

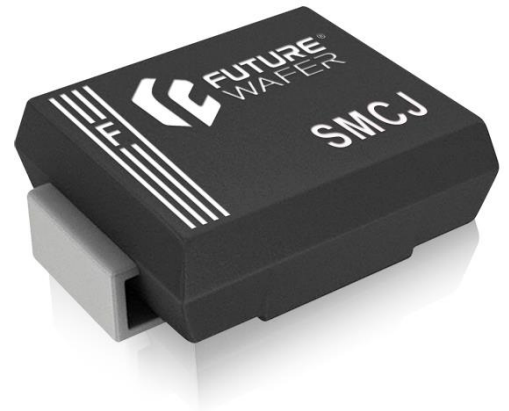
1. Synopsis

1-1. General Description

The 4.0SMCJ 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 4000 W (10/1000 μ s).

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.

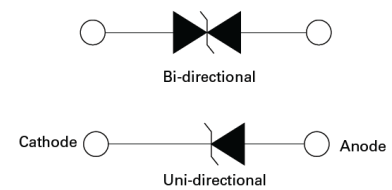
Packaged in SMCJ, This Minimizes PCB Space Consumption.



SMCJ

1-2. Feature List

- Bi / Uni-Directional Configurations
- Plastic Package Has Underwriters
- Glass Passivated Chip Junction in SMCJ Package
- 4000 Watts Peak Pulse Power ($t_p = 10/1000\mu$ s)
- 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: $>\pm 30$ KV, Air: $>\pm 30$ KV
- 61000-4-4(EFT)
- 61000-4-5(Surge): 10/1000 μ s

1-5. Mechanical Characteristics

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



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3. Electrical Property

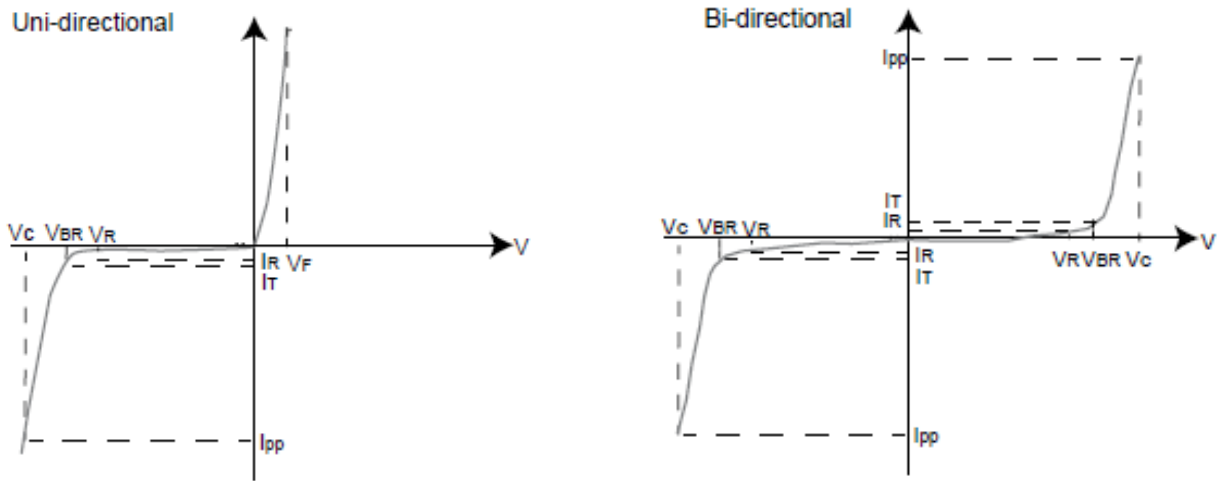
3-1. Absolute Maximum Ratings

Maximum Ratings@25°C Unless Otherwise Specified			
Parameter	Symbol	Value	Units
Peak Pulse Power (tp=10/1000us)	P_{PP}	4000	W
Power Dissipation On Infinite Heat Sink at $T_L = 50^\circ\text{C}$	P_D	6.5	
Peak Forward Surge Current, 8.3ms Signal Half Sine Wave Uni-Directional Only	I_{FSM}	300	A
Maximum instantaneous Forward Voltage at 100A For Uni-Direction Only	V_F	3.5	V
Operating Temperature	T_J	-55~+150	°C
Storage Temperature	T_{STG}		
Typical Thermal Resistance Junction to Lead	$R_{\theta JL}$	15	°C/W
Typical Thermal Resistance Junction to Ambient	$R_{\theta JA}$	75	

