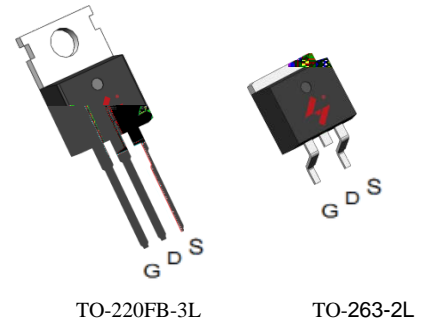


## N-Channel Enhancement Mode MOSFET

### Feature

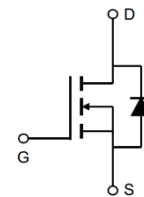
- 80V/120A  
 $R_{DS(ON)} = 7m$  (typ.) @  $V_{GS} = 10V$
- 100% Avalanche Tested
- Reliable and Rugged
- Lead-Free and Green Devices Available  
 (RoHS Compliant)

### Pin Description





### Applications

- Switching application
- Power management for inverter system



N-Channel MOSFET

### Ordering and Marking Information

 <b>P</b> <b>HY3208</b> XYMXXXXXX	 <b>B</b> <b>HY3208</b> XYMXXXXXX	Package Code P : TO-220FB-3L      B: TO-263-2L  Date Code XYMXXXXXX
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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 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 time without notice.

## Absolute Maximum Ratings

Symbol	Parameter		Rating	Unit
<b>Common Ratings</b> (T <sub>c</sub> =25°C Unless Otherwise Noted)				
V <sub>DSS</sub>	Drain-Source Voltage		80	V
V <sub>GSS</sub>	Gate-Source Voltage		±25	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)	T <sub>c</sub> =25°C	120	A
<b>Mounted on Large Heat Sink</b>				
I <sub>DM</sub>	Pulsed Drain Current *	T <sub>c</sub> =25°C	340	A
I <sub>D</sub>	Continuous Drain Current	T <sub>c</sub> =25°C	120	A

T

## Electrical Characteristics (Cont.) (T<sub>c</sub> =25°C Unless Otherwise Noted)

Symbol	Parameter	Test Conditions	HY3208NA3			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	-	1.7	-	
C <sub>iss</sub>	Input Capacitance	V <sub>GS</sub> =0V, V <sub>DS</sub> = 25V, Frequency=1.0MHz	-	3150	-	pF
C <sub>oss</sub>	Output Capacitance		-	460	-	
C <sub>rss</sub>	Reverse Transfer Capacitance		-	205	-	
t <sub>d(ON)</sub>	Turn-on Delay Time		-	18	-	

T<sub>mi</sub>T<sub>J</sub> 2(s)-8 T<sub>c</sub> 0 T<sub>e</sub> f 12 0480.001 T<sub>w</sub> 0.325 0 T<sub>d</sub> [(on 6.4589(e)3V<sub>DD</sub>=24V, R<sub>GS</sub>=4

I<sub>DS</sub>= 20A, V<sub>GS</sub>= 10V

ns

## Typical Operating Characteristics

Figure 1: Power Dissipation

Figure 2: Drain Current

Tc-Case Temperature( )

Tc-Case Temperature( )

Figure 3: Safe Operation Area

Figure 4: Thermal Transient Impedance

V<sub>DS</sub>-Drain-Source Voltage(V)

Maximum Effective Transient Thermal Impedance, Junction-to-Case

Figure 5: Output Characteristics  $I_{csc} = 0$ ,  $T_w = 3.27$ ,  $T_0 = 0.004$ ,  $T_c = -0.004$ ,  $T_w = 0.26$ ,  $T_7$

R<sub>DS(ON)</sub>-ON-Resistance(m )

