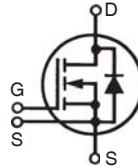


# Polar™ HiperFET™ Power MOSFET

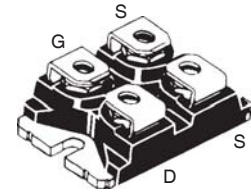
## IXFN38N100P

$V_{DSS} = 1000V$   
 $I_{D25} = 38A$   
 $R_{DS(on)} \leq 210m\Omega$   
 $t_{rr} \leq 300ns$



N-Channel Enhancement Mode  
Fast Intrinsic Rectifier

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	
$V_{DSS}$	$T_J = 25^\circ C$ to $150^\circ C$	1000	V
$V_{DGR}$	$T_J = 25^\circ C$ to $150^\circ C$ , $R_{GS} = 1M\Omega$	1000	V
$V_{GSS}$	Continuous	$\pm 30$	V
$V_{GSM}$	Transient	$\pm 40$	V
$I_{D25}$	$T_C = 25^\circ C$	38	A
$I_{DM}$	$T_C = 25^\circ C$ , Pulse Width Limited by $T_{JM}$	120	A
$I_A$	$T_C = 25^\circ C$	19	A
$E_{AS}$	$T_C = 25^\circ C$	2	J
$dv/dt$	$I_S \leq I_{DM}$ , $V_{DD} \leq V_{DSS}$ , $T_J \leq 150^\circ C$	20	V/ns
$P_D$	$T_C = 25^\circ C$	1000	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~
	$I_{ISOL} \leq 1mA$ , $t = 1s$	3000	V~
$M_d$	Mounting Torque for Base Plate	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
- Low Intrinsic Gate Resistance
- miniBLOC with Aluminum Nitride Isolation
- Low Package Inductance
- Fast Intrinsic Rectifier
- Low  $R_{DS(on)}$  and  $Q_G$

### Advantages

- High Power Density
- Easy to Mount
- Space Savings

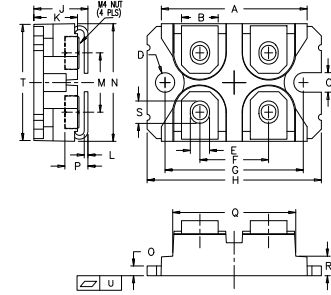
### Applications

- DC-DC Converters
- Battery Chargers
- Switch-Mode and Resonant-Mode Power Supplies
- AC Motor Control
- High Speed Power Switching Application

Symbol	Test Conditions ( $T_J = 25^\circ C$ Unless Otherwise Specified)	Characteristic Values		
		Min.	Typ.	Max.
$BV_{DSS}$	$V_{GS} = 0V$ , $I_D = 3mA$	1000		V
$V_{GS(th)}$	$V_{DS} = V_{GS}$ , $I_D = 1mA$	3.5		6.5 V
$I_{GSS}$	$V_{GS} = \pm 30V$ , $V_{DS} = 0V$			$\pm 300$ nA
$I_{DSS}$	$V_{DS} = V_{DSS}$ , $V_{GS} = 0V$ $T_J = 125^\circ C$			50 $\mu A$ 4 mA
$R_{DS(on)}$	$V_{GS} = 10V$ , $I_D = 19A$ , Note 1			210 m $\Omega$

Symbol	Test Conditions ( $T_J = 25^\circ\text{C}$ Unless Otherwise Specified)	Characteristic Values		
		Min.	Typ.	Max.
$g_{fs}$	$V_{DS} = 20\text{V}, I_D = 19\text{A}$ , Note 1	18	29	S
$C_{iss}$	$V_{GS} = 0\text{V}, V_{DS} = 25\text{V}, f = 1\text{MHz}$		24	nF
$C_{oss}$			1245	pF
$C_{rss}$			80	pF
$R_{Gi}$	Gate Input Resistance		0.78	$\Omega$
$t_{d(on)}$	<b>Resistive Switching Times</b> $V_{GS} = 10\text{V}, V_{DS} = 0.5 \cdot V_{DSS}, I_D = 19\text{A}$ $R_G = 1\Omega$ (External)		74	ns
$t_r$			55	ns
$t_{d(off)}$			71	ns
$t_f$			40	ns
$Q_{g(on)}$	$V_{GS} = 10\text{V}, V_{DS} = 0.5 \cdot V_{DSS}, I_D = 19\text{A}$		350	nC
$Q_{gs}$			150	nC
$Q_{gd}$			150	nC
$R_{thJC}$				0.125 $^\circ\text{C/W}$
$R_{thCS}$		0.05		$^\circ\text{C/W}$

