



# TN40N40TE

## N-Channel Enhancement Mode Power MOSFET

### Product Summary

- $V_{DS} = 40V, I_D = 40A$
- $R_{DS(on)} < 13m\Omega @ V_{GS} = 10V$
- $R_{DS(on)} < 23m\Omega @ V_{GS} = 4.5V$

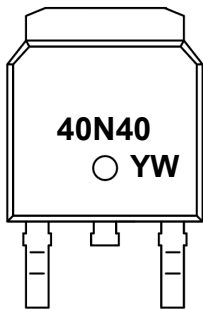
### Features

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

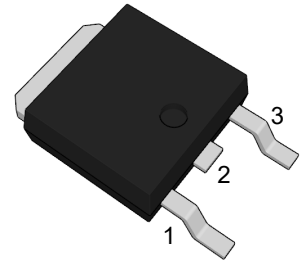
### Application

- Load Switch
- High Frequency Circuits
- Uninterruptible Power Supply

### Marking Code



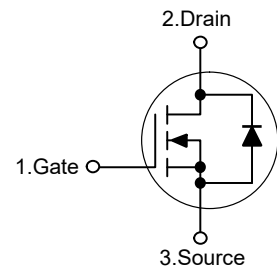
### TO-252



(Top View)

Pin	Description
1	Gate
2	Drain
3	Source

### Schematic Diagram



### Absolute Maximum Ratings

Ratings at 25°C case temperature unless otherwise specified.

Parameter	Symbol	Value	Unit
Drain-Source Voltage	$V_{DS}$	40	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Drain Current-Continuous	$I_D$	40	A
Drain Current-Pulsed <sup>Note1</sup>	$I_{DM}$	140	A
Maximum Power Dissipation	$P_D$	28	W
Single Pulse Avalanche Energy <sup>Note2</sup>	$E_{AS}$	39	mJ
Junction Temperature	$T_J$	150	°C
Storage Temperature Range	$T_{STG}$	-55 to +150	°C

### Thermal Characteristics

Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	4.5	°C/W
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### Electrical Characteristics

( $T_J=25^{\circ}\text{C}$  unless otherwise specified)

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Static Characteristics						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=250\mu A$	40	--	--	V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=40V, V_{GS}=0V$	--	--	1	$\mu A$
Gate-Body Leakage Current	$I_{GSS}$	$V_{GS}=\pm 20V, V_{DS}=0V$	--	--	$\pm 100$	nA
Gate Threshold Voltage <sup>Note3</sup>	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	1.0	1.3	2.5	V
Drain-Source On-Resistance <sup>Note3</sup>	$R_{DS(on)}$	$V_{GS}=10V, I_D=20A$	--	9.5	13	m $\Omega$
		$V_{GS}=4.5V, I_D=10A$	--	12.5	23	m $\Omega$
Forward Transconductance <sup>Note3</sup>	$g_{FS}$	$V_{DS}=5V, I_D=2A$	--	8.5	--	S
Dynamic Characteristics						
Input Capacitance	$C_{iss}$	$V_{DS}=20V, V_{GS}=0V, f=1MHz$	--	1178	--	pF
Output Capacitance	$C_{oss}$		--	91	--	pF
Reverse Transfer Capacitance	$C_{rss}$		--	83	--	pF
Gate Resistance	$R_g$	$V_{DS}=0V, V_{GS}=0V, f=1MHz$	--	1.1	--	$\Omega$
Total Gate Charge	$Q_g$	$V_{DS}=20V, I_D=20A,$ $V_{GS}=10V$	--	23.6	--	nC
Gate-Source Charge	$Q_{gs}$		--	4.4	--	nC
Gate-Drain Charge	$Q_{gd}$		--	6.3	--	nC
Switching Characteristics						
Turn-on Delay Time	$t_{d(on)}$	$V_{DD}=20V, I_D=2A, R_L=3\Omega,$ $V_{GS}=10V, R_{GEN}=3\Omega$	--	10	--	nS
Turn-on Rise Time	$t_r$		--	56	--	nS
Turn-off Delay Time	$t_{d(off)}$		--	27	--	nS
Turn-off Fall Time	$t_f$		--	72	--	nS
Source-Drain Diode Characteristics						
Diode Forward Voltage <sup>Note3</sup>	$V_{SD}$	$V_{GS}=0V, I_S=20A$	--	--	1.2	V
Diode Forward Current	$I_S$		--	--	40	A

