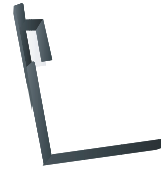


**N-Channel Enhancement Mode MOSFET**

**Feature**

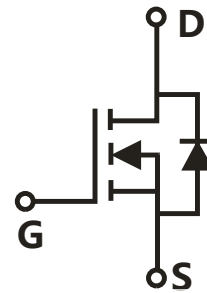
- 150V/195A
- $R_{DS(ON)} = 4.4\ m\ (\text{typ.}) @ V_{GS} = 10V$
- 100% Avalanche Tested
- 100% DVDS
- Reliable and Rugged
- Halogen Free and Green Devices Available
- (RoHS Compliant)

**Pi Descriptio**



**Applicatio s**

- Switching application
- Power management for inverter systems
- Battery management



Single N-Channel MOSFET

**Orderi g a d arki g I formatio**

 <p><b>W</b> <b>HYG045N15</b> <b>XYMXXXXXX</b></p>	<p>Package Code W:TO-247A-3L</p> <p>Date Code XYMXXXXXX</p>
-----------------------------------------------------------------------------------------------------------------------------------------------	---------------------------------------------------------------------

Note: HUAYI halogen free products contain molding compounds 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 time without notice.

**Absolute Maximum Ratings**

Symbol	Parameter	Rating	Unit	
<b>Common Ratings (Tc=25°C Unless Otherwise Noted)</b>				
V <sub>DSS</sub>	Drain-Source Voltage	150	V	
V <sub>GSS</sub>	Gate-Source Voltage	20	V	
T <sub>J</sub>	Junction Temperature Range	-55 to 175	°C	
T <sub>STG</sub>	Storage Temperature Range		°C	
I <sub>S</sub>	Source Current-Continuous(Body Diode)	Tc=25°C	195	A
<b>Recommended Large Heat Sink</b>				
I <sub>DM</sub>	Pulsed Drain Current *	Tc=25°C	700	A
I <sub>D</sub>	Continuous Drain Current	Tc=25°C	195	A
		Tc=100°C	138	A
P <sub>D</sub>	Maximum Power Dissipation	Tc=25°C	441	W
		Tc=100°C	220	W
R <sub>θJC</sub>	Thermal Resistance, Junction-to-Case		0.34	°C/W
R <sub>θJA</sub>	Thermal Resistance, Junction-to-Ambient **		40	°C/W
E <sub>AS</sub>	Single Pulsed-Avalanche Energy ***	L=0.3mH	1305	mJ

Note: \* Repetitive rating pulse width limited by max.junction temperature.  
 \*\* Surface mounted on 1in2 FR-4 board.  
 \*\*\* Limited by T<sub>Jmax</sub>, starting T<sub>J</sub>=25°C, L = 0.3mH, R<sub>C</sub>= 25Ω, V<sub>GS</sub>=10V.

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

Symbol	Parameter	Test Conditions	H G045 15 1			Unit
			Min	Typ.	Max	
<b>Static Characteristics</b>						
BV <sub>DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>DS</sub> =250μA	150	-	-	V
I <sub>DSS</sub>	Drain-to-Source Leakage Current	V <sub>DS</sub> =150V, V <sub>GS</sub> =0V	-	-	1	μA
		T <sub>J</sub> =125°C	-	-	50	μA
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>DS</sub> =250μA	2.0	3.0	4.0	V
I <sub>GSS</sub>	Gate-Source Leakage Current	V <sub>GS</sub> = 20V, V <sub>DS</sub> =0V	-	-	±100	nA
R <sub>DS(ON)</sub>	Drain-Source On-State Resistance	V <sub>GS</sub> =10V, I <sub>DS</sub> =50A	-	4.4	5.5	mΩ
<b>Diode Characteristics</b>						
V <sub>SD</sub>	Diode Forward Voltage	I <sub>SD</sub> =50A, V <sub>GS</sub> =0V	-	0.85	1.3	V
t <sub>rr</sub>	Reverse Recovery Time	I <sub>SD</sub> =50A, dI <sub>SD</sub> /dt=100A/μs	-	112.7	-	ns
Q <sub>rr</sub>	Reverse Recovery Charge		-	461.6	-	nC

