SZ3KASMC Series

Automotive, Surface Mount 3000 W in DO-214AB

AUTOMOTIVE GRADE HF RoHS

Web Resources

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

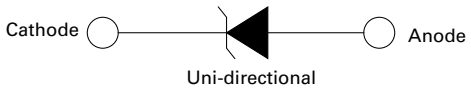
Features

- 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
- Standard zener breakdown voltage range – 6.4 V to 95.8 V for uni-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°C x (1+αT x (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 recgonized 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



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Electrical Characteristics

Part Number	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} (V) (Note 7)	Maximum Peak Pulse Current I_{PP} (A)	Maximum Reverse Leakage I_R @ V_R (µA)	Agency Approval
			Min	Max					
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	3DX	10	11.10	12.30	1	17.0	176.5	5	x
SZ3KASMC11AT3G	3DZ	11	12.20	13.50	1	18.2	164.8	5	x
SZ3KASMC12AT3G	3EE	12	13.30	14.70	1	19.9	150.8	2	x
SZ3KASMC13AT3G	3EG	13	14.40	15.90	1	21.5	139.5	2	x
SZ3KASMC14AT3G	3EK	14	15.60	17.20	1	23.2	129.3	1	x
SZ3KASMC15AT3G	3EM	15	16.70	18.50	1	24.4	123.0	1	x
SZ3KASMC16AT3G	3EP	16	17.80	19.70	1	26.0	115.4	1	x
SZ3KASMC17AT3G	3ER	17	18.90	20.90	1	27.6	108.7	1	x
SZ3KASMC18AT3G	3ET	18	20.00	22.10	1	29.2	102.8	1	x
SZ3KASMC20AT3G	3EV	20	22.20	24.50	1	32.4	92.6	1	x
SZ3KASMC22AT3G	3EX	22	24.40	26.90	1	35.5	84.5	1	x
SZ3KASMC24AT3G	3EZ	24	26.70	29.50	1	38.9	77.1	1	x
SZ3KASMC26AT3G	3FE	26	28.90	31.90	1	42.1	71.3	1	x
SZ3KASMC28AT3G	EFG	28	31.10	34.40	1	45.4	66.1	1	x
SZ3KASMC30AT3G	3FK	30	33.30	36.80	1	48.4	62.0	1	x
SZ3KASMC33AT3G	3FM	33	36.70	40.60	1	53.3	56.3	1	x
SZ3KASMC36AT3G	3FP	36	40.00	44.20	1	58.1	51.7	1	x
SZ3KASMC40AT3G	3FR	40	44.40	49.10	1	64.5	46.5	1	x
SZ3KASMC43AT3G	3FT	43	47.80	52.80	1	69.4	43.2	1	x
SZ3KASMC45AT3G	3FV	45	50.00	55.30	1	72.7	41.3	1	x
SZ3KASMC48AT3G	3FX	48	53.30	58.90	1	77.4	38.8	1	x
SZ3KASMC51AT3G	3FZ	51	56.70	62.70	1	82.4	36.4	1	x
SZ3KASMC54AT3G	3GE	54	60.00	66.30	1	87.1	34.4	1	x
SZ3KASMC58AT3G	3GG	58	64.40	71.20	1	93.6	32.1	1	x
SZ3KASMC60AT3G	3GK	60	66.70	73.70	1	96.8	31.0	1	x
SZ3KASMC64AT3G	3GM	64	71.10	78.60	1	103.0	29.2	1	x
SZ3KASMC70AT3G	3GP	70	77.80	86.00	1	113.0	26.6	1	x
SZ3KASMC75AT3G	3GR	75	83.30	92.10	1	121.0	24.8	1	x
SZ3KASMC78AT3G	3GT	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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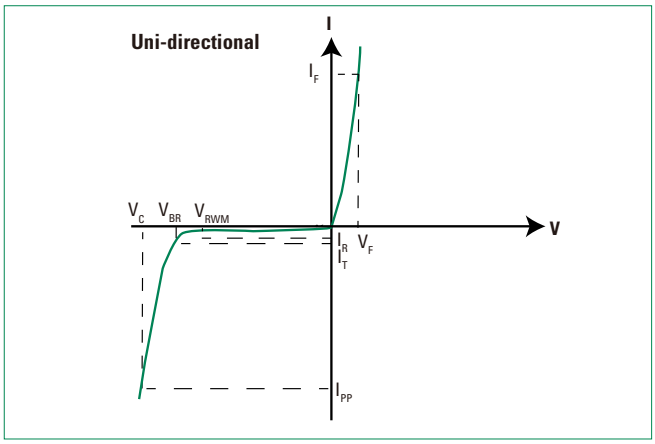
I-V Curve Characteristics (T_A = 25 °C unless otherwise noted, V_F = 3.5 V Max. @ I_F = 100 A)* For Uni-directional