### SOT-227B (IXFN) 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

### Source-Drain Diode

Symbol	Test Conditions ( $T_J = 25^\circ\text{C}$ Unless Otherwise Specified)	Characteristic Values		
		Min.	Typ.	Max.
$I_s$	$V_{GS} = 0\text{V}$			38 A
$I_{SM}$	Repetitive, Pulse Width Limited by $T_{JM}$			150 A
$V_{SD}$	$I_F = I_s, V_{GS} = 0\text{V}$ , Note 1			1.5 V
$t_{rr}$	$I_F = 25\text{A}, -di/dt = 100\text{A}/\mu\text{s}$ $V_R = 100\text{V}, V_{GS} = 0\text{V}$			300 ns
$Q_{RM}$			2.5	$\mu\text{C}$
$I_{RM}$			17.0	A

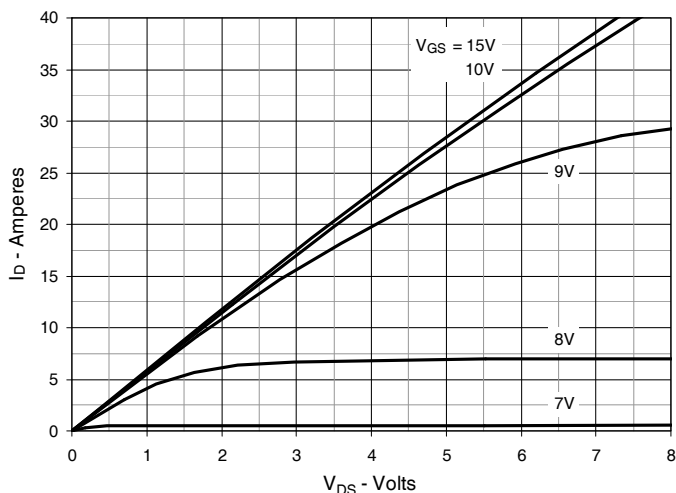
Note 1. Pulse test,  $t \leq 300\mu\text{s}$ , duty cycle,  $d \leq 2\%$ .

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

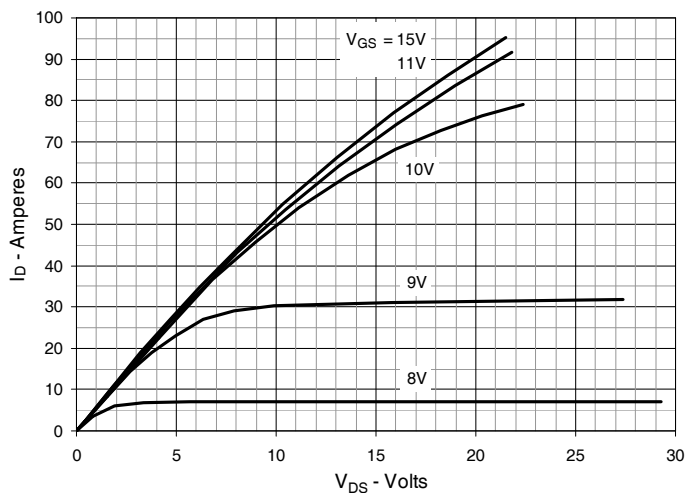
IXYS MOSFETs and IGBTs are covered by one or more of the following U.S. patents:

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	

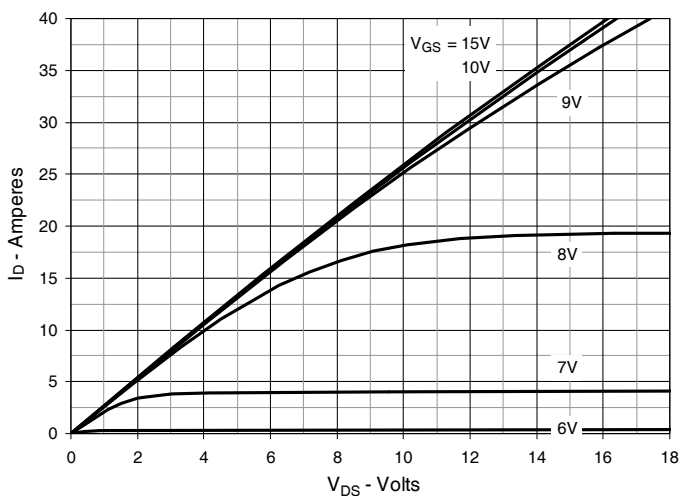
**Fig. 1. Output Characteristics @  $T_J = 25^\circ\text{C}$**



