

### Product Summary

- $V_{DS} = -100V, I_D = -6A$
- $R_{DS(on)} < 170m\Omega @ V_{GS} = -10V$
- $R_{DS(on)} < 200m\Omega @ V_{GS} = -4.5V$

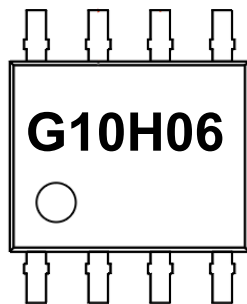
### Features

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

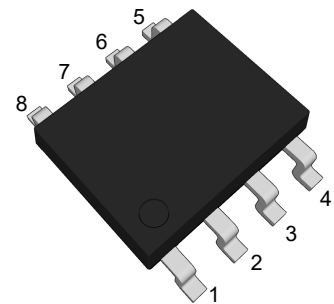
### Application

- Load Switch
- PWM Applications
- Power Management

### Marking Code



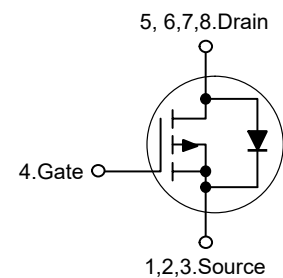
### SOP-8



(Top View)

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

### Schematic Diagram



### Absolute Maximum Ratings

Ratings at 25°C ambient temperature unless otherwise specified.

Parameter	Symbol	Value	Unit
Drain-Source Voltage	$-V_{DS}$	100	V
Gate-Source Voltage	$V_{GS}$	$\pm 20$	V
Drain Current-Continuous	$-I_D$	6	A
Drain Current-Pulsed <sup>Note1</sup>	$-I_{DM}$	24	A
Maximum Power Dissipation	$P_D$	5.4	W
Single Pulse Avalanche Energy <sup>Note2</sup>	$E_{AS}$	87.9	mJ
Junction Temperature	$T_J$	150	°C
Storage Temperature Range	$T_{STG}$	-55 to +150	°C

### Thermal Characteristics

Thermal Resistance, Junction-to-Ambient <sup>Note3</sup>	$R_{\theta JA}$	40	°C/W
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## Electrical Characteristics

(Ta=25°C unless otherwise specified)

Symbol	Parameter	Test Conditions	HYG161P10LA1			Unit
			Min	Typ.	Max	
Static Characteristics						
BV <sub>DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>DS</sub> =-250μA	-100	-	-	V
I <sub>DSS</sub>	Drain-to-Source LeakageCurrent	V <sub>DS</sub> =-100V, V <sub>GS</sub> =0V	-	-	1	μA
		T <sub>J</sub> =100°C	-	-	50	μA
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>DS</sub> =-250μA	-1.0	-1.65	-3.0	V
I <sub>GSS</sub>	Gate-Source Leakage Current	V <sub>GS</sub> =± 20V, V <sub>DS</sub> =0V	-	-	100	nA
R <sub>DS(ON)</sub> *	Drain-Source On-State Resistance	V <sub>GS</sub> =-10V, I <sub>DS</sub> =-3A	-	135	170	mΩ
		V <sub>GS</sub> =-4.5V, I <sub>DS</sub> =-2A	-	145	200	
g <sub>fs</sub>	Transconductance	V <sub>DS</sub> =-10V, I <sub>D</sub> =-3A	-	9.7	-	S
Diode Characteristics						
V <sub>SD</sub> *	Diode Forward Voltage	I <sub>SD</sub> =-3A, V <sub>GS</sub> =0V	-	-0.8	-1.3	V
t <sub>rr</sub>	Reverse Recovery Time	I <sub>SD</sub> =-3A, dI <sub>SD</sub> /dt=100A/μs	-	19.4	-	ns
Q <sub>rr</sub>	Reverse Recovery Charge		-	18.3	-	nC
Symbol	Parameter	Test Conditions	HYG161P10LA1			Unit
			Min	Typ.	Max	
Dynamic Characteristics						
R <sub>G</sub>	Gate Resistance	V <sub>GS</sub> =0V, V <sub>DS</sub> =0V, F=1MHz	-	13.5	-	Ω
C <sub>iss</sub>	Input Capacitance	V <sub>GS</sub> =0V, V <sub>DS</sub> =-25V, Frequency=1.0MHz	-	1376	-	pF
C <sub>oss</sub>	Output Capacitance		-	59	-	
C <sub>rss</sub>	Reverse Transfer Capacitance		-	36	-	
t <sub>d(ON)</sub>	Turn-on Delay Time	V <sub>DD</sub> =-50V, R <sub>G</sub> =2.5Ω, I <sub>DS</sub> =-3A, V <sub>GS</sub> =-10V	-	7.2	-	ns
T <sub>r</sub>	Turn-on Rise Time		-	10	-	
t <sub>d(OFF)</sub>	Turn-off Delay Time		-	51.6	-	
T <sub>f</sub>	Turn-off Fall Time		-	33.5	-	
Gate Charge Characteristics						
Q <sub>g</sub>	Total Gate Charge	V <sub>DS</sub> =-80V, V <sub>GS</sub> =-10V, I <sub>D</sub> =-3A	-	24	-	nC
Q <sub>g (-4.5V)</sub>	Total Gate Charge		-	11	-	
Q <sub>gs</sub>	Gate-Source Charge		-	4.9	-	
Q <sub>gd</sub>	Gate-Drain Charge		-	4.6	-	