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

Part Number	Reverse Stand-off Voltage		Breakdown Voltage		Test Current	Reverse Leakage	Max. Clamp Voltage	Peak Pulse Current	Marking	
	V_{RWM}	$V_{BR} @ I_T$	Min	Max	I_T	$I_R @ V_{RWM}$	$V_C @ I_{PP}$	$I_{PP(10/1000\mu S)}$	Uni	Bi
									V	V
4000 W Surface Mount Transient Voltage Suppressors 4.0SMCJ SERIES										
4.0SMCJ12A	4.0SMCJ12CA	12.0	13.30	14.70	1.0	1.0	19.9	201.0	UEE	FEE
4.0SMCJ13A	4.0SMCJ13CA	13.0	14.40	15.90	1.0	1.0	21.5	186.0	UEG	FEG
4.0SMCJ14A	4.0SMCJ14CA	14.0	15.60	17.20	1.0	1.0	23.2	172.4	UEK	FEK
4.0SMCJ15A	4.0SMCJ15CA	15.0	16.70	18.50	1.0	1.0	24.4	163.9	UEM	FEM
4.0SMCJ16A	4.0SMCJ16CA	16.0	17.80	19.70	1.0	1.0	26.0	153.8	UEP	FEP
4.0SMCJ17A	4.0SMCJ17CA	17.0	18.90	20.90	1.0	1.0	27.6	144.9	UER	FER
4.0SMCJ18A	4.0SMCJ18CA	18.0	20.00	22.10	1.0	1.0	29.2	137.0	UET	FET
4.0SMCJ20A	4.0SMCJ20CA	20.0	22.20	24.50	1.0	1.0	32.4	123.5	UEV	FEV
4.0SMCJ22A	4.0SMCJ22CA	22.0	24.40	26.90	1.0	1.0	35.5	112.7	UEX	FEX
4.0SMCJ24A	4.0SMCJ24CA	24.0	26.70	29.50	1.0	1.0	38.9	102.8	UEZ	FEZ
4.0SMCJ26A	4.0SMCJ26CA	26.0	28.90	31.90	1.0	1.0	42.1	95.0	UFE	FFE
4.0SMCJ28A	4.0SMCJ28CA	28.0	31.10	34.40	1.0	1.0	45.4	88.1	UFG	FFG
4.0SMCJ30A	4.0SMCJ30CA	30.0	33.30	36.80	1.0	1.0	48.4	82.6	UFK	FFK
4.0SMCJ33A	4.0SMCJ33CA	33.0	36.70	40.60	1.0	1.0	53.3	75.0	UFM	FFM
4.0SMCJ36A	4.0SMCJ36CA	36.0	40.00	44.20	1.0	1.0	58.1	68.8	UFP	FFP
4.0SMCJ40A	4.0SMCJ40CA	40.0	44.40	49.10	1.0	1.0	64.5	62.0	UFR	FFR
4.0SMCJ43A	4.0SMCJ43CA	43.0	47.80	52.80	1.0	1.0	69.4	57.6	UFT	FFT
4.0SMCJ45A	4.0SMCJ45CA	45.0	50.00	55.30	1.0	1.0	72.7	55.0	UFV	FFV
4.0SMCJ48A	4.0SMCJ48CA	48.0	53.30	58.90	1.0	1.0	77.4	51.7	UFX	FFX
4.0SMCJ51A	4.0SMCJ51CA	51.0	56.70	62.70	1.0	1.0	82.4	48.5	UFZ	FFZ
4.0SMCJ54A	4.0SMCJ54CA	54.0	60.00	66.30	1.0	1.0	87.1	45.9	UGE	FGE
4.0SMCJ58A	4.0SMCJ58CA	58.0	64.40	71.20	1.0	1.0	93.0	43.0	UGG	FFG

