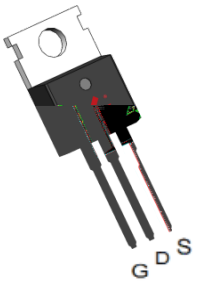
N-Channel Enhancement Mode MOSFET

Feature

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

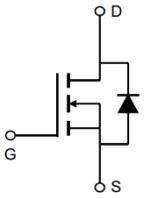
Pin Description



TO-220FB-3L TO-263-2L

Applications

- Switching application
- Power management for inverter system



N-Channel MOSFET

Ordering and Marking Information

P HY3208 XYMXXXXXX B HY3208 XYMXXXXXX	Package Code P :TO-220FB-3L B:TO-263-2L Date Code XYMXXXXXX

Note: HUAYI lead-free products contain molding compounds/die attach materials and 100% matte tin plate Termi-Nation finish;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		80	V
V_{GSS}	Gate-Source Voltage		±25	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	120	A
Mounted on Large Heat Sink				
I_{DM}	Pulsed Drain Current *	Tc=25°C	340	A
I_D	Continuous Drain Current	Tc=25°C	120	A

Max(s)Drain-Current Flow /TT2 erTc 0.002 Tw 8.0 re733 >>BDC 6.9.96 518.44 555 Tw 1.C 4(ent)]TD6(C)

A A

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

Symbol	Parameter	Test Conditions	HY3208NA3			Unit
			Min	Typ.	Max	
Dynamic Characteristics						
R_G	Gate Resistance	V_{GS}=0V,V_{DS}=0V,F=1MHz	-	1.7	-	
C_{iss}	Input Capacitance	V_{GS}=0V,	-	3150	-	pF
C_{oss}	Output Capacitance	V_{DS}= 25V,	-	460	-	
C_{rss}	Reverse Transfer Capacitance	Frequency=1.0MHz	-	205	-	
$t_{d(ON)}$	Turn-on Delay Time	V_{DD}= 40V,R_G=4Ω, I_{DS}= 20A,V_{GS}= 10V	-	18	-	ns

TrniTJ 2(s)-8 Tc 0 Te f 12 0480.001 Tw 0.325 0 Td [(on 6.4589(el)3.1(ap)-2.4(s)2.7(e)-4.1(d)) Tw 3.819 0 T 9.96 6 -0.029 Tc 0.029 Tw 0.157 0 Td [(T)-32.5(im)-39.4(e)]c 044 403.32

Typical Operating Characteristics

Figure 1: Power Dissipation

Tc-Case Temperature( )

Figure 2: Drain Current

I_D-Drain Current(A)

Tc-Case Temperature( )

Figure 3: Safe Operation Area

V_{DS}-Drain-Source Voltage(V)

Figure 4: Thermal Transient Impedance

Z jc Normalized Transient Thermal Impedance

Figure 5: Output Characteristicsc 0 Tw 3.27 0 T0.004 Tc -0.004 T 0.3 0 Td [(71BDC E1j EMC /S

$R_{DS(ON)}$-ON-Resistance(mΩ)

Typical Operating Characteristics(Cont.)

