TNG05P60PA

P-Channel Enhancement Mode Power MOSFET

Product Summary

- V_{DS}= -60V,I_D= -5A
- $R_{DS(on)}$< 132mΩ @V_{GS}= -10V
- $R_{DS(on)}$< 160mΩ @V_{GS}= -4.5V

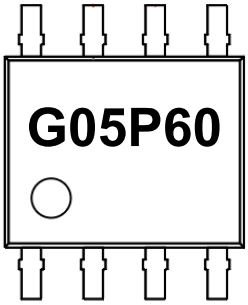
Features

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

Application

- Load Switch
- PWM Applications
- Power Management

Marking Code



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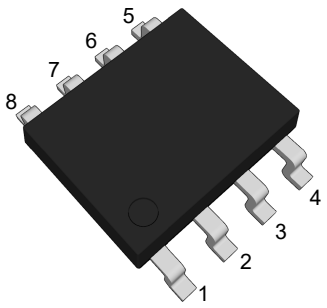
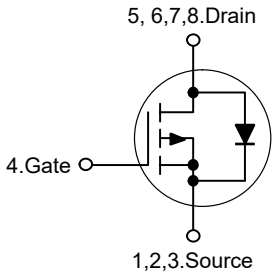


(Top View)

Pin	Description
1,2,3	Source
4	Gate
5,6,7,8	Drain

Schematic Diagram



Absolute Maximum Ratings

Ratings at 25℃ ambient 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	$-I_D$	5	A
Drain Current-Pulsed Note1	$-I_{DM}$	20	A
Maximum Power Dissipation	P_D	2	W
Junction Temperature	T_J	150	°C
Storage Temperature Range	T_{STG}	-55 to +150	°C

Thermal Characteristics

Thermal Resistance,Junction-to-Ambient Note2	$R_{\theta JA}$	62.5	°C/W

Electrical Characteristics

(T_J=25℃ 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=-250μA	60	--	--	V
Zero Gate Voltage Drain Current	$-I_{DSS}$	V_{DS}=-60V,V_{GS}=0V	--	--	1	μA
Gate-Body Leakage Current	I_{GSS}	V_{GS}=±20V,V_{DS}=0V	--	--	±100	nA
Gate Threshold Voltage Note3	$-V_{GS(th)}$	V_{DS}=V_{GS},I_D=-250μA	1.1	--	2.4	V
Drain-Source On-Resistance Note3	$R_{DS(on)}$	V_{GS}=-10V,I_D=-5A	--	--	132	mΩ
		V_{GS}=-4.5V,I_D=-4A	--	--	160	mΩ
Dynamic Characteristics						
Input Capacitance	C_{iss}	V_{DS}=-25V,V_{GS}=0V,f=1MHz	--	290	--	pF
Output Capacitance	C_{oss}		--	60	--	pF
Reverse Transfer Capacitance	C_{rss}		--	5	--	pF
Total Gate Charge	Q_g	V_{DS}=-30V,I_D=-5A, V_{GS}=0~-10V	--	4.92	--	nC
Gate-Source Charge	Q_{gs}		--	0.97	--	nC
Gate-Drain Charge	Q_{gd}		--	0.72	--	nC
Switching Characteristics						
Turn-on Delay Time	$t_{d(on)}$	V_{DD}=-30V,I_D=-2A, V_{GS}=-10V,R_{GEN}=5Ω	--	6.8	--	nS
Turn-on Rise Time	t_r		--	8	--	nS
Turn-off Delay Time	$t_{d(off)}$		--	16	--	nS
Turn-off Fall Time	t_f		--	4	--	nS
Source-Drain Diode Characteristics						
Diode Forward Voltage Note3	$-V_{SD}$	V_{GS}=0V,I_S=-5A	--	--	1.2	V
Diode Forward Current	$-I_S$		--	--	5	A

Note: 1. $R_{\theta JA}$ is measured with the device mounted on a 1inch2 pad of 2oz copper FR4 PCB
2. The power dissipation is limited by 150°C junction temperature.
3. The data tested by pulsed , pulse width ≤ 300us , duty cycle ≤ 2%.

