

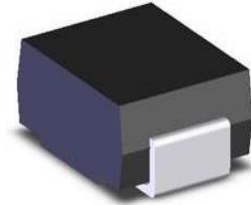
## P6SMAJ Series Datasheet

### Description

The P6SMAJ series is designed specifically to protect sensitive electronic equipment from voltage transients induced by lightning and other transient voltage events. For surface mounted applications in order to optimize board space.

### Features

- Halogen free and RoHS compliant
- Low profile package
- Built-in strain relief Design
- Low inductance
- Excellent clamping capability
- 600W peak pulse power capability at 10/1000 $\mu$ s waveform, repetition rate (duty cycle): 0.01%
- Fast response time: typically less than 1.0ps from 0V to VB min
- Typical IR less than 1 $\mu$ A above 10V devices
- Peak 260 $^{\circ}$ C high temperature Reflow Soldering withstanding
- Meet MSL level1, per J-STD-020
- IEC-61000-4-2 ESD 30kV(Air), 30kV (Contact)
- Unit Weight: 0.07g/PCS



### Applications

TVS components are ideal for the protection of I/O Interfaces, VCC bus and other vulnerable circuits used in telecom, computer, Industrial and consumer electronic applications.

### Maximum Ratings and Characteristics

Ratings at 25 $^{\circ}$ C ambient temperature unless otherwise specified.

Rating	Symbol	Value	Units
Peak pulse power dissipation at 10/1000 $\mu$ s waveform (Note1, Note2, Fig.1)	P <sub>PPM</sub>	Minimum 600	Watts
Peak pulse current of at 10/1000 $\mu$ s waveform (Note 1, Fig.3)	I <sub>PPM</sub>	See Table	Amps
Steady state power dissipation at T <sub>A</sub> =50 $^{\circ}$ C (Fig.5)	P <sub>M(AV)</sub>	5.0	Watts
Maximum Instantaneous Forward Voltage at 25A for Unidirectional Only	V <sub>F</sub>	3.5/5.0	V
Peak forward surge current, 8.3ms single half sine-wave superimposed on rated load, (JEDEC Method) (Note3, Fig.6)	I <sub>FSM</sub>	60	Amps
Operating junction and Storage Temperature Ranges.	T <sub>J</sub> , T <sub>STG</sub>	-55 to +150	$^{\circ}$ C
Typical thermal resistance junction to lead	R <sub><math>\theta</math>JL</sub>	30	$^{\circ}$ C/W
Typical thermal resistance junction to ambient	R <sub><math>\theta</math>JA</sub>	120	$^{\circ}$ C/W