Note: \*Pulse test, pulse width ≤ 300us, duty cycle ≤ 2%

## Test Circuit

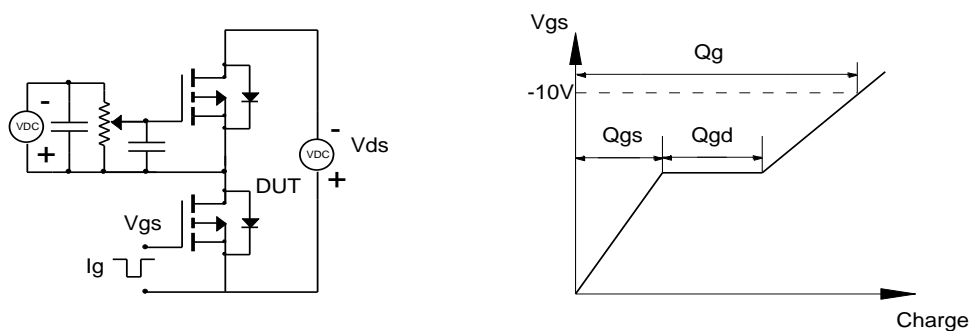


Figure 1: Gate Charge Test Circuit &amp; Waveform

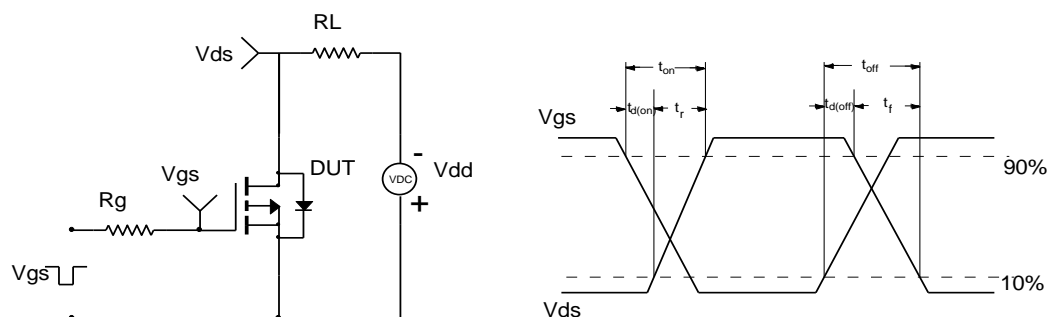


Figure 2: Resistive Switching Test Circuit &amp; Waveform

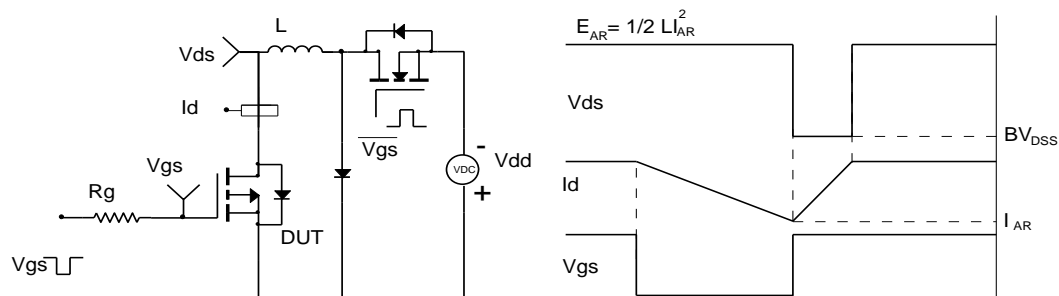


Figure 3: Unclamped Inductive Switching Test Circuit &amp; Waveform

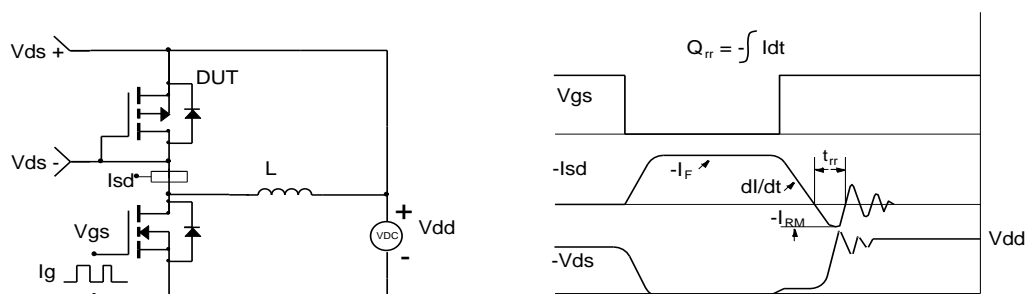


Figure 4: Diode Recovery Test Circuit &amp; Waveform

## Electrical Characteristics

(Ta=25°C unless otherwise specified)

