

## PolarP™ Power MOSFET

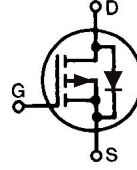
## IXTR170P10P

$$V_{DSS} = -100V$$

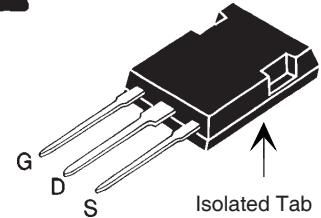
$$I_{D25} = -108A$$

$$R_{DS(on)} \leq 13m\Omega$$

P-Channel Enhancement Mode  
Avalanche Rated



ISOPLUS247  
E153432



G = Gate      D = Drain  
S = Source

Symbol	Test Conditions	Maximum Ratings	
$V_{DSS}$	$T_J = 25^\circ C$ to $150^\circ C$	-100	V
$V_{DGR}$	$T_J = 25^\circ C$ to $150^\circ C$ , $R_{GS} = 1M\Omega$	-100	V
$V_{GSS}$	Continuous	$\pm 20$	V
$V_{GSM}$	Transient	$\pm 30$	V
$I_{D25}$	$T_C = 25^\circ C$	-108	A
$I_{DM}$	$T_C = 25^\circ C$ , Pulse Width Limited by $T_{JM}$	- 510	A
$I_A$	$T_C = 25^\circ C$	-170	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
$P_D$	$T_C = 25^\circ C$	312	W
$T_J$		-55 ... +150	$^\circ C$
$T_{JM}$		150	$^\circ C$
$T_{stg}$		-55 ... +150	$^\circ C$
$V_{ISOL}$	50/60 Hz, RMS $I_{ISOL} \leq 1mA$	$t = 1$ minute $t = 1$ second	2500 3000 V~ V~
$T_L$	1.6mm (0.062 in.) from Case for 10s	300	$^\circ C$
$T_{SOLD}$	Plastic Body for 10s	260	$^\circ C$
$M_d$	Mounting Force	20..120 / 4.5..27	N/lb.
<b>Weight</b>		6	g

### Features

- Silicon Chip on Direct-Copper Bond (DCB) Substrate
  - UL Recognized Package
  - Isolated Mounting Surface
  - 2500V Electrical Isolation
- Dynamic dv/dt Rating
- High Current Handling Capability
- Avalanche Rated
- Fast Intrinsic Diode
- The Rugged PolarP™ Process
- Low  $Q_G$
- Low Drain-to-Tab Capacitance
- 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

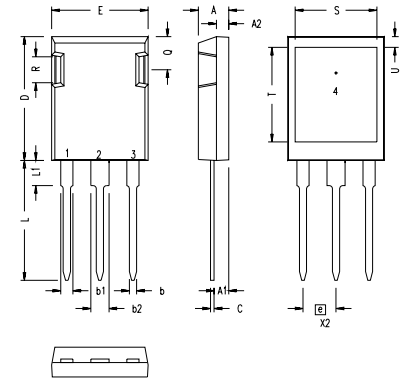
Symbol	Test Conditions ( $T_J = 25^\circ C$ , Unless Otherwise Specified)	Characteristic Values		
		Min.	Typ.	Max.
$BV_{DSS}$	$V_{GS} = 0V$ , $I_D = -250\mu A$	-100		V
$V_{GS(th)}$	$V_{DS} = V_{GS}$ , $I_D = -1mA$	- 2.0		V
$I_{GSS}$	$V_{GS} = \pm 20V$ , $V_{DS} = 0V$			$\pm 100$ nA
$I_{DSS}$	$V_{DS} = V_{DSS}$ , $V_{GS} = 0V$ $T_J = 125^\circ C$			- 50 $\mu A$ - 250 $\mu A$
$R_{DS(on)}$	$V_{GS} = -10V$ , $I_D = -85A$ , Note 1			13 m $\Omega$

