

Absolute Maximum Ratings

Symbol	Parameter	Rating	Unit	
Common Ratings (Tc=25°C Unless Otherwise Noted)				
V _{DSS}	Drain-Source Voltage	100	V	
V _{GSS}	Gate-Source Voltage	f 20	V	
T _J	Junction Temperature Range	-55 to 175	°C	
T _{STG}	Storage Temperature Range		°C	
I _S	Source Current-Continuous(Body Diode)	Tc=25°C	120	A
Mounted on Large Heat Sink				
I _{DM}	Pulsed Drain Current *	Tc=25°C	360	A
I _D	Continuous Drain Current	Tc=25°C	120	A
		Tc=100°C	81.3	A
P _D	Maximum Power Dissipation	Tc=25°C	164.8	W
		Tc=100°C	82.4	W
R _{θC}	Thermal Resistance, Junction-to-Case		0.91	°C/W
R _{θA}	Thermal Resistance, Junction-to-Ambient **		75	°C/W
E _{AS}	Single Pulsed-Avalanche Energy ***	L=0.3mH	420	mJ

Note: * Repetitive rating xpulse width limited by max.junction temperature.
 ** Surface mounted on 1in2 FR-4 board.
 *** Limited by T_{Jmax} , starting T_J=25°C, L = 0.3mH, R_θ= 25 , V_{GS} =10V.

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

Symbol	Parameter	Test Conditions	HYG053N10NS2			Unit
			Min	Typ.	Max	
Static Characteristics						
BV _{DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _{DS} =250 A	100	-	-	V
I _{DSS}	Drain-to-Source Leakage Current	V _{DS} =100V, V _{GS} =0V	-	-	1	A
		T _J =125°C	-	-	50	A
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _{DS} =250 A	2.2	3	3.8	V
I _{GSS}	Gate-Source Leakage Current	V _{GS} = f 20V, V _{DS} =0V	-	-	±100	nA
R _{DS(ON)}	Drain-Source On-State Resistance	V _{GS} =10V, I _{DS} =20A	-	4.5	5.5	m
Diode Characteristics						

V_{SD}

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

Symbol	Parameter	Test Conditions	HYG053N10NS2			Unit
			Min	Typ.	Max	
Dynamic Characteristics						
R _G	Gate Resistance	V _{GS} =0V, V _{DS} =0V, F=500kHz	-	0.7	-	
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} = 25V, Frequency=500kHz	-	6512	-	pF
C _{oss}	Output Capacitance					
C _{rss}	Reverse Transfer Capacitance					
t _{d(ON)}	Turn-on Delay Time	V _{DD} =50V, R _G =2.5 I _{DS} =20A, V _{GS} =10V	-	27	-	ns
T _r	Turn-on Rise Time					
t _{d(OFF)}	Turn-off Delay Time					
T _f	Turn-off Fall Time					
Gate Charge Characteristics						
Q _g	Total Gate Charge(V _{GS} =10V)	V _{DS} =80V, I _{DS} =20A	-	92	-	nC
Q _{gs}	Gate-Source Charge					
Q _{gd}	Gate-Drain Charge					
V _{plateau}	Gate plateau voltage		-	5.3	-	V

