



## Absolute Maximum Ratings

Symbol	Parameter		Rating	Unit
<b>Common Ratings</b> (Tc=25°C Unless Otherwise Noted)				
V <sub>DSS</sub>	Drain-Source Voltage		80	V
V <sub>GSS</sub>	Gate-Source Voltage		20	V
T <sub>J</sub>	Junction Temperature Range		-55 to 175	°C
T <sub>STG</sub>	Storage Temperature Range		-55 to 175	°C
I <sub>S</sub>	Source Current-Continuous(Body Diode)	Tc=25°C	85	A
<b>Mounted on Large Heat Sink</b>				
I <sub>DM</sub>	Pulsed Drain Current *	Tc=25°C	**400	A
I <sub>D</sub>	Continuous Drain Current	Tc=25°C	85	A
		Tc=100°C	60	A
P <sub>D</sub>	Maximum Power Dissipation	Tc=25°C	83.3	W
		Tc=100°C	41.7	W
R <sub>θJC</sub>	Thermal Resistance, Junction-to-Case		1.8	°C/W
R <sub>θJA</sub>	Thermal Resistance, Junction-to-Ambient **		45	°C/W
E <sub>AS</sub>	SinglePulsed-Avalanche Energy ***	L=0.3mH	350***	mJ

Note: \* Repetitive rating pulse width limited by max.junction temperature.

\*\* Surface mounted on 1in2 FR-4 board.

\*\*\* Limited by T<sub>Jmax</sub>, starting T<sub>J</sub>=25°C, L = 0.3mH, R<sub>G</sub>= 25Ω, V<sub>GS</sub>=10V.

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

Symbol	Parameter	Test Conditions	HYG055N08NS1			Unit
			Min	Typ.	Max	
<b>Static Characteristics</b>						
BV <sub>DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>DS</sub> = 250 A	80	-	-	V
I <sub>DSS</sub>	Drain-to-Source Leakage Current	V <sub>DS</sub> = 80V, V <sub>GS</sub> =0V	-	-	1	A
		T <sub>J</sub> =125°C	-	-	50	A
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>DS</sub> = 250 A	2	3	4	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> =20A	-	4.8	6.0	mΩ
<b>Diode Characteristics</b>						
V <sub>SD</sub>	Diode Forward Voltage	I <sub>SD</sub> =20A, V <sub>GS</sub> =0V	-	0.92	1.2	V
t <sub>rr</sub>	Reverse Recovery Time	I <sub>SD</sub> =50A, dI <sub>SD</sub> /dt=100A/	-	57	-	ns
Q <sub>rr</sub>	Reverse Recovery Charge		-	98	-	nC

# HYG055N08NS1C2

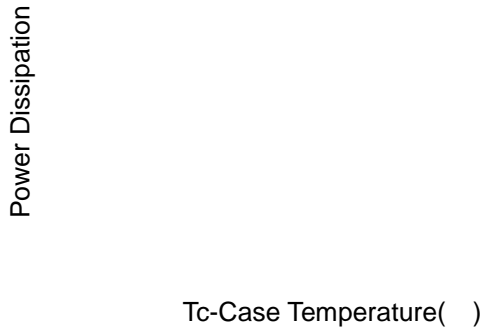
## Electrical Characteristics (Cont.) (Tc =25°C Unless Otherwise Noted)

Symbol	Parameter	Test Conditions	HYG055N08NS1			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	-	3	-	Ω
C <sub>iss</sub>	Input Capacitance	V <sub>GS</sub> =0V, V <sub>DS</sub> = 25V, Frequency=1.0MHz	-	3660	-	pF
C <sub>oss</sub>	Output Capacitance		-	1540	-	
C <sub>rss</sub>	Reverse Transfer Capacitance		-	15	-	
t <sub>d(ON)</sub>	Turn-on Delay Time	V <sub>DD</sub> = 40V, R <sub>G</sub> =4.0 I <sub>DS</sub> = 50A, V <sub>GS</sub> = 10V	-	16	-	ns
T <sub>r</sub>	Turn-on Rise Time		-	89	-	
t <sub>d(OFF)</sub>	Turn-off Delay Time		-	44	-	
T <sub>f</sub>	Turn-off Fall Time		-	93	-	
<b>Gate Charge Characteristics</b>						

