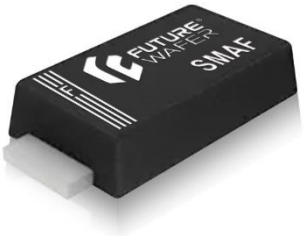
1. Synopsis

1-1. General Description

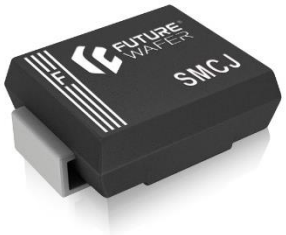
This TBR05L120 Series are Trench MOS Barrier Schottky Rectifier (TBR) Provides Fast Switching Performance in a Compact Thermally Efficient Package. Its Low Profile Makes it a Good Option For Flat Panel Display and Other Applications With Limited Vertical Clearance. The Device Offers Low Leakage Over Temperature Making it a Good Match For Applications Requiring Low Quiescent Current.



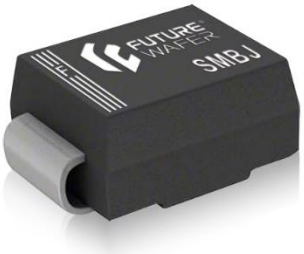
SMAJ



SMAF



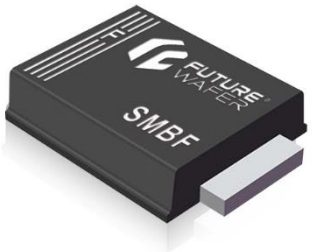
SMCJ



SMBJ



TO277B



SMBF

1-2. Feature List

- Trench MOS Barrier Schottky Technology
- Low Forward Voltage Drop
- 120-Volts Reverse
- High Frequency Operation

1-3. Applications

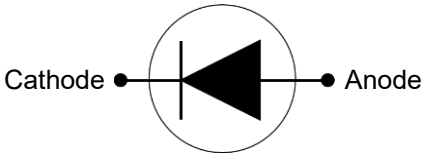
- Switch Mode Power Supply
- Power Factor Correction
- Solar Inverter
- Uninterruptible Power Supply
- High Efficiency DC/DC Converters
- Motor Drivers

1-4. Benefits

- Essentially No Switching Losses
- Higher Efficiency
- Reduction Of Heat Sink Requirements
- Parallel Devices Without Thermal Runaway
- Higher System Reliability Due To Lower Operating Temperatures

1-5. Mechanical Characteristics

- Molded JEDEC Package:
  - SMAJ / SMAF
  - SMBJ / SMBF
  - SMCJ
  - TO277B
- Packing: Tape and Reel
- Flammability rating UL 94V-0
- Halogen Free
- JEDEC MSL Classification: Level 1



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2. Contents

1. Synopsis 1
1-1. General Description 1
1-2. Feature List 1
1-3. Applications 1
1-4. Benefits 1
1-5. Mechanical Characteristics 1
2. Contents 2
3. Electrical Property 3
3-1. Absolute Maximum Ratings 3
3-2. Electrical Characteristics 3
3-3. Thermal Characteristics 3
3-4. Ratings and Characteristics Curve 4
4. Soldering Parameters 5
5. Package Information 6
5-1. Dimension-SMAJ 6
5-2. PCB Pad Layout Recommendation-SMAJ 6
5-3. Dimension-SMAF 7
5-4. PCB Pad Layout Recommendation-SMAF 7
5-5. Dimension-SMBJ 8
5-6. PCB Pad Layout Recommendation-SMBJ 8
5-7. Dimension-SMBF 9
5-8. PCB Pad Layout Recommendation-SMBF 9
5-9. Dimension-SMCJ 10
5-10. PCB Pad Layout Recommendation-SMCJ 10
5-11. Dimension-TO277B 11
5-12. PCB Pad Layout Recommendation-TO277B 11
6. Packing 12
6-1. Taping and Reel Specification-SMAJ & SMAF 12
6-2. Embossed Carrier Tape Specification-SMAJ & SMAF 12
6-3. Taping and Reel Specification-SMBJ & SMBF 13
6-4. Embossed Carrier Tape Specification-SMBJ & SMBF 13
6-5. Taping and Reel Specification-SMCJ 14
6-6. Embossed Carrier Tape Specification-SMCJ 14
6-7. Taping and Reel Specification-TO277B 15
6-8. Embossed Carrier Tape Specification-TO277B 15
6-9. Surface Mount Reel Specification-SMAJ & SMAF & SMBJ & SMBF & TO277B 16
6-10. Tape Leader and Trailer Specification-SMAJ & SMAF & SMBJ & SMBF & TO277B 16
6-11. Surface Mount Reel Specification-SMCJ 17
6-12. Tape Leader and Trailer Specification-SMCJ 17
7. Ordering Information 18
8. Version 18
8-1. History 18
8-2. Company Profile 18

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3. Electrical Property

3-1. Absolute Maximum Ratings

Maximum Ratings@25°C Unless Otherwise Specified			
Parameter	**Symbol**	**Values**	**Units**
Peak Repetitive Reverse Voltage	V_{RRM}	120	V
Maximum RMS Voltage	V_{RMS}	84	
Average Rectified Output Current	I_O	5	A
Peak Forward Surge Current, 8.3mS Signal Half Sine Wave Unidirectional Only(1)	I_{FSM}	100	

Notes: (1) Measured on 8.3ms signal half sine wave or equivalent square wave, duty cycle=4 per minute maximum.

3-2. Electrical Characteristics

Parameter	**Symbol**	**Condition**		**Min.**	**Typ.**	**Max.**	**Units**
Forward Voltage Drop	V_F	I_F = 2.5A	T_J = 25°C	-	0.6	-	V
		I_F = 5A		-	0.77	0.88	
		I_F = 2.5A	T_J = 125°C	-	0.53	-	
		I_F = 5A		-	0.62	0.72	
Reverse Current	I_R	V_R = 120V	T_J = 25°C	-	10	20	uA
			T_J = 125°C	-	4	20	mA
ESD Standards	V_{ESD}	IEC61000-4-2, Contact		-	-	8	KV

3-3. Thermal Characteristics

Parameter	**Symbol**	**Min.**	**Typ.**	**Max.**	**Units**
Thermal Resistance, Junction-Ambient	$R_{\theta JA}$	-	115	-	°C/W
Thermal Resistance, Junction-Case	$R_{\theta JC}$	-	12.0	-	
Operating Temperature	T_J	-55 ~ +150			°C
Storage Temperature	T_{STG}				

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3-4. Ratings and Characteristics Curve

