



# TN05N60SQ

## N-Channel Enhancement Mode Power MOSFET

### Product Summary

- $V_{DS} = 60V, I_D = 5A$
- $R_{DS(on)} < 45m\Omega @ V_{GS} = 10V$
- $R_{DS(on)} < 60m\Omega @ V_{GS} = 4.5V$

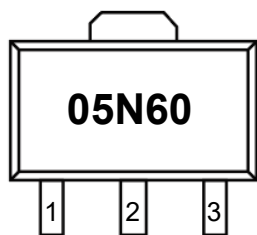
### Features

- Advanced Trench Technology
- RoHS and Reach Compliant
- Halogen and Antimony Free
- Moisture Sensitivity Level 1

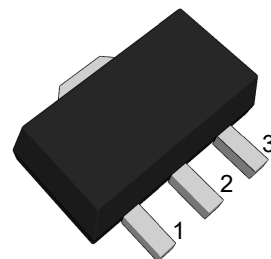
### Application

- Power Switching Application
- Uninterruptible Power Supply

### Marking Code



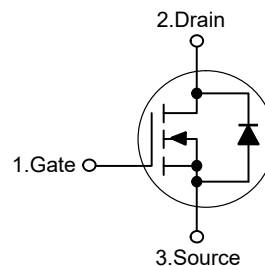
### SOT-89



(Top View)

Pin	Description
1	Gate
2	Drain
3	Source

### Schematic Diagram



### Absolute Maximum Ratings

Ratings at 25°C ambient temperature unless otherwise specified.

Parameter	Symbol	Value	Unit
Drain-Source Voltage	$V_{DS}$	60	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Drain Current-Continuous	$I_D$	5	A
Drain Current-Pulsed <sup>Note1</sup>	$I_{DM}$	20	A
Maximum Power Dissipation	$P_D$	1.2	W
Junction Temperature	$T_J$	150	°C
Storage Temperature Range	$T_{STG}$	-55 to +150	°C

### Thermal Characteristics

Thermal Resistance, Junction-to-Ambient <sup>Note2</sup>	$R_{\theta JA}$	104	°C/W
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### Electrical Characteristics

(Ta=25°C unless otherwise specified)

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Static Characteristics						
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=250\mu A$	60	--	--	V
Zero Gate Voltage Drain Current	$I_{DSS}$	$V_{DS}=60V, V_{GS}=0V$	--	--	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>	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	1.2	1.6	2.5	V
Drain-Source On-Resistance <sup>Note3</sup>	$R_{DS(on)}$	$V_{GS}=10V, I_D=5A$	--	31	45	m $\Omega$
		$V_{GS}=4.5V, I_D=5A$	--	37	55	m $\Omega$
Forward Transconductance <sup>Note3</sup>	$g_{FS}$	$V_{DS}=5V, I_D=1A$	--	4	--	S
Dynamic Characteristics						
Input Capacitance	$C_{iss}$	$V_{DS}=15V, V_{GS}=0V, f=1MHz$	--	870	--	pF
Output Capacitance	$C_{oss}$		--	87	--	pF
Reverse Transfer Capacitance	$C_{rss}$		--	70	--	pF
Total Gate Charge	$Q_g$	$V_{DS}=30V, I_D=4.5A$ $, V_{GS}=10V$	--	14	--	nC
Gate-Source Charge	$Q_{gs}$		--	2.9	--	nC
Gate-Drain Charge	$Q_{gd}$		--	5.2	--	nC
Switching Characteristics						
Turn-on Delay Time	$t_{d(on)}$	$V_{DD}=30V, I_D=2A,$ $V_{GS}=10V, R_{GEN}=3\Omega$ $R_L=6.7\Omega$	--	5	--	nS
Turn-on Rise Time	$t_r$		--	2.6	--	nS
Turn-off Delay Time	$t_{d(off)}$		--	16.1	--	nS
Turn-off Fall Time	$t_f$		--	2.3	--	nS
Source-Drain Diode Characteristics						
Diode Forward Voltage <sup>Note3</sup>	$V_{SD}$	$V_{GS}=0V, I_S=5A$	--	--	1.2	V
Diode Forward Current <sup>Note2</sup>	$I_S$		--	--	5	A