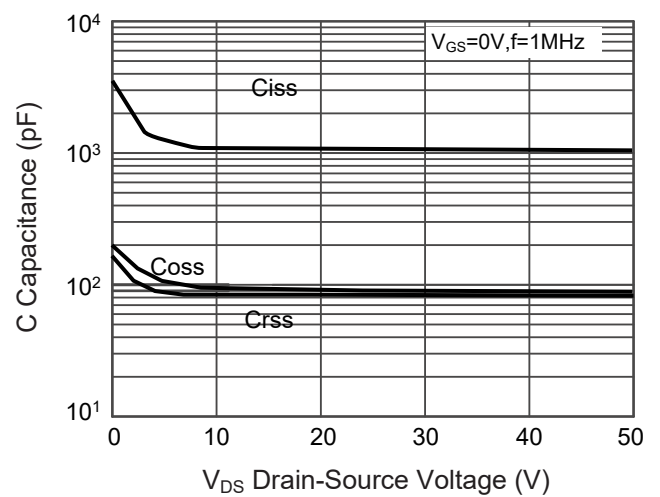
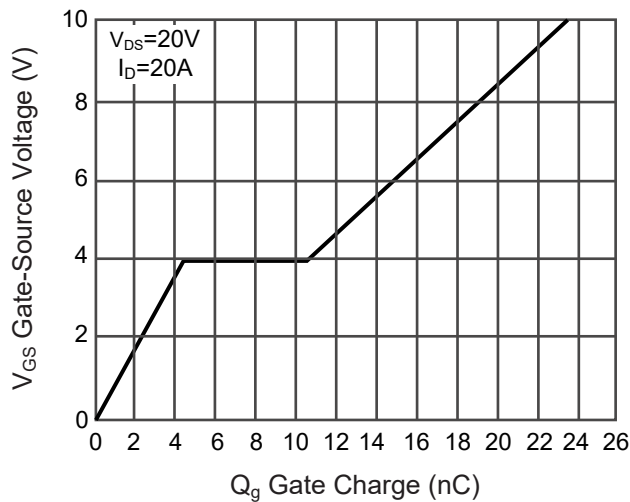
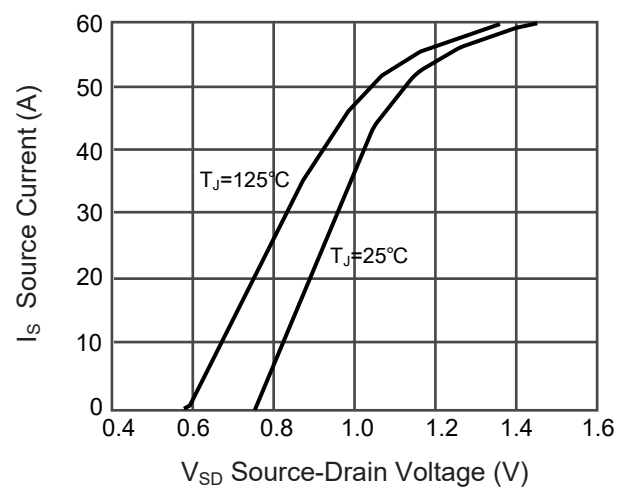
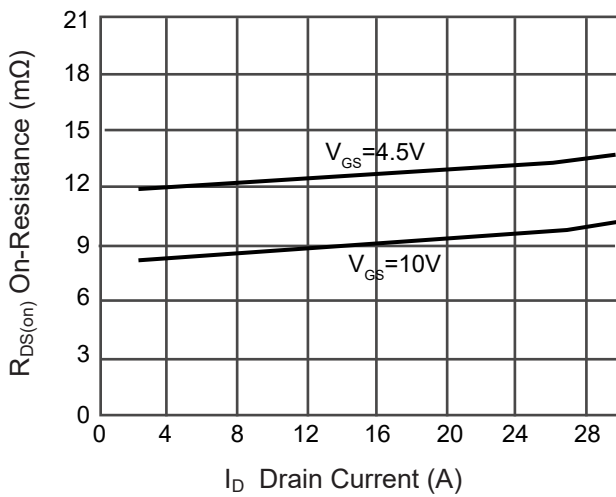
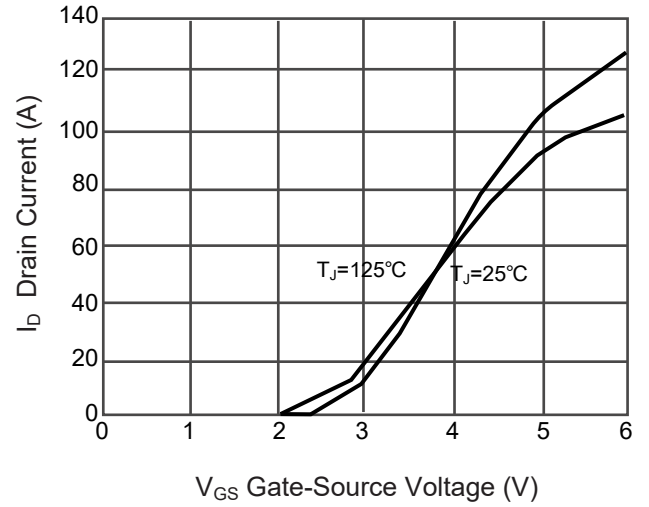
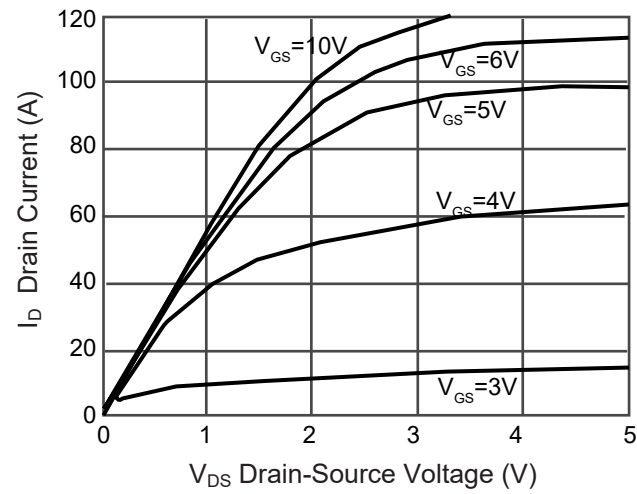
Note: 1. Repetitive Rating: Pulse width limited by maximum junction temperature  
2. EAS condition:  $T_J=25^{\circ}\text{C}, V_{DD}=20V, V_G=10V, R_G=25\Omega, L=0.5\text{mH}, I_{AS}=12.5A$   
3. Pulse Test: Pulse Width $\leq 300\mu s$ , Duty Cycle $\leq 2\%$



