

Product Summary

- $V_{DS} = -60V, I_D = 85A$
- $R_{DS(on)} < 11m\Omega @ V_{GS} = -10V$
- $R_{DS(on)} < 13m\Omega @ V_{GS} = -4.5V$

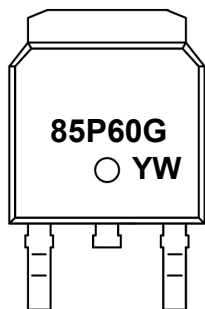
Features

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

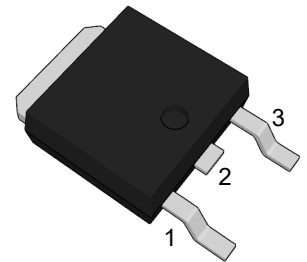
Application

- Load Switch
- PWM Application
- Power Management

Marking Code



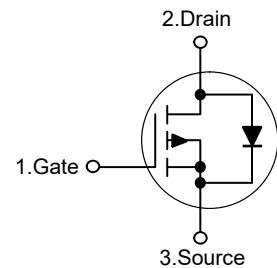
TO-252



(Top View)

Pin	Description
1	Gate
2	Drain
3	Source

Schematic Diagram



Absolute Maximum Ratings

Ratings at 25°C case temperature unless otherwise specified.

Parameter	Symbol	Value	Unit
Drain-Source Voltage	$-V_{DS}$	60	V
Gate-Source Voltage	V_{GS}	± 20	V
Drain Current-Continuous	$-I_D$	85	A
Drain Current-Pulsed ^{Note1}	$-I_{DM}$	240	A
Maximum Power Dissipation	P_D	521	W
Junction Temperature	T_J	150	°C
Storage Temperature Range	T_{STG}	-55 to +150	°C

Thermal Characteristics

Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	2.40	°C/W
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Electrical Characteristics

(T_J=25°C unless otherwise specified)

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Static Characteristics						
Drain-Source Breakdown Voltage	$-V_{(BR)DSS}$	$V_{GS}=0V, I_D=-250\mu A$	30	--	--	V
Zero Gate Voltage Drain Current	$-I_{DSS}$	$V_{DS}=-60V, V_{GS}=0V$	--	--	1	μA
Gate-Body Leakage Current	I_{GSS}	$V_{GS}=\pm 20V, V_{DS}=0V$	--	--	± 100	nA
Gate Threshold Voltage ^{Note2}	$-V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=-250\mu A$	1	--	2.5	V
Drain-Source On-Resistance ^{Note2}	$R_{DS(on)}$	$V_{GS}=-10V, I_D=-30A$	--	6	11	m Ω
		$V_{GS}=-4.5V, I_D=-15A$	--	8	13	m Ω
Dynamic Characteristics						
Input Capacitance	C_{iss}	$V_{DS}=-15V, V_{GS}=0V, f=1MHz$	--	4448	--	pF
Output Capacitance	C_{oss}		--	808	--	pF
Reverse Transfer Capacitance	C_{rss}		--	521	--	pF
Total Gate Charge	Q_g	$V_{DS}=-15V, I_D=-15A$ $, V_{GS}=-4.5V$	--	37	--	nC
Gate-Source Charge	Q_{gs}		--	23	--	nC
Gate-Drain Charge	Q_{gd}		--	14	--	nC
Switching Characteristics						
Turn-on Delay Time	$t_{d(on)}$	$V_{DD}=-15V, I_D=-15A,$ $V_{GS}=-10V, R_{GEN}=3.3\Omega$	--	15	--	nS
Turn-on Rise Time	t_r		--	22	--	nS
Turn-off Delay Time	$t_{d(off)}$		--	85	--	nS
Turn-off Fall Time	t_f		--	47	--	nS
Source-Drain Diode Characteristics						
Diode Forward Voltage ^{Note2}	$-V_{SD}$	$V_{GS}=0V, I_S=-10A$	--	--	1.2	V
Diode Forward Current	$-I_S$		--	--	20	A

