TN80P20TE

P-Channel Enhancement Mode Power MOSFET

Product Summary

- V_{DS}= -20V,I_D= -80A
- $R_{DS(on)}$< 4.5mΩ @V_{GS}= -4.5V
- $R_{DS(on)}$< 6mΩ @V_{GS}= -2.5V

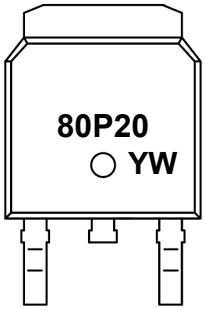
Features

- Advanced Trench Technology
- 100% Avalanche Tested
- RoHS Compliant
- Halogen and Antimony Free
- Moisture Sensitivity Level 3

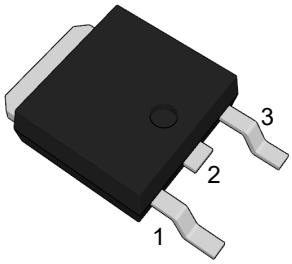
Application

- Load Switch
- PWM Application
- Power management

Marking Code



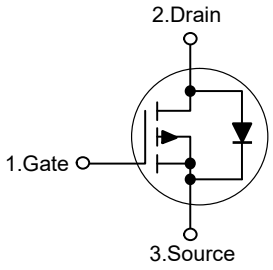
TO-252



(Top View)

Pin	Description
1	Gate
2	Drain
3	Source

Schematic Diagram



Absolute Maximum Ratings

Ratings at 25℃ case temperature unless otherwise specified.

Parameter	Symbol	Value	Unit
Drain-Source Voltage	$-V_{DS}$	20	V
Gate-Source Voltage	V_{GS}	±12	V
Drain Current-Continuous	$-I_D$	80	A
Drain Current-Pulsed Note1	$-I_{DM}$	280	A
Maximum Power Dissipation	P_D	43	W
Junction Temperature	T_J	150	°C
Storage Temperature Range	T_{STG}	-55 to +150	°C

Thermal Characteristics

Thermal Resistance,Junction-to-Case	$R_{\theta JC}$	2.90	°C/W

Electrical Characteristics

(T_J=25℃ unless otherwise specified)

Symbol	Parameter		Test condition	Min.	Typ.	Max.	Units
Static Characteristics							
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage		V_{GS} = 0V, I_D = -250μA	-20	-	-	V
I_{GSS}	Gate-body Leakage current		V_{DS} = 0V, V_{GS} = ±12V	-	-	±100	nA
I_{DSS}	Zero Gate Voltage Drain Current	T_J=25℃	V_{DS} = -20V, V_{GS} = 0V	-	-	-1	μA
		T_J=100℃		-	-	-100	μA
$V_{GS(th)}$	Gate-Threshold Voltage		V_{DS} = V_{GS}, I_D = -250μA	-0.4	-0.7	-1	V
$R_{DS(on)}$	Drain-Source On-Resistance[4]		V_{GS} = -4.5V, I_D = -10A	-	3.8	4.5	mΩ
			V_{GS} = -2.5V, I_D = -10A	-	5	6.0	mΩ
g_{fs}	Forward Transconductance[4]		V_{DS} = -4.5V, I_D = -10A	-	56	-	S
Dynamic Characteristics[5]							
C_{iss}	Input Capacitance		V_{DS} = -10V, V_{GS} =0V, f=1MHz	-	4770	-	pF
C_{oss}	Output Capacitance			-	665	-	
C_{rss}	Reverse Transfer Capacitance			-	570	-	
R_g	Gate Resistance		f =1MHz	-	9.6	-	Ω
Switching Characteristics[5]							
Q_g	Total Gate Charge		V_{GS} = -4.5V,V_{DS} = -10V, I_D= -10A	-	55	-	nC
Q_{gs}	Gate-Source Charge			-	5.2	-	
Q_{gd}	Gate-Drain Charge			-	10	-	
$t_{d(on)}$	Turn-On Delay Time		V_{GS} = -4.5V, V_{DD} = -10V, R_G = 3Ω, I_D= -10A	-	22	-	ns
t_r	Rise Time			-	38	-	
$t_{d(off)}$	Turn-Off Delay Time			-	110	-	
t_f	Fall Time			-	62	-	
Drain-Source Body Diode Characteristics							
V_{SD}	Diode Forward Voltage[4]		I_S = -10A, V_{GS} = 0V	-	-	-1.2	V
I_S	Continuous Source Current	T_C=25°C	-	-	-	-80	A

