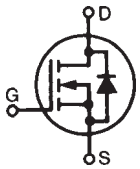
PolarHV™ HiPerFET Power MOSFET

N-Channel Enhancement Mode Avalanche Rated Fast Intrinsic Diode

IXFH 44N50P
IXFT 44N50P
IXFK 44N50P

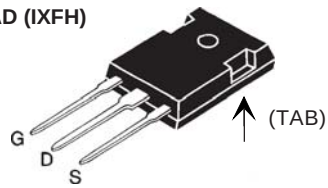
V_{DSS} = 500 V
I_{D25} = 44 A
$R_{DS(on)}$ < 140 mΩ
t_{rr} < 200 ns



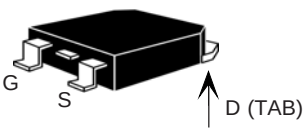
Symbol	Test Conditions	Maximum Ratings	
V_{DSS}	T_J = 25°C to 175°C	500	V
V_{DGR}	T_J = 25°C to 175°C; R_{GS} = 1 MΩ	500	V
V_{GSM}	Transient	±40	V
V_{GSM}	Continuous	±30	V
I_{D25}	T_C = 25°C	44	A
I_{DM}	T_C = 25°C, pulse width limited by T_{JM}	132	A
I_{AR}	T_C = 25°C	44	A
E_{AR}	T_C = 25°C	55	mJ
E_{AS}	T_C = 25°C	1.7	J
dv/dt	$I_S \le I_{DM}$, di/dt ≤ 100 A/μs, $V_{DD} \le V_{DSS}$, $T_J \le 150°C$, R_G = 10 Ω	10	V/ns
P_D	T_C = 25°C	650	W
T_J		-55 ... +150	°C
T_{JM}		150	°C
T_{stg}		-55 ... +150	°C
T_L	1.6 mm (0.062 in.) from case for 10 s	300	°C
	Maximum tab temperature for soldering for 10s	260	°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

Symbol	Test Conditions (T_J = 25°C, unless otherwise specified)	Characteristic Values Min.	Typ.	Max.	
V_{DSS}	V_{GS} = 0 V, I_D = 250 μA	500			V
$V_{GS(th)}$	$V_{DS} = V_{GS}$, I_D = 4 mA	3.0		5.0	V
I_{GSS}	V_{GS} = ±30 V_{DC}, V_{DS} = 0			±10	nA
I_{DSS}	$V_{DS} = V_{DSS}$, V_{GS} = 0 V, T_J = 25°C			25	μA
	$V_{DS} = V_{DSS}$, V_{GS} = 0 V, T_J = 125°C			500	μA
$R_{DS(on)}$	V_{GS} = 10 V, $I_D = 0.5\ I_{D25}$, Pulse test, t ≤ 300 μs, duty cycle d ≤ 2 %			140	mΩ

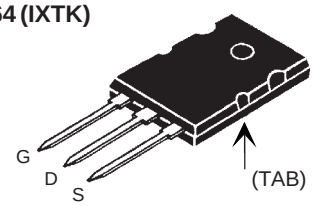
TO-247 AD (IXFH)



TO-268 (IXTT)



TO-264 (IXTK)



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

Features

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

Advantages

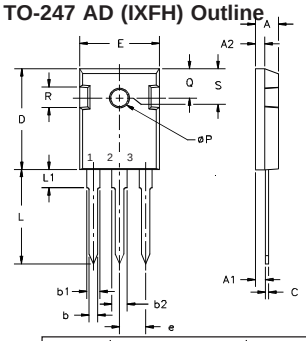
- Easy to mount
- Space savings
- High power density

Symbol	Test Conditions (T_J = 25°C, unless otherwise specified)	Characteristic Values Min.	Typ.	Max.	
g_{fs}	V_{DS}= 20 V; I_D = 0.5 I_{D25}, pulse test		32		S
C_{iss}	V_{GS} = 0 V, V_{DS} = 25 V, f = 1 MHz		5440		pF
C_{oss}			639		pF
C_{rss}			40		pF
$t_{d(on)}$	V_{GS} = 10 V, V_{DS} = 0.5 V_{DSS}, I_D = I_{D25} R_G = 3 Ω (External)		25		ns
t_r			27		ns
$t_{d(off)}$			70		ns
t_f			18		ns
$Q_{g(on)}$	V_{GS}= 10 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	K/W
R_{thCK}	(TO-247)		0.21		K/W
	(TO-264)		0.15		K/W

