

### Description

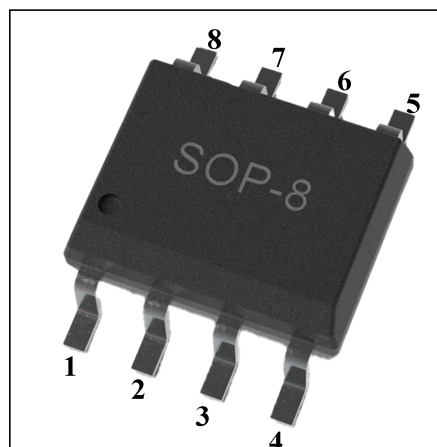
### P-Channel Enhancement Mode Power MOSFET

The TN11P30PA uses advanced trench technology to provide excellent  $R_{DS(ON)}$ , low gate charge and operation with gate voltages as low as 2.5V. This device is suitable for use as a

Battery protection or in other Switching application.

### General Features

- $V_{DS} = -30V, I_D = -11A$   
 $R_{DS(on)} < 16m\Omega @ V_{GS} = 10V$
- Fully characterized avalanche voltage and current



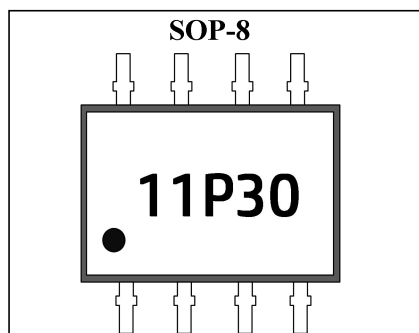
### Mechanical Characteristics

- Package: SOP-8
- Packaging: Tape and Reel per EIA 481
- RoHS Compliant
- Marking : Making Code

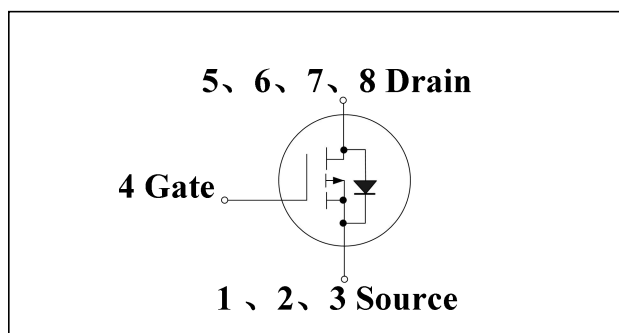
### Applications

- Battery protection
- Load switch
- Uninterruptible power supply

### Marking : Making Code



### Schematic Diagram



### Absolute Maximum Rating (Ratings at 25 °C ambient temperature unless otherwise specified.)

Parameter	Symbols	Value	Unit
Drain-Source Voltage	$-V_{DS}$	30	V
Gate-Source Voltage	$-V_{GS}$	$\pm 20$	V
Drain Current-Continuous ( $T_C = 100^\circ C$ )	$I_D (100^\circ C)$	9	A
Drain Current-Pulsed <sup>Note1</sup>	$-I_{DM}$	40	A
Junction Temperature	$P_D$	3.7	W
Maximum Power Dissipation	$T_J$	-55 to +150	$^\circ C$
Storage Temperature Range	$T_{STG}$	-55 to +150	$^\circ C$
Thermal Resistance, Junction-to-Ambient <sup>Note2</sup>	$R_{\theta JA}$	33.8	$^\circ C/W$