Test Circuit

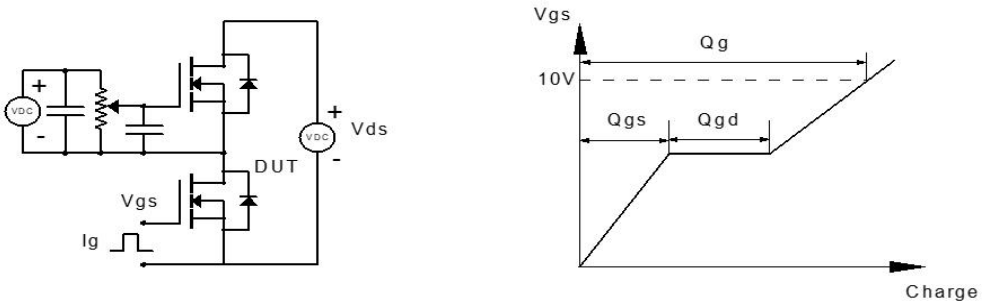


Figure 1: Gate Charge Test Circuit & Waveform

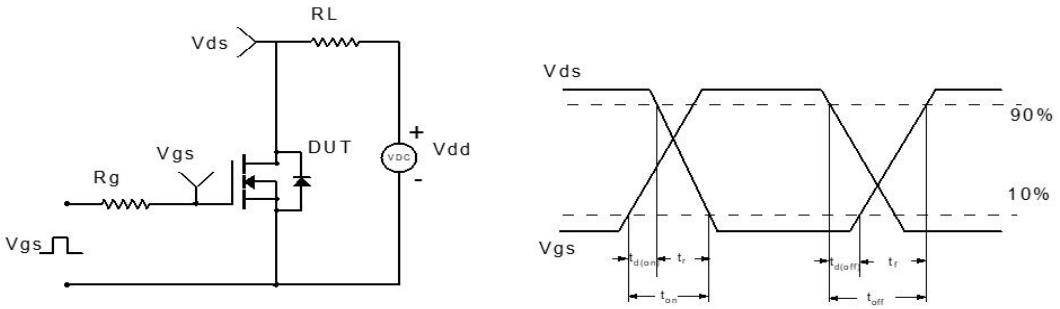


Figure 2: Resistive Switching Test Circuit & Waveform