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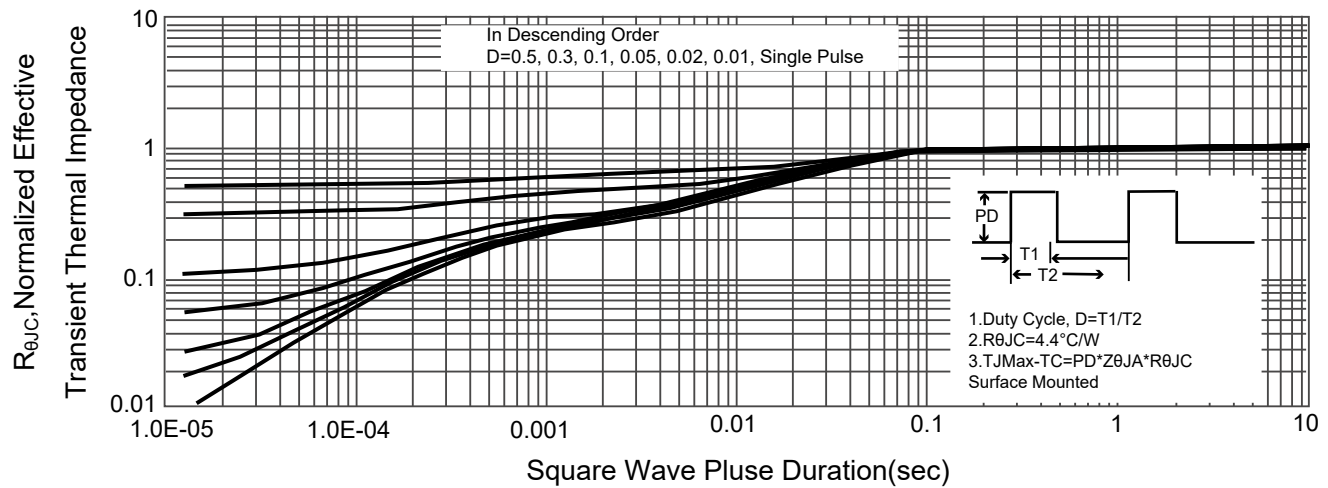
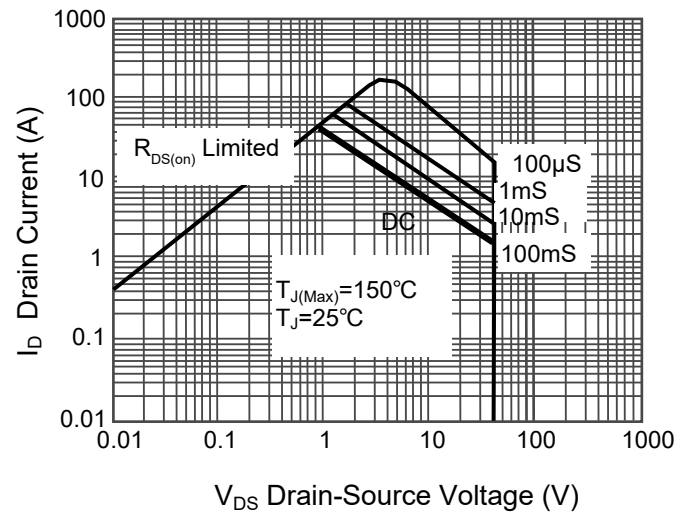
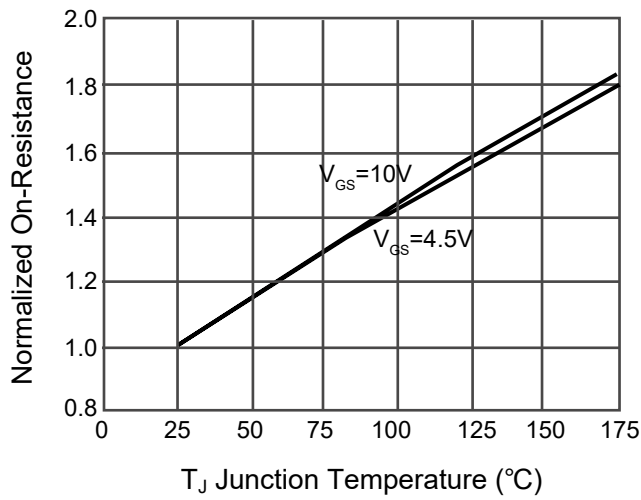
### Typical Characteristic Curves





