

PolarHV™ HiPerFET Power MOSFET

N-Channel Enhancement Mode
 Avalanche Rated
 Fast Intrinsic Diode

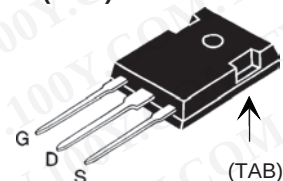
IXFH 44N50P
 IXFK 44N50P
 IXFT 44N50P



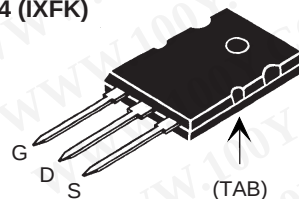
$$\begin{aligned} V_{DSS} &= 500 \text{ V} \\ I_{D25} &= 44 \text{ A} \\ R_{DS(on)} &\leq 140 \text{ m}\Omega \\ t_{rr} &\leq 200 \text{ ns} \end{aligned}$$

Symbol	Test Conditions	Maximum Ratings	
V_{DSS}	$T_J = 25^\circ\text{C}$ to 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}	$T_C = 25^\circ\text{C}$	44	A
I_{DM}	$T_C = 25^\circ\text{C}$, pulse width limited by T_{JM}	110	A
I_{AR}	$T_C = 25^\circ\text{C}$	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	$T_C = 25^\circ\text{C}$	650	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	$^\circ\text{C}$
T_{SOLD}	Plastic case for 10 s	260	$^\circ\text{C}$
M_d	Mounting torque (TO-247)	1.13/10	Nm/lb.in.
Weight	TO-247	6	g
	TO-268	5	g
	TO-264	10	g

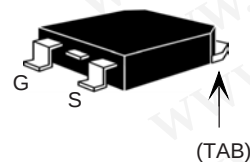
TO-247 AD (IXFH)



TO-264 (IXFK)



TO-268 (IXFT)



G = Gate
 S = Source
 D = Drain
 TAB = Drain

Features

- International standard packages
- Unclamped Inductive Switching (UIS) rated
- Low package inductance
- easy to drive and to protect

Advantages

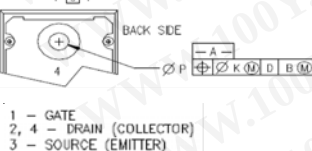
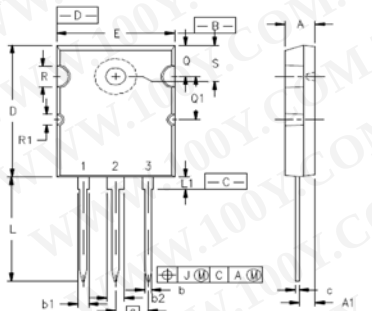
- Easy to mount
- Space savings
- High power density

Symbol	Test Conditions ($T_J = 25^\circ\text{C}$, unless otherwise specified)	Characteristic Values		
		Min.	Typ.	Max.
BV_{DSS}	$V_{GS} = 0 \text{ V}$, $I_D = 250 \mu\text{A}$	500		V
$V_{GS(th)}$	$V_{DS} = V_{GS}$, $I_D = 4 \text{ mA}$	3.0		5.0 V
I_{GSS}	$V_{GS} = \pm 30 \text{ V}_{DC}$, $V_{DS} = 0$			$\pm 10 \text{ nA}$
I_{DSS}	$V_{DS} = V_{DSS}$			25 μA
	$V_{GS} = 0 \text{ V}$ $T_J = 125^\circ\text{C}$			500 μA
$R_{DS(on)}$	$V_{GS} = 10 \text{ V}$, $I_D = 0.5 I_{D25}$ Pulse test, $t \leq 300 \mu\text{s}$, duty cycle $d \leq 2\%$			140 $\text{m}\Omega$

Symbol	Test Conditions	Characteristic Values (T _j = 25°C, unless otherwise specified)		
		Min.	Typ.	Max.
g_{fs}	$V_{DS} = 20\text{ V}; I_D = 0.5 I_{D25}, \text{ pulse test}$	20	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
$t_{d(on)}$	$V_{GS} = 10\text{ V}, V_{DS} = 0.5 V_{DSS}, I_D = I_{D25}$ $R_G = 3\ \Omega \text{ (External)}$		28	ns
t_r			29	ns
$t_{d(off)}$			85	ns
t_f			27	ns
$Q_{g(on)}$	$V_{GS} = 10\text{ V}, V_{DS} = 0.5 V_{DSS}, I_D = 0.5 I_{D25}$		98	nC
Q_{gs}			35	nC
Q_{gd}			30	nC
R_{thJC}				0.19°C/W
R_{thCS}	(TO-247)	0.21		°C/W
	(TO-264)	0.15		°C/W