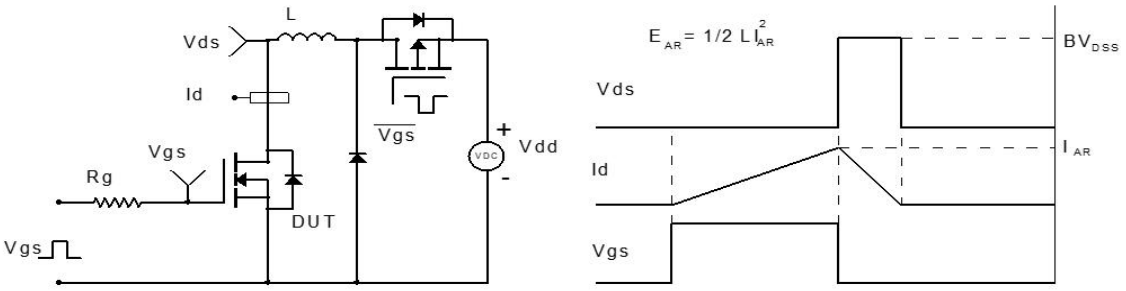


Figure 3: Unclamped Inductive Switching Test Circuit& Waveform

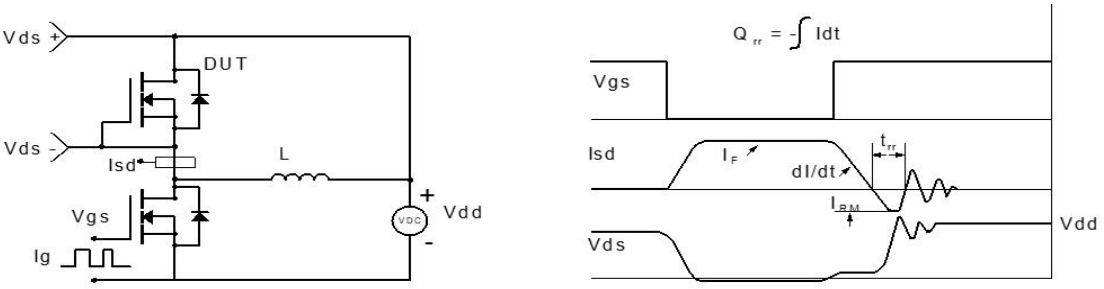
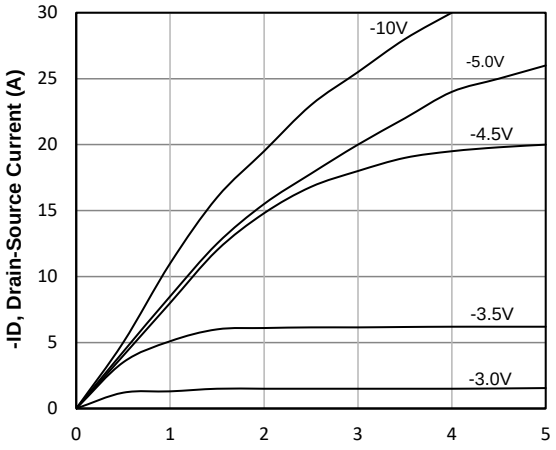
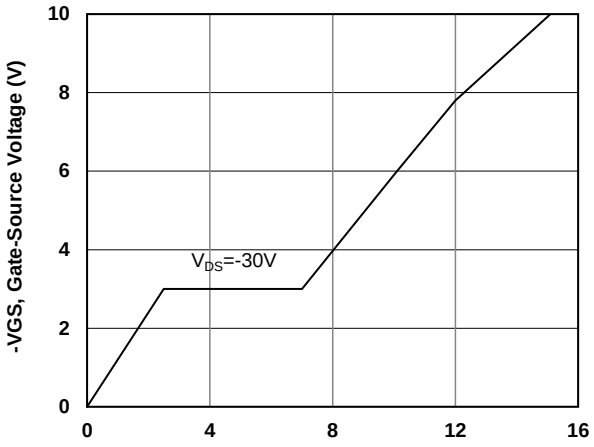