## Typical Operating Characteristics(Cont.)

Figure 7: On-Resistance vs. Temperature

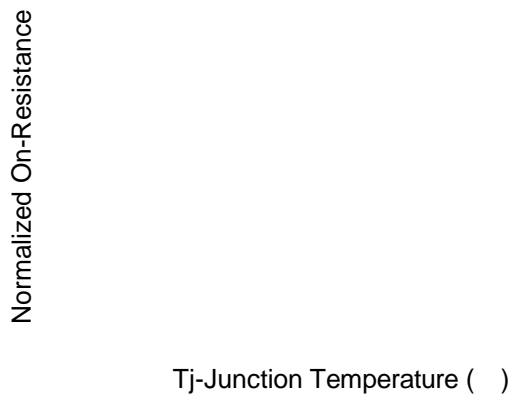


Figure 8: Source-Drain Diode Forward

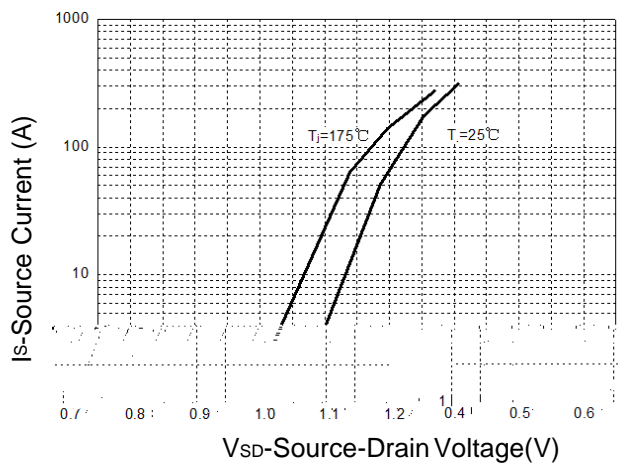


Figure 9: Capacitance Characteristics

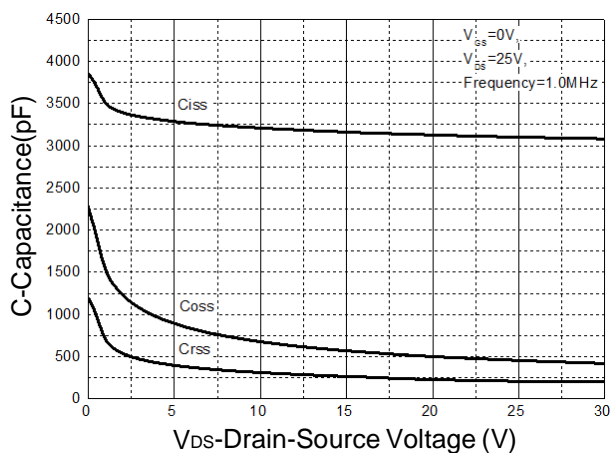
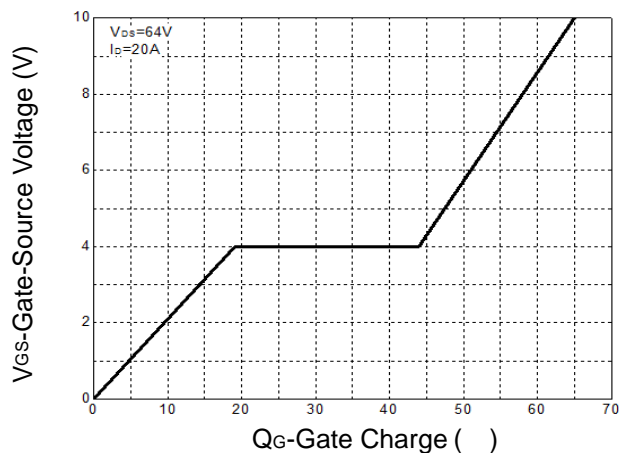
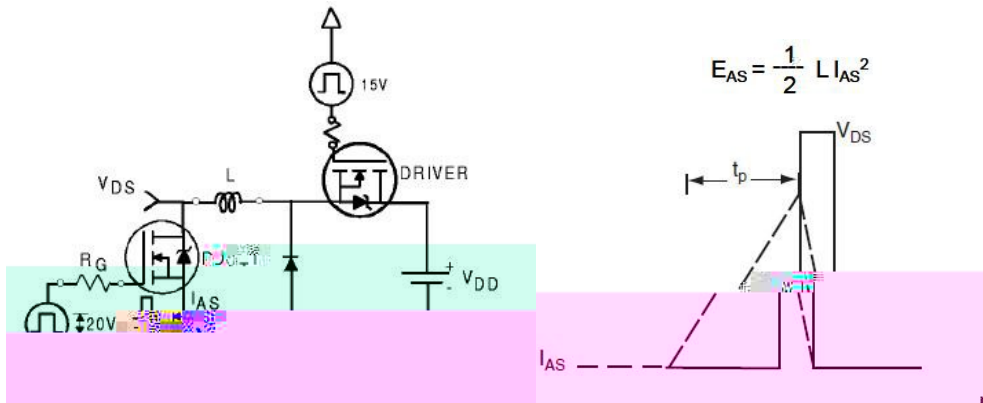