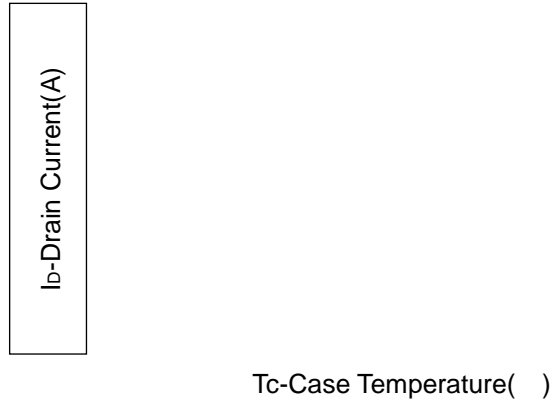
Q<sub>g</sub> Total J/F3 94 TD(T)9(o)26(t)25(a)14(l)29( 39 0.480003 15.6 ref\*2621 94 DC 62.16 530.35 TD(Q)J4999 15.6 ref

## Typical Operating Characteristics

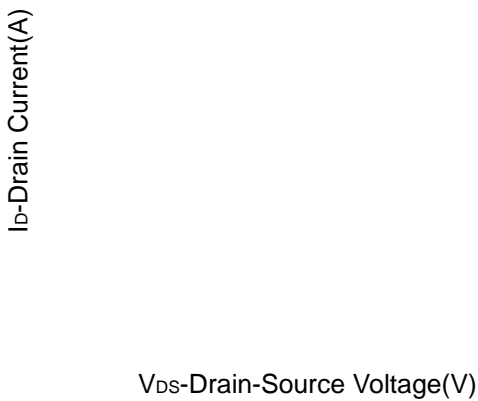
**Figure 1: Power Dissipation**



**Figure 2: Drain Current**



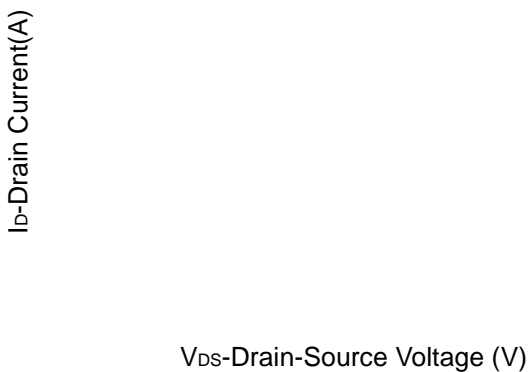
**Figure 3: Safe Operation Area**



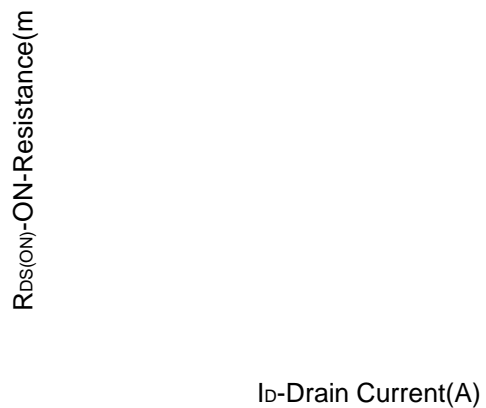
**Figure 4: Thermal Transient Impedance**