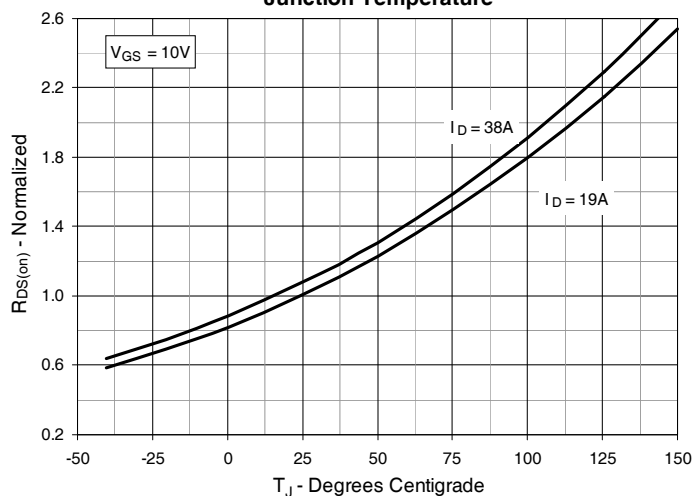
**Fig. 2. Extended Output Characteristics @  $T_J = 25^\circ\text{C}$**



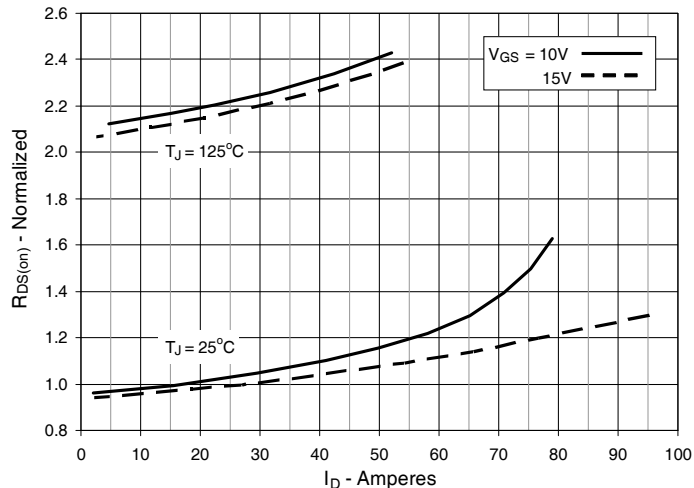
**Fig. 3. Output Characteristics @  $T_J = 125^\circ\text{C}$**



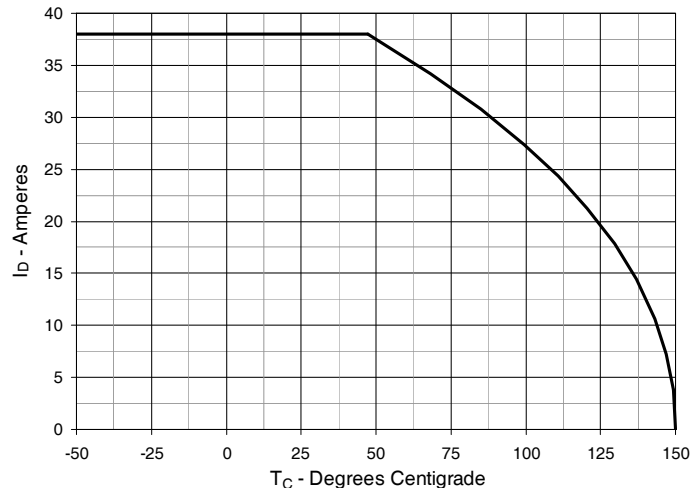
**Fig. 4.  $R_{DS(on)}$  Normalized to  $I_D = 19\text{A}$  Value vs. Junction Temperature**



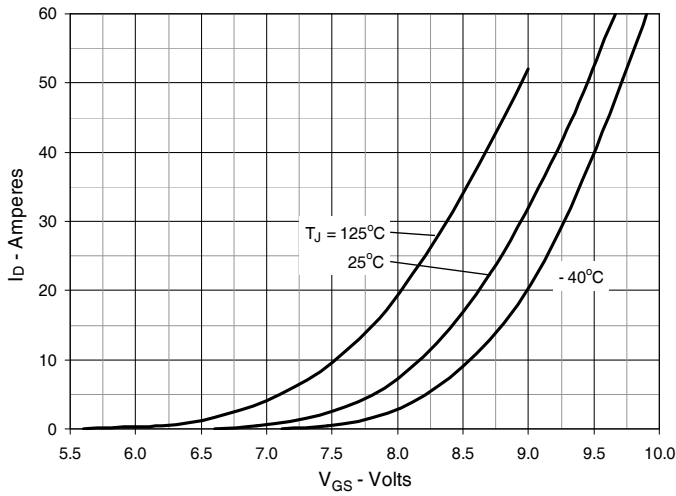
**Fig. 5.  $R_{DS(on)}$  Normalized to  $I_D = 19\text{A}$  Value vs. Drain Current**