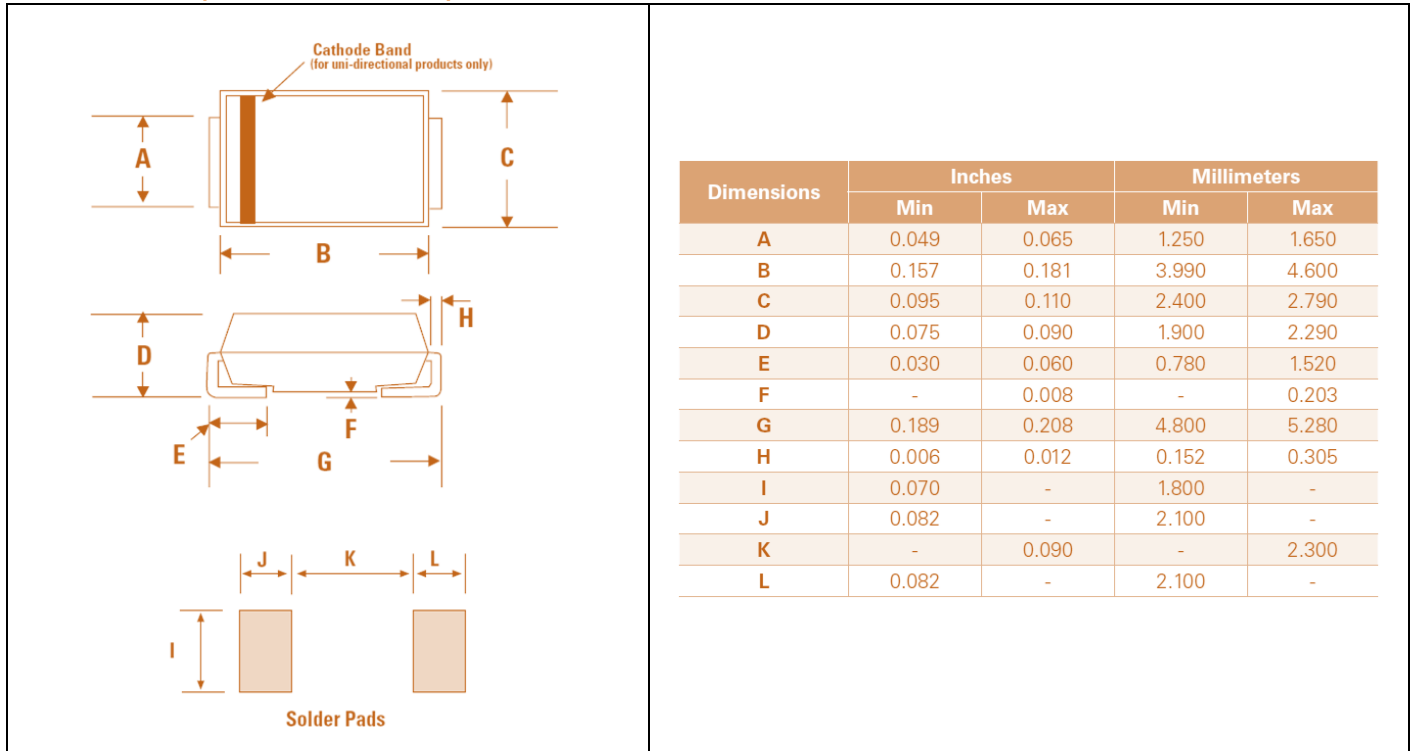
Notes: 1. Non-repetitive current pulse, per Fig.3 and Derating above T<sub>A</sub>=25 $^{\circ}$ C per Fig.2.

2. Each terminal is surface Mounted on the 5.0mm $\times$ 5.0mm (0.03mm thick) copper pads.

3. 8.3ms single half sine-wave or equivalent square wave, duty cycle=4 pulses per minutes maximum.