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 I_{ppm}
(Peak Impulse Current)

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

Fig 1. Peak Pulse Power Rating Curve

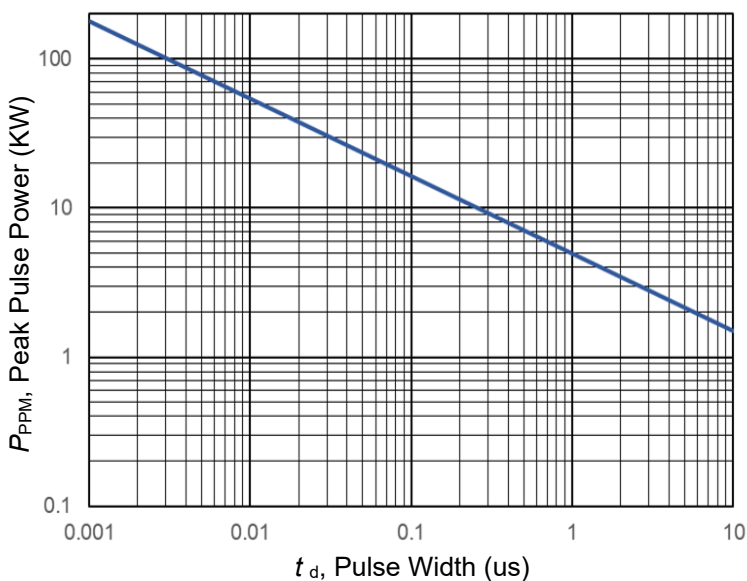
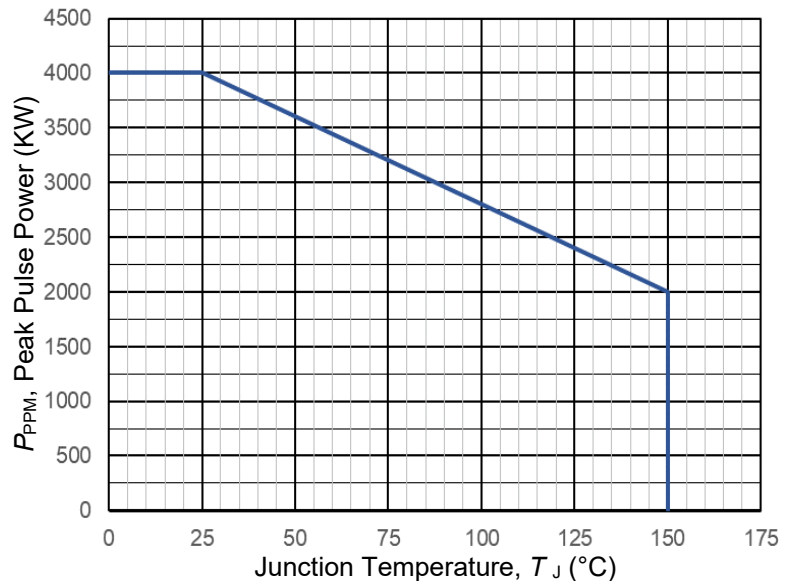


Fig 2. Pulse Derating Curve



3-4. Ratings and Characteristics Curve ($T_A=25^\circ\text{C}$ unless otherwise noted)

