

SMA6LxxxXX Series transient voltage suppressors are excellent overvoltage protective devices.

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



SMAF (SOD-128)

### Features

- Excellent clamping capability
- Low leakage current
- Low capacitance
- High surge capability
- Glass passivated chip
- Epoxy resin package
- Built-in strain relief
- Will not fatigue
- RoHS Compliant
- Fast response time: typically less than 1.0ps from 0 Volts to  $V_{BR}$  min

### Mechanical Characteristics

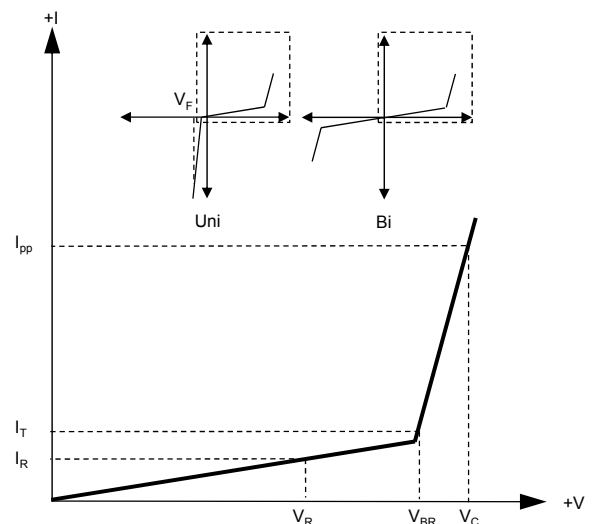
- Package: SMAF plastic package.
- Lead Finish: Matte Tin
- Case Material: Epoxy Molding Compound.
- UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020

### Applications

- Telecom
- Computer
- Industrial electronic
- Consumer electronic

### Electrical Parameters

Parameter	Definition
$C_J$	Junction Capacitance - typical capacitance measured with 0V or $V_R$ bias
$I_{PP}$	Peak Pulse Current - maximum rated peak impulse current
$V_C$	Clamping Voltage - Peak voltage measured across the suppressor at a specified $I_{ppm}$ (peak impulse current)
$V_{BR}$	Breakdown Voltage - Maximum voltage that flows through the TVS at a specified test current ( $I_T$ )
$I_R$	Leakage Current - maximum peak off-state current measured at $V_R$
$V_R$	Peak Off-state Voltage - maximum voltage that can be applied while maintaining off state



### Summary of Packing Options

Package	Packing Description	Packing Quantity	Industry Standard
SMAF	Tape/Reel, 11" reel	5000	EIA-481-1
	Tape/Reel, 7" reel	3000	EIA-481-1

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

Parameter	Symbol	Value	Units	Remarks
Peak Pulse Power Dissipation	$P_{PPM}$	600	W	(Note1)(Note2)
Steady State Power Dissipation	$P_D$	3.3	W	(Note3)
Peak Forward Surge Current	$I_{FSM}$	60	A	(Note4)
Maximum Instantaneous Forward Voltage at 25A	$V_{FM}$	3.5/6.5	V	(Note5)
Typical Thermal Resistance Junction to Lead	$R_{\theta JL}$	25	$^\circ\text{C/W}$	
Typical Thermal Resistance Junction to Ambient	$R_{\theta JA}$	110	$^\circ\text{C/W}$	
Operating Temperature Range	$T_J$	-55 to 150	$^\circ\text{C}$	
Storage Temperature Range	$T_{STG}$	-55 to 150	$^\circ\text{C}$	

Notes1: Non-repetitive current pulse , 10/1000us Waveform.

Notes2: Mounted on copper pad area of 5×5mm to each terminal.

Notes3: Infinite HeatSink at  $T_A=50^\circ\text{C}$

Notes4: Measured on 8.3ms single half sine wave or equivalent square wave, duty cycle=4 perminute maximum.