Fig 1. Maximum Forward Current Derating Curve

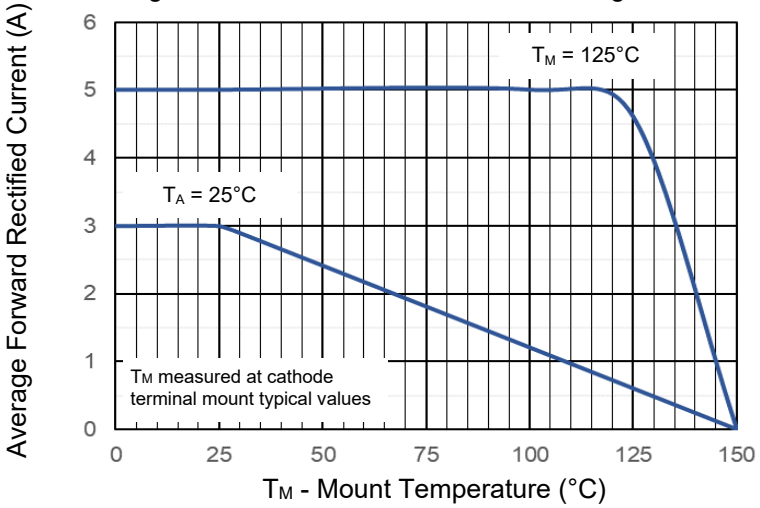


Fig 2. Typical Instantaneous Forward Characteristics

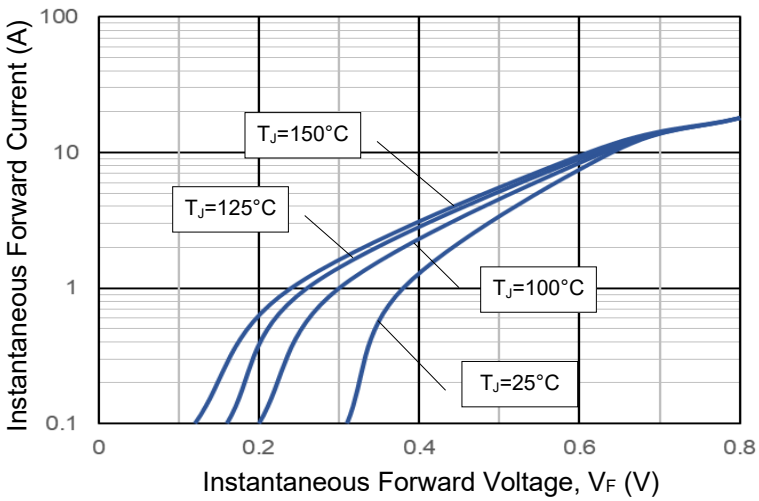


Fig 3. Typical Reverse Current Characteristics

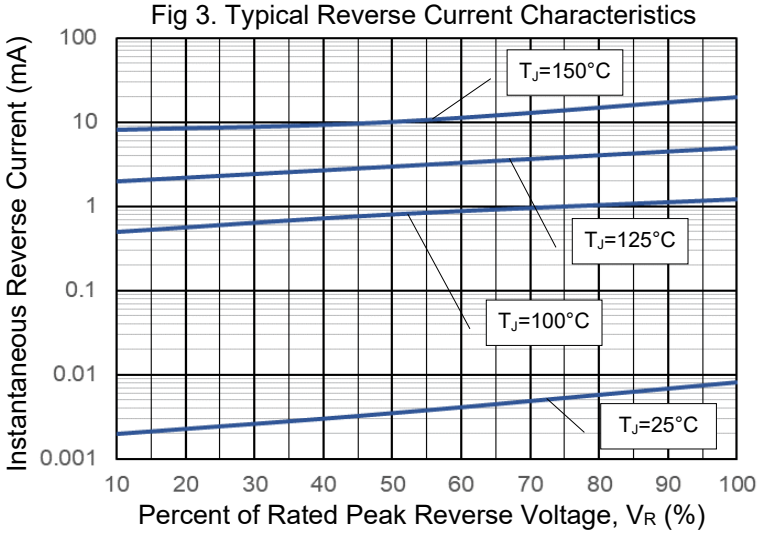


Fig 4. Typical Junction Capacitance

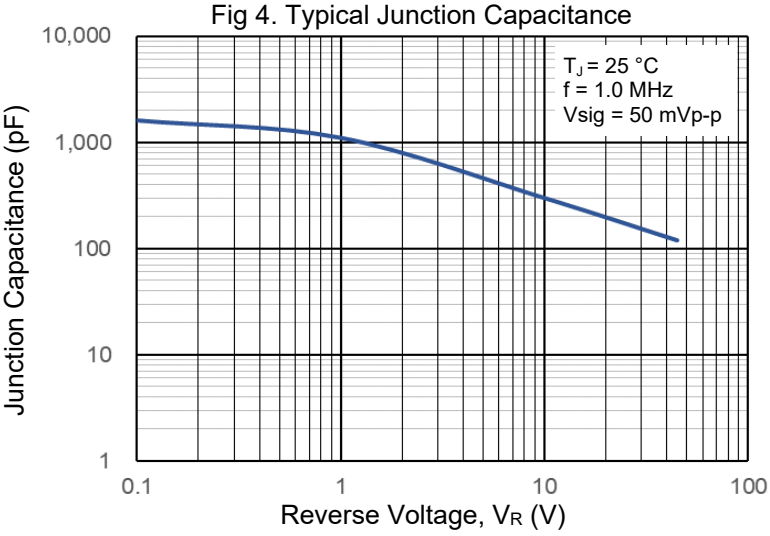


Fig 5. Forward Power Loss Characteristics

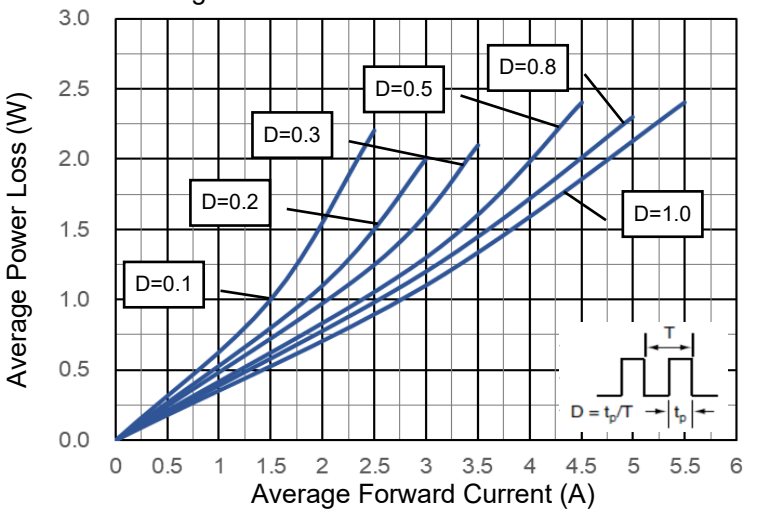
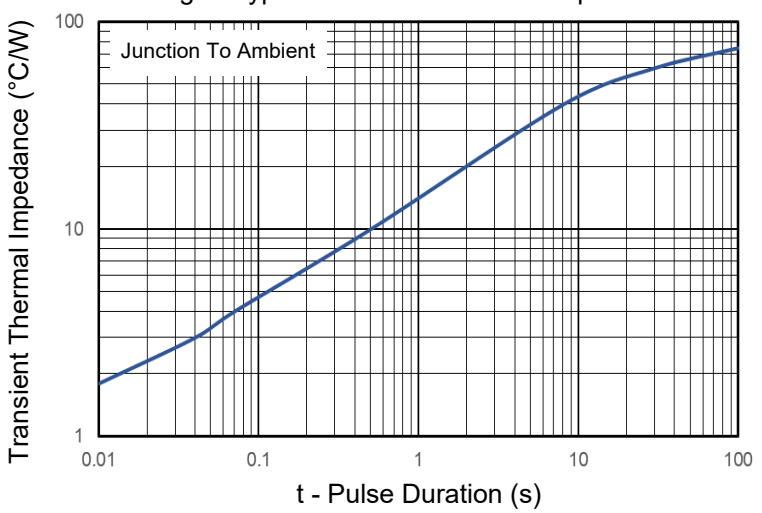


