

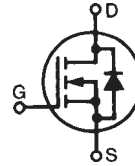
PolarHV™ HiPerFET IXFR 44N50P

Power MOSFET

ISOPLUS247™

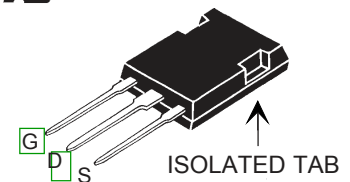
(Electrically Isolated Back Surface)

N-Channel Enhancement
 Avalanche Rated
 Fast Intrinsic Diode



$V_{DSS} = 500 \text{ V}$
 $I_{D25} = 24 \text{ A}$
 $R_{DS(on)} \leq 150 \text{ m}\Omega$
 $t_{rr} \leq 200 \text{ ns}$

ISOPLUS247 (IXFR)
 E153432



G = Gate
 S = Source
 D = Drain

Symbol	Test Conditions	Maximum Ratings	
V_{DSS}	$T_J = 25^\circ\text{C}$ to 175°C	500	V
V_{DGR}	$T_J = 25^\circ\text{C}$ to 175°C ; $R_{GS} = 1 \text{ M}\Omega$	500	V
V_{GSM}	Transient	± 40	V
V_{GSM}	Continuous	± 30	V
I_{D25}	$T_C = 25^\circ\text{C}$	24	A
I_{DM}	$T_C = 25^\circ\text{C}$, pulse width limited by T_{JM}	132	A
I_{AR}	$T_C = 25^\circ\text{C}$	44	A
E_{AR}	$T_C = 25^\circ\text{C}$	55	mJ
E_{AS}	$T_C = 25^\circ\text{C}$	1.7	J
dv/dt	$I_S \leq I_{DM}$, $di/dt \leq 100 \text{ A}/\mu\text{s}$, $V_{DD} \leq V_{DSS}$, $T_J \leq 150^\circ\text{C}$, $R_G = 10 \Omega$	10	V/ns
P_D	$T_C = 25^\circ\text{C}$	208	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..25	N/lb
Weight		5	g

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

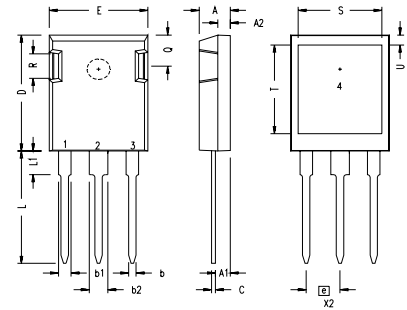
- † Easy to mount
- † Space savings
- † High power density

Symbol	Test Conditions	Characteristic Values		
		Min.	Typ.	Max.
BV_{DSS}	$V_{GS} = 0 \text{ V}$, $I_D = 250 \mu\text{A}$	500		V
$V_{GS(th)}$	$V_{DS} = V_{GS}$, $I_D = 4 \text{ mA}$	2.5		5.0 V
I_{GSS}	$V_{GS} = \pm 30 \text{ V}_{DC}$, $V_{DS} = 0$			$\pm 100 \text{ nA}$
I_{DSS}	$V_{DS} = V_{DSS}$ $V_{GS} = 0 \text{ V}$			25 μA 500 μA
$R_{DS(on)}$	$V_{GS} = 10 \text{ V}$, $I_D = 22 \text{ A}$			150 $\text{m}\Omega$

Symbol	Test Conditions	Characteristic Values ($T_J = 25^\circ\text{C}$, unless otherwise specified)		
		Min.	Typ.	Max.
g_{fs}	$V_{DS} = 20\text{ V}$; $I_D = 22\text{ A}$, Note 1		32	S
C_{iss}	$V_{GS} = 0\text{ V}$, $V_{DS} = 25\text{ V}$, $f = 1\text{ MHz}$		5440	pF
C_{oss}			639	pF
C_{rss}			40	pF
$t_{d(on)}$	$V_{GS} = 10\text{ V}$, $V_{DS} = 0.5 V_{DSS}$, $I_D = 22\text{ A}$ $R_G = 3\ \Omega$ (External)		25	ns
t_r			27	ns
$t_{d(off)}$			70	ns
t_f			18	ns
$Q_{g(on)}$	$V_{GS} = 10\text{ V}$, $V_{DS} = 0.5 V_{DSS}$, $I_D = 22\text{ A}$		98	nC
Q_{gs}			35	nC
Q_{gd}			30	nC
R_{thJC}				$0.6\ ^\circ\text{C/W}$
R_{thCS}		0.15		$^\circ\text{C/W}$

