

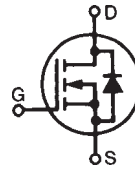
# PolarHV™ HiPerFET IXFR 48N60P

## Power MOSFET

### ISOPLUS247™

(Electrically Isolated Back Surface)

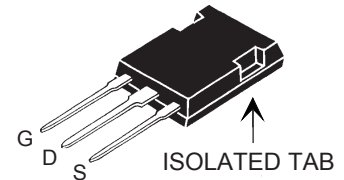
N-Channel Enhancement Mode  
Avalanche Rated  
Fast Intrinsic Diode



$$\begin{aligned} V_{DSS} &= 600 \text{ V} \\ I_{D25} &= 32 \text{ A} \\ R_{DS(on)} &\leq 150 \text{ m}\Omega \\ t_{rr} &\leq 200 \text{ ns} \end{aligned}$$

Symbol	Test Conditions	Maximum Ratings	
$V_{DSS}$	$T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$	600	V
$V_{DGR}$	$T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$ ; $R_{GS} = 1 \text{ M}\Omega$	600	V
$V_{GSS}$	Continuous	$\pm 30$	V
$V_{GSM}$	Transient	$\pm 40$	V
$I_{D25}$	$T_C = 25^\circ\text{C}$	32	A
$I_{DM}$	$T_C = 25^\circ\text{C}$ , pulse width limited by $T_{JM}$	110	A
$I_{AR}$	$T_C = 25^\circ\text{C}$	32	A
$E_{AR}$	$T_C = 25^\circ\text{C}$	70	mJ
$E_{AS}$	$T_C = 25^\circ\text{C}$	2.0	J
$dv/dt$	$I_S \leq I_{DM}$ , $di/dt \leq 100 \text{ A}/\mu\text{s}$ , $V_{DD} \leq V_{DSS}$ , $T_J \leq 150^\circ\text{C}$ , $R_G = 4 \Omega$	20	V/ns
$P_D$	$T_C = 25^\circ\text{C}$	300	W
$T_J$		-55 ... +150	$^\circ\text{C}$
$T_{JM}$		150	$^\circ\text{C}$
$T_{stg}$		-55 ... +150	$^\circ\text{C}$
$T_L$	1.6 mm (0.062 in.) from case for 10 s	300	$^\circ\text{C}$
$V_{ISOL}$	50/60 Hz, RMS, 1 minute	2500	V~
$F_C$	Mounting Force	20..120 / 4.5..26	N/lb.
<b>Weight</b>		5	g

ISOPLUS247 (IXFR)  
E153432



G = Gate      D = Drain  
S = Source

#### Features

- † International standard isolated package
- † UL recognized package
- † Silicon chip on Direct-Copper-Bond substrate
  - High power dissipation
  - Isolated mounting surface
  - 2500V electrical isolation
- † Unclamped Inductive Switching (UIS) rated
- † Low package inductance
  - easy to drive and to protect
- † Fast intrinsic diode

#### Advantages

- † Easy to mount
- † Space savings
- † High power density

Symbol	Test Conditions	Characteristic Values		
		Min.	Typ.	Max.
$BV_{DSS}$	$V_{GS} = 0 \text{ V}$ , $I_D = 250 \mu\text{A}$	600		V
$V_{GS(th)}$	$V_{DS} = V_{GS}$ , $I_D = 8 \text{ mA}$	3.0		5.0 V
$I_{GSS}$	$V_{GS} = \pm 30 \text{ V}_{DC}$ , $V_{DS} = 0$			$\pm 200 \text{ nA}$
$I_{DSS}$	$V_{DS} = V_{DSS}$ , $V_{GS} = 0 \text{ V}$			25 $\mu\text{A}$ 1000 $\mu\text{A}$
$R_{DS(on)}$	$V_{GS} = 10 \text{ V}$ , $I_D = I_T$			150 m $\Omega$

