

1. Synopsis

1-1. General Description

State of the Fast Recovery Rectifiers Specifically
Designed with Optimized Performance of Forward Voltage
Drop and Fast Recovery Time.

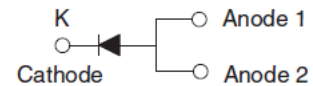
The Planar Structure and The Platinum Doped Life Time Control
Guarantee The Best Overall Performance, Ruggedness, and
Reliability Characteristics.

These Devices are Intended for use in PFC, Boost, Lighting,
in the AC/DC Section of SMPS, Freewheeling and Clamp Diodes.

The Extremely Optimized Stored Charge and Low Recovery
Current Minimize the Switching Losses and Reduce Power
Dissipation in The Switching Element.



TO-277B



1-2. Feature List

- Maximum Forward Voltage, $V_F = 0.94V$ ($T_J = 25^\circ C$)
- 200-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: TO-277B
- 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	Values	Units
Peak Repetitive Reverse Voltage	V_{RRM}	200	V
Continuous Forward Current	$I_{F(AV)}, T_C \leq 75^\circ\text{C}$	6	A
Nonrepetitive Peak Surge Current	$I_{FSM}, 60\text{HZ}$	150	
Power Dissipation	P_D	26	W
Operating Temperature	T_J	-65 ~ +175	°C
Storage Temperature	T_{STG}		

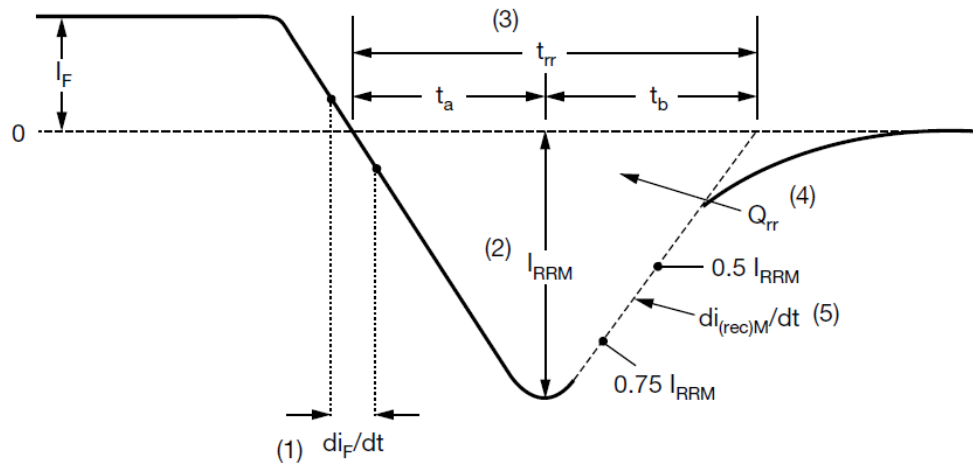
3-2. Electrical Characteristics

Parameter	Symbol	Condition	Values			Units
			Min.	Typ.	Max.	
DC Blocking Voltage	V_{DC}	$I_R = 50\mu\text{A}$	200	-	-	V
Diode Forward Voltage	V_F	$I_F = 6\text{A}$				
		$T_J = 25^\circ\text{C}$	-	-	0.94	
Reverse Current	I_R	$V_R = 200\text{V}$	-	2	-	uA
		$T_J = 125^\circ\text{C}$				
Reverse Recovery Time	t_{rr}	$V_R = 30\text{V}, di/dt = 50\text{A}/\mu\text{s}, I_F = 1\text{A}$	-	16	25	nS
		$I_F = 0.5\text{A}, I_R = 1\text{A}, I_{rr} = 0.25\text{A}$				
			-	-	20	

3-3. Thermal Characteristics

Parameter	Symbol	Values			Units
		Min.	Typ.	Max.	
Thermal Resistance, Junction-Case	R_{thJC}	-	2.4	3.5	°C/W
Thermal Resistance, Junction-Ambient	R_{thJA}	-	65	70	