Maximum Effective Transient Thermal Impedance, Junction-to-Case

**Figure 5: Output Characteristics**

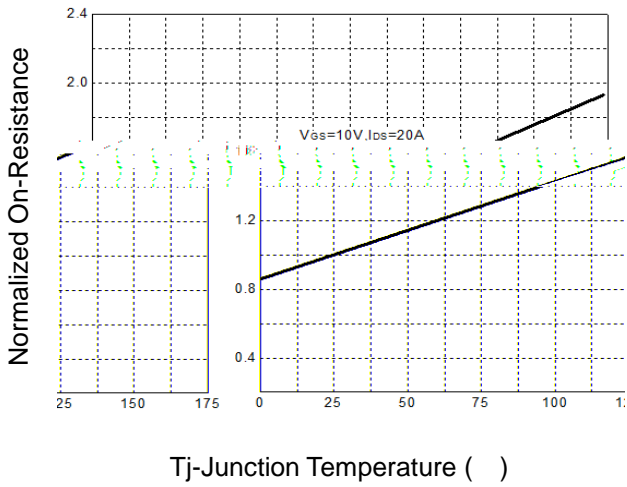


**Figure 6: Drain-Source On Resistance**

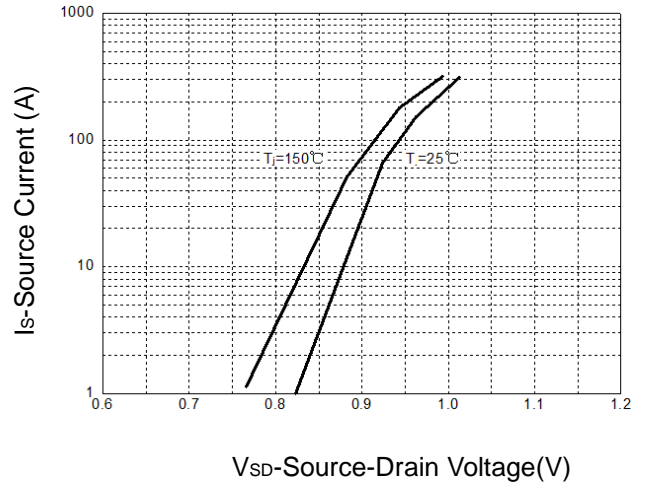


**Typical Operating Characteristics(Cont.)**

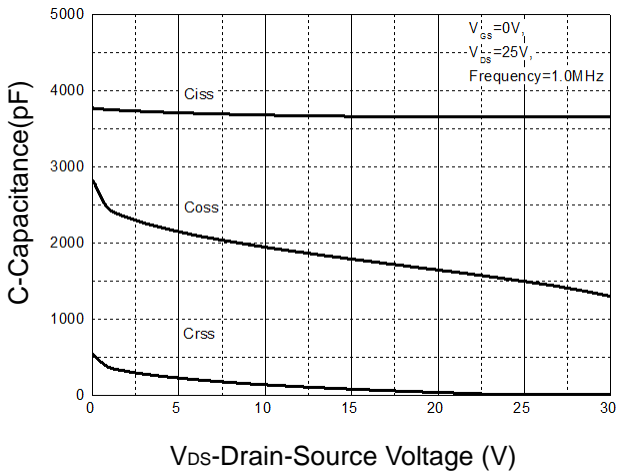
**Figure 7: On-Resistance vs. Temperature**



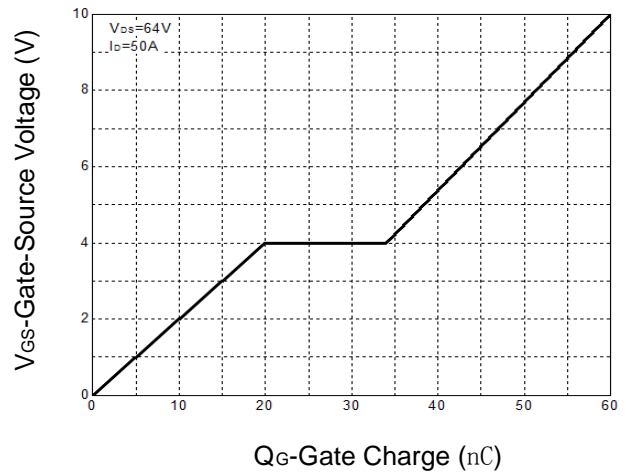
**Figure 8: Source-Drain Diode Forward**



