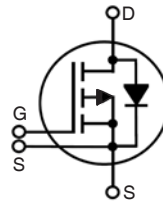


# PolarP™ Power MOSFET

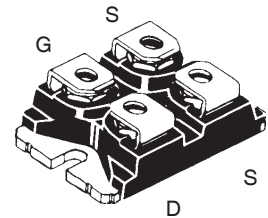
## IXTN40P50P

$V_{DSS} = -500V$   
 $I_{D25} = -40A$   
 $R_{DS(on)} \leq 230m\Omega$

P-Channel Enhancement Mode  
Avalanche Rated



miniBLOC, SOT-227  
 E153432



G = Gate      D = Drain  
 S = Source

Either Source Terminal at miniBLOC can be used as Main or Kelvin Source.

Symbol	Test Conditions	Maximum Ratings	
$V_{DSS}$	$T_J = 25^\circ C$ to $150^\circ C$	- 500	V
$V_{DGR}$	$T_J = 25^\circ C$ to $150^\circ C$ , $R_{GS} = 1M\Omega$	- 500	V
$V_{GSS}$	Continuous	$\pm 20$	V
$V_{GSM}$	Transient	$\pm 30$	V
$I_{D25}$	$T_C = 25^\circ C$	- 40	A
$I_{DM}$	$T_C = 25^\circ C$ , Pulse Width Limited by $T_{JM}$	- 120	A
$I_A$	$T_C = 25^\circ C$	- 40	A
$E_{AS}$	$T_C = 25^\circ C$	3.5	J
$dv/dt$	$I_S \leq I_{DM}$ , $V_{DD} \leq V_{DSS}$ , $T_J \leq 150^\circ C$	10	V/ns
$P_D$	$T_C = 25^\circ C$	890	W
$T_J$		-55 ... +150	$^\circ C$
$T_{JM}$		150	$^\circ C$
$T_{stg}$		-55 ... +150	$^\circ C$
$V_{ISOL}$	50/60 Hz, RMS $t = 1$ minute	2500	V~
	$I_{ISOL} \leq 1mA$ $t = 1$ second	3000	V~
$M_d$	Mounting Torque	1.5/13	Nm/lb.in
	Terminal Connection Torque	1.3/11.5	Nm/lb.in
<b>Weight</b>		30	g

### 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

Symbol	Test Conditions ( $T_J = 25^\circ C$ , Unless Otherwise Specified)	Characteristic Values		
		Min.	Typ.	Max.
$BV_{DSS}$	$V_{GS} = 0V$ , $I_D = -250\mu A$	- 500		V
$V_{GS(th)}$	$V_{DS} = V_{GS}$ , $I_D = -1mA$	- 2.0		- 4.5 V
$I_{GSS}$	$V_{GS} = \pm 20V$ , $V_{DS} = 0V$			$\pm 100$ nA
$I_{DSS}$	$V_{DS} = V_{DSS}$ , $V_{GS} = 0V$ $T_J = 125^\circ C$			- 50 $\mu A$ - 250 $\mu A$
$R_{DS(on)}$	$V_{GS} = -10V$ , $I_D = 0.5 \cdot I_{D25}$ , Note 1			230 m $\Omega$

Symbol	Test Conditions ( $T_J = 25^\circ\text{C}$ , Unless Otherwise Specified)	Characteristic Values		
		Min.	Typ.	Max.
$g_{fs}$	$V_{DS} = -10\text{V}$ , $I_D = 0.5 \cdot I_{D25}$ , Note 1	23	38	S
$C_{iss}$	$V_{GS} = 0\text{V}$ , $V_{DS} = -25\text{V}$ , $f = 1\text{MHz}$		11.5	nF
$C_{oss}$			1150	pF
$C_{rss}$			93	pF
$t_{d(on)}$	<b>Resistive Switching Times</b> $V_{GS} = -10\text{V}$ , $V_{DS} = 0.5 \cdot V_{DSS}$ , $I_D = 0.5 \cdot I_{D25}$ $R_G = 1\Omega$ (External)		37	ns
$t_r$			59	ns
$t_{d(off)}$			90	ns
$t_f$			34	ns
$Q_{g(on)}$	$V_{GS} = -10\text{V}$ , $V_{DS} = 0.5 \cdot V_{DSS}$ , $I_D = 0.5 \cdot I_{D25}$		205	nC
$Q_{gs}$			55	nC
$Q_{gd}$			75	nC
$R_{thJC}$				0.14 $^\circ\text{C/W}$
$R_{thCS}$		0.05		$^\circ\text{C/W}$

