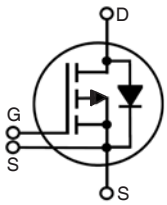
IXYS

PolarP™ Power MOSFET

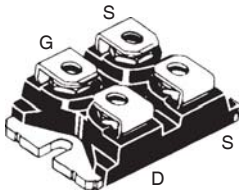
IXTN90P20P

V_{DSS} = - 200V
I_{D25} = - 90A
$R_{DS(on)}$ ≤ 44mΩ

P-Channel Enhancement Mode
Avalanche Rated



miniBLOC
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		- 200	V
V_{DGR}	T_J = 25°C to 150°C, R_{GS} = 1MΩ		- 200	V
V_{GSS}	Continuous		±20	V
V_{GSM}	Transient		±30	V
I_{D25}	T_C = 25°C		- 90	A
I_{DM}	T_C = 25°C, Pulse Width Limited by T_{JM}		- 270	A
I_A	T_C = 25°C		- 90	A
E_{AS}	T_C = 25°C		3.5	J
dv/dt	I_S ≤ I_{DM}, V_{DD} ≤ V_{DSS}, T_J ≤ 150°C		10	V/ns
P_D	T_C = 25°C		890	W
T_J			-55 ... +150	°C
T_{JM}			150	°C
T_{stg}			-55 ... +150	°C
V_{ISOL}	50/60 Hz, RMS	t = 1 minute	2500	V~
	I_{ISOL} ≤ 1mA	t = 1 second	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 = - 250μA	- 200			V
$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = -1mA	- 2.0		- 4.5	V
I_{GSS}	V_{GS} = ±20V, V_{DS} = 0V			±100	nA
I_{DSS}	V_{DS} = V_{DSS}, V_{GS} = 0V			- 50	μA
	T_J = 125°C			- 250	μA
$R_{DS(on)}$	V_{GS} = -10V, I_D = 0.5 • I_{D25}, Note 1			44	mΩ

Features

- International Standard Package
- miniBLOC, with Aluminium Nitride Isolation
- Rugged PolarP™ Process
- Avalanche Rated
- Low Package Inductance

Advantages

- Easy to Mount
- Space Savings
- High Power Density

Applications

- High-Side Switches
- Push Pull Amplifiers
- DC Choppers
- Automatic Test Equipment
- Current Regulators

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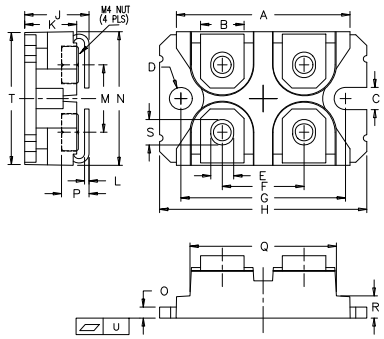
Symbol	Test Conditions (T_J = 25°C, Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max.	
g_{fs}	V_{DS} = -10V, I_D = 0.5 • I_{D25}, Note 1	30	51		S
C_{iss}	V_{GS} = 0V, V_{DS} = - 25V, f = 1MHz		12		nF
C_{oss}			2210		pF
C_{rss}			250		pF
$t_{d(on)}$	**Resistive Switching Times**		32		ns
t_r	V_{GS} = -10V, V_{DS} = 0.5 • V_{DSS}, I_D = 0 .5 • I_{D25}		60		ns
$t_{d(off)}$	R_G = 1Ω (External)		89		ns
t_f			28		ns
$Q_{g(on)}$	V_{GS} = -10V, V_{DS} = 0.5 • V_{DSS}, I_D = 0.5 • I_{D25}		205		nC
Q_{gs}			45		nC
Q_{gd}			80		nC
R_{thJC}				0.14	°C/W
R_{thCS}			0.05		°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			- 90	A
I_{SM}	Repetitive, Pulse Width Limited by T_{JM}			- 360	A
V_{SD}	I_F = - 45A, V_{GS} = 0V, Note 1			- 3.2	V
t_{rr}	I_F = - 45A, -di/dt = -150A/µs		315		ns
Q_{RM}	V_R = -100V, V_{GS} = 0V		6.6		µC
I_{RM}			- 42		A

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

SOT-227B (IXTN) Outline



(M4 screws (4x) supplied)

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

IXYS Reserves the Right to Change Limits, Test Conditions, and Dimensions.