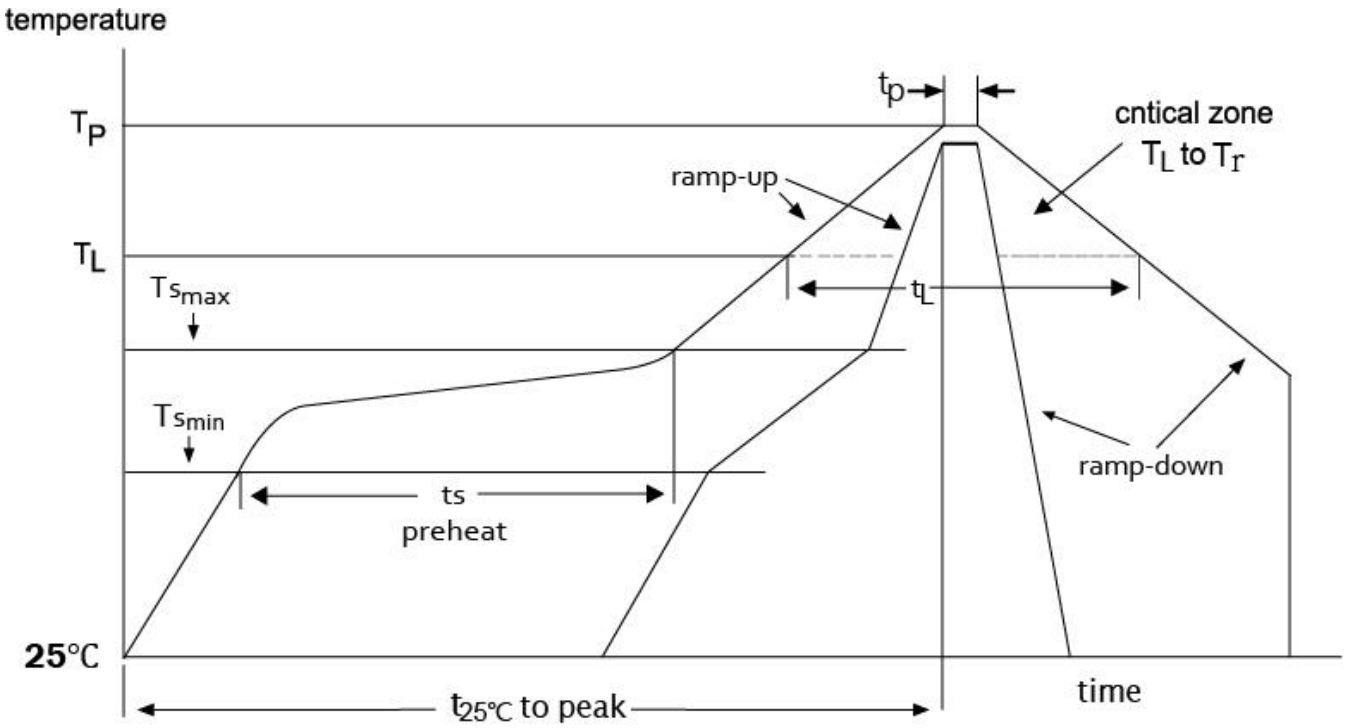
Fig 6. Typical Transient Thermal Impedance



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4. Soldering Parameters

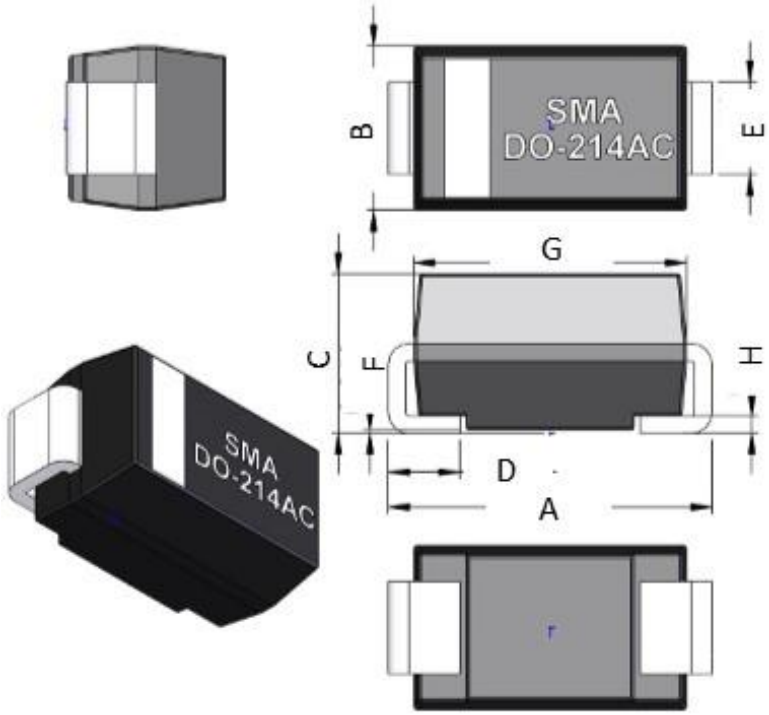
Profile Feature	SnPb eutectic assembly	Pb-free assembly
Average ramp-up rate (Tsmax to Tp)	3 °C/s maximum	3 °C/s maximum
Preheat		
Temperature minimum (Tsmin)	100 °C	150 °C
Temperature maximum (Tsmax)	150 °C	200 °C
Time (tsmin to tsmax)	60 s to 120 s	60 s to 180 s
Time maintained above		
Temperature (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

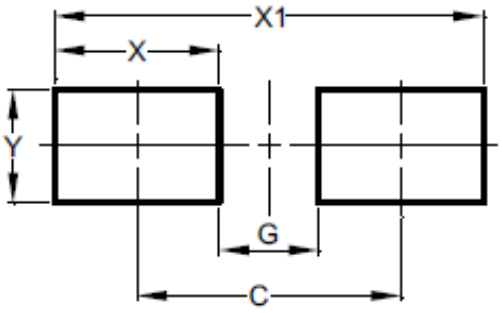
5-1. Dimension-SMAJ



SMAJ		
Symbol	**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-SMAJ

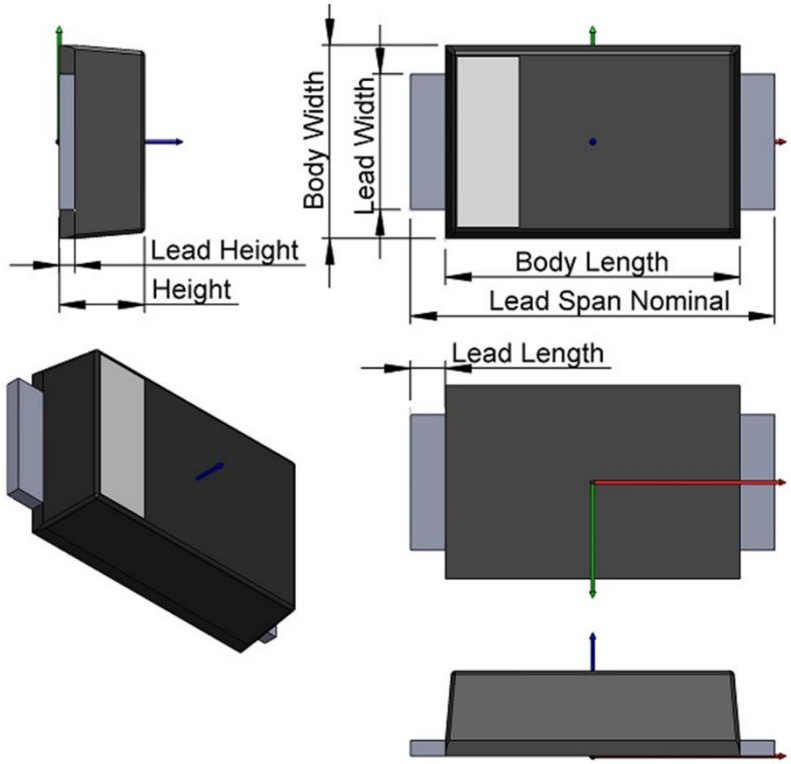


SMAJ	
Symbol	**Values**
C	4.00
G	1.50
X	2.50
X1	6.50
Y	1.70

Unit:mm

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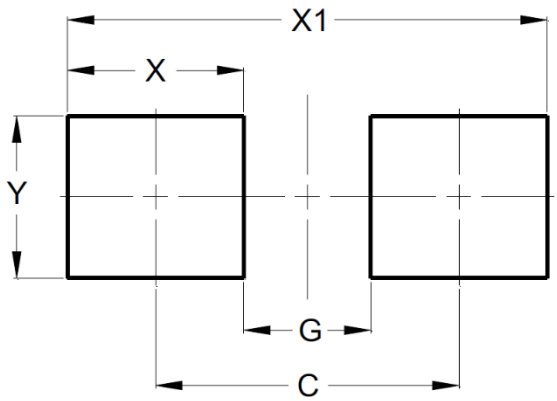
5-3. Dimension-SMAF



