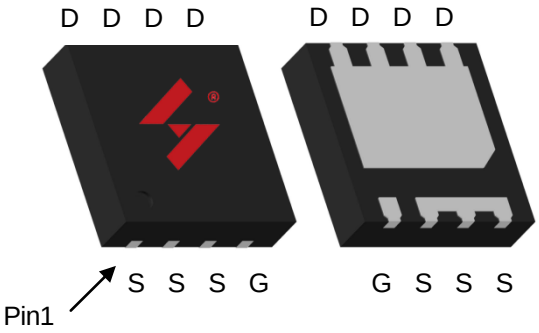
Single N-Channel Enhancement Mode MOSFET

Feature

- 30V/55A
  $R_{DS(ON)}$= 3.3m (typ.) @V_{GS} = 10V
  $R_{DS(ON)}$= 4.3 m (typ.) @V_{GS} = 4.5V
- 100% Avalanche Tested
- Reliable and Rugged
- Halogen Free and Green Devices Available (RoHS Compliant)

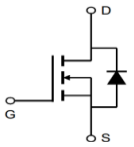
Pin Description



DFN3*3-8L

Applications

- Power Management for DC/DC
- Switching Application
- Battery Protection



Single N-Channel MOSFET

Ordering and Marking Information

C1 G032N03 XYMXXXXX	Package Code C1: DFN3*3-8L Date Code XYMXXXXX

Note:HUAYI lead-free products contain molding compounds/die attach materials and 100% matte tin plateTermi-Nationfinish;which are fully compliant with RoHS.HUAYI lead-free products meet or exceed the lead-Free require-ments 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 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 pr-oduct and/or to this document at any time without notice.

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	℃
T_{STG}	Storage Temperature Range		-55 to 175	℃
I_S	Source Current-Continuous(Body Diode)	Tc=25°C	55	A
Mounted on Large Heat Sink				
I_{DM}	Pulsed Drain Current *	Tc=25°C	220	A
I_D	Continuous Drain Current	Tc=25°C	55	A
		[redacted]	38.8	A
P_D	Maximum Power Dissipation	Tc=25°C	23	W

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

Symbol	Parameter	Test Conditions	HYG032N03LR1			Unit
			Min	Typ.	Max	
Dynamic Characteristics						
R_G	Gate Resistance	V_{GS}=0V,V_{DS}=0V, Frequency=1.0MHz	-	2	-	Ω
C_{iss}	Input Capacitance	V_{GS}=0V, V_{DS}=25V, Frequency=1.0MHz	-	2872	-	pF
C_{oss}	Output Capacitance		-	332	-	
C_{rss}	Reverse Transfer Capacitance		-	277	-	
$t_{d(ON)}$	Turn-on Delay Time	V_{DD}=15V,R_G=4 I_{DS}=20A,V_{GS}=10V	-	11	-	ns
T_r	Turn-on Rise Time		-	50	-	
$t_{d(OFF)}$	Turn-off Delay Time		-	52	-	
T_f	Turn-off Fall Time		-	57	-	
Gate Charge Characteristics						
Q_g(10V)	Total Gate Charge	V_{DS} =24V, V_{GS}=10V, I_D=20A		61		nC
Q_g(4.5V)	Total Gate Charge		-	32	-	