IXYS MOSFETs and IGBTs are covered by one or more of the following U.S. patents: 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 7,005,734 B2 7,157,338B2 4,860,072 5,017,508 5,063,307 5,381,025 6,259,123 B1 6,534,343 6,710,405 B2 6,759,692 7,063,975 B2 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 7,071,537

Fig. 1. Output Characteristics @ T_J = 25ºC

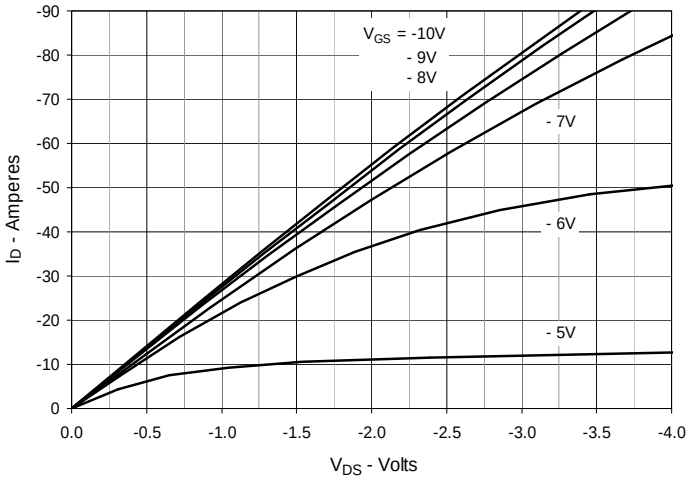