4. V<sub>F</sub> < 3.5V for single die parts and V<sub>F</sub> < 5.0V for stacked-die parts.

### Dimensions (SMA/DO-214AC)



### Electrical Characteristics (TA=25°C)

Part Number		Device Code		Reverse Stand-Off Voltage	Breakdown Voltage @I <sub>T</sub>		Test Current	Maximum Clamping Voltage @I <sub>PP</sub>	Peak Pulse Current	Reverse Leakage @V <sub>R</sub>
Uni	Bi	UNI	BI	V <sub>R</sub> (V)	Min(V)	Max(V)	I <sub>T</sub> (mA)	V <sub>C</sub> (V)	I <sub>PP</sub> (A)	I <sub>R</sub> (μA)
P6SMAJ5.0A	P6SMAJ5.0CA	AE	WE	5.0	6.40	7.00	10	9.2	65.3	800
P6SMAJ6.0A	P6SMAJ6.0CA	AG	WG	6.0	6.67	7.37	10	10.3	58.3	800
P6SMAJ6.5A	P6SMAJ6.5CA	AK	WK	6.5	7.22	7.98	10	11.2	53.6	500
P6SMAJ7.0A	P6SMAJ7.0CA	AM	WM	7.0	7.78	8.60	10	12.0	50.0	200
P6SMAJ7.5A	P6SMAJ7.5CA	AP	WP	7.5	8.33	9.21	1	12.9	46.6	100
P6SMAJ8.0A	P6SMAJ8.0CA	AR	WR	8.0	8.89	9.83	1	13.6	44.2	50
P6SMAJ8.5A	P6SMAJ8.5CA	AT	WT	8.5	9.44	10.40	1	14.4	41.7	20
P6SMAJ9.0A	P6SMAJ9.0CA	AV	WV	9.0	10.00	11.10	1	15.4	39.0	10
P6SMAJ10A	P6SMAJ10CA	AX	WX	10.0	11.10	12.30	1	17.0	35.3	5
P6SMAJ11A	P6SMAJ11CA	AZ	WZ	11.0	12.20	13.50	1	18.2	33.0	1
P6SMAJ12A	P6SMAJ12CA	BE	XE	12.0	13.30	14.70	1	19.9	30.2	1
P6SMAJ13A	P6SMAJ13CA	BG	XG	13.0	14.40	15.90	1	21.5	28.0	1
P6SMAJ14A	P6SMAJ14CA	BK	XK	14.0	15.60	17.20	1	23.2	25.9	1
P6SMAJ15A	P6SMAJ15CA	BM	XM	15.0	16.70	18.50	1	24.4	24.6	1
P6SMAJ16A	P6SMAJ16CA	BP	XP	16.0	17.80	19.70	1	26.0	23.1	1
P6SMAJ17A	P6SMAJ17CA	BR	XR	17.0	18.90	20.90	1	27.6	21.8	1
P6SMAJ18A	P6SMAJ18CA	BT	XT	18.0	20.00	22.10	1	29.2	20.6	1
P6SMAJ20A	P6SMAJ20CA	BV	XV	20.0	22.20	24.50	1	32.4	18.6	1
P6SMAJ22A	P6SMAJ22CA	BX	XX	22.0	24.40	26.90	1	35.5	16.9	1

