

Single P-Channel Enhancement Mode MOSFET

Feature

Pin Description

- ' -30V/-40A
- $R_{DS(ON)} = 7.9\text{ m } (\text{typ.}) @ V_{GS} = -10\text{V}$
- $R_{DS(ON)} = 10.5\text{ m } (\text{typ.}) @ V_{GS} = -4.5\text{V}$
- ' 100% Avalanche Tested
- ' Reliable and Rugged
- ' Halogen Free and Green Devices Available
(RoHS Compliant)

Applications

- ' Switching Application
- ' Lithium battery protect board

Ordering and Marking Information

<p>C1 G090P03 XYMXXXXXX</p>	<p>Package Code C1: DFN3*3-8L</p> <p>Date Code XYMXXXXXX</p>
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Note: HUAYI lead-free products contain molding compounds/die attach materials and 100% matte tin plate Termination finish; which are fully compliant with RoHS. HUAYI lead-free products meet or exceed the lead-free requirements of IPC/JEDEC J-STD-020 for MSL classification at lead-free peak reflow temperature. HUAYI defines “Green” to mean lead-free (RoHS compliant) and halogen free (Br or Cl does not exceed 900ppm by weight in homogeneous

Absolute Maximum Ratings

Symbol	Parameter		Rating	Unit
Common Ratings (Tc=25°C Unless Otherwise Noted)				
V _{DSS}	Drain-Source Voltage		-30	V
V _{GSS}	Gate-Source Voltage		±20	V
T _J	Junction Temperature Range		-55 to 175	°C
T _{STG}	Storage Temperature Range		-55 to 175	°C
I _S	Source Current-Continuous(Body Diode)	Tc=25°C	-40	A
Mounted on Large Heat Sink				
I _{DM}	Pulsed Drain Current *	Tc=25°C	-200	A
I _D	Continuous Drain Current	Tc=25°C	-40	A
		Tc=100°C	-28	A
P _D	Maximum Power Dissipation	Tc=25°C	25	W
		Tc=100°C	12.5	W
R _{θJC}			6.0	°C/W
R _{θJA}	Thermal Resistance, Junction-to-Ambient **		75	°C/W
E _{AS}	Single Pulsed-Avalanche Energy ***	L=0.1mH	148	mJ

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

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

*** Limited by T_{Jmax} , starting T_J=25°C, L = 0.1mH, R_c= 25 , V_{GS}=10V.

Electrical Characteristics

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

Symbol	Parameter	Test Conditions	HYG090P03LA1			Unit
			Min	Typ.	Max	
Dynamic Characteristics						
R _G	Gate Resistance	V _{GS} =0V, V _{DS} =0V, F=1MHz	-	5	-	
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =-25V, Frequency=1.0MHz	-	2992	-	pF
C _{oss}			-	329	-	
C _{rss}	Reverse Transfer Capacitance		-	267	-	
t _{d(ON)}	Turn-on Delay Time	V _{DD} =-15V, R _G =4 Ω, I _{DS} =-10A, V _{GS} =-10V	-	9.5	-	ns

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Typical Operating Characteristics