Notes:

1.Repetitive rating, pulse width limited by junction temperature TJ(MAX)=150°C.

2.The EAS data shows Max. rating. The test condition is VDD= -25V, VGS= -10V, L= 0.4mH, IAS= -20A.

3.The data tested by surface mounted on a 1 inch2 FR-4 board with 2OZ copper, The value in any given application depends on the user's specific board design.

4.The data tested by pulsed, pulse width ⩽ 300us, duty cycle ⩽ 2%.

This value is guaranteed by design hence it is not included in the production test

Typical Characteristic Curves

Figure1: Output Characteristics

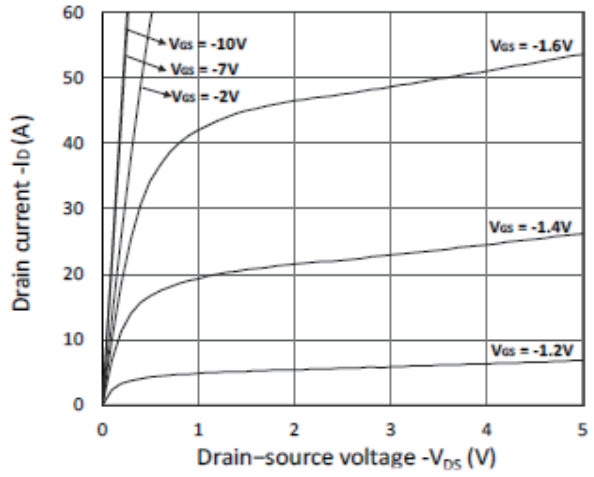


Figure 2: Typical Transfer Characteristics

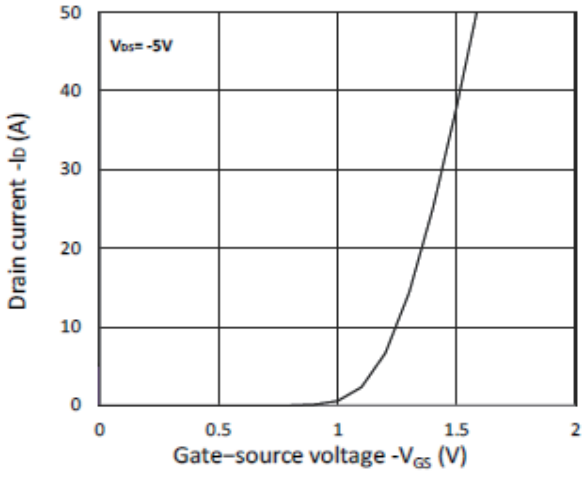


Figure 3:Forward Characteristics of Reverse