Source-Drain Diode

Symbol	Test Conditions (T_J = 25°C, unless otherwise specified)	Characteristic Values Min.	typ.	Max.	
I_S	V_{GS} = 0 V			44	A
I_{SM}	Repetitive			132	A
V_{SD}	I_F = I_S, V_{GS} = 0 V, Pulse test, t ≤ 300 µs, duty cycle d ≤ 2 %			1.5	V
t_{rr}	I_F = 22 A,			200	ns
Q_{RM}	-di/dt = 100 A/µs		0.6		µC
I_{RM}	V_R = 100V		6.0		A

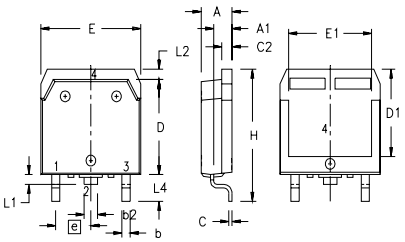
TO-247 AD (IXFH) Outline

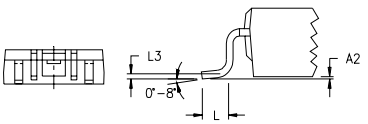


Terminals:
1 - Gate
2 - Drain
3 - Source
Tab - Drain

Dim.	Millimeter Min.	Max.	Inches Min.	Max.
A	4.7	5.3	.185	.209
A_1	2.2	2.54	.087	.102
A_2	2.2	2.6	.059	.098
b	1.0	1.4	.040	.055
b_1	1.65	2.13	.065	.084
b_2	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	

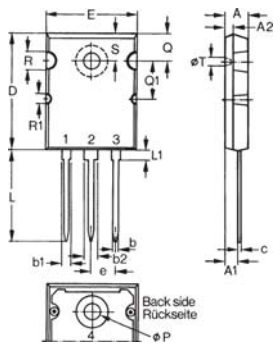
TO-268 (IXTT) Outline





SYM	INCHES MIN	MAX	MILLIMETERS 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

TO-264 Outline



Dim.	Millimeter Min.	Max.	Inches Min.	Max.
A	4.82	5.13	.190	.202
A1	2.54	2.89	.100	.114
A2	2.00	2.10	.079	.083
b	1.12	1.42	.044	.056
b1	2.39	2.69	.094	.106
b2	2.90	3.09	.114	.122
c	0.53	0.83	.021	.033
D	25.91	26.16	1.020	1.030
E	19.81	19.96	.780	.786
e	5.46 BSC		.215 BSC	
J	0.00	0.25	.000	.010
K	0.00	0.25	.000	.010
L	20.32	20.83	.800	.820
L1	2.29	2.59	.090	.102
P	3.17	3.66	.125	.144
Q	6.07	6.27	.239	.247
Q1	8.38	8.69	.330	.342
R	3.81	4.32	.150	.170
R1	1.78	2.29	.070	.090
S	6.04	6.30	.238	.248
T	1.57	1.83	.062	.072

