

# **HYG090P03LQ1S**

100% Avalanche Tested

- Reliable and Rugged
- Halogen Free and Green Devices Available  
(RoHS Compliant)

## **Applications**

- Switching application
- Li-battery protection
- DC-DC
- Motor control

## **Ordering and Marking Information**

## Absolute Maximum Ratings

Symbol	Parameter	Rating	Unit
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Common Ratings (Tc=25°C Unless Otherwise Noted)

## Electrical Characteristics (Cont.) (Tc =25°C Unless Otherwise Noted)

Symbol	Parameter	Test Conditions	HYG090P03LQ1			Unit
			Min	Typ.	Max	
<b>Dynamic Characteristics</b>						
R <sub>G</sub>	Gate Resistance	V <sub>GS</sub> =0V, V <sub>DS</sub> =0V, F=1MHz	-	5.9	-	
C <sub>iss</sub>	Input Capacitance	V <sub>GS</sub> =0V, V <sub>DS</sub> =-25V, Frequency=1MHz	-	2336	-	pF
C <sub>oss</sub>	Output Capacitance					
C <sub>rss</sub>	Reverse Transfer Capacitance					
t <sub>d(ON)</sub>	Turn-on Delay Time	V <sub>DD</sub> =-15V, R <sub>G</sub> =2.5Ω, I <sub>DS</sub> =-8A, V <sub>GS</sub> =-10V	-	9	-	ns
T <sub>r</sub>	Turn-on Rise Time					
t <sub>d(OFF)</sub>	Turn-off Delay Time					
T <sub>f</sub>	Turn-off Fall Time					
<b>Gate Charge Characteristics</b>						
Q <sub>g</sub>	Total Gate Charge(V <sub>GS</sub> =-10V)	V <sub>DS</sub> =-24V, I <sub>DS</sub> =-8A	-	55	-	nC
	Total Gate Charge(V <sub>GS</sub> =-4.5V)		-	29	-	
Q <sub>gs</sub>	Gate-Source Charge		-	8	-	
Q <sub>gd</sub>	Gate-Drain Charge		-	15	-	
V <sub>plateau</sub>	Gate plateau voltage		-	-3.2	-	V