Figure 1: Power Dissipation

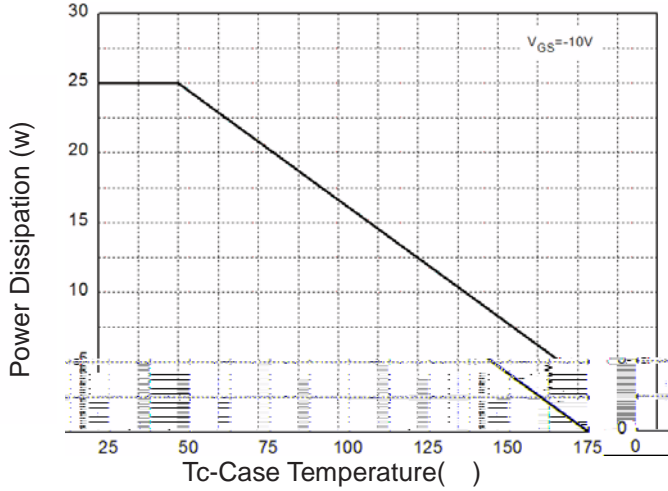


Figure 2: Drain Current

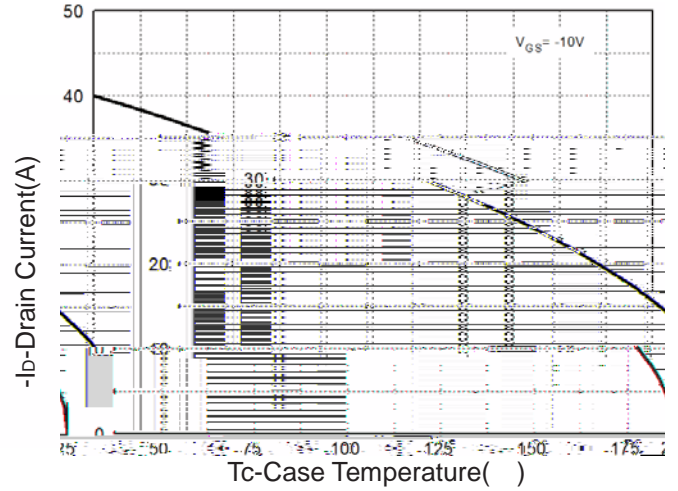


Figure 3: Safe Operation Area

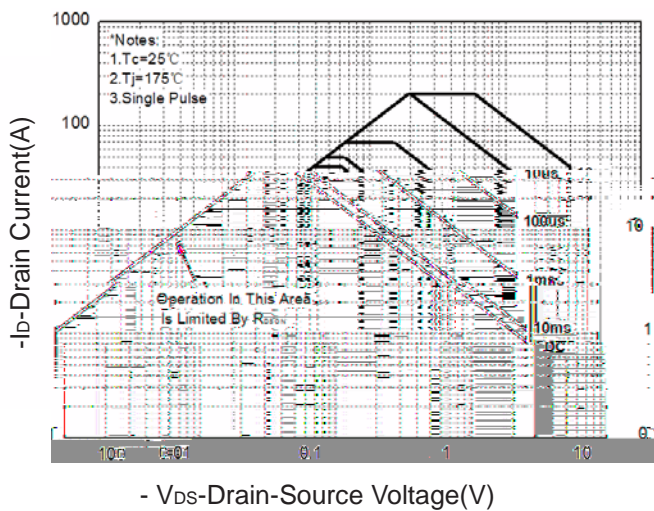


Figure 4: Thermal Transient Impedance