Source-Drain Diode		Characteristic Values (T _j = 25°C, unless otherwise specified)		
Symbol	Test Conditions	Min.	Typ.	Max.
I_S	$V_{GS} = 0\text{ V}$			44 A
I_{SM}	Repetitive			110 A
V_{SD}	$I_F = I_S, V_{GS} = 0\text{ V},$ Pulse test, $t \leq 300\ \mu\text{s}$, duty cycle $d \leq 2\%$			1.5 V
t_{rr}	$I_F = 25\text{ A}, -di/dt = 100\text{ A}/\mu\text{s}$ $V_R = 100\text{ V}, V_{GS} = 0\text{ V}$			200 ns
Q_{RM}				0.6 μC
I_{RM}				6.0 A

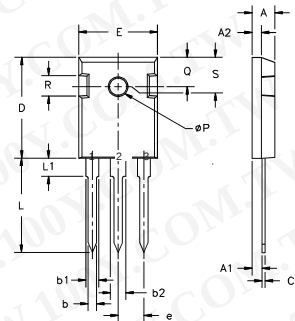
TO-264 (IXFK) Outline



SYM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.185	.209	4.70	5.31
A1	.102	.118	2.59	3.00
b	.037	.055	0.94	1.40
b1	.087	.102	2.21	2.59
b2	.110	.126	2.79	3.20
c	.017	.029	0.43	0.74
D	1.007	1.047	25.58	26.59
E	.760	.799	19.30	20.29
e	.215 BSC		5.46 BSC	
J	.000	.010	0.00	0.25
K	.000	.010	0.00	0.25
L	.779	.842	19.79	21.39
L1	.087	.102	2.21	2.59
ØP	.122	.138	3.10	3.51
Q	.240	.256	6.10	6.50
Q1	.330	.346	8.38	8.79
ØR	.155	.187	3.94	4.75
ØR1	.085	.093	2.16	2.36
S	.243	.253	6.17	6.43

1 - GATE
 2, 4 - DRAIN (COLLECTOR)
 3 - SOURCE (EMITTER)

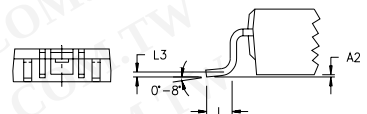
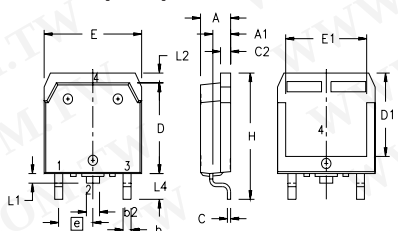
TO-247 (IXFH) Outline



Terminals: 1 - Gate
 2 - Drain
 3 - Source
 Tab - Drain

Dim.	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	4.7	5.3	.185	.209
A1	2.2	2.54	.087	.102
A2	2.2	2.6	.059	.098
b	1.0	1.4	.040	.055
b1	1.65	2.13	.065	.084
b2	2.87	3.12	.113	.123
C	.4	.8	.016	.031
D	20.80	21.46	.819	.845
E	15.75	16.26	.610	.640
e	5.20	5.72	0.205	0.225
L	19.81	20.32	.780	.800
L1		4.50		.177
ØP	3.55	3.65	.140	.144
Q	5.89	6.40	0.232	0.252
R	4.32	5.49	.170	.216
S	6.15	BSC	242	BSC

TO-268 (IXFT) Outline



SYM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.193	.201	4.90	5.10
A1	.106	.114	2.70	2.90
A2	.001	.010	0.02	0.25
b	.045	.057	1.15	1.45
b2	.075	.083	1.90	2.10
C	.016	.026	0.40	0.65
C2	.057	.063	1.45	1.60
D	.543	.551	13.80	14.00
D1	.488	.500	12.40	12.70
E	.624	.632	15.85	16.05
E1	.524	.535	13.30	13.60
e	.215 BSC		5.45 BSC	
H	.736	.752	18.70	19.10
L	.094	.106	2.40	2.70
L1	.047	.055	1.20	1.40
L2	.039	.045	1.00	1.15
L3	.010	BSC	0.25	BSC
L4	.150	.161	3.80	4.10

IXYS reserves the right to change limits, test conditions, and dimensions.