Fig 3. Maximum Non-repetitive Forward Surge Current Uni-direction Only

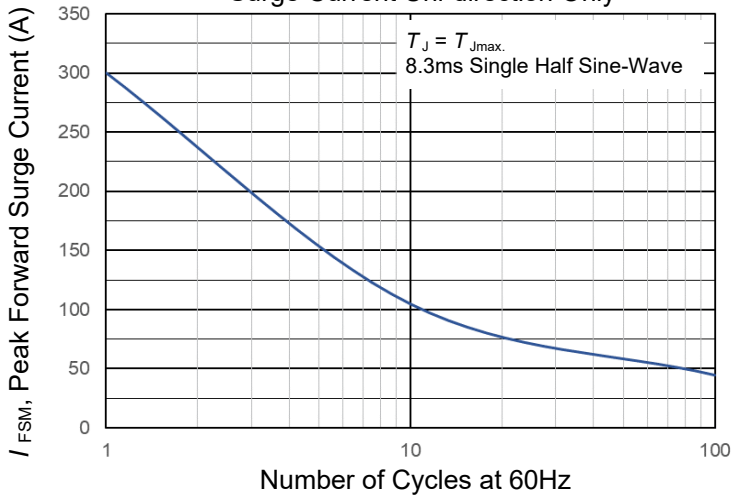


Fig 4. Typical Junction Capacitance

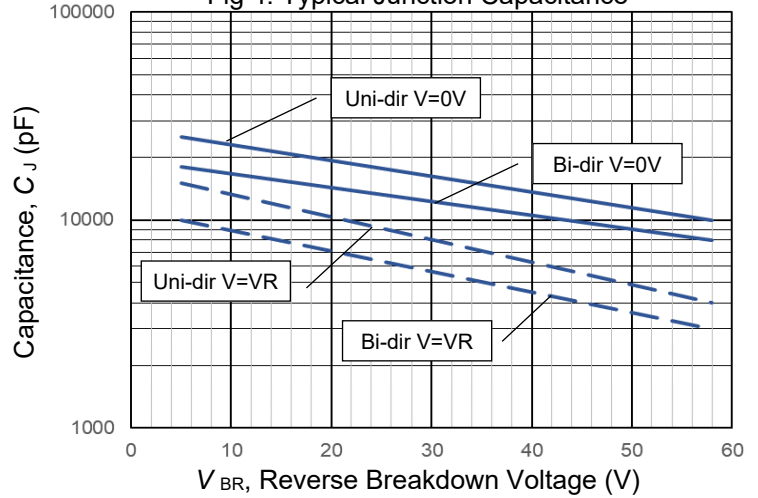


Fig 5. Maximum Forward Voltage