Symbol	Test Conditions	Characteristic Values		
		(T <sub>J</sub> = 25°C, unless otherwise specified)		
		Min.	Typ.	Max.
g <sub>fs</sub>	V <sub>DS</sub> = 20 V; I <sub>D</sub> = I <sub>T</sub> , Notes 1, 2	35	53	S
C <sub>iss</sub>	V <sub>GS</sub> = 0 V, V <sub>DS</sub> = 25 V, f = 1 MHz		8860	pF
C <sub>oss</sub>			850	pF
C <sub>rss</sub>			60	pF
t <sub>d(on)</sub>	V <sub>DS</sub> = 0.5 V <sub>DSS</sub> , I <sub>D</sub> = I <sub>T</sub> , V <sub>GS</sub> = 10 V R <sub>G</sub> = 2 Ω (External)		30	ns
t <sub>r</sub>			25	ns
t <sub>d(off)</sub>			85	ns
t <sub>f</sub>			22	ns
Q <sub>g(on)</sub>	V <sub>GS</sub> = 10 V, V <sub>DS</sub> = 0.5 V <sub>DSS</sub> , I <sub>D</sub> = I <sub>T</sub>		150	nC
Q <sub>gs</sub>			50	nC
Q <sub>gd</sub>			50	nC
R <sub>thJC</sub>			0.42	°C/W
R <sub>thCS</sub>		0.15		°C/W

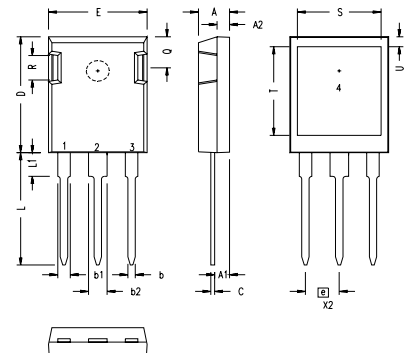
### Source-Drain Diode

Symbol	Test Conditions	Characteristic Values		
		(T <sub>J</sub> = 25°C, unless otherwise specified)		
		Min.	Typ.	Max.
I <sub>S</sub>	V <sub>GS</sub> = 0 V			32 A
I <sub>SM</sub>	Repetitive			110 A
V <sub>SD</sub>	I <sub>F</sub> = I <sub>S</sub> , V <sub>GS</sub> = 0 V, Note 1			1.5 V
t <sub>rr</sub>	I <sub>F</sub> = 20A, -di/dt = 100 A/μs V <sub>R</sub> = 480V			200 ns
Q <sub>RM</sub>			0.8	μC
I <sub>RM</sub>			6.0	A