### Source-Drain Diode

Symbol	Test Conditions ( $T_J = 25^\circ\text{C}$ , Unless Otherwise Specified)	Characteristic Values		
		Min.	Typ.	Max.
$I_S$	$V_{GS} = 0\text{V}$			- 40 A
$I_{SM}$	Repetitive, Pulse Width Limited by $T_{JM}$			-160 A
$V_{SD}$	$I_F = -20\text{A}$ , $V_{GS} = 0\text{V}$ , Note 1			- 3.0 V
$t_{rr}$	$I_F = -20\text{A}$ , $-di/dt = -150\text{A}/\mu\text{s}$ $V_R = -100\text{V}$ , $V_{GS} = 0\text{V}$		477	ns
$Q_{RM}$			14.5	$\mu\text{C}$
$I_{RM}$			- 61	A

Note 1: Pulse test,  $t \leq 300\mu\text{s}$ , duty cycle,  $d \leq 2\%$ .

### SOT-227B (IXTN) Outline



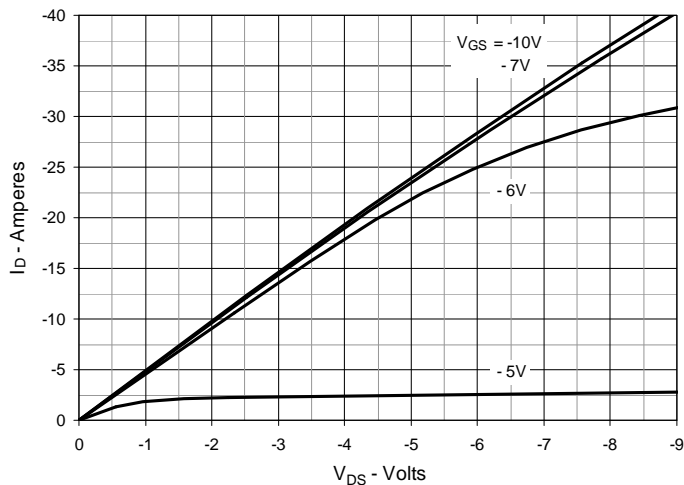
(M4 screws (4x) supplied)

SYM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	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

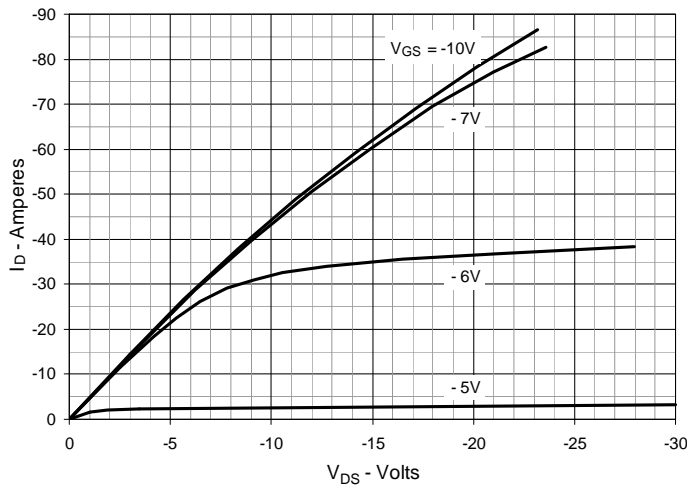
IXYS Reserves the Right to Change Limits, Test Conditions, and Dimensions.

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	

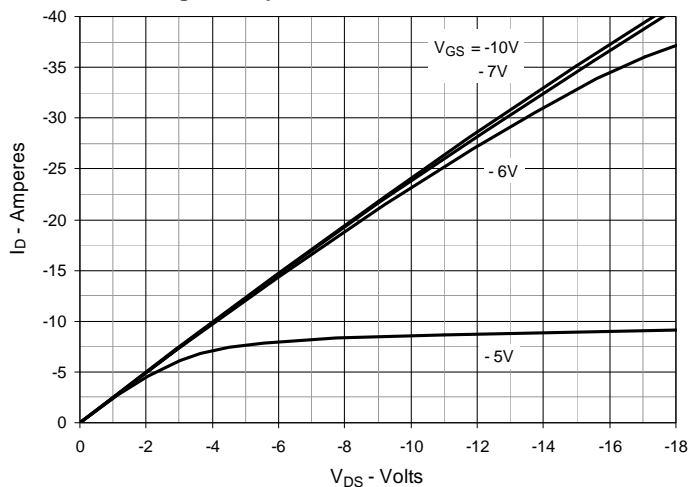
**Fig. 1. Output Characteristics @  $T_J = 25^\circ\text{C}$**