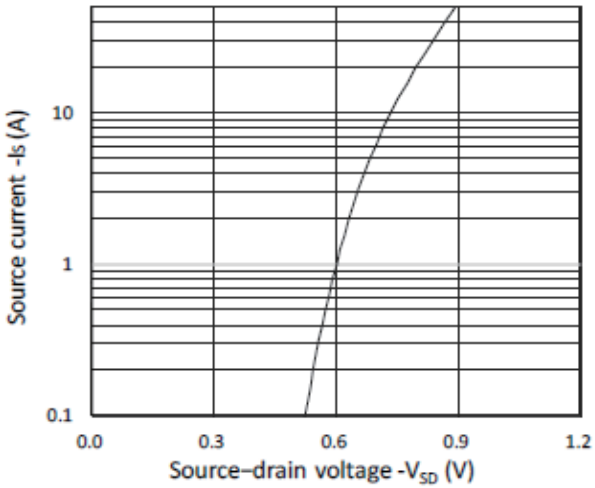


Figure 4: RDS(ON) vs. VGS

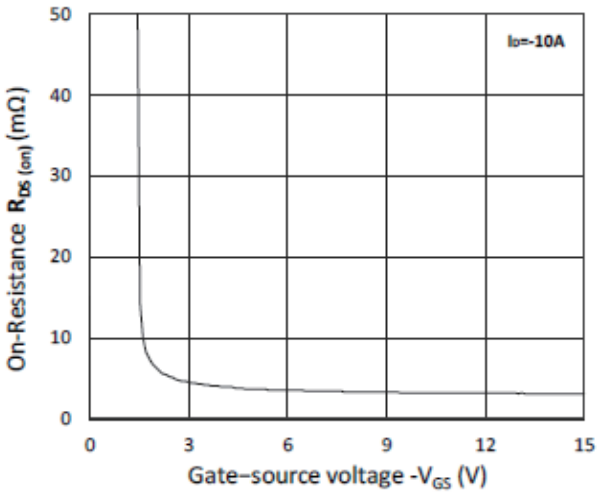


Figure 5: RDS(ON) vs. ID

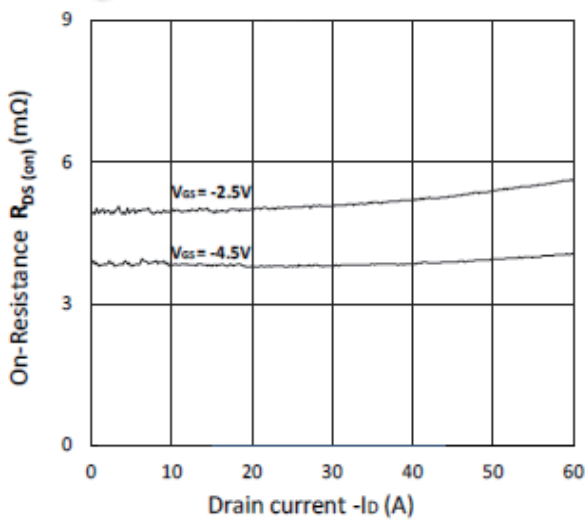


Figure 6:Normalized RDS(on) vs. Temperature

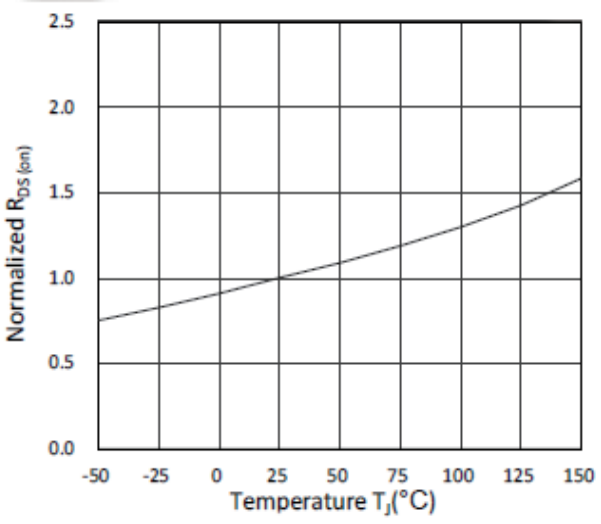


Figure 7: Capacitance Characteristics

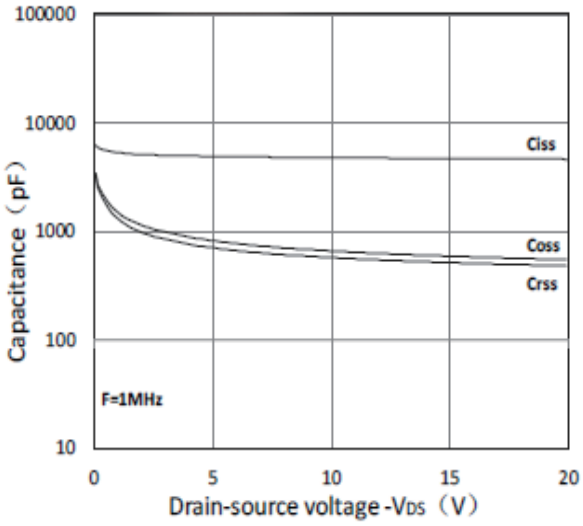