**Figure 9: Capacitance Characteristics**

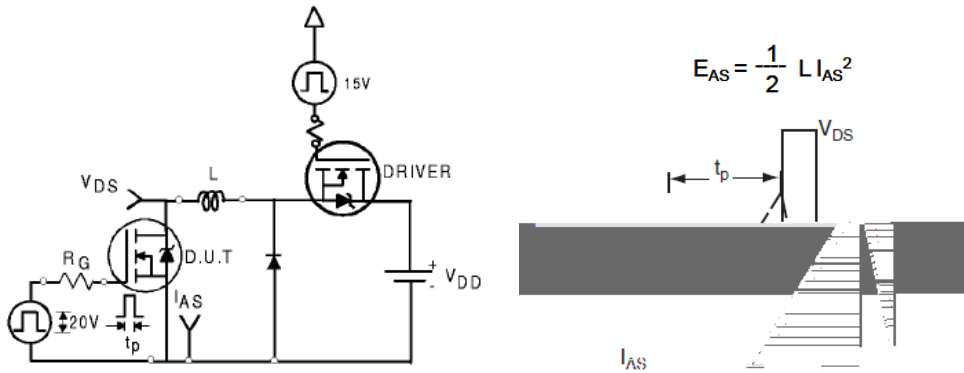


**Figure 10: Gate Charge Characteristics**

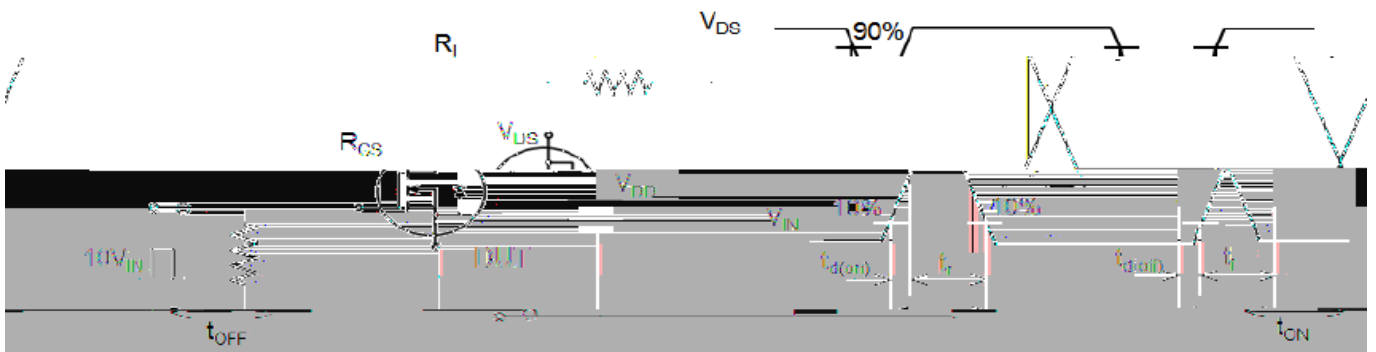


# HYG055N08NS1C2

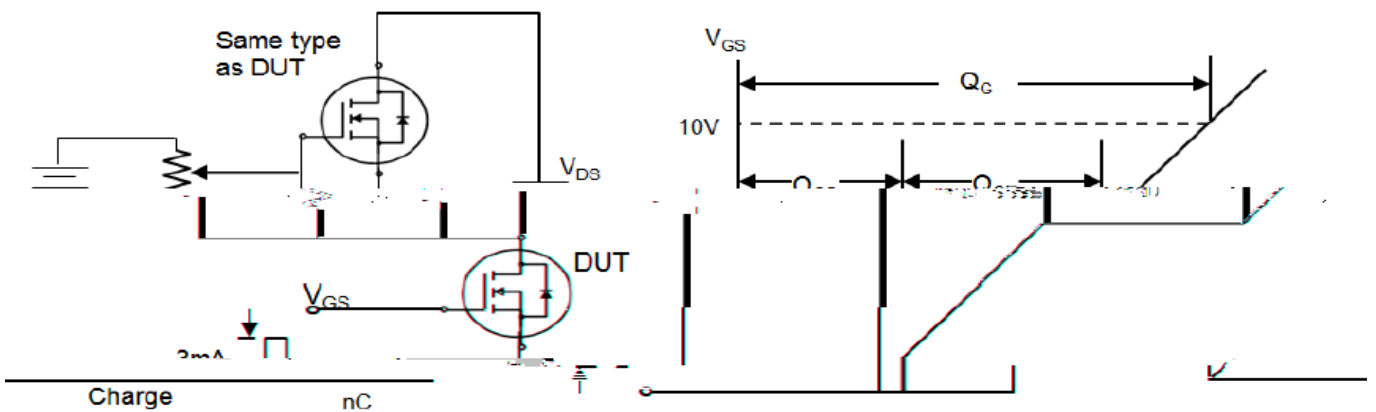