SMAF		
Symbol	**Min.**	**Max.**
Body Length	4.15	4.35
Lead Span Nominal	5.05	5.35
Lead Width	1.25	1.45
Body Width	2.50	2.70
Height	0.90	1.30
Lead Height	0.15	0.30
Lead Length	0.70	1.00

Unit:mm

5-4. PCB Pad Layout Recommendation-SMAF

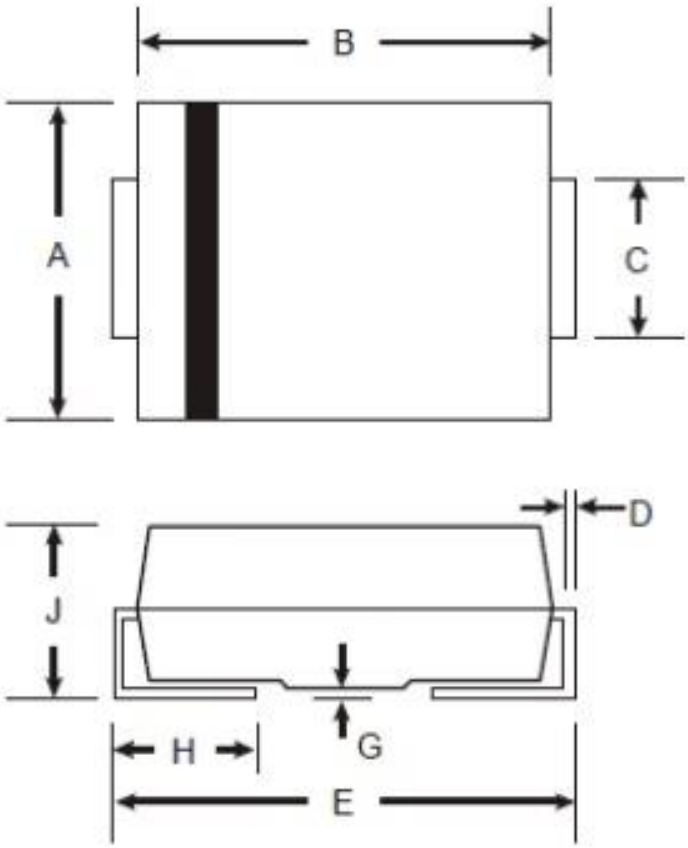


SMAF	
Symbol	**Values**
C	4.32
G	3.12
X	1.20
X1	5.52
Y	1.52

Unit:mm

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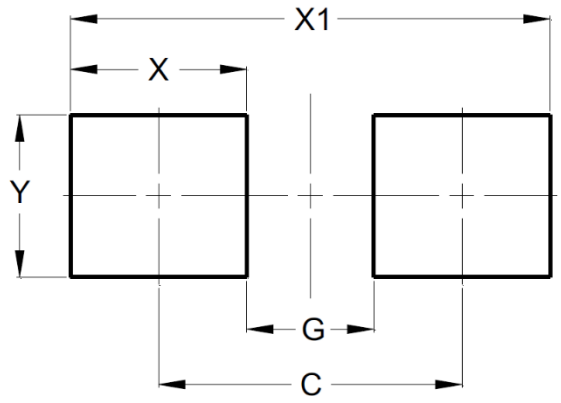
5-5. Dimension-SMBJ



SMBJ		
Symbol	**Min.**	**Max.**
A	3.30	3.94
B	4.06	4.57
C	1.96	2.21
D	0.15	0.31
E	4.80	5.59
G	0.05	0.20
H	0.76	1.52
J	1.98	2.50

Unit:mm

5-6. PCB Pad Layout Recommendation-SMBJ

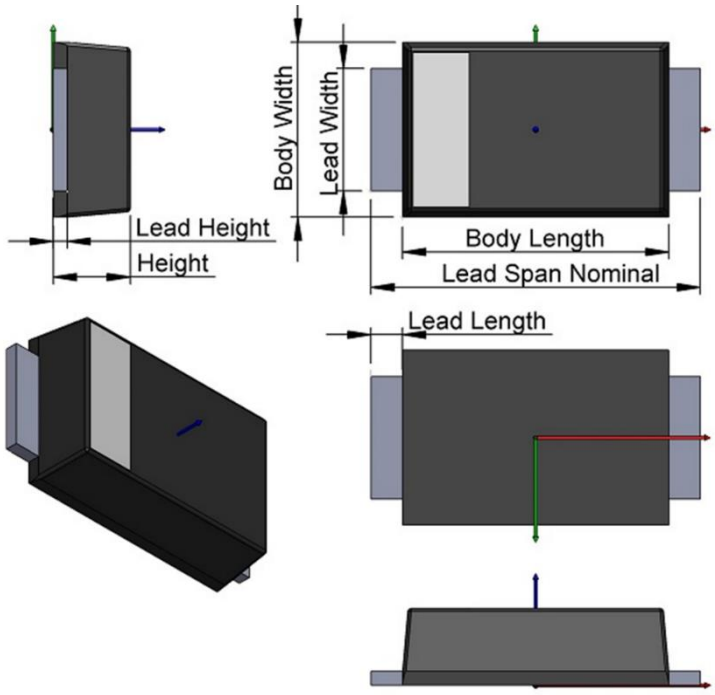


SMBJ	
Symbol	**Values**
C	4.30
G	1.80
X	2.50
X1	6.80
Y	2.30

Unit:mm

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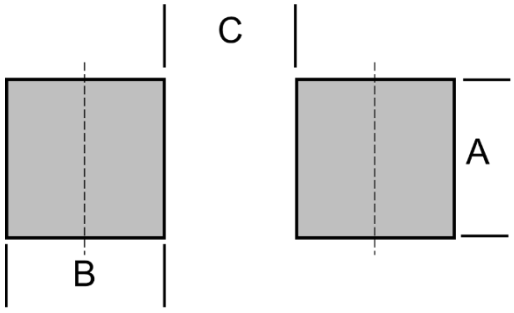
5-7. Dimension-SMBF



SMBF			
Symbol	**Min.**	**Typ.**	**Max.**
Body Length	-	4.4	-
Lead Span Nominal	5.2	-	5.6
Lead Width	1.9	-	2.1
Body Width	3.1	-	3.7
Height	1.1	-	1.7
Lead Height	-	0.2	-
Lead Length	-	0.02	-