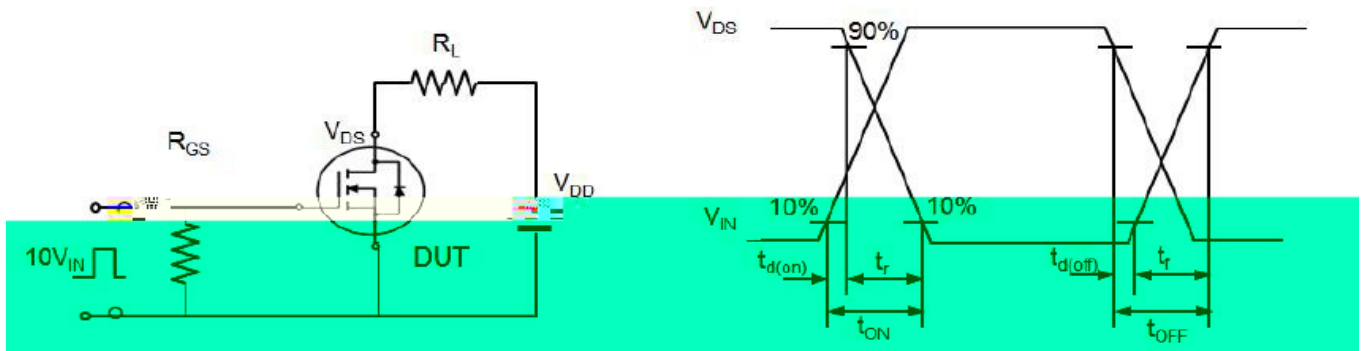
Figure 10: Gate Charge Characteristics



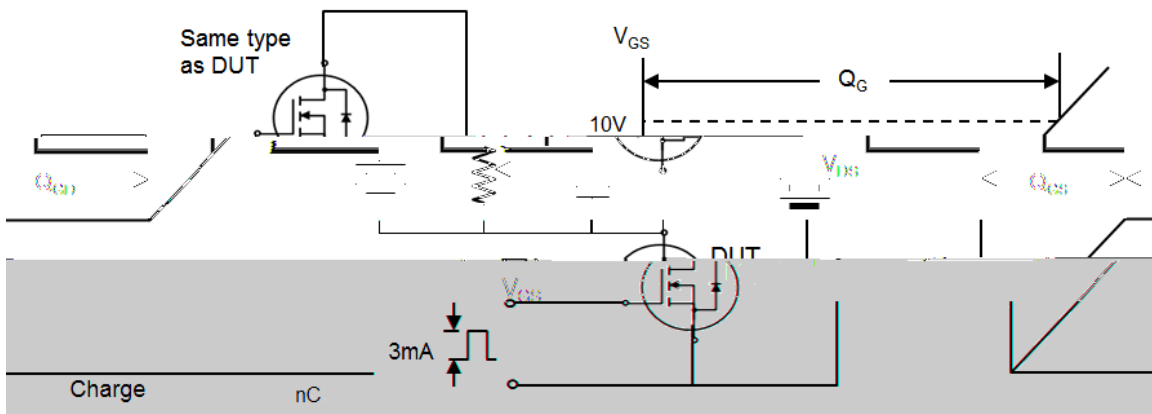
**Avalanche Test Circuit**



**Switching Time Test Circuit**



**Gate Charge Test Circuit**

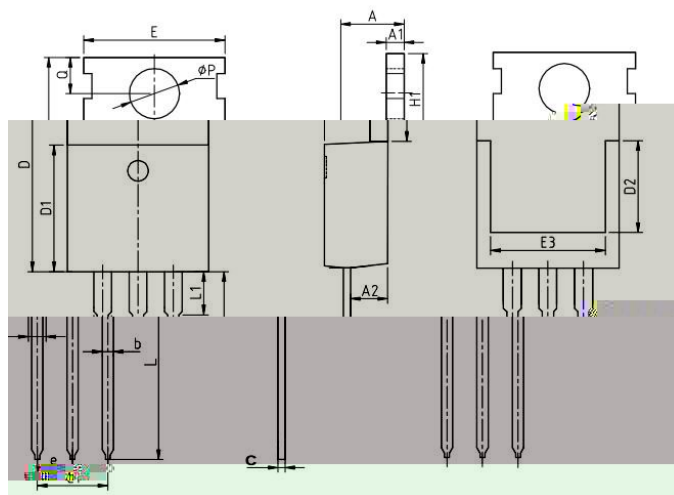


## Device Per Unit

Package Type	Unit	Quantity
TO-220FB-3L	Tube	50