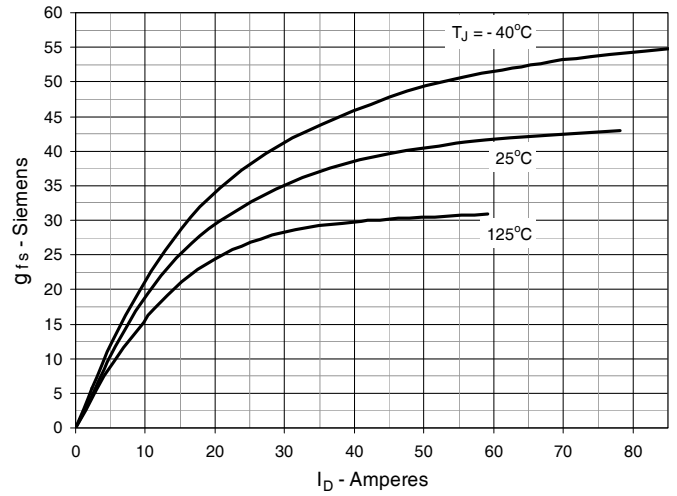
**Fig. 6. Maximum Drain Current vs. Case Temperature**



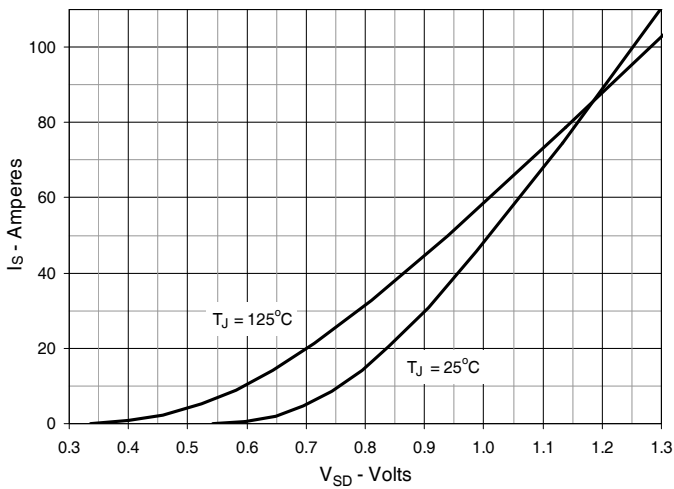
**Fig. 7. Input Admittance**



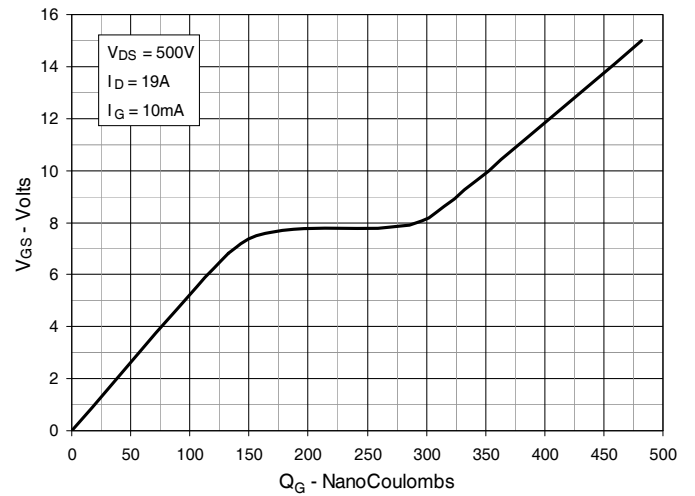
**Fig. 8. Transconductance**



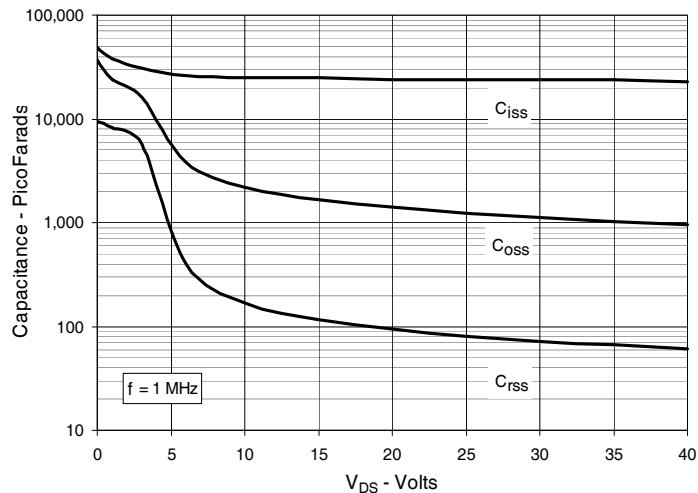
**Fig. 9. Forward Voltage Drop of Intrinsic Diode**