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

2. Surface Mounted on FR4 Board,  $t \leq 10$  sec.

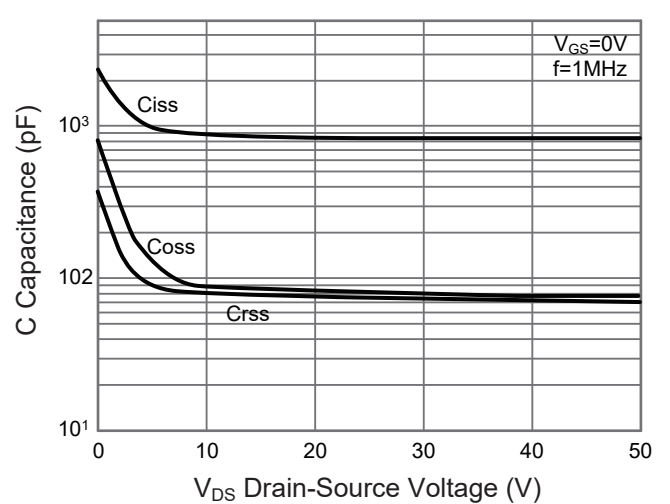
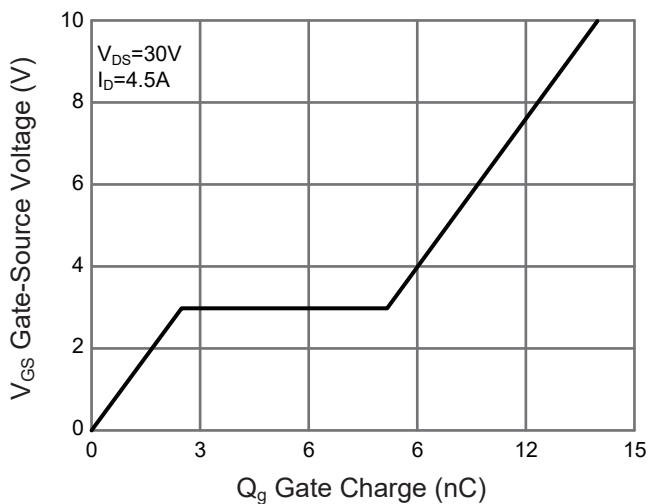
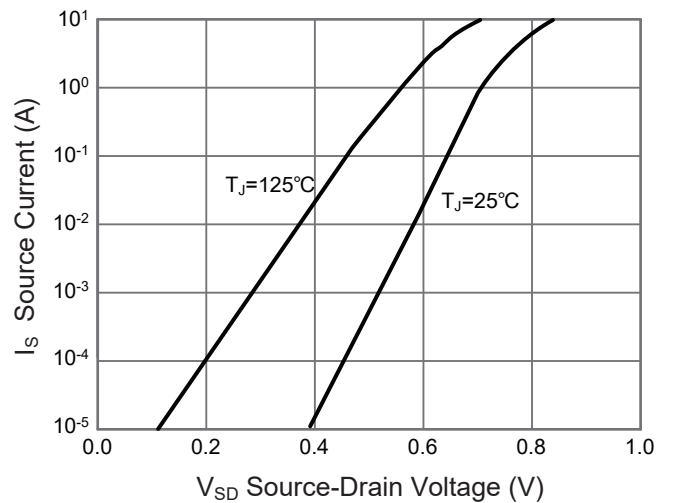
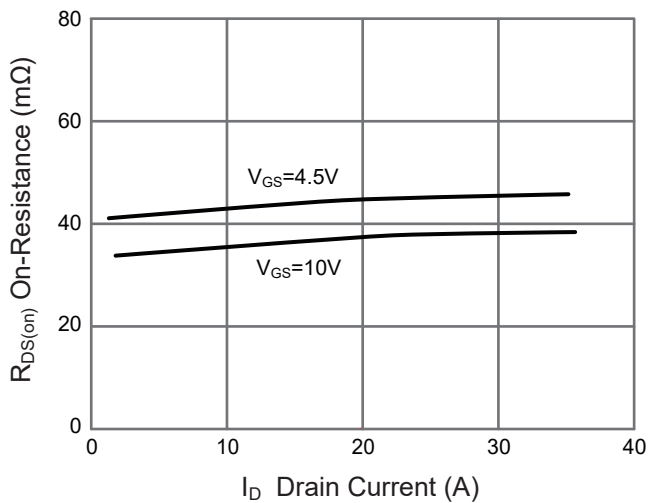
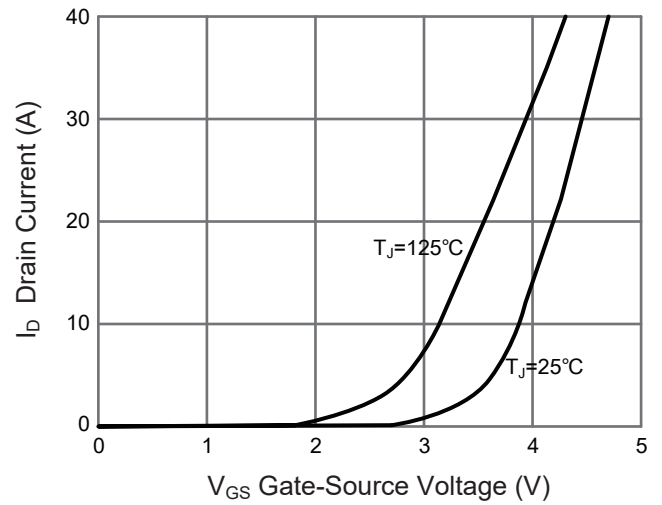
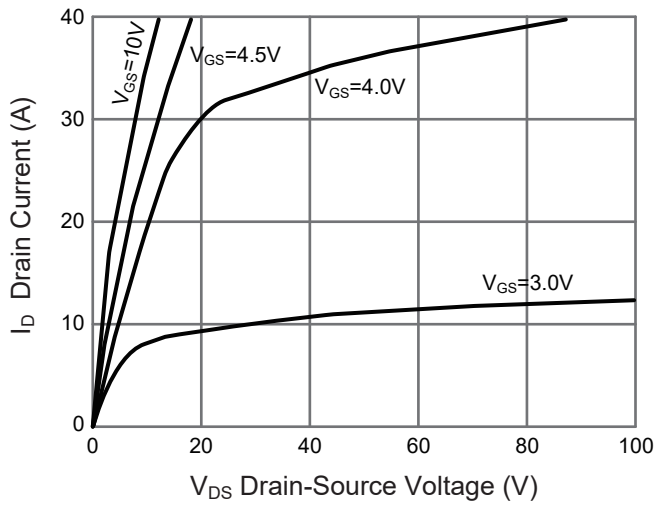
3. Pulse Test: Pulse width  $\leq 300\mu s$ , duty cycle  $\leq 0.5\%$ .