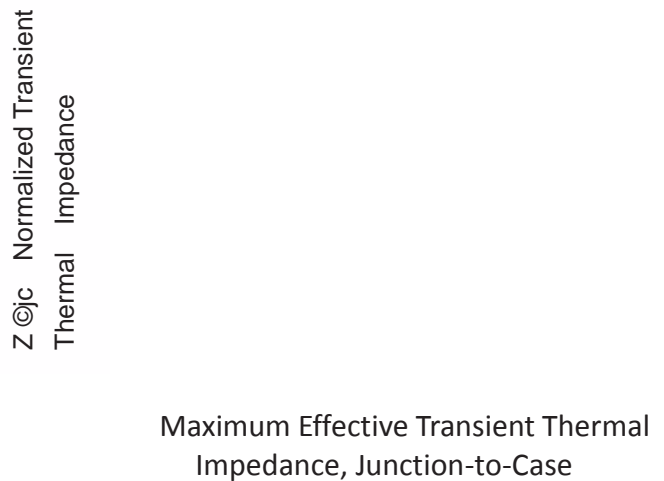


Figure 5: Output Characteristics

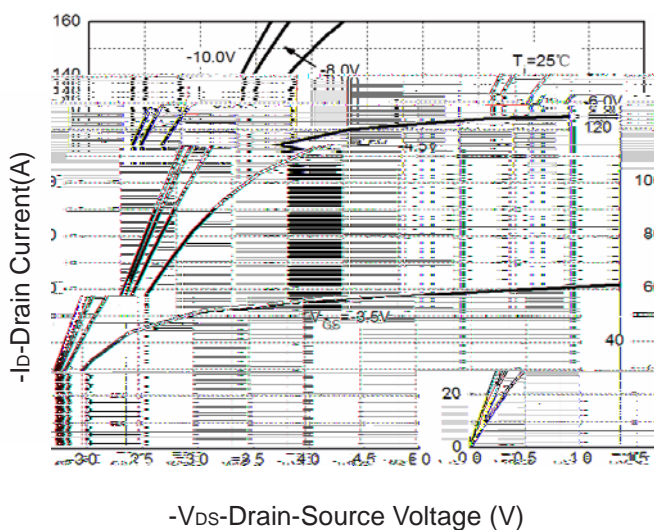
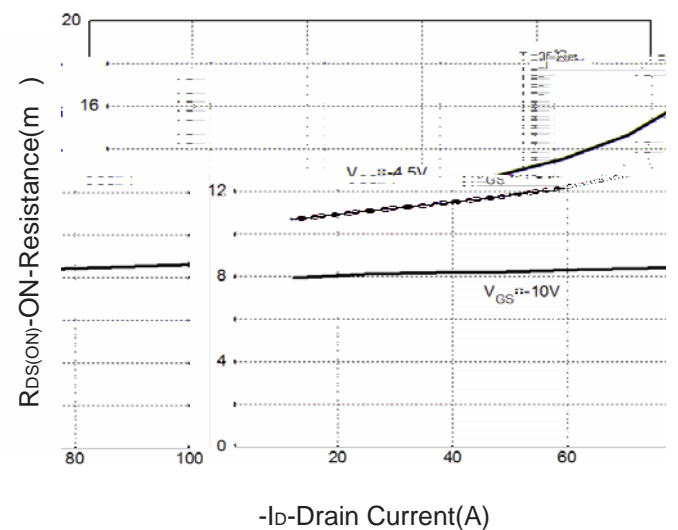


Figure 6: Drain-Source On Resistance



Typical Operating Characteristics(Cont.)