Figure 8: Gate Charge Characteristics

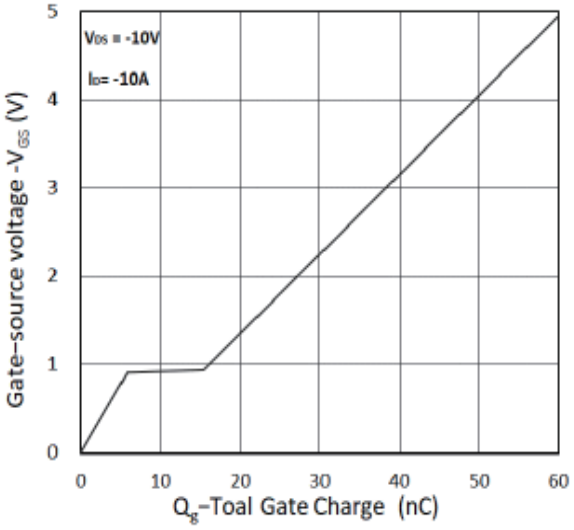


Figure 9: Power Dissipation

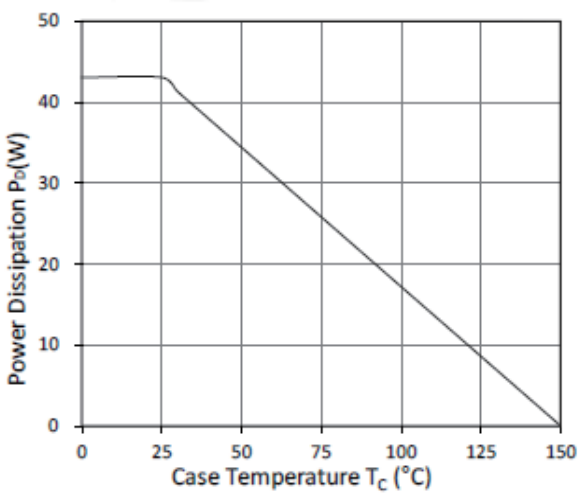


Figure 10: Safe Operating Area

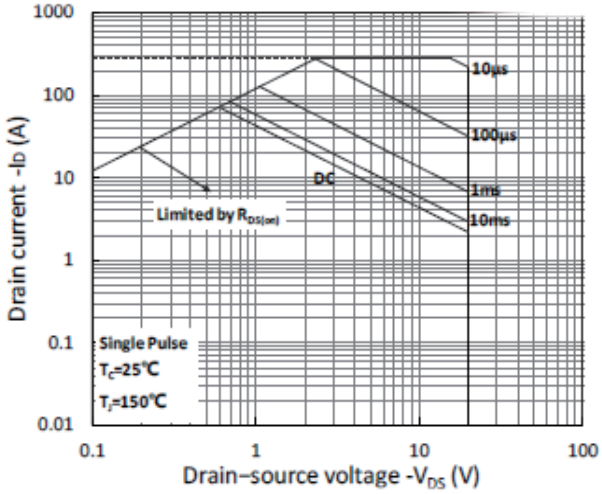
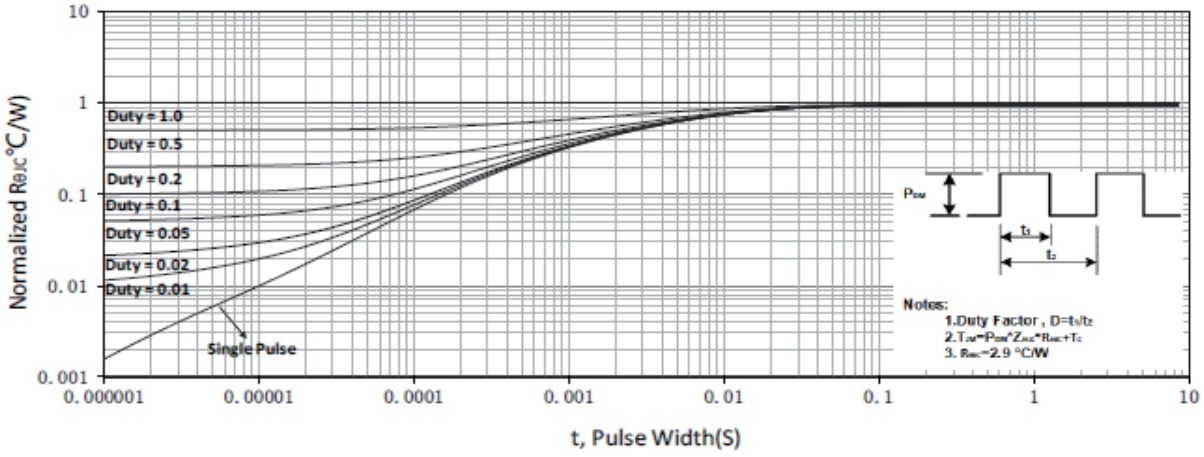


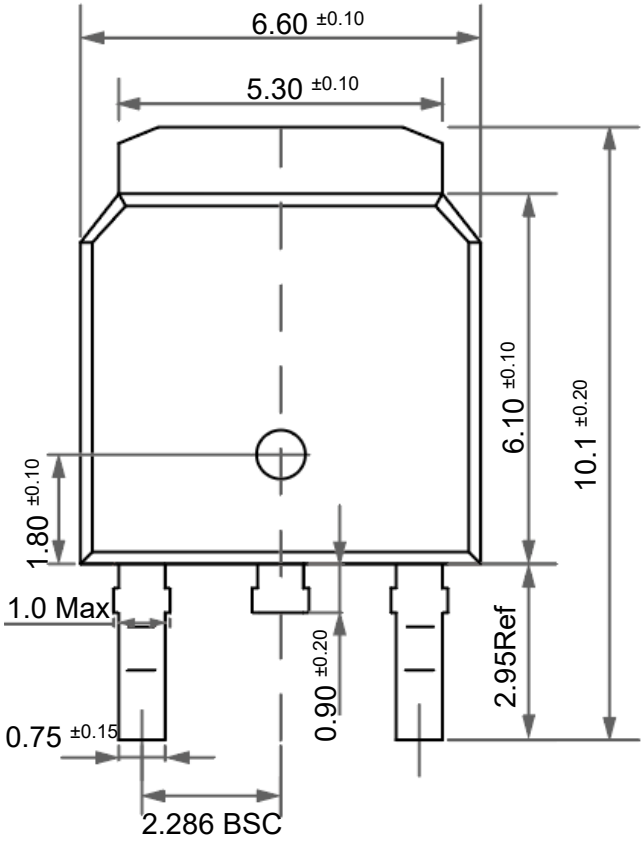
Figure 11: Normalized Maximum Transient Thermal Impedance