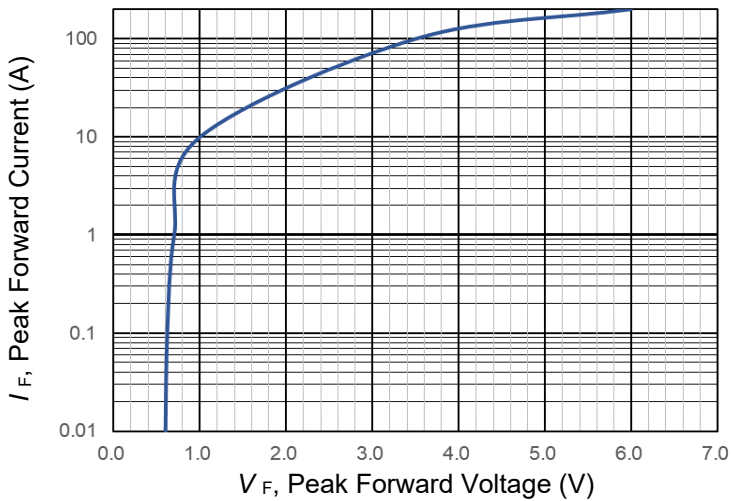


Fig 6. Typical Transient Thermal Impedance

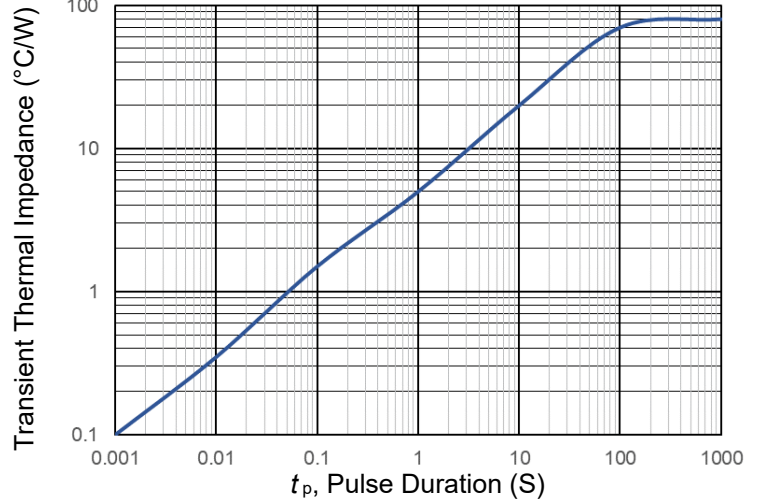
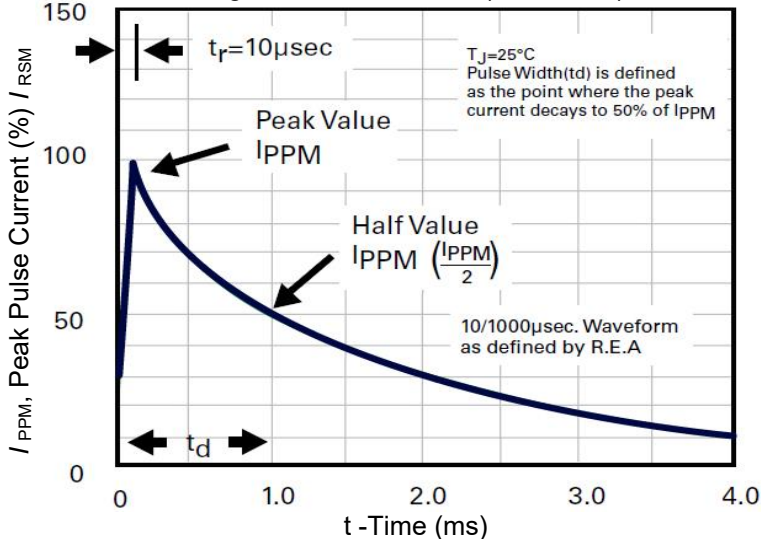


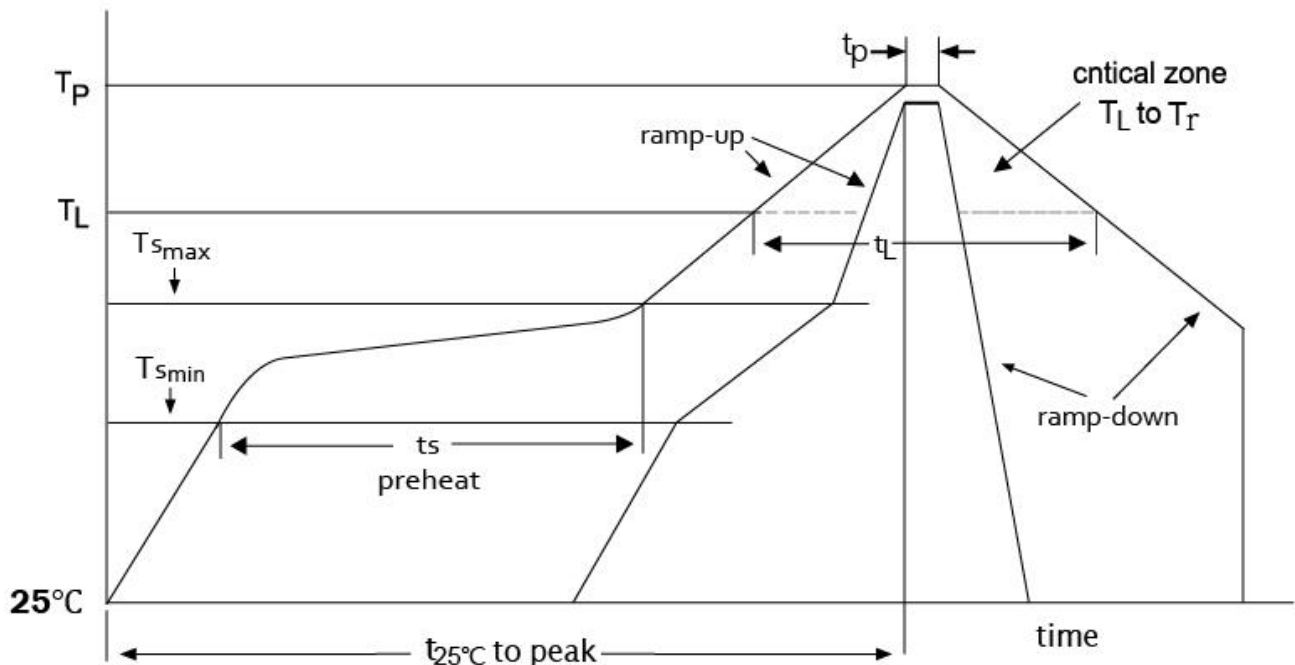
Fig 7. Pulse Waveform (10/1000us)