IXYS MOSFETs and IGBTs are covered by 4,835,592 4,931,844 5,049,961 5,237,481 6,162,665 6,404,065 B1 6,683,344 6,727,585
 one or more of the following U.S. patents: 4,850,072 5,017,508 5,063,307 5,381,025 6,259,123 B1 6,534,343 6,710,405 B2 6,759,692
 4,881,106 5,034,796 5,187,117 5,486,715 6,306,728 B1 6,583,505 6,710,463 6,771,478 B2

Fig. 1. Output Characteristics
@ 25°C

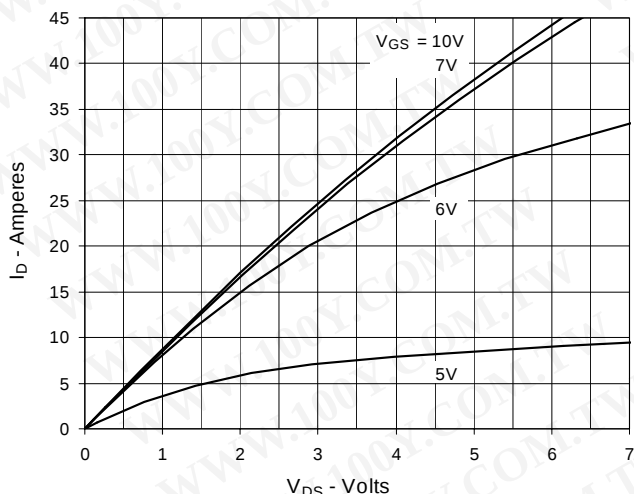


Fig. 2. Extended Output Characteristics
@ 25°C