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

## Typical Operating Characteristics

Figure 1: Power Dissipation

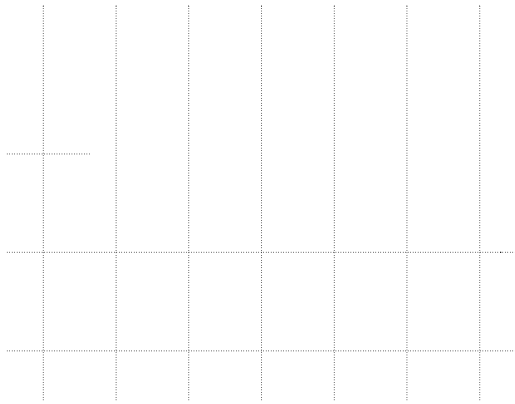


Figure 2: Drain Current

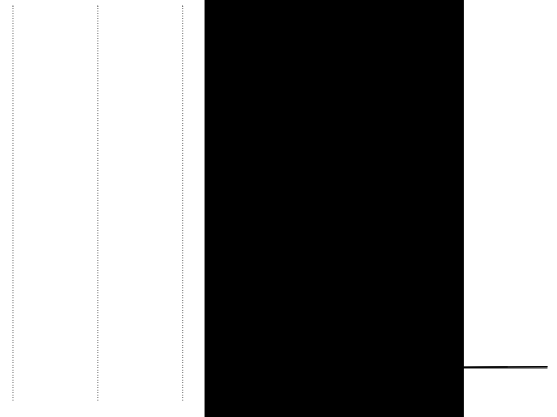


Figure 3: Safe Operation Area

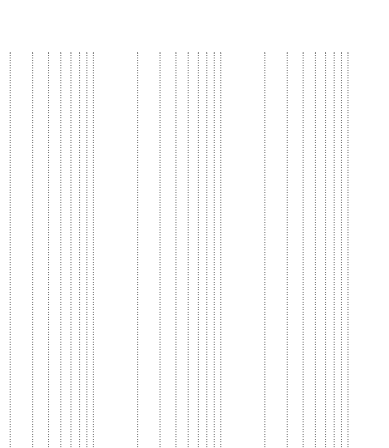


Figure 4: Thermal Transient Impedance

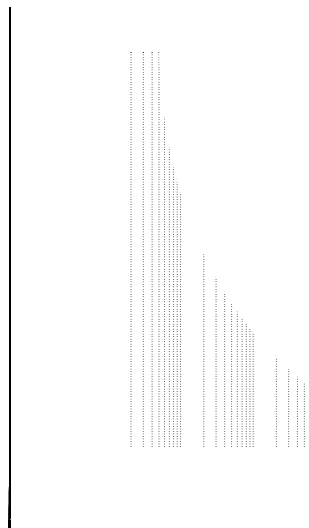


Figure 5: Output Characteristics

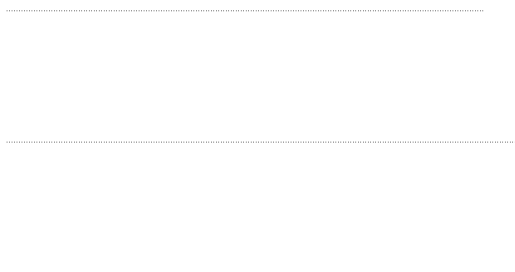


Figure 6: Drain-Source On Resistance

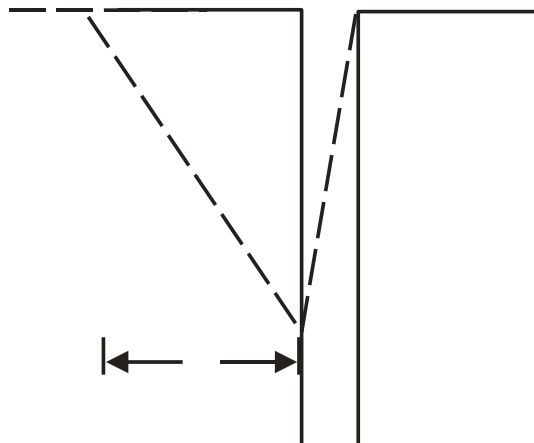
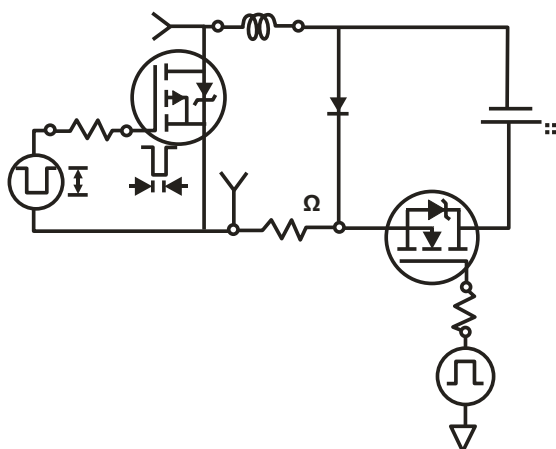


## Typical Operating Characteristics(Cont.)

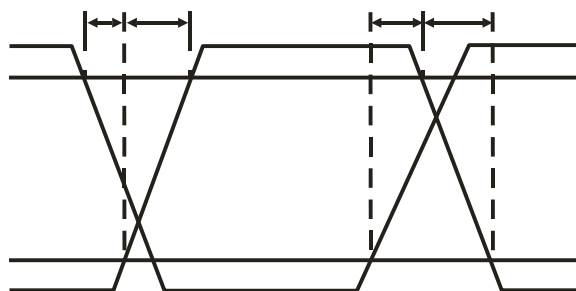
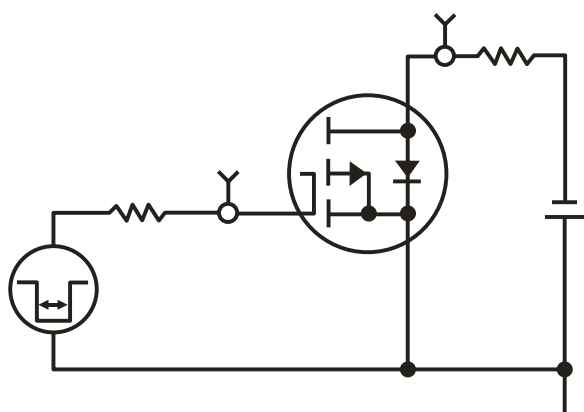
Figure 7: On-Resistance vs. Temperature