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

ymbol	Parameter	est Co ditio s	H G045 15 1			U it
			i	yp.	ax	
<b>Dy amic Characteristics</b>						
R <sub>G</sub>	Gate Resistance	V <sub>GS</sub> =0V, V <sub>DS</sub> =0V, F=100KHz	-	2.3	-	Ω
C <sub>iss</sub>	Input Capacitance	V <sub>GS</sub> =0V, V <sub>DS</sub> =25V, Frequency=500KHz	-	7438	-	pF
C <sub>oss</sub>	Output Capacitance					
C <sub>rss</sub>	Reverse Transfer Capacitance					
t <sub>d(ON)</sub>	Turn-on Delay Time	V <sub>DD</sub> =75V, R <sub>G</sub> =2.5 , I <sub>DS</sub> =50A, V <sub>GS</sub> =10V	-	32.8	-	ns
T <sub>r</sub>	Turn-on Rise Time					
t <sub>d(OFF)</sub>	Turn-off Delay Time					
T <sub>f</sub>	Turn-off Fall Time					
<b>Gate Charge Characteristics</b>						
Q <sub>g</sub>	Total Gate Charge(V <sub>GS</sub> =10V)	V <sub>GS</sub> =10V, V <sub>DS</sub> =75V, I <sub>DS</sub> =50A	-	94.6	-	nC
Q <sub>gs</sub>	Gate-Source Charge					
Q <sub>gd</sub>	Gate-Drain Charge					
V <sub>plateau</sub>	Gate plateau voltage		-	5.01	-	V