## Avalanche Test Circuit



## Switching Time Test Circuit



## Gate Charge Test Circuit



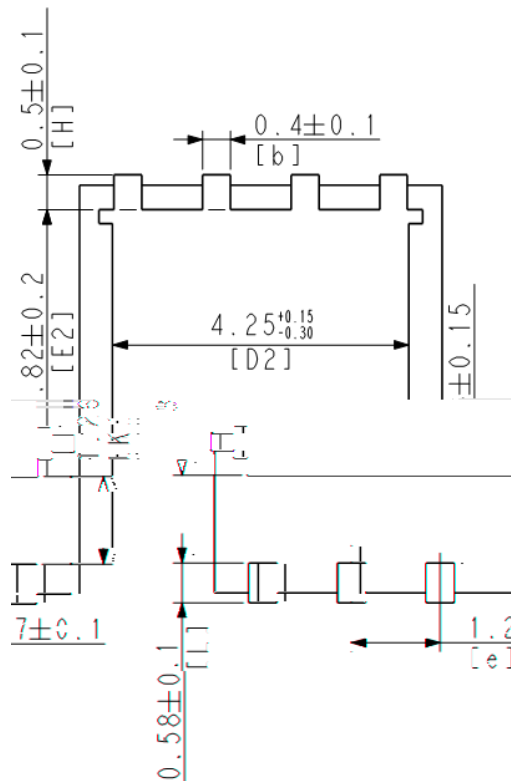
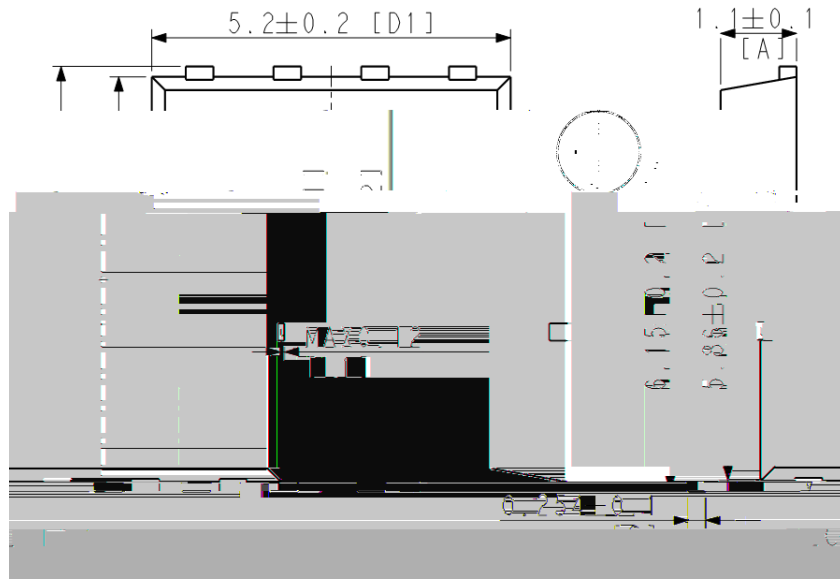
# HYG055N08NS1C2