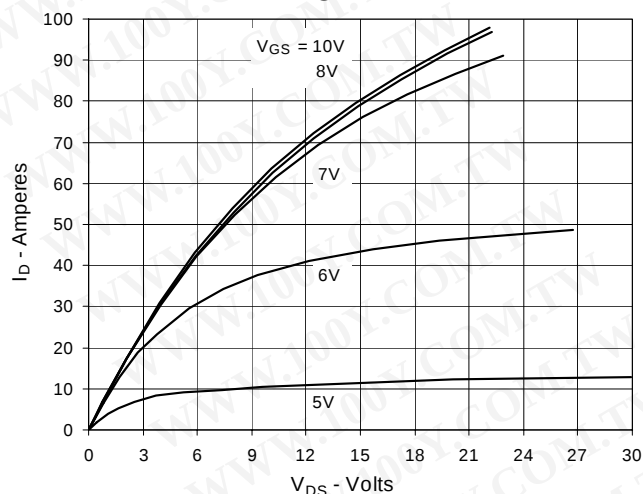


Fig. 3. Output Characteristics
@ 125°C

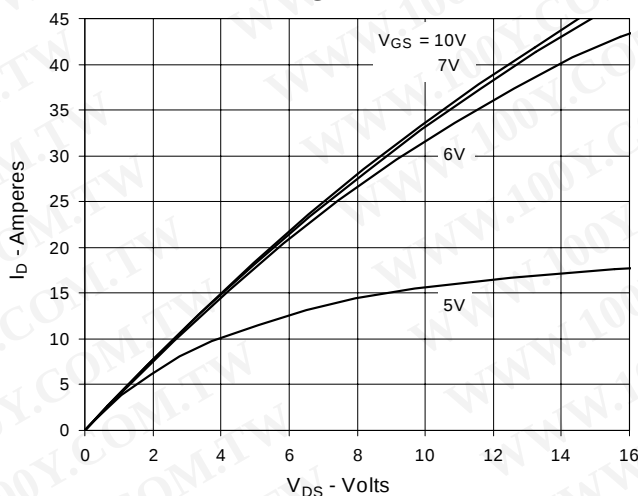


Fig. 4. $R_{DS(on)}$ Normalized to $I_D = 22A$ Value
vs. Junction Temperature

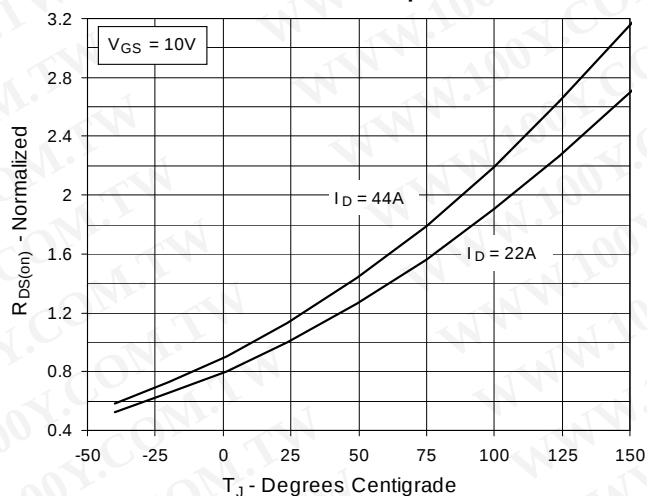


Fig. 5. $R_{DS(on)}$ Normalized to $I_D = 22A$ Value
vs. Drain Current

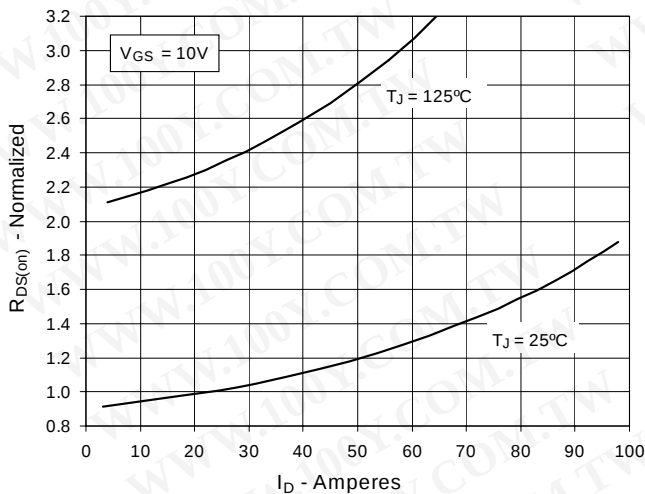


Fig. 6. Maximum Drain Current vs.
Case Temperature

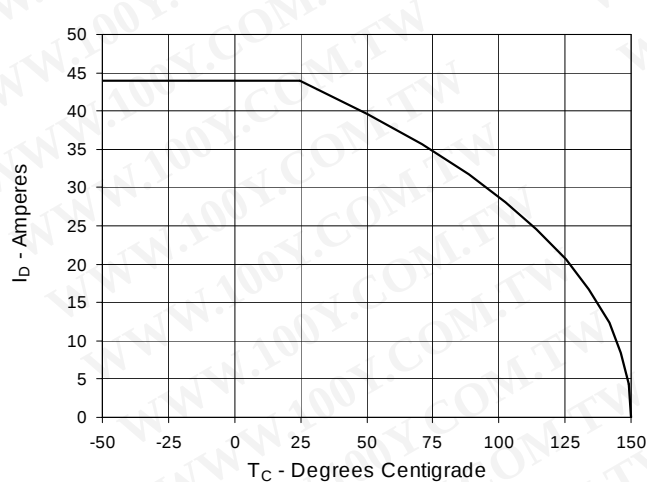


Fig. 7. Input Admittance

