

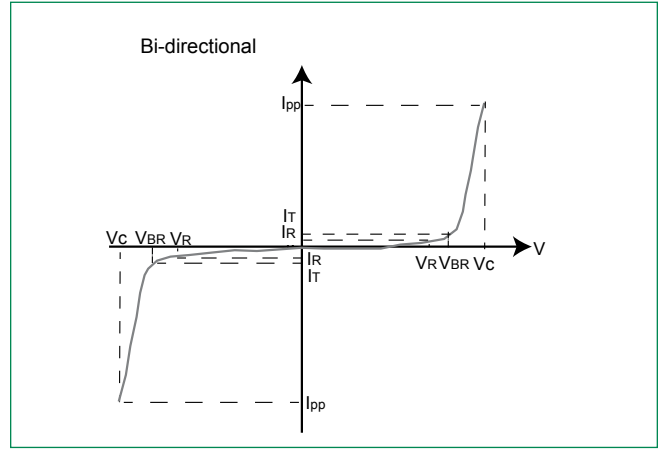
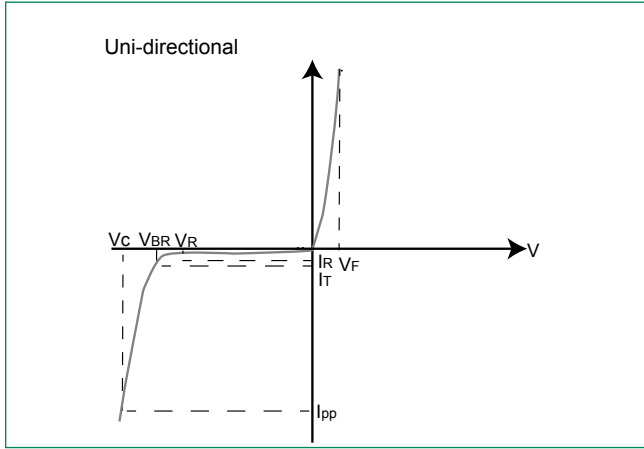
### Electrical Characteristics (T<sub>A</sub> = 25°C unless otherwise noted)

