

N-Channel Enhancement Mode MOSFET

Feature

Pin Description

- z 40V/150A
- z $R_{DS(ON)} = 2.1 \Omega$ @ $V_{GS} = 10V$
- z $R_{DS(ON)} = 1.5 \Omega$ @ $V_{GS} = 4.5V$
- z 100% Avalanche Tested
- z 100% DVDS
- z Reliable and Rugged
- z Halogen Free and Green Devices Available (RoHS Compliant)

Applications

- z Load Switch
- z Li-battery protection
- z Motor drive for electric tools

Ordering and Marking Information

C2 HYG035N04 XYMXXXXXX	Package Code C2: PDFN8L(5x6) Date Code XYMXXXXXX
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Note: HUAYI halogen free products contain molding compounds/die attach materials and 100% matte tin plate Termination finish; which are fully compliant with RoHS. HUAYI halogen free products meet or exceed the halogen free requirements of IPC/JEDEC J-STD-020 for MSL classification at halogen free peak reflow temperature. HUAYI defines 'Green' to mean halogen free (RoHS compliant) and halogen free (Br or Cl does not exceed 900ppm by weight in homogeneous material and total of Br and Cl does not exceed 1500ppm by weight).

HUAYI reserves the right to make changes, corrections, enhancements, modifications, and improvements to this product and/or to this document at any

Absolute Maximum Ratings

Symbol	Parameter		Rating	Unit
Common Ratings (Tc=25°C Unless Otherwise Noted)				
V _{DSS}	Drain-Source Voltage		40	V
V _{GSS}	Gate-Source Voltage		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	150	A
Mounted on Large Heat Sink				
I _{DM}	Pulsed Drain Current *	Tc=25°C	540	A
I _D	Continuous Drain Current	Tc=25°C	150	A

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

Symbol	Parameter	Test Conditions	HYG035N04LR1			Unit
			Min	Typ.	Max	
Dynamic Characteristics						
R _G	Gate Resistance	V _{GS} =0V, V _{DS} =0V, F=1MHz	-	2	-	
C _{iss}	Input Capacitance	V _{GS} =0V, V _{DS} =25V, Frequency=1MHz	-	5907	-	pF
C _{oss}	Output Capacitance					
C _{rss}	Reverse Transfer Capacitance					
t _{d(ON)}	Turn-on Delay Time	V _{DD} =20V, R _G =4 I _{DS} =40A, V _{GS} =10V	-	16	-	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} =32V, I _{DS} =40A	-	108	-	nC
Q _g	Total Gate Charge(V _{GS} =4.5V)					
Q _{gs}	Gate-Source Charge					
Q _{gd}	Gate-Drain Charge					
V _{plateau}	Gate plateau voltage		-	3.5	-	V