Fig. 1. Output Characteristics @ 25°C

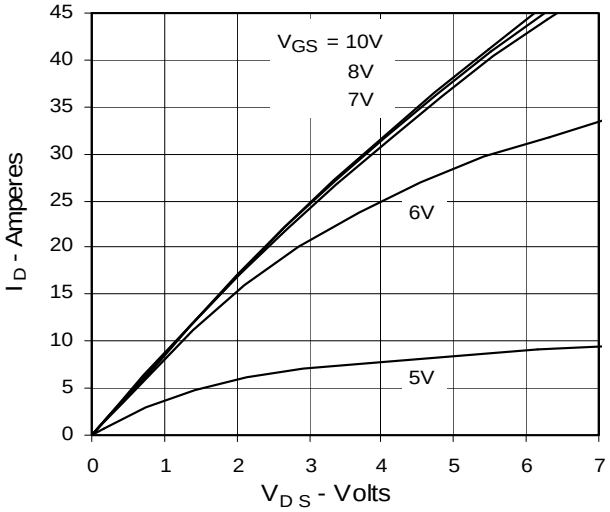


Fig. 2. Extended Output Characteristics @ 25°C

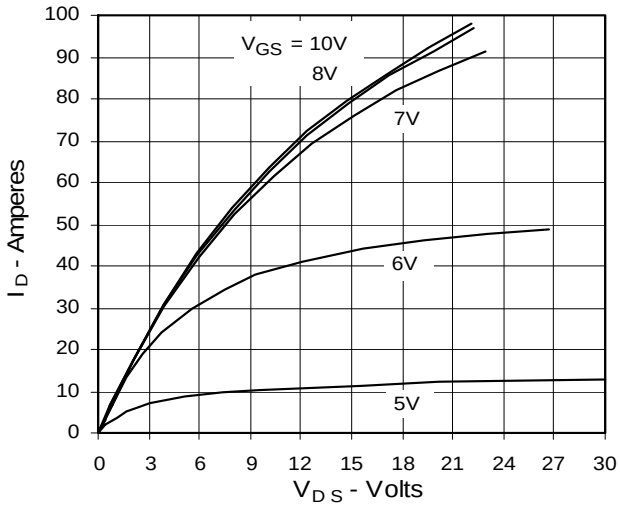


Fig. 3. Output Characteristics @ 125°C

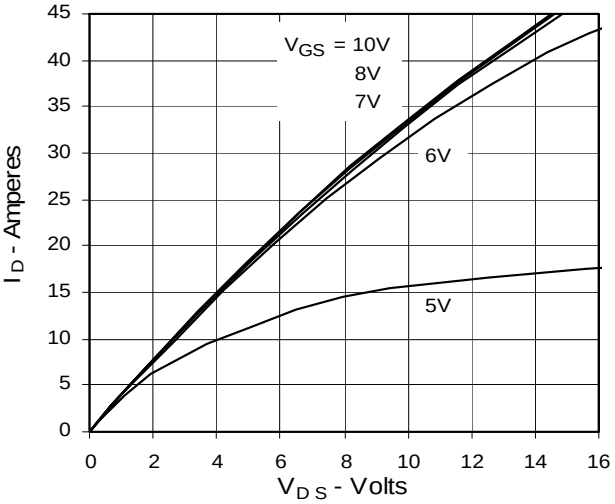


Fig. 4. $R_{DS(on)}$ Normalized to 0.5 I_{D25} Value vs. Junction Temperature

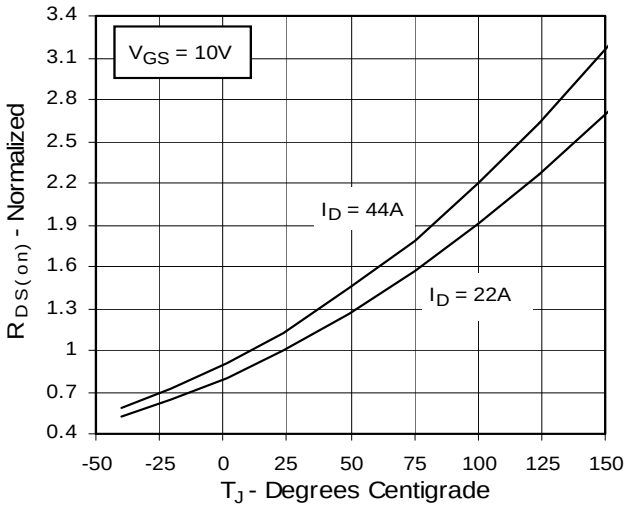


