty cycle.

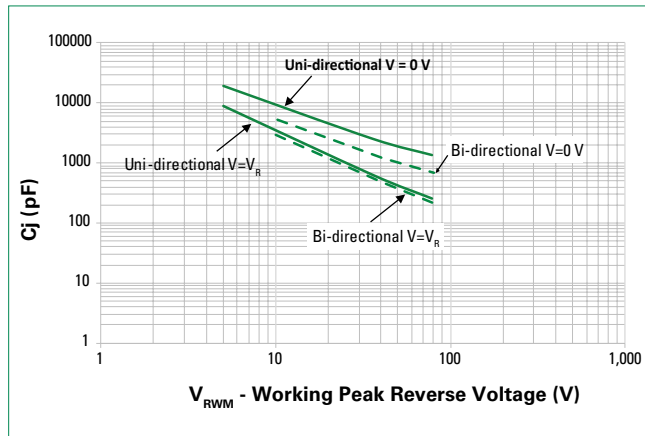
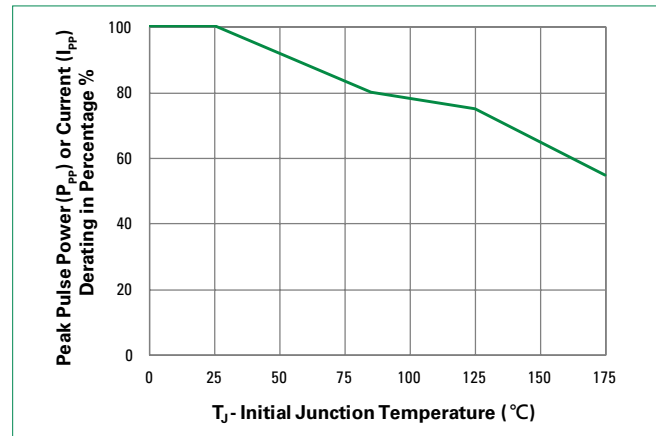
I-V Curve Characteristics ($T_A = 25^\circ\text{C}$ unless otherwise noted) For Bidirectional

Symbol	Parameter
I_{PP}	Maximum Reverse Peak Pulse Current
V_C	Clamping Voltage @ I_{PP}
V_{RWM}	Working Peak Reverse Voltage
I_R	Maximum Reverse Leakage Current @ V_{RWM}
V_{BR}	Breakdown Voltage @ I_T
I_T	Breakdown Current

Figure 1. Pulse Rating Curve**Figure 2. 10/1000 μs Pulse Waveform**

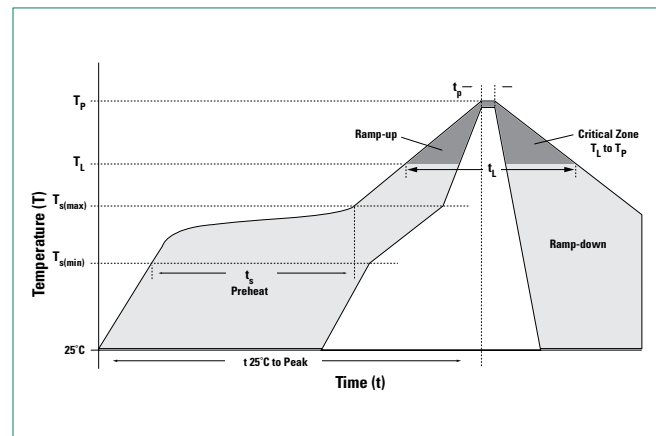
SZ3KASMC Series

Automotive, Surface Mount 3000 W in DO-214AB

Figure 3. Typical Junction Capacitance**Figure 4. Surge Derating Curve**

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 – 120 seconds
Average Ramp Up Rate (Liquidus Temp (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)		30 seconds max
Ramp-down Rate		6 °C/second max
Time 25 °C to Peak Temperature (T_p)		8 minutes max
Do Not Exceed		260 °C



Physical Specifications

Weight	0.00733 ounce, 0.228 grams
Case	JEDEC DO-214AB. Void-free, transfer-molded, thermosetting plastic epoxy meets UL 94V-0
Polarity	Color band denotes cathode except bidirectional
Terminal	Matte Tin-plated leads, solderable per JESD22-B102

