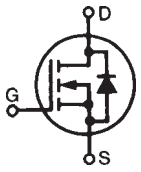
IXYS

PolarHV™ HiPerFET Power MOSFET

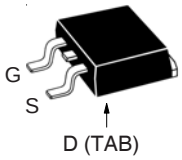
N-Channel Enhancement Mode
Avalanche Rated
Fast Intrinsic Diode

IXFA10N80P
IXFP10N80P
IXFQ10N80P
IXFH10N80P

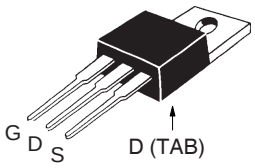


V_{DSS} = 800V
I_{D25} = 10A
$R_{DS(on)}$ ≤ 1.1Ω
t_{rr} ≤ 250ns

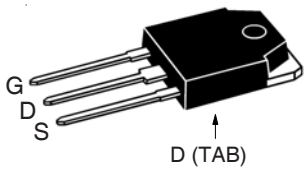
TO-263 AA (IXFA)



TO-220AB (IXFP)



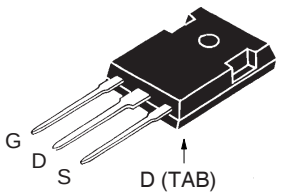
TO-3P (IXFQ)



Symbol	Test Conditions	Maximum Ratings	
V_{DSS}	T_J = 25°C to 150°C	800	V
V_{DGR}	T_J = 25°C to 150°C, R_{GS} = 1MΩ	800	V
V_{GSS}	Continuous	±30	V
V_{GSM}	Transient	±40	V
I_{D25}	T_C = 25°C	10	A
I_{DM}	T_C = 25°C, Pulse Width Limited by T_{JM}	30	A
I_A	T_C = 25°C	5	A
E_{AS}	T_C = 25°C	600	mJ
dV/dt	$I_S \le I_{DM}$, $V_{DD} \le V_{DSS}$, $T_J \le 150°C$	10	V/ns
P_D	T_C = 25°C	300	W
T_J		-55 ... +150	°C
T_{JM}		150	°C
T_{stg}		-55 ... +150	°C
T_L	1.6mm (0.062) from Case for 10s	300	°C
T_{SOLD}	Plastic Body for 10s	260	°C
M_d	Mounting Torque (TO-220,TO-247)	1.13 / 10	Nm/lb.in.
Weight	TO-263	2.5	g
	TO-220	3.0	g
	TO-3P	5.5	g
	TO-247	6.0	g

Symbol	Test Conditions (T_J = 25°C Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max.	
BV_{DSS}	V_{GS} = 0V, I_D = 250μA	800			V
$V_{GS(th)}$	$V_{DS} = V_{GS}$, I_D = 2.5mA	3.0		5.5	V
I_{GSS}	V_{GS} = ± 30V, V_{DS} = 0V			±100	nA
I_{DSS}	$V_{DS} = V_{DSS}$, V_{GS} = 0V			25	μA
	T_J = 150°C			500	μA
$R_{DS(on)}$	V_{GS} = 10V, $I_D = 0.5 \bullet I_{D25}$, Note 1			1.1	Ω

TO-247 (IXFH)



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

Features

- International Standard Packages
- Avalanche Rated
- Low Package Inductance
- Easy to Drive and to Protect

Advantages

- Easy to Mount
- Space Savings
- High Power Density

Applications

- Switched-Mode and Resonant-Mode Power Supplies
- DC-DC Converters
- Laser Drivers
- AC and DC Motor Drives
- Robotics and Servo Controls