Typical Operating Characteristics

Figure 1: Power Dissipation

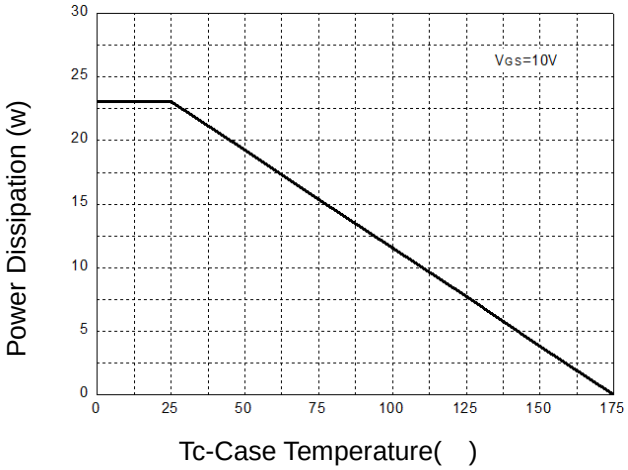


Figure 2: Drain Current

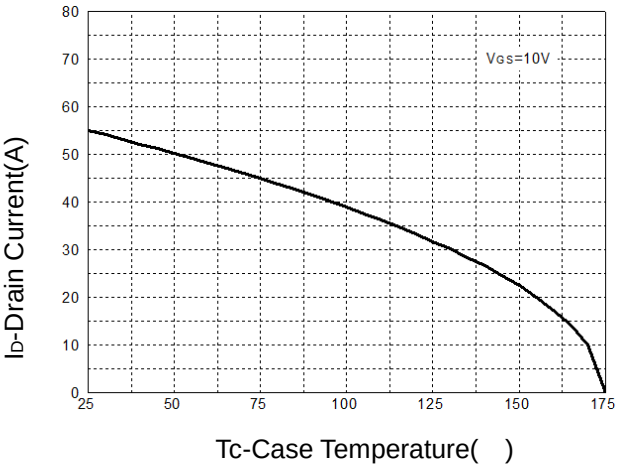


Figure 3: Safe Operation Area

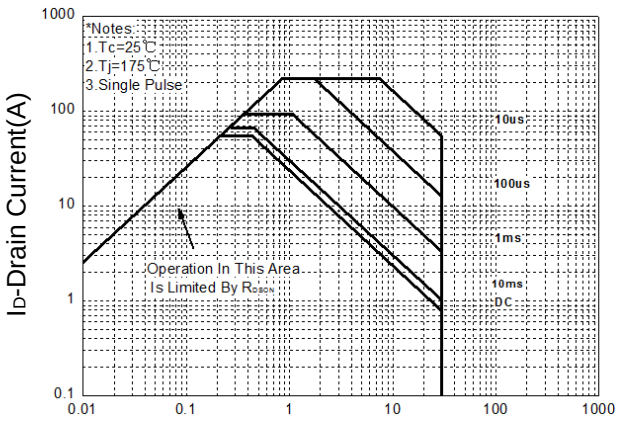