Figure 7: On-Resistance vs. Temperature

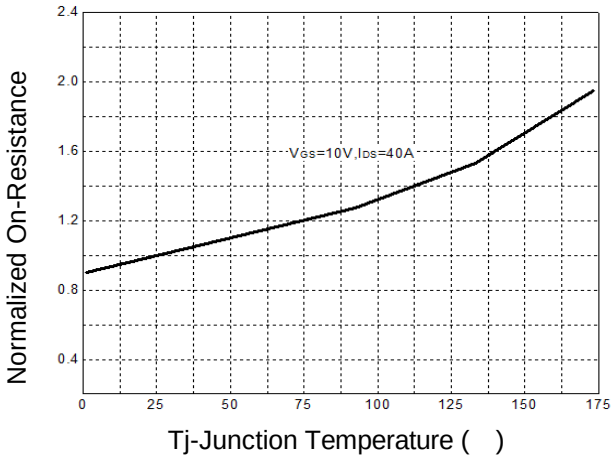


Figure 8: Source-Drain Diode Forward

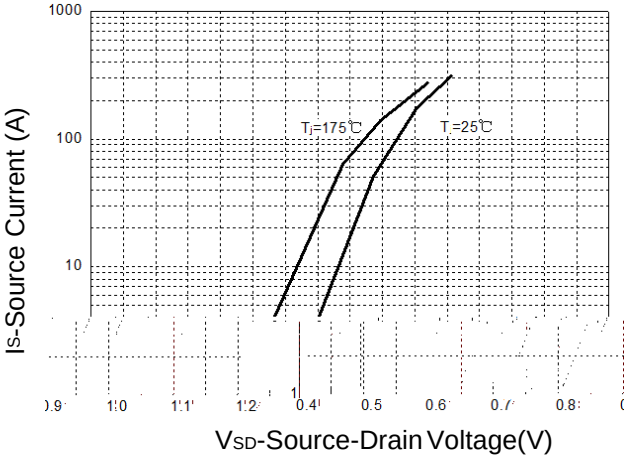


Figure 9: Capacitance Characteristics

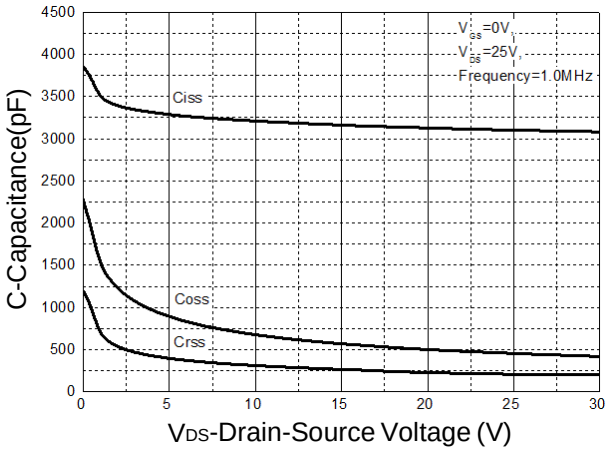
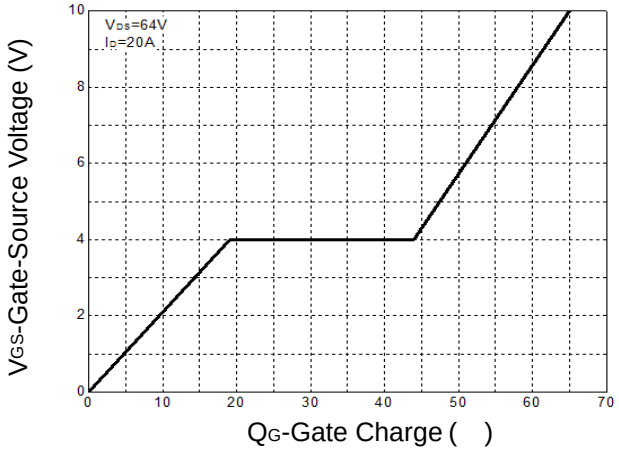
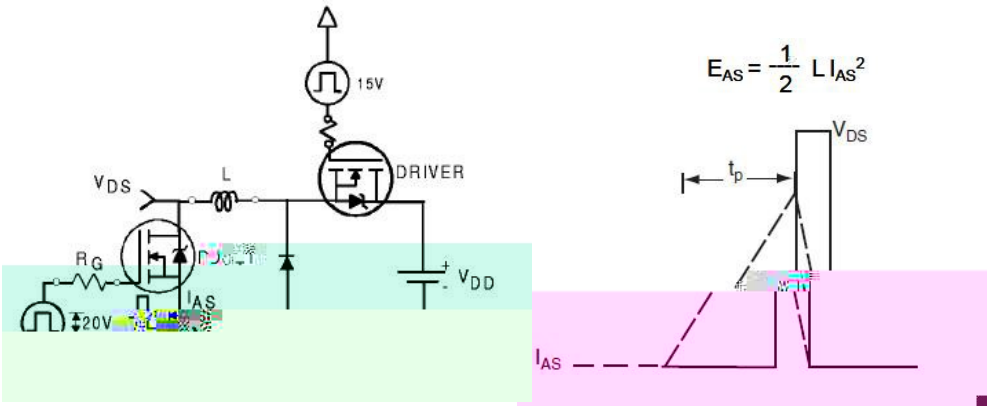