Figure 1: Power Dissipation

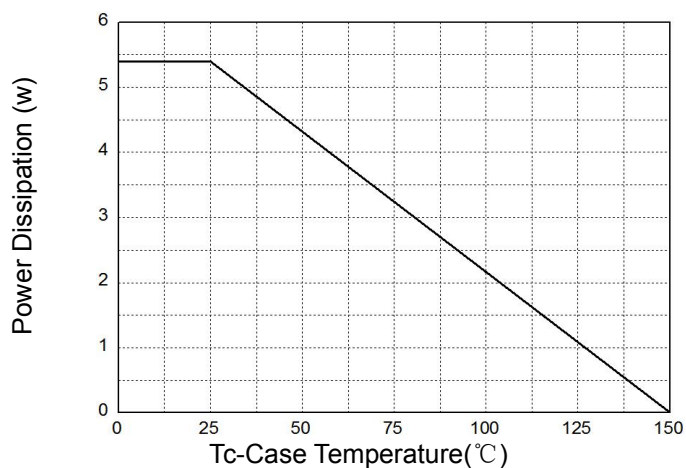


Figure 2: Drain Current

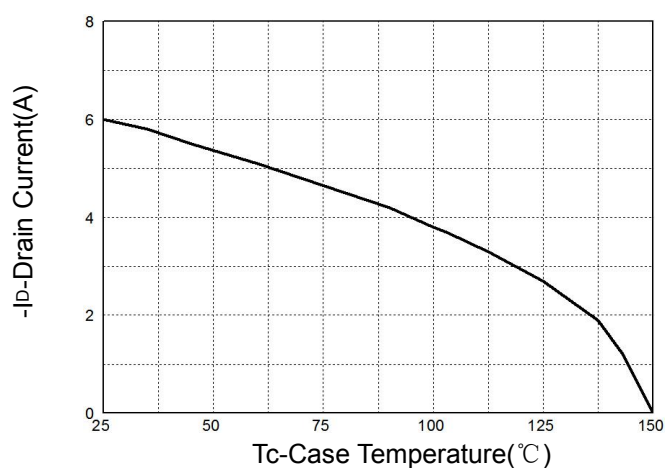


Figure 3: Safe Operation Area

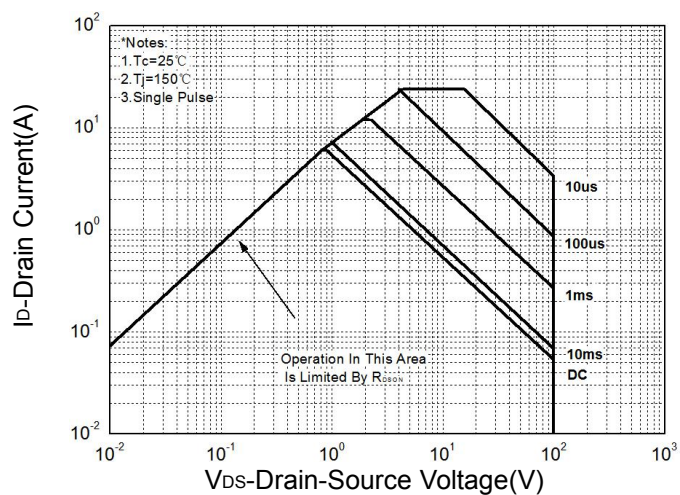


Figure 4: Thermal Transient Impedance