Part Number (Uni)	Part Number (Bi)	Marking		Reverse Stand off Voltage V <sub>R</sub> (Volts)	Breakdown Voltage V <sub>BR</sub> (Volts) @ I <sub>T</sub>		Test Current I <sub>T</sub> (mA)	Maximum Clamping Voltage V <sub>C</sub> @ I <sub>pp</sub> (V)	Maximum Peak Pulse Current I <sub>pp</sub> (A)	Maximum Reverse Leakage I <sub>R</sub> @ V <sub>R</sub> (μA)	Agency Approval 
		Uni.	Bi.		Min.	Max.					
SMAJ5.0A	SMAJ5.0CA	AE	WE	5.0	6.40	7.00	10	9.2	43.5	800	X
SMAJ6.0A	SMAJ6.0CA	AG	WG	6.0	6.67	7.37	10	10.3	38.8	800	X
SMAJ6.5A	SMAJ6.5CA	AK	WK	6.5	7.22	7.98	10	11.2	35.7	500	X
SMAJ7.0A	SMAJ7.0CA	AM	WM	7.0	7.78	8.60	10	12.0	33.3	200	X
SMAJ7.5A	SMAJ7.5CA	AP	WP	7.5	8.33	9.21	1	12.9	31.0	100	X
SMAJ8.0A	SMAJ8.0CA	AR	WR	8.0	8.89	9.83	1	13.6	29.4	50	X
SMAJ8.5A	SMAJ8.5CA	AT	WT	8.5	9.44	10.40	1	14.4	27.8	20	X
SMAJ9.0A	SMAJ9.0CA	AV	WV	9.0	10.00	11.10	1	15.4	26.0	10	X
SMAJ10A	SMAJ10CA	AX	WX	10.0	11.10	12.30	1	17.0	23.5	5	X
SMAJ11A	SMAJ11CA	AZ	WZ	11.0	12.20	13.50	1	18.2	22.0	1	X
SMAJ12A	SMAJ12CA	BE	XE	12.0	13.30	14.70	1	19.9	20.1	1	X
SMAJ13A	SMAJ13CA	BG	XG	13.0	14.40	15.90	1	21.5	18.6	1	X
SMAJ14A	SMAJ14CA	BK	XK	14.0	15.60	17.20	1	23.2	17.2	1	X
SMAJ15A	SMAJ15CA	BM	XM	15.0	16.70	18.50	1	24.4	16.4	1	X
SMAJ16A	SMAJ16CA	BP	XP	16.0	17.80	19.70	1	26.0	15.4	1	X
SMAJ17A	SMAJ17CA	BR	XR	17.0	18.90	20.90	1	27.6	14.5	1	X
SMAJ18A	SMAJ18CA	BT	XT	18.0	20.00	22.10	1	29.2	13.7	1	X
SMAJ20A	SMAJ20CA	BV	XV	20.0	22.20	24.50	1	32.4	12.3	1	X
SMAJ22A	SMAJ22CA	BX	XX	22.0	24.40	26.90	1	35.5	11.3	1	X
SMAJ24A	SMAJ24CA	BZ	XZ	24.0	26.70	29.50	1	38.9	10.3	1	X
SMAJ26A	SMAJ26CA	CE	YE	26.0	28.90	31.90	1	42.1	9.5	1	X
SMAJ28A	SMAJ28CA	CG	YG	28.0	31.10	34.40	1	45.4	8.8	1	X
SMAJ30A	SMAJ30CA	CK	YK	30.0	33.30	36.80	1	48.4	8.3	1	X
SMAJ33A	SMAJ33CA	CM	YM	33.0	36.70	40.60	1	53.3	7.5	1	X
SMAJ36A	SMAJ36CA	CP	YP	36.0	40.00	44.20	1	58.1	6.9	1	X
SMAJ40A	SMAJ40CA	CR	YR	40.0	44.40	49.10	1	64.5	6.2	1	X
SMAJ43A	SMAJ43CA	CT	YT	43.0	47.80	52.80	1	69.4	5.8	1	X
SMAJ45A	SMAJ45CA	CV	YV	45.0	50.00	55.30	1	72.7	5.5	1	X
SMAJ48A	SMAJ48CA	CX	YX	48.0	53.30	58.90	1	77.4	5.2	1	X
SMAJ51A	SMAJ51CA	CZ	YZ	51.0	56.70	62.70	1	82.4	4.9	1	X
SMAJ54A	SMAJ54CA	RE	ZE	54.0	60.00	66.30	1	87.1	4.6	1	X
SMAJ58A	SMAJ58CA	RG	ZG	58.0	64.40	71.20	1	93.6	4.3	1	X
SMAJ60A	SMAJ60CA	RK	ZK	60.0	66.70	73.70	1	96.8	4.1	1	X
SMAJ64A	SMAJ64CA	RM	ZM	64.0	71.10	78.60	1	103.0	3.9	1	X
SMAJ70A	SMAJ70CA	RP	ZP	70.0	77.80	86.00	1	113.0	3.5	1	X
SMAJ75A	SMAJ75CA	RR	ZR	75.0	83.30	92.10	1	121.0	3.3	1	X
SMAJ78A	SMAJ78CA	RT	ZT	78.0	86.70	95.80	1	126.0	3.2	1	X
SMAJ85A	SMAJ85CA	RV	ZV	85.0	94.40	104.00	1	137.0	2.9	1	X
SMAJ90A	SMAJ90CA	RX	ZX	90.0	100.00	111.00	1	146.0	2.7	1	X
SMAJ100A	SMAJ100CA	RZ	ZZ	100.0	111.00	123.00	1	162.0	2.5	1	X
SMAJ110A	SMAJ110CA	SE	VE	110.0	122.00	135.00	1	177.0	2.3	1	X
SMAJ120A	SMAJ120CA	SG	VG	120.0	133.00	147.00	1	193.0	2.1	1	X
SMAJ130A	SMAJ130CA	SK	VK	130.0	144.00	159.00	1	209.0	1.9	1	X
SMAJ150A	SMAJ150CA	SM	VM	150.0	167.00	185.00	1	243.0	1.6	1	X
SMAJ160A	SMAJ160CA	SP	VP	160.0	178.00	197.00	1	259.0	1.5	1	X
SMAJ170A	SMAJ170CA	SR	VR	170.0	189.00	209.00	1	275.0	1.5	1	X
SMAJ180A	SMAJ180CA	ST	VT	180.0	201.00	222.00	1	292.0	1.4	1	-
SMAJ188A	SMAJ188CA	SB	VB	188.0	209.00	231.00	1	304.0	1.4	1	-
SMAJ200A	SMAJ200CA	SV	VV	200.0	224.00	247.00	1	324.0	1.2	1	-
SMAJ220A	-	SX	-	220.0	246.00	272.00	1	356.0	1.1	1	-
-	SMAJ220CA*	-	VX	220.0	246.00	272.00	1	356.0	1.7	1	-
SMAJ250A	-	SZ	-	250.0	279.00	309.00	1	405.0	1.0	1	-
-	SMAJ250CA*	-	VZ	250.0	279.00	309.00	1	405.0	1.5	1	-
SMAJ300A*	SMAJ300CA*	TE	UE	300.0	335.00	371.00	1	486.0	1.3	1	-
SMAJ350A*	SMAJ350CA*	TG	UG	350.0	391.00	432.00	1	567.0	1.1	1	-
SMAJ400A*	SMAJ400CA*	TK	UK	400.0	447.00	494.00	1	648.0	1.0	1	-
SMAJ440A*	SMAJ440CA*	TM	UM	440.0	492.00	543.00	1	713.0	0.9	1	-