Fig. 2. Extended Output Characteristics @ T_J = 25ºC

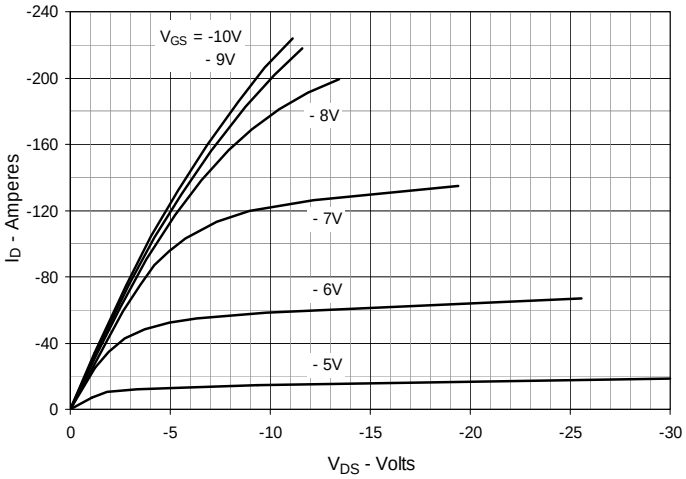


Fig. 3. Output Characteristics @ T_J = 125ºC

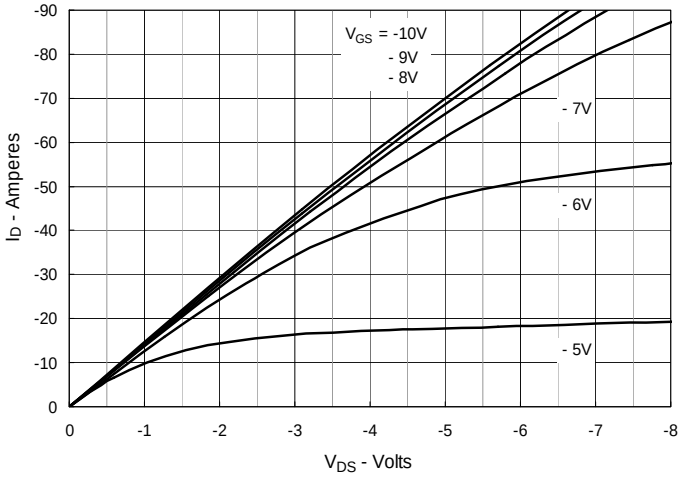


Fig. 4. $R_{DS(on)}$ Normalized to I_D = - 45A Value vs. Junction Temperature

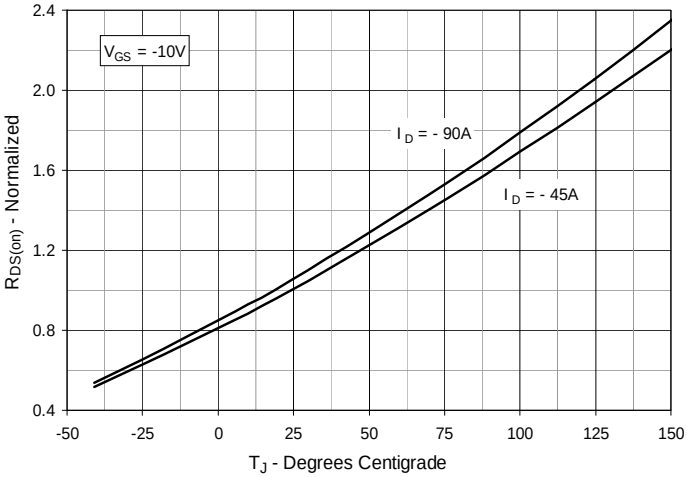


Fig. 5. $R_{DS(on)}$ Normalized to I_D = - 45A Value vs. Drain Current