Figure 4: Diode Recovery Test Circuit & Waveform

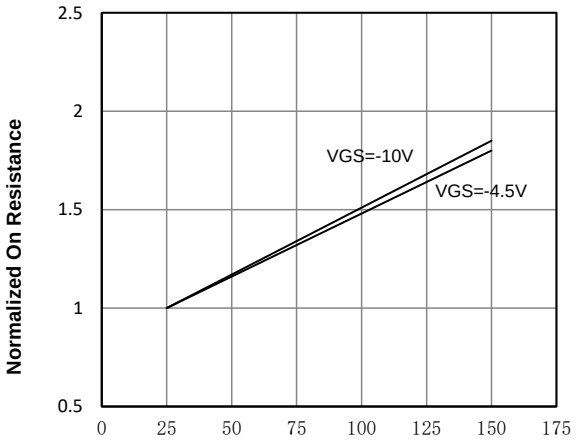
Typical Operating Characteristics



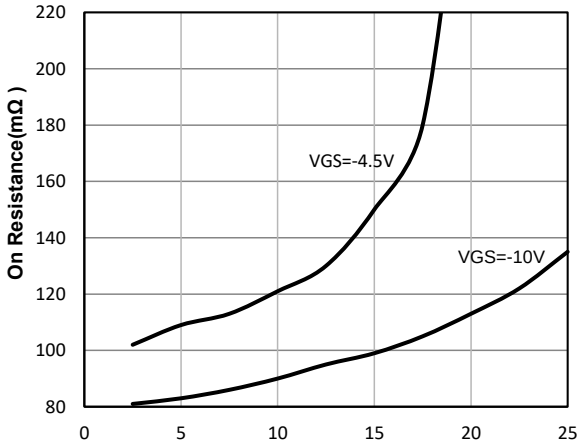
-VDS, Drain -Source Voltage (V)
Fig1. Typical Output Characteristics



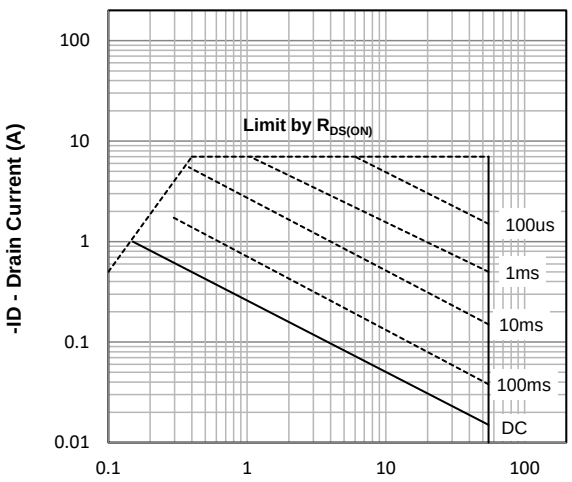
Qg -Total Gate Charge (nC)
Fig2. Typical Gate Charge Vs.Gate-Source Voltage



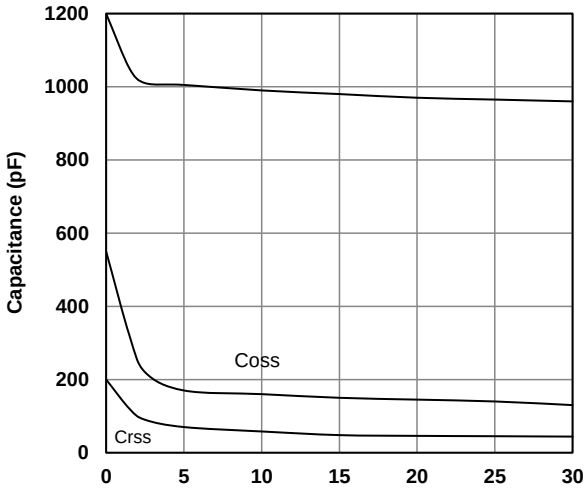
Tj - Junction Temperature (°C)
Fig3. Normalized On-Resistance Vs. Temperature



