

PolarP™ Power MOSFET

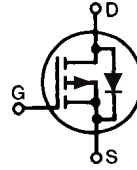
IXTR40P50P

$$V_{DSS} = -500V$$

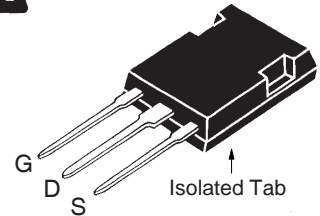
$$I_{D25} = -22A$$

$$R_{DS(on)} \leq 260m\Omega$$

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 $150^\circ C$	- 500	V
V_{DGR}	$T_J = 25^\circ C$ to $150^\circ C$, $R_{GS} = 1M\Omega$	- 500	V
V_{GSS}	Continuous	± 20	V
V_{GSM}	Transient	± 30	V
I_{D25}	$T_C = 25^\circ C$	- 22	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	$T_C = 25^\circ C$	312	W
T_J		-55 ... +150	$^\circ C$
T_{JM}		150	$^\circ C$
T_{stg}		-55 ... +150	$^\circ C$
T_L	Maximum Lead Temperature for Soldering	300	$^\circ C$
T_{SOLD}	1.6 mm (0.062in.) from Case for 10s	260	$^\circ C$
V_{ISOL}	50/60 Hz, RMS, t= 1min	2500	V~
M_d	Mounting Force	20..120/4.5..27	N/lb
Weight		5	g

Features

- Silicon Chip on Direct-Copper Bond (DCB) Substrate
 - UL Recognized Package
 - Isolated Mounting Surface
 - 2500V~ Electrical Isolation
- Dynamic dv/dt Rating
- 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}	$V_{GS} = 0V$, $I_D = -250\mu A$	- 500		V
$V_{GS(th)}$	$V_{DS} = V_{GS}$, $I_D = -1mA$	- 2.0		V
I_{GSS}	$V_{GS} = \pm 20V$, $V_{DS} = 0V$			± 100 nA
I_{DSS}	$V_{DS} = V_{DSS}$, $V_{GS} = 0V$ $T_J = 125^\circ C$			- 50 μA - 250 μA
$R_{DS(on)}$	$V_{GS} = -10V$, $I_D = -20A$, Note 1			260 m Ω

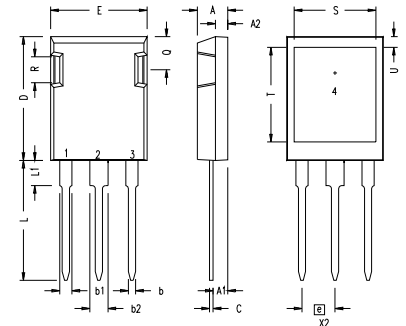
Symbol	Test Conditions ($T_J = 25^\circ\text{C}$, Unless Otherwise Specified)	Characteristic Values		
		Min.	Typ.	Max.
g_{fs}	$V_{DS} = -10\text{V}$, $I_D = -20\text{A}$, Note 1	23	38	S
C_{iss}	$V_{GS} = 0\text{V}$, $V_{DS} = -25\text{V}$, $f = 1\text{MHz}$		11.5	nF
C_{oss}			1150	pF
C_{rss}			93	pF
$t_{d(on)}$	Resistive Switching Times $V_{GS} = -10\text{V}$, $V_{DS} = 0.5 \cdot V_{DSS}$, $I_D = -20\text{A}$ $R_G = 1\Omega$ (External)		37	ns
t_r			59	ns
$t_{d(off)}$			90	ns
t_f			34	ns
$Q_{g(on)}$	$V_{GS} = -10\text{V}$, $V_{DS} = 0.5 \cdot V_{DSS}$, $I_D = -20\text{A}$		205	nC
Q_{gs}			55	nC
Q_{gd}			75	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	$V_{GS} = 0\text{V}$			- 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	μC
I_{RM}			- 61	A