Source-Drain Diode		Characteristic Values ($T_J = 25^\circ\text{C}$, unless otherwise specified)		
Symbol	Test Conditions	Min.	Typ.	Max.
I_s	$V_{GS} = 0\text{ V}$			30 A
I_{SM}	Repetitive			132 A
V_{SD}	$I_F = I_s$, $V_{GS} = 0\text{ V}$, Note 1			1.5 V
t_{rr}	$I_F = 22\text{ A}$,			200 ns
Q_{RM}	$-di/dt = 100\text{ A}/\mu\text{s}$		0.6	μC
I_{RM}	$V_R = 100\text{ V}$		6.0	A

Notes: 1. Pulse test, $t \leq 300\text{ ms}$, duty cycle $d \leq 2\%$

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

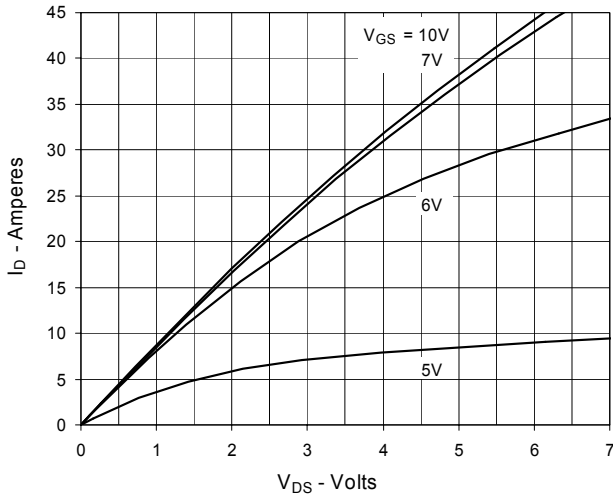


Fig. 2. Extended Output Characteristics @ 25°C

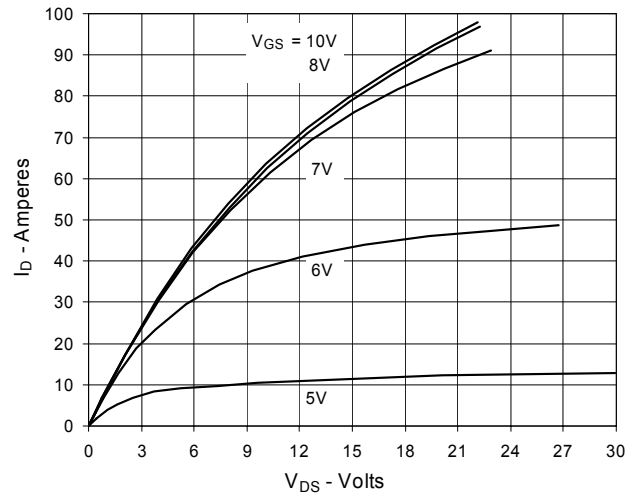


Fig. 3. Output Characteristics @ 125°C

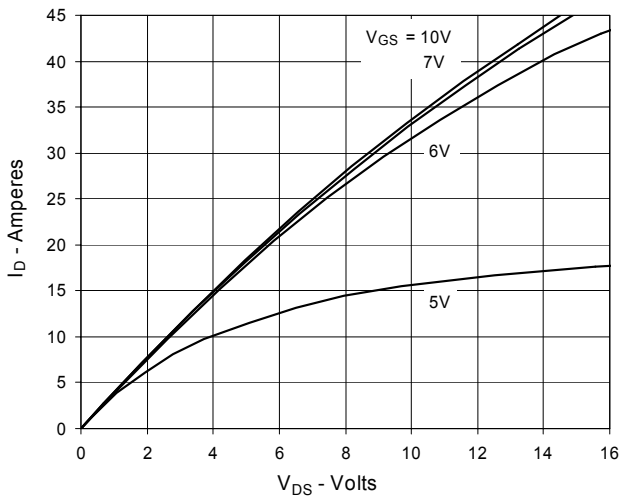


Fig. 4. $R_{DS(on)}$ Normalized to $I_D = 22A$ Value vs. Junction Temperature

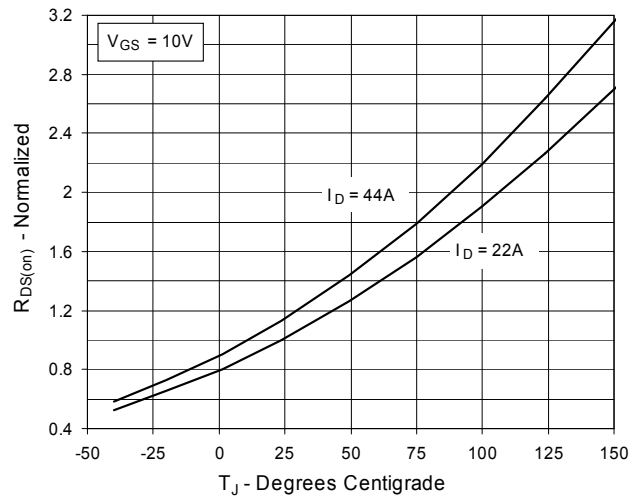