**Notes:**

For bidirectional type having V<sub>C</sub> of 10 volts and less, the I<sub>n</sub> limit is double.  
 For stack-die parts, use \* to label the part number.

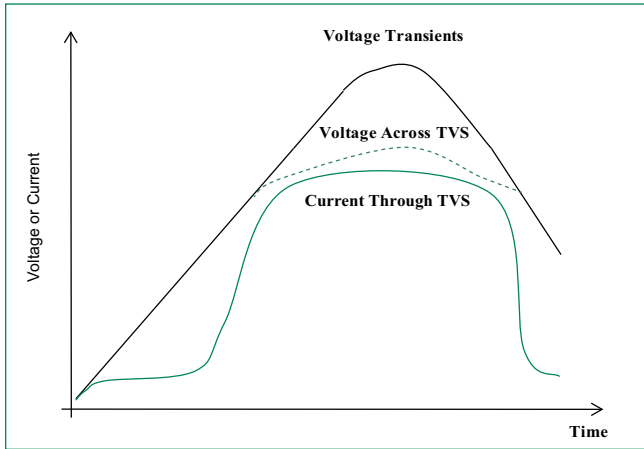
**I-V Curve Characteristics**



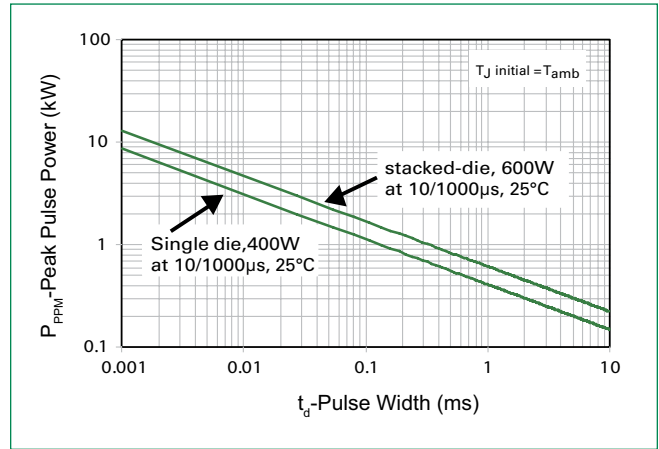
- $P_{PPM}$**  Peak Pulse Power Dissipation – Max power dissipation
- $V_R$**  Stand-off Voltage – Maximum voltage that can be applied to the TVS without operation
- $V_{BR}$**  Breakdown Voltage – Maximum voltage that flows through the TVS at a specified test current ( $I_T$ )
- $V_C$**  Clamping Voltage – Peak voltage measured across the TVS at a specified  $I_{ppm}$  (peak impulse current)
- $I_R$**  Reverse Leakage Current – Current measured at  $V_R$
- $V_F$**  Forward Voltage Drop for Uni-directional