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

Typical Operating Characteristics

Figure 1: Power Dissipation

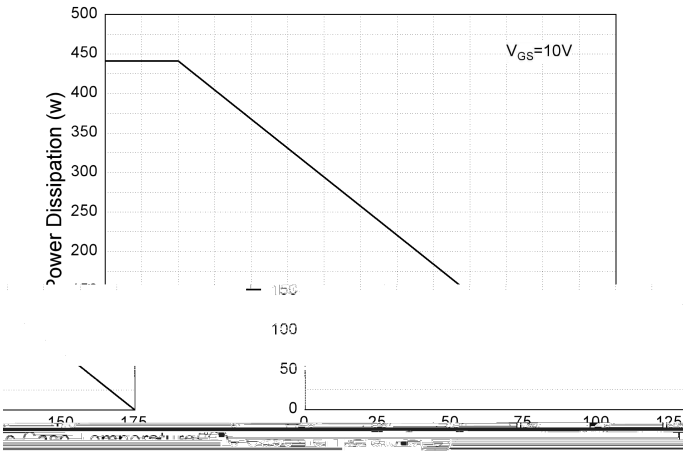


Figure 2: Drain Current

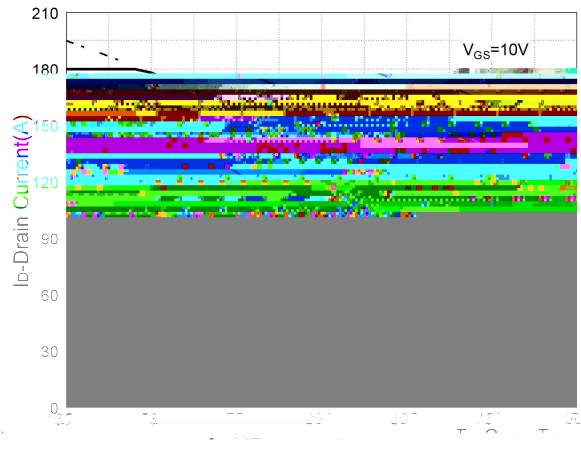


Figure 3: Safe Operating Area

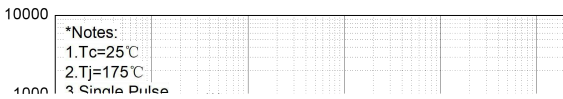


Figure 4: Thermal Resistance



Figure 5: Output Characteristics

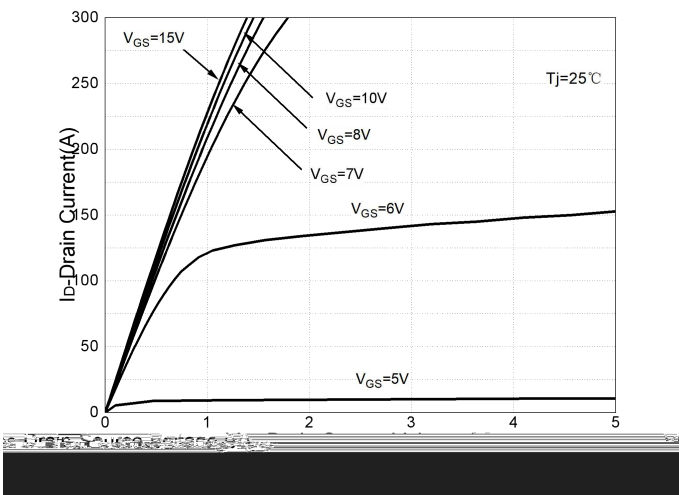


Figure 6: Drain-Source Resistance

Typical Operating Characteristics(Co t.)

Figure 7: On-Resistance vs. Temperature

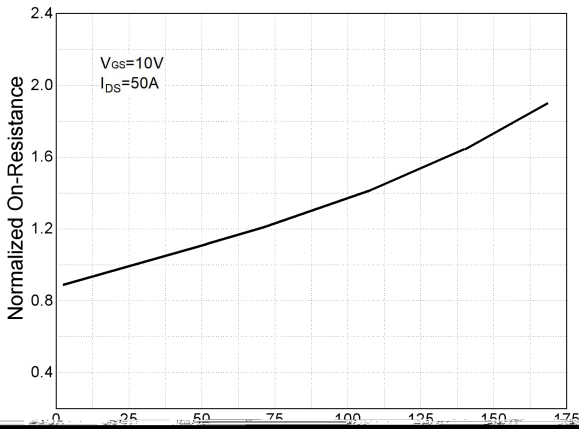


Figure 8: Source-Drain Diode Forward

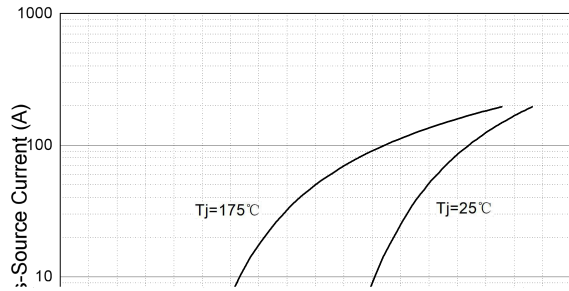


Figure 9: Capacitance Characteristics

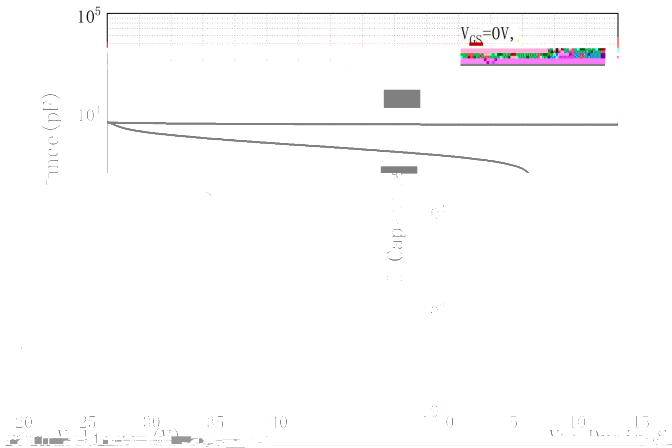
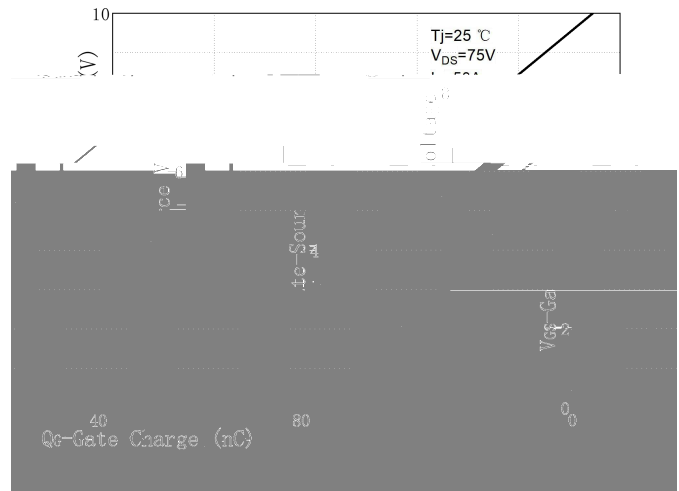