3-4. Reverse Recovery Waveform and Definitions



Symbol	Units
di_F/dt	Rate of change of current through zero crossing
I_{RRM}	Peak reverse recovery current
t_{rr}	Reverse recovery time measured from zero crossing point of negative going I_F to point where a line passing through $0.75 I_{RRM}$ and $0.50 I_{RRM}$ extrapolated to zero current.
Q_{rr}	Area under curve defined by t_{rr} and I_{RRM}
$di_{(rec)M}/dt$	Peak rate of change of current during t_b portion of t_{rr}

3-5. Ratings and Characteristics Curve

Fig 1. DC Current Derating Curve

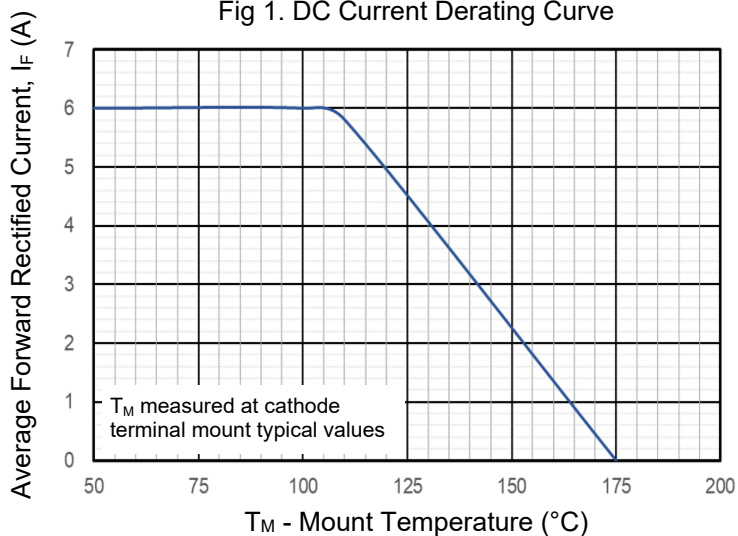


Fig 2. Typical Instantaneous Forward Characteristics

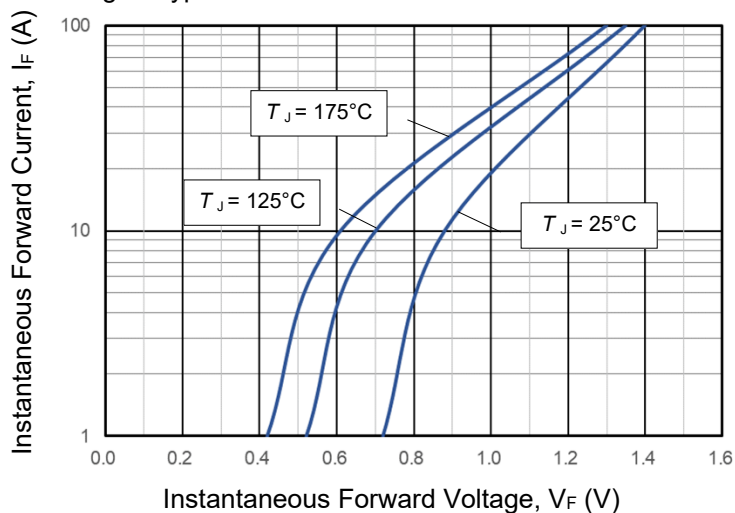


Fig 3. Typical Reverse Current Characteristics

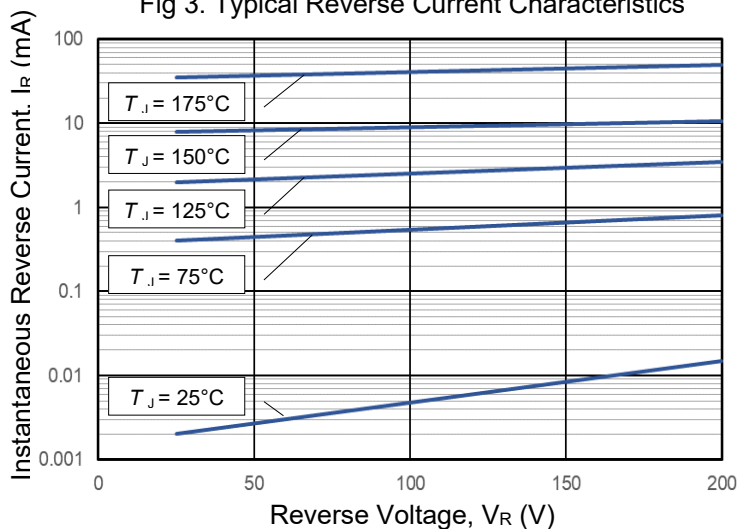
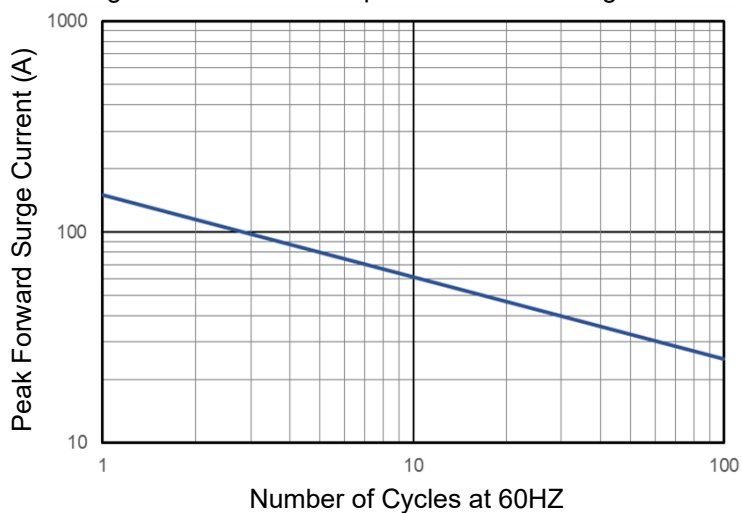


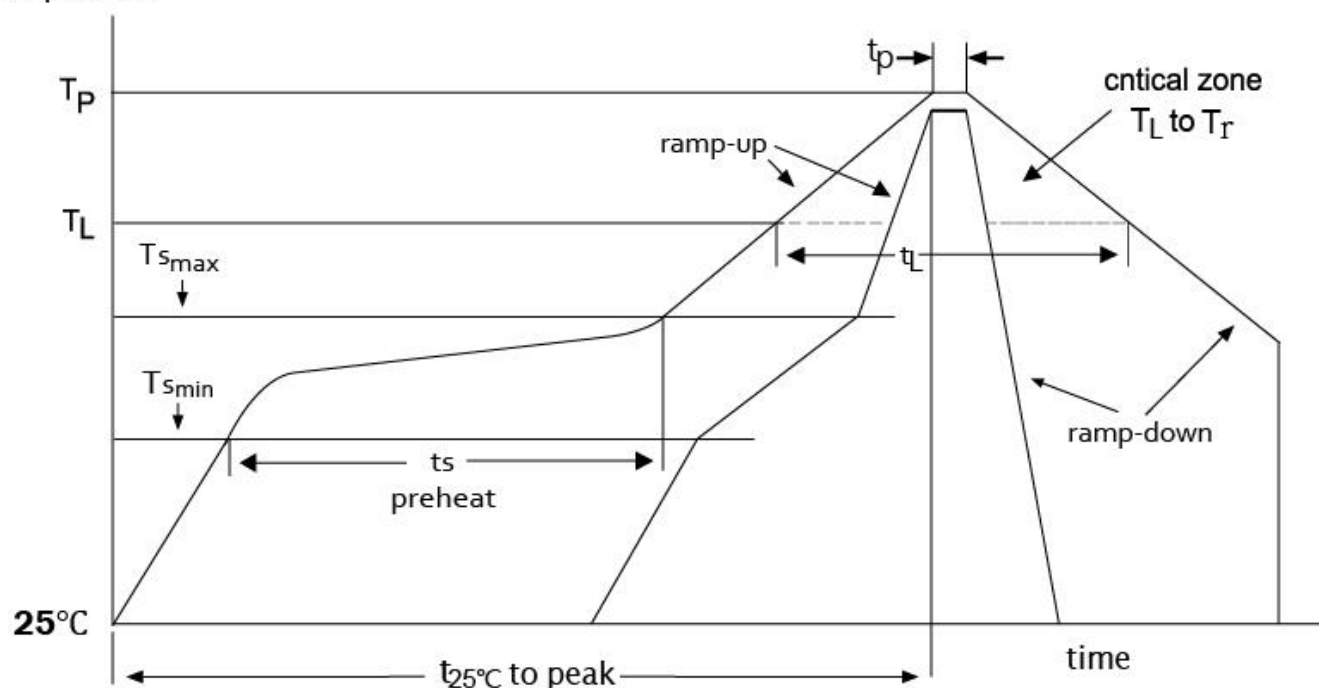
Fig 4. Maximum Non-repetitive Forward Surge Current