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

**Figure 1 - TVS Transients Clamping Waveform**

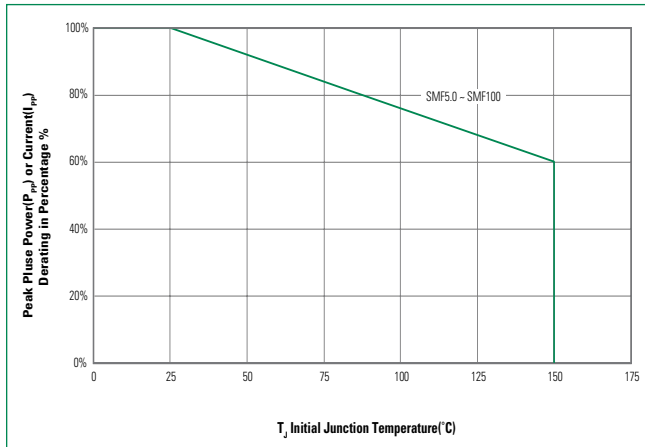


**Figure 2 - Peak Pulse Power Rating Curve**

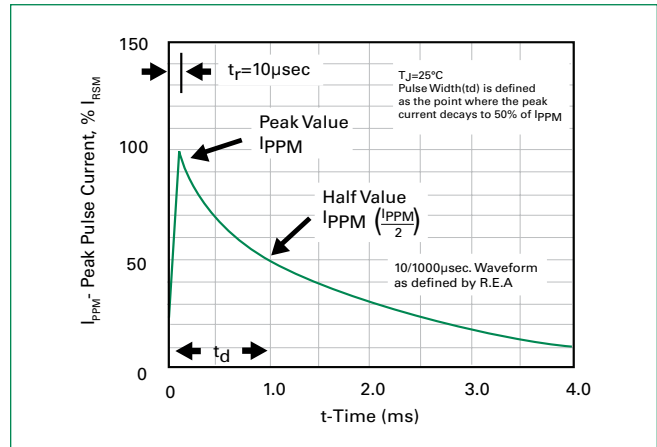


**Ratings and Characteristic Curves** ( $T_A=25^\circ\text{C}$  unless otherwise noted) (Continued)

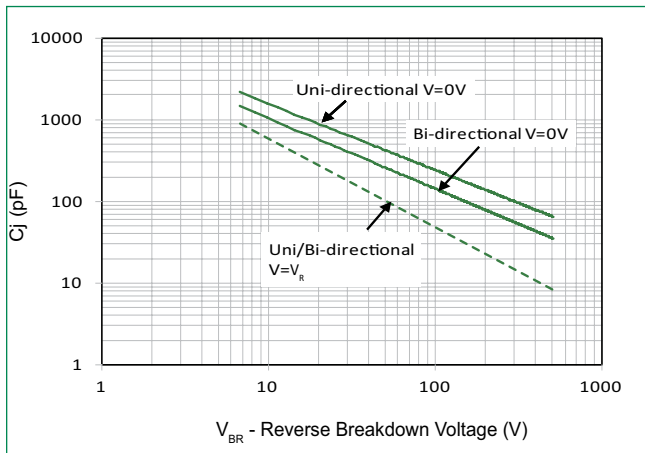
**Figure 3 - Peak Pulse Power Derating Curve**