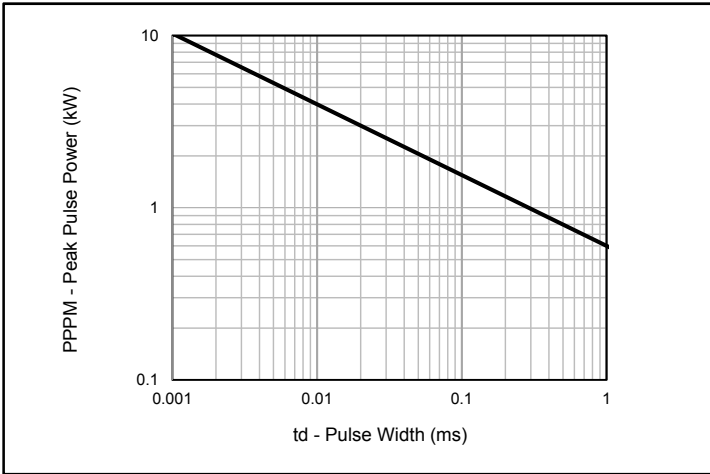
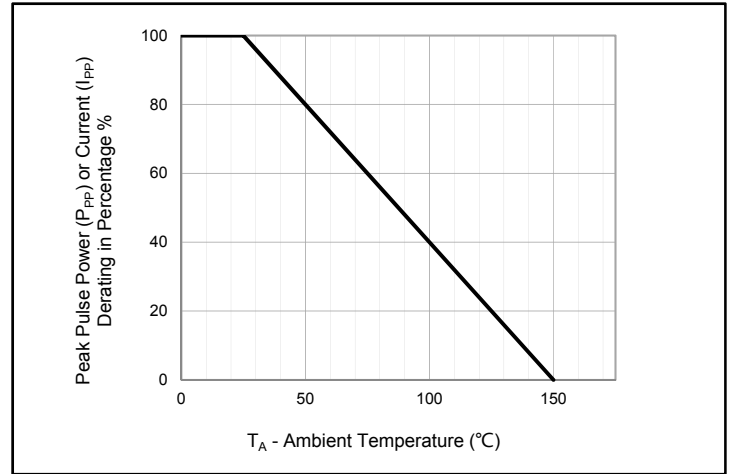
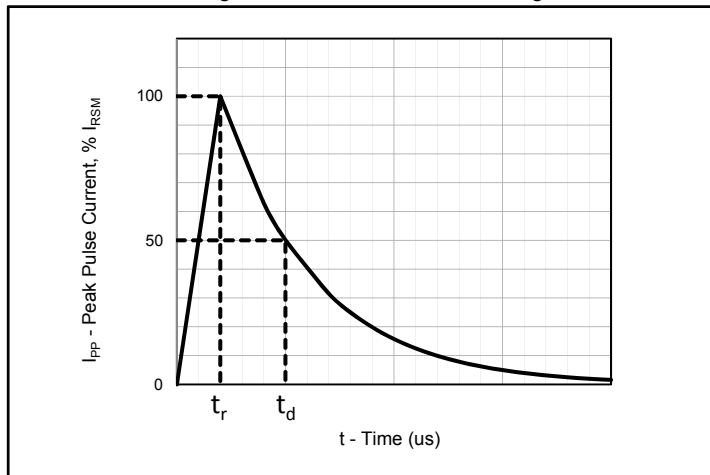
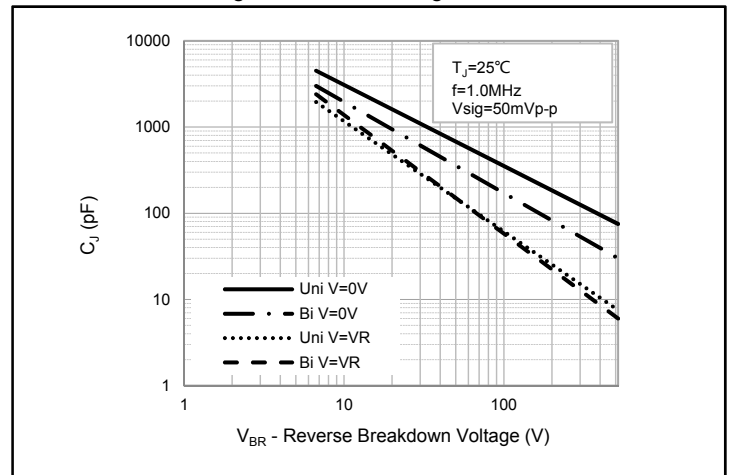
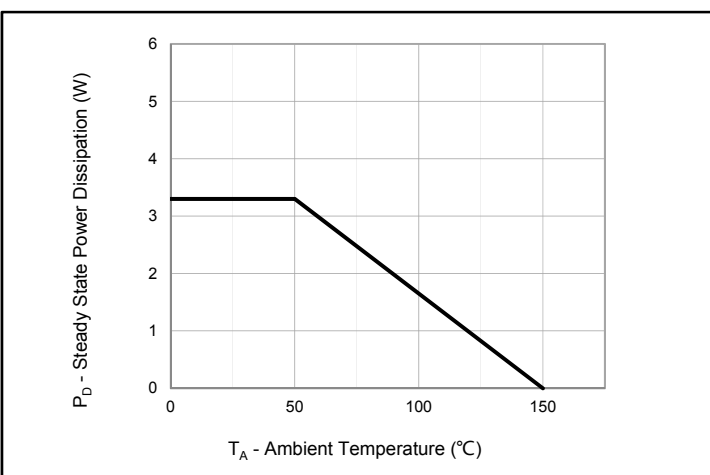
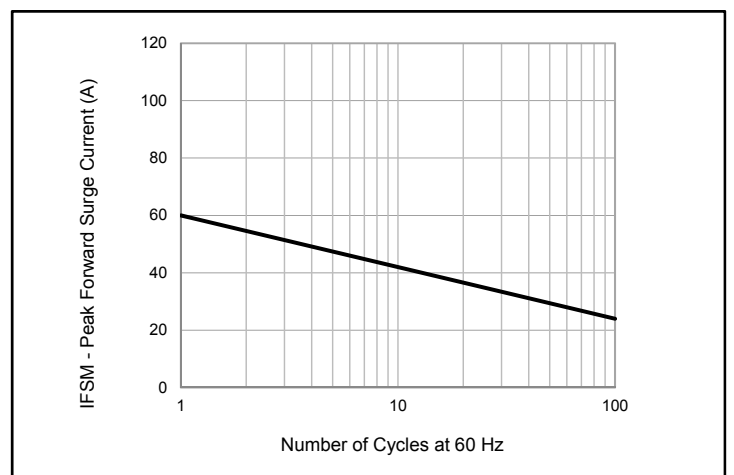
Notes5: For UnidirectionalOnly,  $V_{FM}<3.5\text{V}$  for  $V_{BR} \leq 200\text{V}$  and  $V_{FM}<5.0\text{V}$  for  $V_{BR} \geq 201\text{V}$ .

