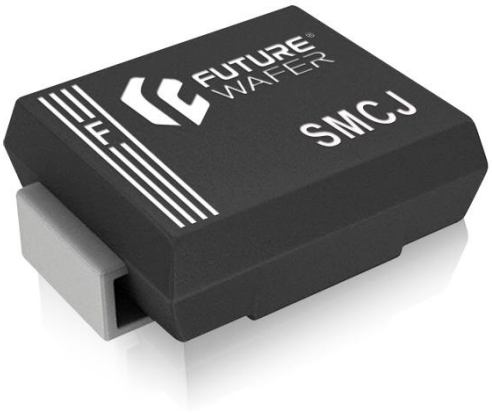
1. Synopsis

1-1. General Description

The 6KA 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 6600 W (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 SMCJ, This Minimizes PCB Space Consumption.



SMCJ

1-2. Feature List



- Uni-Directional Configurations
- Plastic Package Has Underwriters
- Glass Passivated Chip Junction in SMCJ Package
- 6600 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
- 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 SMCJ Package
- Packing: Tape and Reel
- Flammability Rating UL 94V-0
- Halogen Free
- JEDEC MSL Classification: Level 1

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2. Contents

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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}	6600	W
Power Dissipation On Infinite Heat Sink at T_L = 50°C	P_D	8	
Peak Forward Surge Current,8.3mS Signal Half Sine Wave Uni-Directional Only	I_{FSM}	700	A
Maximum instantaneous Forward Voltage at 100A For Uni-Direction Only	V_F	5.0	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)

	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}	**Marking**
Uni	V	V		m A	μA	V	A	
6600W Surface Mount Transient Voltage Suppressors 6KA Series								
6KA21A	21.0	23.00	26.00	1.0	1.0	33.9	195.0	6K21A
6KA24A	24.0	27.00	32.60	1.0	1.0	38.9	170.0	6K24A
6KA33A	33.0	36.70	40.60	1.0	1.0	53.3	124.0	6K33A
6KA36A	36.0	40.00	44.20	1.0	1.0	58.1	114.0	6K36A
6KA48A	48.0	53.30	58.90	1.0	1.0	77.4	85.0	6K48A
6KA51A	51.0	56.70	62.70	1.0	1.0	82.4	80.0	6K51A
6KA58A	58.0	64.40	71.20	1.0	1.0	93.6	71.0	6K58A

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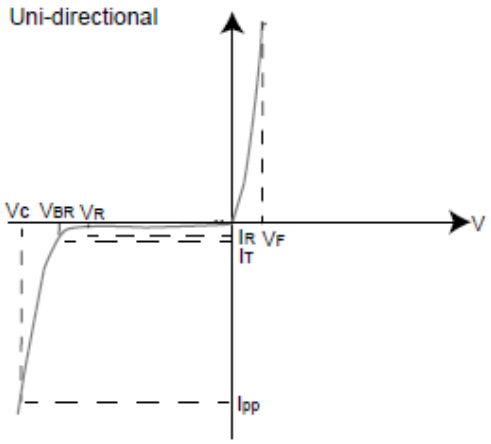
3-3. I-V Curve Characteristics



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)