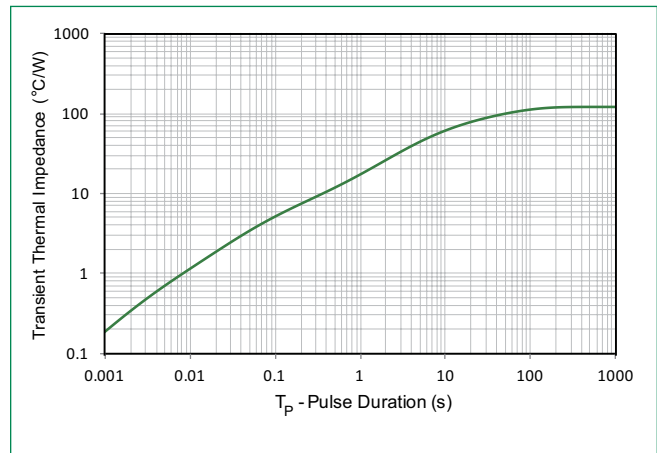
**Figure 4 - Pulse Waveform**



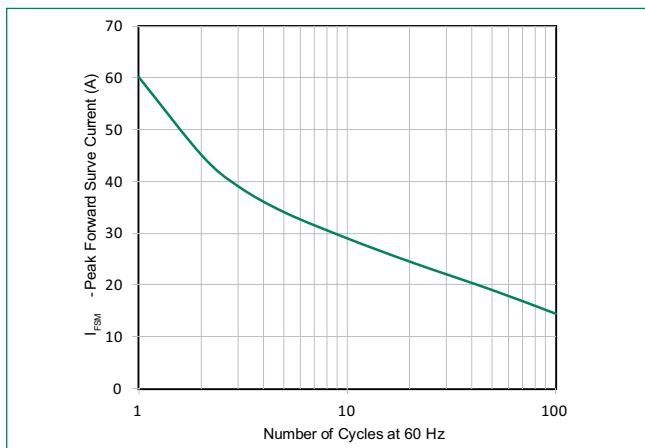
**Figure 5 - Typical Junction Capacitance**



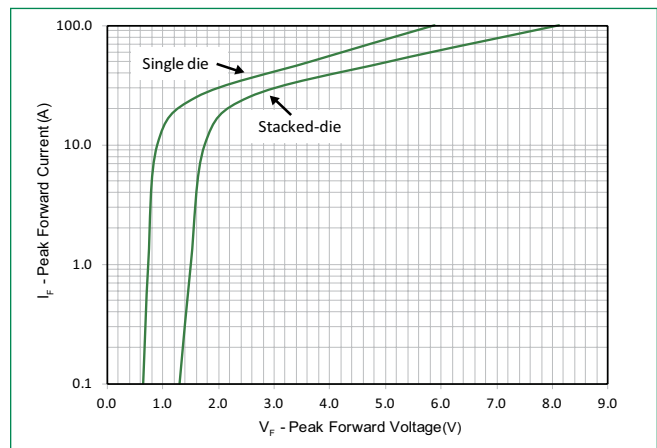
**Figure 6 - Typical Transient Thermal Impedance**