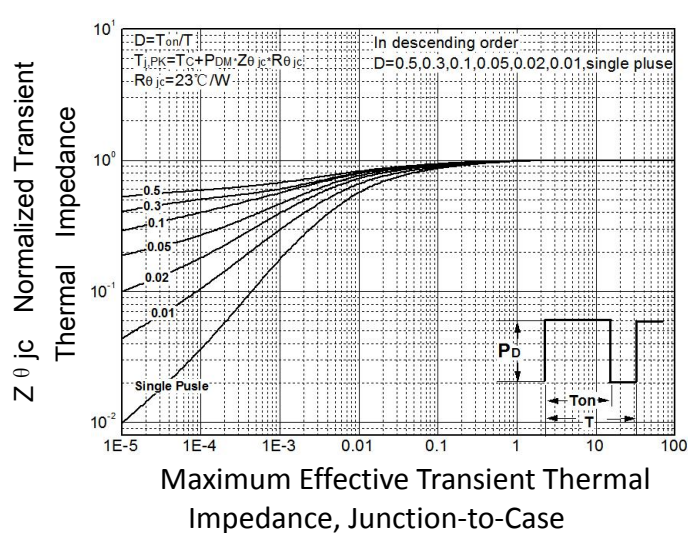


Figure 5: Output Characteristics

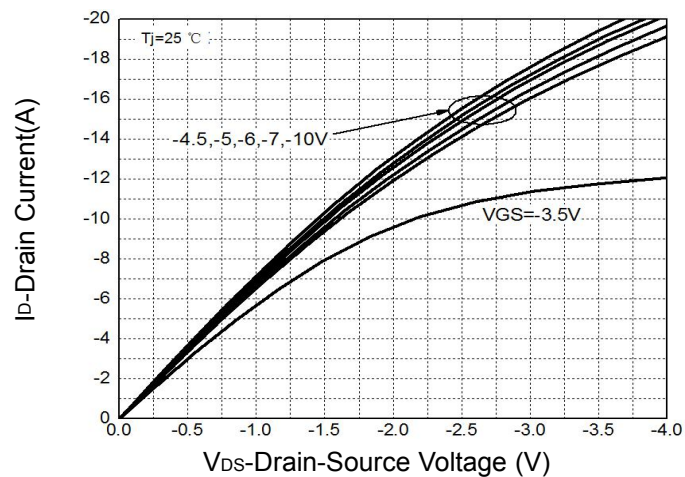


Figure 6: Drain-Source On Resistance

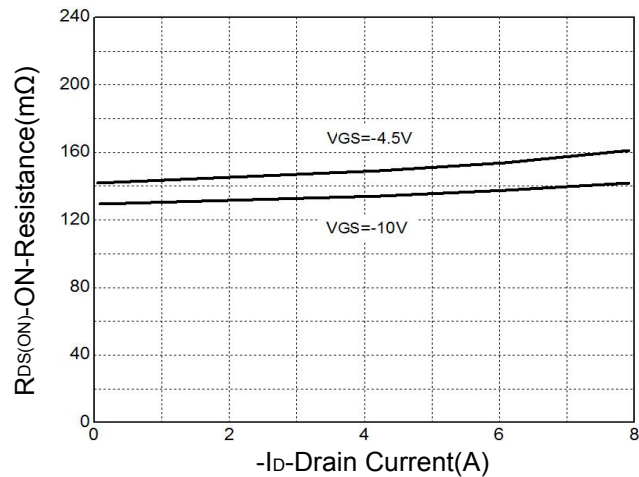


Figure 7: On-Resistance vs. Temperature