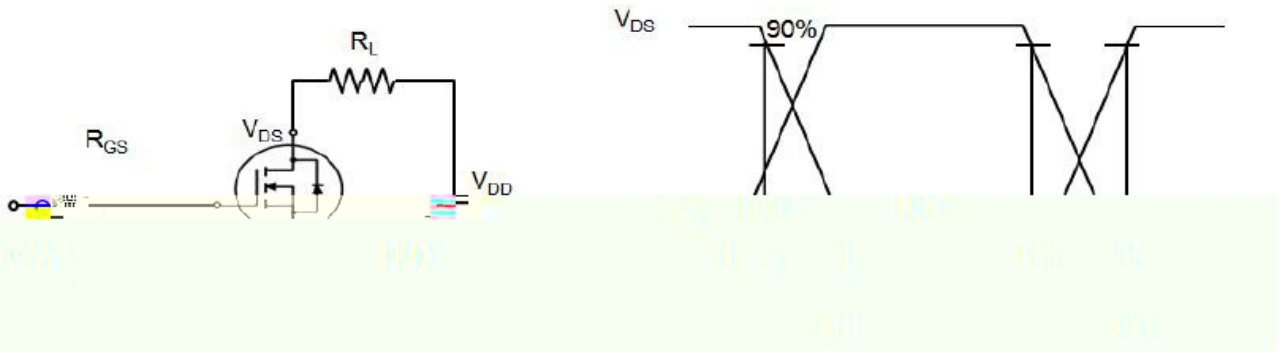
Figure 10: Gate Charge Characteristics



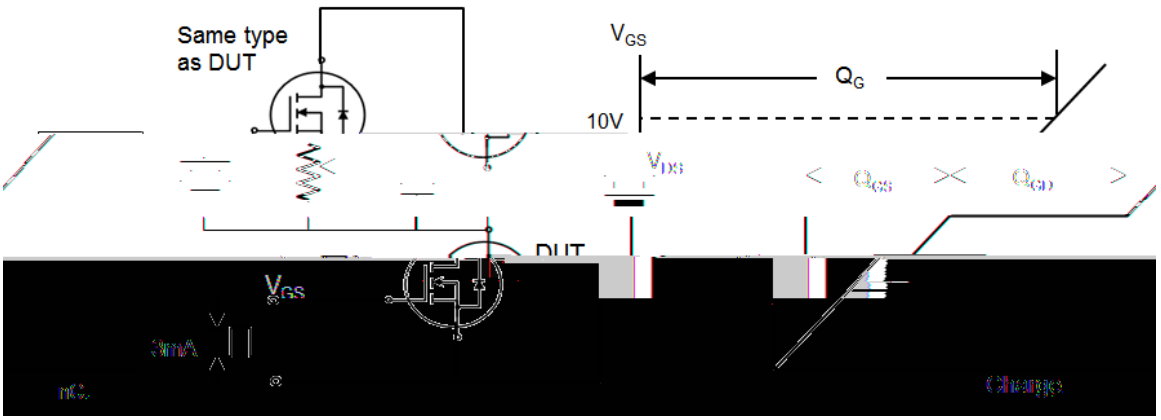
Avalanche Test Circuit



Switching Time Test Circuit



Gate Charge Test Circuit

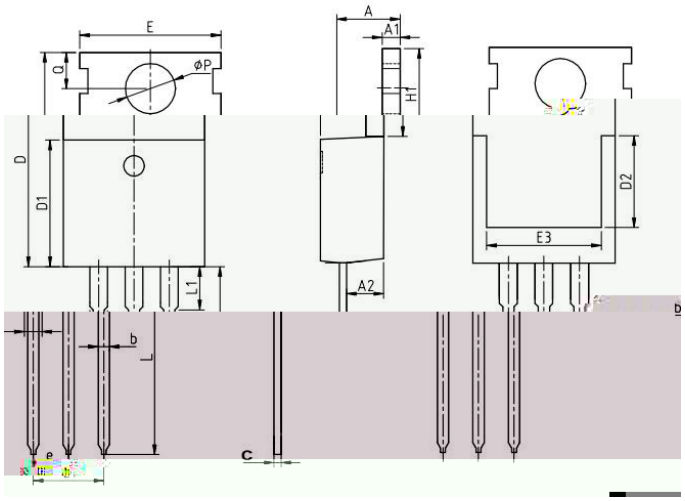


Device Per Unit

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

Package Information

TO-220FB-3L



COMMON DIMENSIONS

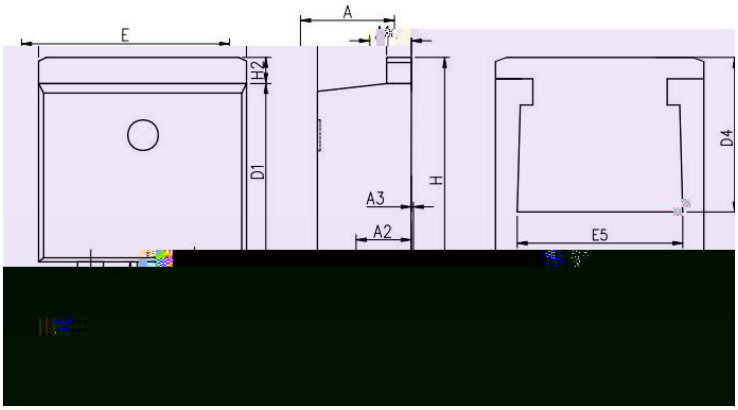
SYMBOL	mm		
	MIN	NOM	MAX
A	4.37	4.57	4.77
A1	1.25	1.30	1.45
A2	2.20	2.40	2.60
b	0.70	0.80	0.95
b2	1.17	1.27	1.47
c	0.40	0.50	0.65
D	15.10	15.60	16.10
D1	8.80	9.10	9.40
D2	5.50	-	-