**Electrical Characteristics**(Tc=25°C Unless otherwise specified)

Parameter	Symbols	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	$-I_{DSS}$	$V_{DS}=-30V, V_{GS}=0V$	--	--	1	$\mu A$
Gate-Body Leakage Current	$I_{GSS}$	$V_{GS}=\pm 20V, V_{DS}=0V$	--	--	$\pm 100$	$\mu A$
Gate Threshold Voltage <sup>Note3</sup>	$-V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=-250\mu A$	1.0	1.6	2.5	V
Drain-Source On-Resistance <sup>Note3</sup>	$R_{DS(ON)}$	$V_{GS}=-10V, I_D=-12A$	--	12	15	m $\Omega$
		$V_{GS}=-4.5V, I_D=-5A$	--	18	27	
Dynamic Characteristics						
Input Capacitance	$C_{iss}$	$V_{DS}=-15V, V_{GS}=0V, f=1MHz$	--	1330	--	pF
Output Capacitance	$C_{oss}$		--	183	--	pF
Reverse Transfer Capacitance	$C_{rss}$		--	156	--	pF
Total Gate Charge	$Q_g$	$V_{DS}=-15V, I_D=-5A, V_{GS}=-10V$	--	22	--	nC
Gate-Source Charge	$Q_{gs}$		--	1.0	--	nC
Gate-Drain Charge	$Q_{gd}$		--	1.8	--	nC
Switching Characteristics						
Turn-on Delay Time	$t_{d(on)}$	$V_{DD}=-15V, I_D=-10A, V_{GS}=-10V, R_{GEN}=2.5\Omega$	--	9	--	nS
Turn-on Rise Time	$t_r$		--	13	--	nS
Turn-off Delay Time	$t_{d(off)}$		--	48	--	nS
Turn-off Fall Time	$t_f$		--	20	--	nS
Source-Drain Diode Characteristics						
Diode Forward Voltage <sup>Note3</sup>	$-V_{SD}$	$V_{GS}=0V, I_S=15A$	--	0.8	1.2	V
Diode Forward Current <sup>Note2</sup>	$-I_S$	--	--	--	11	A

Notes:

- Repetitive Rating: Pulse width limited by maximum junction temperature.
- EAS condition: T<sub>J</sub>=25°C, V<sub>GS</sub>=10V, R<sub>G</sub>=25  $\Omega$ , L=0.5mH, I<sub>AS</sub>=-12.7A.
- Pulse Test: Pulse width  $\leq 300 \mu s$ , duty cycle  $\leq 0.5\%$ .

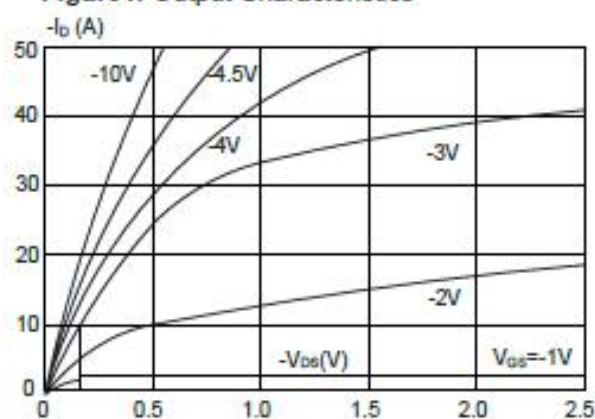
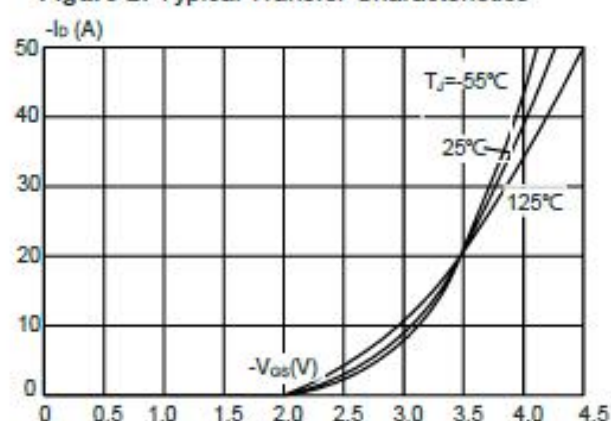
**Typical Characteristics Curves****Figure1: Output Characteristics****Figure 2: Typical Transfer Characteristics**