Note: *Pulse test pulse width "300us duty cycle "2%

Typical Operating Characteristics

Figure 1: Power Dissipation

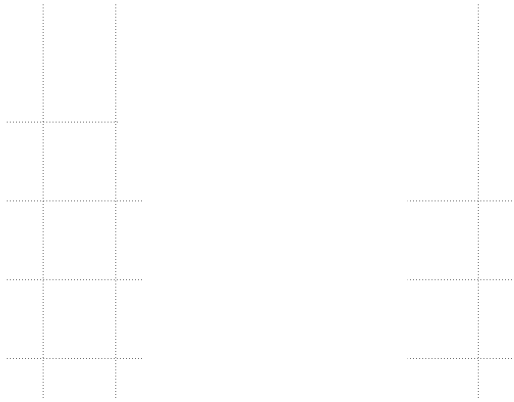


Figure 2: Drain Current



Figure 3: Safe Operation Area



Figure 4: Thermal Transient Impedance

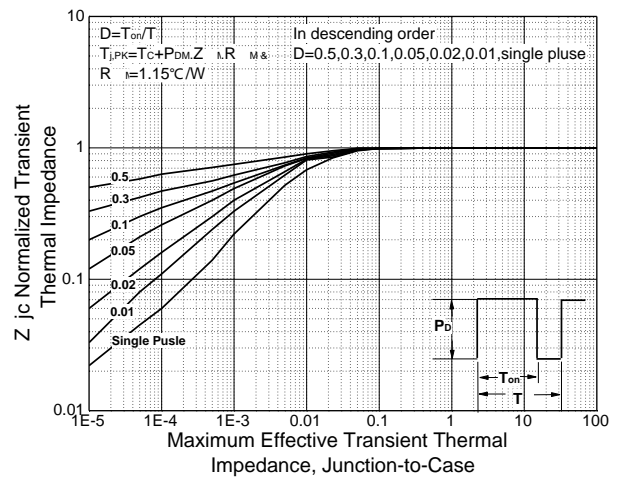
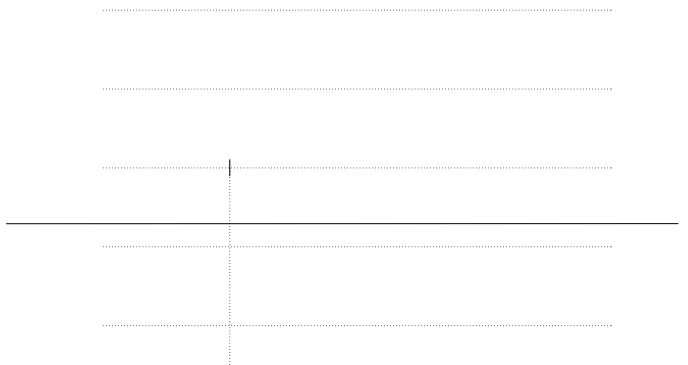


Figure 5: Output Characteristics



Figure 6: Drain-Source On Resistance



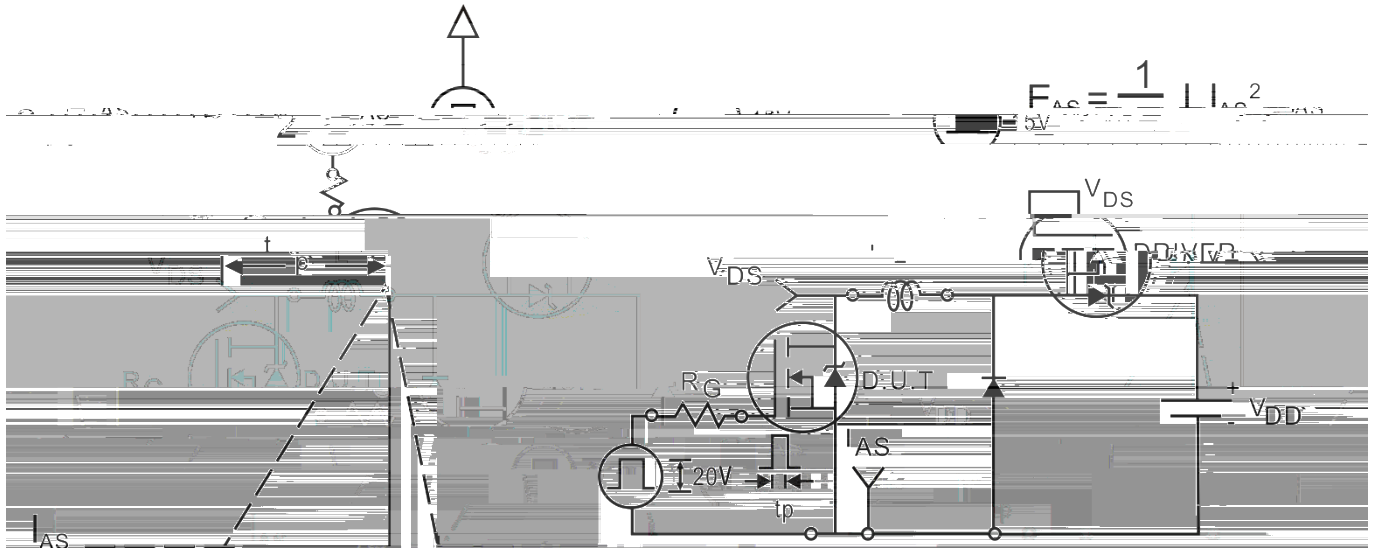
Typical Operating Characteristics(Cont.)

