1. Synopsis

1-1. General Description

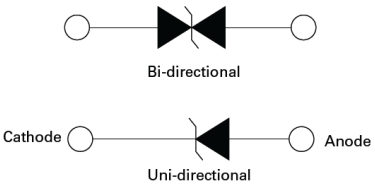
SMAJ

The SMA6J Series Has Been Designed To Protect Sensitive Equipment Against Electro-Static Discharges According to IEC 61000-4-2, MIL STD 883 Method 3015, And Electrical Over Stress Such as IEC 61000-4-4 and 5. They Are Generally For Surges Below 600W(10/1000 μs.).

This Technology Makes It Compatible With High-End Equipment And SMPS Where Low Leakage Current And High Junction Temperature Are Required To Provide Reliability And Stability Over Time. Their Low Clamping Voltages Provide a Better Safety Margin to Protect Sensitive Circuits With Extended Life Time Expectancy.

Packaged in SMAJ, This Minimizes PCB Space Consumption.

1-2. Feature List



- Bi / Uni-Directional Configurations
- Plastic Package Has Underwriters
- Glass Passivated Chip Junction in SMAJ Package
- 600 Watts Peak Pulse Power (t_p = 10/1000uS)
- Halogen Free and RoHS Compliant
- Fast Response Time: Typically Less Than
  1.0ps From 0 Volts to V(BR) For Uni-Directional and
  5.0ns For Bi-Directional Types
- High Temperature Soldering Guaranteed:
  250°C / 10 Seconds at Terminals

1-3. Applications

- Power Supply Protection
- Industrial Application
- Power Manager

1-4. IEC Compatibility

- EN61000-4
- 61000-4-2(ESD): Contact: >±30KV, Air: >±30KV
- 61000-4-4(EFT)
- 61000-4-5(Surge):10/1000uS

1-5. Mechanical Characteristics

- Molded JEDEC SMAJ Package
- Packing: Tape and Reel
- Flammability Rating UL 94V-0
- Halogen Free
- JEDEC MSL Classification: Level 1