Symbol	Test Conditions (T_J = 25°C, Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max	
g_{fs}	V_{DS}= 20V, I_D = 0.5 • I_{D25}, Note 1	7	11		S
C_{iss}	V_{GS} = 0V, V_{DS} = 25V, f = 1MHz		2050		pF
C_{oss}			172		pF
C_{rss}			16		pF
$t_{d(on)}$	**Resistive Switching Times**		21		ns
t_r	V_{GS} = 10V, V_{DS} = 0.5 • V_{DSS}, I_D = 0.5 • I_{D25}		22		ns
$t_{d(off)}$	R_G = 5Ω (External)		62		ns
t_f			22		ns
$Q_{g(on)}$	V_{GS}= 10V, V_{DS} = 0.5 • V_{DSS}, I_D = 0.5 • I_{D25}		40		nC
Q_{gs}			12		nC
Q_{gd}			14		nC
R_{thJC}				0.42	°C/W
R_{thCS}	(TO-220)		0.50		°C/W
R_{thCS}	(TO-247 & TO-3P)		0.25		°C/W

Source-Drain Diode

Symbol	Test Conditions (T_J = 25°C, Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max	
I_S	V_{GS} = 0V			10	A
I_{SM}	Repetitive, Pulse WidthLlimited by T_{JM}			30	A
V_{SD}	I_F = I_S, V_{GS} = 0V, Note 1			1.5	V
t_{rr}	I_F = 10A, V_{GS} = 0V		200	250	ns
I_{RM}	-di/dt = 100A/μs		3.0		A
Q_{RM}	V_R = 100V		0.6		μC

