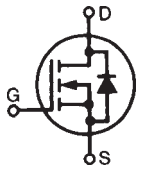
IXYS

Polar™ Power MOSFET HiPerFET™

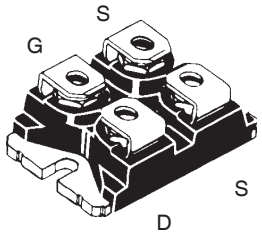
IXFN20N120P

V_{DSS} = 1200V
I_{D25} = 20A
$R_{DS(on)}$ ≤ 570mΩ
t_{rr} ≤ 300ns

N-Channel Enhancement Mode
Avalanche Rated
Fast Intrinsic Diode



miniBLOC, SOT-227 B (IXFN)
E153432



G = Gate D = Drain
S = Source

Either Source terminal S can be used as the Source terminal or the Kelvin Source (gate return) terminal.

Symbol	Test Conditions		Maximum Ratings	
V_{DSS}	T_J = 25°C to 150°C		1200	V
V_{DGR}	T_J = 25°C to 150°C, R_{GS} = 1MΩ		1200	V
V_{GSS}	Continuous		± 30	V
V_{GSM}	Transient		± 40	V
I_{D25}	T_C = 25°C		20	A
I_{DM}	T_C = 25°C, pulse width limited by T_{JM}		50	A
I_A	T_C = 25°C		10	A
E_{AS}	T_C = 25°C		1	J
dV/dt	$I_S \le I_{DM}$, $V_{DD} \le V_{DSS}$, $T_J \le 150°C$		20	V/ns
P_D	T_C = 25°C		595	W
T_J			-55 ... +150	°C
T_{JM}			150	°C
T_{stg}			-55 ... +150	°C
T_L	1.6mm (0.062 in.) from case for 10s		300	°C
V_{ISOL}	50/60 Hz, RMS	t = 1min	2500	V~
	$I_{ISOL} \le$ 1mA	t = 1s	3000	V~
M_d	Mounting torque		1.5/13	Nm/lb.in.
	Terminal connection torque		1.3/11.5	Nm/lb.in.
Weight			30	g

Symbol	Test Conditions (T_J = 25°C, unless otherwise specified)	Characteristic Values Min.	Typ.	Max.	
BV_{DSS}	V_{GS} = 0V, I_D = 1mA	1200			V
$V_{GS(th)}$	$V_{DS} = V_{GS}$, I_D = 1mA	3.5		6.5	V
I_{GSS}	V_{GS} = ± 30V, V_{DS} = 0V			± 200	nA
I_{DSS}	$V_{DS} = V_{DSS}$			25	μA
	V_{GS} = 0V, T_J = 125°C			5	mA
$R_{DS(on)}$	V_{GS} = 10V, I_D = 10A, Note 1			570	mΩ

Features

- International standard package
- Encapsulating epoxy meets UL 94 V-0, flammability classification
- miniBLOC with Aluminium nitride isolation
- Fast recovery diode
- Unclamped Inductive Switching (UIS) rated
- Low package inductance
  - easy to drive and to protect

Advantages

- Easy to mount
- Space savings
- High power density

Applications:

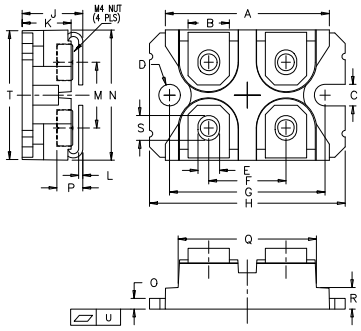
- High Voltage Switched-mode and resonant-mode power supplies
- High Voltage Pulse Power Applications
- High Voltage Discharge circuits in Lasers Pulsers, Spark Igniters, RF Generators
- High Voltage DC-DC converters
- High Voltage DC-AC inverters

Symbol	Test Conditions (T_J = 25°C unless otherwise specified)	Characteristic Values Min.	Typ.	Max.	
g_{fs}	V_{DS} = 20V, I_D = 10A, Note 1	10	16		S
C_{iss}	V_{GS} = 0V, V_{DS} = 25V, f = 1MHz		11.1		nF
C_{oss}			600		pF
C_{rss}			60		pF
R_{Gi}	Gate input resistance		1.60		Ω
$t_{d(on)}$	**Resistive Switching Times**		49		ns
t_r	V_{GS} = 10V, V_{DS} = 0.5 • V_{DSS}, I_D = 10A		45		ns
$t_{d(off)}$	R_G = 1Ω (External)		72		ns
t_f			70		ns
$Q_{g(on)}$	V_{GS} = 10V, V_{DS} = 0.5 • V_{DSS}, I_D = 10A		193		nC
Q_{gs}			74		nC
Q_{gd}			85		nC
R_{thJC}				0.21	°C/W
R_{thCS}			0.05		°C/W