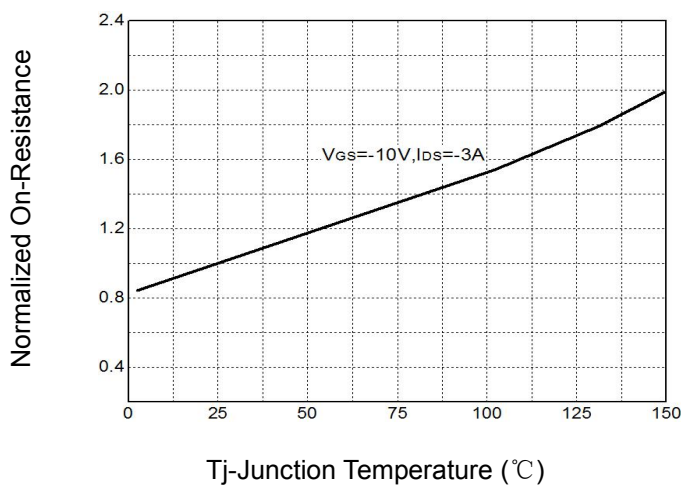


Figure 8: Source-Drain Diode Forward

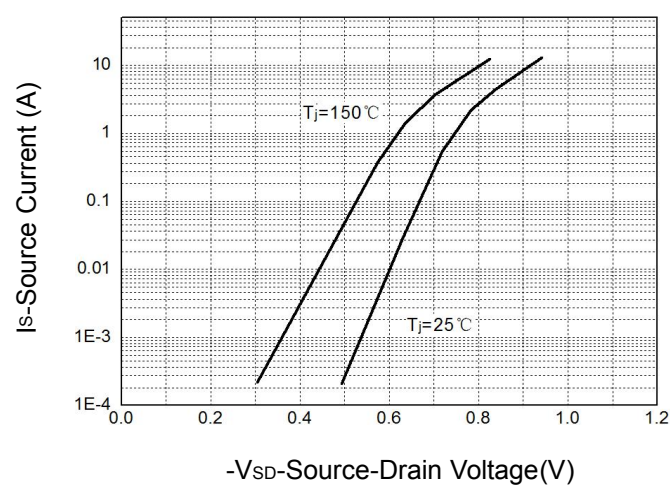


Figure 9: Capacitance Characteristics

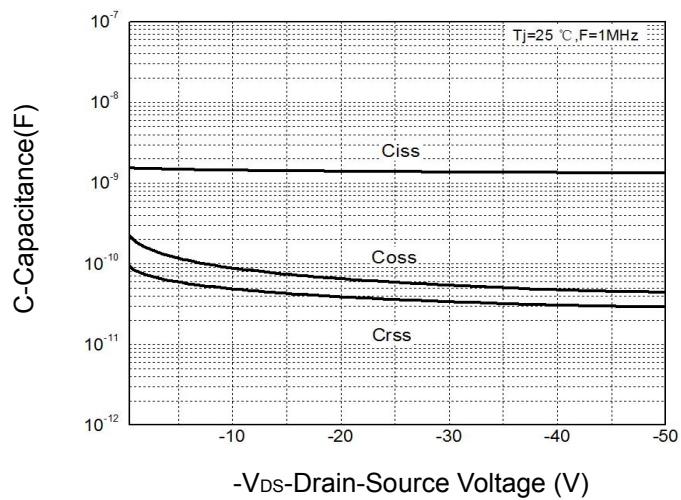
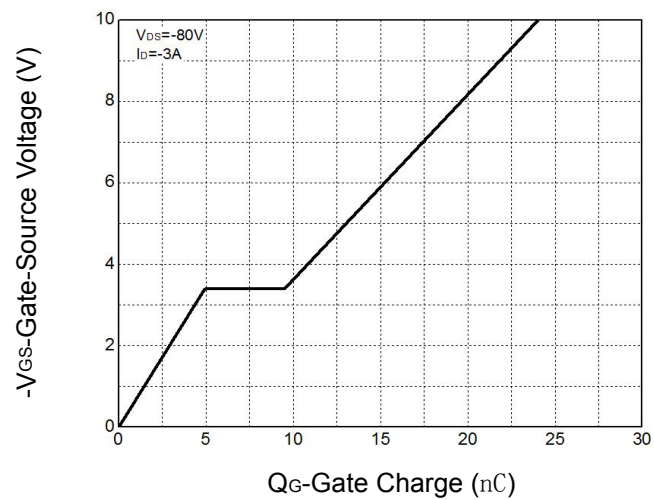