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

Fig 1. Peak Pulse Power Rating Curve

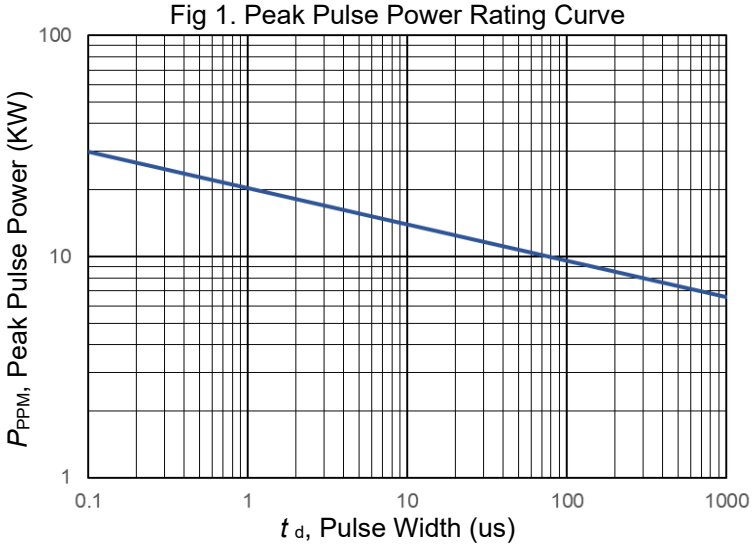


Fig 2. Pulse Derating Curve

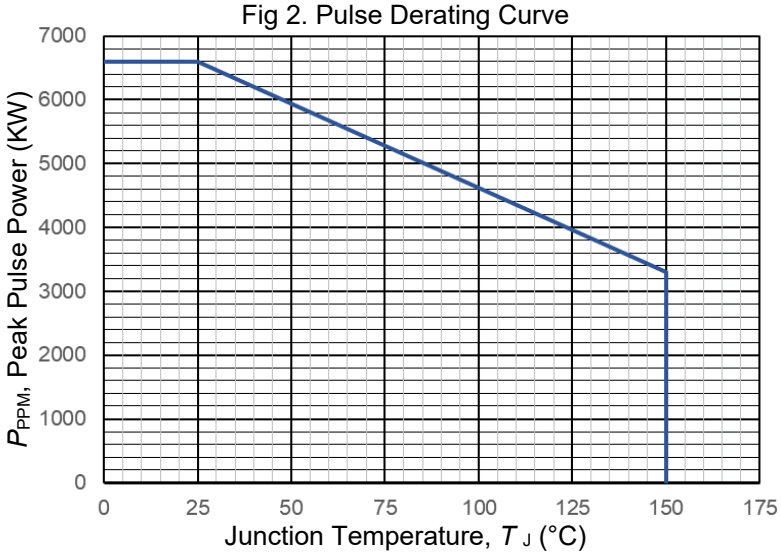


Fig 3. Maximum Non-repetitive Forward Surge Current Uni-direction Only