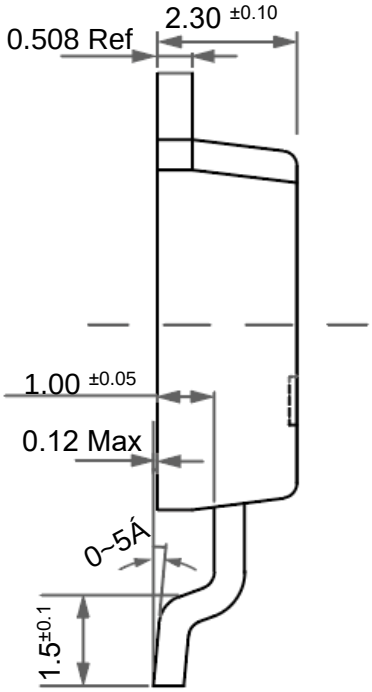
Package Outline

TO-252

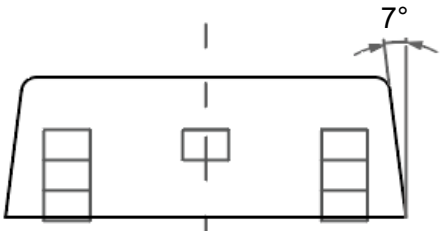
Dimensions in mm



Front View



Side View



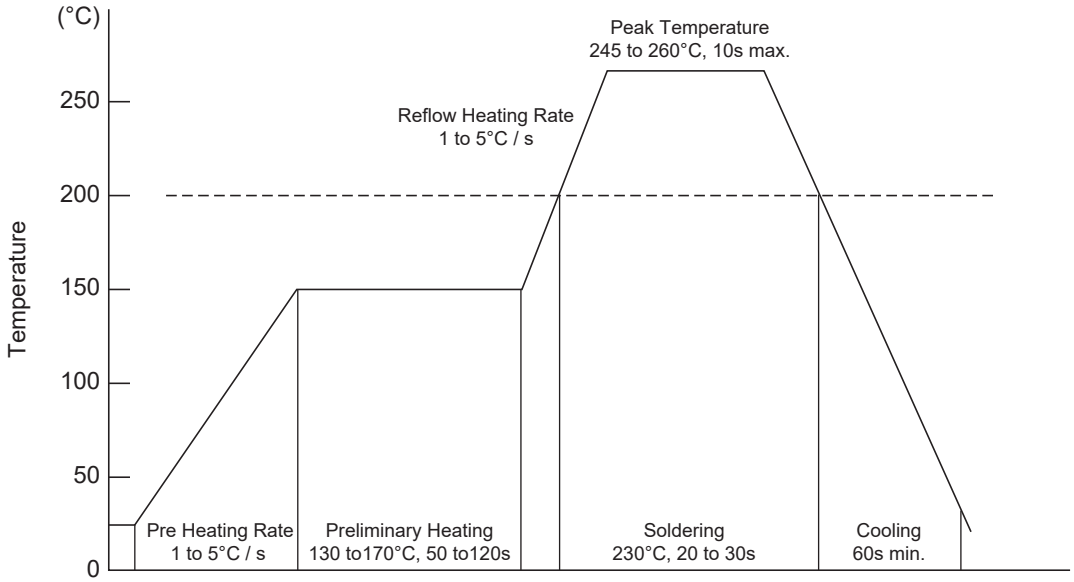
Bottom View

Ordering Information

Device	Package	Shipping
TN80P20TE	TO-252	2,500PCS/Reel&13inches

Conditions of Soldering and Storage

◆ Recommended condition of reflow soldering



Recommended peak temperature is over 245°C. If peak temperature is below 245°C, you may adjust the following parameters:

- Time length of peak temperature (longer)
- Time length of soldering (longer)
- Thickness of solder paste (thicker)