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 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.

Figure 1. Pulse Rating Curve

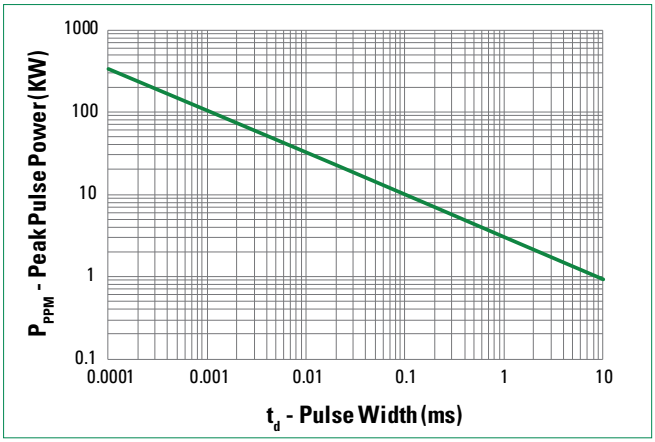


Figure 2. 10/1000 µs Pulse Waveform

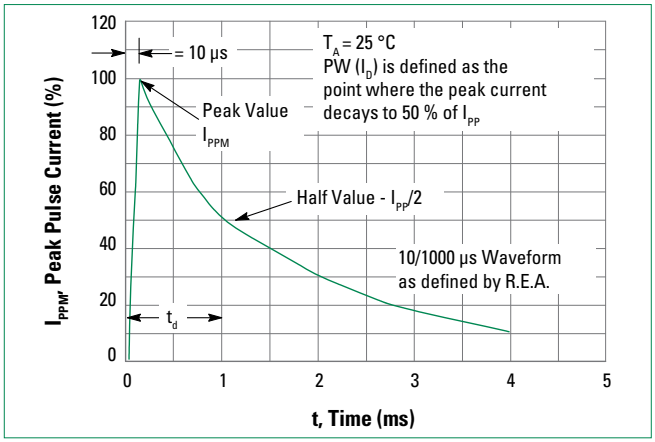


Figure 3. Typical Junction Capacitance

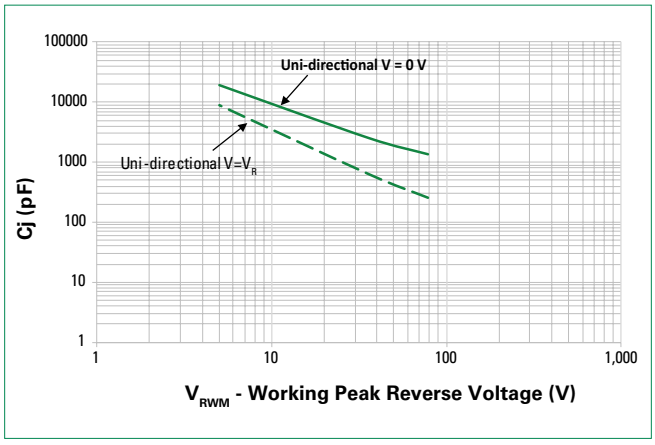
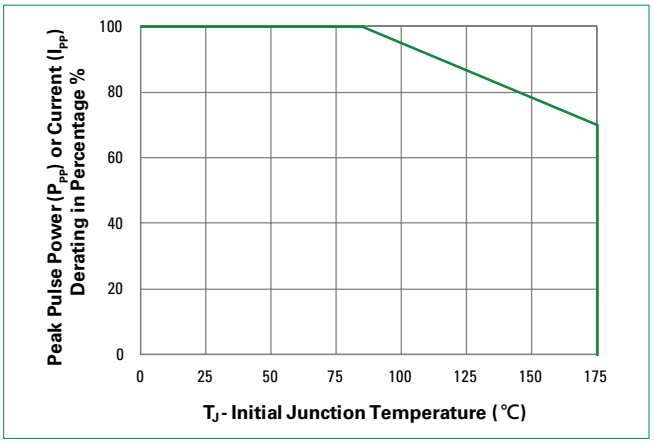


Figure 4. Surge Derating Curve



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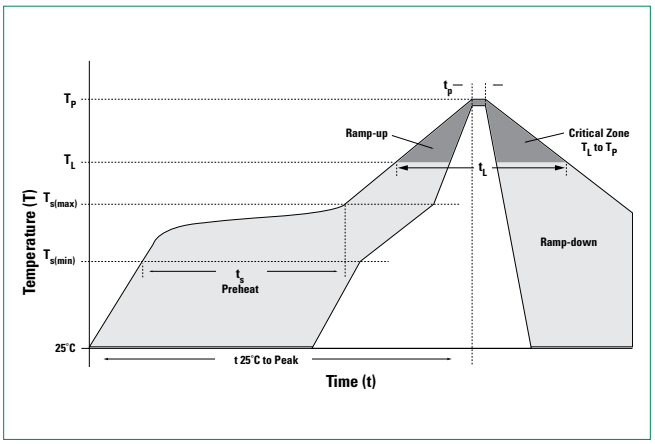
Soldering Parameters

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