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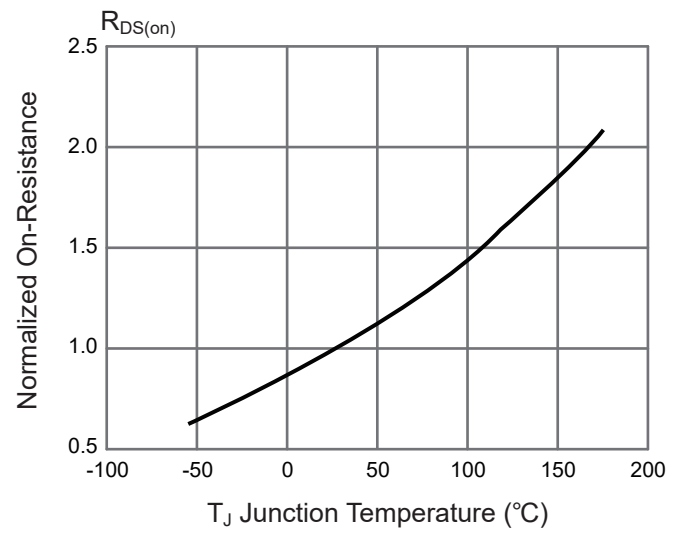
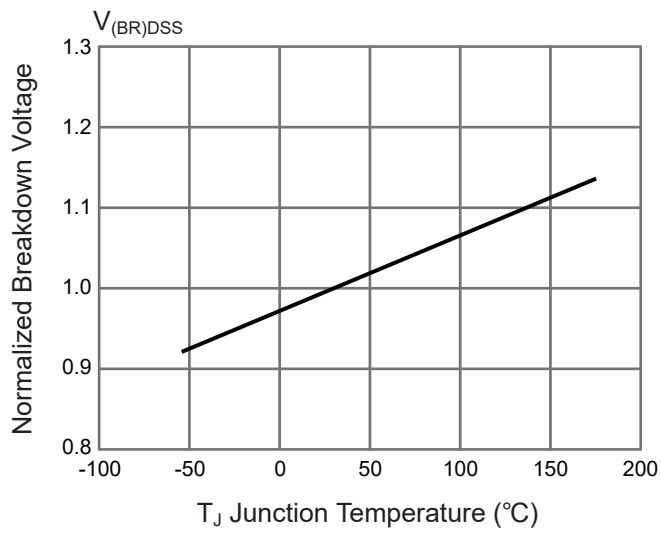
### Typical Characteristic Curves