Figure 3: On-resistance vs. Drain Current

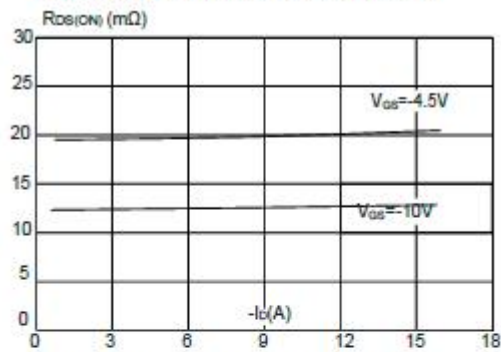


Figure 5: Gate Charge Characteristics

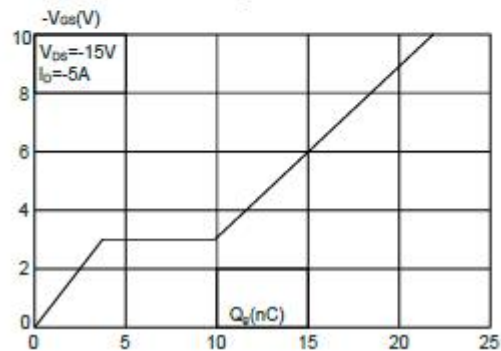


Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

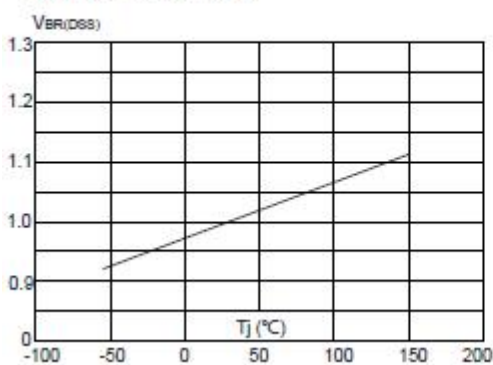


Figure 9: Maximum Safe Operating Area

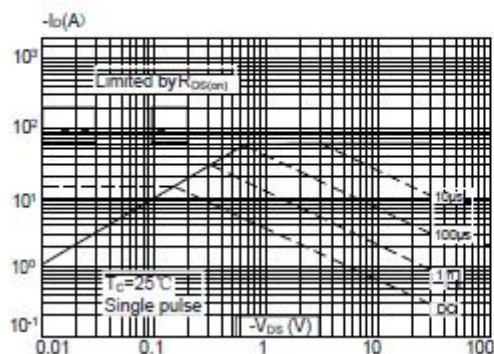


Figure 4: Body Diode Characteristics