- ID, Drain-Source Current (A)
Fig4. On-Resistance Vs. Drain-Source Current



-VDS, Drain -Source Voltage (V)
Fig5. Maximum Safe Operating Area

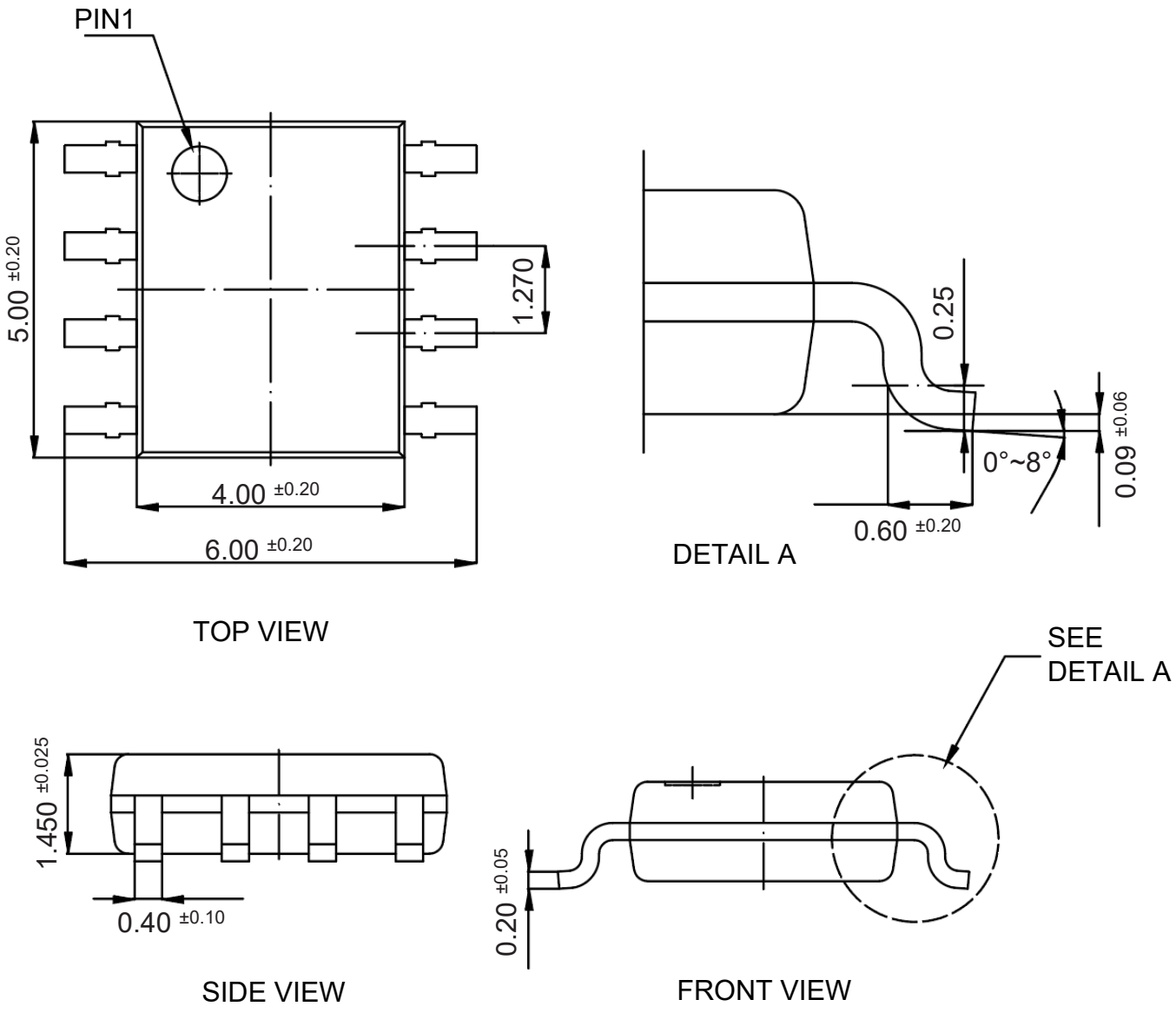


-VDS , Drain-Source Voltage (V)
Fig6 Typical Capacitance Vs.Drain-Source Voltage

Package Outline