Note: *Pulse test Èpulse width " 300us Èduty cycle " 2%

Typical Operating Characteristics

Figure 1: Power Dissipation

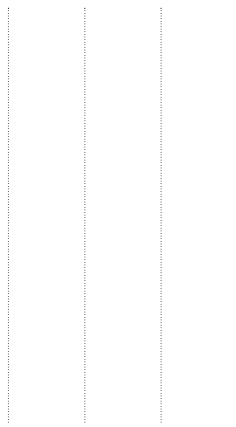


Figure 2: Drain Current

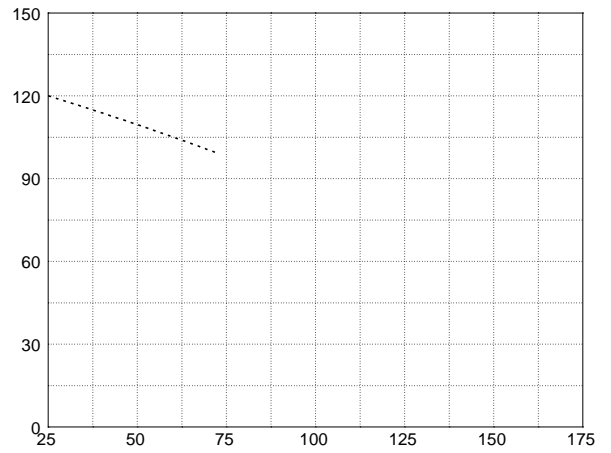


Figure 3: Safe Operation Area

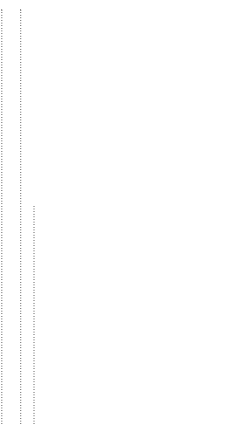


Figure 4: Thermal Transient Impedance

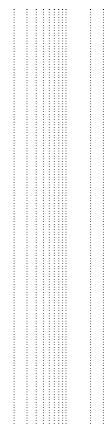


Figure 5: Output Characteristics

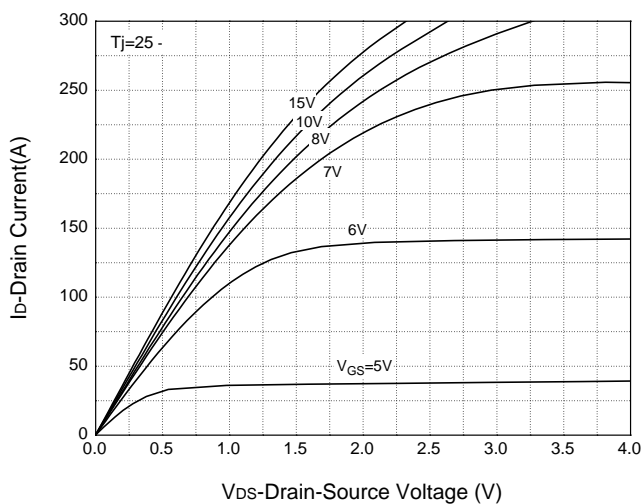
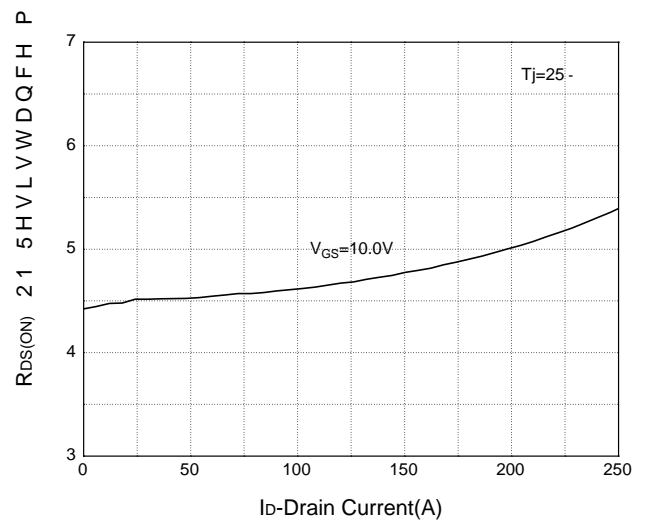


Figure 6: Drain-Source On Resistance



Typical Operating Characteristics(Cont.)