Figure 4: Thermal Transient Impedance

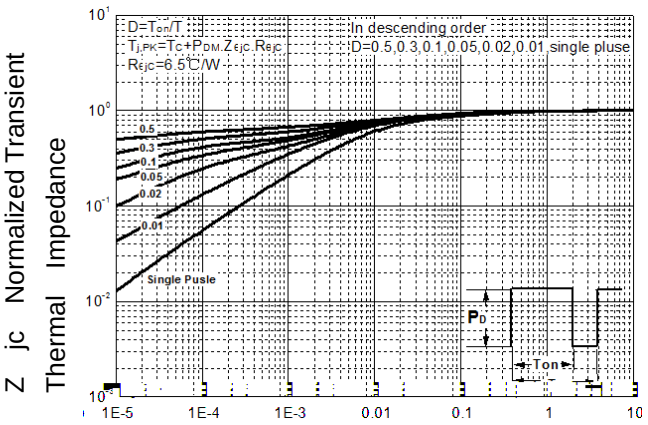


Figure 5: Output Characteristics

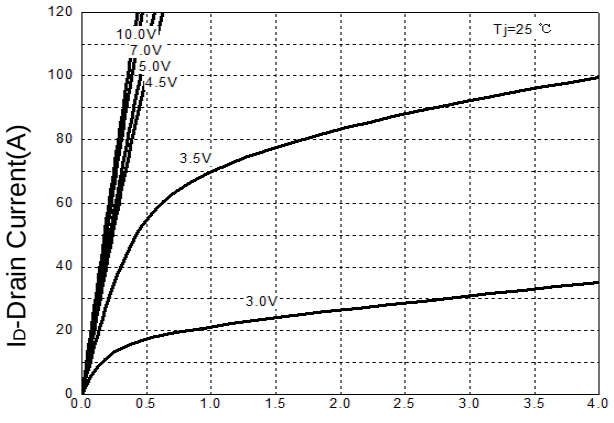
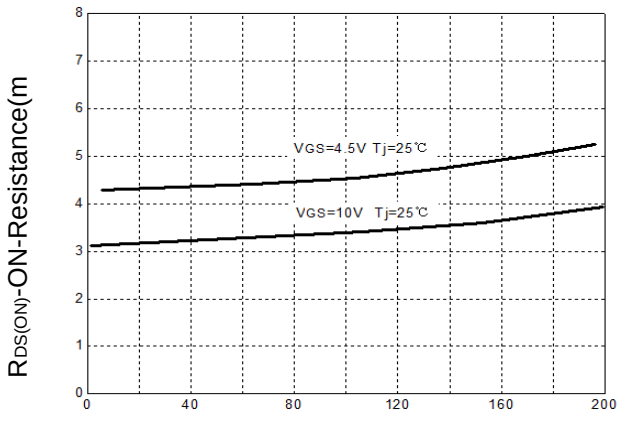
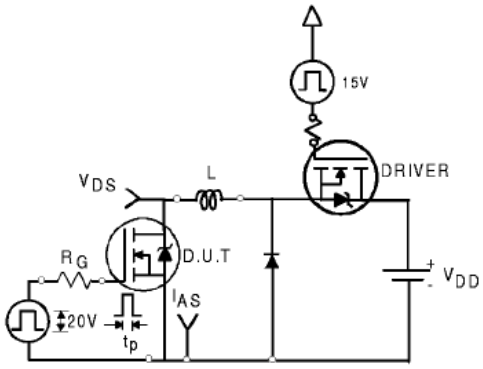