Note 1. Pulse test, t ≤ 300 μs, duty cycle d ≤ 2 %

Fig. 1. Forward-Bias Safe Operating Area

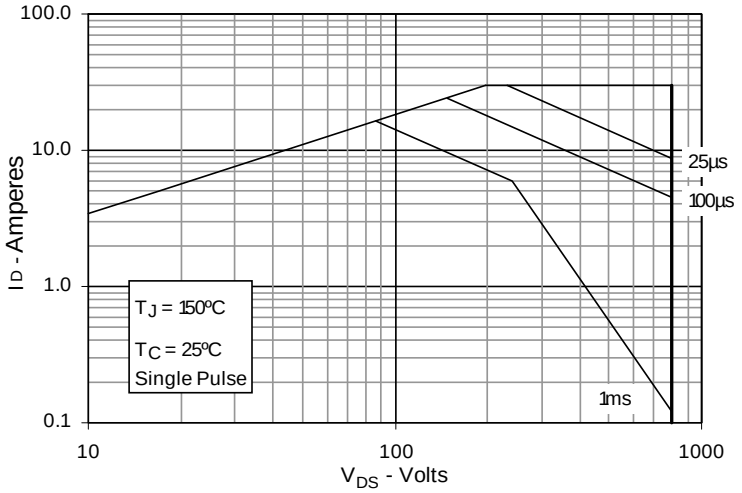


Fig. 2. Output Characteristics @ 25ºC

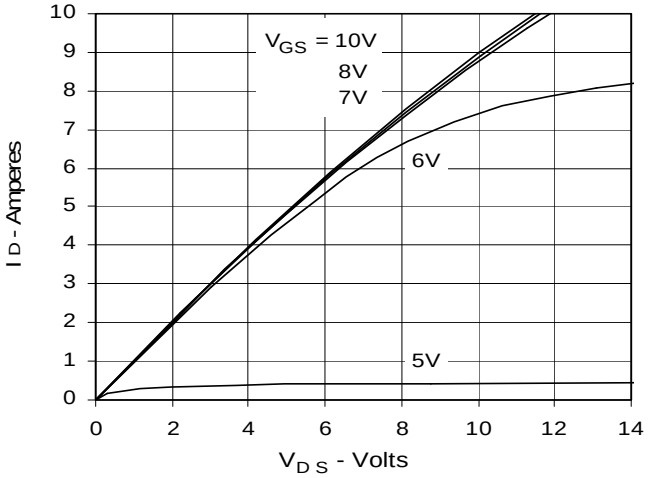


Fig. 3. Extended Output Characteristics @ 25ºC

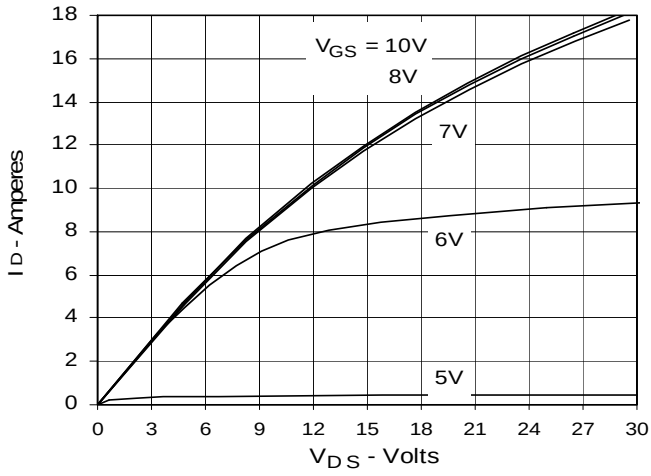


Fig. 4. Output Characteristics @ 125ºC

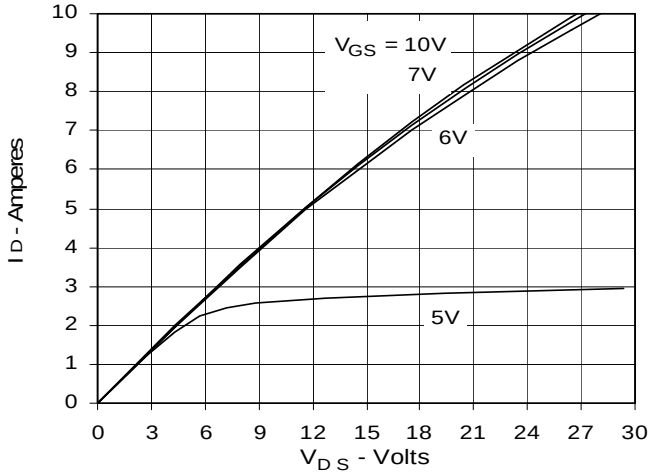