Figure 7: On-Resistance vs. Temperature

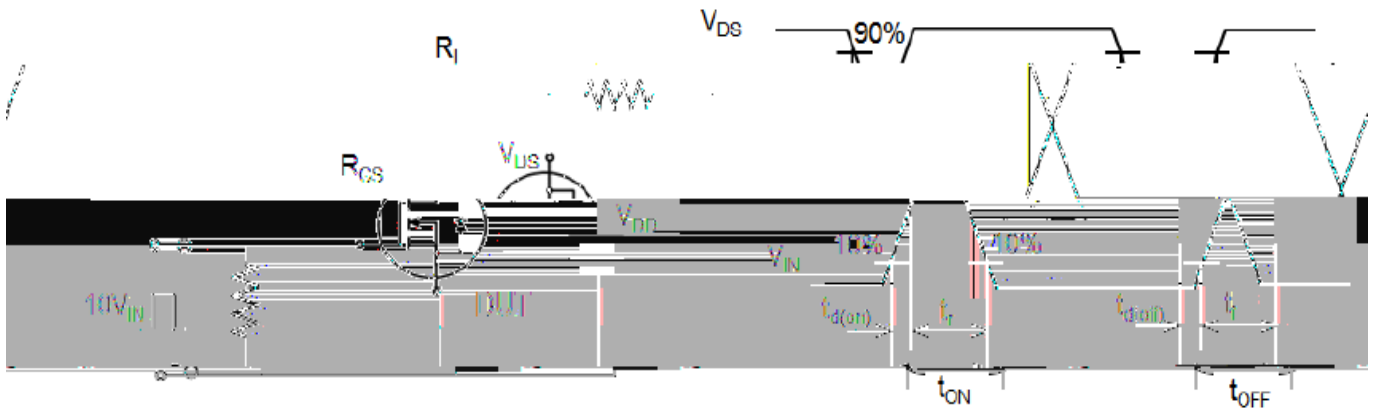
Figure 8: Source-Drain Diode Forward

Figure 9: Capacitance Characteristics

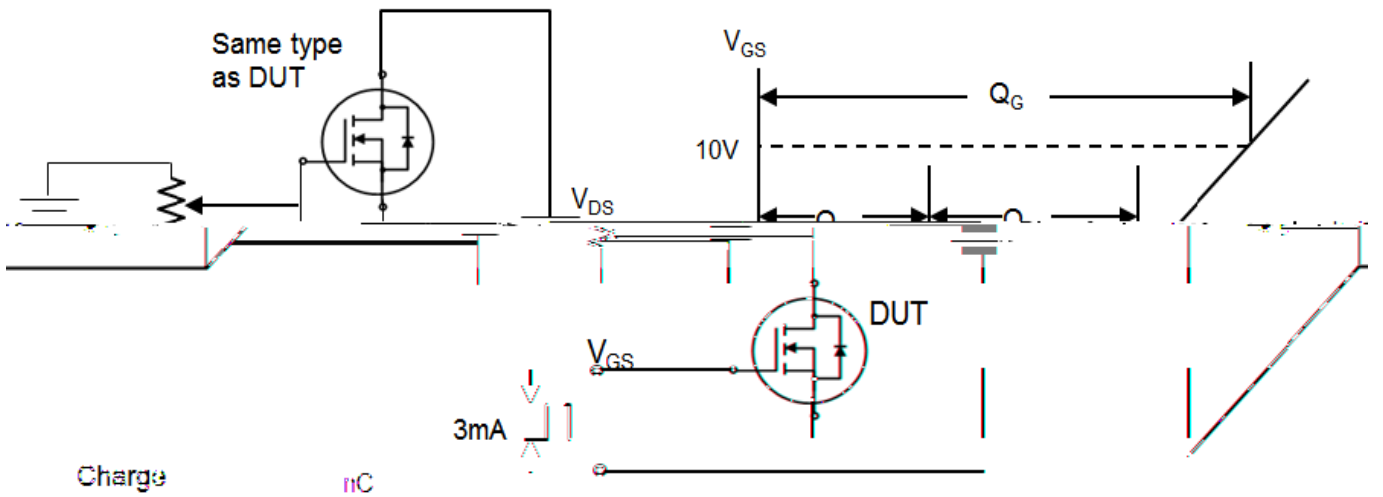