Unit:mm

5-8. PCB Pad Layout Recommendation-SMBF

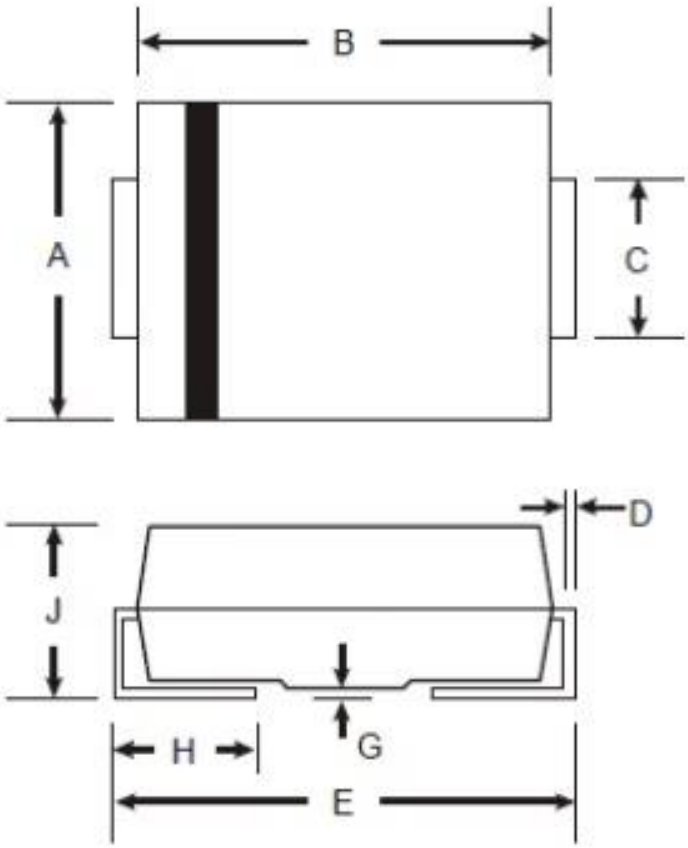


SMBF	
Symbol	**Values**
C	3.10
A	2.20
B	2.10

Unit:mm

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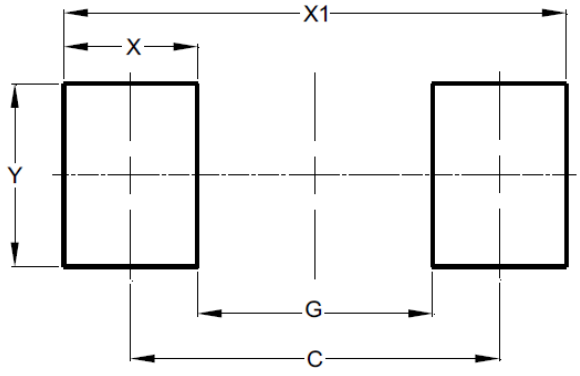
5-9. Dimension-SMCJ



SMCJ		
Symbol	**Min.**	**Max.**
A	5.85	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

5-10. PCB Pad Layout Recommendation-SMCJ

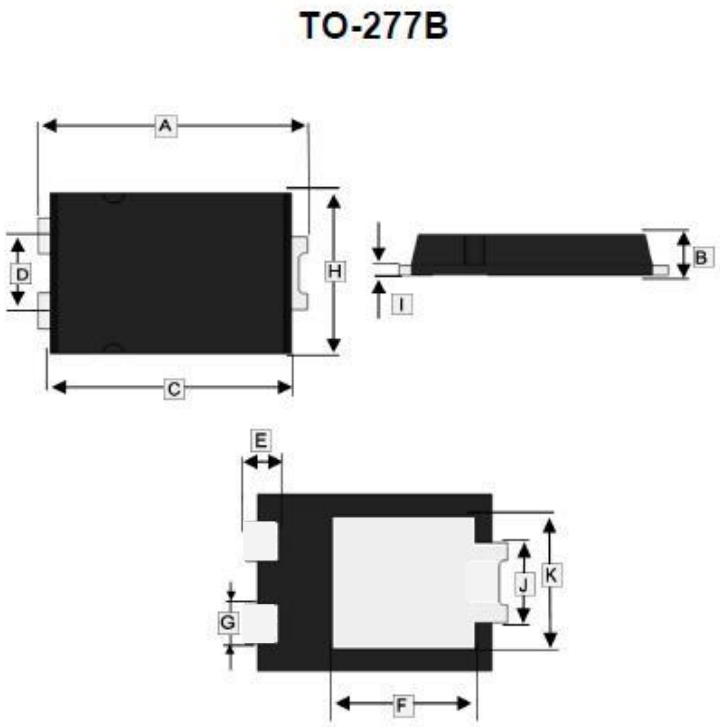


SMCJ	
Symbol	**Values**
C	6.90
G	4.40
X	2.50
X1	9.40
Y	3.30

Unit:mm

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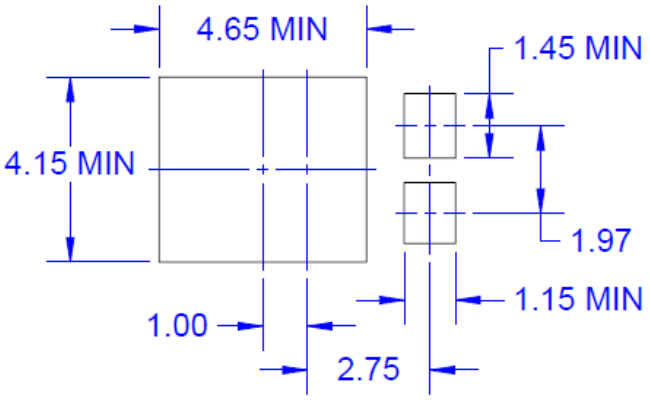
5-11. Dimension-TO277B



TO-277B		
Symbol	**Min**	**Max**
A	6.30	6.70
B	0.95	1.25
C	5.28	5.48
D	1.74	1.94
E	0.70	1.00
F	3.40	3.70
G	0.85	0.95
H	3.88	4.08
I	0.20	0.30
J	1.70	1.90
K	2.90	3.20

Unit:mm

5-12. PCB Pad Layout Recommendation-TO277B

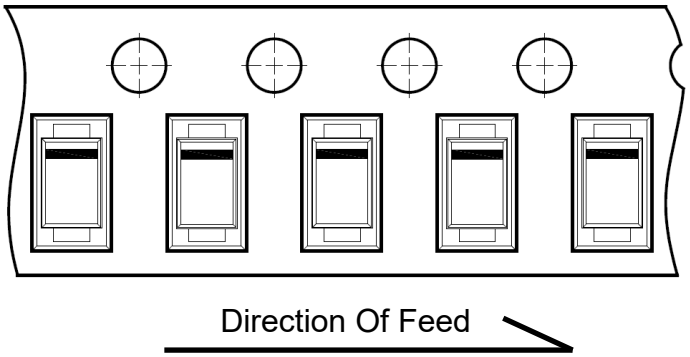


Unit:mm

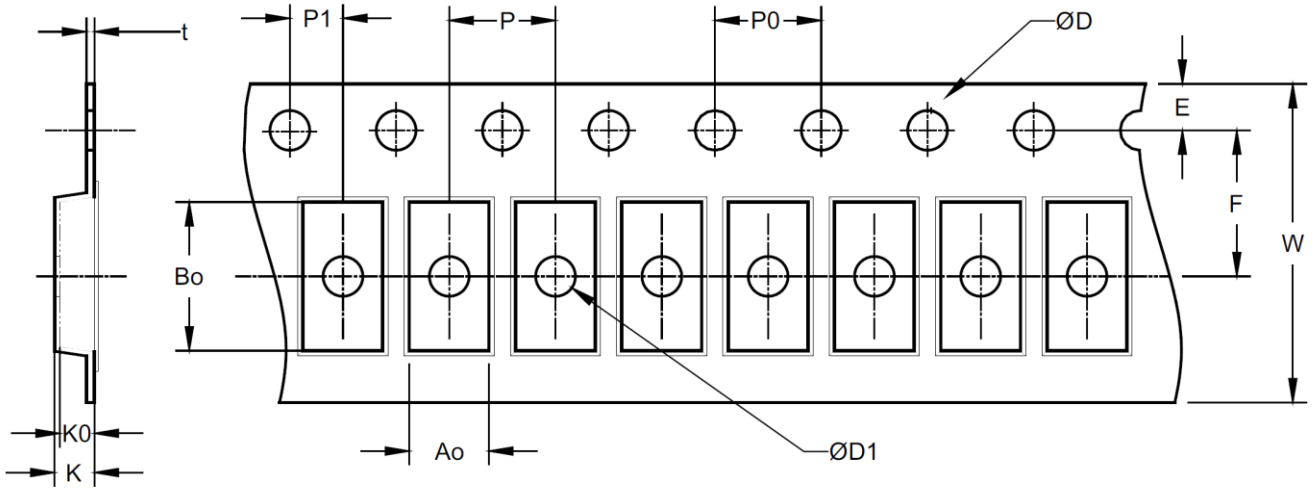
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6. Packing