## Package Information

### TO-220FB-3L



#### COMMON DIMENSIONS

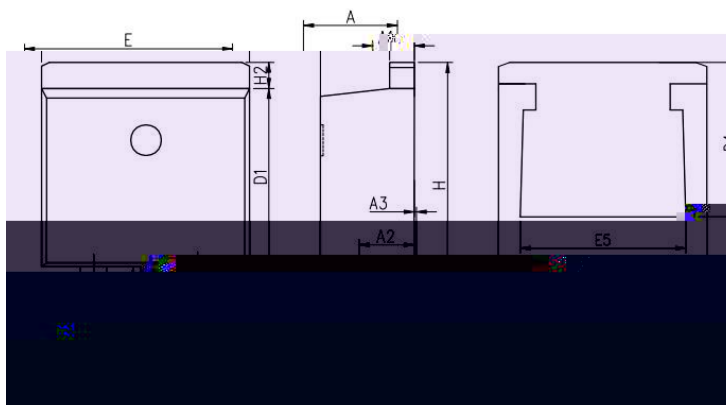
SYMBOL	mm		
	MIN	NOM	MAX
A	4.37	4.57	4.77
A1	1.25	1.30	1.45
A2	2.20	2.40	2.60
b	0.70	0.80	0.95
b2	1.17	1.27	1.47
c	0.40	0.50	0.65
D	15.10	15.60	16.10
D1	8.80	9.10	9.40
D2	5.50	-	-
E	9.70	10.00	10.30
E3	7.00	-	-
e	2.54 BSC		
e1	5.08 BSC		
H1	6.25	6.50	6.85
L	12.75	13.50	13.80
L1	-	3.10	3.40
P	3.40	3.60	3.80
Q	2.60	2.80	3.00