2. Contents

3. Electrical Property

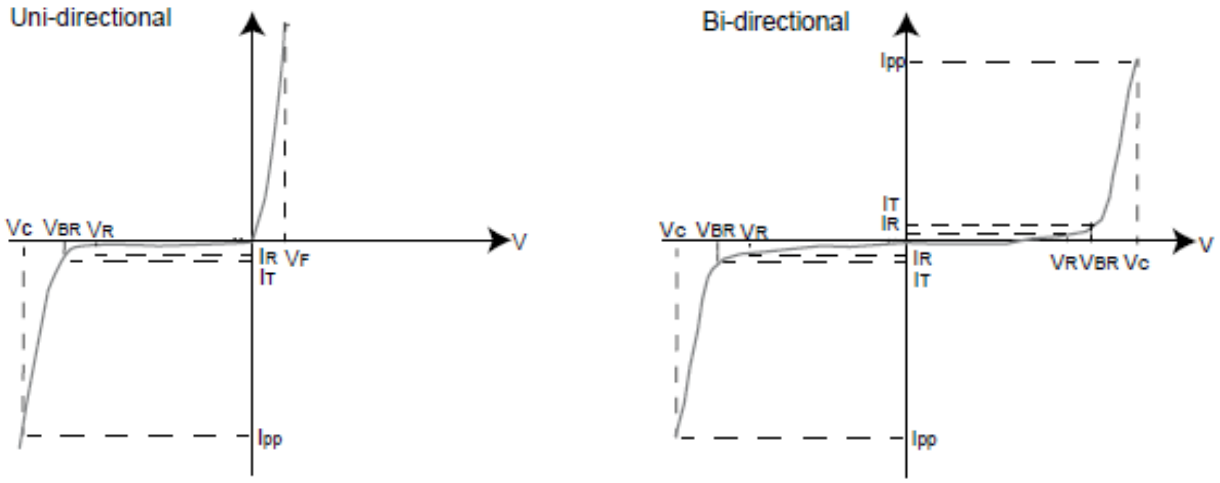
3-1. Absolute Maximum Ratings

Maximum Ratings@25°C Unless Otherwise Specified				
Parameter	**Symbol**		**Value**	**Units**
Peak Pulse Power	P_{PP}	(tp = 10/1000us)	600	W
		(tp = 8/20us)	3000	
Peak Forward Surge Current,8.3mS Signal Half Sine Wave Uni-Directional Only	I_{FSM}		100	A
Maximum Instantaneous Forward Voltage at 100A For Uni-Direction Only	V_F		3.5	V
Power Dissipation on Infinite Heatsink	P_D		3	W
Peak Pulse Voltage (IEC61000-4-2 Contact)	V_{PP}		± 30	KV
Operating Temperature	T_J		-65~+150	°C
Storage Temperature	T_{STG}			

3-2. Electrical Characteristics (Tamb=25°C)

		Reverse Stand-off Voltage	**Breakdown Voltage**		**Test Current**	**Reverse Leakage**	**Max. Clamp Voltage**	**Peak Pulse Current**		
			V_{BR} @ I_T							
Part Number		V_{RWM}	Min	Max	I_T	I_R @ V_{RWM}	V_C @ I_{PP}	I_{PP} (10/1000uS)	**Marking**	
Uni	Bi	V	V		mA	μA	V	A	Uni	Bi
600W Surface Mount Transient Voltage Suppressors NVS6A Series										
SMA6J12A	SMA6J12CA	12.0	13.30	14.70	1.0	0.2	19.9	30.2	GEE	BEE
SMA6J13A	SMA6J13CA	13.0	14.40	15.90	1.0	0.2	21.5	27.9	GEG	BEB
SMA6J15A	SMA6J15CA	15.0	16.70	18.50	1.0	0.2	24.4	24.6	GEM	BEM
SMA6J20A	SMA6J20CA	20.0	22.20	24.50	1.0	0.2	32.4	18.5	GEV	BEV
SMA6J24A	SMA6J24CA	24.0	26.70	29.50	1.0	0.2	38.9	15.4	GEZ	BEZ
SMA6J33A	SMA6J33CA	33.0	36.70	40.60	1.0	0.2	53.3	11.3	GFM	BFM
SMA6J36A	SMA6J36CA	36.0	40.00	44.20	1.0	0.2	58.1	10.3	GFP	BFP
SMA6J40A	SMA6J40CA	40.0	44.40	49.10	1.0	0.2	64.5	9.3	GFR	BFR
SMA6J43A	SMA6J43CA	43.0	47.80	52.80	1.0	0.2	69.4	8.6	GFT	BFT
SMA6J45A	SMA6J45CA	45.0	50.00	55.30	1.0	0.2	72.7	8.3	GFV	BFV
SMA6J48A	SMA6J48CA	48.0	53.30	58.90	1.0	0.2	77.4	7.8	GFX	BFX
SMA6J51A	SMA6J51CA	51.0	56.70	62.70	1.0	0.2	82.4	7.3	GFZ	BFZ
SMA6J54A	SMA6J54CA	54.0	60.00	66.30	1.0	0.2	87.1	6.9	GGE	BBE
SMA6J58A	SMA6J58CA	58.0	64.40	71.20	1.0	0.2	93.0	6.4	GGG	BGG

3-3. 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
I_R	**Reverse Leakage Current**-Current Measured at V_R
V_F	**Forward Voltage Drop for Uni-directional**
V_{BR}	**Breakdown Voltage**-Maximum Voltage that Flows Though the TVS at a Specified Test Current(I_T)
V_C	**Clamping Voltage**-Peak Voltage Measured Across the Suppressor at a Specified Ippm (Peak Impulse Current)

3-4. Ratings and Characteristics Curve (TA=25°C unless otherwise noted)