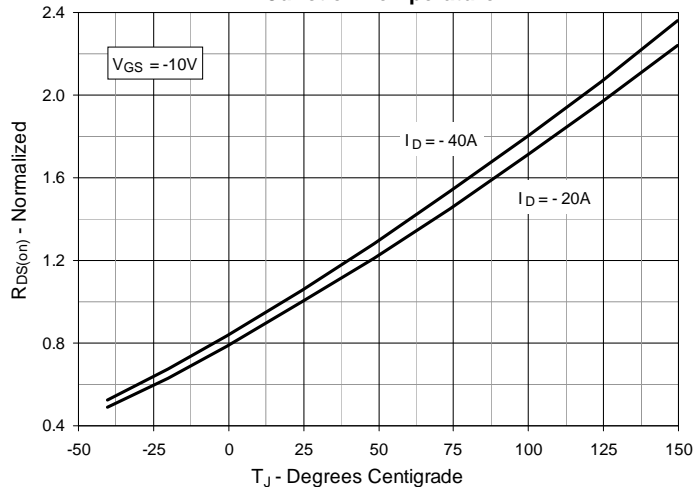
**Fig. 2. Extended Output Characteristics @  $T_J = 25^\circ\text{C}$**



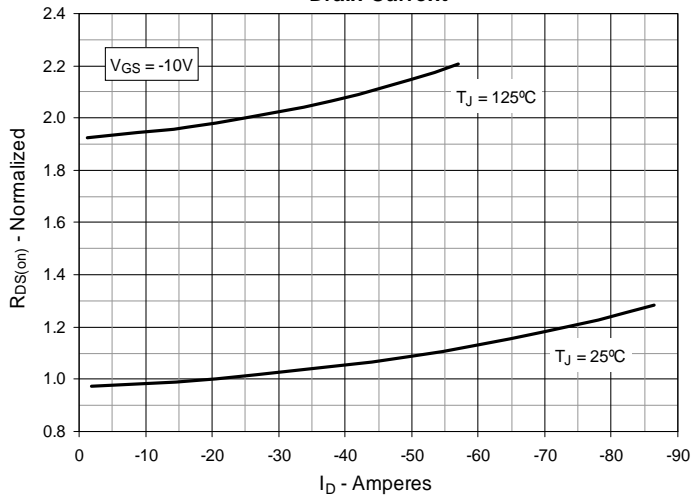
**Fig. 3. Output Characteristics @  $T_J = 125^\circ\text{C}$**



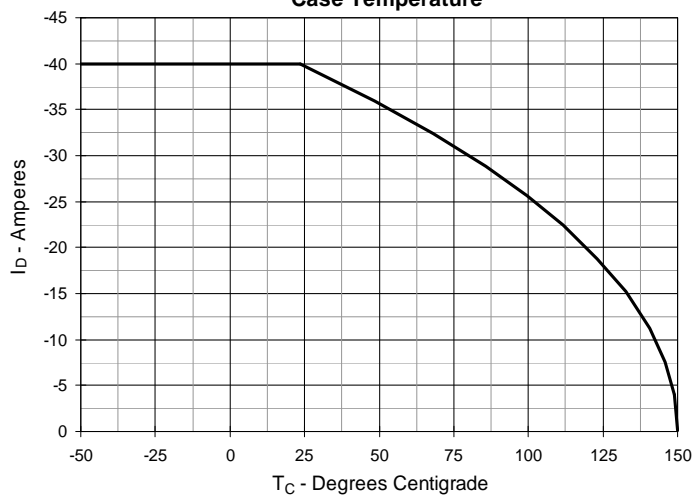
**Fig. 4.  $R_{DS(on)}$  Normalized to  $I_D = -20\text{A}$  Value vs. Junction Temperature**



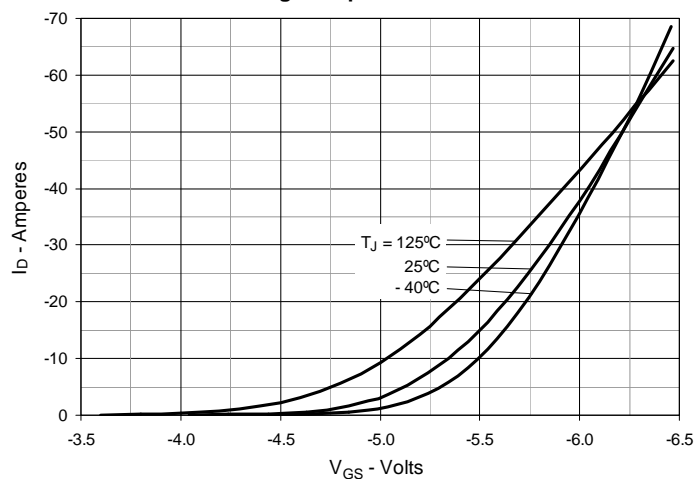
**Fig. 5.  $R_{DS(on)}$  Normalized to  $I_D = -20\text{A}$  Value vs. Drain Current**