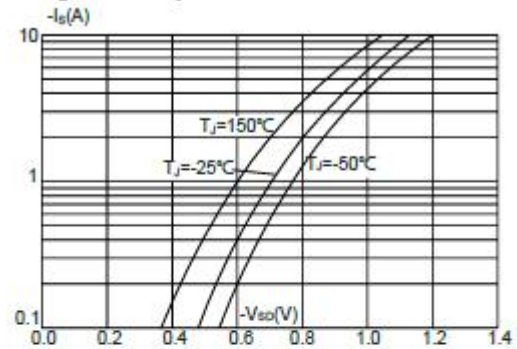


Figure 6: Capacitance Characteristics

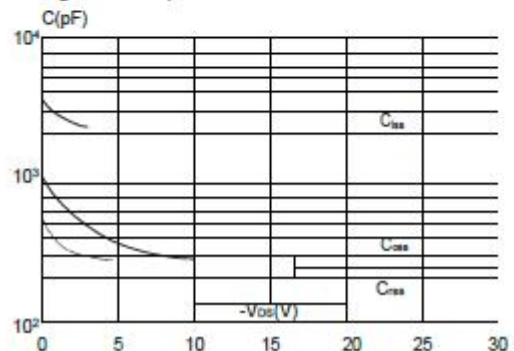


Figure 8: Normalized on Resistance vs. Junction Temperature

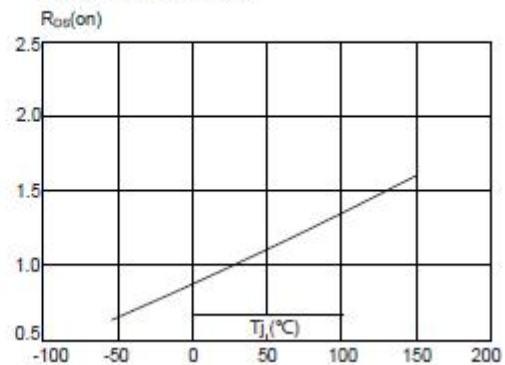
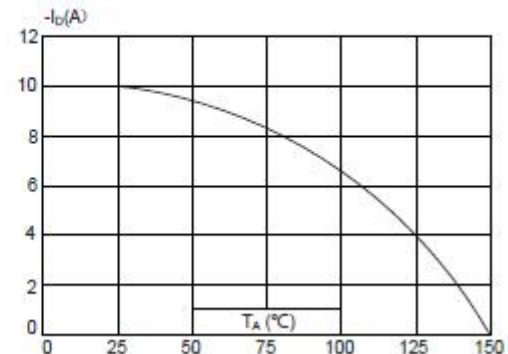
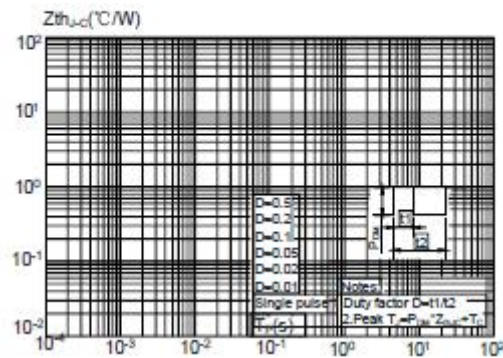


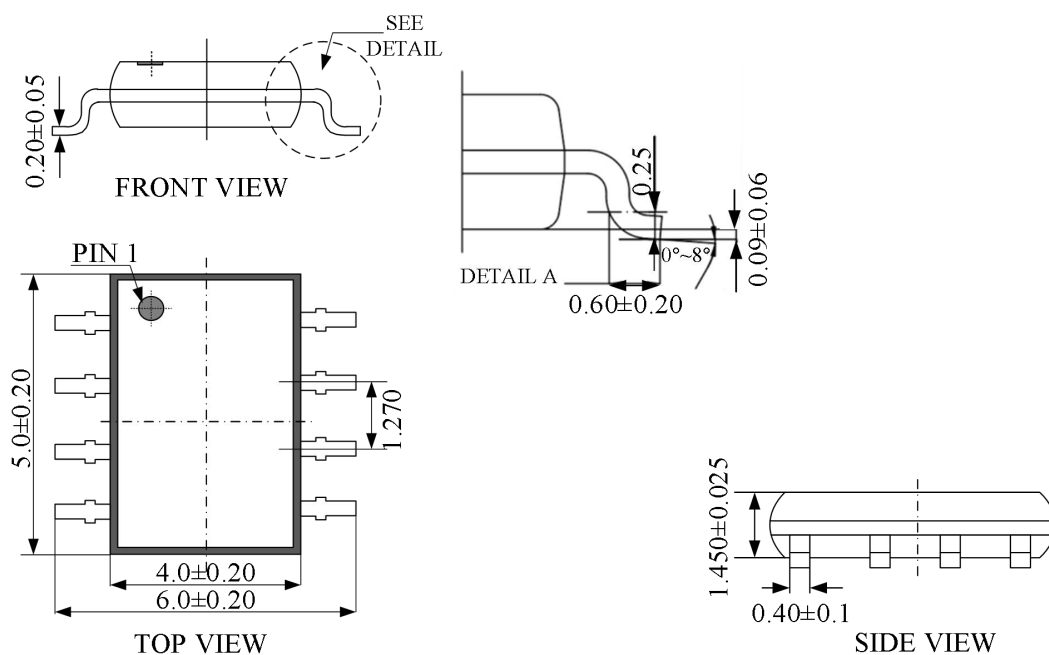
Figure 10: Maximum Continuous Drain Current vs. Ambient Temperature



**Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Case**



### Outline Drawing – SOP-8(Dimensions in mm)

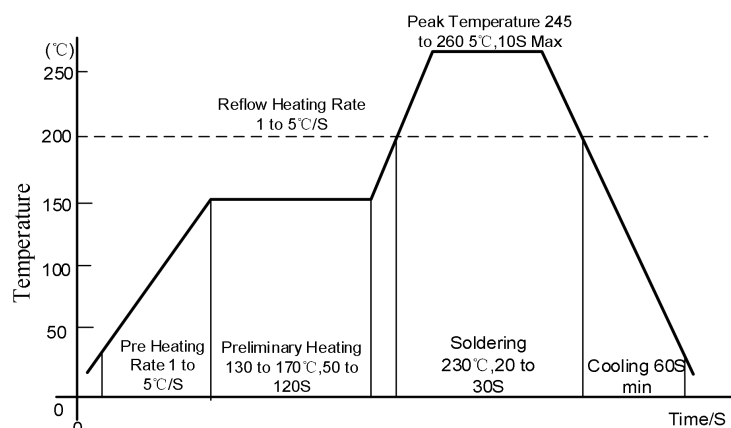


## Package Information

Package Type	Description	Quantity (pcs)	Standard
SOP-8	Reel -13" tape	4000	EIA-481

## 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

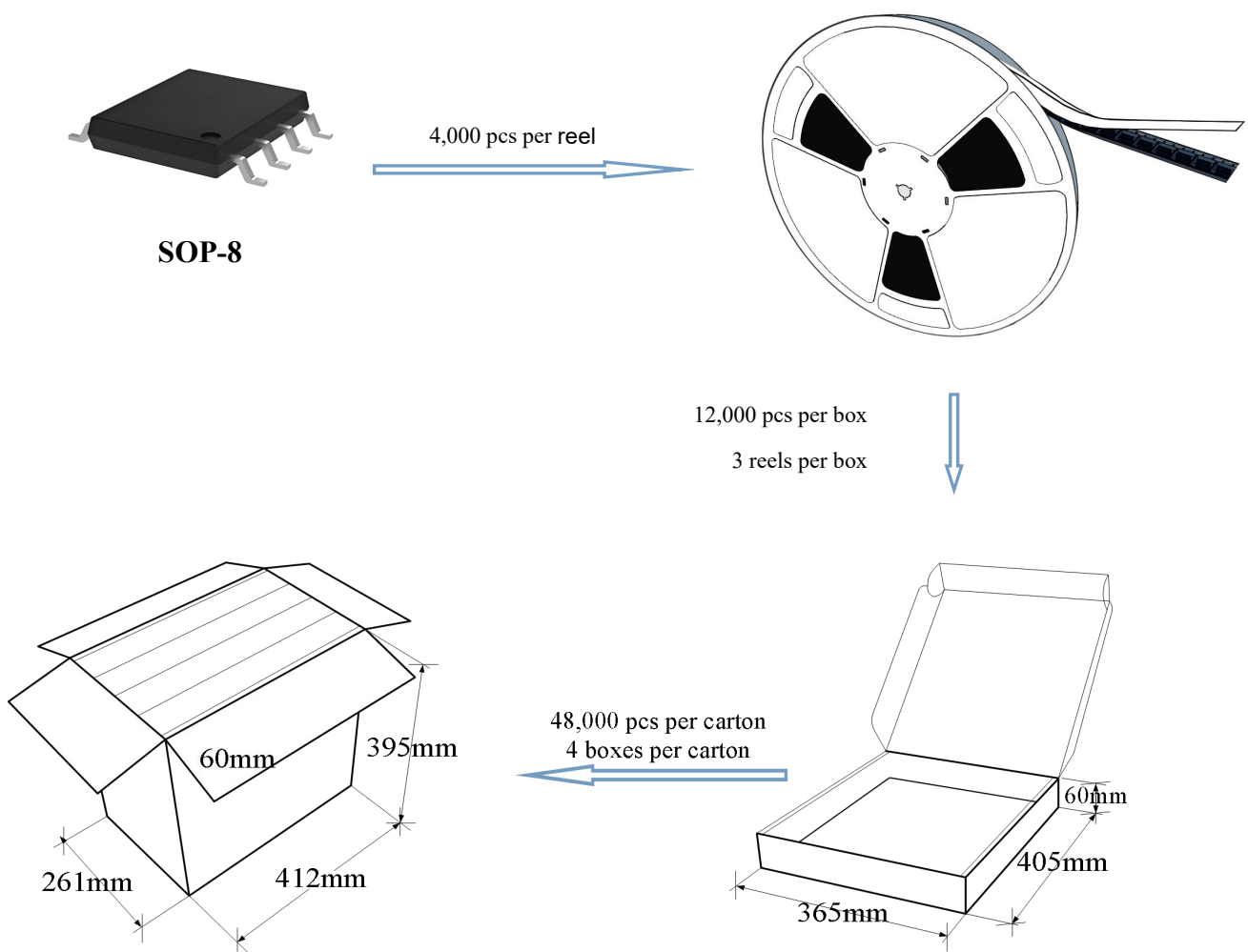
●Temperature: 300°C
●Time: 3s max
●Times: one time