6-1. Taping and Reel Specification-SMAJ & SMAF

Taping Width	Tape Orientation
12mm	

6-2. Embossed Carrier Tape Specification-SMAJ & SMAF

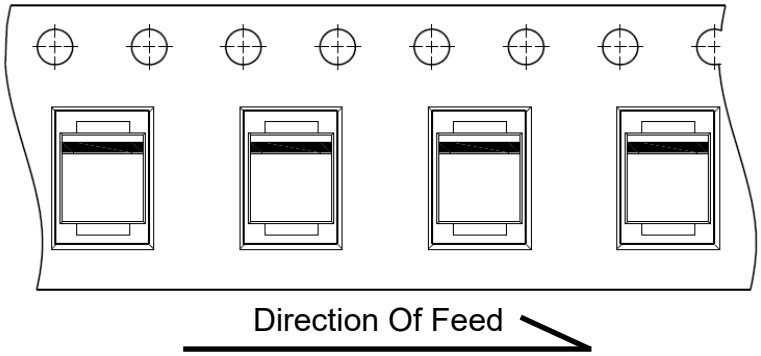


Unit:mm

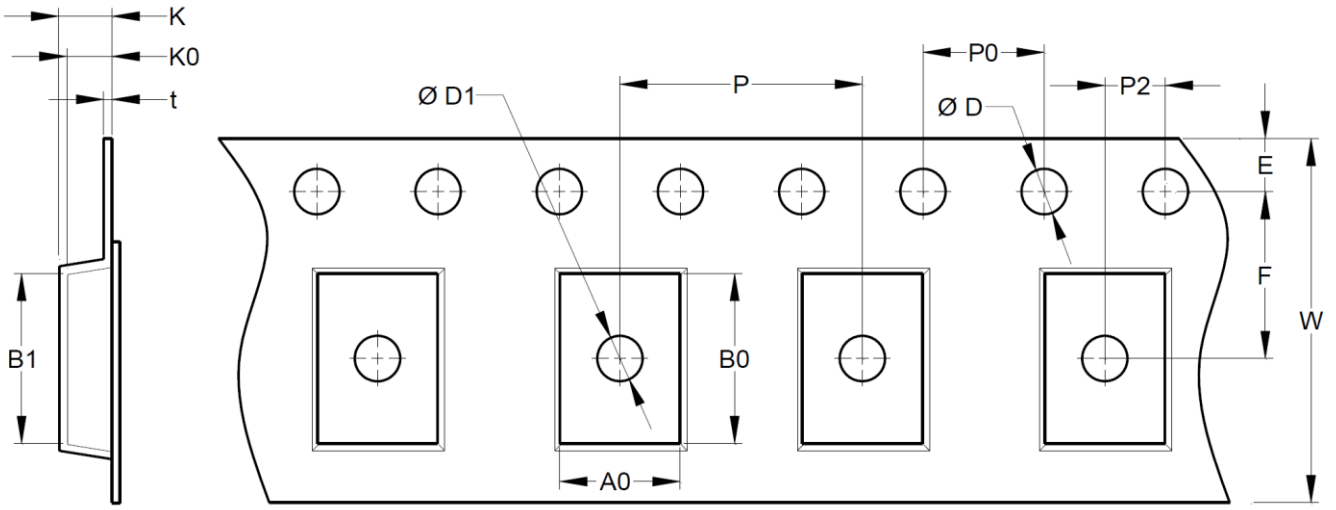
Dimension	W	Ao	Bo	D	D1	E	F	K	P	P0	P1	t	W
Value	12 mm	3.0 ±0.10	5.6 ±0.10	1.5 ±0.10	1.5 Min	1.75 ±0.10	5.5 ±0.05	1.2 ±0.10	4.0 ±0.10	4.0 ±0.05	2.0 ±0.05	0.25 ±0.05	12 ±0.2
A0 / B0 / K0	Determined by Component Size. The Clearance Between the Component And The Cavity Must Comply to The Rotational And Lateral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

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6-3. Taping and Reel Specification-SMBJ & SMBF

Taping Width	Tape Orientation
12mm	

6-4. Embossed Carrier Tape Specification-SMBJ & SMBF

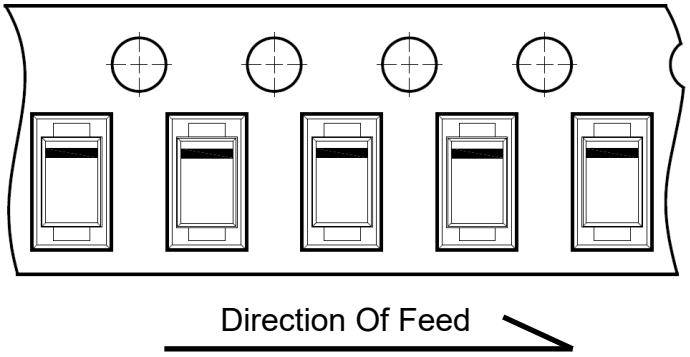


Unit:mm

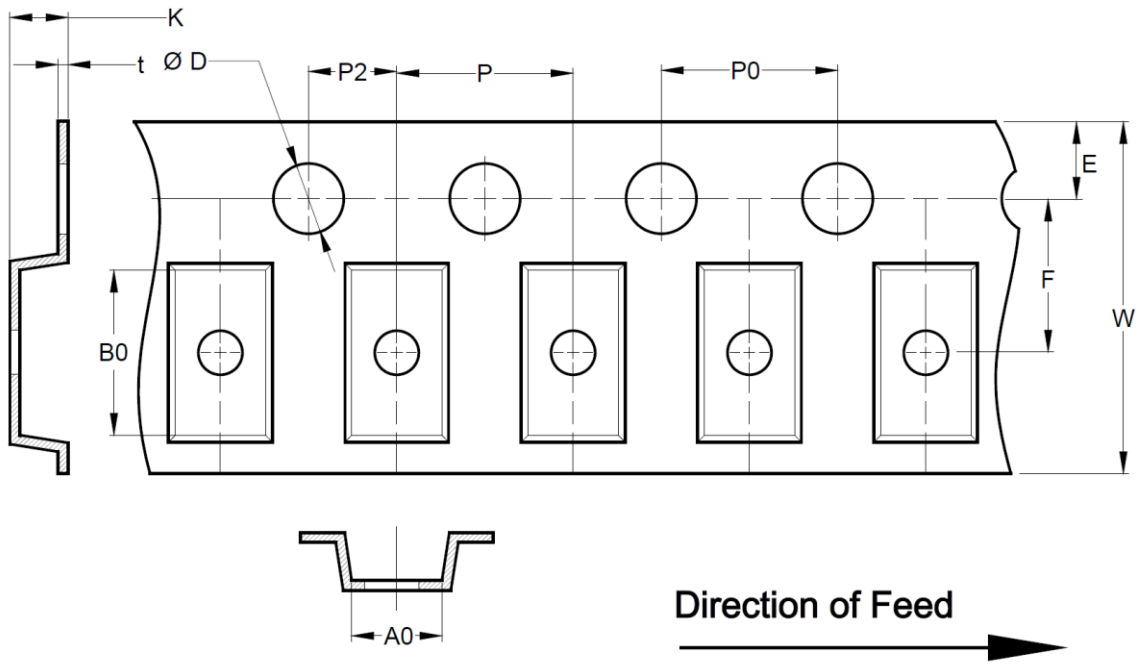
Dimension	W	B1	D	D1	E	F	K	P	P0	P2	t	W
Value	12 mm	8.2 Max	1.5+ 0.1/- 0.0	1.5 Min.	1.75 ±0.10	5.5 ±0.05	4.5 Max.	8.0 ±0.10	4.0 ±0.10	2.0 ±0.05	0.4 Max.	12 ±0.3
A0 / B0 / K0	Determined by Component Size. The Clearance Between the Component And The Cavity Must Comply to The Rotational And Lateral Movement Requirement Provided in Figures in The "Maximum Component Movement in Tape Pocket" Section.											