### Electrical Characteristics (TA=25°C)

Part Number		Device Code		Reverse Stand-Off Voltage	Breakdown Voltage @I <sub>T</sub>		Test Current	Maximum Clamping Voltage @I <sub>PP</sub>	Peak Pulse Current	Reverse Leakage @V <sub>R</sub>
Uni	Bi	UNI	BI	V <sub>R</sub> (V)	Min(V)	Max(V)	I <sub>T</sub> (mA)	V <sub>C</sub> (V)	I <sub>PP</sub> (A)	I <sub>R</sub> (μA)
P6SMAJ24A	P6SMAJ24CA	BZ	XZ	24.0	26.70	29.50	1	38.9	15.5	1
P6SMAJ26A	P6SMAJ26CA	CE	YE	26.0	28.90	31.90	1	42.1	14.3	1
P6SMAJ28A	P6SMAJ28CA	CG	YG	28.0	31.10	34.40	1	45.4	13.3	1
P6SMAJ30A	P6SMAJ30CA	CK	YK	30.0	33.30	36.80	1	48.4	12.4	1
P6SMAJ33A	P6SMAJ33CA	CM	YM	33.0	36.70	40.60	1	53.3	11.3	1
P6SMAJ36A	P6SMAJ36CA	CP	YP	36.0	40.00	44.20	1	58.1	10.4	1
P6SMAJ40A	P6SMAJ40CA	CR	YR	40.0	44.40	49.10	1	64.5	9.3	1
P6SMAJ43A	P6SMAJ43CA	CT	YT	43.0	47.80	52.80	1	69.4	8.7	1
P6SMAJ45A	P6SMAJ45CA	CV	YV	45.0	50.00	55.30	1	72.7	8.3	1
P6SMAJ48A	P6SMAJ48CA	CX	YX	48.0	53.30	58.90	1	77.4	7.8	1
P6SMAJ51A	P6SMAJ51CA	CZ	YZ	51.0	56.70	62.70	1	82.4	7.3	1
P6SMAJ54A	P6SMAJ54CA	RE	ZE	54.0	60.00	66.30	1	87.1	6.9	1
P6SMAJ58A	P6SMAJ58CA	RG	ZG	58.0	64.40	71.20	1	93.6	6.5	1
P6SMAJ60A	P6SMAJ60CA	RK	ZK	60.0	66.70	73.70	1	96.8	6.2	1
P6SMAJ64A	P6SMAJ64CA	RM	ZM	64.0	71.10	78.60	1	103.0	5.9	1
P6SMAJ70A	P6SMAJ70CA	RP	ZP	70.0	77.80	86.00	1	113.0	5.3	1
P6SMAJ75A	P6SMAJ75CA	RR	ZR	75.0	83.30	92.10	1	121.0	5.0	1
P6SMAJ78A	P6SMAJ78CA	RT	ZT	78.0	86.70	95.80	1	126.0	4.8	1
P6SMAJ85A	P6SMAJ85CA	RV	ZV	85.0	94.40	104.0	1	137.0	4.4	1
P6SMAJ90A	P6SMAJ90CA	RX	ZX	90.0	100.0	111.0	1	146.0	4.1	1
P6SMAJ100A	P6SMAJ100CA	RZ	ZZ	100.0	111.00	123.00	1	162.0	3.7	1
P6SMAJ110A	P6SMAJ110CA	SE	VE	110.0	122.0	135.0	1	177.0	3.4	1
P6SMAJ120A	P6SMAJ120CA	SG	VG	120.0	133.0	147.0	1	193.0	3.1	1
P6SMAJ130A	P6SMAJ130CA	SK	VK	130.0	144.0	159.0	1	209.0	2.9	1
P6SMAJ150A	P6SMAJ150CA	SM	VM	150.0	167.0	185.0	1	243.0	2.5	1
P6SMAJ160A	P6SMAJ160CA	SP	VP	160.0	178.0	197.0	1	259.0	2.3	1
P6SMAJ170A	P6SMAJ170CA	SR	VR	170.0	189.0	209.0	1	275.0	2.2	1
P6SMAJ180A	P6SMAJ180CA	ST	VT	180.0	201.0	222.0	1	292.0	2.1	1
P6SMAJ190A	P6SMAJ190CA	SU	YU	190.0	211.0	233.0	1	308.0	2.0	1
P6SMAJ200A	P6SMAJ200CA	SV	VV	200.0	224.0	247.0	1	324.0	1.9	1
P6SMAJ210A	P6SMAJ210CA	SW	YW	210.0	237.0	263.0	1	340.0	1.8	1
P6SMAJ220A	P6SMAJ220CA	GE	VX	220.0	246.0	272.0	1	356.0	1.7	1
P6SMAJ250A	P6SMAJ250CA	SZ	VZ	250.0	279.0	309.0	1	405.0	1.5	1