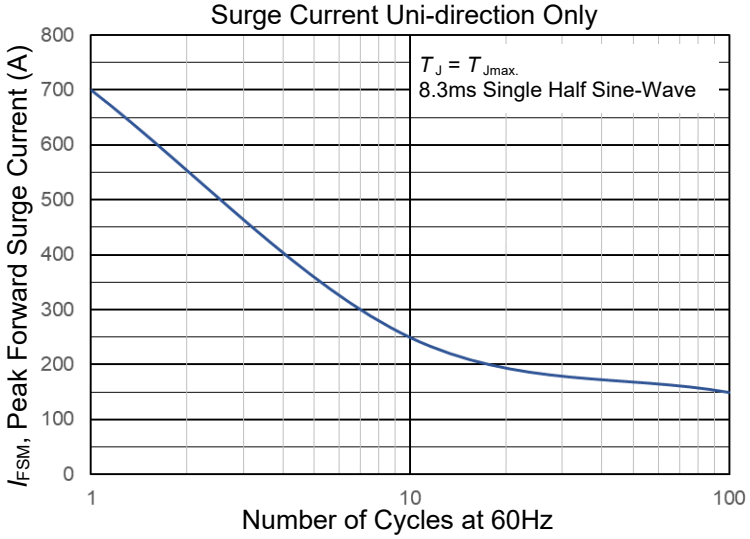


Fig 4. Maximum Forward Voltage

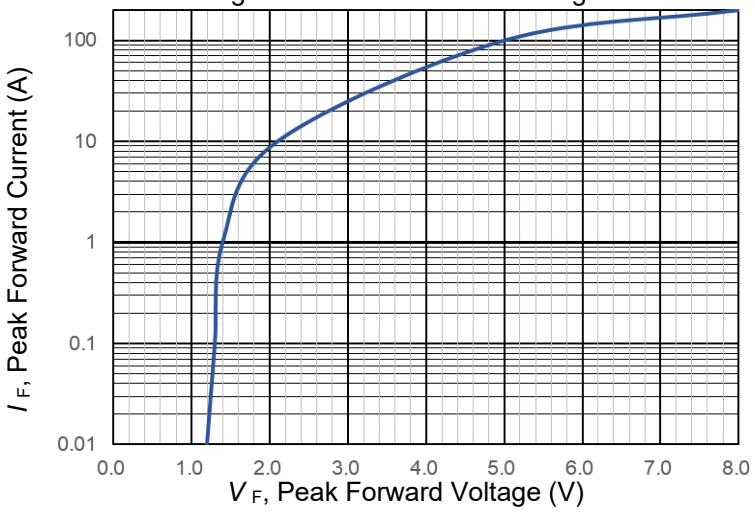


Fig 5. Typical Transient Thermal Impedance

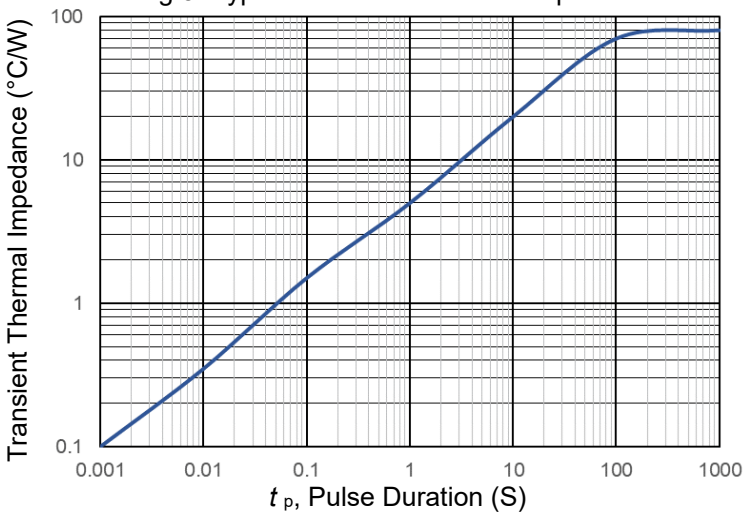
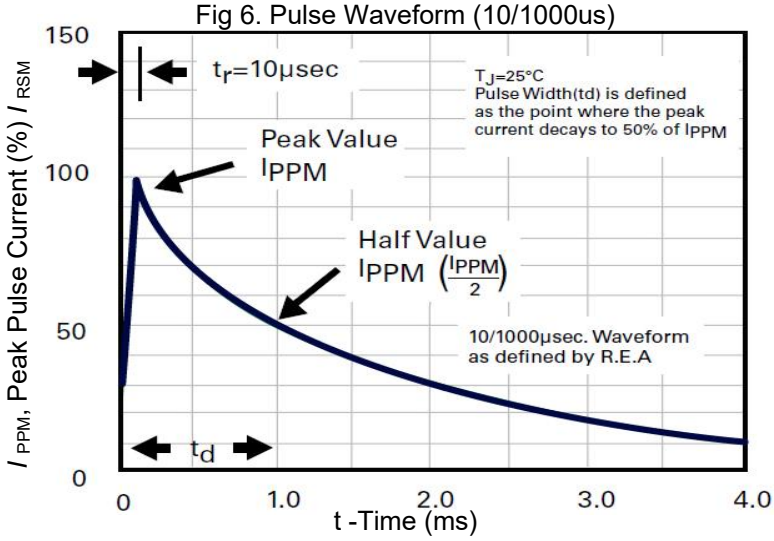


Fig 6. Pulse Waveform (10/1000us)