Fig. 5. $R_{DS(on)}$ Normalized to 0.5 I_{D25} Value vs. Junction Temperature

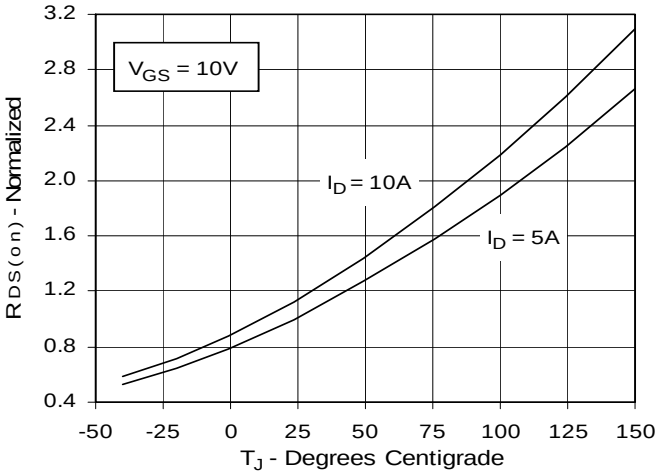


Fig. 6. $R_{DS(on)}$ Normalized to 0.5 I_{D25} Value vs. I_D

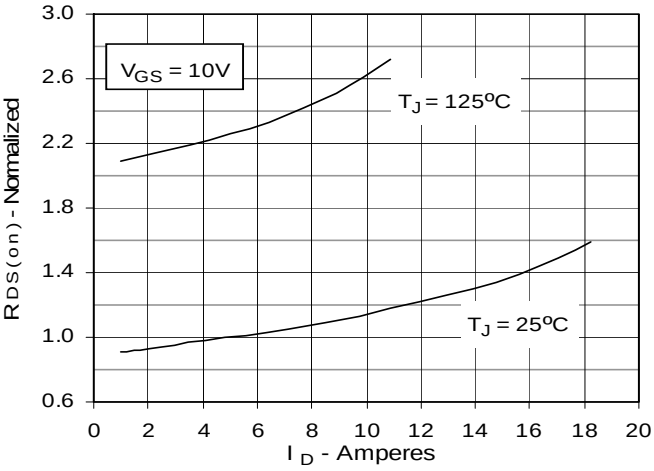


Fig. 7. Drain Current vs. Case Temperature

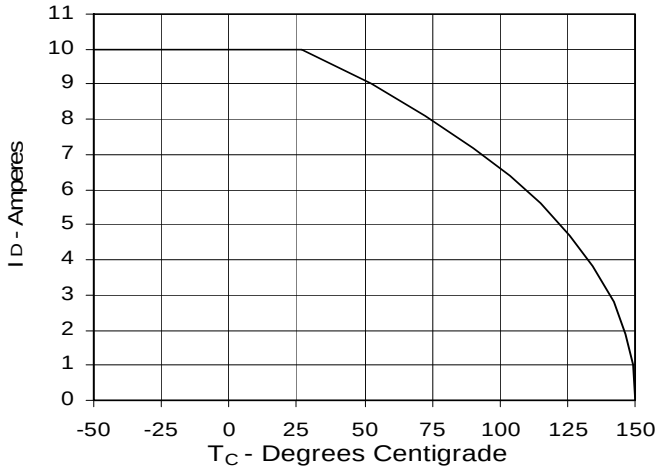


Fig. 8. Input Admittance

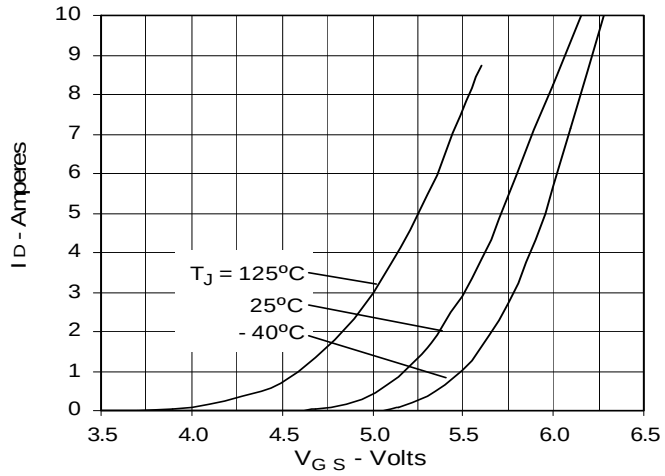