Note: 1. Repetitive Rating: Pulse width limited by maximum junction temperature

2. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$

Typical Characteristic Curves

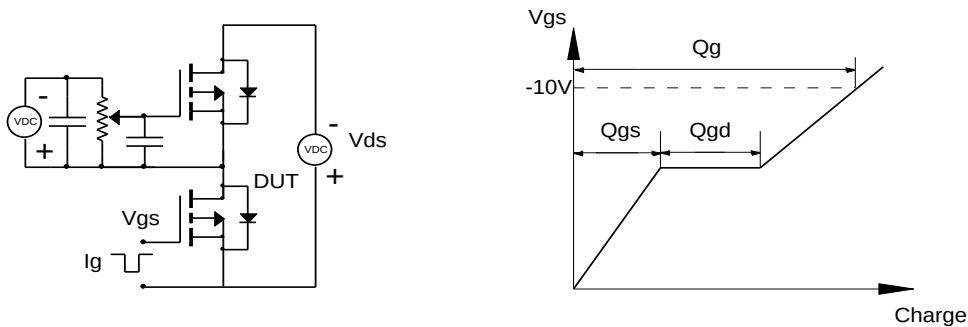


Figure 1: Gate Charge Test Circuit & Waveform

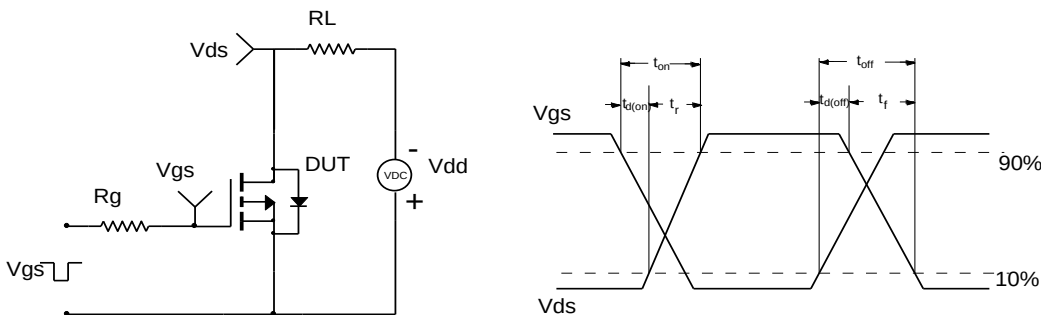