Fig. 5. $R_{DS(on)}$ Normalized to 0.5 I_{D25} Value vs. I_D

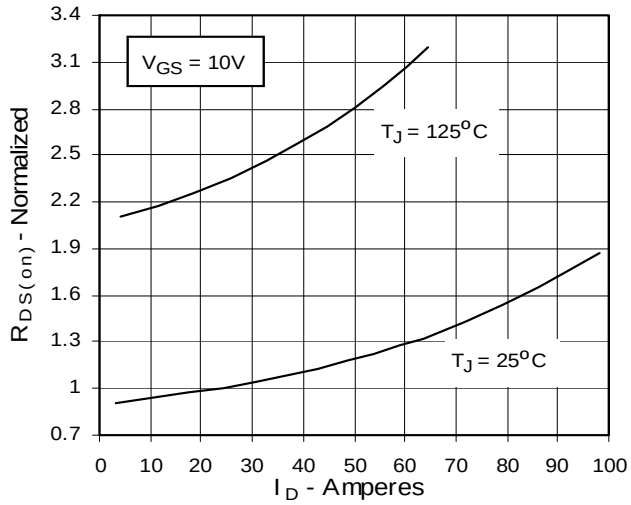


Fig. 6. Drain Current vs. Case Temperature

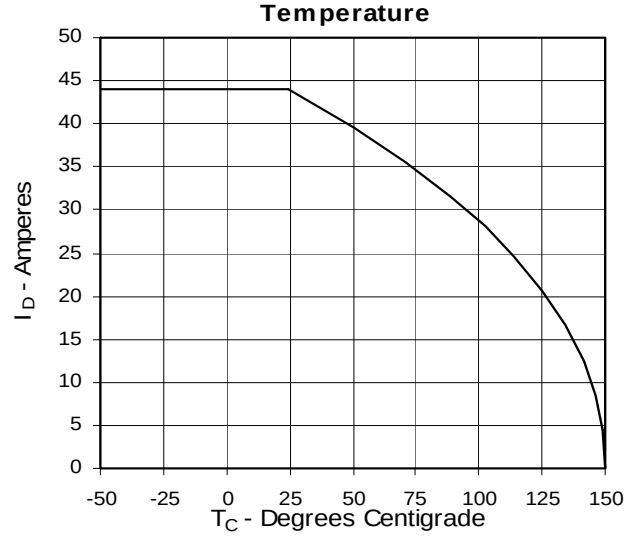


Fig. 7. Input Admittance

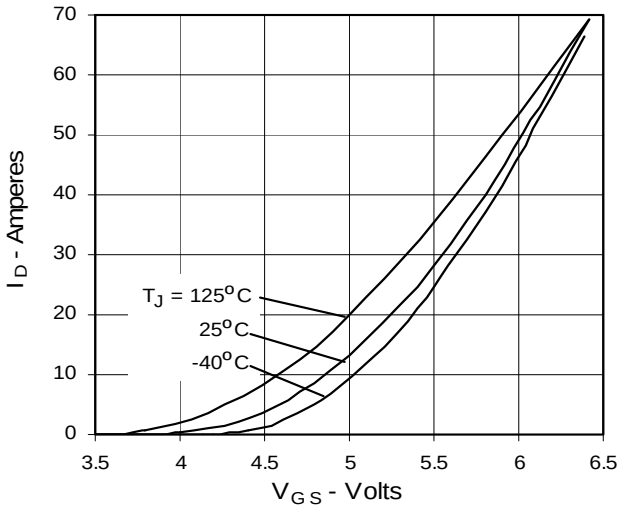


Fig. 8. Transconductance

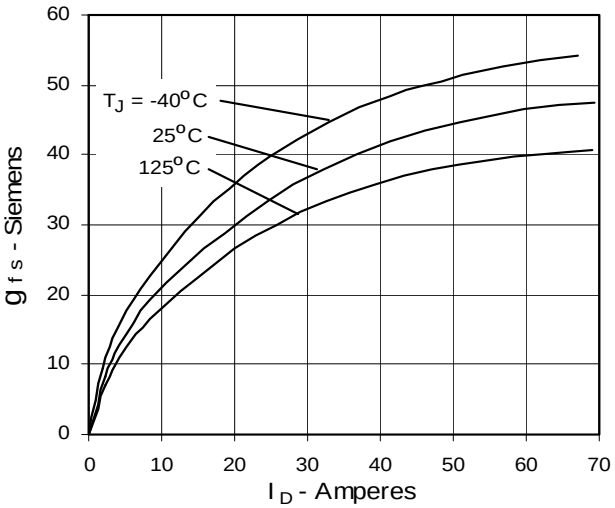


Fig. 9. Source Current vs. Source-To-Drain Voltage