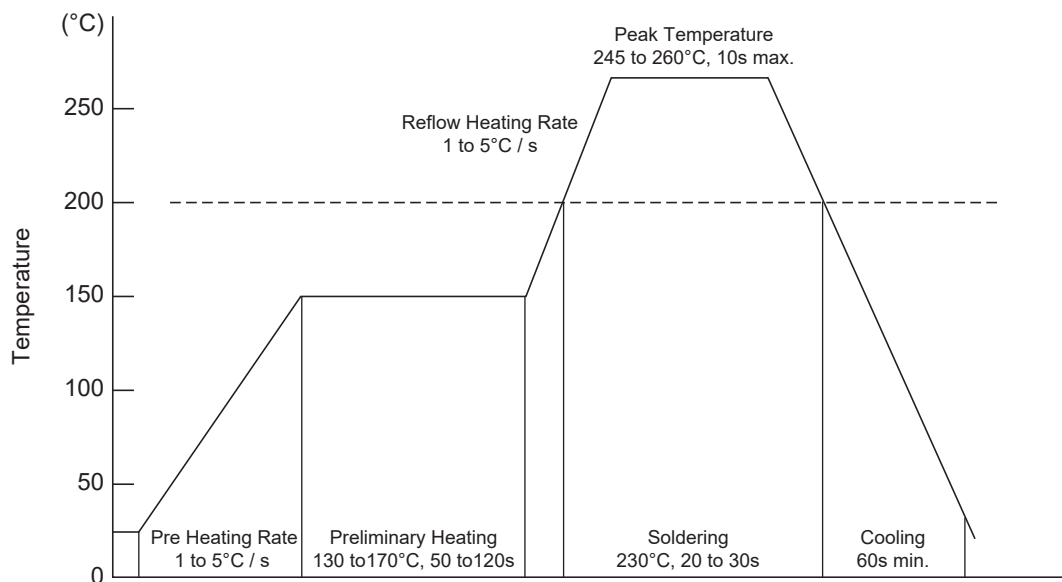
Figure 10: Gate Charge Characteristics





## 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

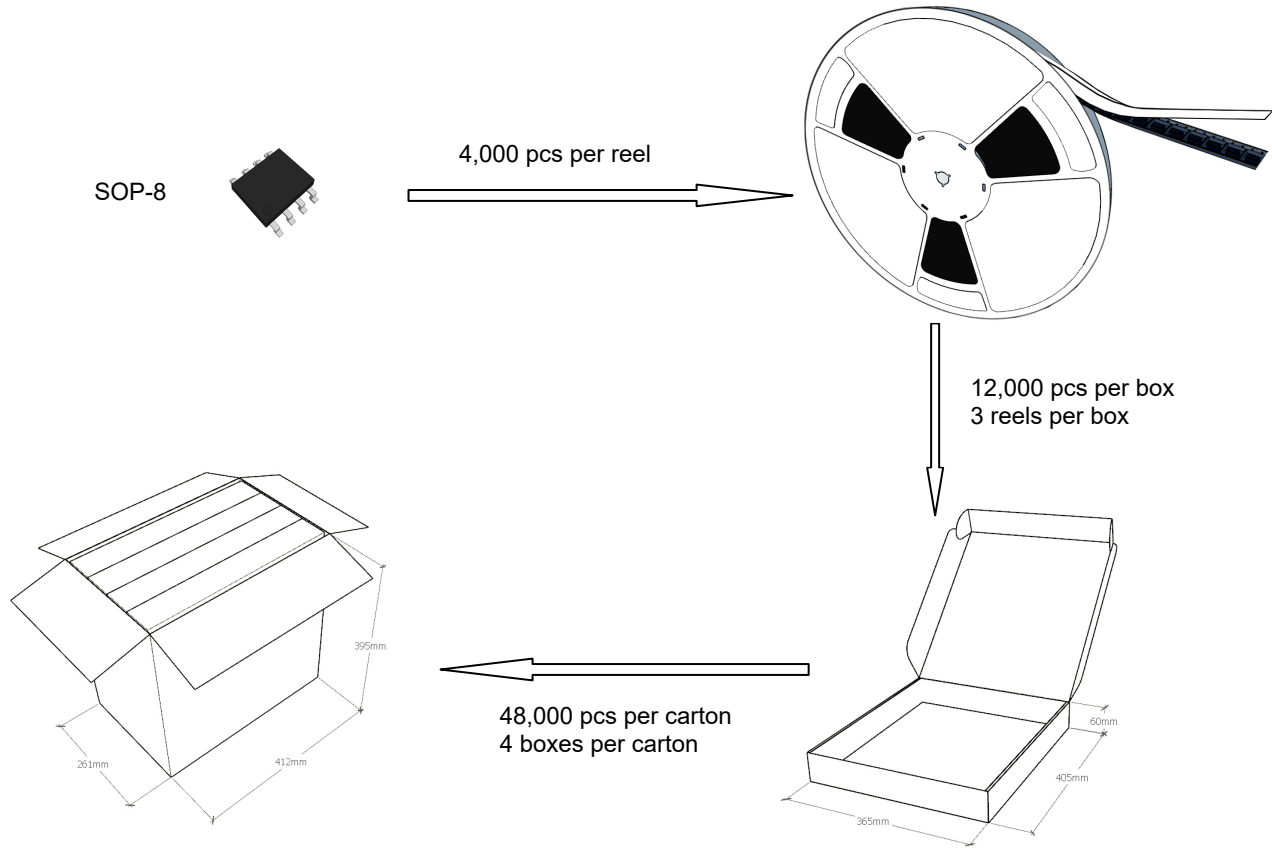