4. Soldering Parameters

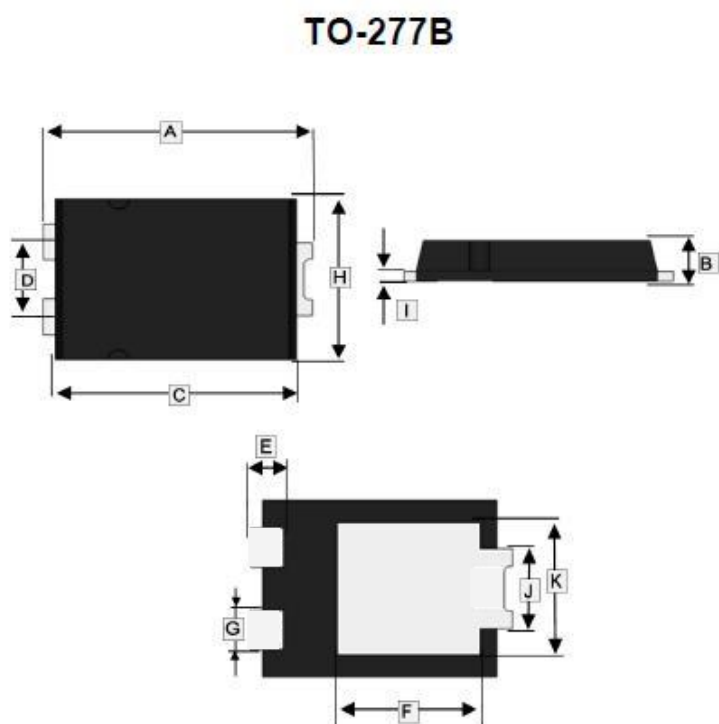
Profile Feature	SnPb eutectic assembly	Pb-free assembly
Average ramp-up rate (T _{smax} to T _p)	3 °C/s maximum	3 °C/s maximum
Preheat		
Temperature minimum (T _{smin})	100 °C	150 °C
Temperature maximum (T _{smax})	150 °C	200 °C
Time (t _{smin} to t _{smax})	60 s to 120 s	60 s to 180 s
Time maintained 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