Figure 8: Source-Drain Diode Forward

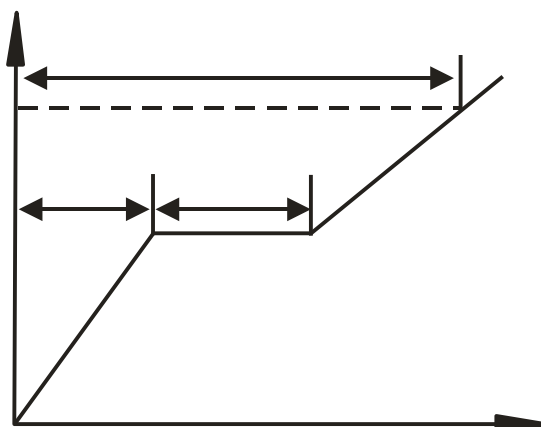
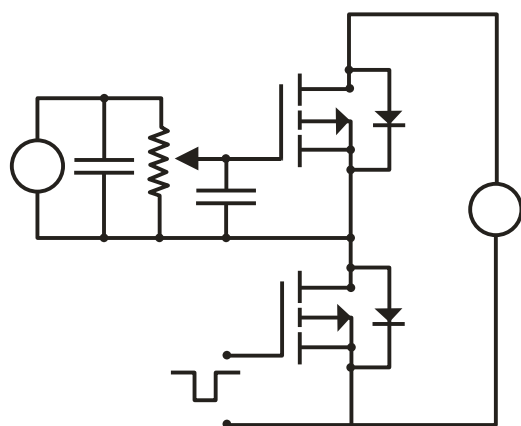
**Avalanche Test Circuit**