Fig 1. Peak Pulse Power Dissipation vs. Initial Junction Temperature

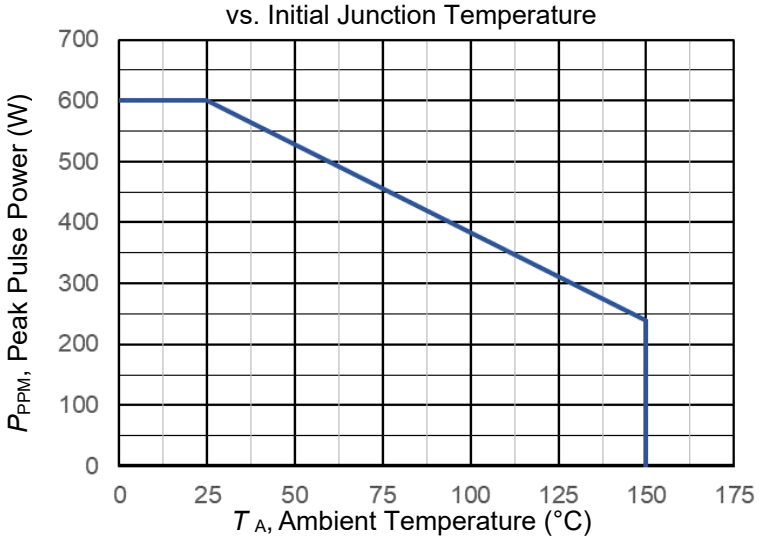


Fig 2. Peak Pulse Power Rating Curve

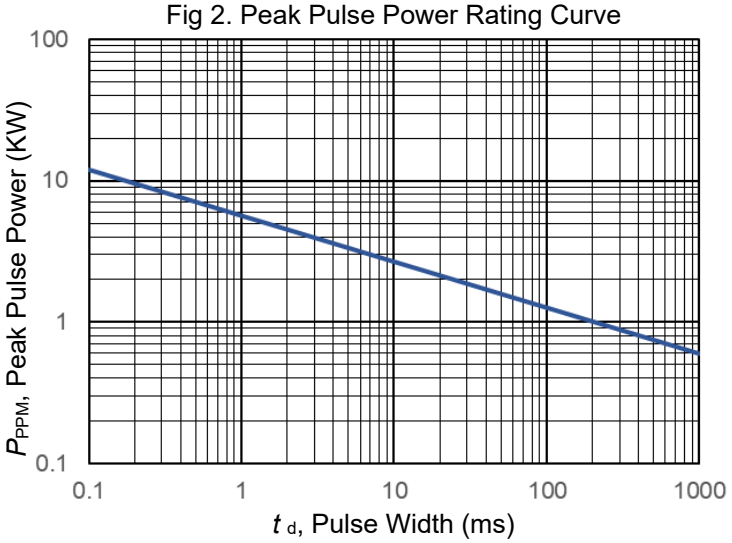