●Storage conditions

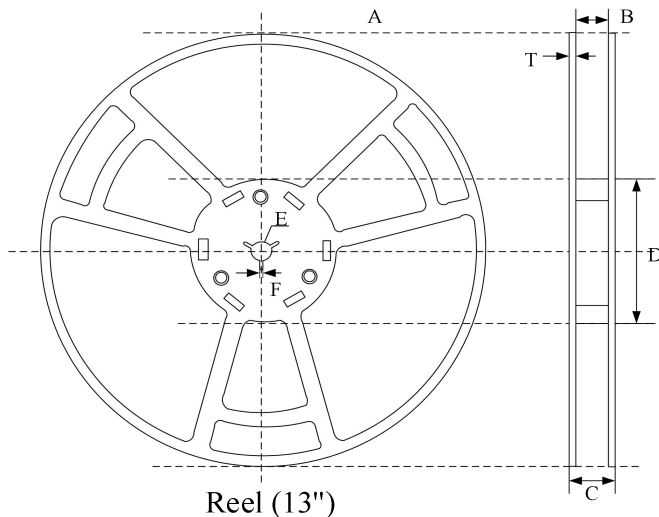
●Temperature: 5 to 40° C
●Humidity: 30 to 80% RH
●Recommended period: One year after manufacturing

## Package Specifications

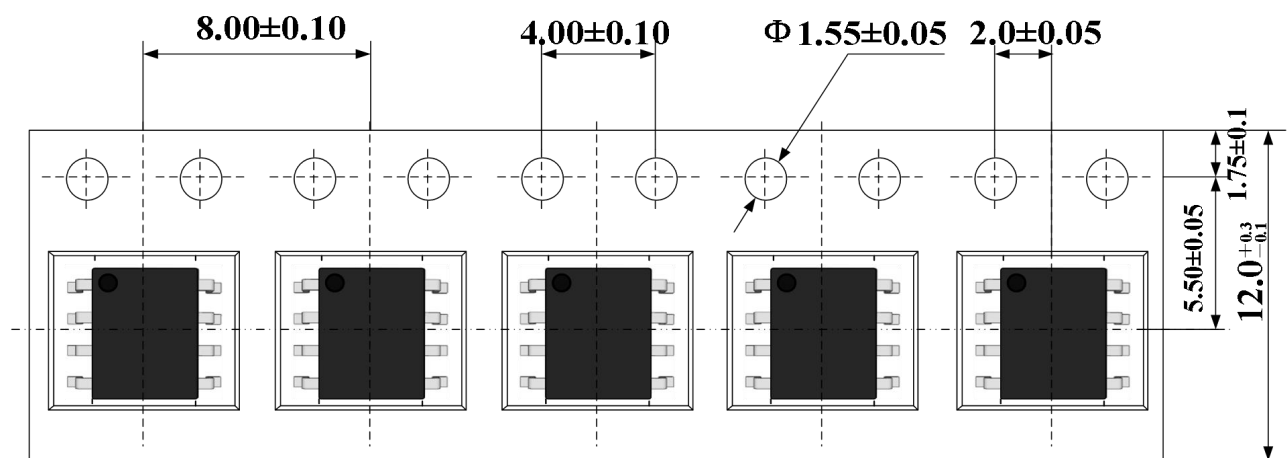
●The method of packaging



## Embossed tape and reel data




Symbol	Value(unit:mm)
A	$\phi 330 \pm 1$
B	$12.7 \pm 0.5$
C	$16.5 \pm 0.3$
D	$\phi 99.5 \pm 0.5$
E	$\phi 13.6 \pm 0.3$
F	$2.8 \pm 0.3$
T	$1.9 \pm 0.2$



## Contact Information

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For additional information, please contact your local Sales Representative.

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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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