**Switching Time Test Circuit**



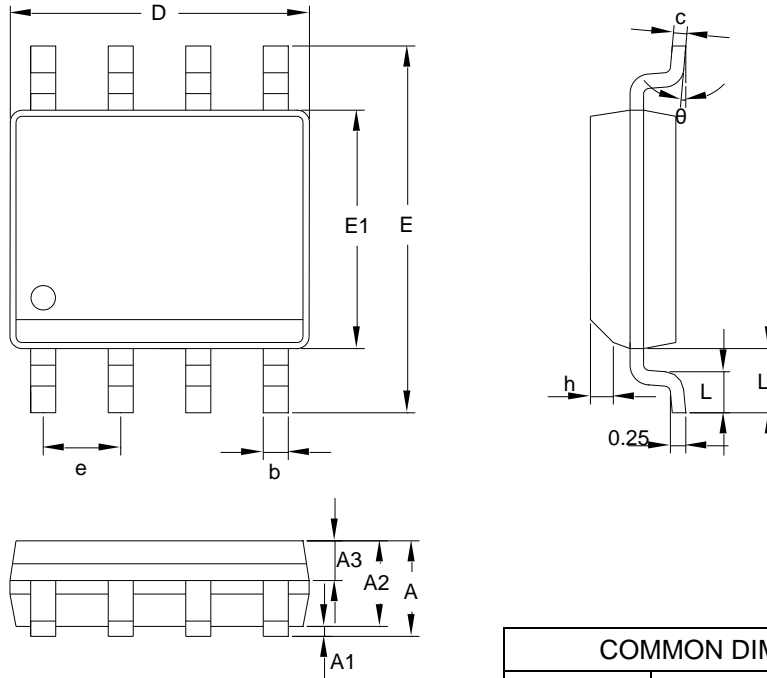
**Gate Charge Test Circuit**



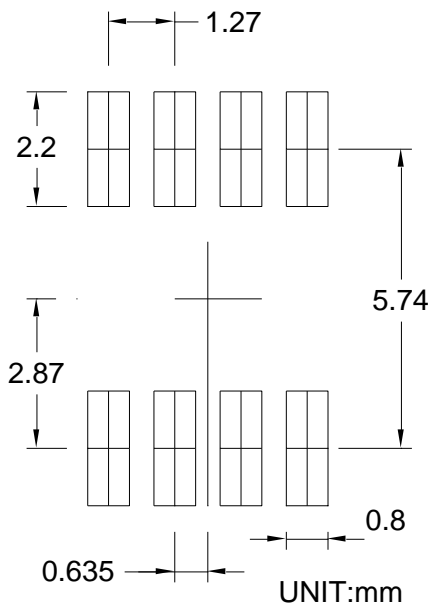
## Device Per Unit

Package Type	Unit	Quantity
SOP8L	Reel	2500

## Package Information



### RECOMMENDED LAND PATTERN

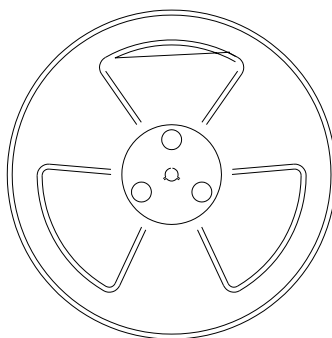
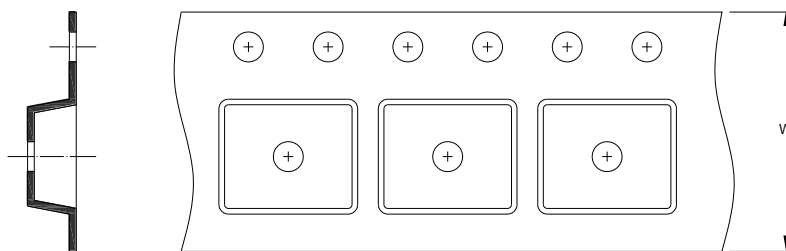


COMMON DIMENSIONS			
SYMBOL	mm		
	MIN	NOM	MAX
A	-	-	1.75
A1	0.10	-	0.225
A2	1.30	1.40	1.50
A3	0.60	0.65	0.70
b	0.39	-	0.47
c	0.20	-	0.24
D	4.80	4.90	5.00
E	5.80	6.00	6.20
E1	3.80	3.90	4.00
e	1.27 BSC		
h	0.25	-	0.50
L	0.50	-	0.80
L1	1.05 REF		
$\theta$	0°	-	8°

Note:

1. Follow JEDEC MS-012AA.
2. Dimension D" does not include mold flash, protrusions or gate burrs. Mold flash, protrusion or gate burrs shall not exceed 6 mil per side.
3. Dimension E" does not include inter-lead flash or protrusions. Inter-lead flash and protrusions shall not exceed 10 mil per side.

## Carrier Tape & Reel Dimensions

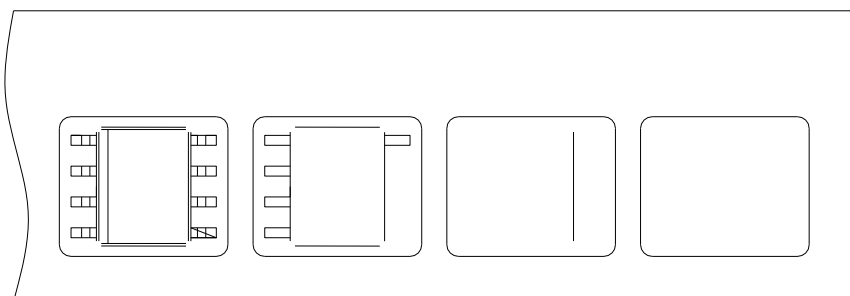


**d**

Application	A	H	T1	C	d	D	W	E1	F
SOP8L	330 2.00	50 MIN	12.4+2.00 -0.20	13.0+0.50 -0.20	1.5 MIN	20.2 MIN	12.0 0.30	1.75 0.10	5.5 0.05
	P0	P1	P2	D0	D1	T	A0	B0	K0
	4.0 0.10	8.0 0.10	2.0 0.05	1.5+0.10 -0.00	1.5 MIN	0.6+0.00 -0.40	6.40 0.20	5.20 0.20	2.10 0.20