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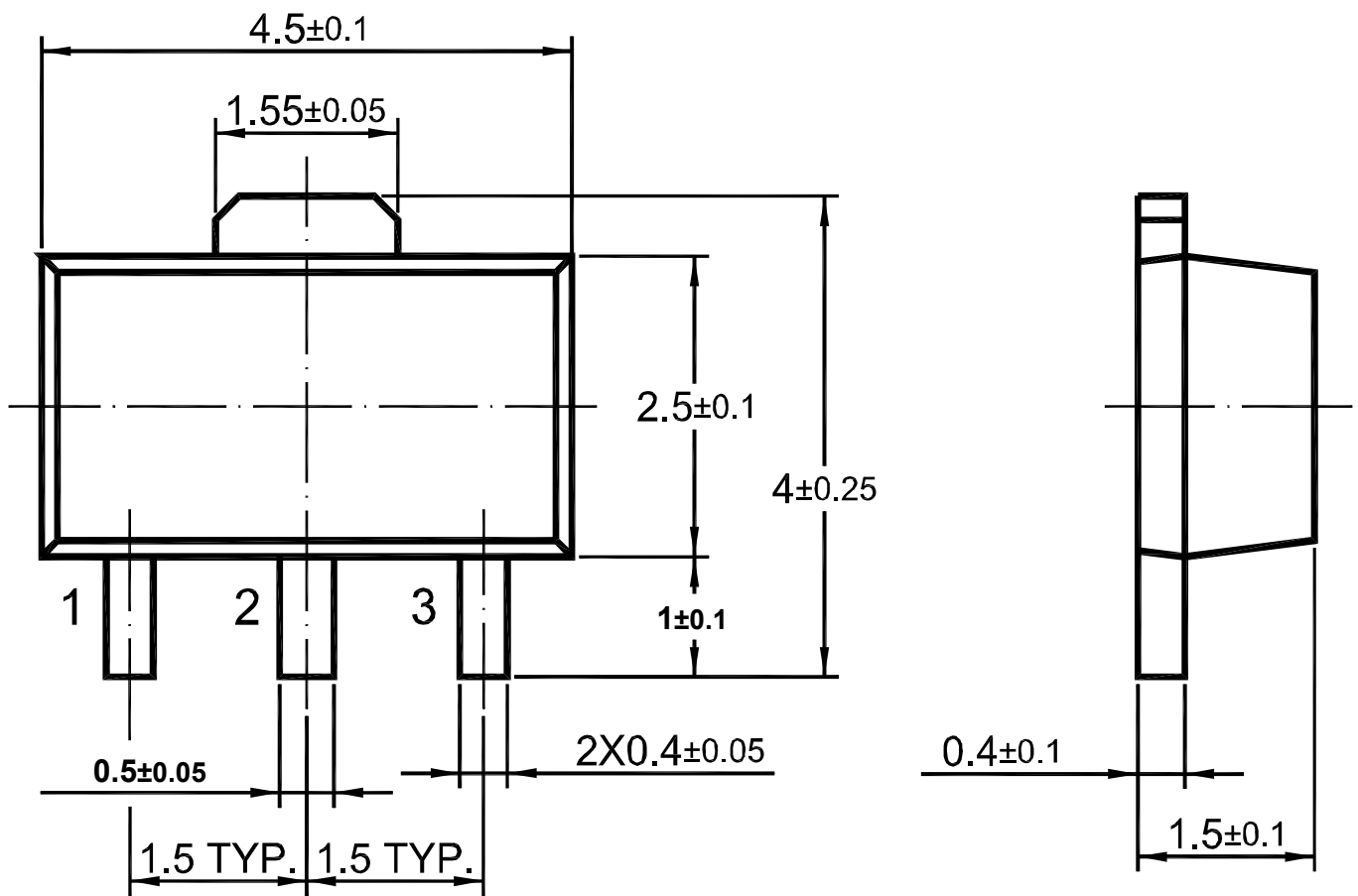