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

Figure 1. Peak Pulse Power Rating Curve

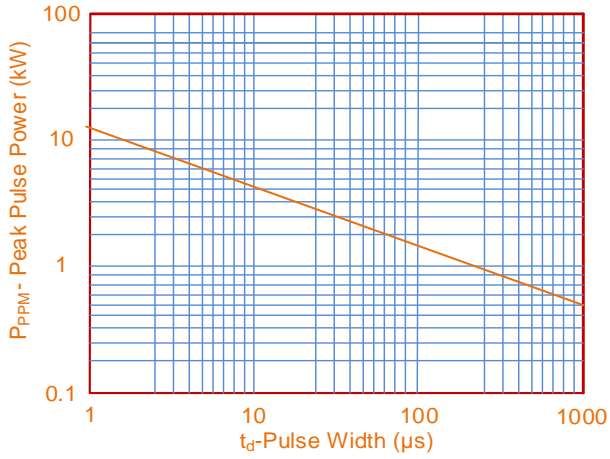


Figure 2. Pulse Derating Curve

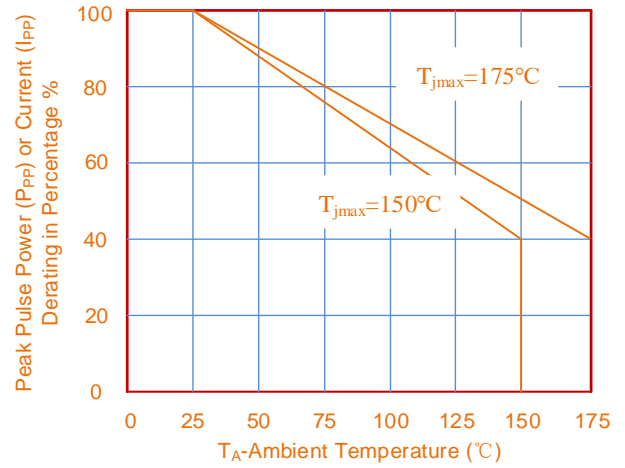


Figure 3. Pulse Waveform

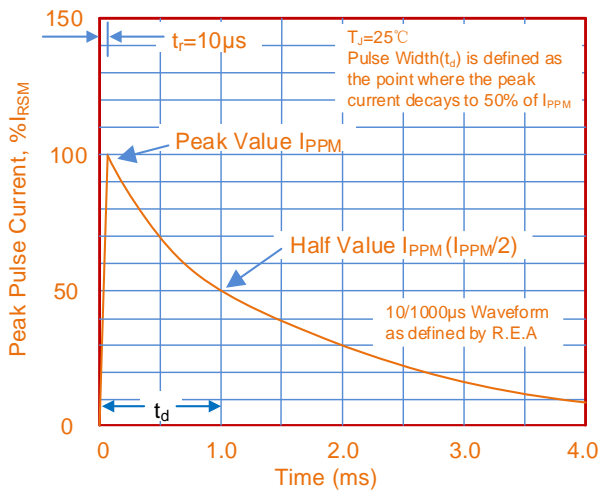


Figure 4. Typical Junction Capacitance