### ◆ Storage conditions

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

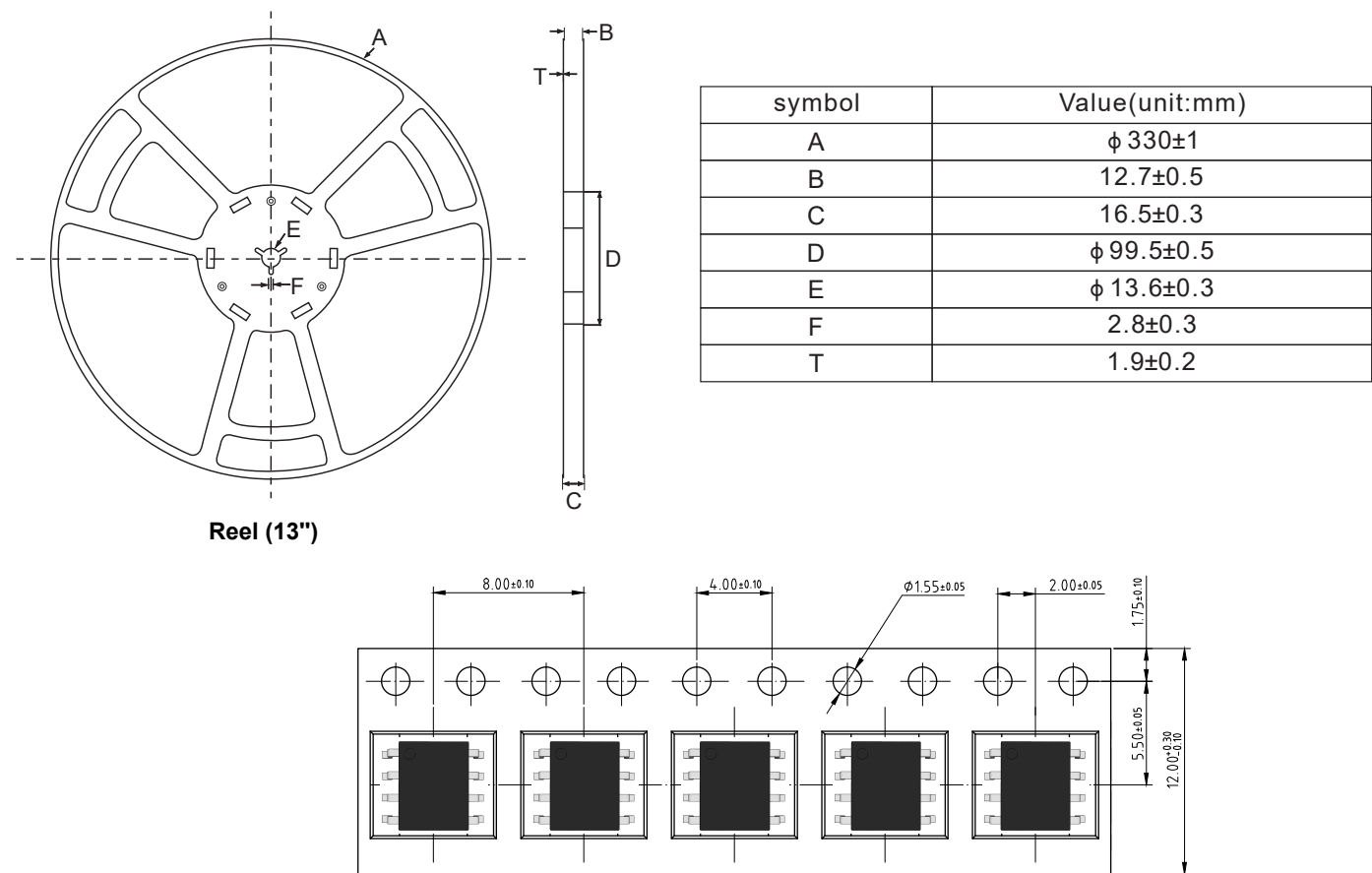


Package Specifications

- The method of packaging



◆ Embossed tape and reel data





## Contact Information

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For additional information, please contact your local Sales Representative.



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