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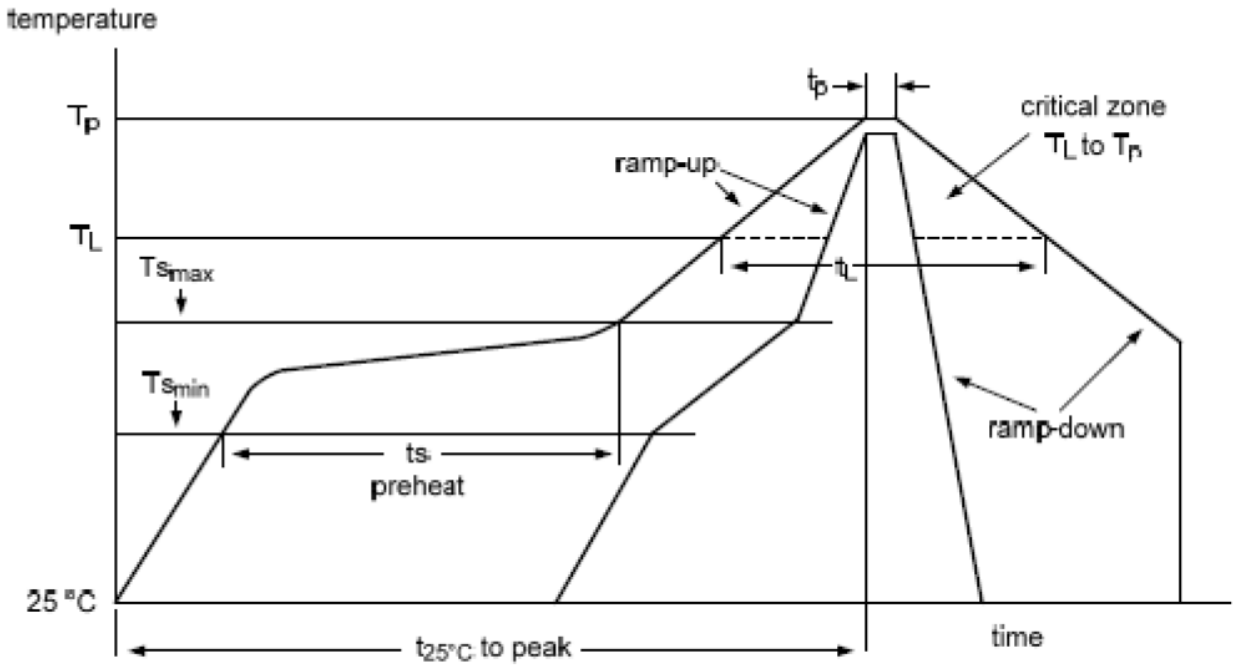
4. Soldering Parameters

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



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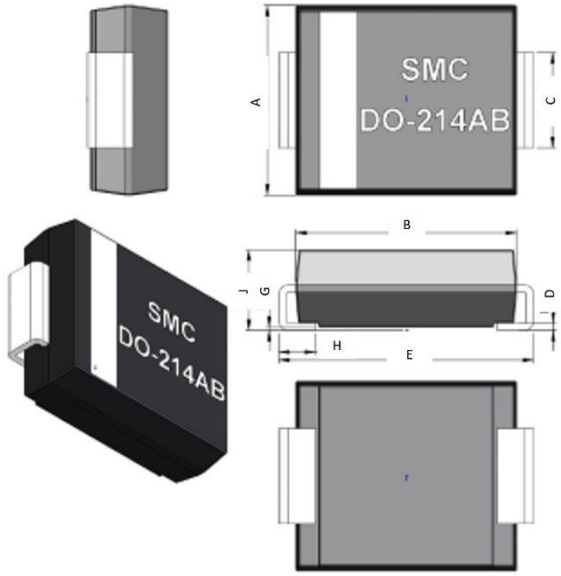
5. Package Information