## Device Per Unit

Package Type	Unit	Quantity
TO-263-2L	Tube	50
TO-263-2L	Reel	800

## Package Information

### TO-263-2L

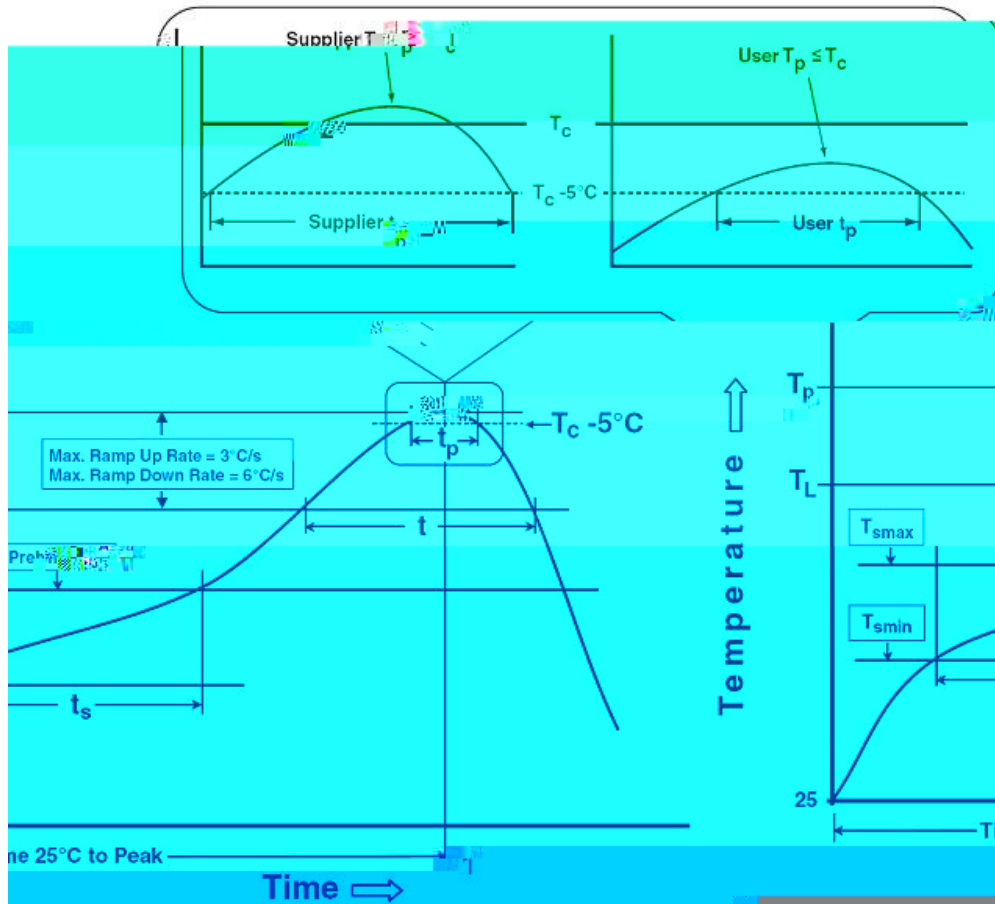


COMMON DIMENSIONS

SYMBOL	mm		
	MIN	NOM	MAX
A	4.37	4.57	4.77
A1	1.22	1.27	1.42
A2	2.49	2.69	2.89
A3	0	0.13	0.25
b	0.7	0.81	0.96
b1	1.17	1.27	1.47
c	0.3	0.38	0.53
D1	8.5	8.7	8.9
D4	6.6	-	-
E	9.86	10.16	10.36
E5	7.06	-	-
e	2.54 BSC		
H	14.7	15.1	15.5
H2	1.07	1.27	1.47
L	2	2.3	2.6
L1	1.4	1.55	1.7
L4	0.25 BSC		
	0°	5°	9°



## 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	
Temperature max ( $T_{smax}$ )	150 °C	
Time ( $T_{smin}$ to $T_{smax}$ ) ( $t_s$ )	60	

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

Package Thickness	Volume mm <350	Volume mm 350
2.5 mm	235 °C	220 °C
2.5 mm	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