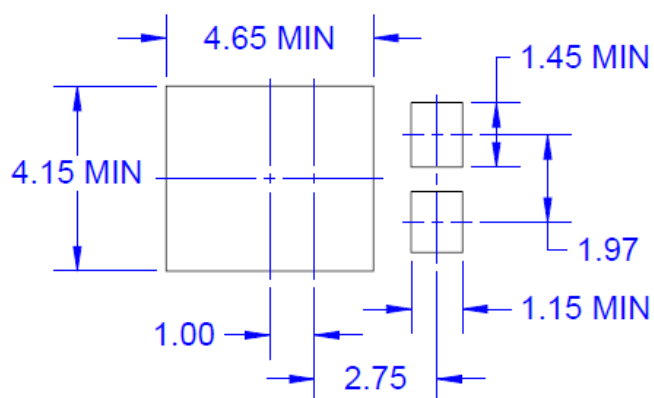
5-1. Dimension



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

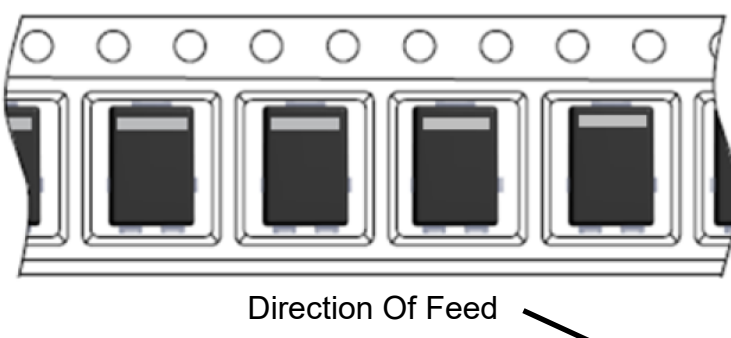
5-2. PCB Pad Layout Recommendation



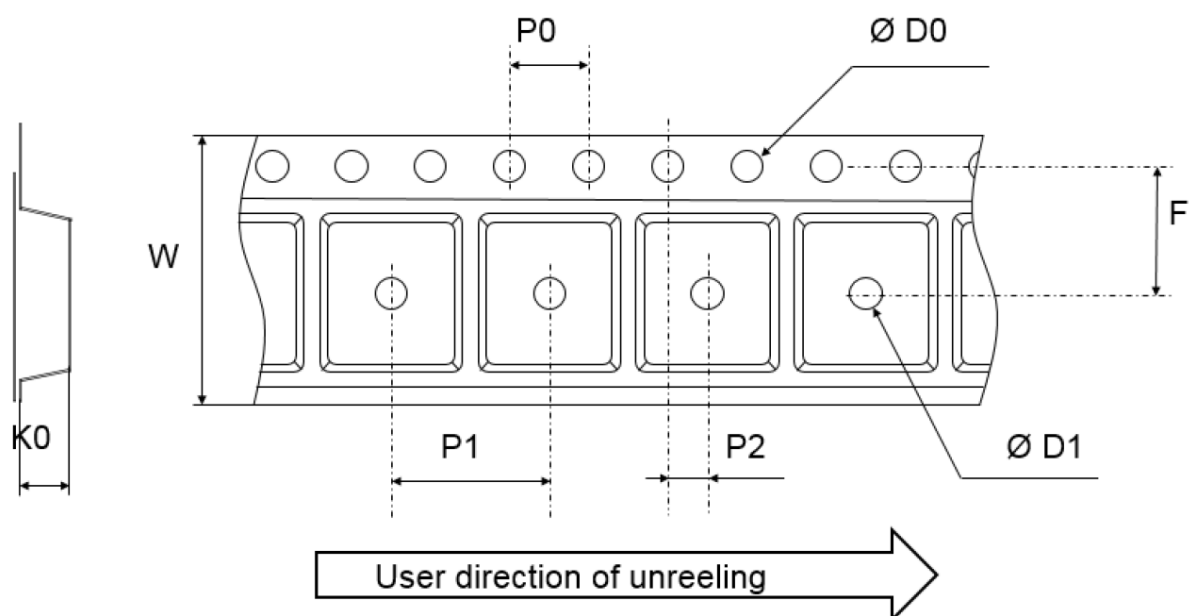
Unit:mm

6. Packing

6-1. Taping and Reel Specification

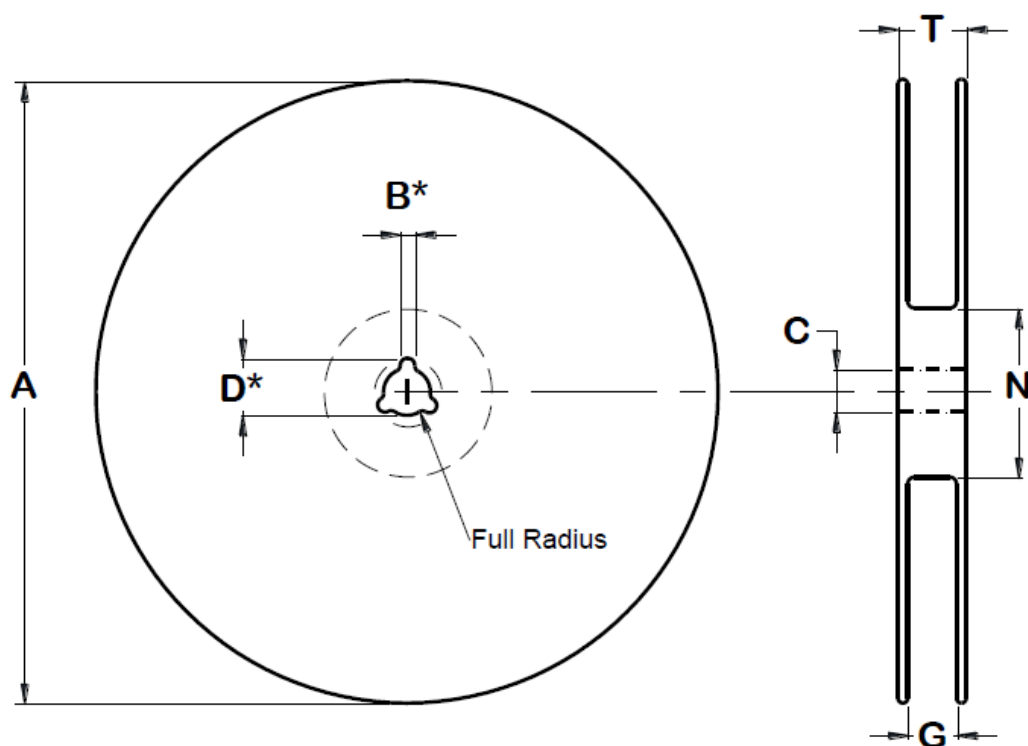
Taping Width	Tape Orientation
12mm	

6-2. Embossed Carrier Tape Specification



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