Fig 3. Peak Forward Voltage Drop vs. Peak Forward Current

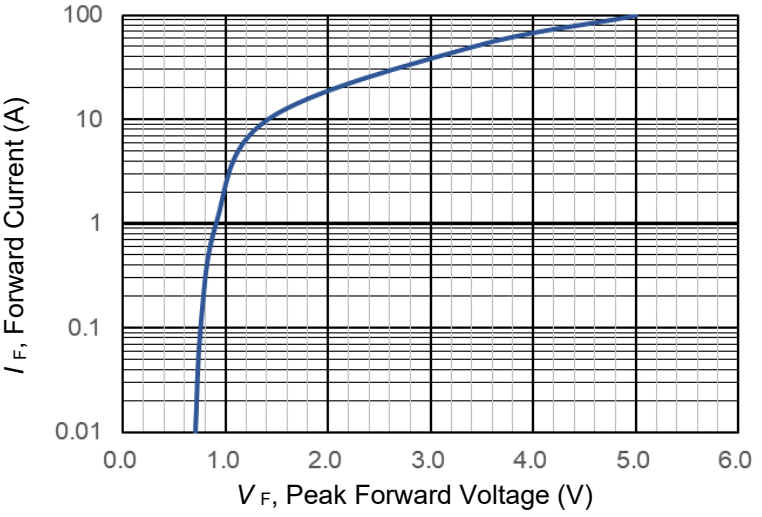


Fig 4. Maximum Non-repetitive Forward Surge Current Uni-direction Only