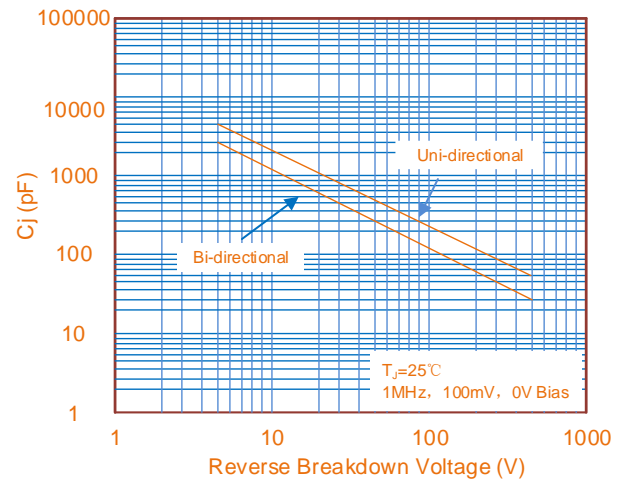


Figure 5. Steady State Power Dissipation Derating Curve

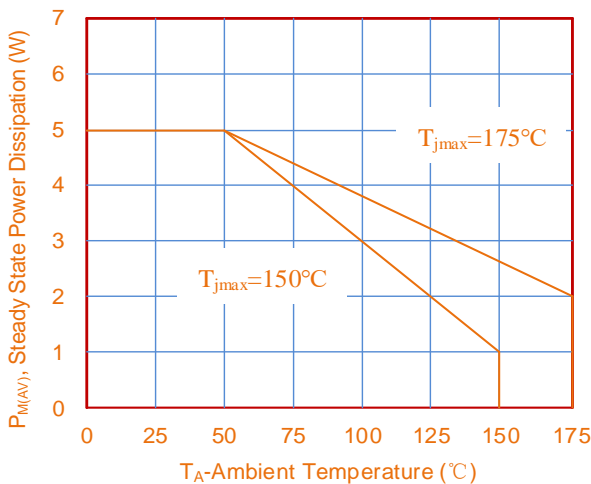
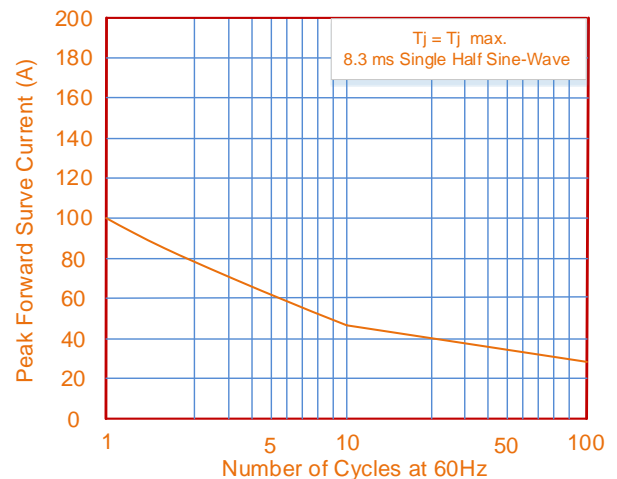
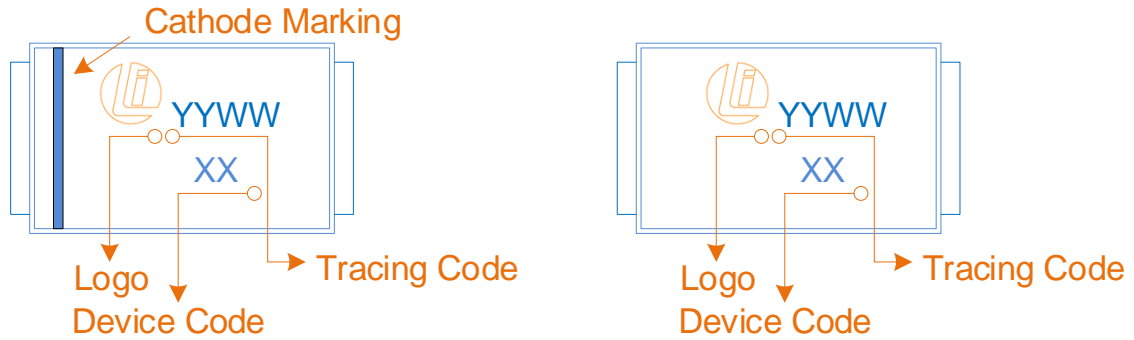


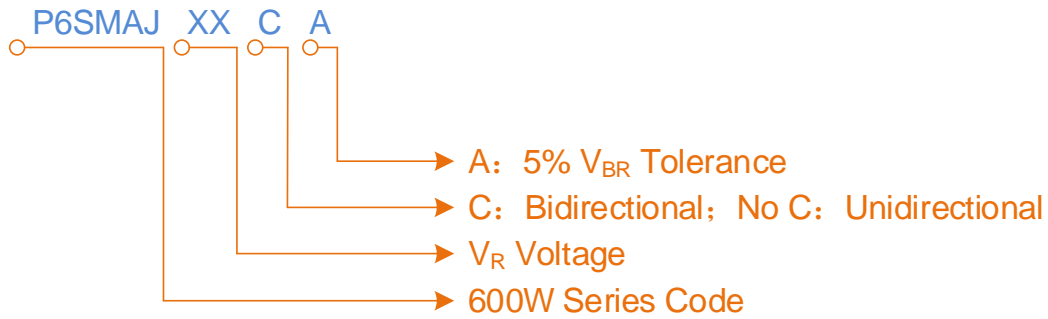
Figure 6. Maximum Non-Repetitive Forward Surge Current Uni-Directional Only