◆ Conditions of hand soldering

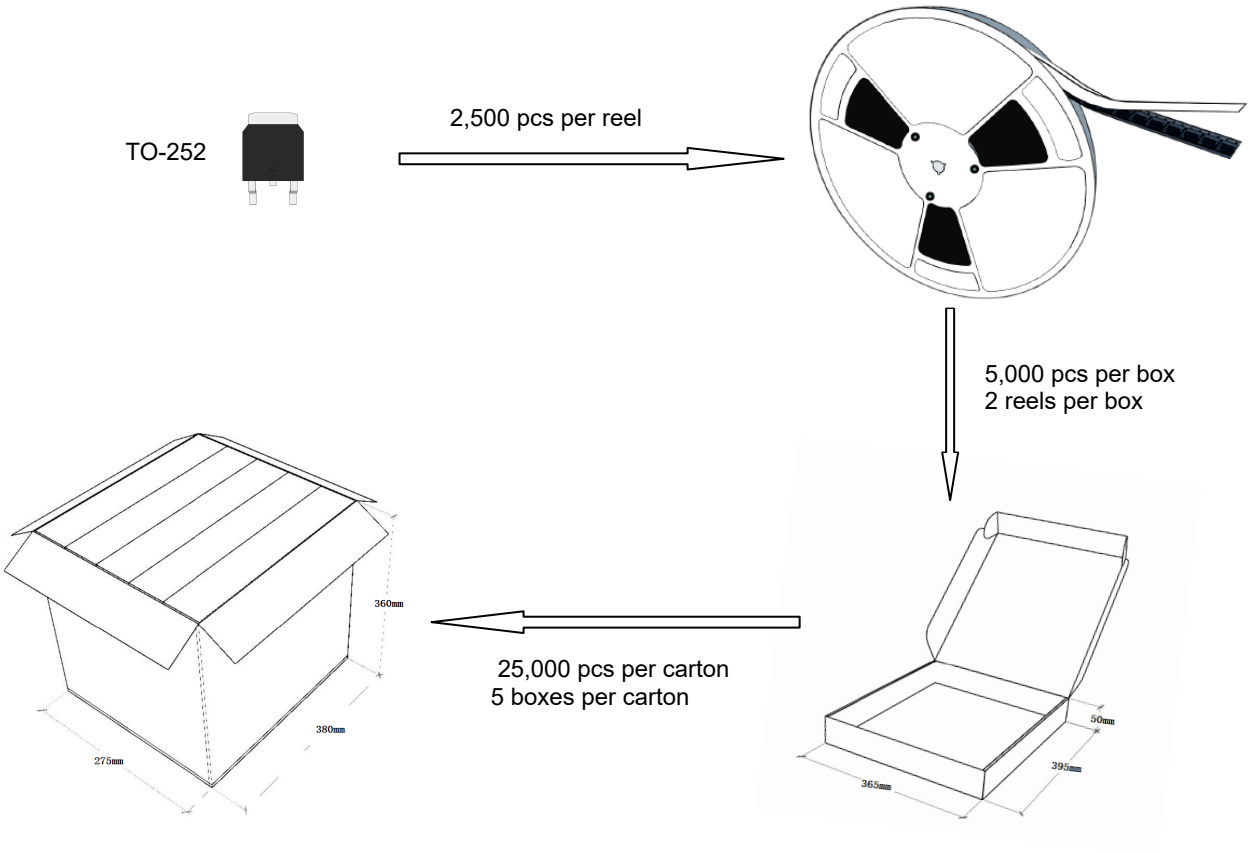
- Temperature: 300°C
- Time: 3s max.
- Times: one time