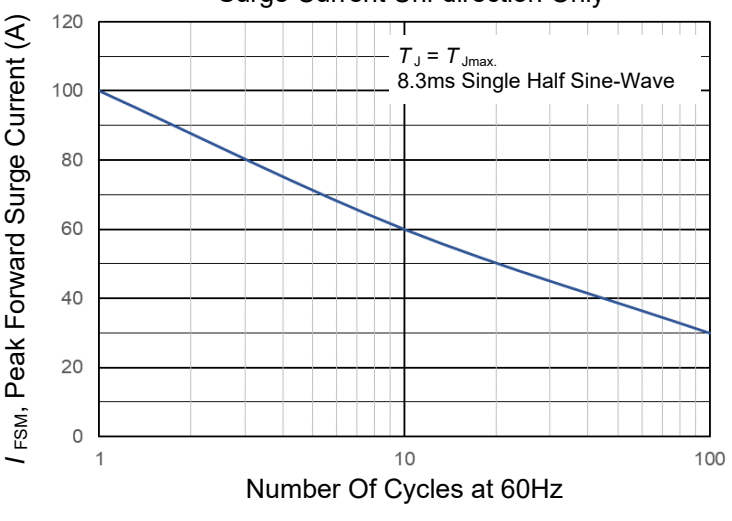


Fig 5. Forward Voltage Curve

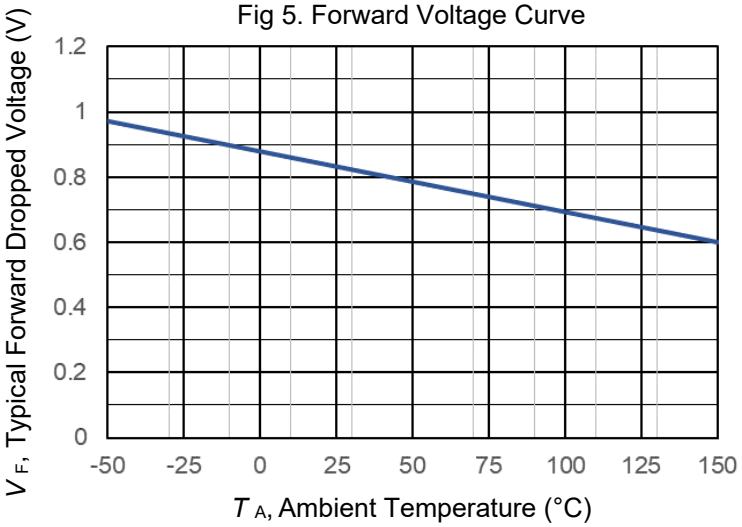
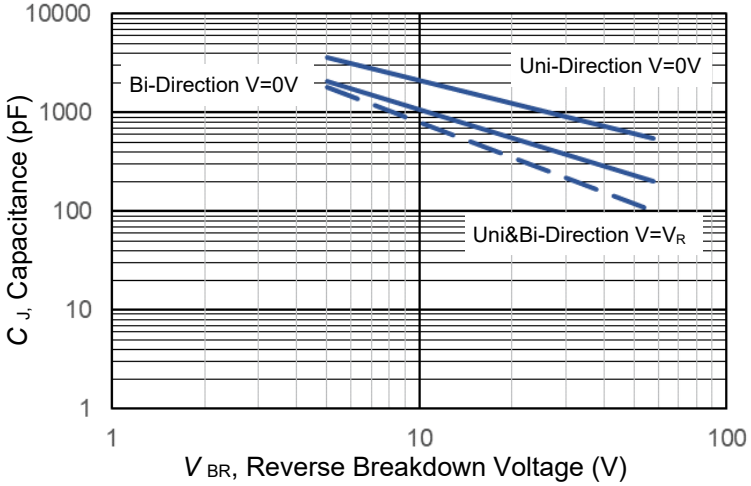
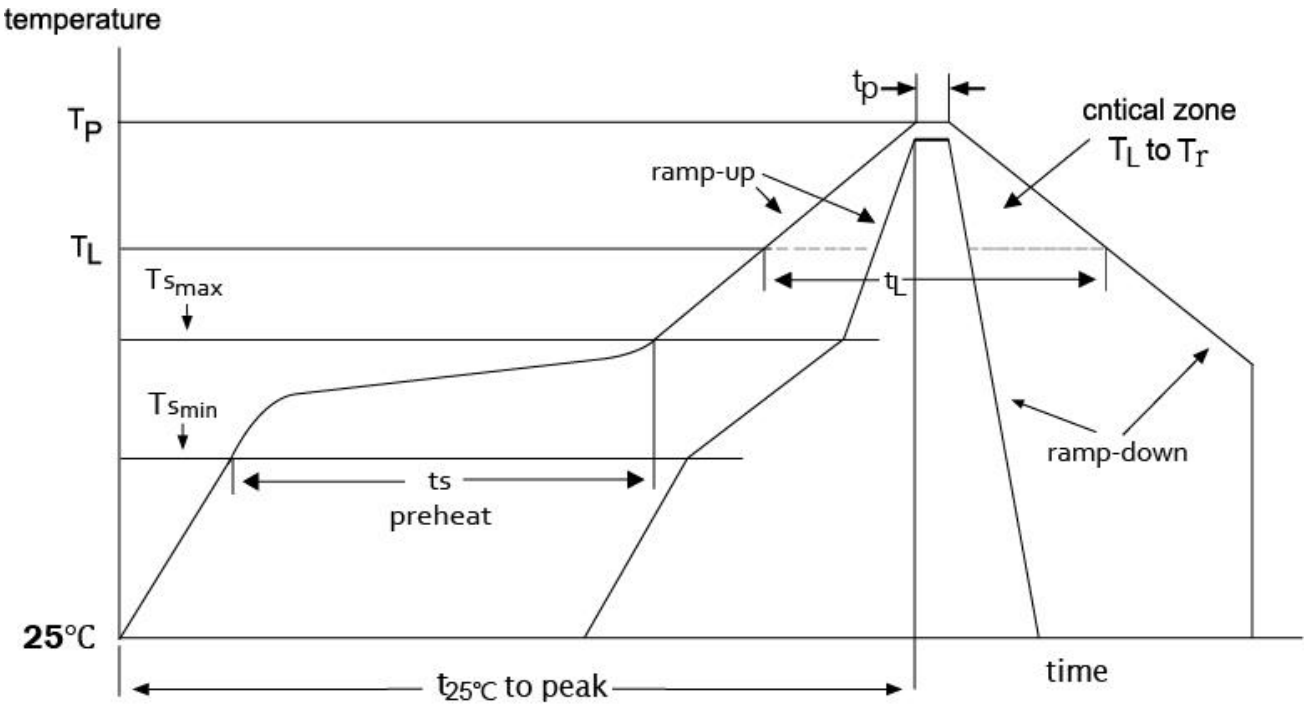