Fig. 5. $R_{DS(on)}$ Normalized to $I_D = 22A$ Value vs. Drain Current

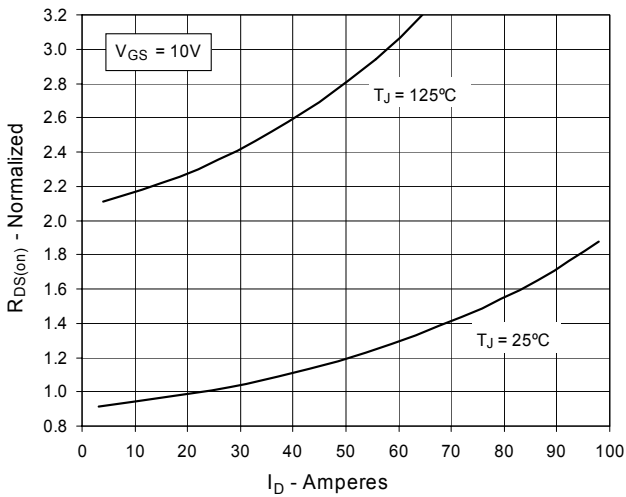


Fig. 6. Maximum Drain Current vs. Case Temperature

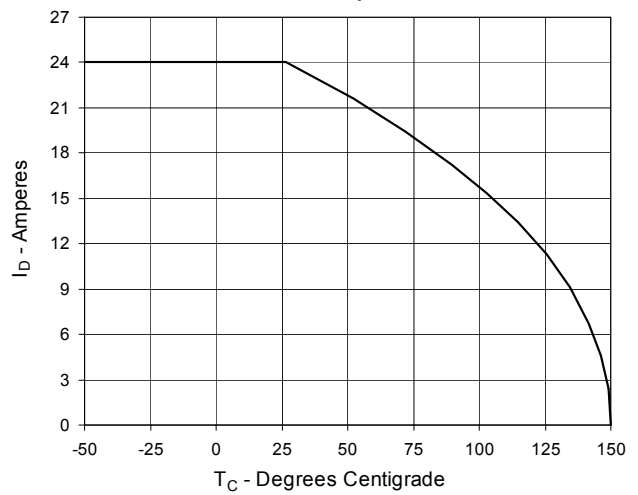


Fig. 7. Input Admittance

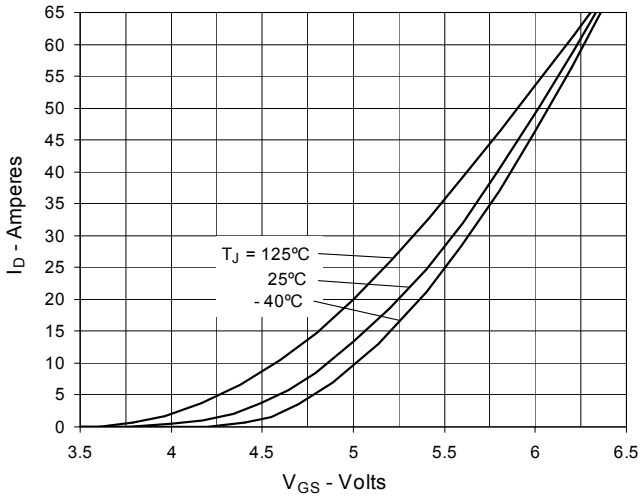


Fig. 8. Transconductance

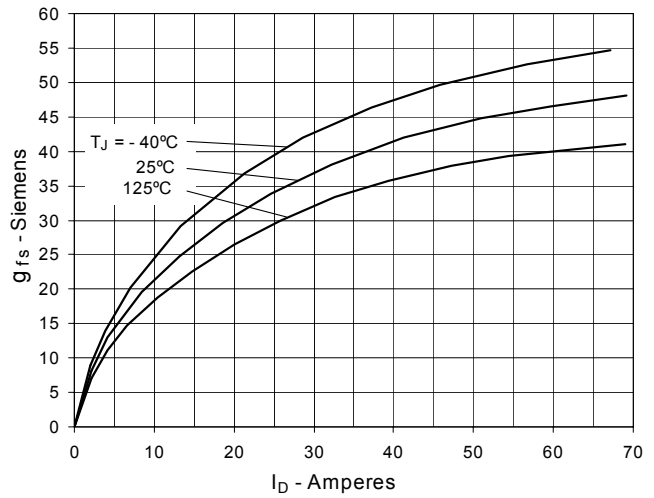


Fig. 9. Forward Voltage Drop of Intrinsic Diode