Fig. 9. Transconductance

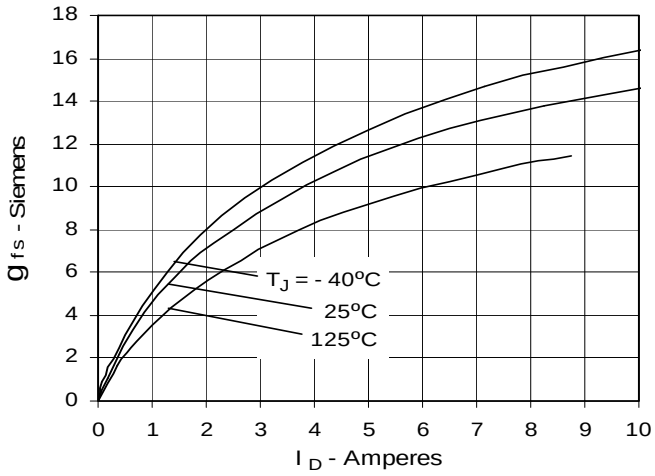


Fig. 10. Source Current vs. Source-To-Drain Voltage

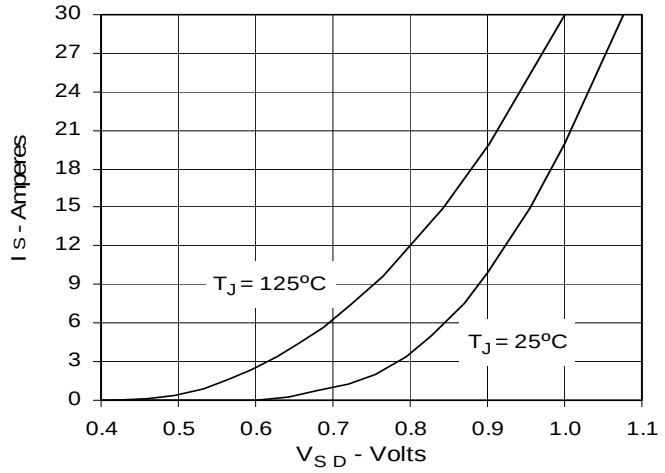


Fig. 11. Gate Charge

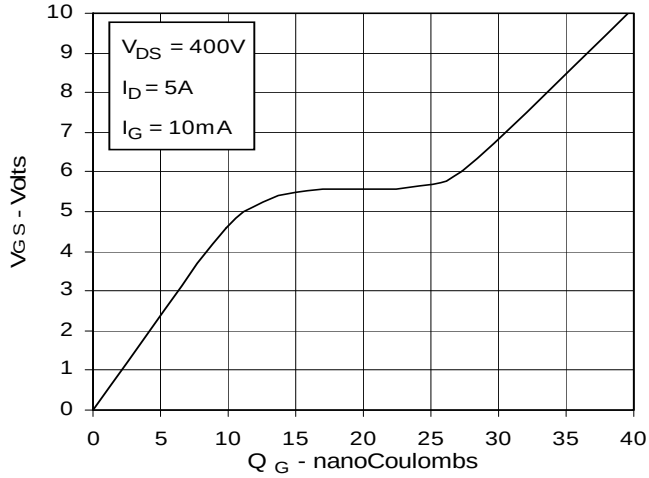


Fig. 12. Capacitance

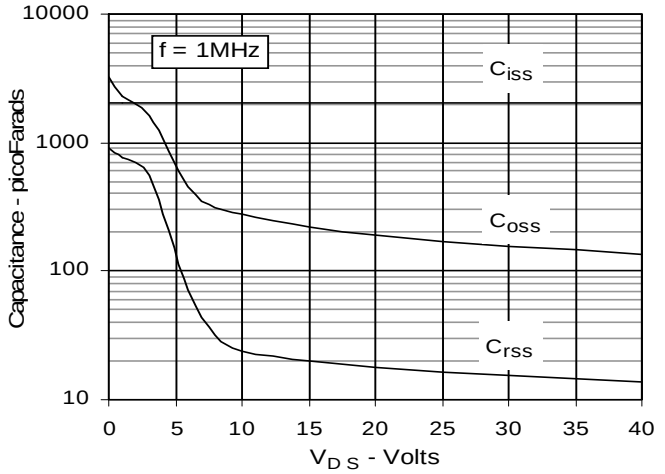
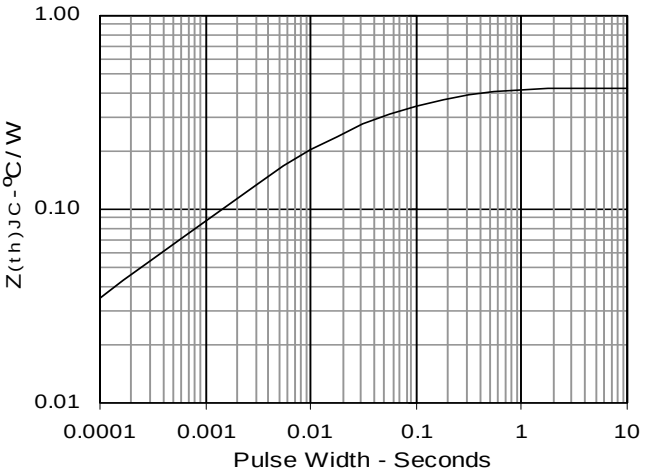
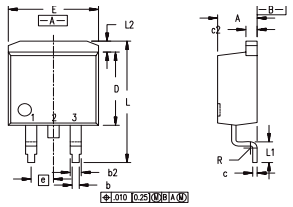