Fig 6. Typical Junction Capacitance



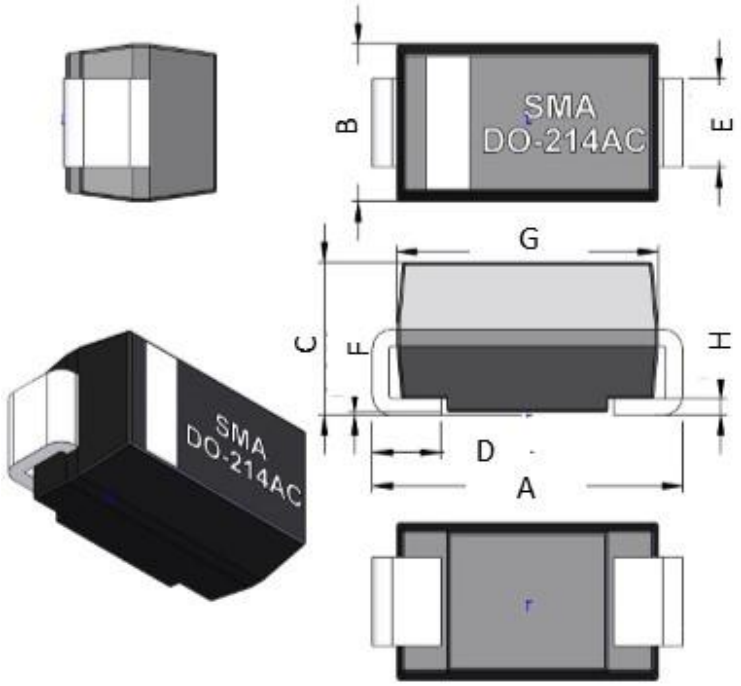
4. Soldering Parameters

Profile Feature	SnPb eutectic assembly	Pb-free assembly
Average ramp-up rate (Tsmax to Tp)	3 °C/s maximum	3 °C/s maximum
Preheat		
Temperature minimum (Tsmin)	100 °C	150 °C
Temperature maximum (Tsmax)	150 °C	200 °C
Time (tsmin to tsmax)	60 s to 120 s	60 s to 180 s
Time maintained above		
Temperature (TL)	183 °C	217 °C
Time (tL)	60 s to 150 s	60 s to 150 s
Peak/classificationtemperature(T)	235 °C	260 °C
Number of allowed reflow cycles	3	3
Time within 5 °C of actual peak temperature (tp)	10 s to 30 s	20 s to 40 s
Ramp-down rate	6 °C/s maximum	6 °C/s maximum
Time 25 °C to peak temperature	6 minutes maximum	8 minutes maximum



5. Package Information

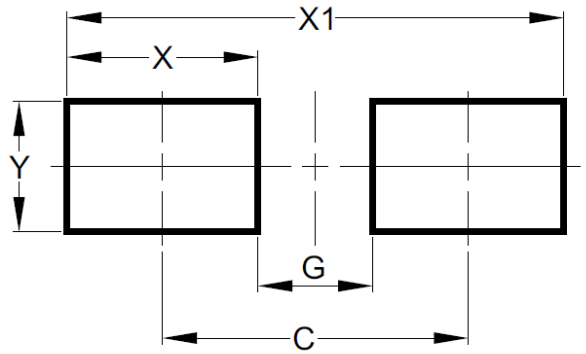
5-1. Dimension



SMAJ		
Dim	Min	Max
A	4.75	5.25
B	2.55	2.85
C	2.00	2.50
D	0.85	1.55
E	1.35	1.65
F	-	0.40
G	4.25	4.55
H	0.15	0.30