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

ISOPLUS247 (IXTR) Outline



- 1 - Gate
- 2,4 - Drain
- 3 - Source

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

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	

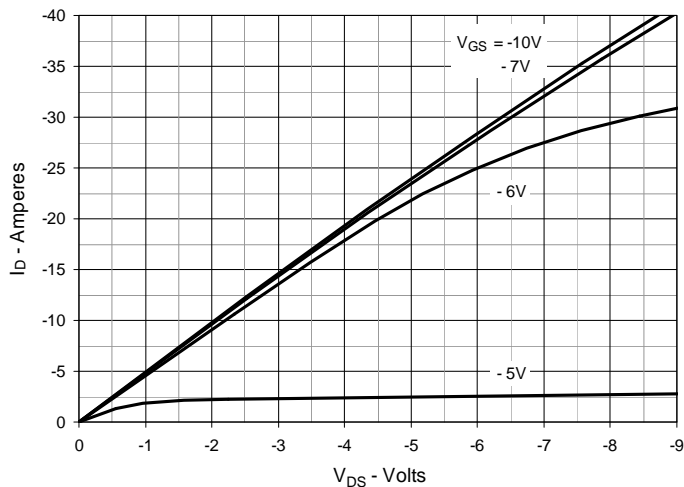
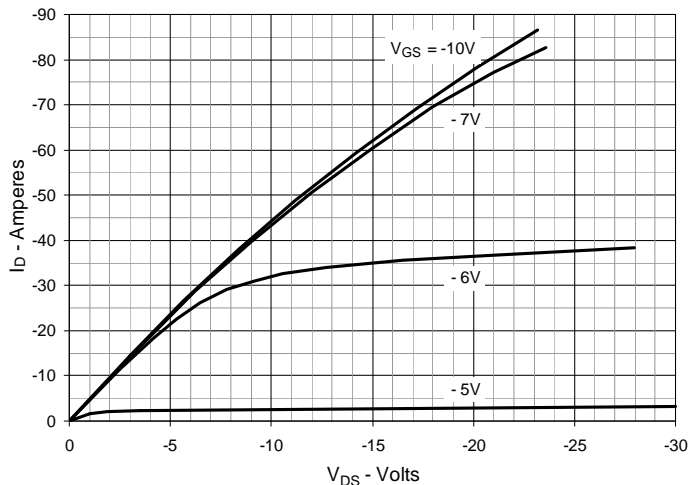
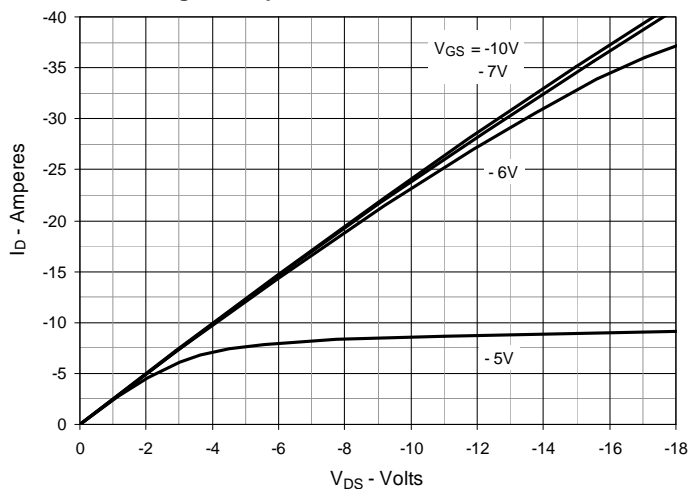
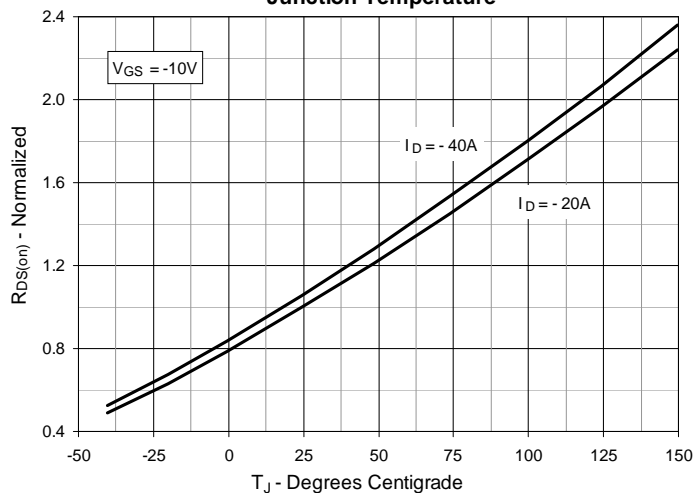
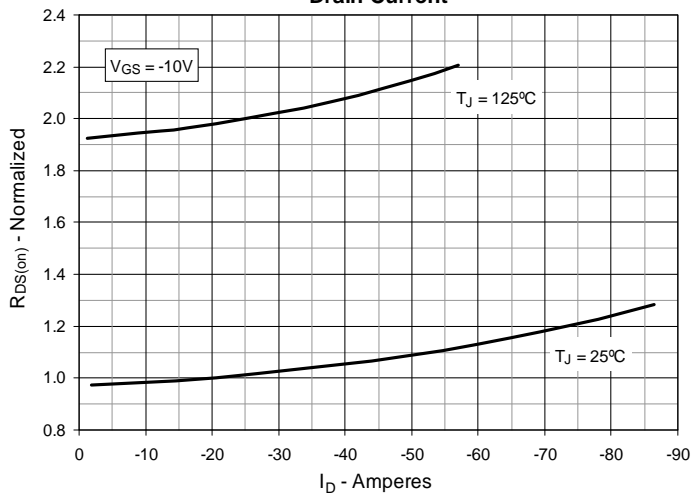
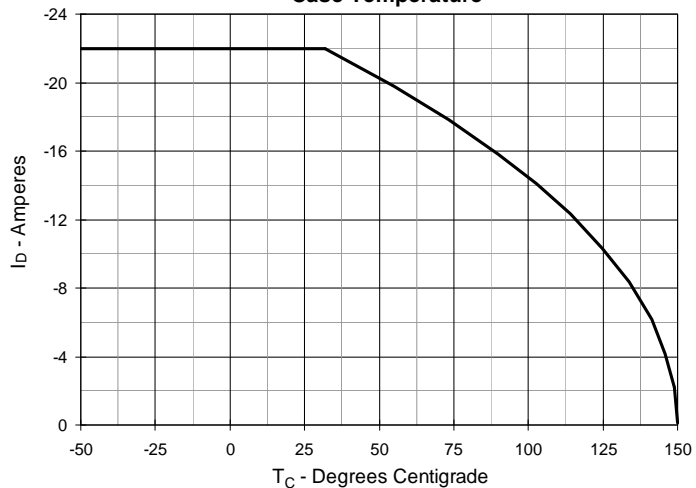
Fig. 1. Output Characteristics @ $T_J = 25^\circ\text{C}$