**Figure 7 - Maximum Non-Repetitive Forward Surge Current Uni-Directional Only**

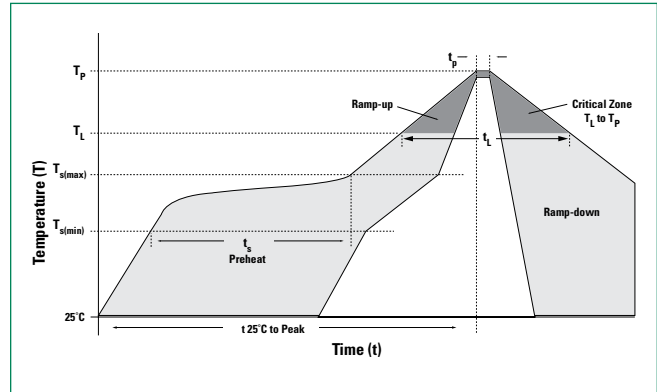


**Figure 8 - Peak Forward Voltage Drop vs Peak Forward Current (Typical Values)**



**Soldering Parameters**

<b>Reflow Condition</b>		Lead-free assembly
<b>Pre Heat</b>	- Temperature Min ( $T_{s(min)}$ )	150°C
	- Temperature Max ( $T_{s(max)}$ )	200°C
	- Time (min to max) ( $t_s$ )	60 – 120 secs
<b>Average ramp up rate (Liquidus Temp (<math>T_L</math>) to peak</b>		3°C/second max
<b><math>T_{s(max)}</math> to <math>T_L</math> - Ramp-up Rate</b>		3°C/second max
<b>Reflow</b>	- Temperature ( $T_L$ ) (Liquidus)	217°C
	- Time (min to max) ( $t_L$ )	60 – 150 seconds
<b>Peak Temperature (<math>T_p</math>)</b>		260 <sup>+0/-5</sup> °C
<b>Time within 5°C of actual peak Temperature (<math>t_p</math>)</b>		30 seconds Max
<b>Ramp-down Rate</b>		6°C/second Max
<b>Time 25°C to peak Temperature (<math>T_p</math>)</b>		8 minutes Max.
<b>Do not exceed</b>		260°C



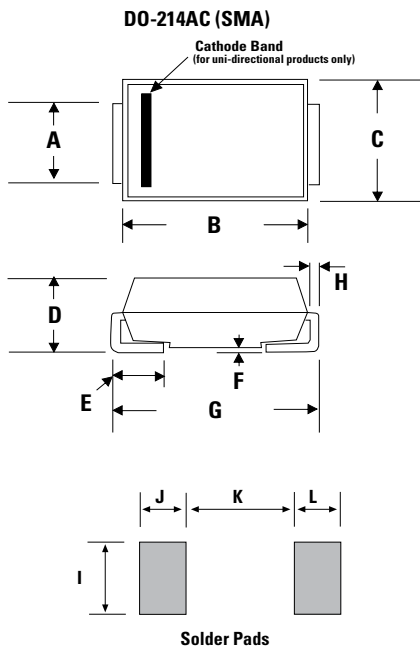
**Physical Specifications**

<b>Weight</b>	0.002 ounce, 0.061 gram
<b>Case</b>	JEDEC DO-214AC Molded Plastic over glass passivated junction
<b>Polarity</b>	Color band denotes cathode except Bipolar
<b>Terminal</b>	Matte Tin-plated leads, Solderable per JESD22-B102

**Environmental Specifications**

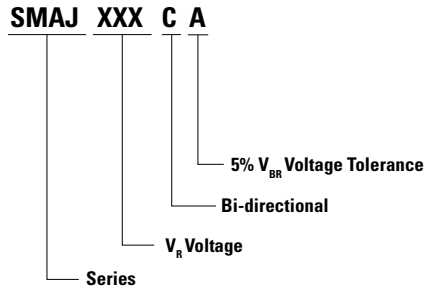
<b>High Temp. Storage</b>	JESD22-A103
<b>HTRB</b>	JESD22-A108
<b>Temperature Cycling</b>	JESD22-A104
<b>MSL</b>	JEDEC-J-STD-020, Level 1
<b>H3TRB</b>	JESD22-A101
<b>RSH</b>	JESD22-A111

**Dimensions**

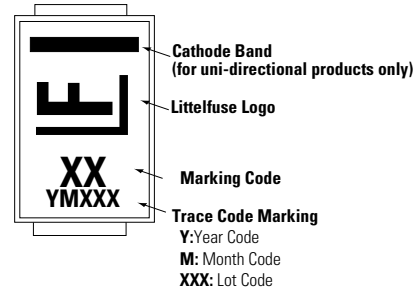


Dimensions	Inches		Millimeters	
	Min	Max	Min	Max
A	0.049	0.065	1.250	1.650
B	0.157	0.181	3.990	4.600
C	0.095	0.110	2.400	2.790
D	0.075	0.090	1.900	2.290
E	0.030	0.060	0.780	1.520
F	-	0.008	-	0.203
G	0.189	0.208	4.800	5.280
H	0.006	0.012	0.152	0.305
I	0.070	-	1.800	-
J	0.082	-	2.100	-
K	-	0.090	-	2.300
L	0.082	-	2.100	-