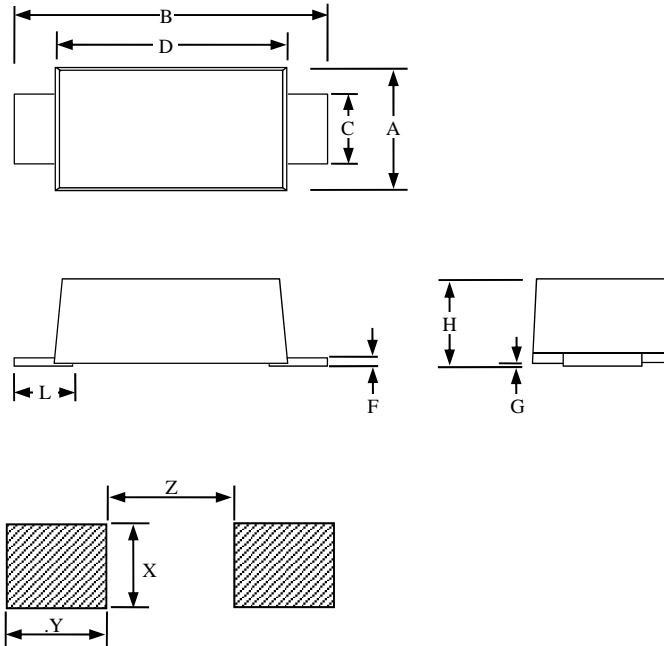
**Electrical Characteristics ( $T_A=25^\circ\text{C}$  unless otherwise noted)**