SOP-8

Dimensions in mm

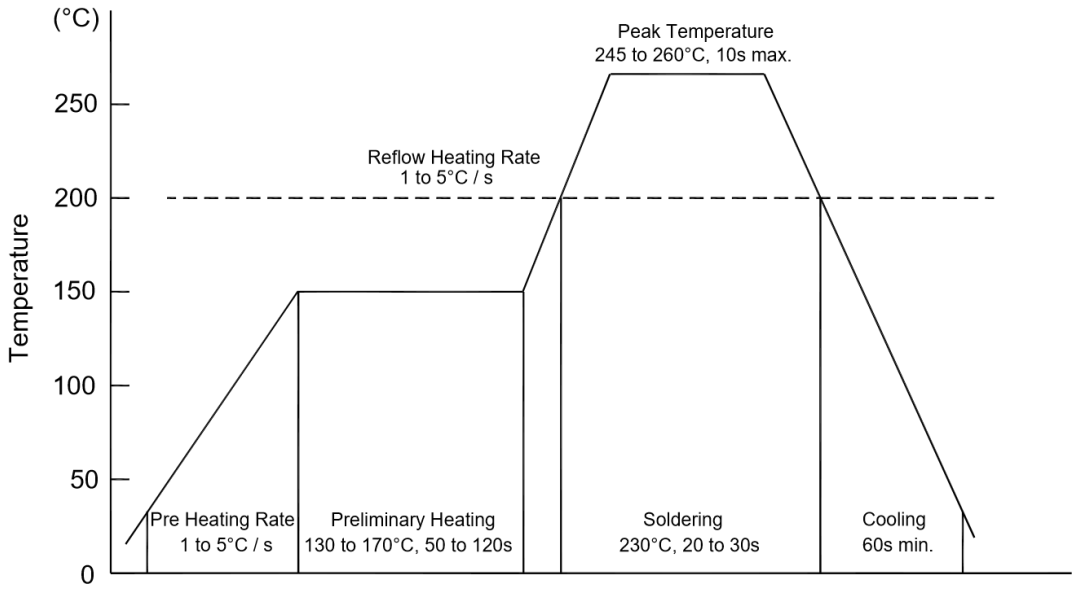


Ordering Information

Device	Package	Shipping
TNG05P60PA	SOP-8	4,000PCS/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

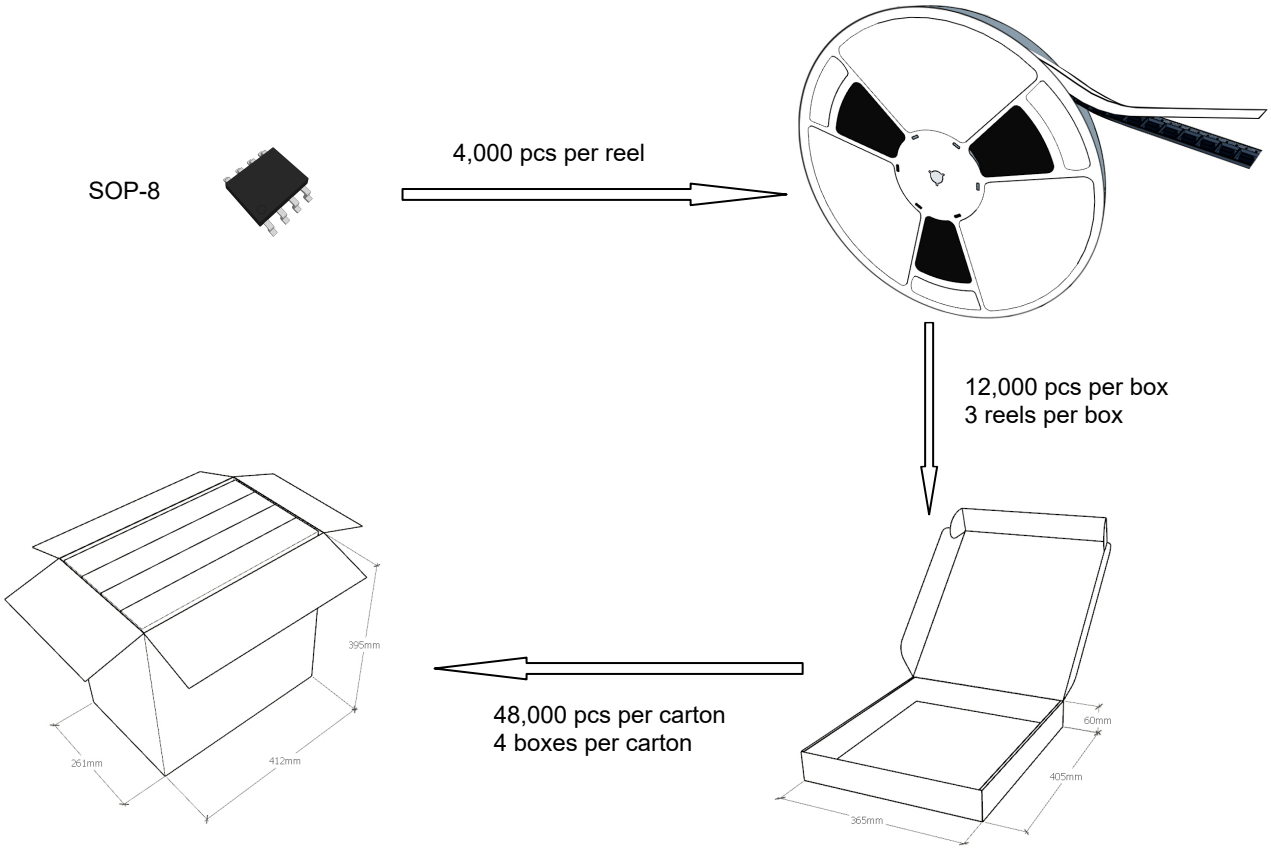
- Temperature: 300°C
- Time: 3s max.
- Times: one time