Figure 7: On-Resistance vs. Temperature

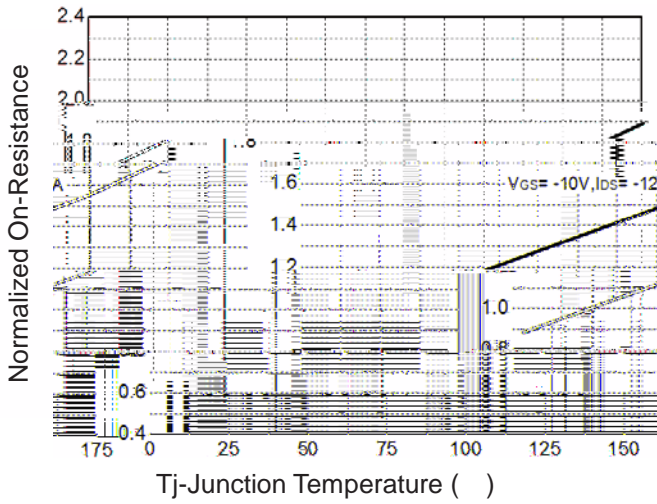


Figure 8: Source-Drain Diode Forward

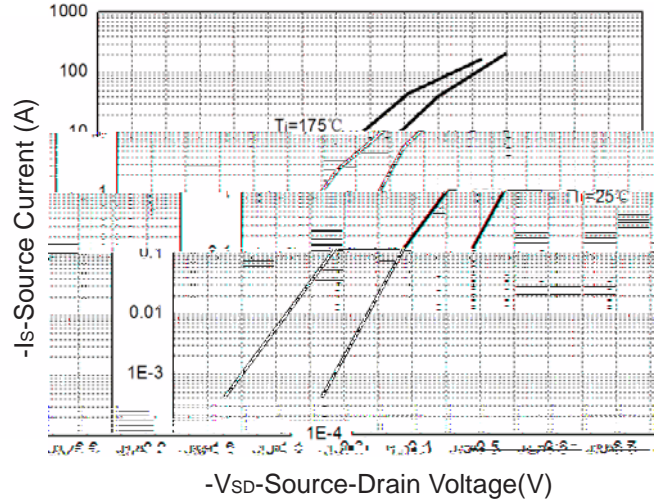


Figure 9: Capacitance Characteristics

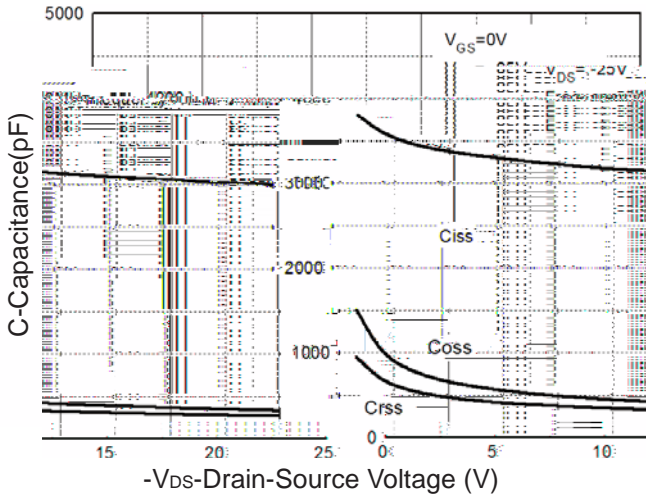
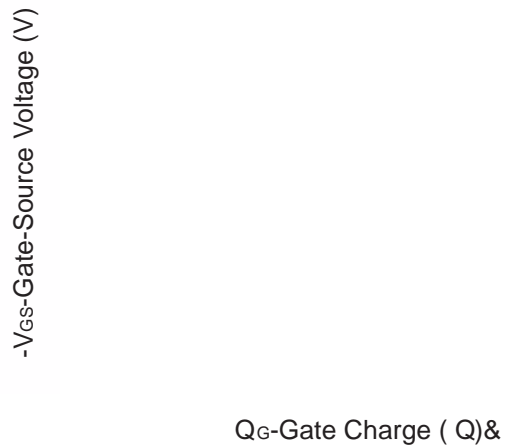
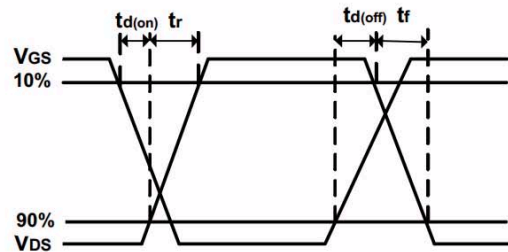
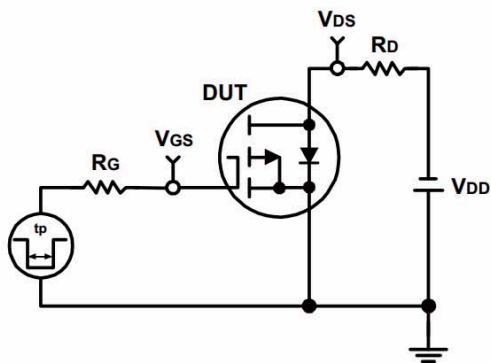