Symbol	Test Conditions ( $T_J = 25^\circ\text{C}$ , Unless Otherwise Specified)	Characteristic Values		
		Min.	Typ.	Max.
$g_{fs}$	$V_{DS} = -10\text{V}$ , $I_D = -85\text{A}$ , Note 1	35	58	S
$C_{iss}$	$V_{GS} = 0\text{V}$ , $V_{DS} = -25\text{V}$ , $f = 1\text{MHz}$		12.6	nF
$C_{oss}$			4190	pF
$C_{rss}$			930	pF
$t_{d(on)}$	<b>Resistive Switching Times</b> $V_{GS} = -10\text{V}$ , $V_{DS} = 0.5 \cdot V_{DSS}$ , $I_D = -85\text{A}$ $R_G = 1\Omega$ (External)		32	ns
$t_r$			75	ns
$t_{d(off)}$			82	ns
$t_f$			45	ns
$Q_{g(on)}$	$V_{GS} = -10\text{V}$ , $V_{DS} = 0.5 \cdot V_{DSS}$ , $I_D = -85\text{A}$		240	nC
$Q_{gs}$			45	nC
$Q_{gd}$			120	nC
$R_{thJC}$				0.40 $^\circ\text{C/W}$
$R_{thCS}$		0.15		$^\circ\text{C/W}$

### Source-Drain Diode

Symbol	Test Conditions ( $T_J = 25^\circ\text{C}$ , Unless Otherwise Specified)	Characteristic Values		
		Min.	Typ.	Max.
$I_S$	$V_{GS} = 0\text{V}$			-170 A
$I_{SM}$	Repetitive, Pulse Width Limited by $T_{JM}$			-680 A
$V_{SD}$	$I_F = -85\text{A}$ , $V_{GS} = 0\text{V}$ , Note 1			-3.3 V
$t_{rr}$	$I_F = -85\text{A}$ , $-di/dt = -100\text{A}/\mu\text{s}$ $V_R = -50\text{V}$ , $V_{GS} = 0\text{V}$		176	ns
$Q_{RM}$			1.25	$\mu\text{C}$
$I_{RM}$			-14.2	A

### ISOPLUS247 (IXTR) Outline



SYM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.190	.205	4.83	5.21
A1	.090	.100	2.29	2.54
A2	.075	.085	1.91	2.16
b	.045	.055	1.14	1.40
b1	.075	.084	1.91	2.13
b2	.115	.123	2.92	3.12
C	.024	.031	0.61	0.80
D	.819	.840	20.80	21.34
E	.620	.635	15.75	16.13
e	.215 BSC		5.45 BSC	
L	.780	.800	19.81	20.32
L1	.150	.170	3.81	4.32
Q	.220	.244	5.59	6.20
R	.170	.190	4.32	4.83
S	.520	.540	13.21	13.72
T	.620	.640	15.75	16.26
U	.065	.080	1.65	2.03

- 1 - GATE
- 2 - DRAIN (COLLECTOR)
- 3 - SOURCE (EMITTER)
- 4 - NO CONNECTION

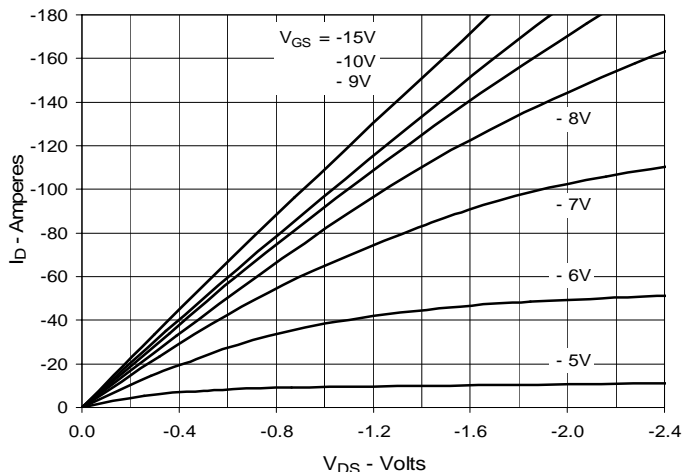
NOTE: This drawing will meet all dimensions requirement of JEDEC outline TO-247AD except screw hole.

Note 1: Pulse Test,  $t \leq 300\mu\text{s}$ ; Duty Cycle,  $d \leq 2\%$ .