### Package Outline

SOT-89

Dimensions in mm



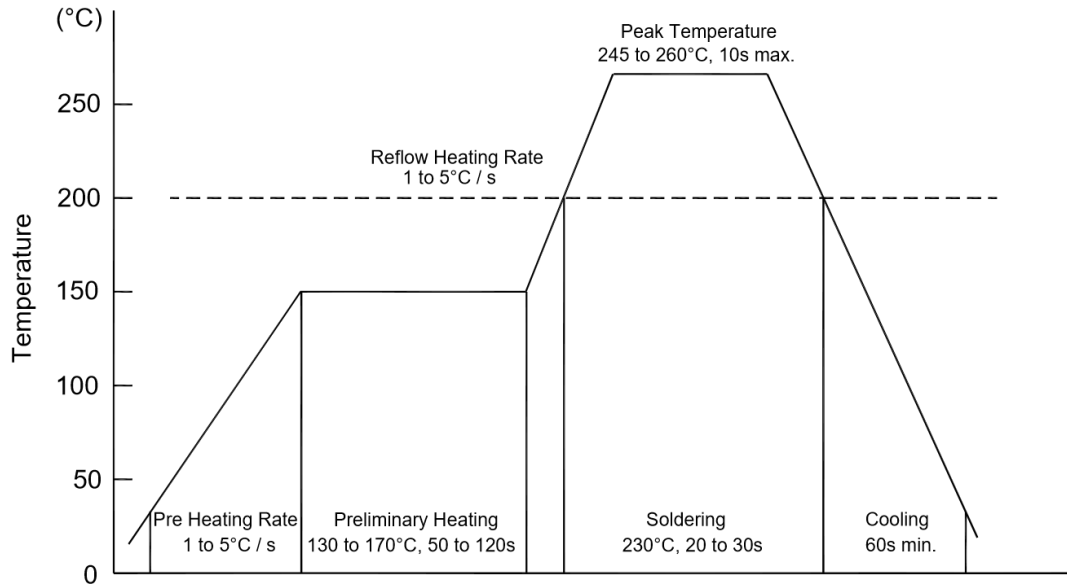
### Ordering Information

Device	Package	Shipping
PJM05N60SQ	SOT-89	1,000PCS/Reel&7inches
		3,000PCS/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