Source-Drain Diode (T_J = 25°C unless otherwise specified)		Characteristic Values Min.	Typ.	Max.	
I_S	V_{GS} = 0V			20	A
I_{SM}	Repetitive, pulse width limited by T_{JM}			80	A
V_{SD}	I_F = I_S, V_{GS} = 0V, Note 1			1.5	V
t_{rr}	I_F = 10A, -di/dt = 100A/μs			300	ns
Q_{RM}	V_R = 100V		0.84		μC
I_{RM}			9		A

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

SOT-227B Outline



SYM	INCHES MIN	INCHES MAX	MILLIMETERS MIN	MILLIMETERS MAX
A	1.240	1.255	31.50	31.88
B	.307	.323	7.80	8.20
C	.161	.169	4.09	4.29
D	.161	.169	4.09	4.29
E	.161	.169	4.09	4.29
F	.587	.595	14.91	15.11
G	1.186	1.193	30.12	30.30
H	1.496	1.505	38.00	38.23
J	.460	.481	11.68	12.22
K	.351	.378	8.92	9.60
L	.030	.033	0.76	0.84
M	.496	.506	12.60	12.85
N	.990	1.001	25.15	25.42
O	.078	.084	1.98	2.13
P	.195	.235	4.95	5.97
Q	1.045	1.059	26.54	26.90
R	.155	.174	3.94	4.42
S	.186	.191	4.72	4.85
T	.968	.987	24.59	25.07
U	-.002	.004	-0.05	0.1