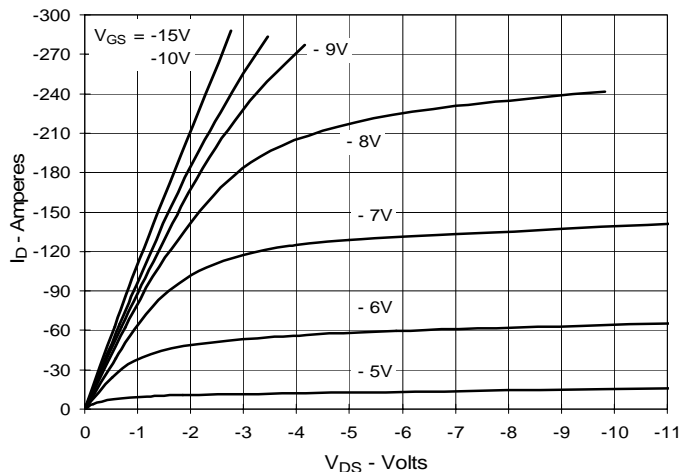
IXYS Reserves the Right to Change Limits, Test Conditions, and Dimensions.

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
	4,850,072	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	

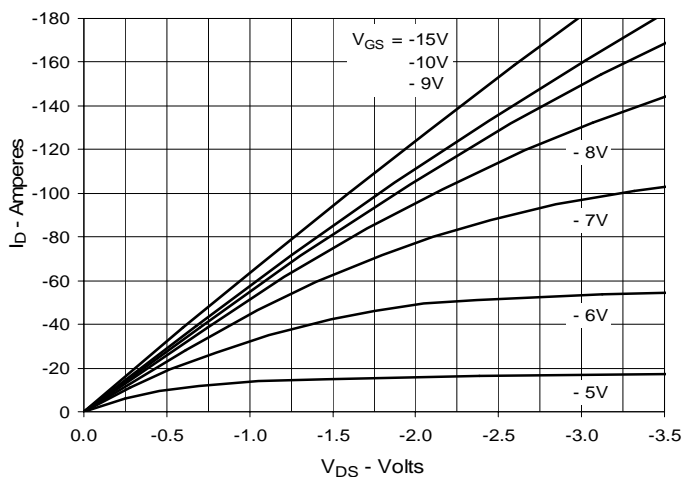
**Fig. 1. Output Characteristics @ 25°C**



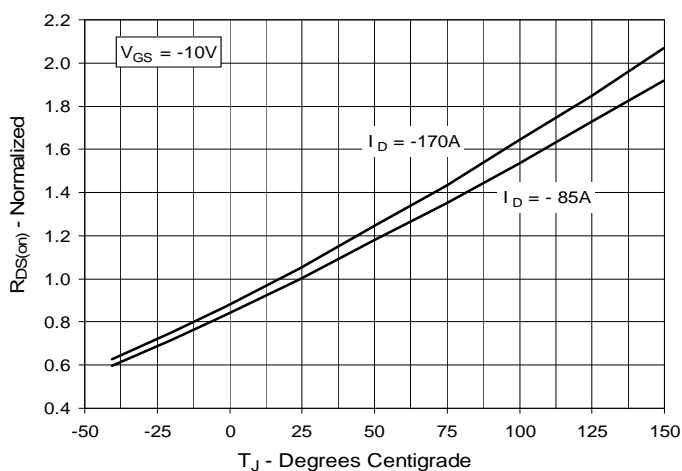
**Fig. 2. Extended Output Characteristics @ 25°C**



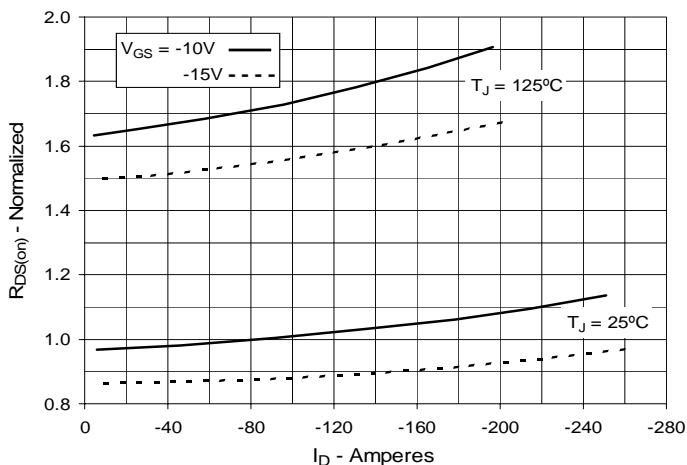
**Fig. 3. Output Characteristics @ 125°C**