4. Soldering Parameters

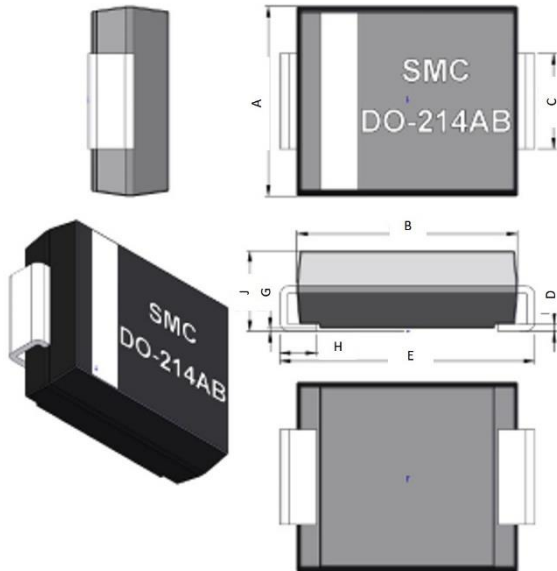
Profile Feature	SnPb eutectic assembly	Pb-free assembly
Average ramp-up rate (T _{smax} to T _p)	3 °C/s maximum	3 °C/s maximum
Preheat		
Temperature minimum (T _{smin})	100 °C	150 °C
Temperature maximum (T _{smax})	150 °C	200 °C
Time (t _{smin} to t _{smax})	60 s to 120 s	60 s to 180 s
Time maintained above		
Temperature (T _L)	183 °C	217 °C
Time (t _L)	60 s to 150 s	60 s to 150 s
Peak/classification temperature (T)	235 °C	260 °C
Number of allowed reflow cycles	3	3
Time within 5 °C of actual peak temperature (t _p)	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

temperature



5. Package Information

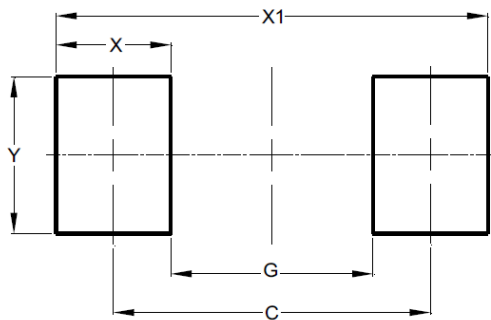
5-1. Dimension



SMCJ		
Dim	Min.	Max.
A	5.67	6.15
B	6.75	7.05
C	2.80	3.10
D	0.10	0.20
E	7.65	8.15
G	0.04	0.16
H	0.90	1.60
J	2.05	2.95