Figure 6: Drain-Source On Resistance

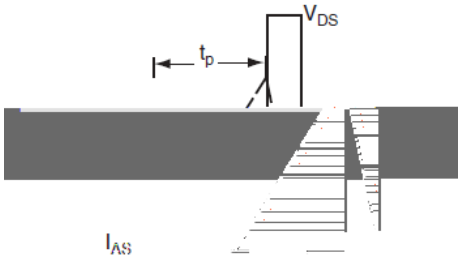


HYG032N03LR1C1

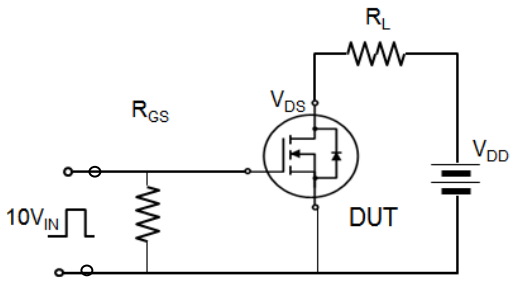
Avalanche Test Circuit

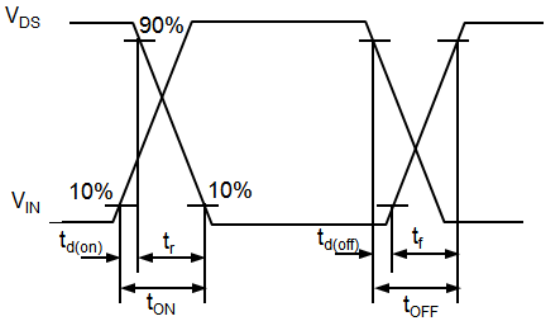


$$E_{AS} = \frac{1}{2} L I_{AS}^2$$

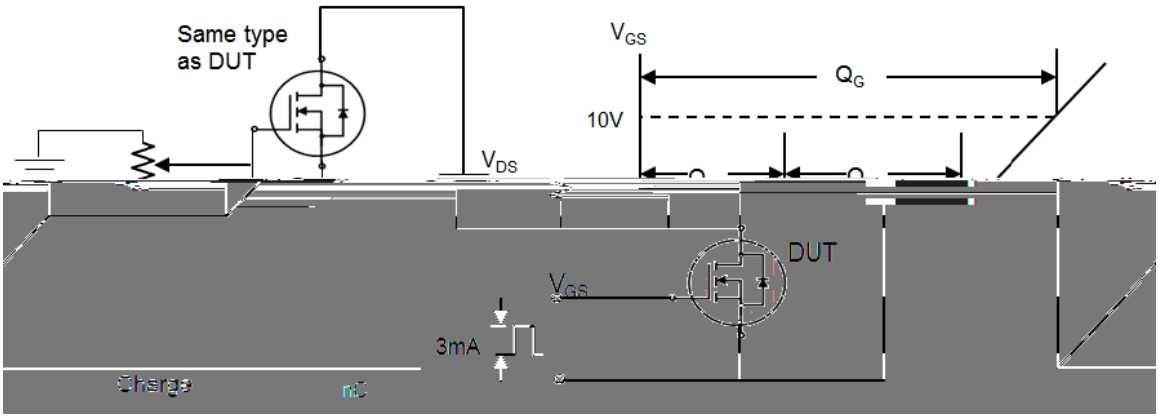


Switching Time Test Circuit





Gate Charge Test Circuit

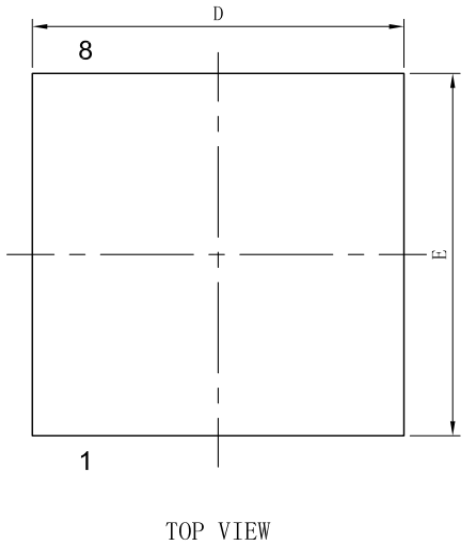


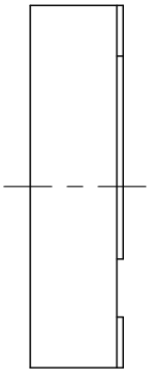
Device Per Unit

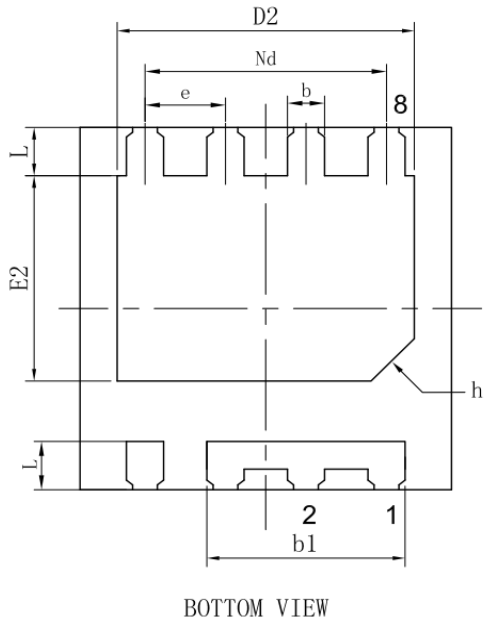
Package Type	Unit	Quantity
DFN3*3-8L	Reel	3000