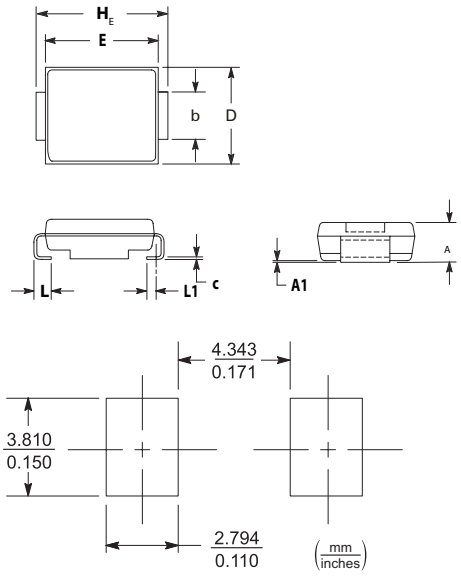
Physical Specifications

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

Dimensions



Soldering Footprint

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		

Ordering Information

Device	Package	Shipping
SZ3KASMCxxAT3G	SMC (Pb–Free)	2,500 / Tape & Reel

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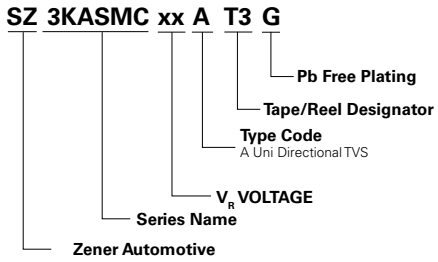
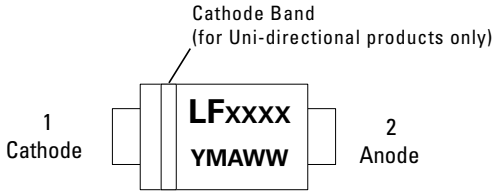
Part Numbering System



Part Marking System



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

Tape and Reel Specification