Figure 7: On-Resistance vs. Temperature

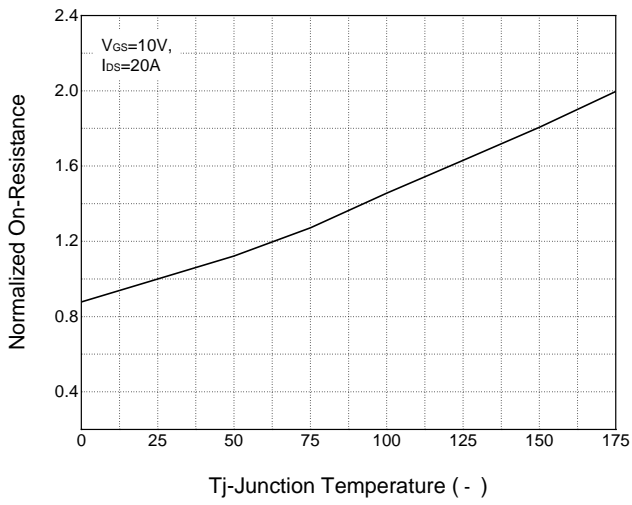


Figure 8: Source-Drain Diode Forward

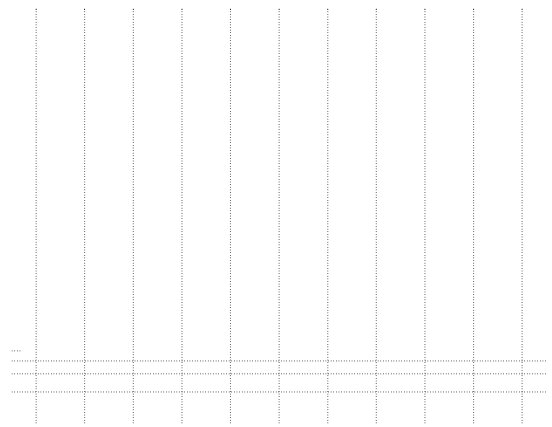


Figure 9: Capacitance Characteristics

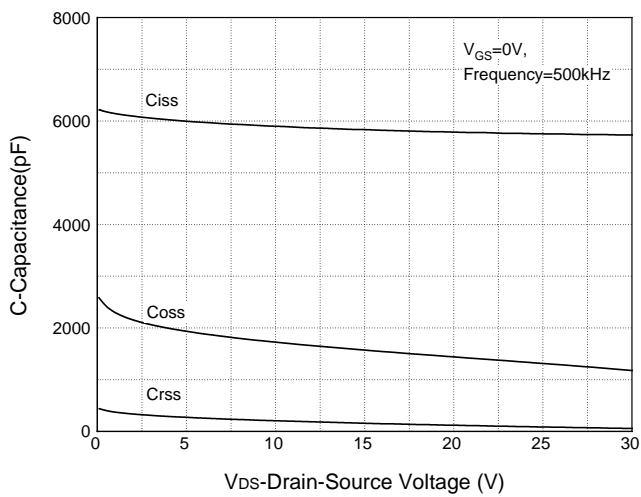
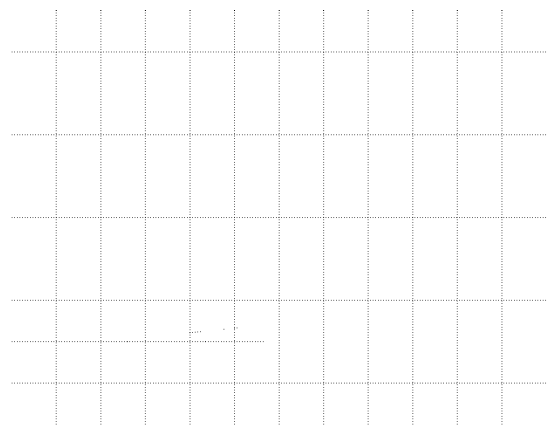
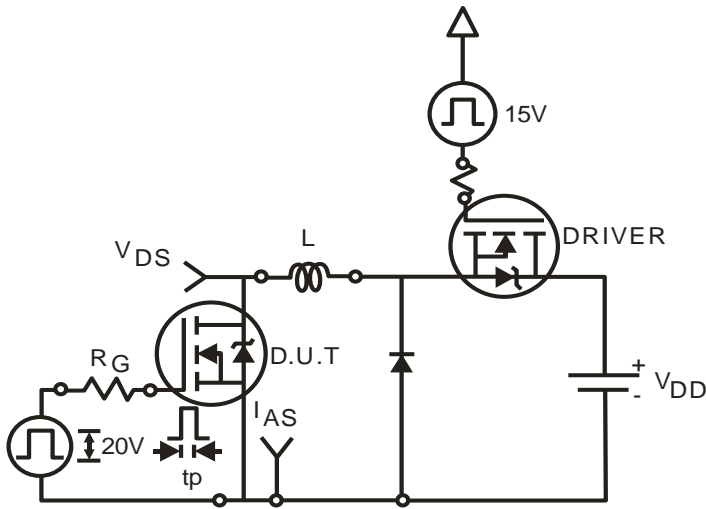