Figure 2: Resistive Switching Test Circuit & Waveform

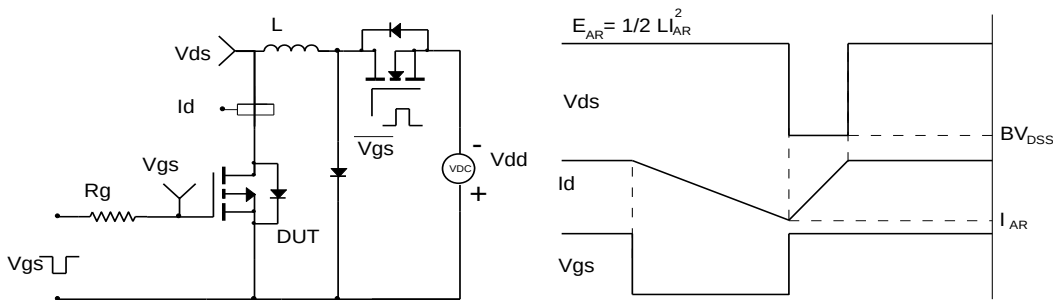


Figure 3: Unclamped Inductive Switching Test Circuit& Waveform

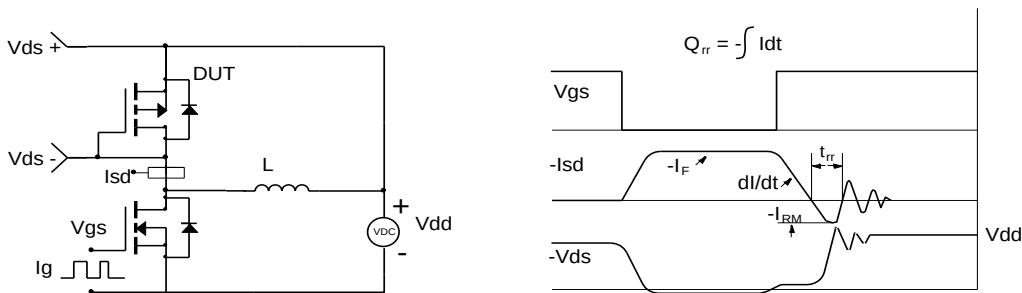


Figure 4: Diode Recovery Test Circuit & Waveform

Typical Characteristic Curves

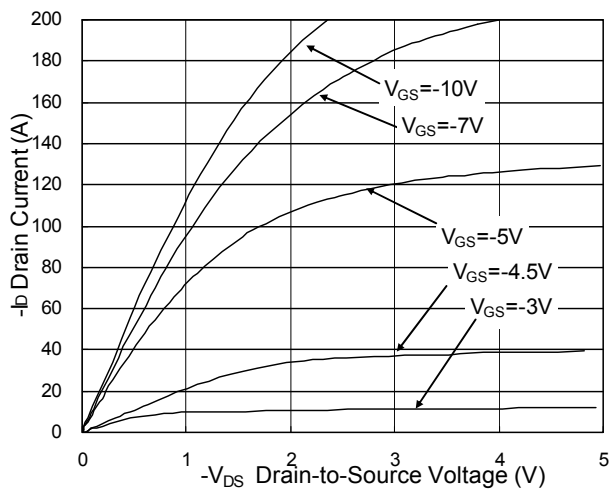