Unit:mm

5-2. PCB Pad Layout Recommendation

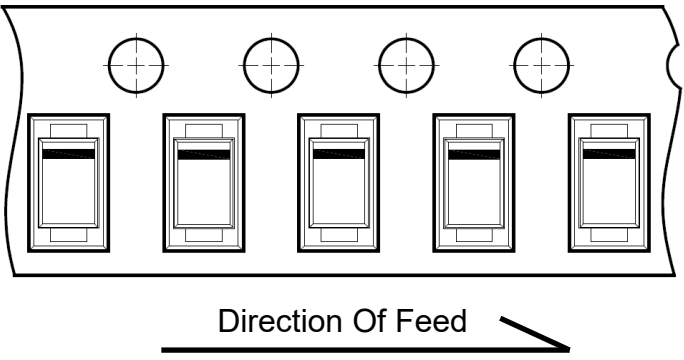


Dimensions	Value
C	6.90
G	4.40
X	2.50
X1	9.40
Y	3.30

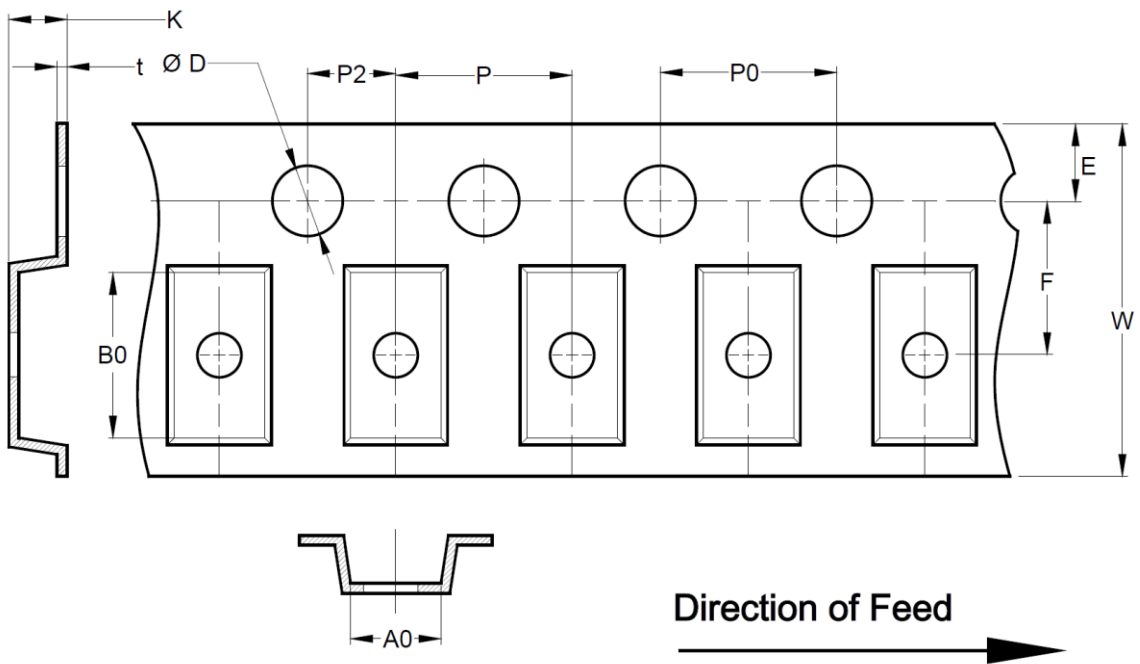
Unit:mm

6. Packing

6-1. Taping and Reel Specification

Taping Width	Tape Orientation
16mm	

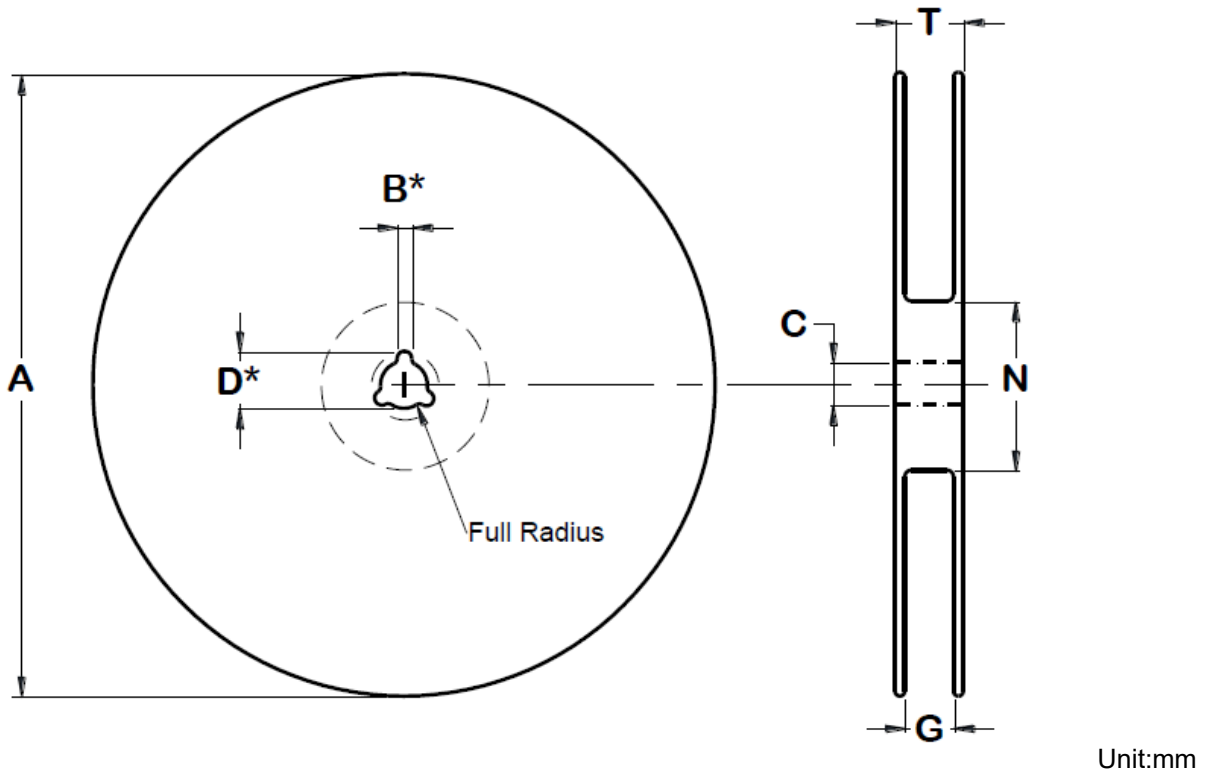
6-2. Embossed Carrier Tape Specification