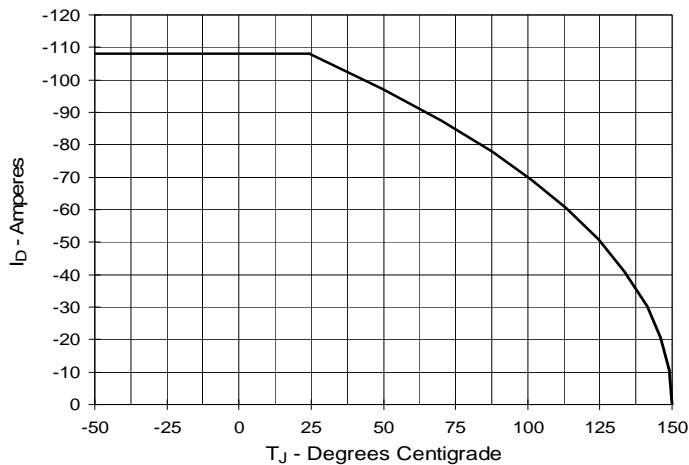
**Fig. 4.  $R_{DS(on)}$  Normalized to  $I_D = -85A$  vs. Junction Temperature**



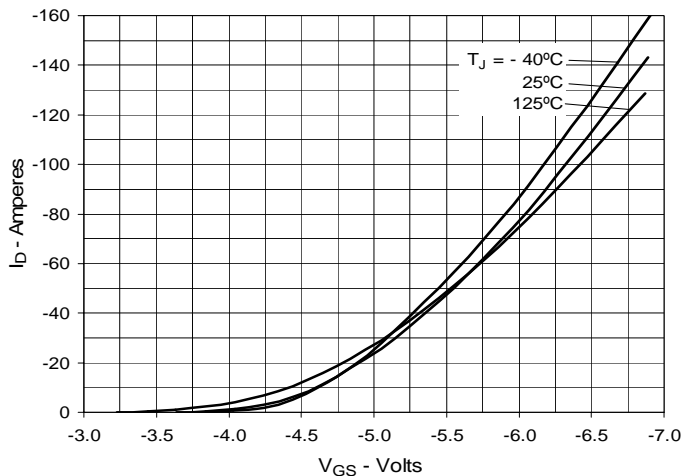
**Fig. 5.  $R_{DS(on)}$  Normalized to  $I_D = -85A$  vs. Drain Current**



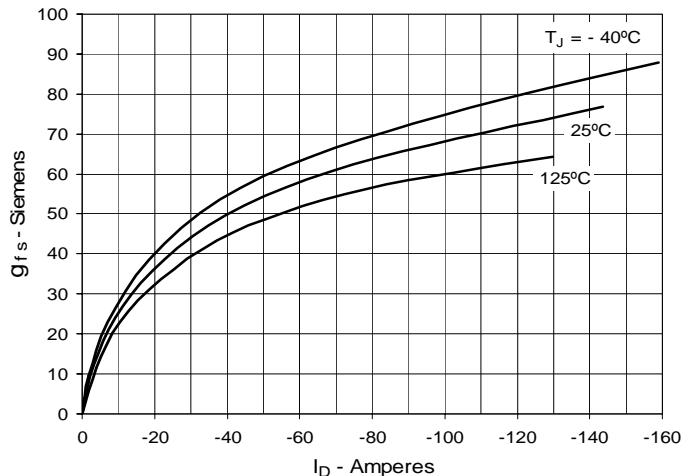
**Fig. 6. Maximum Drain Current vs. Case Temperature**