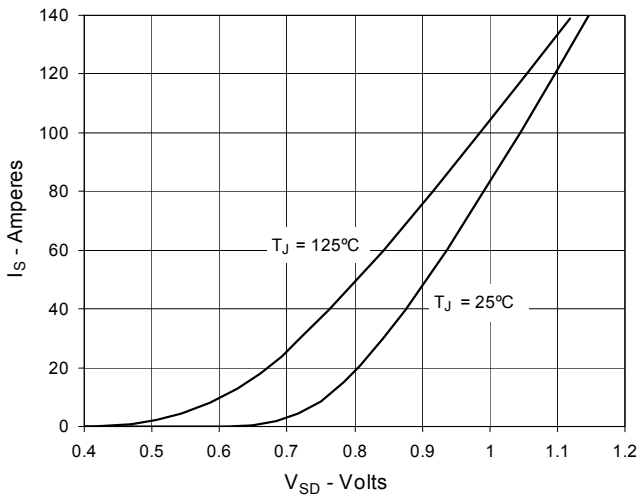


Fig. 10. Gate Charge

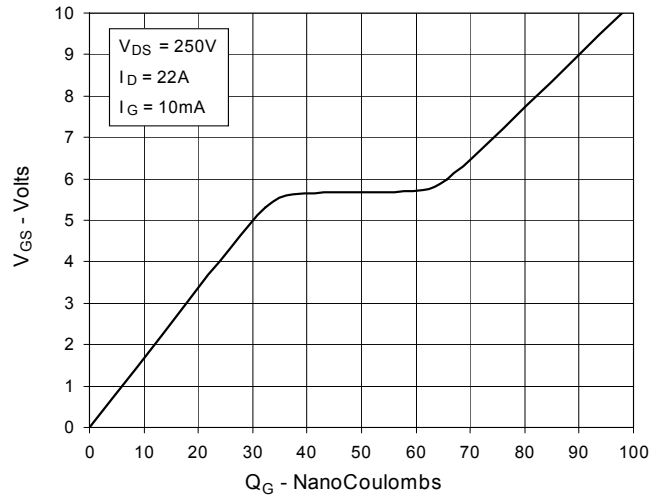


Fig. 11. Capacitance

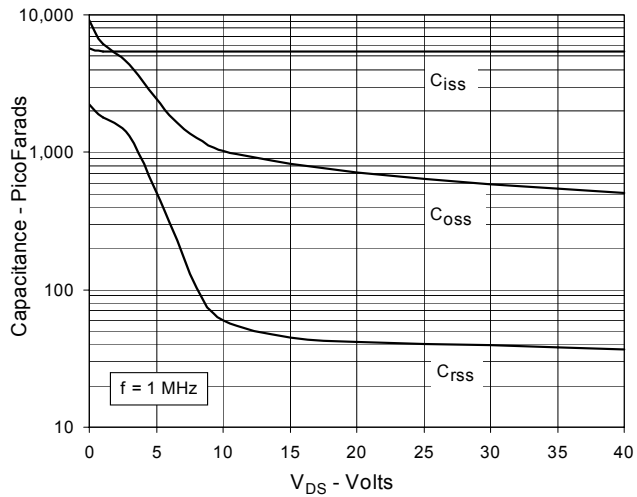


Fig. 12. Forward-Bias Safe Operating Area

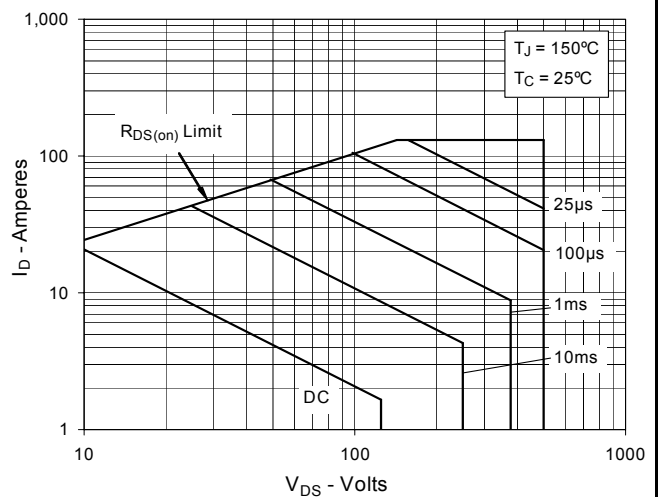
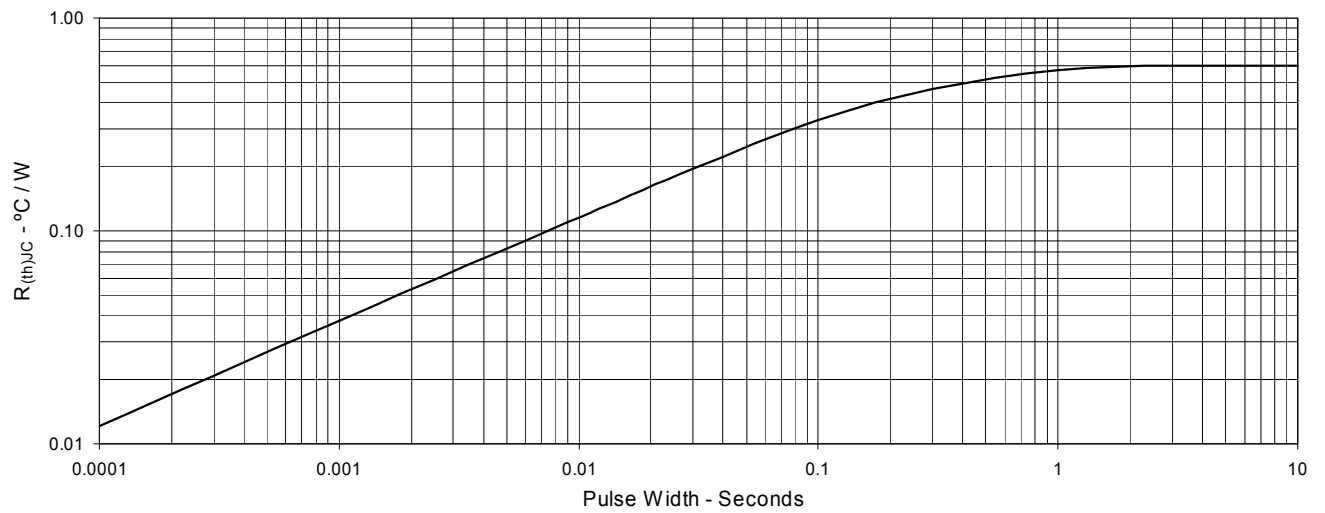


Fig. 13. Maximum Transient Thermal Resistance





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