Unit:mm

Dimension	W	D	D1	E	F	K	P	P0	P2	t
Value	16 mm	1.5 +0.1/-0.0	1.4 mm	1.75 ±0.10	7.5 ±0.10	3.7 Max.	8.0 ±0.10	4.0 ±0.10	2.0 ±0.10	0.4 Max.
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.									

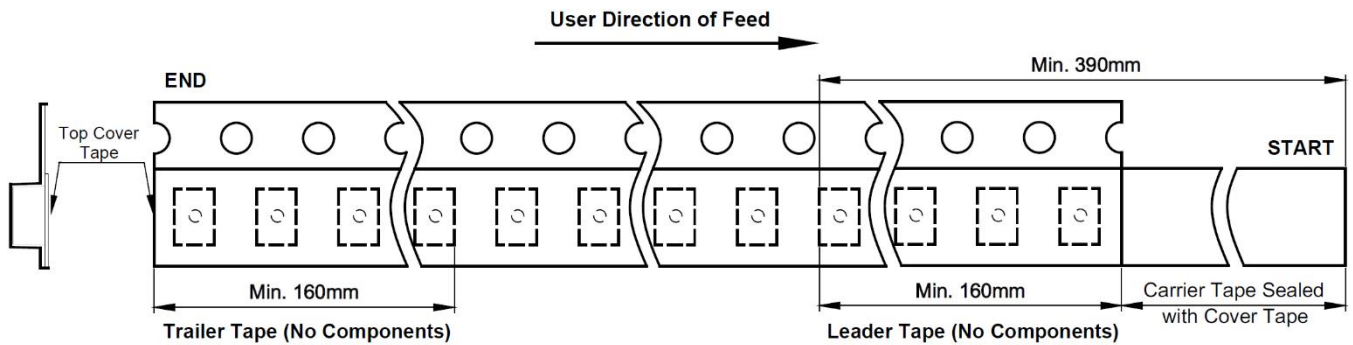
6-3. Surface Mount Reel Specification



Unit:mm

Dimension	Tape Width	Reel Size	A	B	C	D	N	G	T
Value	16 mm	13"	330 ±2	2.0 +0.5-0	13 +0.5-0.2	20.5 ±0.2	100 ±5	16.4 +1.5/-0.0	22.4

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
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
4.0SMCJxxA	Series	3,000PCS	SMCJ	13"reel
4.0SMCJxxCA				

9. Version

9-1. History

Version	Date	File No.	Recording	Basis
2.0	16-May-2021	F12122L	New Create	System
2.1	19-Jul-2021		Update Version	System