Figure 10: Gate Charge Characteristics



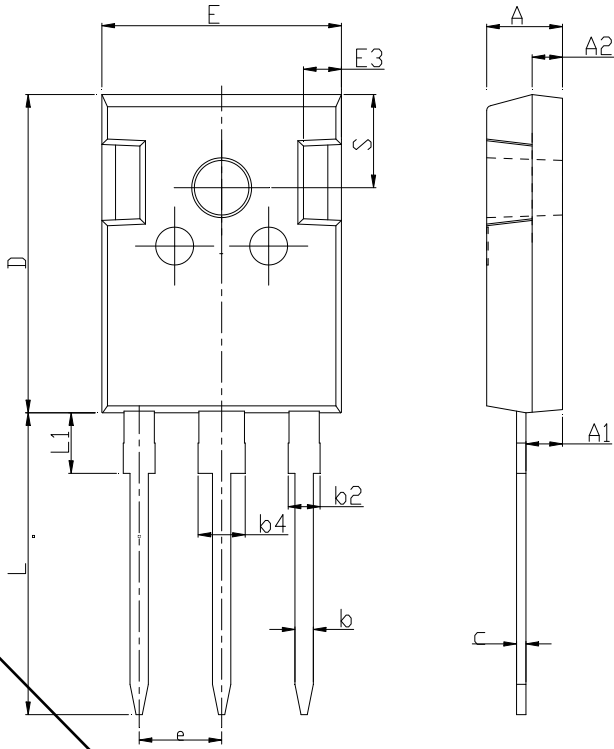


Device Per U it

Package ype	U it	Qua tity
TO-247A-3L	Tube	30

Package I formatio

O-247A-3L



COMMON DIMENSIONS

SYMBOL	mm		
	MIN	NOM	MAX
A	4.80	5.00	5.20
A1	2.21	2.41	2.59
A2	1.85	2.00	2.15
b	1.11	1.21	1.36
b2	1.91	2.01	2.21
b4	2.91	3.01	3.21
c	0.51	0.61	0.75
D	20.70	21.00	21.30
D1	16.25	16.55	16.85
E	15.50	15.80	16.10
E1	13.00	13.30	13.60
E2	4.80	5.00	5.20
E3	2.30	2.50	2.70
e	5.44BSC		
L	19.62	19.92	20.22
L1	-	-	4.30
P	3.40	3.60	3.80
P1	-	-	7.30
S	6.15BSC		

**H G04**



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 /500/1000 Hrs, V <sub>gs</sub> 100% @ 150°C
PCT	JESD-22, A102	96 Hrs, 100%RH, 2atm, 121°C
TCT	JESD-22, A104	250/500/1000 Cycles, -55°C~150°C

### Customer Service

Worldwide Sales and Service: [sales@hymexa.com](mailto:sales@hymexa.com)

Technical Support: [Technology@hymexa.com](mailto:Technology@hymexa.com)

Huayi Microelectronics Co., Ltd.

No.8928, Shangji Road, Economic and Technological Development Zone, Xi'an, China

TEL: (86-029) 86685706

FAX: (86-029) 86685705

E-mail: [sales@hymexa.com](mailto:sales@hymexa.com)

Web net: <http://www.hymexa.com/>