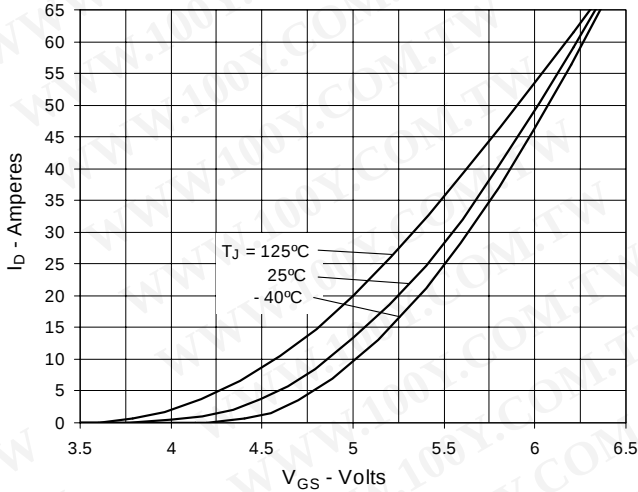


Fig. 8. Transconductance

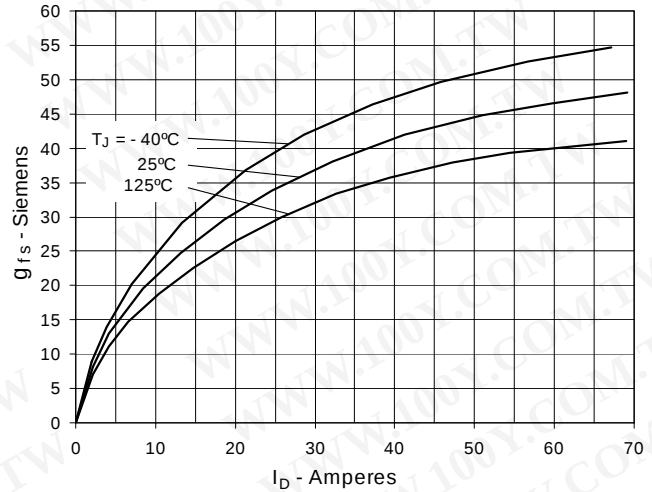


Fig. 9. Forward Voltage Drop of Intrinsic Diode

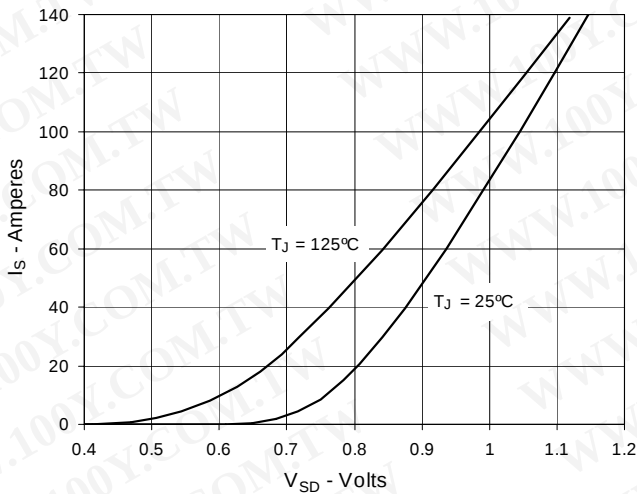


Fig. 10. Gate Charge

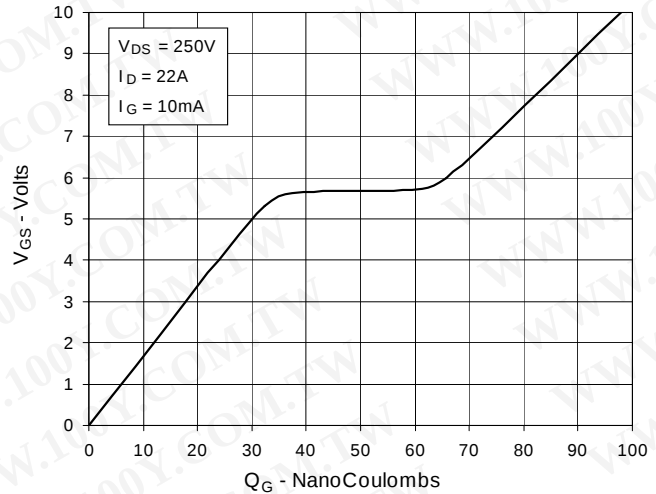


Fig. 11. Capacitance

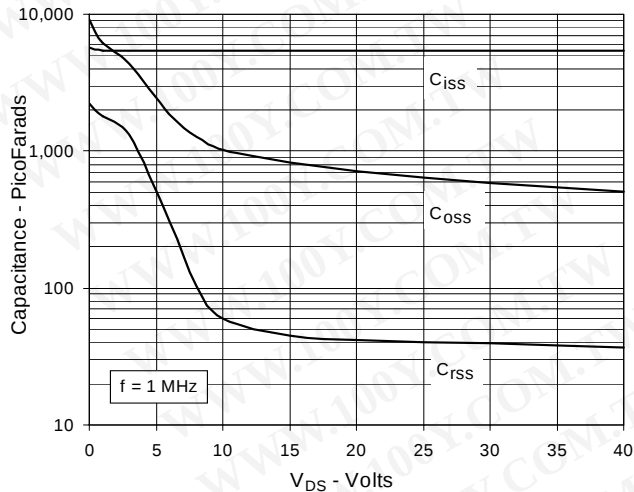


Fig. 12. Forward-Bias Safe Operating Area

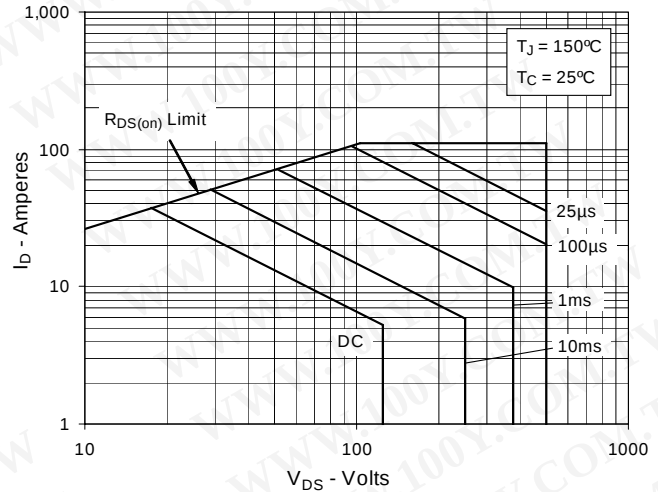


Fig. 13. Maximum Transient Thermal Resistance