Fig.1 Typical Output Characteristics

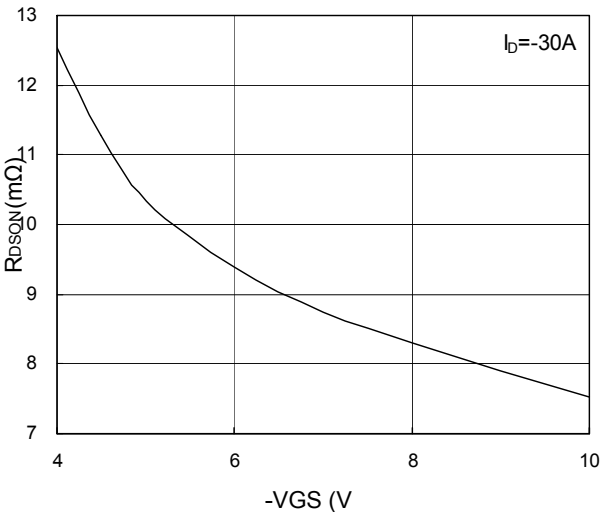


Fig.2 On-Resistance v.s Gate-Source

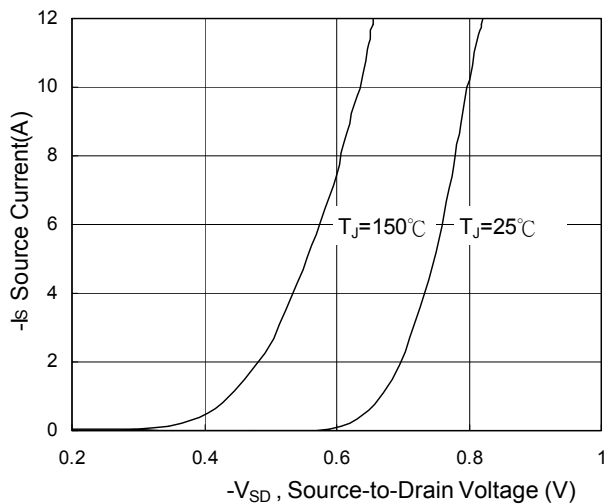


Fig.3 Forward Characteristics Of Reverse

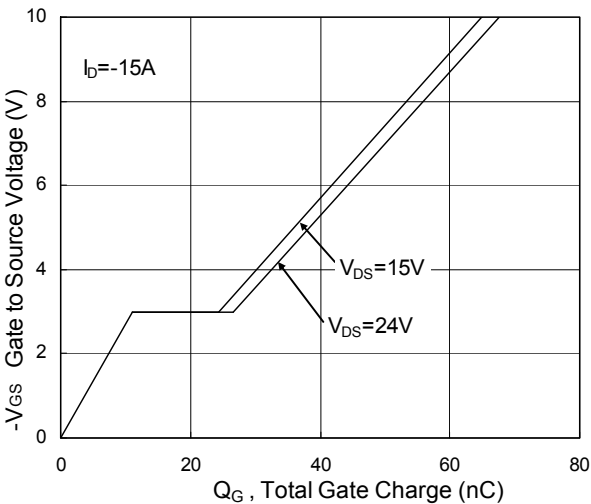


Fig.4 Gate-Charge Characteristics

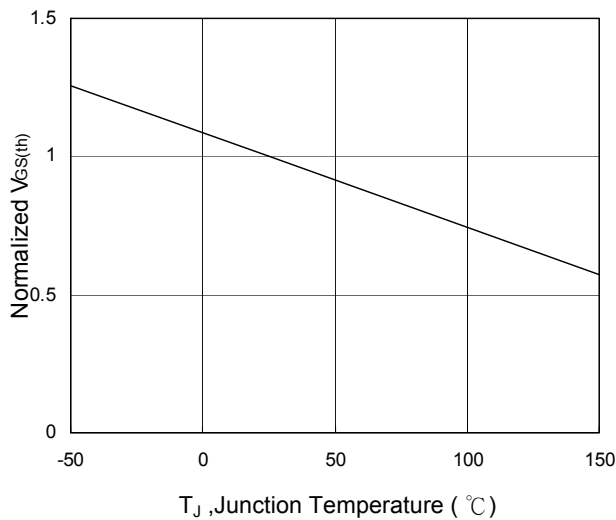