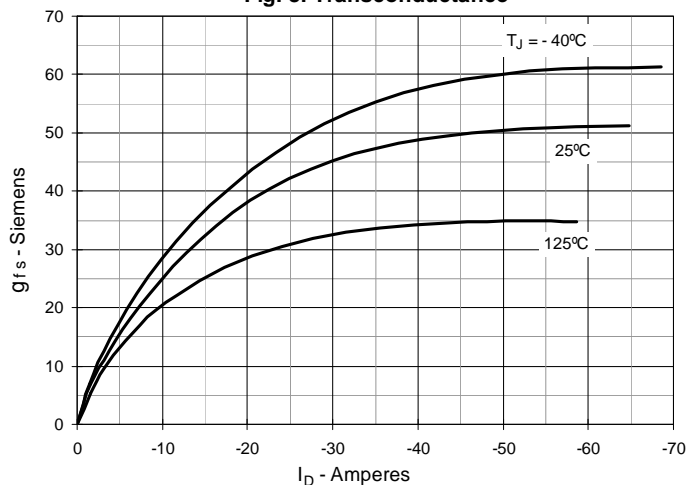
**Fig. 6. Maximum Drain Current vs. Case Temperature**



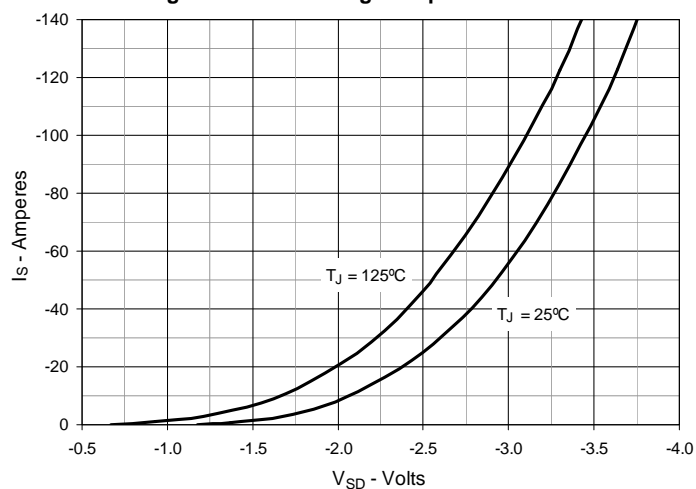
**Fig. 7. Input Admittance**



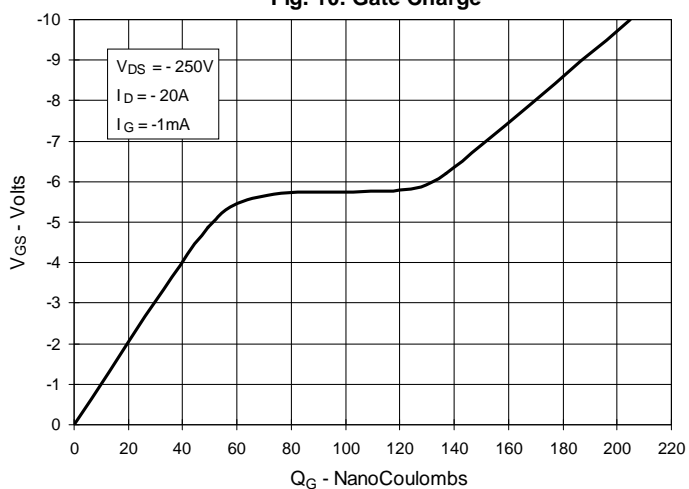
**Fig. 8. Transconductance**



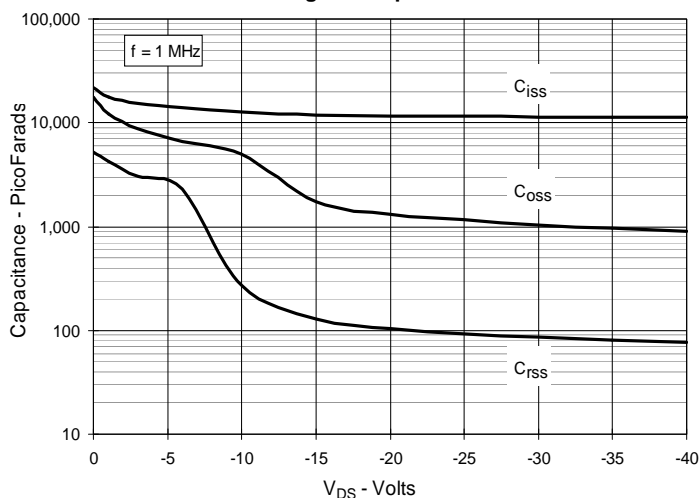
**Fig. 9. Forward Voltage Drop of Intrinsic Diode**