◆ Storage conditions

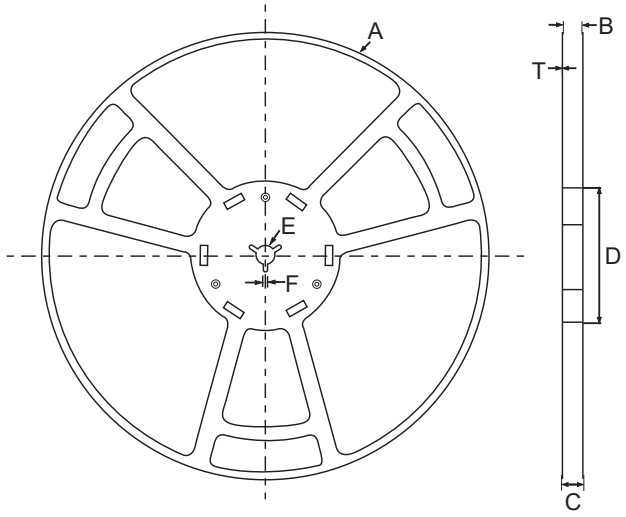
- **Temperature**
  5 to 40°C
- **Humidity**
  30 to 80% RH
- **Recommended period**
  One year after manufacturing

Package Specifications

- The method of packaging

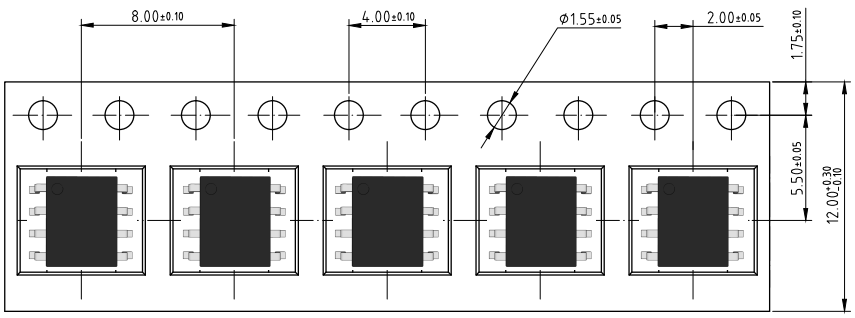


- **Embossed tape and reel data**



Reel (13")

symbol	Value(unit:mm)
A	ϕ330±1
B	12.7±0.5
C	16.5±0.3
D	ϕ99.5±0.5
E	ϕ13.6±0.3
F	2.8±0.3
T	1.9±0.2



Contact Information

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For additional information, please contact your local Sales Representative.