Avalanche Test Circuit



Switching Time Test Circuit



Gate Charge Test Circuit



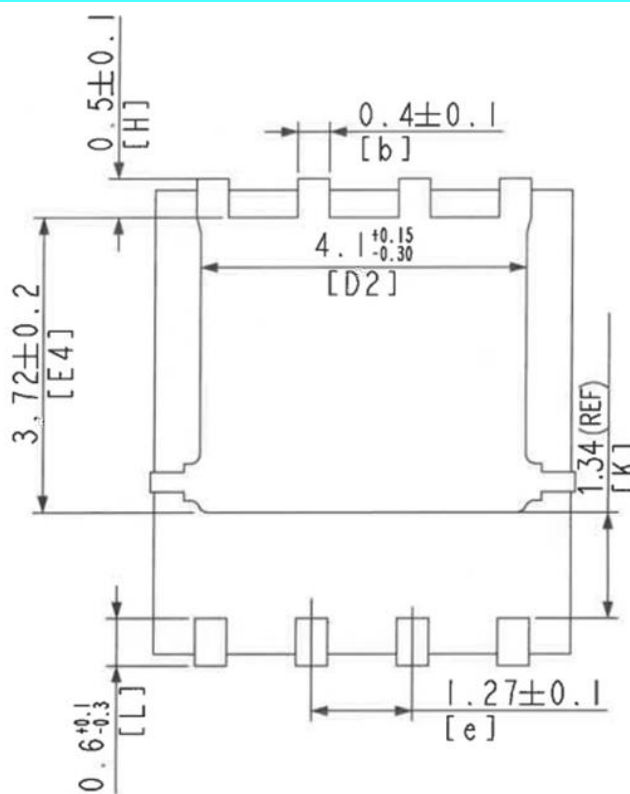
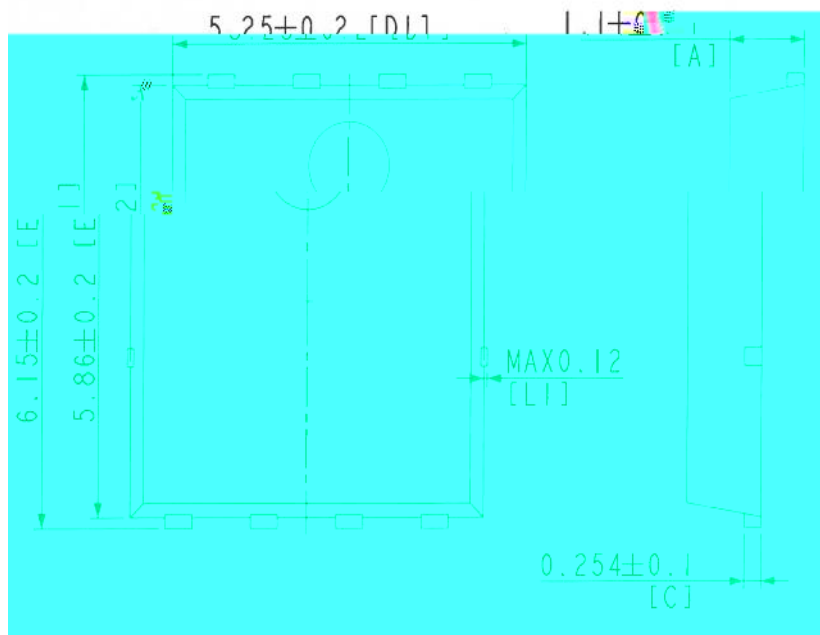
Device Per Unit