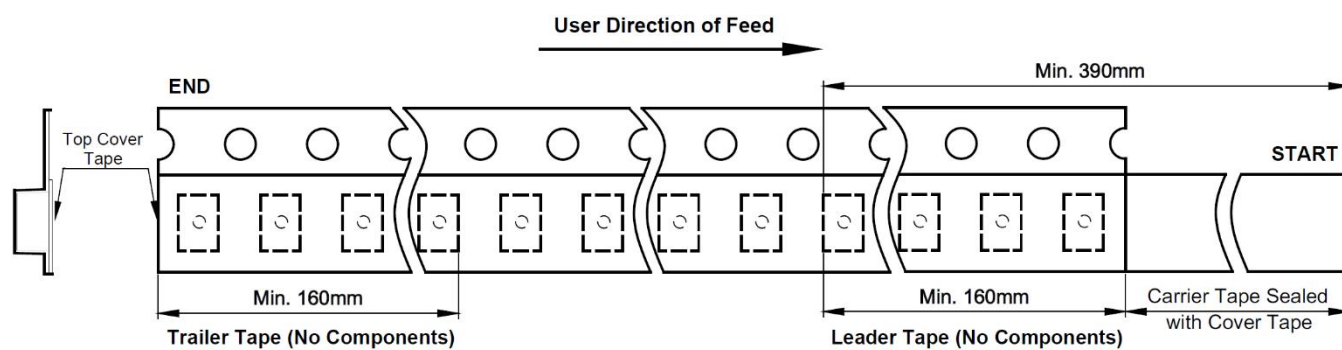
6-3. Surface Mount Reel Specification



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. Ordering Information

Part Number	Marking Code	Quantity	Component Package	Packaging Option
FR06S20HT	06S20	5,000PCS	TO-277B	Tape & Reel - 12mm tape / 13"reel

8. Version

8-1. History

Version	Date	File No.	Recording	Basis
A	15-Mar-2018	F21812A	New Create	Market
B	29-Jan-2020		Update Version	System
2.0	14-Oct-2021		Update Version	System