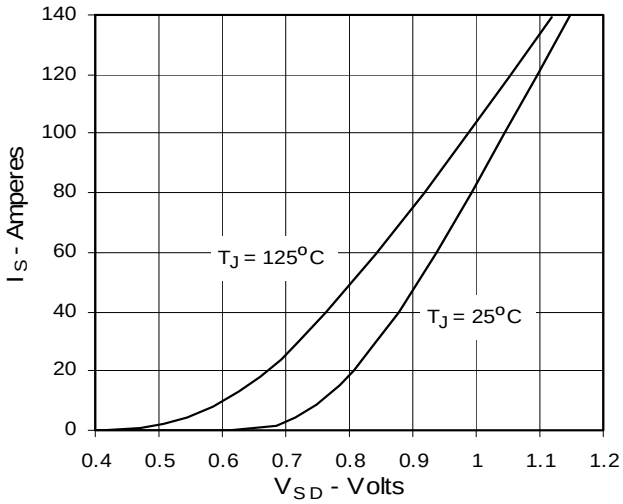


Fig. 10. Gate Charge

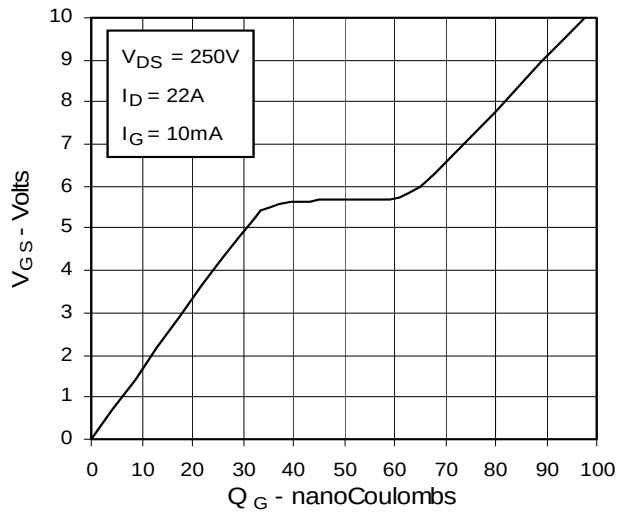


Fig. 11. Capacitance

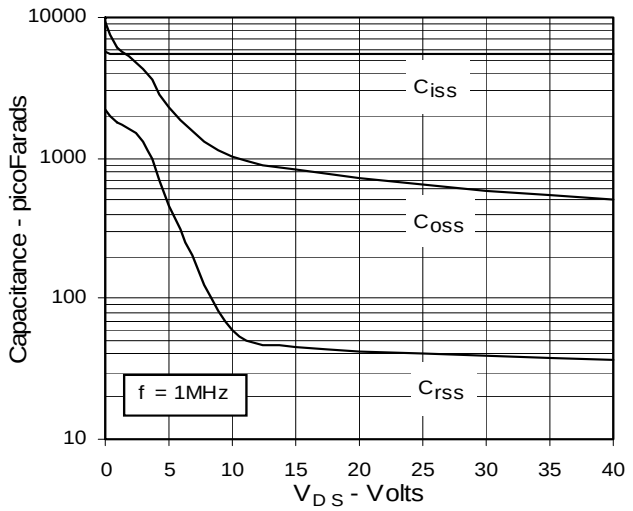


Fig. 12. Forward-Bias Safe Operating Area

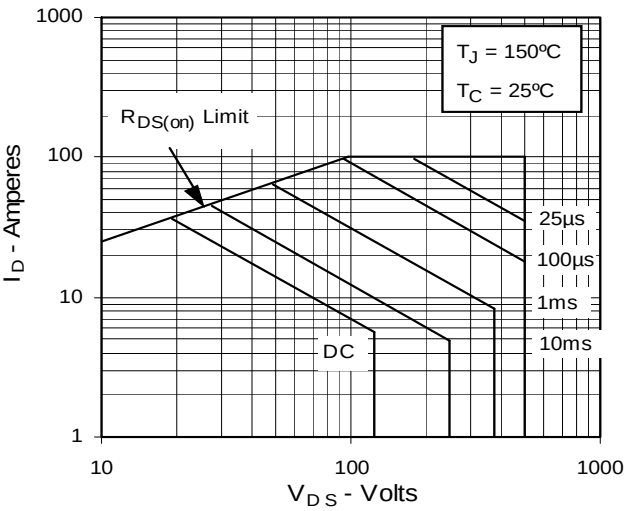


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Fig. 13. Maximum Transient Thermal Resistance