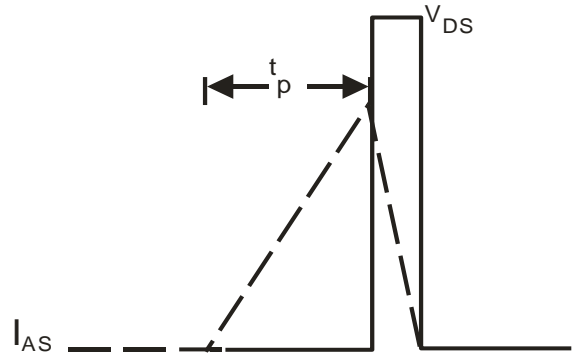
Figure 10: Gate Charge Characteristics



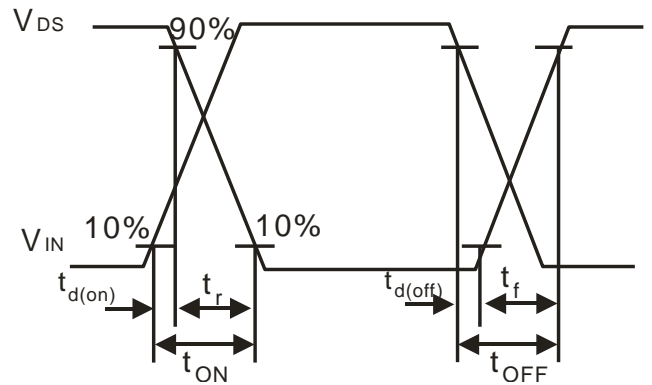
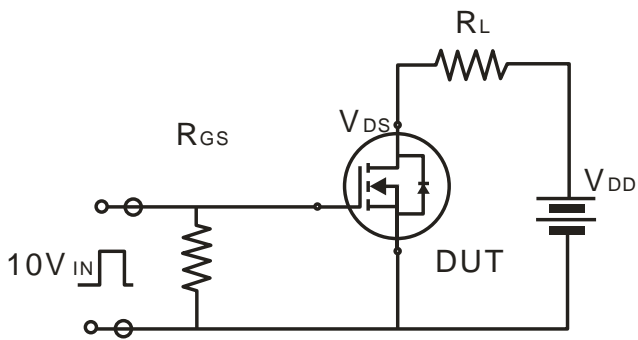
Avalanche Test Circuit



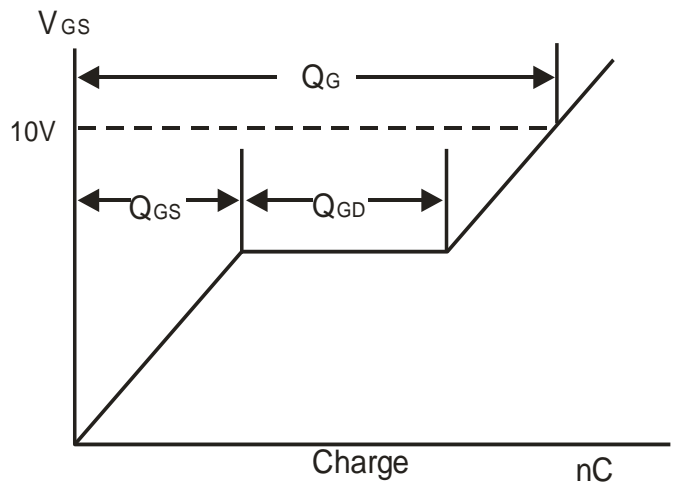
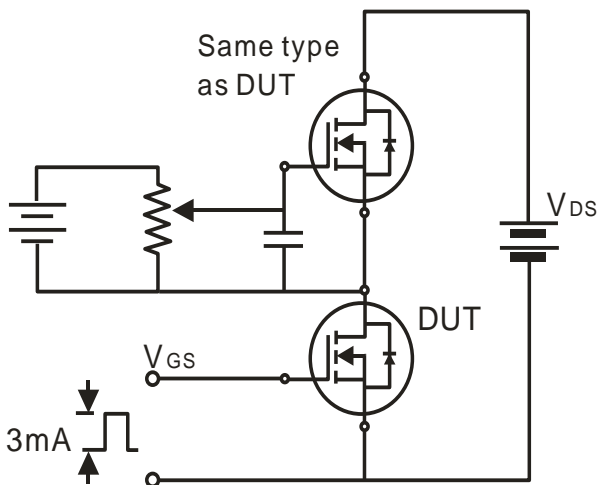
$$E_{AS} = \frac{1}{2} L I_{AS}^2$$