E	9.70	10.00	10.30
E3	7.00	-	-
e	2.54 BSC		
e1	5.08 BSC		
H1	6.25	6.50	6.85
L	12.75	13.50	13.80
L1	-	3.10	3.40
ΦP	3.40	3.60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

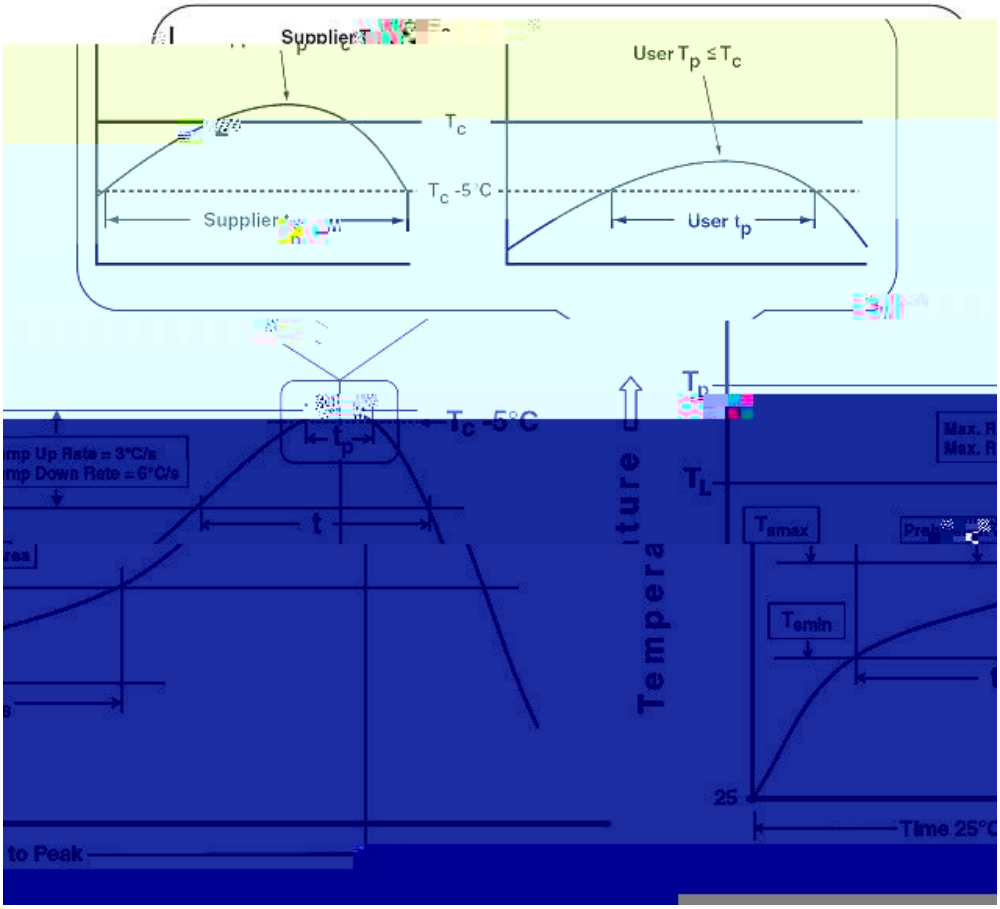
TO-263-2L



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		
θ	0°	5°	9°

Classification Profile



Classification Reflow Profiles

Profile Feature	Sn-Pb Eutectic Assembly	Pb-Free Assembly
Preheat & Soak		
Temperature min (T_{smin})	100 °C	
Temperature max (T_{smax})	150 °C	
Time (Tsmin to Tsmax) (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 -22, A108 1684 4