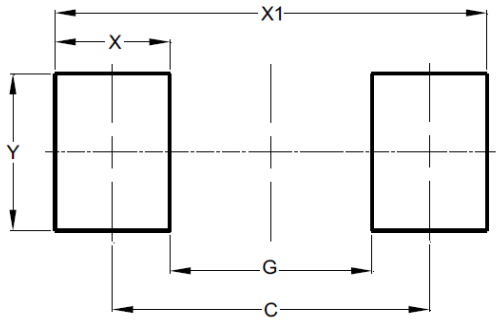
5-1. Dimension



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

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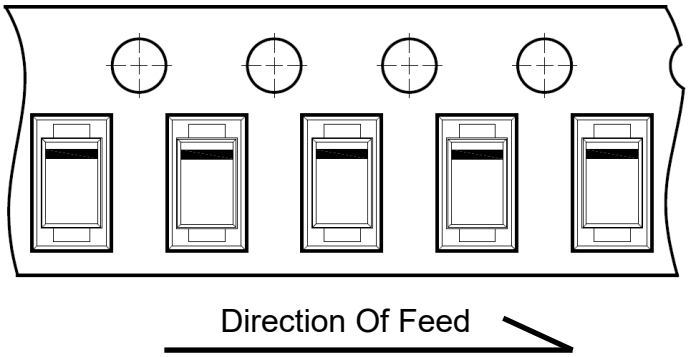
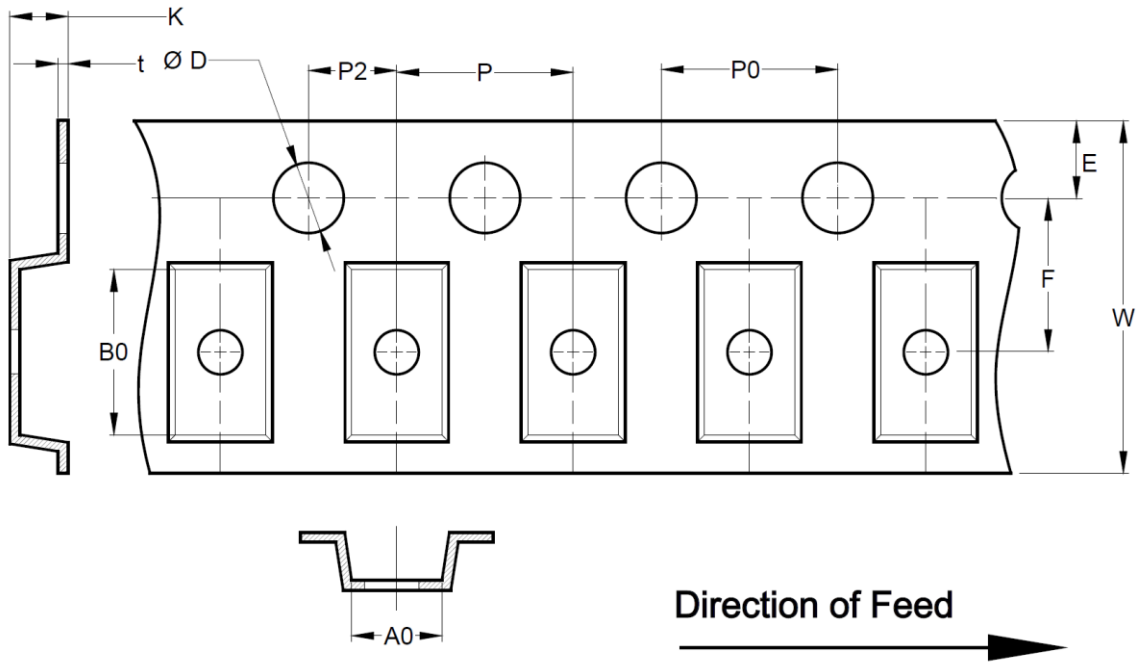
6. Packing

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.									