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

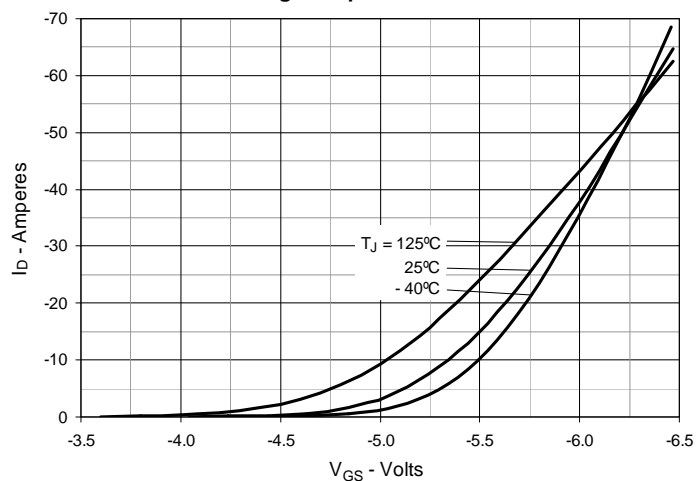


Fig. 8. Transconductance

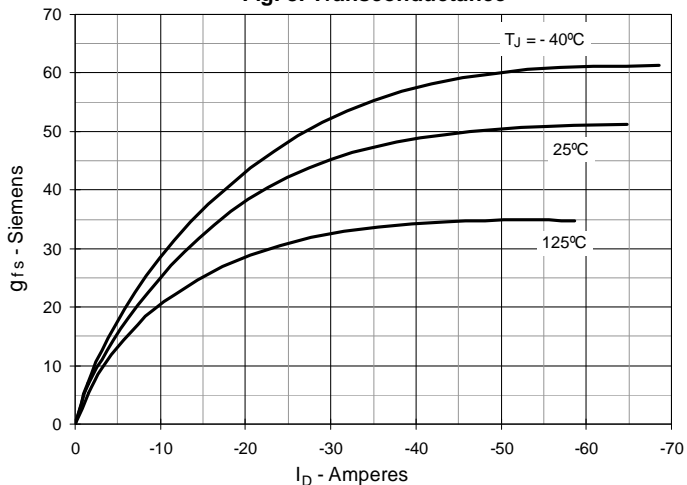


Fig. 9. Forward Voltage Drop of Intrinsic Diode

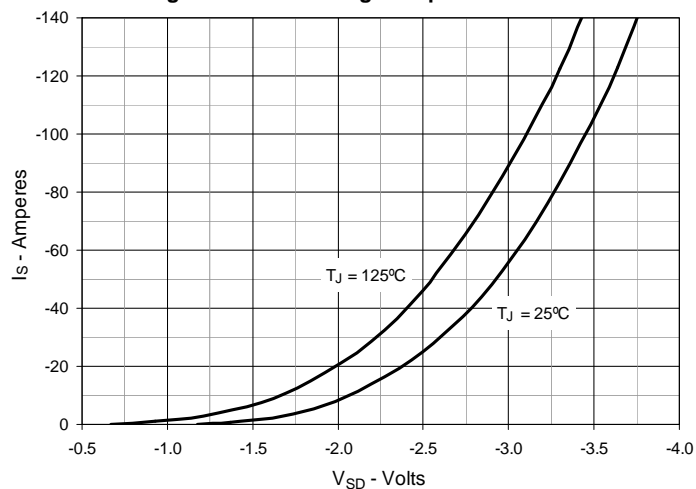


Fig. 10. Gate Charge

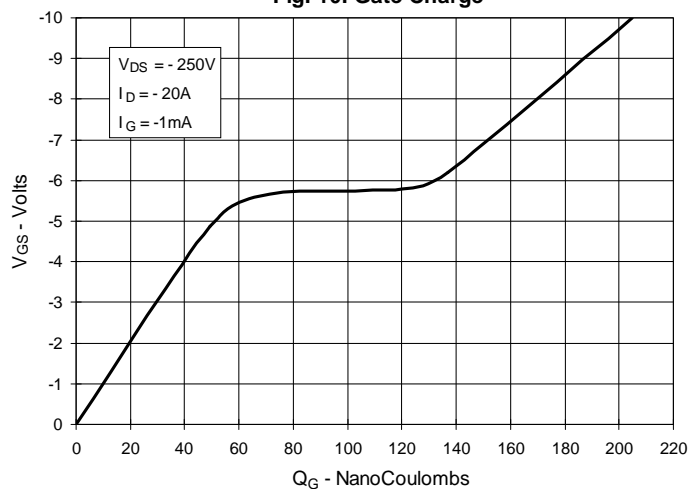