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6-5. Taping and Reel Specification-SMCJ

Taping Width	Tape Orientation
16mm	

6-6. Embossed Carrier Tape Specification-SMCJ

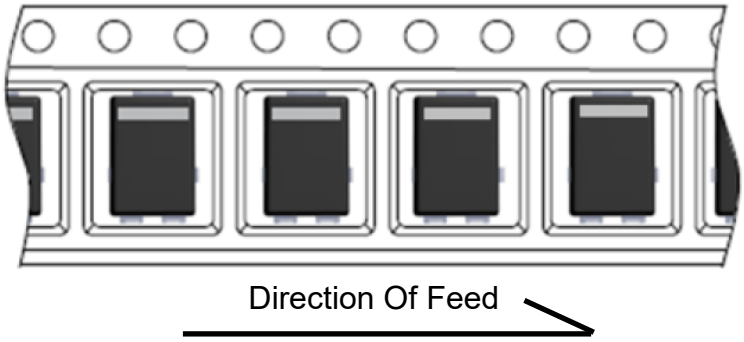


Unit:mm

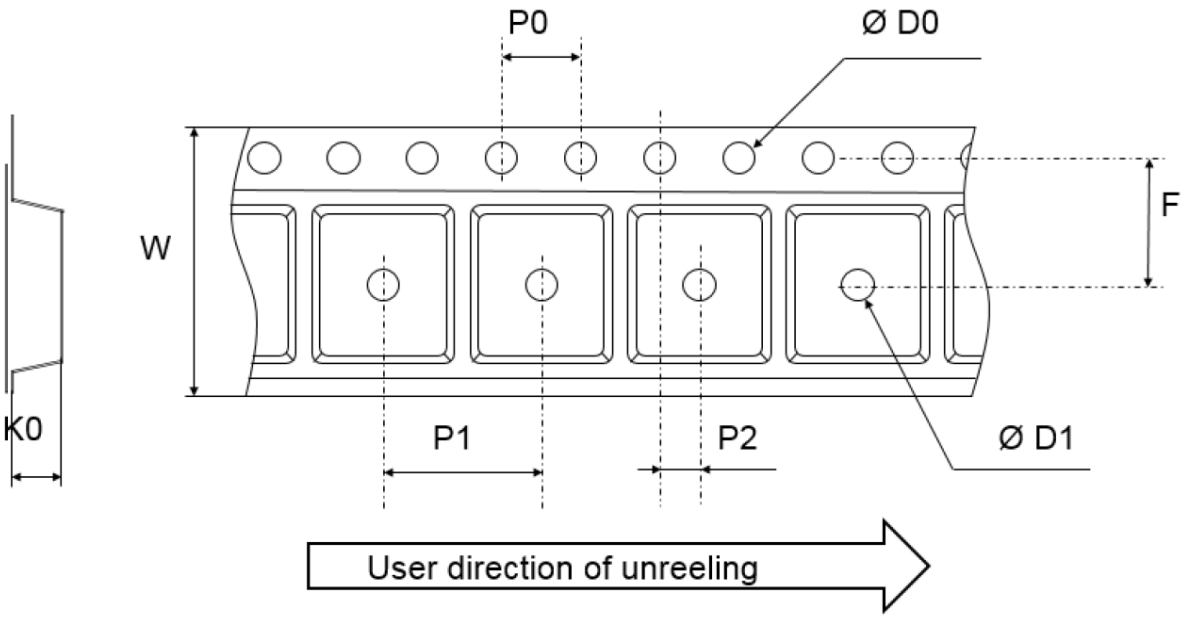
Dimension	W	D	D1	E	F	K	P	P0	P2	t
Value	16 mm	1.5 +0.1/-0.0	1.4 mm	1.75 ±0.10	7.5 ±0.10	3.7 Max.	8.0 ±0.10	4.0 ±0.10	2.0 ±0.10	0.4 Max.
A0 / B0 / K0	Determined by Component Size. The Clearance Between The Component And The Cavity Must Comply to The Rotational and Lateral Movement Requirement Provided in Figures in The "Maximum Component Movement in Tape Pocket" Section.									

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6-7. Taping and Reel Specification-TO277B

Taping Width	Tape Orientation
12mm	

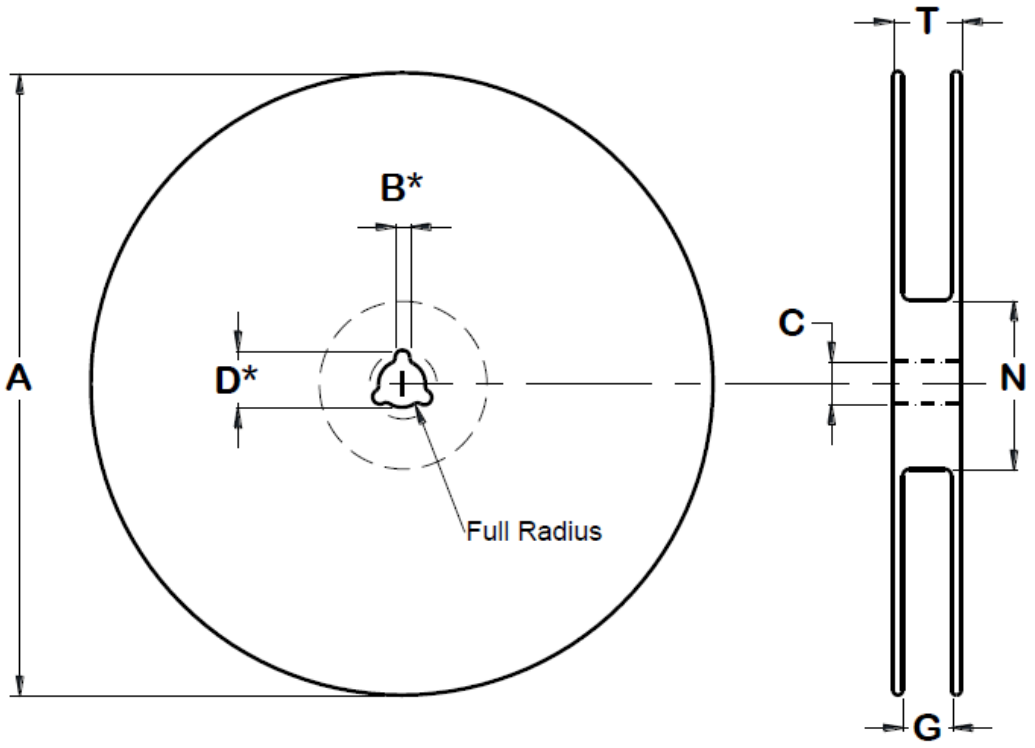
6-8. Embossed Carrier Tape Specification-TO277B