### Notes:

1. Pulse test, t ≤ 300 μs, duty cycle d ≤ 2 %;
2. Test current I<sub>T</sub> = 24 A.

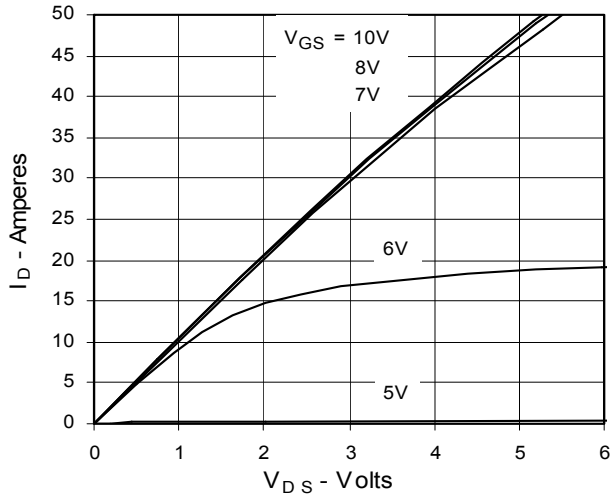
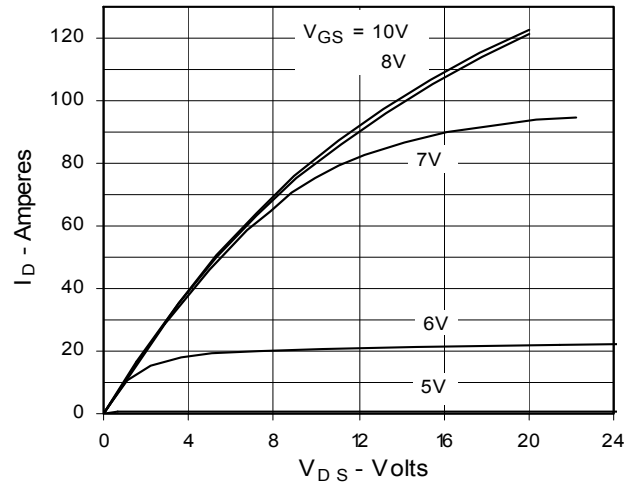
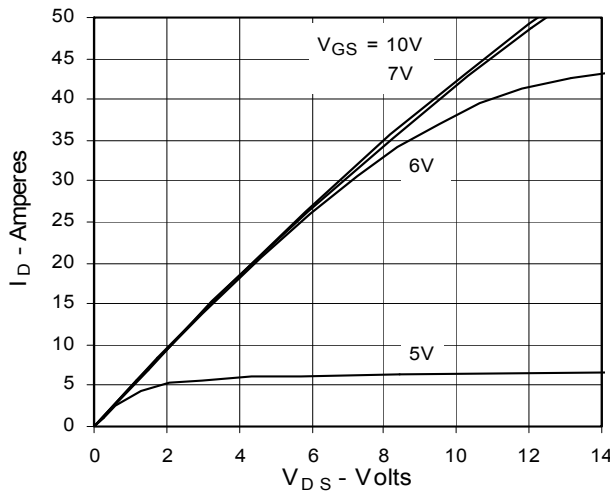
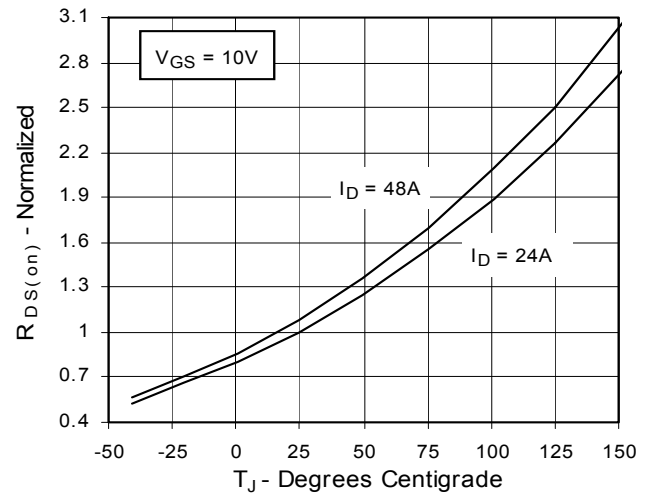
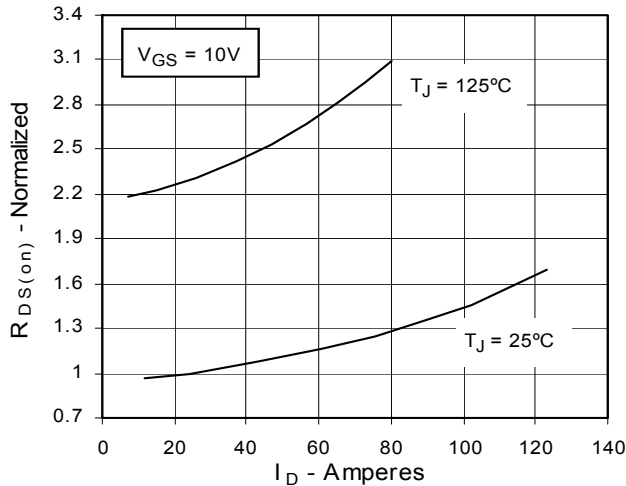
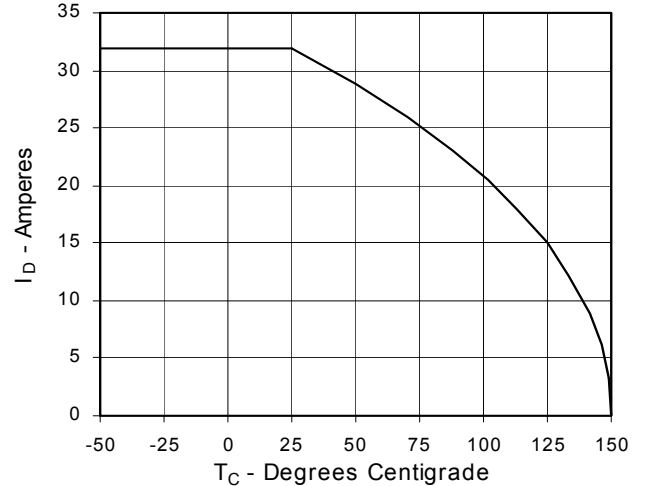
### ISOPLUS247 Outline