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## N-Channel Enhancement Mode Power MOSFET





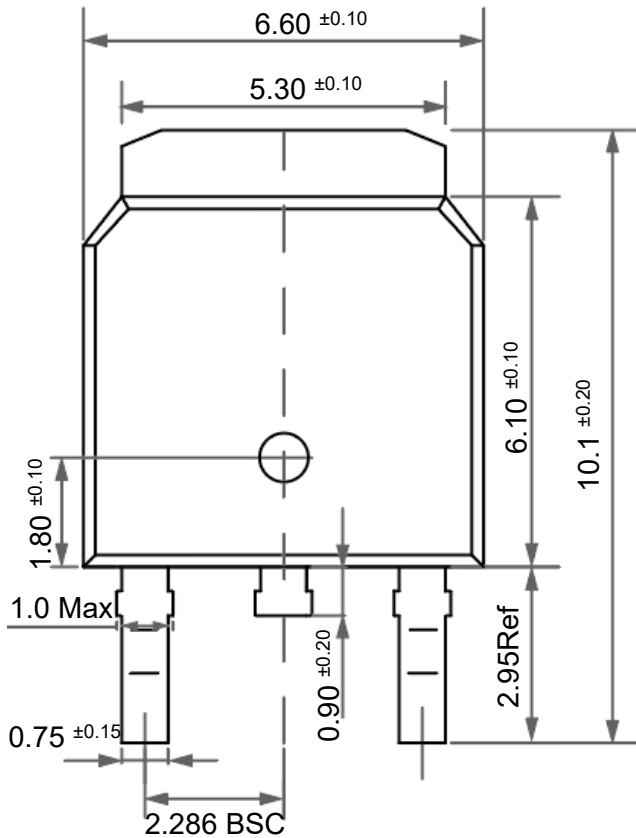
# TN40N40TE

## N-Channel Enhancement Mode Power MOSFET

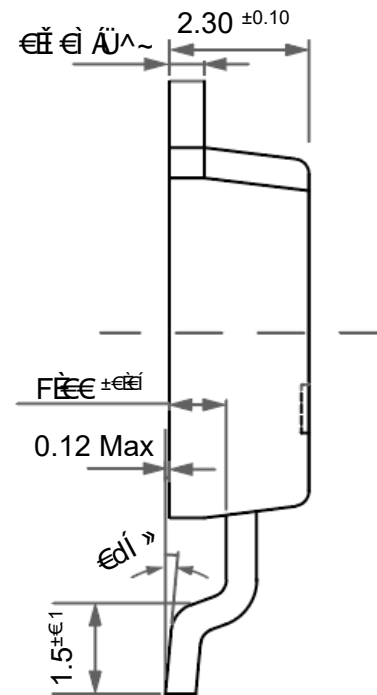
### Package Outline

TO-252

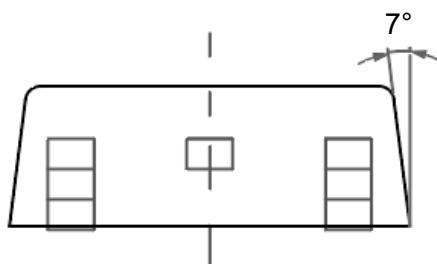
Dimensions in mm



Front View



Side View



Bottom View

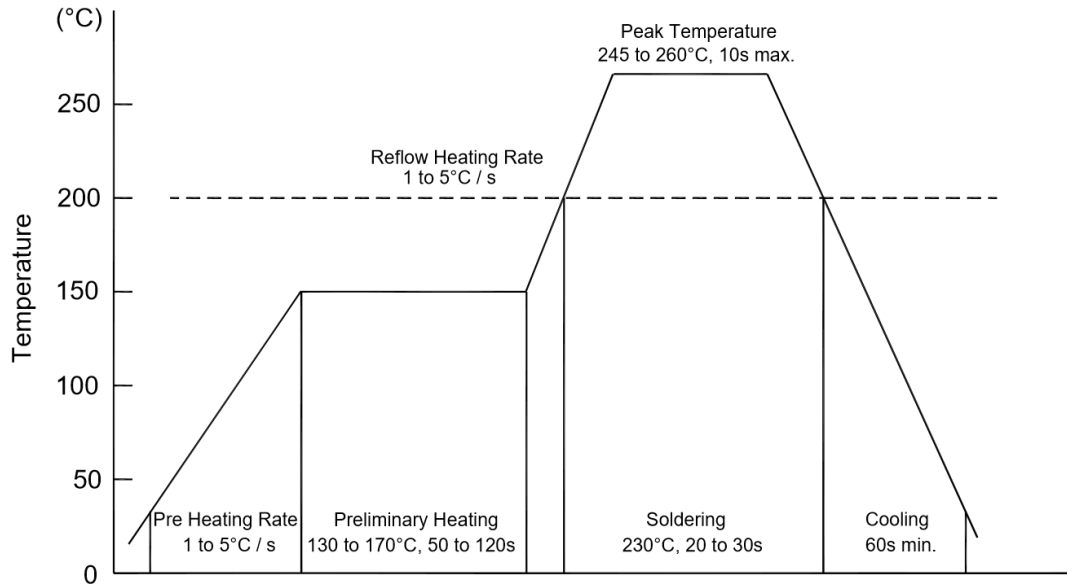
### Ordering Information

Device	Package	Shipping
TN40N40TE	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