## Marking Code



## Part Number Code

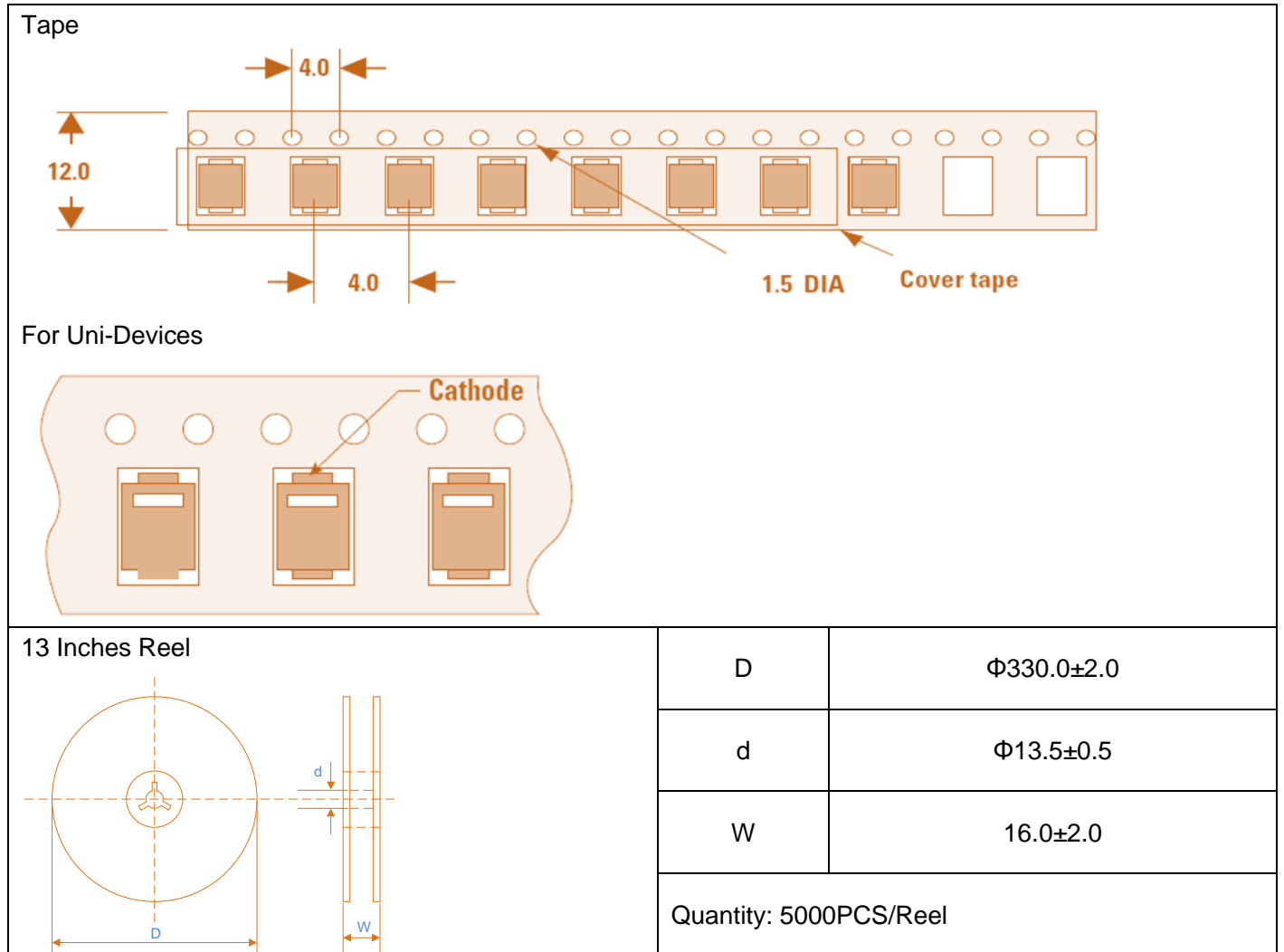


## Soldering Parameters



Reflow Condition		Lead-free Soldering
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 ( $T_A$ ) to peak)		3°C/second max
$T_{s(max)}$ to $T_A$ - Ramp-up Rate		3°C/second max
Reflow	- Temperature ( $T_A$ )	217°C
	- Time (min to max) ( $t_s$ )	60 – 150 seconds
Peak Temperature ( $T_p$ )		260°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 Temperature		260°C

## Packaging Specification



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