Part Number (Uni)	Part Number (Bi)	Marking Code		Reverse Stand off Voltage $V_R$ (V)	Breakdown Voltage $V_{BR} @ I_T$ (V)		Test Current $I_T$ (mA)	Maximum Clamping Voltage $V_C @ I_{PP}$ (V)	Maximum Peak Pulse Current $I_{PP}$ (A)	Maximun Reverse Leakage $I_R @ V_R$ ( $\mu\text{A}$ )
		Uni	Bi		Min	Max				
SMA6L5.0A	SMA6L5.0CA	6AE	6WE	5	6.4	7	10	9.2	65.3	800
SMA6L6.0A	SMA6L6.0CA	6AG	6WG	6	6.67	7.37	10	10.3	58.3	800
SMA6L6.5A	SMA6L6.5CA	6AK	6WK	6.5	7.22	7.98	10	11.2	53.6	500
SMA6L7.0A	SMA6L7.0CA	6AM	6WM	7	7.78	8.6	10	12	50	200
SMA6L7.5A	SMA6L7.5CA	6AP	6WP	7.5	8.33	9.21	1	12.9	46.6	100
SMA6L8.0A	SMA6L8.0CA	6AR	6WR	8	8.89	9.83	1	13.6	44.2	50
SMA6L8.5A	SMA6L8.5CA	6AT	6WT	8.5	9.44	10.4	1	14.4	41.7	20
SMA6L9.0A	SMA6L9.0CA	6AV	6WV	9	10	11.1	1	15.4	39	10
SMA6L10A	SMA6L10CA	6AX	6WX	10	11.1	12.3	1	17	35.3	5
SMA6L11A	SMA6L11CA	6AZ	6WZ	11	12.2	13.5	1	18.2	33	1
SMA6L12A	SMA6L12CA	6BE	6XE	12	13.3	14.7	1	19.9	30.2	1
SMA6L13A	SMA6L13CA	6BG	6XG	13	14.4	15.9	1	21.5	28	1
SMA6L14A	SMA6L14CA	6BK	6XK	14	15.6	17.2	1	23.2	25.9	1
SMA6L15A	SMA6L15CA	6BM	6XM	15	16.7	18.5	1	24.4	24.6	1
SMA6L16A	SMA6L16CA	6BP	6XP	16	17.8	19.7	1	26	23.1	1
SMA6L17A	SMA6L17CA	6BR	6XR	17	18.9	20.9	1	27.6	21.8	1
SMA6L18A	SMA6L18CA	6BT	6XT	18	20	22.1	1	29.2	20.6	1
SMA6L20A	SMA6L20CA	6BV	6XV	20	22.2	24.5	1	32.4	18.6	1

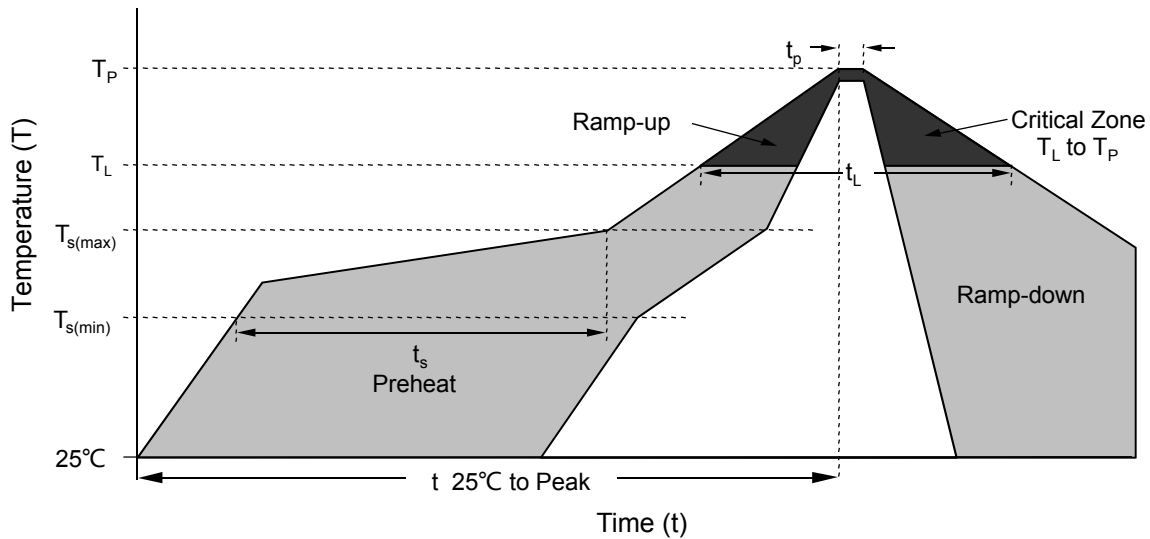
**Electrical Characteristics (T<sub>A</sub>=25°C unless otherwise noted)**