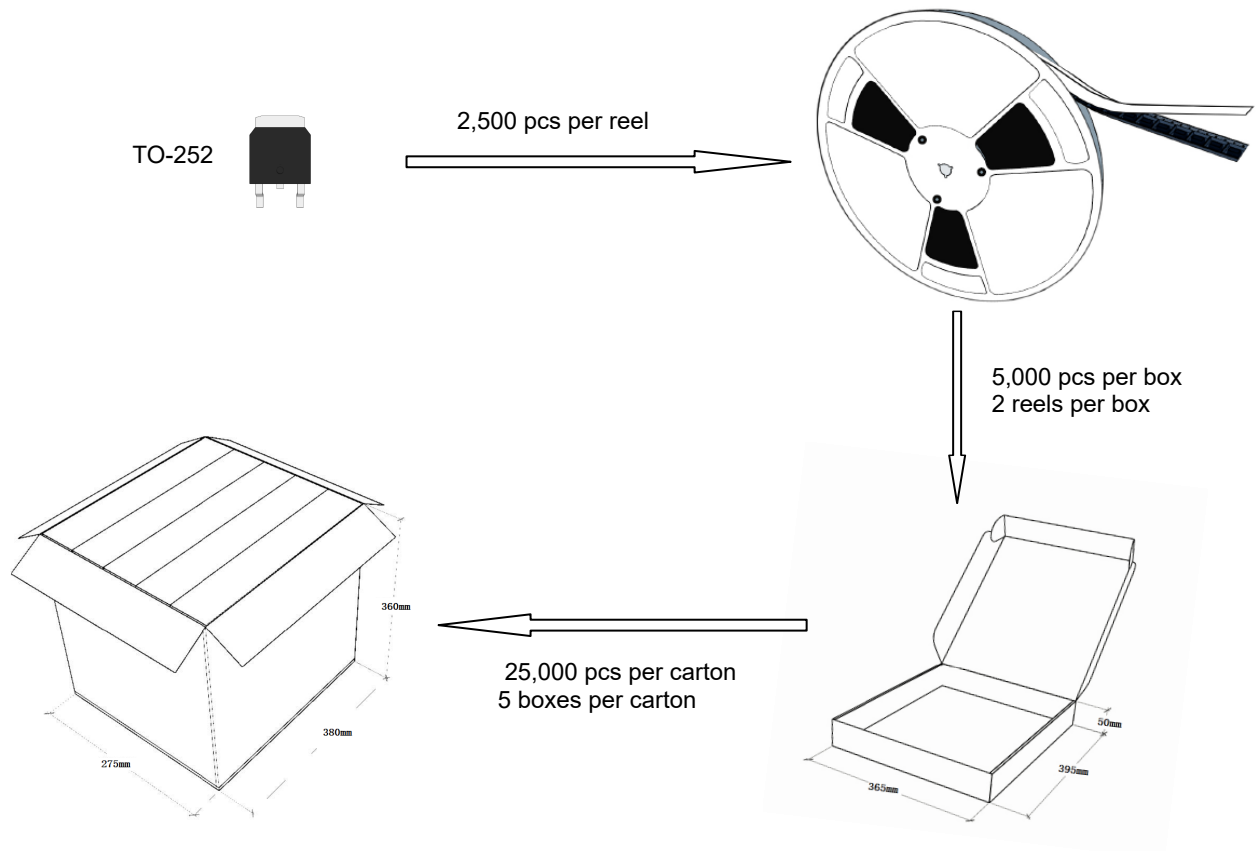


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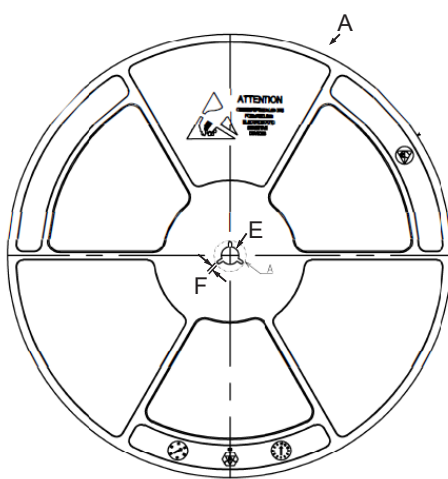
## N-Channel Enhancement Mode Power MOSFET

### Package Specifications

- The method of packaging



### ◆ reel data



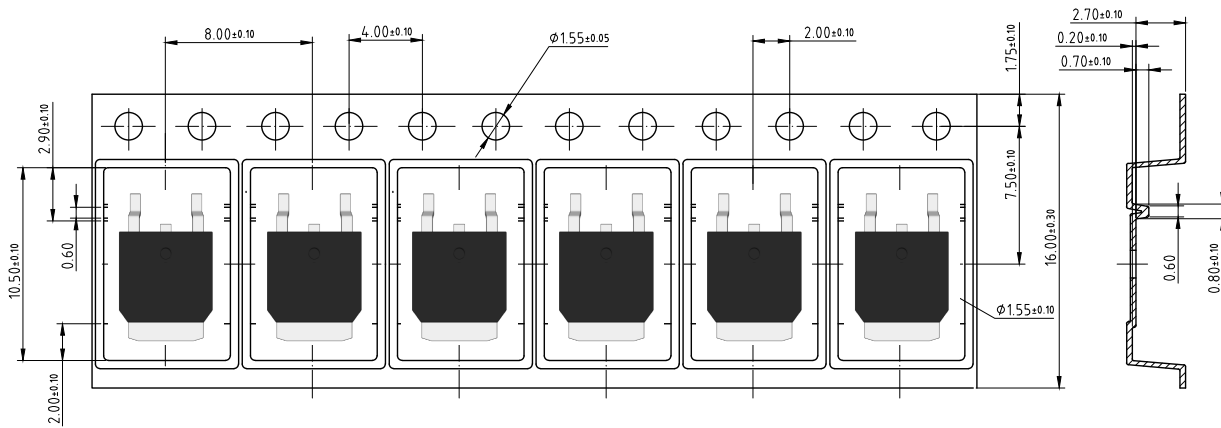
Symbol	Value(unit:mm)
A	$\Phi 330.2 \pm 1$
B	$17 \pm 0.5$
C	$21.2 \pm 2$
D	$\Phi 100 \pm 0.5$
E	$\Phi 13.4 \pm 0.2$
F	$2.3 \pm 0.2$
T	$2.1 \pm 0.2$



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### ◆ Embossed tape data








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### Contact Information

TANI website: <http://www.tanisemi.com> Email: [tani@tanisemi.com](mailto:tani@tanisemi.com)

For additional information, please contact your local Sales Representative.

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