**Fig. 10. Gate Charge**



**Fig. 11. Capacitance**



**Fig. 12. Forward-Bias Safe Operating Area**

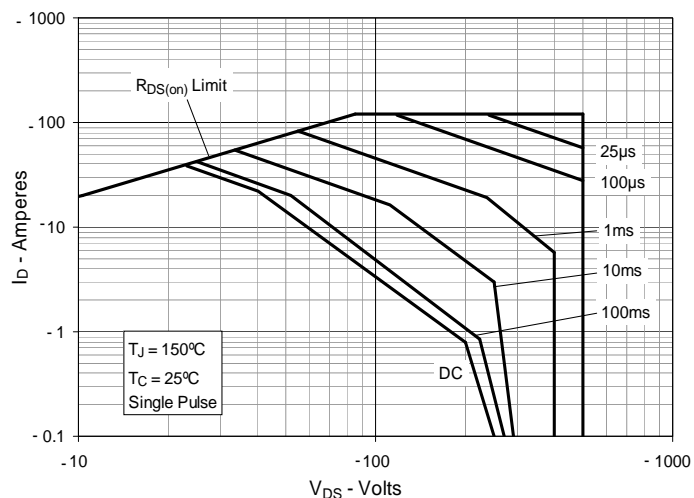
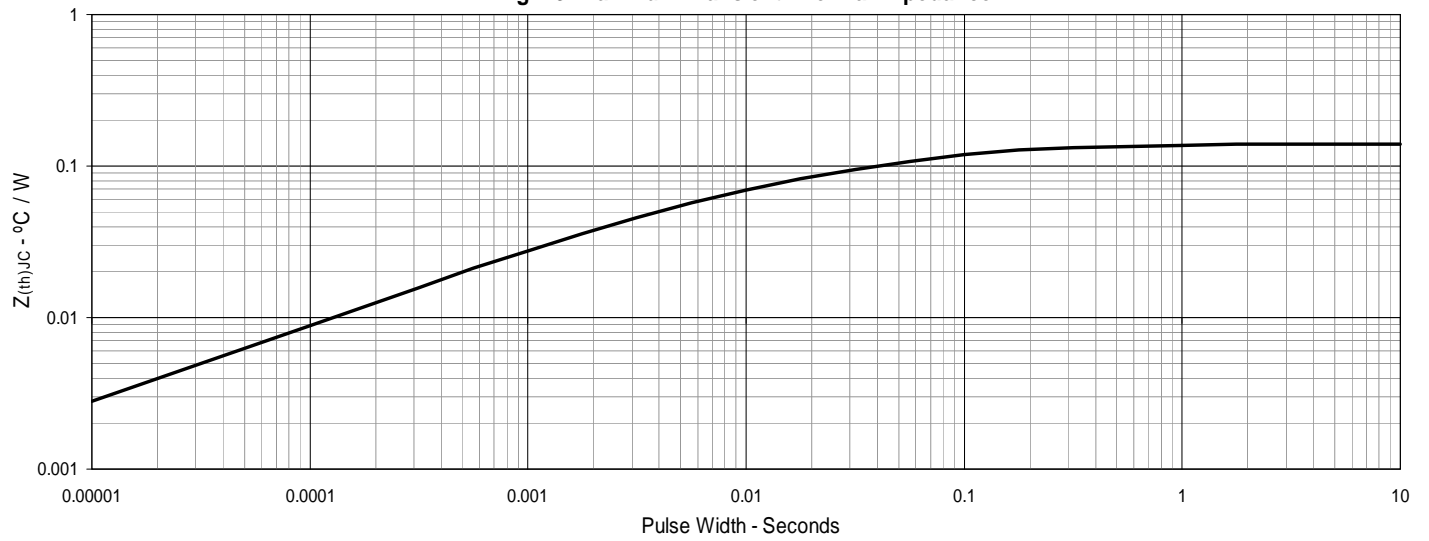


Fig. 13. Maximum Transient Thermal Impedance





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