Unit:mm

5-2. PCB Pad Layout Recommendation

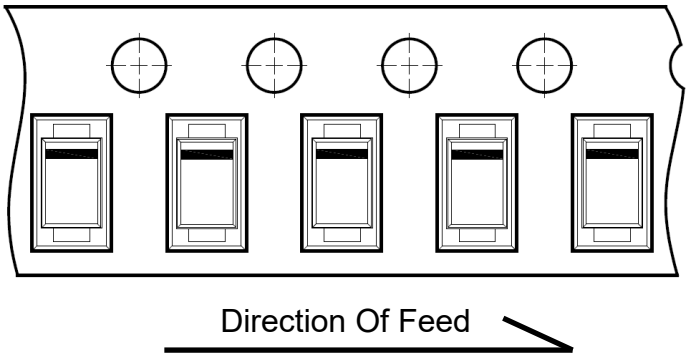


Dimension	Value
C	4.00
G	1.50
X	2.50
X1	6.50
Y	1.70

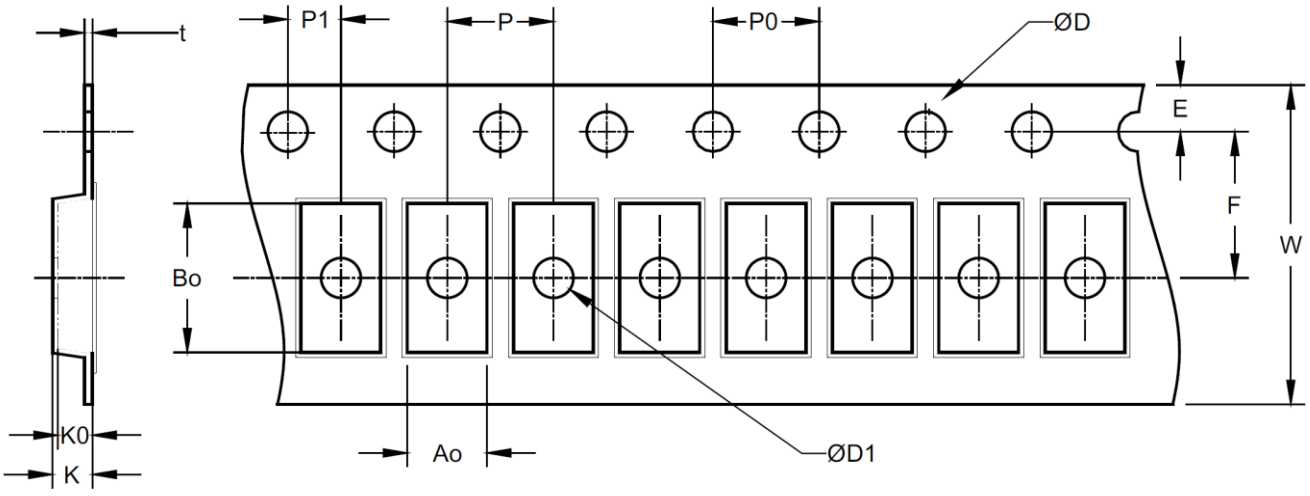
Unit:mm

6. Packing

6-1. Taping and Reel Specification

Taping Width	Tape Orientation
12mm	

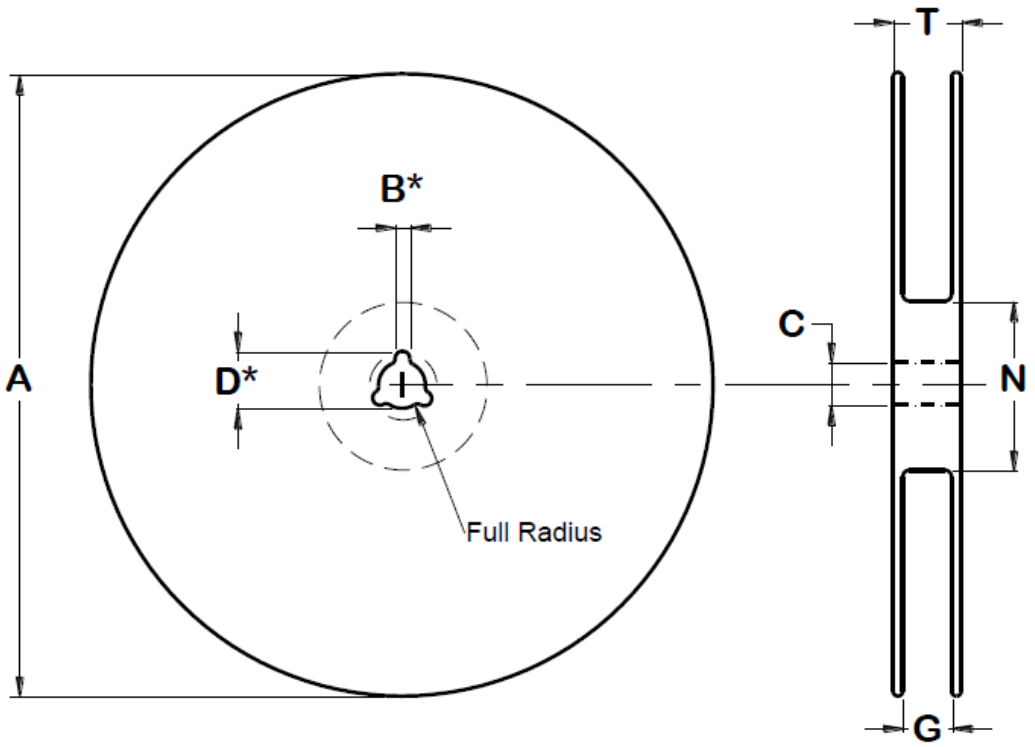
6-2. Embossed Carrier Tape Specification



Unit:mm

Dimension	W	Ao	Bo	D	D1	E	F	K	P	P0	P1	t	W
Value	12 mm	3.0 ±0.10	5.6 ±0.10	1.5 ±0.10	1.5 Min	1.75 ±0.10	5.5 ±0.05	1.2 ±0.10	4.0 ±0.10	4.0 ±0.05	2.0 ±0.05	0.25 ±0.05	12 ±0.2
A0 / B0 / K0	Determined by Component Size. The Clearance Between the Component And The Cavity Must Comply to The Rotational And Lateral Movement Requirement Provided in Figures in The "Maximum Component Movement in Tape Pocket" Section.												