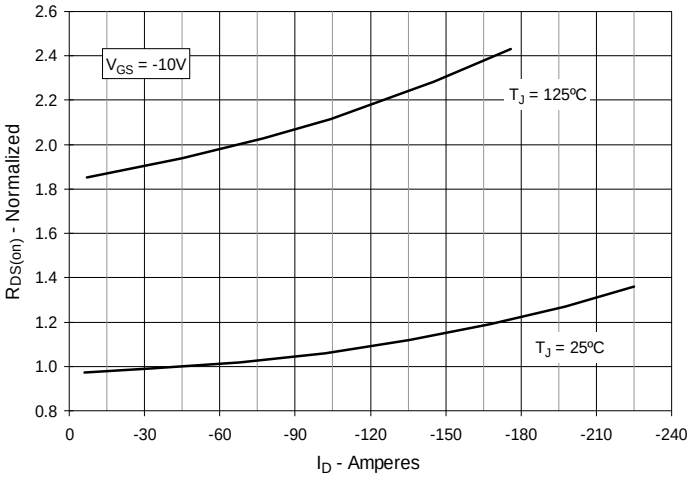


Fig. 6. Maximum Drain Current vs. Case Temperature

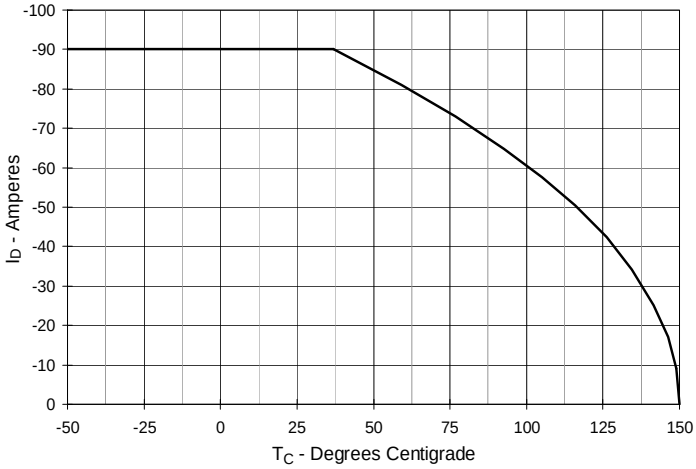


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Fig. 7. Input Admittance

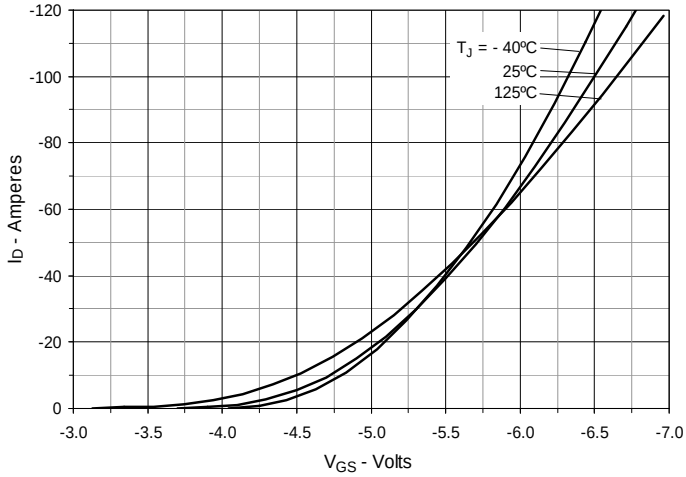

Fig. 8. Transconductance

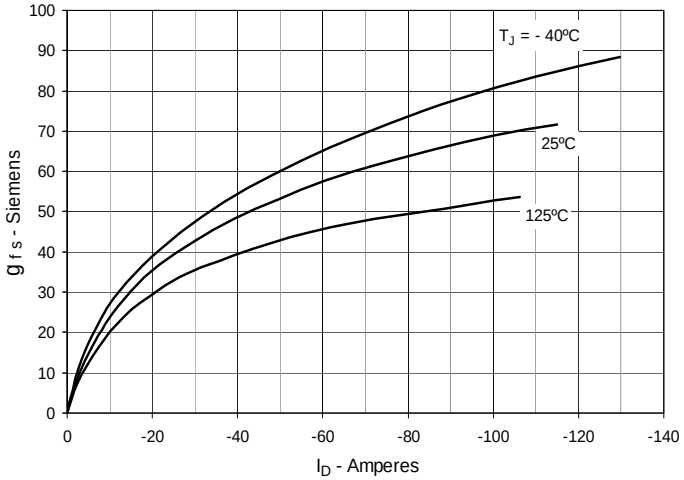

Fig. 9. Forward Voltage Drop of Intrinsic Diode

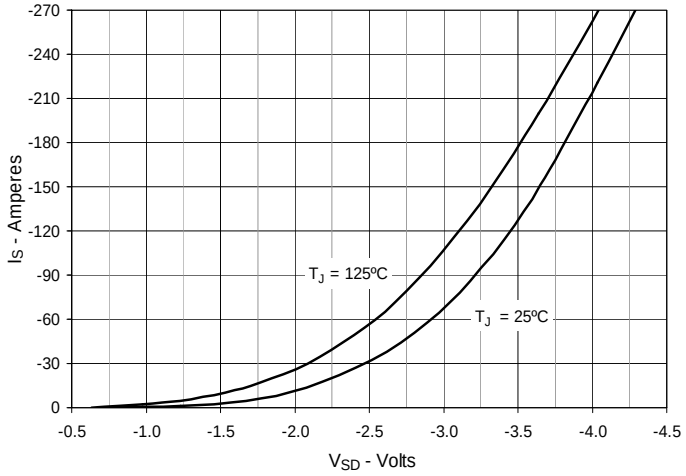