Dimension	W	D0	D1	F	K0	P0	P1	P2
Value	12 mm	1.55±0.05 mm	1.5mm,Min	5.5±0.05 mm	1.4±0.1 mm	4.0±0.1 mm	8.0±0.1 mm	2.0±0.05 mm

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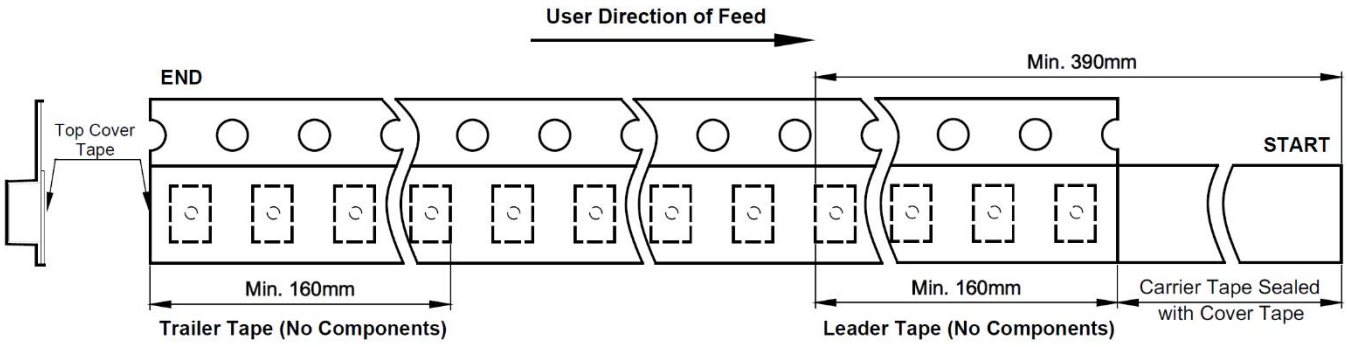
6-9. Surface Mount Reel Specification-SMAJ & SMAF & SMBJ & SMBF & TO277B



Unit:mm

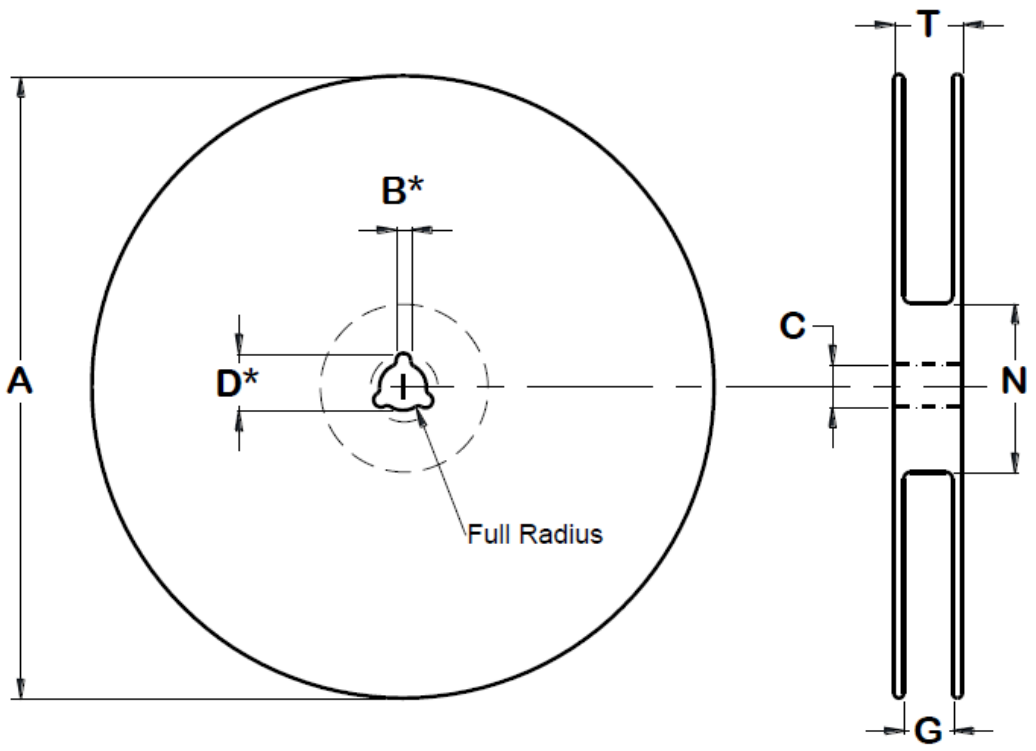
Dimension	Tape Width	Reel Size	A	B	C	D	N	G	T
Value	12 mm	13"	330 ±2	2.0 +0.5-0	13 +0.5-0.2	20.5 ±0.2	100 ±2	12.4 +2.0 -0.0	18.4

6-10. Tape Leader and Trailer Specification-SMAJ & SMAF & SMBJ & SMBF & TO277B



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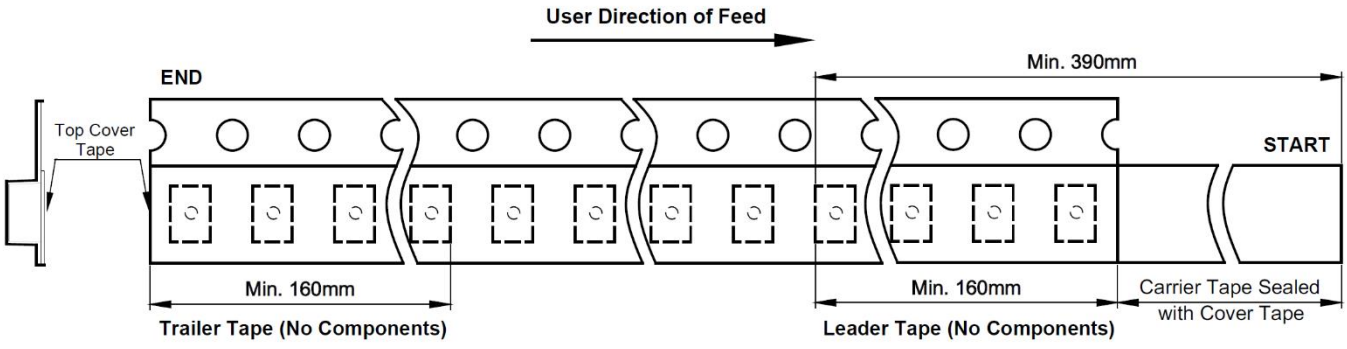
6-11. Surface Mount Reel Specification-SMCJ



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

6-12. Tape Leader and Trailer Specification-SMCJ



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7. Ordering Information

Part Number	Marking Code	Quantity	Component Package	Packaging Option
TBR05L120A	F52A	5,000PCS	SMAJ	13” Reel
TBR05L120AF	F52F		SMAF	
TBR05L120B	F52B	3,000PCS	SMBJ	
TBR05L120BF	F5V2		SMBF	
TBR05L120C	F52C		SMCJ	
TBR05L120HT	F52HT	5,000PCS	TO277B	

8. Version

8-1. History

Version	Date	File No.	Recording	Basis
A	06-Sep-2020	F22037Z	New Create	Market
2.0	20-Feb-2021		Update Version	System
2.1	05-Oct-2021		Update Version	System

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