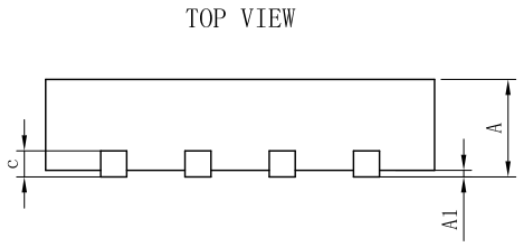
Package Information

DFN3*3-8L



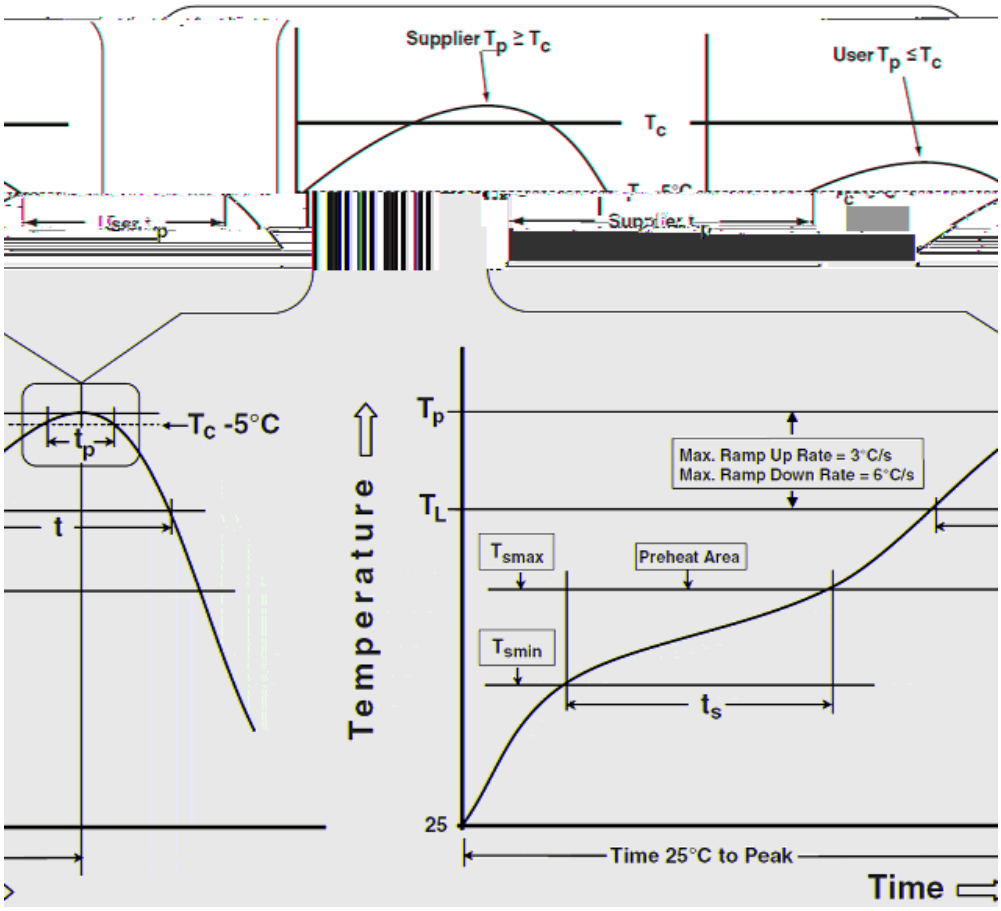






SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	0.70	0.75	0.80
A1	0.00	0.02	0.05
b	0.25	0.30	0.35
b1	1.55	1.60	165.00
c	0.19	0.20	0.21
D	2.90	3.00	3.10
D2	2.30	2.40	2.50
Nd	1.90	1.95	2.00
E	2.90	3.00	3.10
E2	1.60	1.70	1.80
e	0.65bsc		
L	0.35	0.40	0.45
h	0.30	0.35	0.40

Classification Profile



Classification Reflow Profiles

Profile Feature	Sn-Pb Eutectic Assembly	Pb-Free Assembly
Preheat & Soak Temperature min (T_{smin}) Temperature max (T_{smax}) Time (Tsmin to Tsmax) (t_s)	100 °C 150 °C 60-120 seconds	150 °C 200 °C 60-120 seconds
Average ramp-up rate ($T_{smax}$to T_P)	3 °C/second max.	3°C/second max.
Liquidous temperature (T_L) Time at liquidous (t_L)	183 °C 60-150 seconds	217 °C 60-150 seconds
Peak package body Temperature (T_p)*	See Classification Temp in table 1	SeeClassification Tempin 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
	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	168/500/1000 Hrs, Bias @ 150°C
HTGB	JESD-22, A108	168 /500/1000 Hrs, V_{gs}100% @ 150°C
PCT	JESD-22, A102	96 Hrs, 100%RH, 2atm, 121°C
TCT	JESD-22, A104	500 Cycles, -55°C~150°C

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