Fig. 1. Output Characteristics @ 25ºC

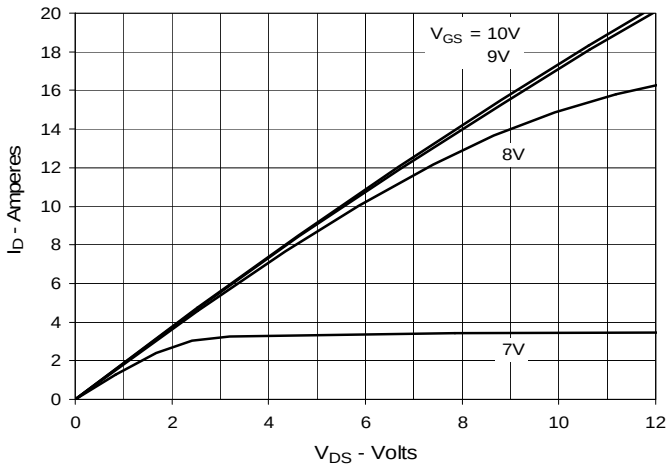


Fig. 2. Extended Output Characteristics @ 25ºC

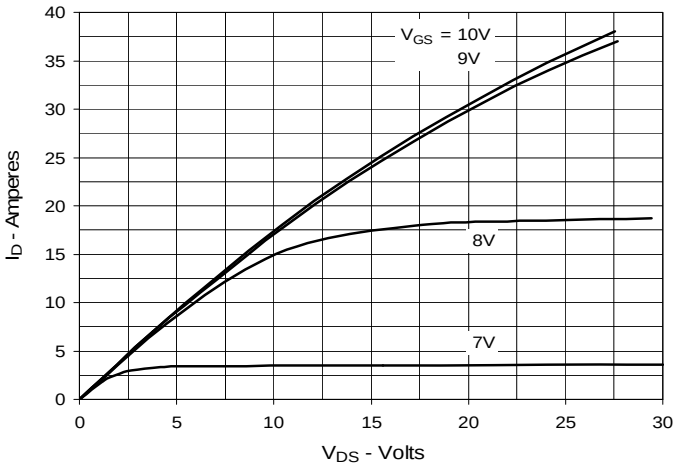


Fig. 3. Output Characteristics @ 125ºC

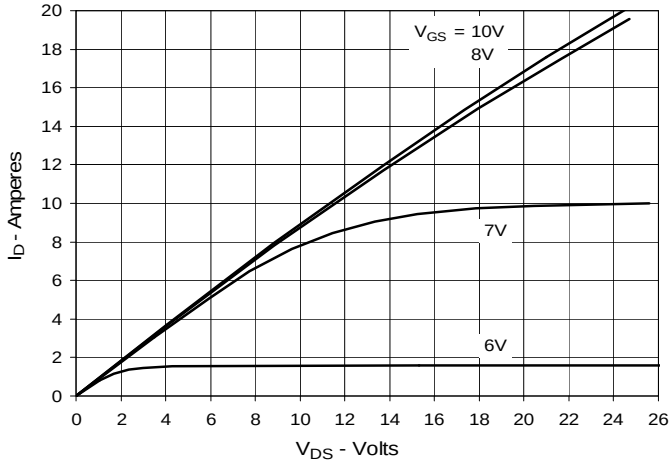


Fig. 4. $R_{DS(on)}$ Normalized to I_D = 10A Value vs. Junction Temperature

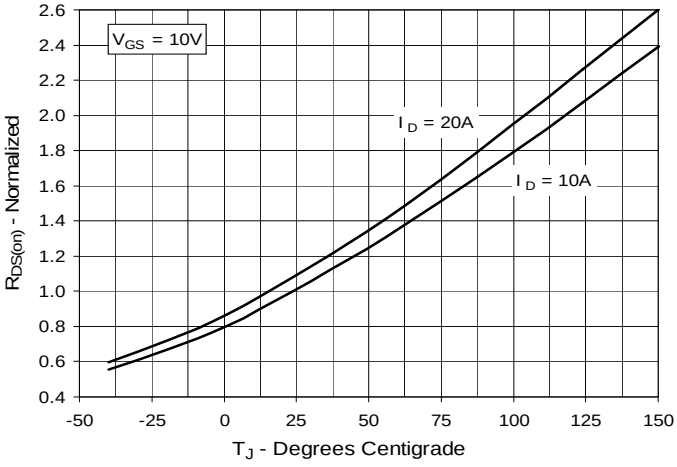


Fig. 5. $R_{DS(on)}$ Normalized to I_D = 10A Value vs. Drain Current

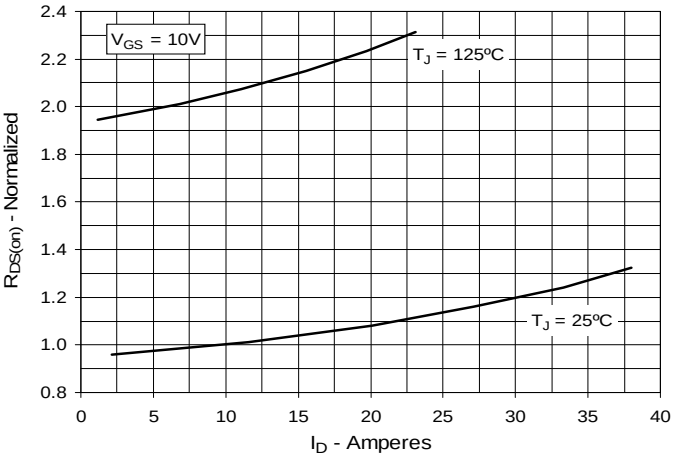