Package Type	Unit	Quantity
PDFN8L(5x6)	Reel	5000

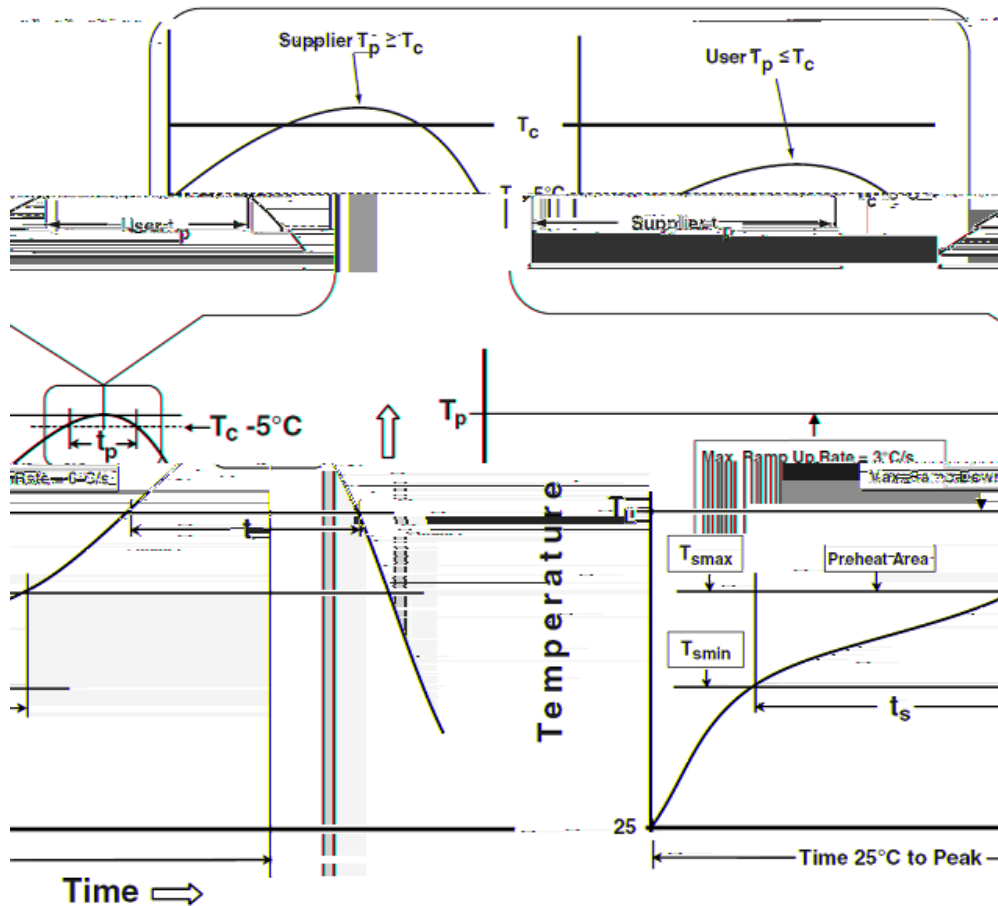
Package Information

PDFN8L(5x6)

(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 <350	Volume mm 350
2.5 mm	235 °C	220 °C
• P P	220 °C	220 °C

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

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

Customer Service

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