Figure 10: Gate Charge Characteristics

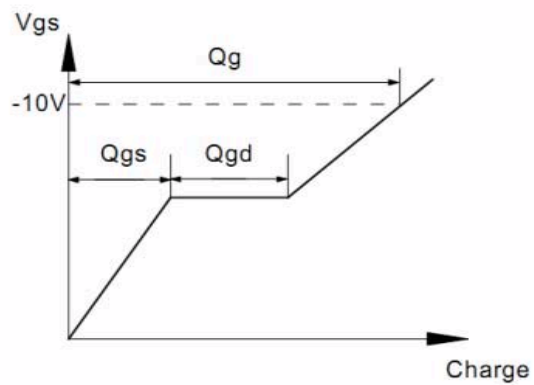
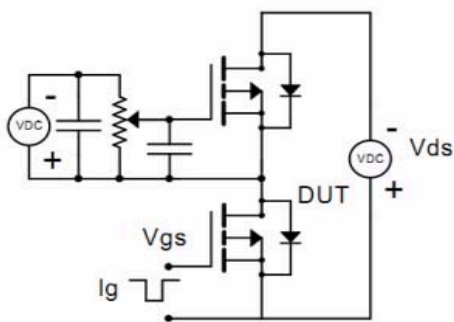


Avalanche Test Circuit

Switching Time Test Circuit



Gate Charge Test Circuit



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Device Per Unit

Package Type	Unit
DFN3*3-8L	Reel

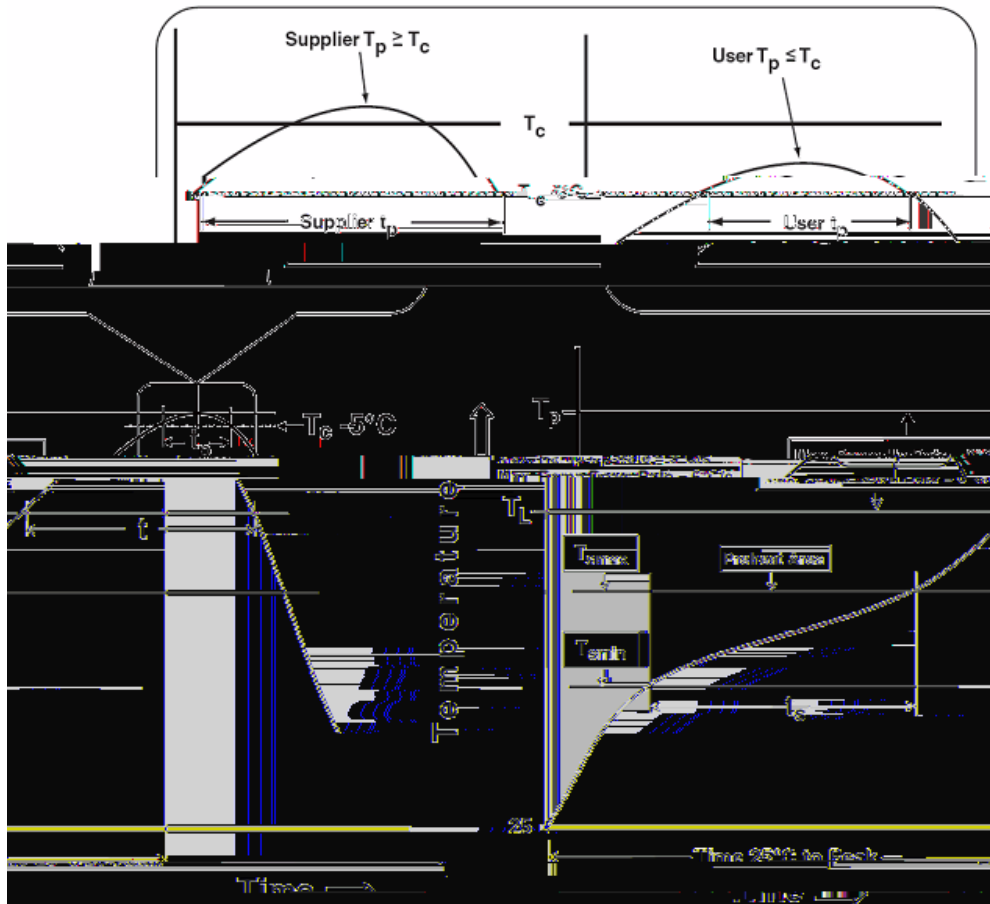
Package Information

DFN3*3-8L



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MAX

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.

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

Package Thickness	Volume mm³ <350	Volume mm³ 1 350
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