Fig. 6. Maximum Drain Current vs. Case Temperature

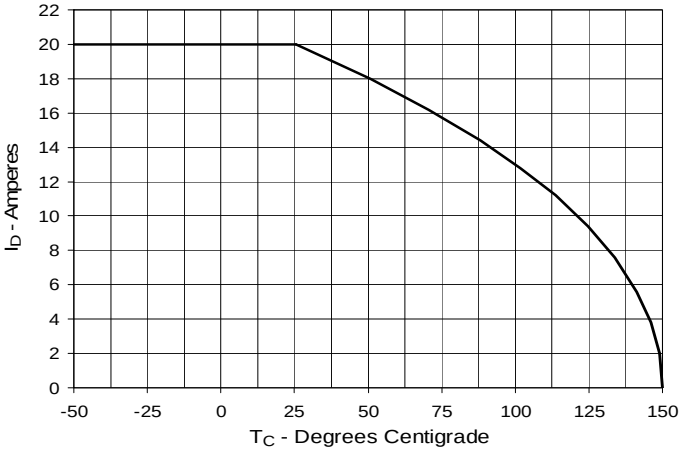


Fig. 7. Input Admittance

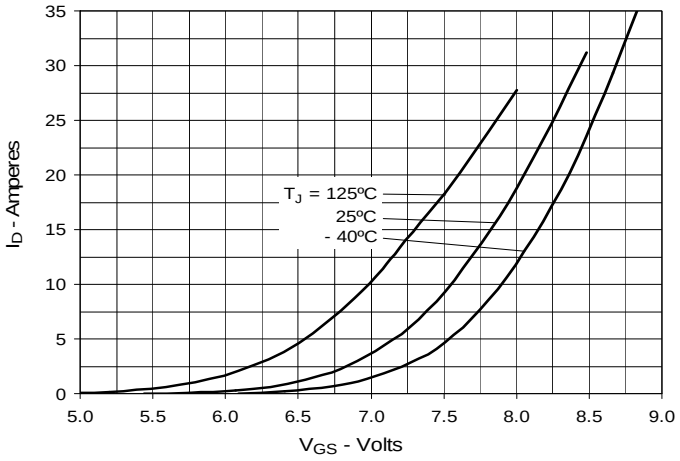


Fig. 8. Transconductance

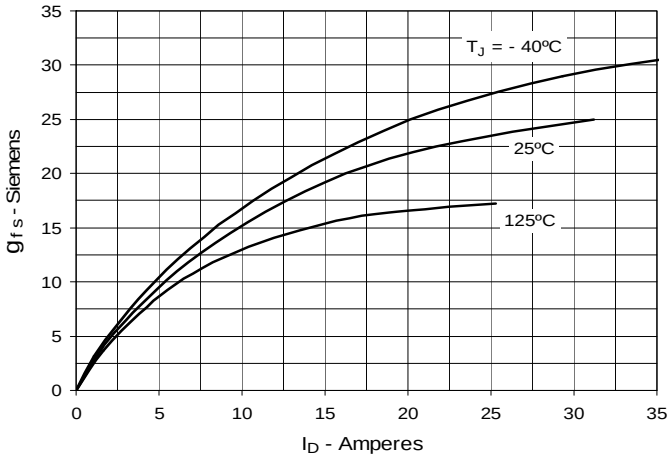


Fig. 9. Forward Voltage Drop of Intrinsic Diode

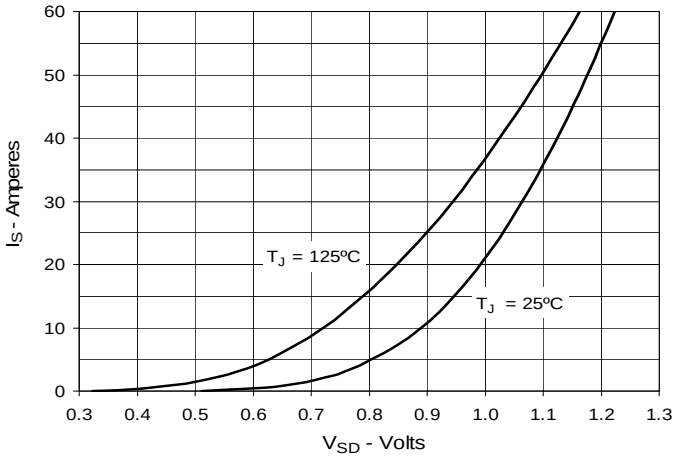


Fig. 10. Gate Charge

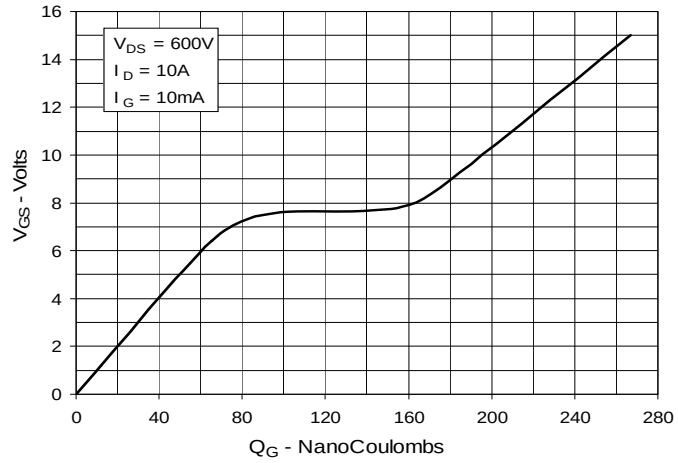


Fig. 11. Capacitance

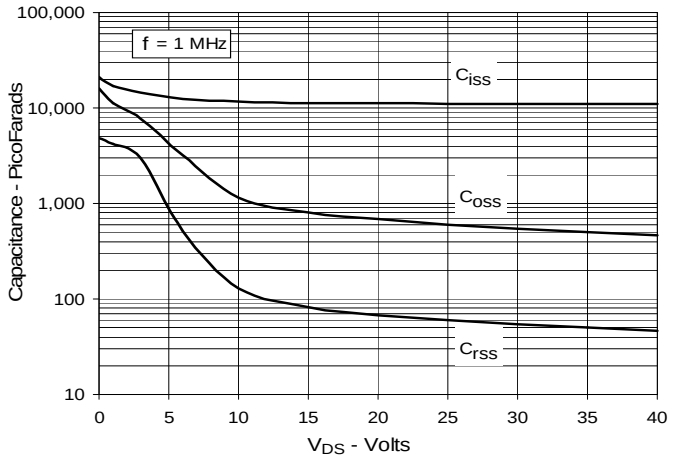


Fig. 12. Maximum Transient Thermal Impedance