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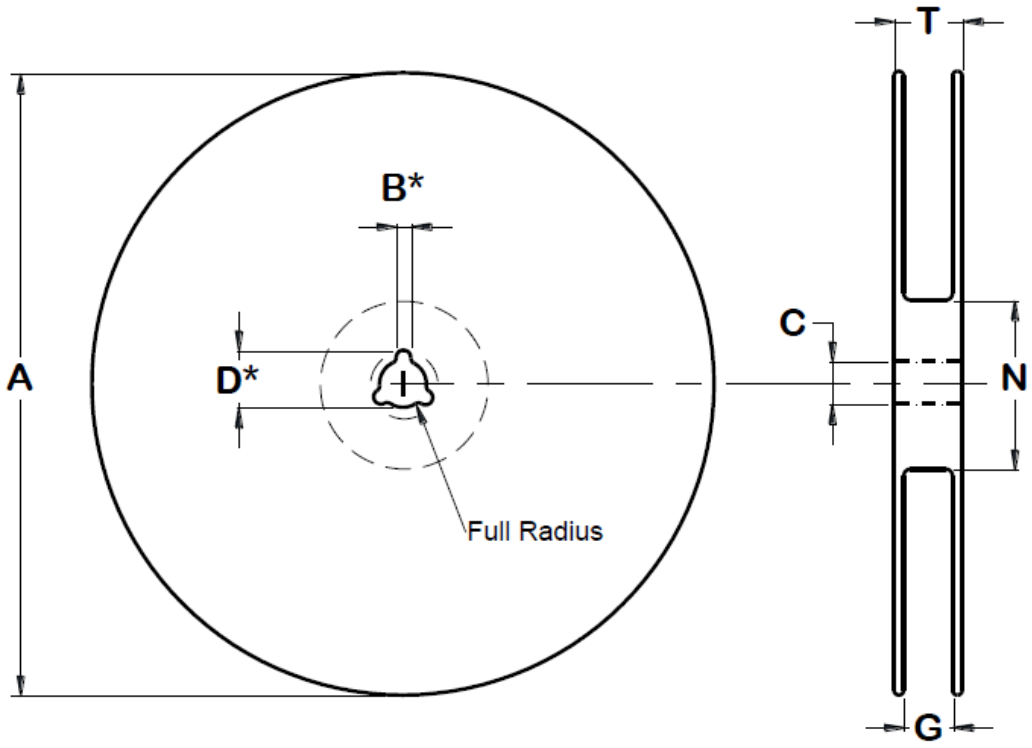
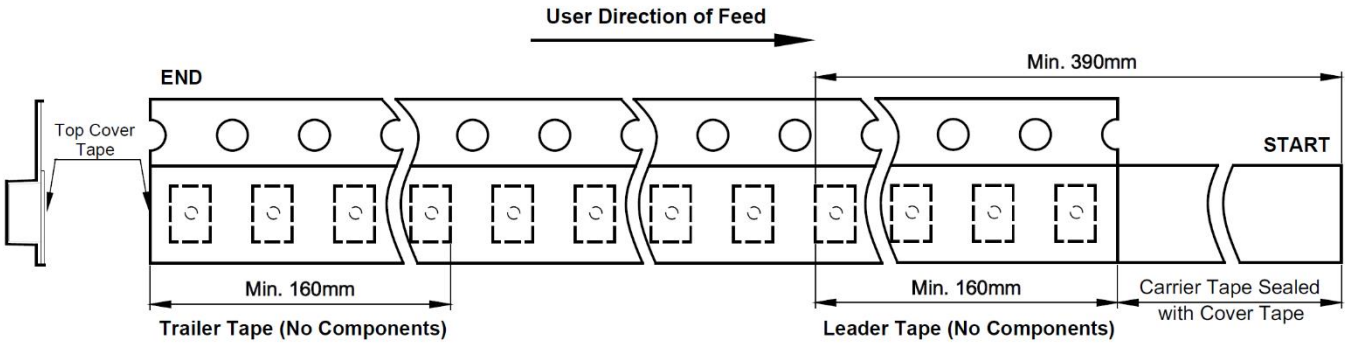
6-3. Surface Mount Reel Specification



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



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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

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8. Ordering Information

Part Number	Marking Code	Quantity	Component Package	Packaging Option
6KAxxA	Series	3,000PCS	SMCJ	13"reel

9. Version

9-1. History

Version	Date	File No.	Recording	Basis
A	30-Jan-2018	F118055	New Create	Market
B	22-Jun-2019		Update Company Information	System
2.0	23-May-2021		Update Version	System
2.1	19-Jul-2021		Update Version	System

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