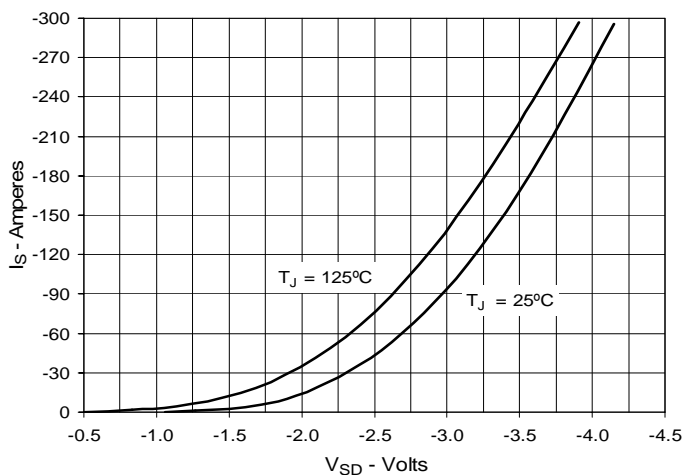
**Fig. 7. Input Admittance**



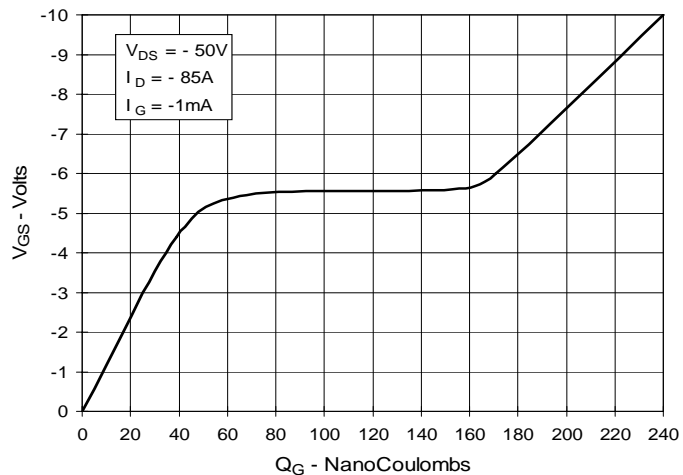
**Fig. 8. Transconductance**



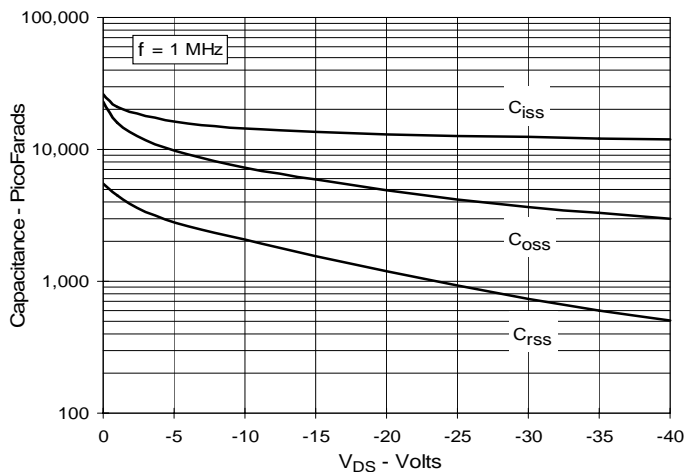
**Fig. 9. Forward Voltage Drop of Intrinsic Diode**



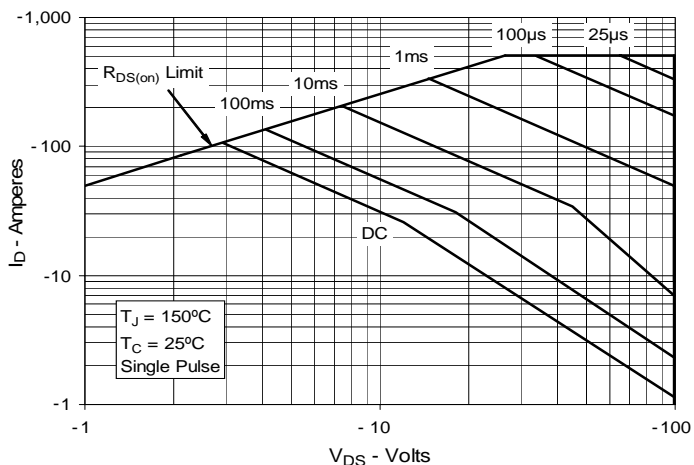
**Fig. 10. Gate Charge**



**Fig. 11. Capacitance**



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



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Fig. 13. Maximum Transient Thermal Impedance