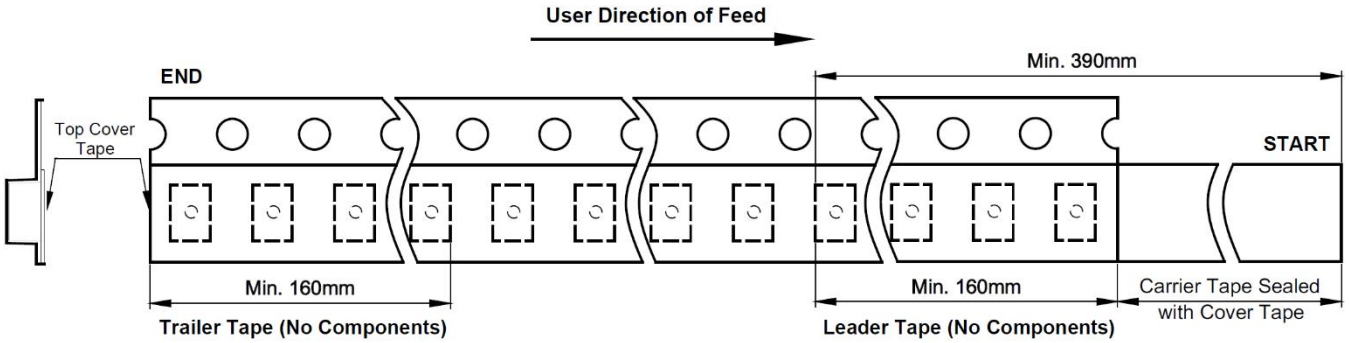
6-3. Surface Mount Reel Specification



Unit:mm

Dimension	Tape Width	Reel Size	A	B	C	D	N	G	T
Value	12 mm	13"	330 ±2	2.0 +0.5-0	13 +0.5-0.2	20.5 ±0.2	100 ±2	12.4 +2.0 -0.0	18.4

6-4. Tape Leader and Trailer Specification



7. Family Members

Part Number	Component Package	Watts	Working Voltage V_{RWM}(V)
SMF Series	SOD-123FL	300W	5.0V ~ 190V
NVS4M Series		400W	5.0V ~ 58V
NVS4D Series	DFN2020-3L	400W	3.3V ~ 58V
SMAJ Series	**SMAJ**	400W	5.0V ~ 190V
SMA6J Series		**600W**	**12V ~ 58V**
NVS6A Series	SMAF	600W	12V ~ 58V
SMBJ Series	SMBJ	600W	5.0V ~ 190V
SMB10J Series		1000W	
NVS15B Series	SMBF	1500W	5.0V ~ 58V
SMPJ Series	TO-277	1500W	5.0V ~ 200V
SMCJ Series	SMCJ	1500W	5.0V ~ 190V
2.0SMCJ Series		2000W	
3.0SMCJ Series		3000W	
4.0SMCJ Series		4000W	12V ~ 58V
5.0SMCJ Series		5000W	12V ~ 170V
6KA Series		6600W	21V ~ 58V
5KP Series	P600	5000W	5.0V ~ 180V
10KP Series		10000W	17V ~ 180V
15KP Series		15000W	
20KP Series		20000W	20V ~ 180V

8. Ordering Information

Part Number	Marking Code	Quantity	Component Package	Packaging Option
SMA6JxxA	Series	5,000PCS	SMAJ	13"reel
SMA6JXXCA				

9. Version

9-1. History

Version	Date	File No.	Recording	Basis
2.0	13-May-2021	F12122X	New Develop	Market
2.1	14-Jul-2021	F12122X	Update Version	System

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