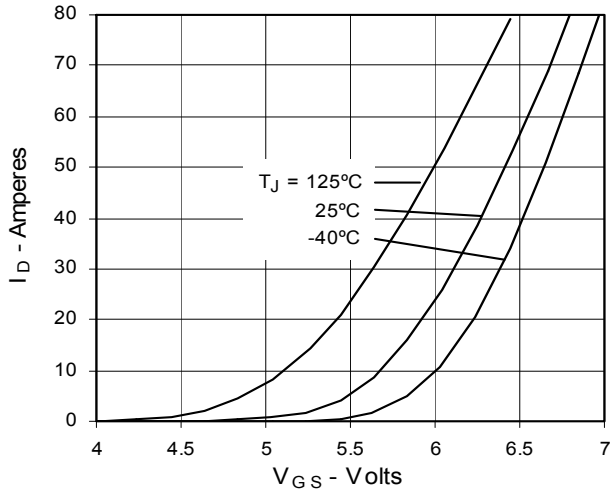
SYM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.190	.205	4.83	5.21
A1	.090	.100	2.29	2.54
A2	.075	.085	1.91	2.16
b	.045	.055	1.14	1.40
b1	.075	.084	1.91	2.13
b2	.115	.123	2.92	3.12
C	.024	.031	0.61	0.80
D	.819	.840	20.80	21.34
E	.620	.635	15.75	16.13
e	.215 BSC		5.45 BSC	
L	.780	.800	19.81	20.32
L1	.150	.170	3.81	4.32
Q	.220	.244	5.59	6.20
R	.170	.190	4.32	4.83
S	.520	.540	13.21	13.72
T	.620	.640	15.75	16.26
U	.065	.080	1.65	2.03

- 1 - GATE
- 2 - DRAIN (COLLECTOR)
- 3 - SOURCE (EMITTER)
- 4 - NO CONNECTION

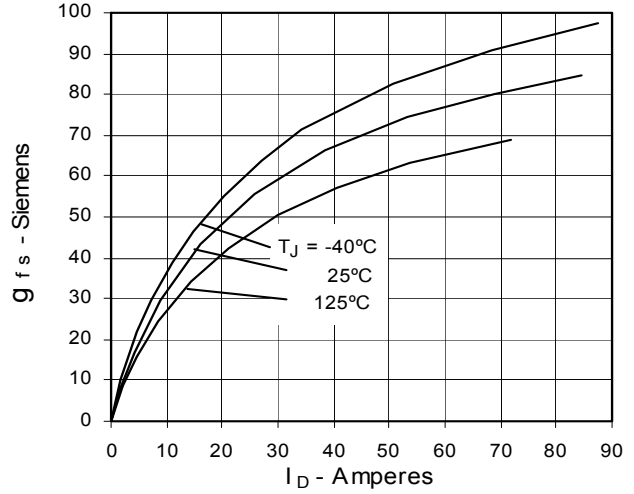
NOTE: This drawing will meet all dimensions requirement of JEDEC outline TO-247AD except screw hole.