## Device Per Unit

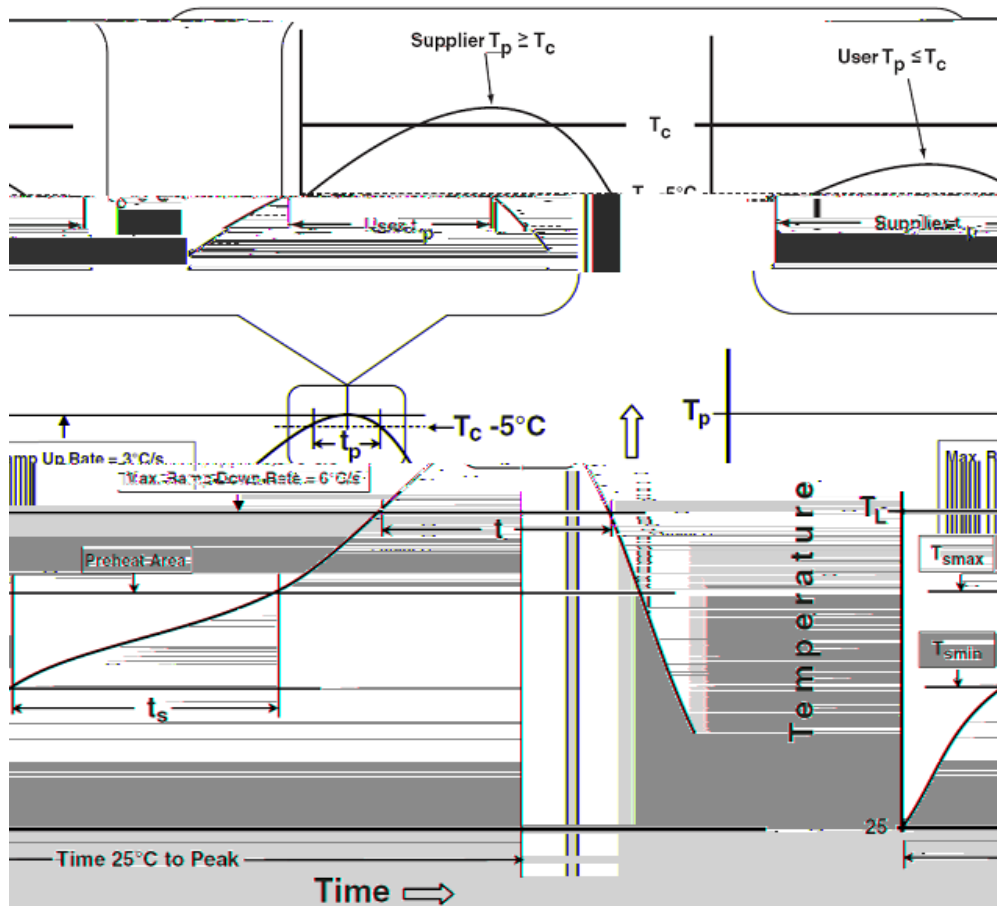
Package Type	Unit	Quantity
PPAK5*6-8L	Reel	5000

## Package Information

PPAK5\*6-8L



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.



# HYG055N08NS1C2

---

Table 1. SnPb Eutectic Process Classification Temperatures (Tc)

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