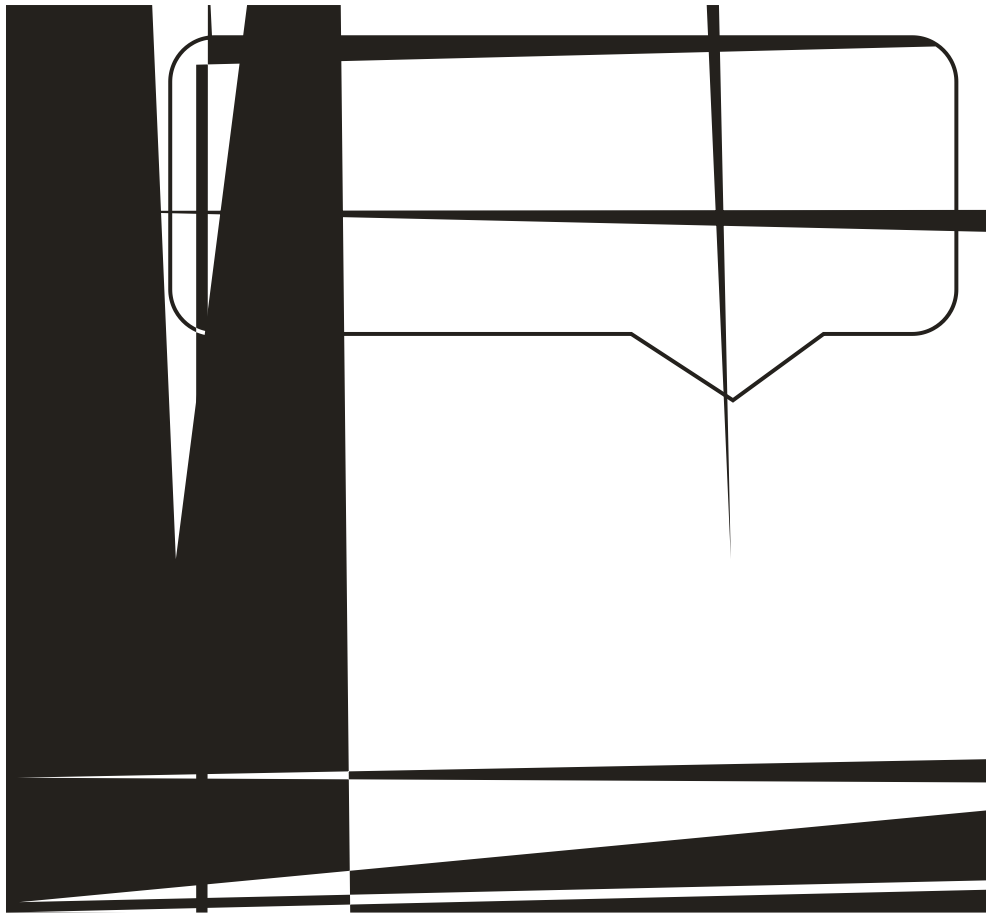
## Taping Direction Information

USER DIRECTION OF FEED





**Classification Profile**



**Classification Reflow Profiles**

Profile Feature	Sn-Pb Eutectic Assembly	Pb-Free Assembly
<b>Preheat &amp; Soak</b>		
Temperature min ( $T_{smin}$ )	100 °C	150 °C
Temperature max ( $T_{smax}$ )	150 °C	200 °C
Time ( $T_{smin}$ to $T_{smax}$ ) ( $t_s$ )	60-120 seconds	60-120 seconds
Average ramp-up rate ( $T_{smax}$ to $T_P$ )	3 °C/second max.	3°C/second max.
Liquidous temperature ( $T_L$ )	183 °C	217 °C
Time at liquidous ( $t_L$ )	60-150 seconds	60-150 seconds
Peak package body Temperature ( $T_P$ )*	See Classification Temp in table 1	See Classification Temp in table 2
Time ( $t_P$ )** within 5°C of the specified classification temperature ( $T_c$ )	20** seconds	30** seconds
Average ramp-down rate ( $T_P$ to $T_{smax}$ )	6 °C/second max.	6 °C/second max.
Time 25°C to peak temperature	6 minutes max.	8 minutes max.
*Tolerance for peak profile Temperature ( $T_P$ ) is defined as a supplier minimum and a user maximum.		
** Tolerance for time at peak profile temperature ( $t_P$ ) is defined as a supplier minimum and a user maximum.		

Table 1. SnPb Eutectic Process – Classification Temperatures (Tc)

<b>Package Thickness</b>	<b>Volume mm<sup>3</sup> &lt;350</b>	<b>Volume mm<sup>3</sup> ≥350</b>
<2.5 mm	235 °C	220 °C
≥2.5 mm		