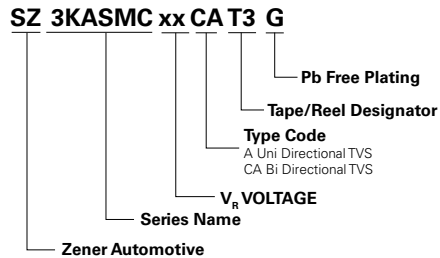
Environmental Specifications

High Temperature Storage	JESD22-A103
HTRB	JESD22-A108
Temperature Cycling	JESD22-A104
MSL	JEDEC J-STD-020, Level 1
H3TRB	JESD22-A101
RSH	JESD22-A111

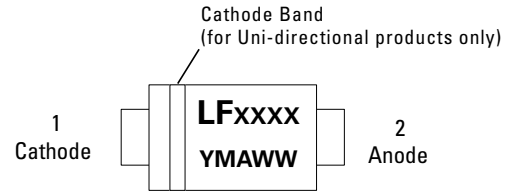
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Part Numbering System

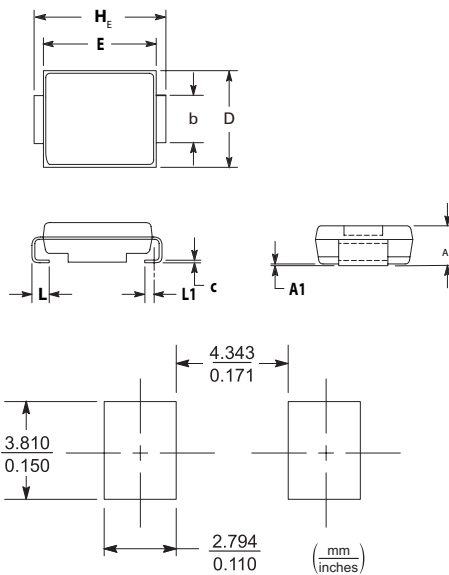


Part Marking System



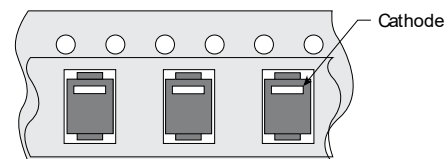
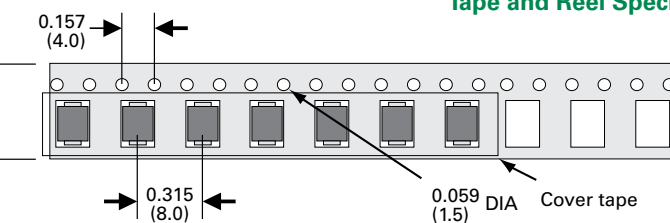
XXXX = Marking Code
Y = Year
M = Month
A = Assembly Location
WW = Lot Code

Dimensions

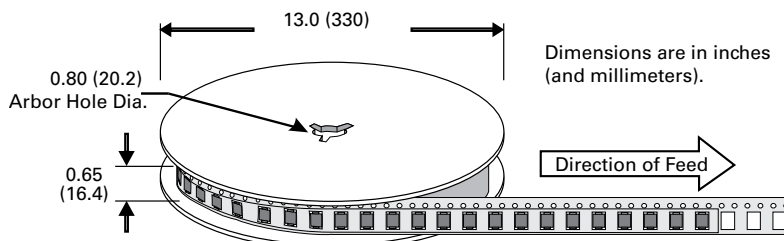


Dim	Inches			Millimeters		
	Min	Nom	Max	Min	Nom	Max
A	0.079	0.087	0.095	2.00	2.22	2.41
A1	0.002	0.004	0.008	0.05	0.10	0.20
b	0.115	0.118	0.125	2.92	3.00	3.18
c	0.006	0.009	0.012	0.15	0.23	0.30
D	0.220	0.230	0.240	5.59	5.84	6.10
E	0.260	0.270	0.280	6.60	6.86	7.11
H _E	0.305	0.313	0.320	7.75	7.94	8.13
L	0.030	0.040	0.050	0.76	1.02	1.27
L1	0.020 REF			0.51 REF		

Soldering Footprint



Tape and Reel Specification



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