Fig. 11. Capacitance

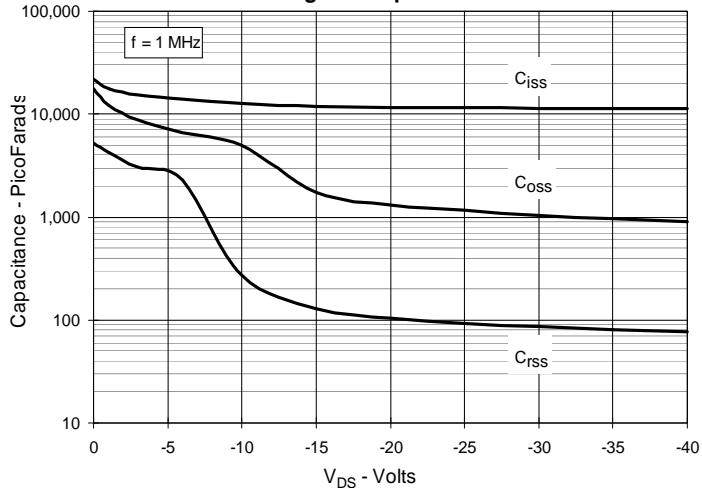


Fig. 12. Forward-Bias Safe Operating Area

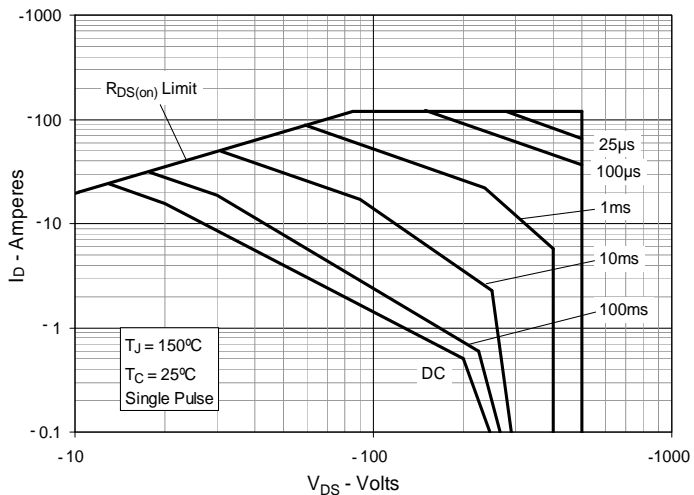
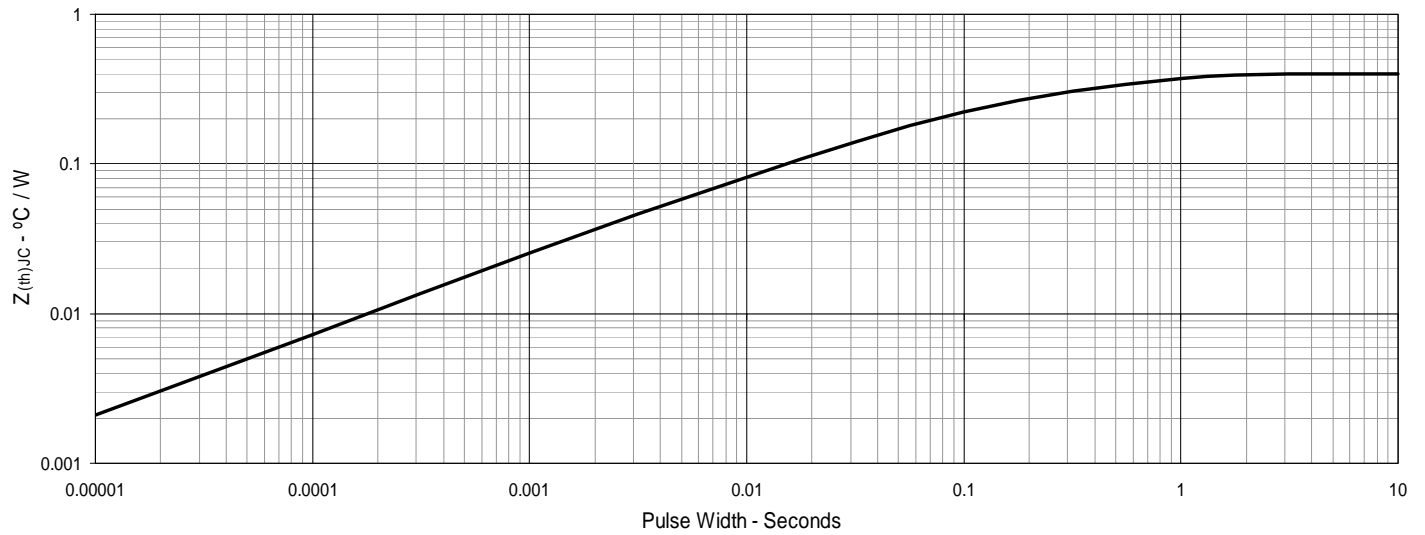


Fig. 13. Maximum Transient Thermal Impedance





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