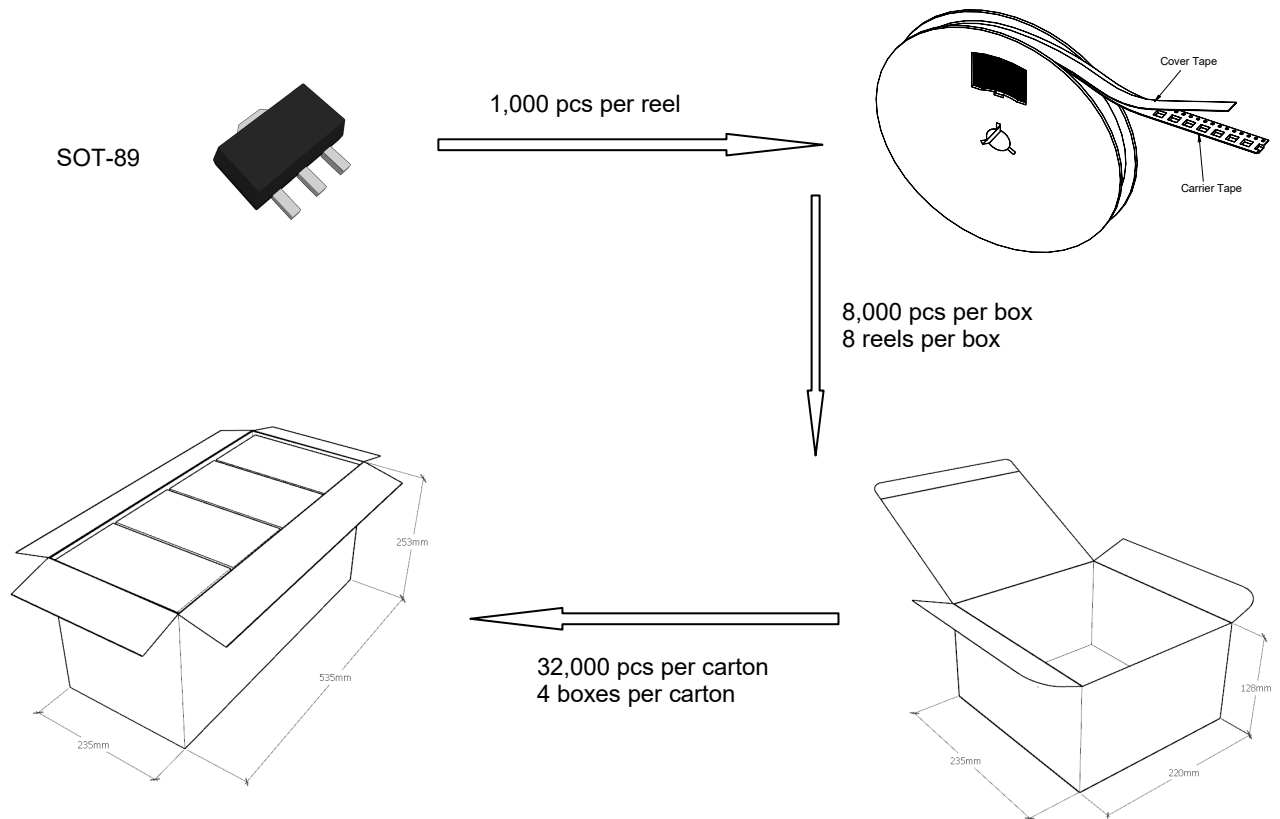


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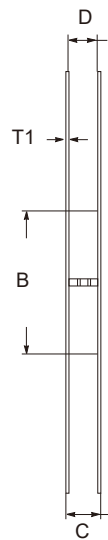
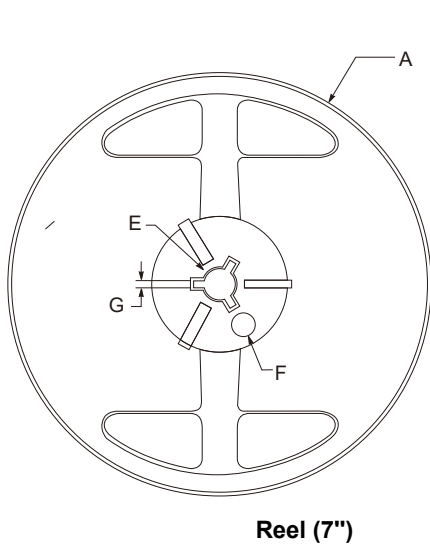
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### Package Specifications

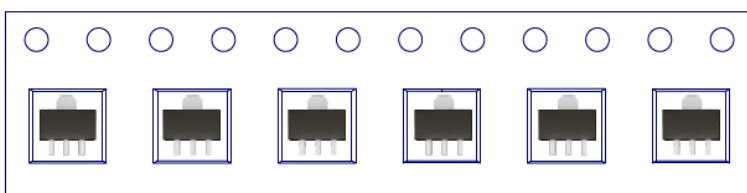
- The method of packaging (1,000PCS/Reel&7inches)



### ◆ Embossed tape and reel data



symbol	Value(unit:mm)
A	$\Phi 179 \pm 1$
B	$60.5 \pm 0.2$
C	$15.3 \pm 0.3$
D	$12.5 \sim 13.7$
E	$\Phi 13.5 \pm 0.2$
F	$\Phi 10.0 \pm 0.2$
G	$2.7 \pm 0.2$
T1	$1.0 \pm 0.2$