Fig. 10. Gate Charge

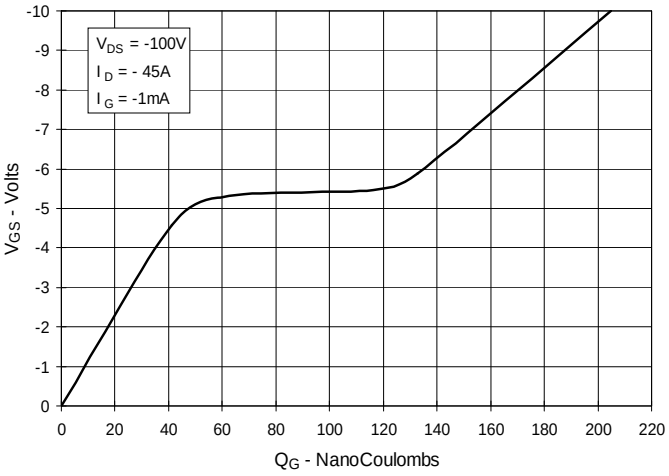

Fig. 11. Capacitance

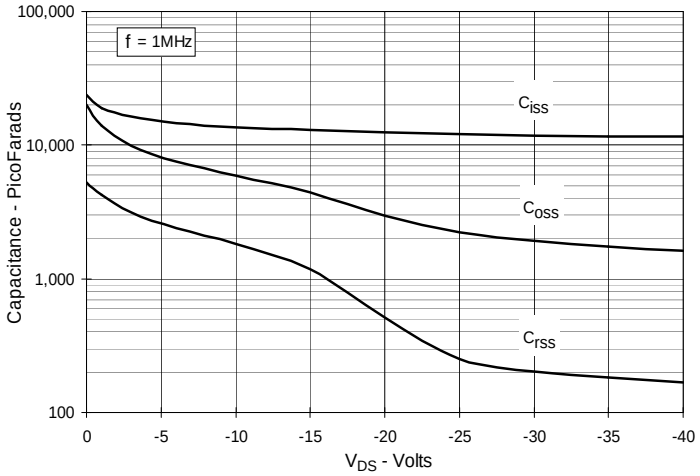

Fig. 12. Forward-Bias Safe Operating Area

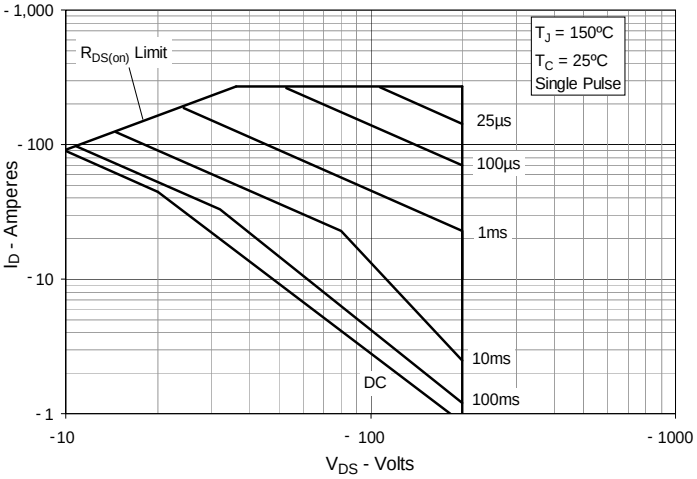

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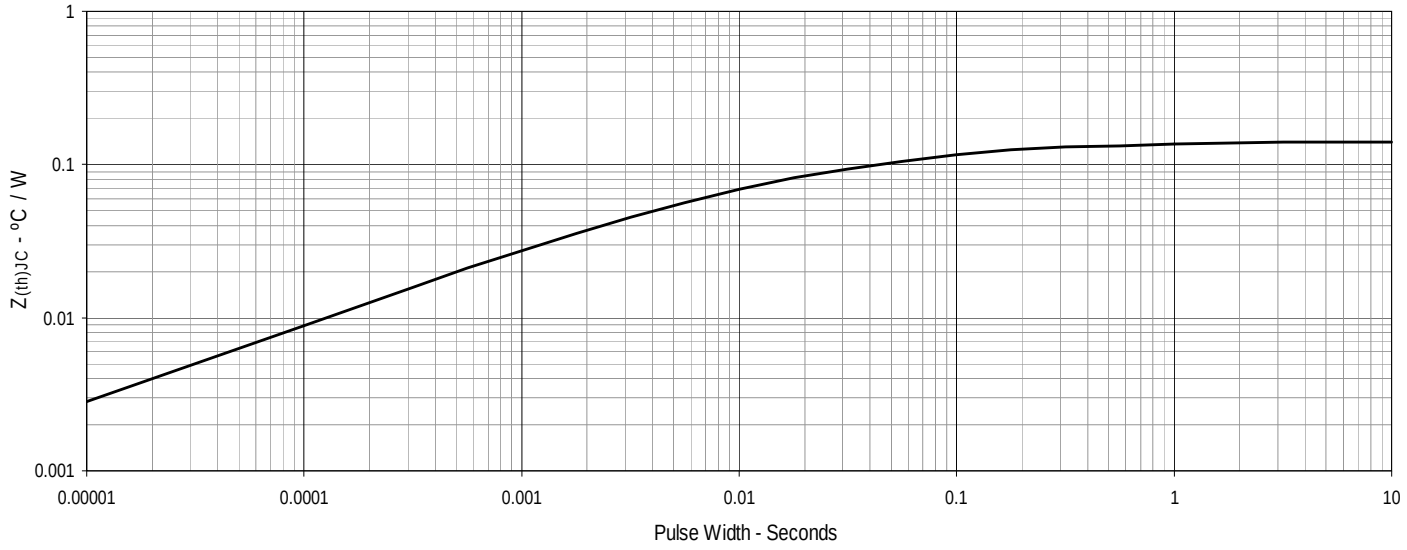
Fig. 13. Maximum Transient Thermal Impedance



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