Fig.5 Normalized V_GS(th) v.s T_J

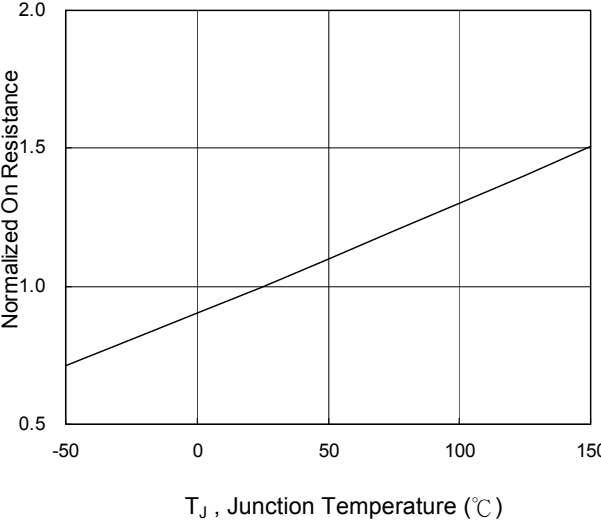


Fig.6 Normalized R_DS(on) v.s T_J

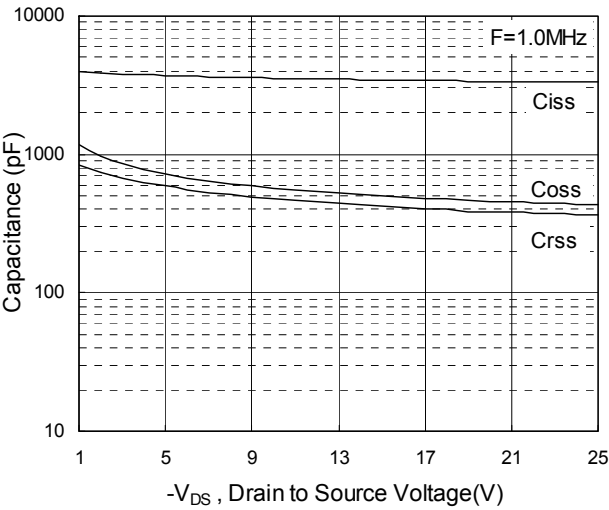


Fig.7 Capacitance

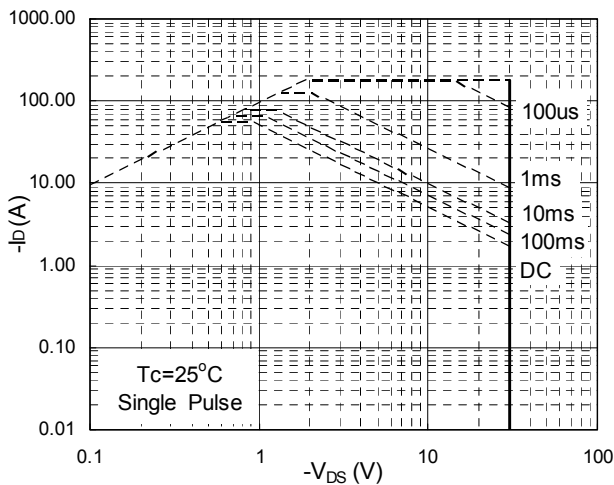


Fig.8 Safe Operating Area

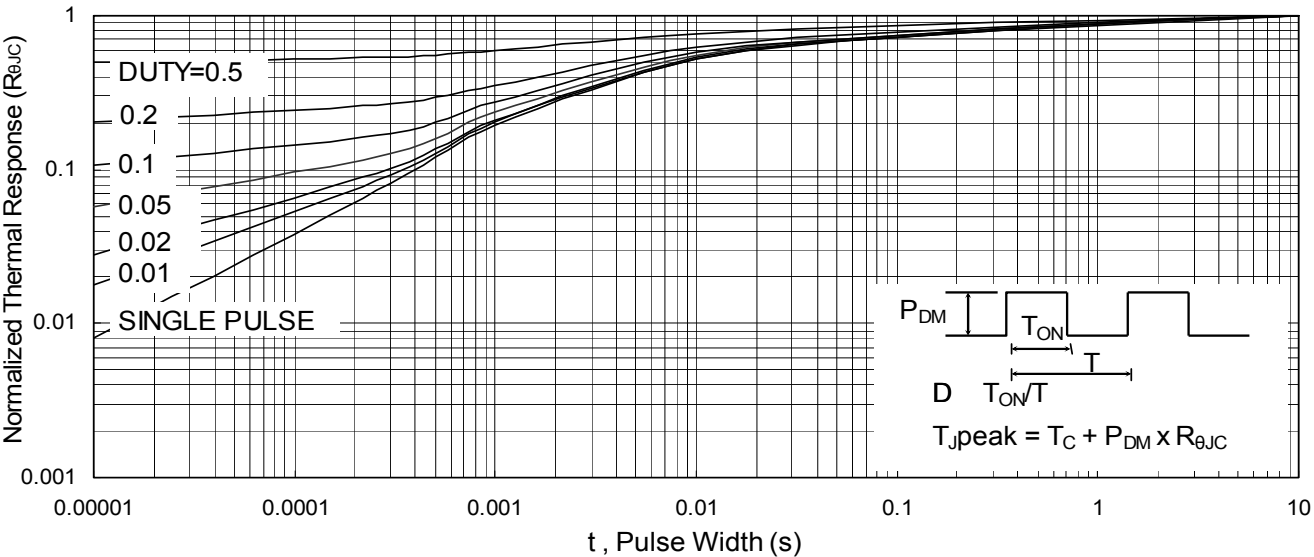
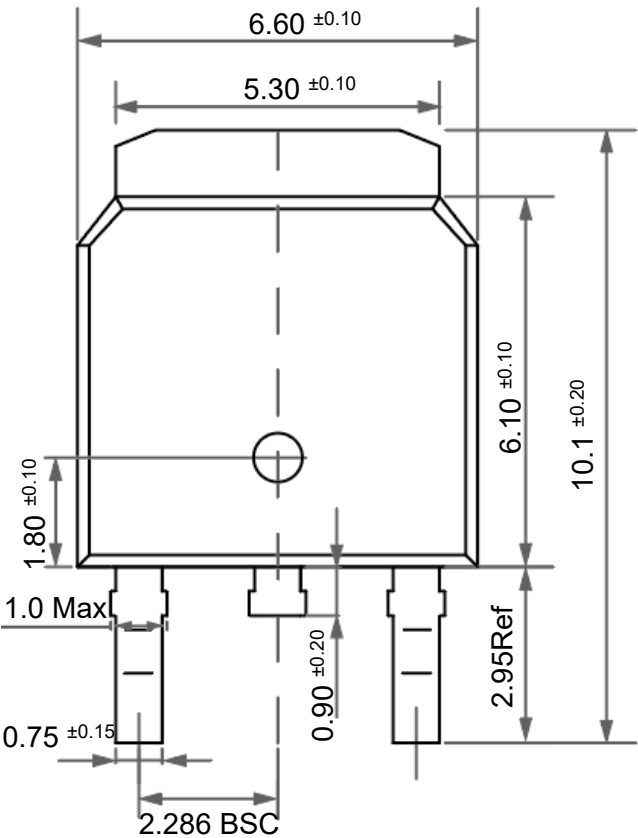