◆ Storage conditions

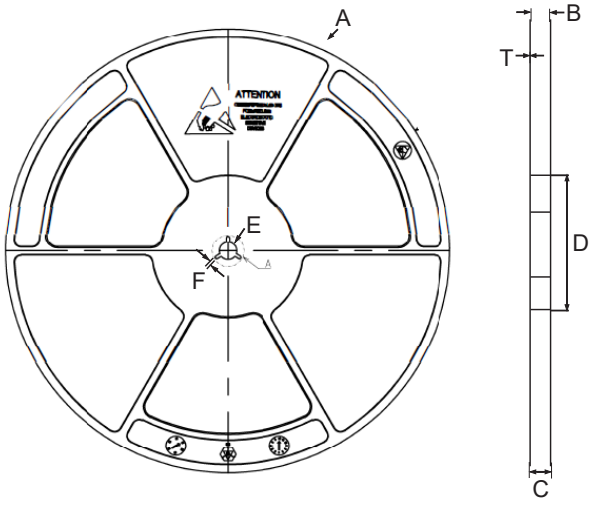
- **Temperature**
  5 to 40°C
- **Humidity**
  30 to 80% RH
- **Recommended period**
  One year after manufacturing

Package Specifications

- The method of packaging



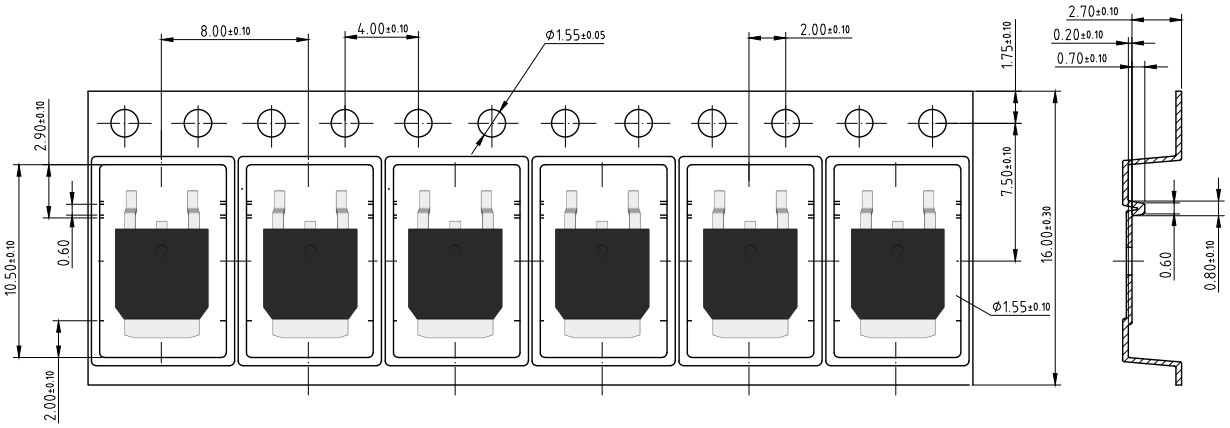
◆ **reel data**



Reel (13")

Symbol	Value(unit:mm)
A	Φ330.2±1
B	17±0.5
C	21.2±2
D	Φ100±0.5
E	Φ13.4±0.2
F	2.3±0.2
T	2.1±0.2

◆ **Embossed tape data**



Contact Information

TANI website: **http://www.tanisemi.com** Email:tani@tanisemi.com

For additional information, please contact your local Sales Representative.

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Product Specification Statement

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The product parameters described in the product specification are numerical values, characteristics, and functions obtained through actual testing or theoretical calculations of the product in an independent or ideal state. Due to the complexity of product applications and variations in test conditions and equipment, there may be slight fluctuations in parameter test values. TANI shall not guarantee that the actual performance of the product when installed in the customer's system or equipment will be entirely consistent with the product specification, especially concerning dynamic parameters. It is recommended that users consult with professionals for product selection and system design. Users should also thoroughly validate and assess whether the actual parameters and performance when installed in their respective systems or equipment meet their requirements or expectations. Additionally, users should exercise caution in verifying product compatibility issues, and TANI assumes no responsibility for the application of the product. TANI strives to provide accurate and up -to- date information to the best of our ability. However, due to technical, human, or other reasons, TANI cannot guarantee that the information provided in the product specification is entirely accurate and error-free. TANI shall not be held responsible for any losses or damages resulting from the use or reliance on any information in these product specifications.

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