Fig. 13. Maximum Transient Thermal Impedance



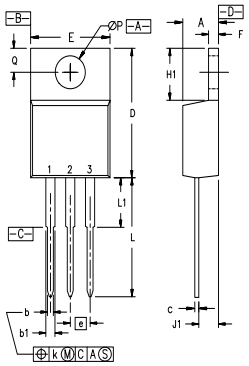
TO-263 (IXFA) Outline



1. Gate
2. Collector
3. Emitter
4. Collector
   Bottom
   Side

Dim.	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	4.06	4.83	.160	.190
b	0.51	0.99	.020	.039
b2	1.14	1.40	.045	.055
c	0.40	0.74	.016	.029
c2	1.14	1.40	.045	.055
D	8.64	9.65	.340	.380
D1	8.00	8.89	.280	.320
E	9.65	10.41	.380	.405
E1	6.22	8.13	.270	.320
e	2.54	BSC	.100	BSC
L	14.61	15.88	.575	.625
L1	2.29	2.79	.090	.110
L2	1.02	1.40	.040	.055
L3	1.27	1.78	.050	.070
L4	0	0.13	0	.005

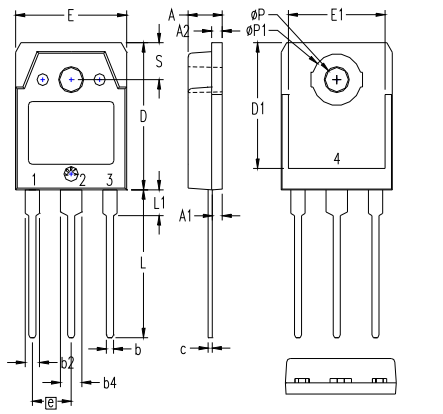
TO-220 (IXFP) Outline



Pins: 1 - Gate 2 - Drain
3 - Source 4 - Drain

SYM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.170	.190	4.32	4.83
b	.025	.040	0.64	1.02
b1	.045	.065	1.15	1.65
c	.014	.022	0.35	0.56
D	.580	.630	14.73	16.00
E	.390	.420	9.91	10.66
e	.100 BSC		2.54 BSC	
F	.045	.055	1.14	1.40
H1	.230	.270	5.85	6.85
J1	.090	.110	2.29	2.79
k	0	.015	0	0.38
L	.500	.550	12.70	13.97
L1	.110	.230	2.79	5.84
ØP	.139	.161	3.53	4.08
Q	.100	.125	2.54	3.18

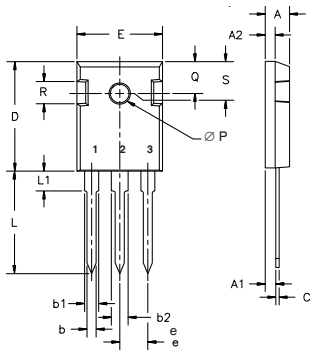
TO-3P (IXFQ) Outline



Pins: 1 - Gate 2 - Drain
3 - Source 4 - Drain

SYM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.185	.193	4.70	4.90
A1	.051	.059	1.30	1.50
A2	.057	.065	1.45	1.65
b	.035	.045	0.90	1.15
b2	.075	.087	1.90	2.20
b4	.114	.126	2.90	3.20
c	.022	.031	0.55	0.80
D	.780	.799	19.80	20.30
D1	.665	.677	16.90	17.20
E	.610	.622	15.50	15.80
E1	.531	.539	13.50	13.70
e	.215 BSC		5.45 BSC	
L	.779	.795	19.80	20.20
L1	.134	.142	3.40	3.60
øP	.126	.134	3.20	3.40
øP1	.272	.280	6.90	7.10
S	.193	.201	4.90	5.10

TO-247 (IXFH) Outline



Pins: 1 - Gate 2 - Drain
3 - Source 4 - Drain

Dim.	Millimeter		Inches	
	Min.	Max.	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	

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IXYS:

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