Fig.9 Normalized Maximum Transient Thermal Impedance

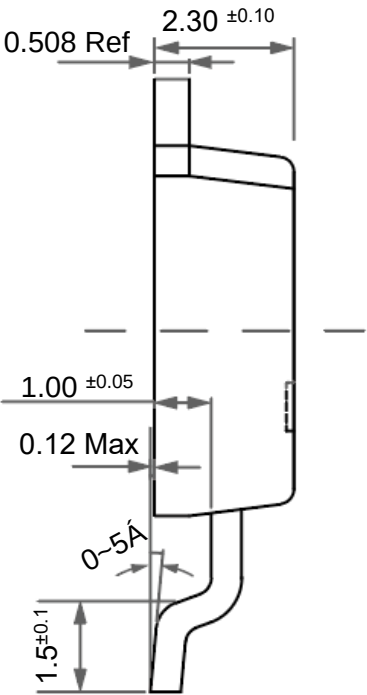
Package Outline

TO-252

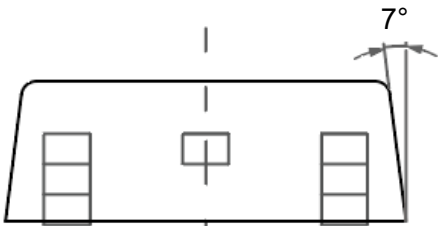
Dimensions in mm



Front View



Side View



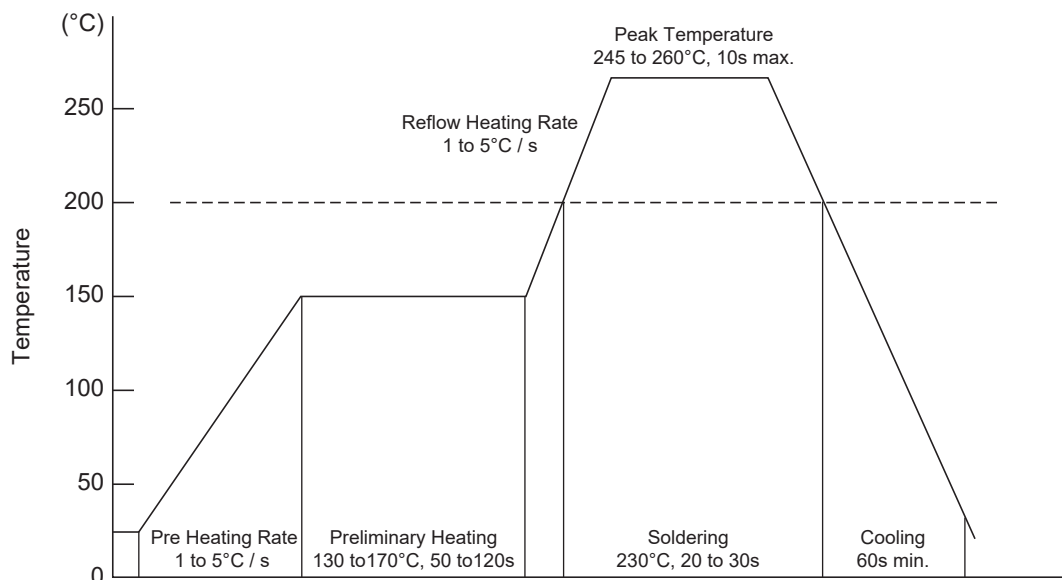
Bottom View

Ordering Information

Device	Package	Shipping
TNG85P60TE	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