Part Number (Uni)	Part Number (Bi)	Marking Code		Reverse Stand off Voltage V <sub>R</sub> (V)	Breakdown Voltage V <sub>BR</sub> @ I <sub>T</sub> (V)		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)
		Uni	Bi		Min	Max				
SMA6L22A	SMA6L22CA	6BX	6XX	22	24.4	26.9	1	35.5	16.9	1
SMA6L24A	SMA6L24CA	6BZ	6XZ	24	26.7	29.5	1	38.9	15.5	1
SMA6L26A	SMA6L26CA	6CE	6YE	26	28.9	31.9	1	42.1	14.3	1
SMA6L28A	SMA6L28CA	6CG	6YG	28	31.1	34.4	1	45.4	13.3	1
SMA6L30A	SMA6L30CA	6CK	6YK	30	33.3	36.8	1	48.4	12.4	1
SMA6L33A	SMA6L33CA	6CM	6YM	33	36.7	40.6	1	53.3	11.3	1
SMA6L36A	SMA6L36CA	6CP	6YP	36	40	44.2	1	58.1	10.4	1
SMA6L40A	SMA6L40CA	6CR	6YR	40	44.4	49.1	1	64.5	9.3	1
SMA6L43A	SMA6L43CA	6CT	6YT	43	47.8	52.8	1	69.4	8.7	1
SMA6L45A	SMA6L45CA	6CV	6YV	45	50	55.3	1	72.7	8.3	1
SMA6L48A	SMA6L48CA	6CX	6YX	48	53.3	58.9	1	77.4	7.8	1
SMA6L51A	SMA6L51CA	6CZ	6YZ	51	56.7	62.7	1	82.4	7.3	1
SMA6L54A	SMA6L54CA	6RE	6ZE	54	60	66.3	1	87.1	6.9	1
SMA6L58A	SMA6L58CA	6RG	6ZG	58	64.4	71.2	1	93.6	6.5	1
SMA6L60A	SMA6L60CA	6RK	6ZK	60	66.7	73.7	1	96.8	6.2	1
SMA6L64A	SMA6L64CA	6RM	6ZM	64	71.1	78.6	1	103	5.9	1
SMA6L70A	SMA6L70CA	6RP	6ZP	70	77.8	86	1	113	5.3	1
SMA6L75A	SMA6L75CA	6RR	6ZR	75	83.3	92.1	1	121	5	1
SMA6L78A	SMA6L78CA	6RT	6ZT	78	86.7	95.8	1	126	4.8	1
SMA6L85A	SMA6L85CA	6RV	6ZV	85	94.4	104	1	137	4.4	1
SMA6L90A	SMA6L90CA	6RX	6ZX	90	100	111	1	146	4.1	1
SMA6L100A	SMA6L100CA	6RZ	6ZZ	100	111	123	1	162	3.7	1
SMA6L110A	SMA6L110CA	6SE	6VE	110	122	135	1	177	3.4	1
SMA6L120A	SMA6L120CA	6SG	6VG	120	133	147	1	193	3.1	1
SMA6L130A	SMA6L130CA	6SK	6VK	130	144	159	1	209	2.9	1
SMA6L150A	SMA6L150CA	6SM	6VM	150	167	185	1	243	2.5	1
SMA6L160A	SMA6L160CA	6SP	6VP	160	178	197	1	259	2.3	1
SMA6L170A	SMA6L170CA	6SR	6VR	170	189	209	1	275	2.2	1
SMA6L180A	SMA6L180CA	6ST	6VT	180	201	222	1	292	2.1	1
SMA6L200A	SMA6L200CA	6SV	6VV	200	224	247	1	324	1.9	1
SMA6L220A	SMA6L220CA	6SX	6VX	220	246	272	1	356	1.7	1
SMA6L250A	SMA6L250CA	6SZ	6VZ	250	279	309	1	405	1.5	1
SMA6L300A	SMA6L300CA	6TE	6UE	300	335	371	1	486	1.3	1
SMA6L350A	SMA6L350CA	6TG	6UG	350	391	432	1	567	1.1	1
SMA6L400A	SMA6L400CA	6TK	6UK	400	447	494	1	648	0.9	1
SMA6L440A	SMA6L440CA	6TM	6UM	440	492	543	1	713	0.9	1