**Fig. 10. Gate Charge**



**Fig. 11. Capacitance**



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

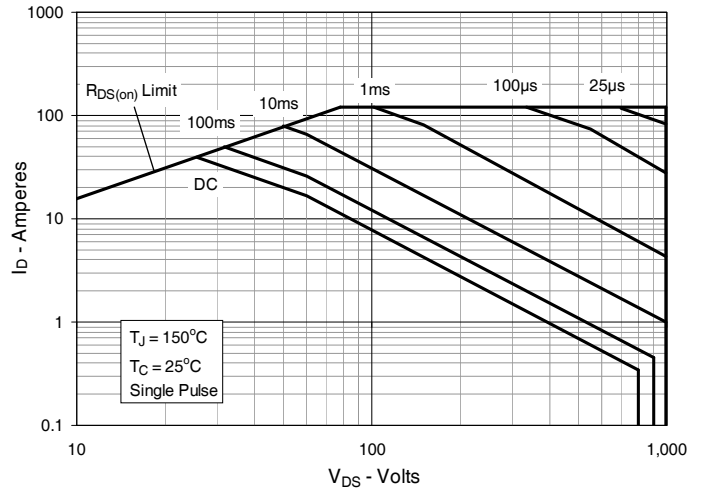
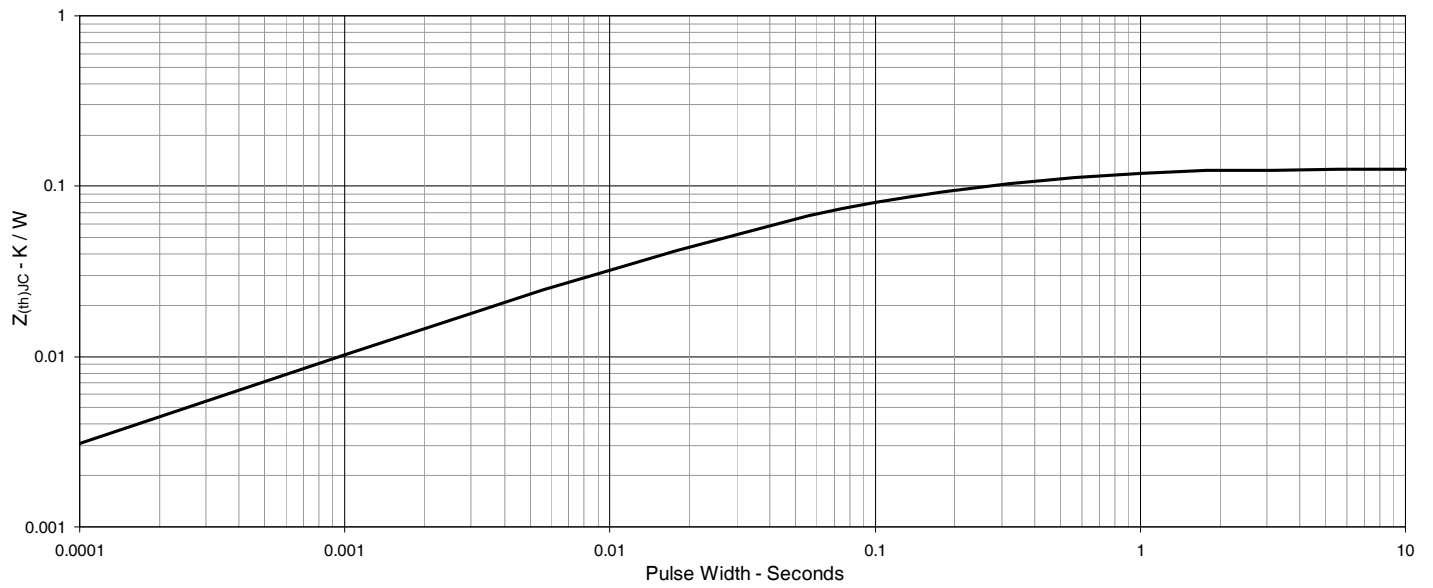


Fig. 13. Maximum Transient Thermal Impedance





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