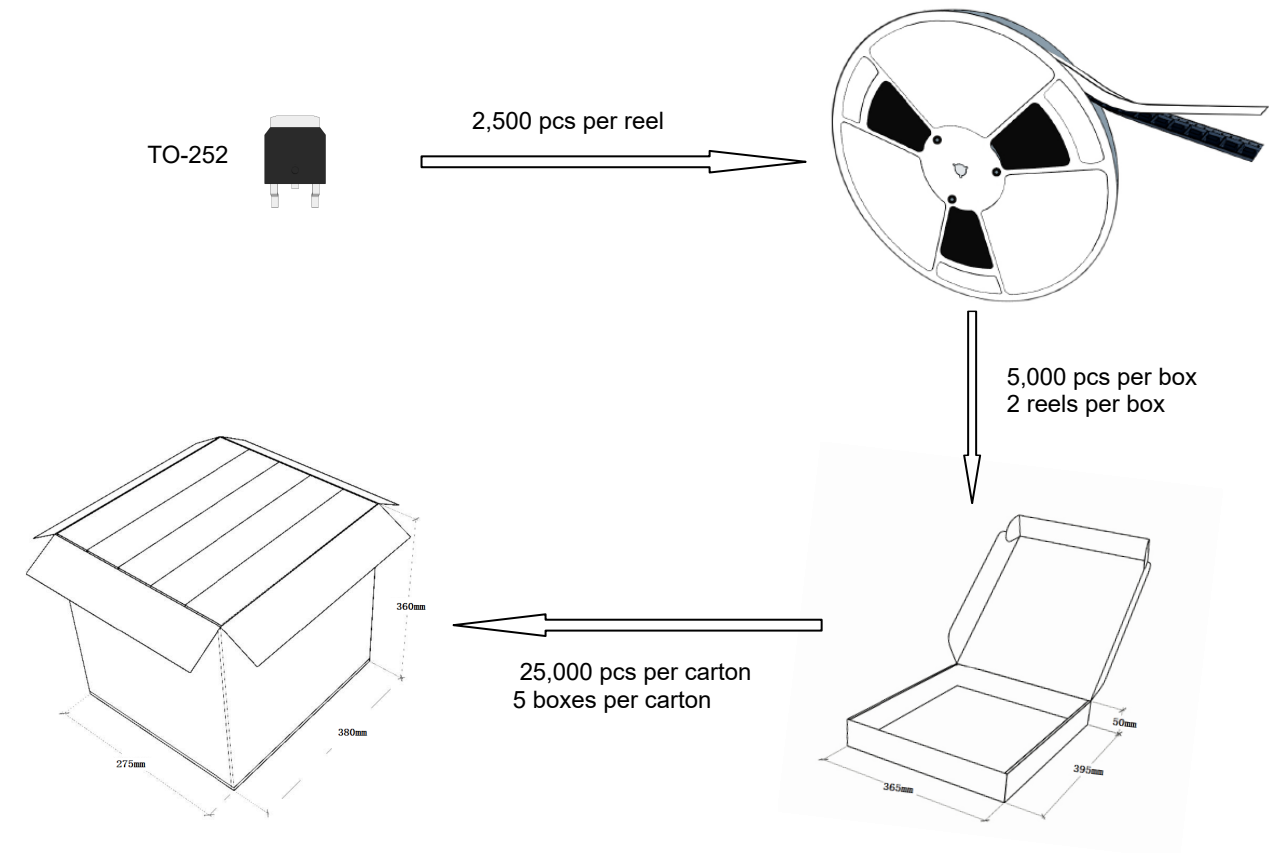
- Temperature: 300°C
- Time: 3s max.
- Times: one time