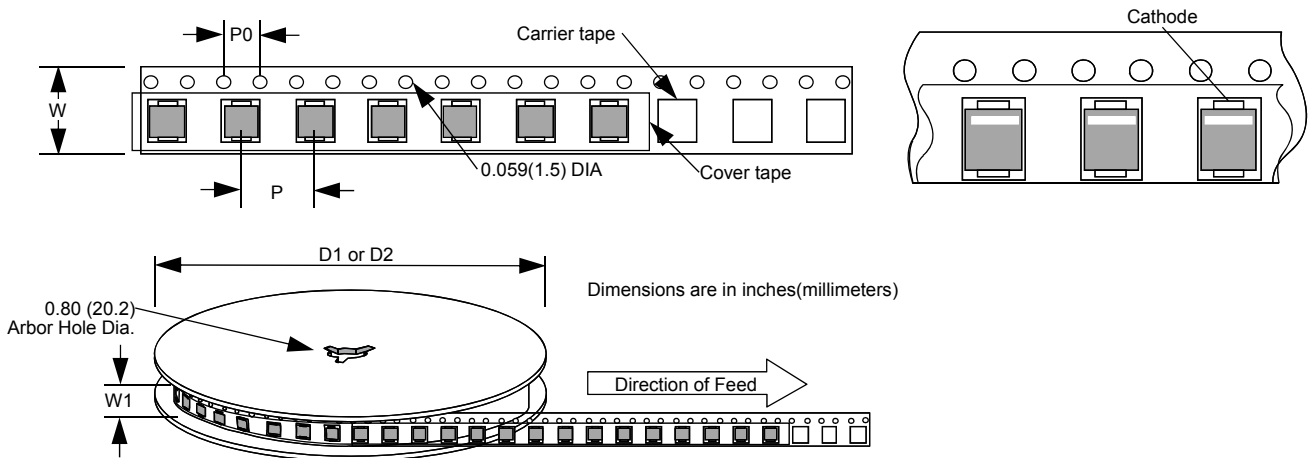

**Fig.1 - Peak Pulse Power Rating**

**Fig.2 - Pulse Derating Curve**

**Fig.3 - Pulse Waveform**

**Fig.4 - Typical Junction Capacitance**

**Fig.5 - Steady State Power Dissipation Derating Curve**

**Fig.6 - Maximum Non-Repetitive Peak Forward Surge Current  
Uni-Directional Only**



SMAF						
Dimension	Inches			Millimeters		
	MIN	NOM	MAX	MIN	NOM	MAX
A	0.094		0.11	2.4		2.8
B	0.173		0.189	4.4		4.8
C	0.051		0.059	1.3		1.5
D	0.128		0.144	3.25		3.65
F	0.006		0.012	0.15		0.3
G	-		0.004	-		0.1
H	0.043		0.055	1.1		1.4
L	0.028		0.047	0.7		1.2
X		0.067			1.7	
Y		0.098			2.5	
Z		0.059			1.5	



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 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 ( $t_L$ )	60 – 150 secs
Peak Temperature ( $T_P$ )		260 <sup>+0/-5</sup> °C
Time within 5°C of actual peak Temperature ( $t_p$ )		20 – 40 secs
Ramp-down Rate		6°C/second max
Time 25°C to peak Temperature (t)		8 minutes Max.
Do not exceed		260°C



Dimension	Inches			Millimeters		
	MIN	NOM	MAX	MIN	NOM	MAX
P		0.157			4	
P0		0.157			4	
W		0.472			12	
W1		0.492			12.5	
D1		7			177.8	
D2		11			279.4	

**Disclaimer**

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