**Fig. 1. Output Characteristics  
@ 25°C**

**Fig. 2. Extended Output Characteristics  
@ 25°C**

**Fig. 3. Output Characteristics  
@ 125°C**

**Fig. 4.  $R_{DS(on)}$  Normalized to  $I_D = 24A$   
Value vs. Junction Temperature**

**Fig. 5.  $R_{DS(on)}$  Normalized to  
 $I_D = 24A$  Value vs. Drain Current**

**Fig. 6. Drain Current vs. Case  
Temperature**


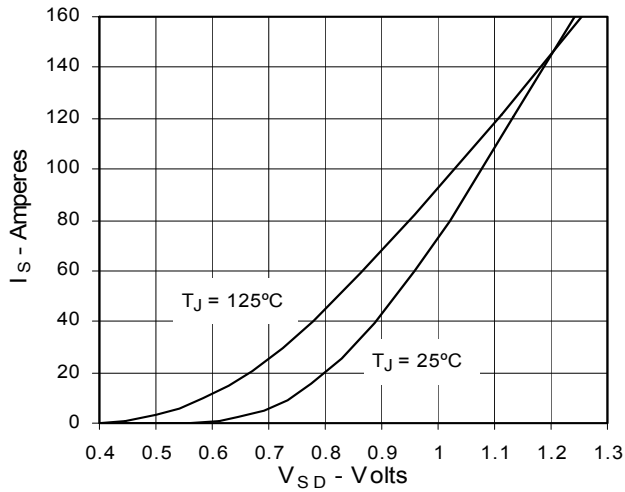
**Fig. 7. Input Admittance**



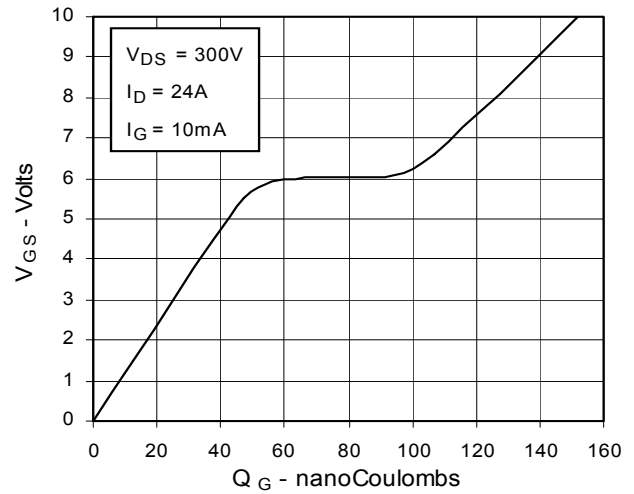
**Fig. 8. Transconductance**



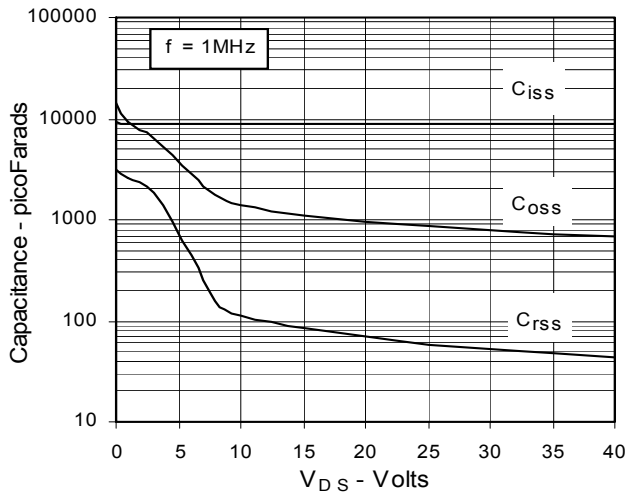
**Fig. 9. Source Current vs. Source-To-Drain Voltage**



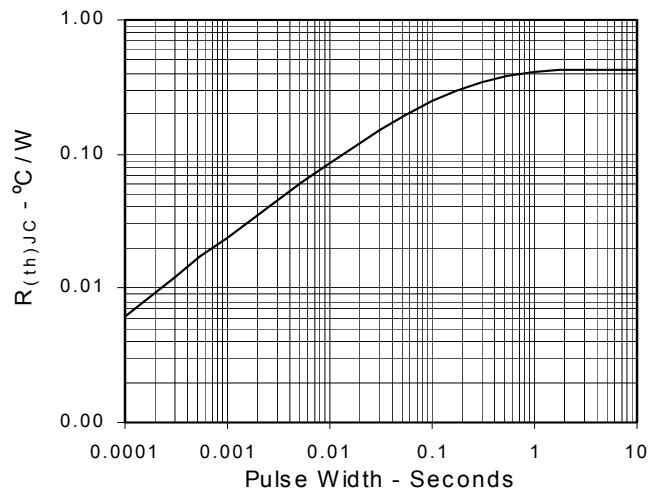
**Fig. 10. Gate Charge**



**Fig. 11. Capacitance**



**Fig. 13. Maximum Transient Thermal Resistance**



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