◆ Storage conditions

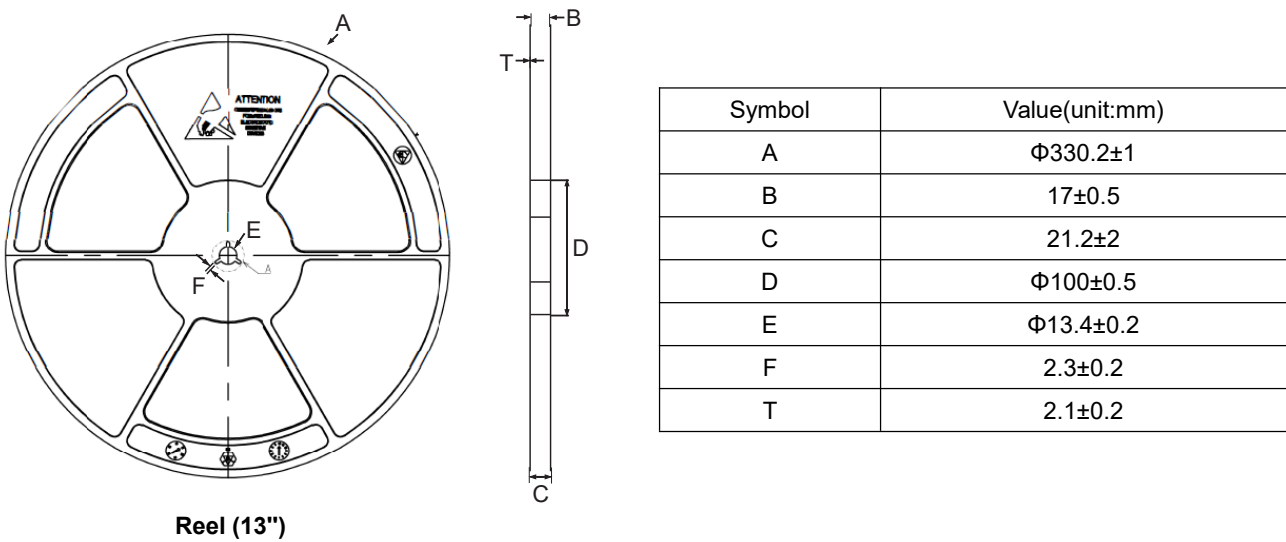
- **Temperature**
5 to 40°C
- **Humidity**
30 to 80% RH
- **Recommended period**
One year after manufacturing

Package Specifications

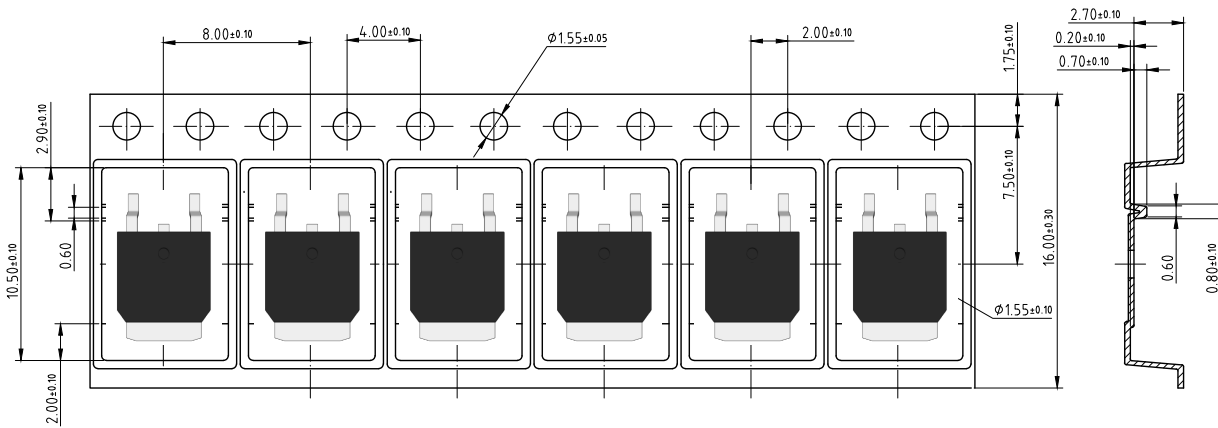
- The method of packaging



reel data



◆ Embossed tape data



Contact Information

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For additional information, please contact your local Sales Representative.

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