Switching Time Test Circuit



Gate Charge Test Circuit



Device Per Unit

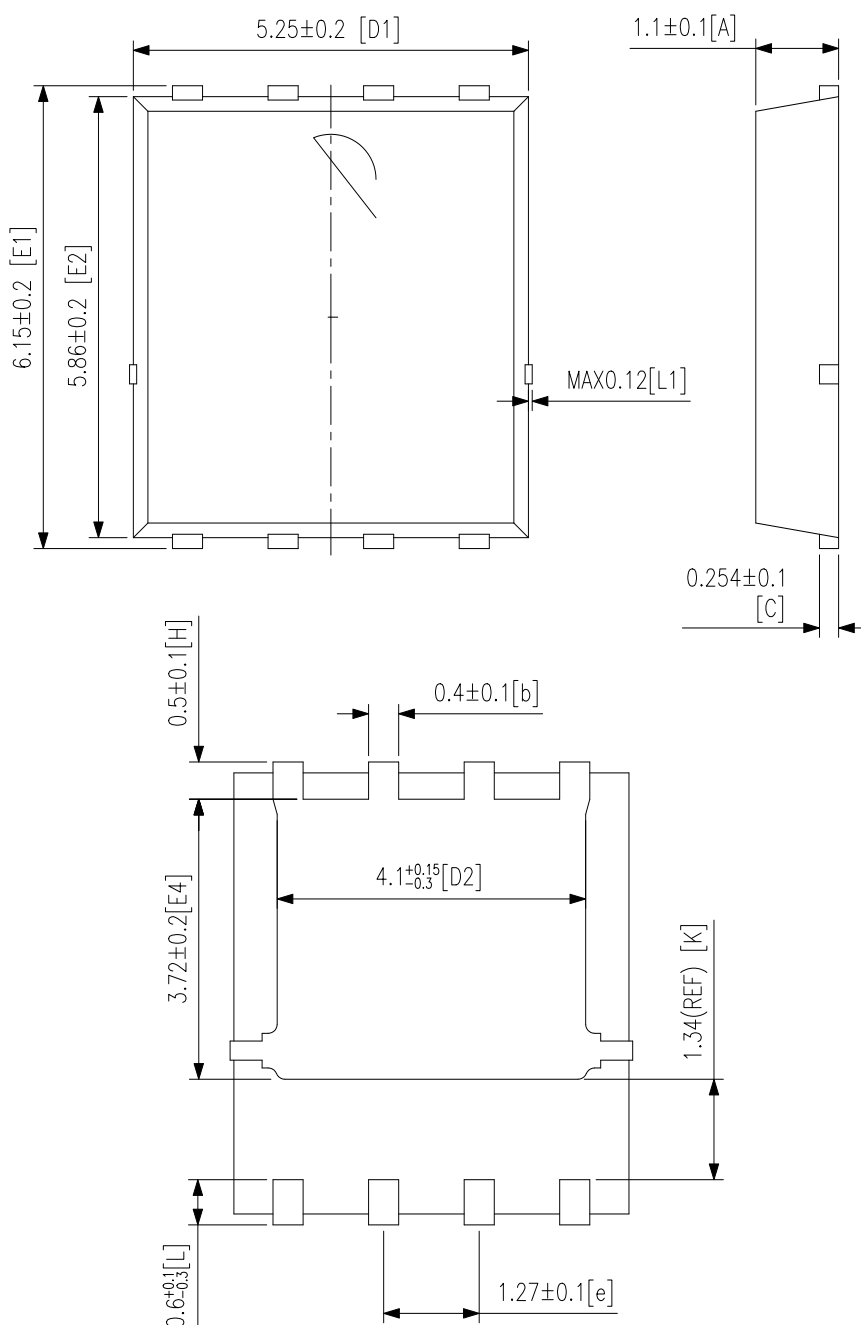
Device Per Unit

Package Type	Unit	Quantity
PDFN8L(5x6)	Reel	5000

Package Information

PDFN8L(5x6 Å)

(unit:mm)



Classification Profile

Classification Reflow Profiles

Profile Feature	Sn-Pb Eutectic Assembly	Pb-Free Assembly
Preheat & Soak		
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)

Package Thickness	Volume mm ³ <350	Volume mm ³ 1 350
Ø2.5 mm	235 °C	220 °C
• P P	220 °C	220 °C

Table 2.Pb-free Process ±Classification Temperatures (Tc)

Package Thickness	Volume mm ³ <350	Volume mm ³ 350-2000	Volume mm ³ 1 2000
<1.6 mm	260 °C	260 °C	260 °C
1.6 mm ±2.5 mm	260 °C	250 °C	245 °C
1 2.5 mm	250 °C	245 °C	245 °C

Reliability Test Program

Test item	Method	Description
SOLDERABILITY	JESD-22, B102	5 Sec, 245°C
HTRB	JESD-22, A108	168/500 Hrs, Bias @ 150°C
HTGB	JESD-22, A108	168 /500 Hrs, V _{gs} 100% @ 150°C
PCT	JESD-22, A102	96 Hrs, 100%RH, 2atm, 121°C
TCT	JESD-22, A104	250/500 Cycles, -55°C~150°C