### Part Numbering System



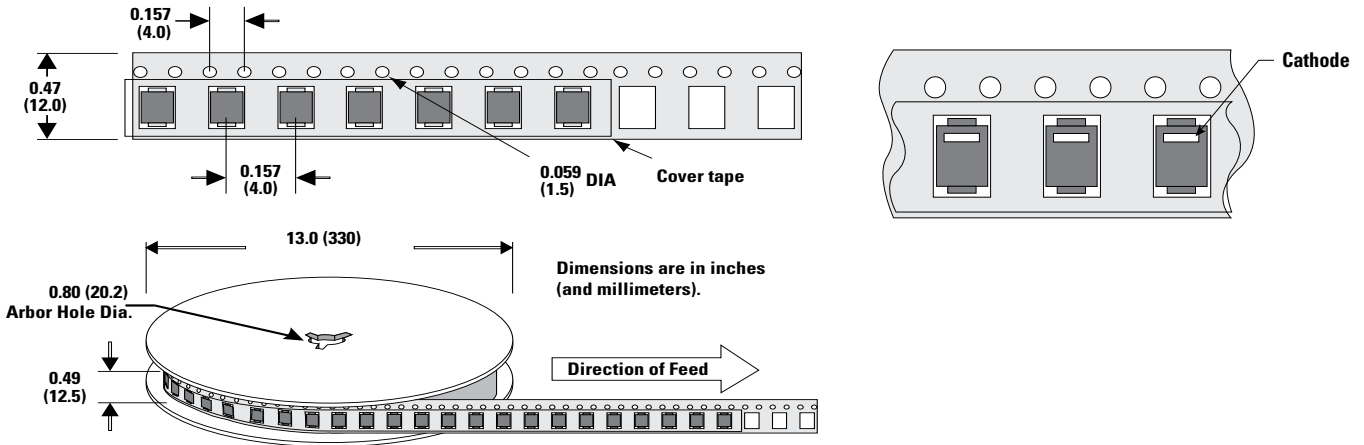
### Part Marking System



### Packaging

Part number	Component Package	Quantity	Packaging Option	Packaging Specification
SMAJ-xxxXX	DO-214AC	5000	Tape & Reel - 12mm tape/13" reel	EIA STD RS-481

### Tape and Reel Specification



# Mouser Electronics

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## Littelfuse:

[SMAJ130CA](#) [SMAJ5.0](#) [SMAJ8.0A](#) [SMAJ110A](#) [SMAJ40C](#) [SMAJ16CA](#) [SMAJ20](#) [SMAJ22A](#) [SMAJ36A](#) [SMAJ51](#)  
[SMAJ110CA](#) [SMAJ170](#) [SMAJ200C](#) [SMAJ22CA](#) [SMAJ30](#) [SMAJ300CA](#) [SMAJ58CA](#) [SMAJ7.0A](#) [SMAJ12CA](#)  
[SMAJ26C](#) [SMAJ28A](#) [SMAJ48](#) [SMAJ100A](#) [SMAJ110](#) [SMAJ170CA](#) [SMAJ22](#) [SMAJ48C](#) [SMAJ11CA](#) [SMAJ160](#)  
[SMAJ160CA](#) [SMAJ220C](#) [SMAJ28CA](#) [SMAJ6.5A](#) [SMAJ75](#) [SMAJ7.5A](#) [SMAJ100CA](#) [SMAJ48CA](#) [SMAJ6.0](#)  
[SMAJ64A](#) [SMAJ70A](#) [SMAJ15A](#) [SMAJ220A](#) [SMAJ8.5](#) [SMAJ90A](#) [SMAJ10C](#) [SMAJ13C](#) [SMAJ14CA](#) [SMAJ51CA](#)  
[SMAJ75C](#) [SMAJ43CA](#) [SMAJ43A](#) [SMAJ300A](#) [SMAJ36CA](#) [SMAJ440A](#) [SMAJ100](#) [SMAJ30C](#) [SMAJ5.0C](#) [SMAJ58A](#)  
[SMAJ78A](#) [SMAJ9.0CA](#) [SMAJ150A](#) [SMAJ250CA](#) [SMAJ300](#) [SMAJ36](#) [SMAJ48A](#) [SMAJ8.0CA](#) [SMAJ20CA](#)  
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[SMAJ250C](#) [SMAJ30A](#) [SMAJ45A](#)