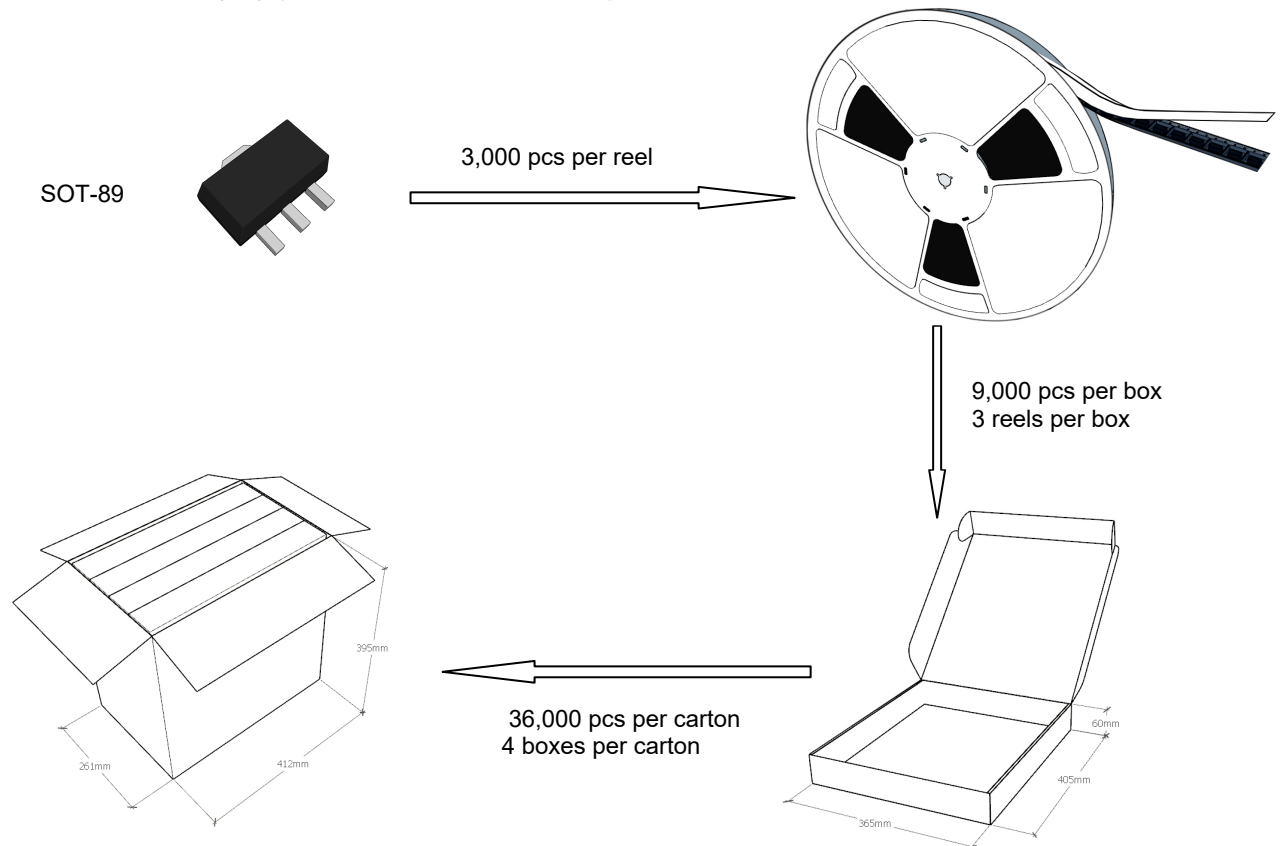


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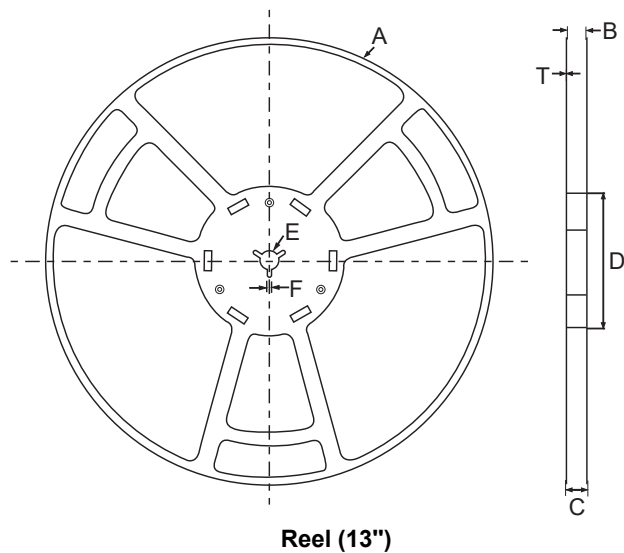
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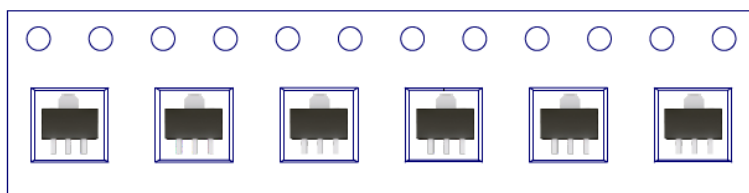
- The method of packaging (3,000PCS/Reel&13inches)



### ◆ 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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