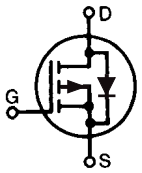
IXYS

PolarP™ Power MOSFET

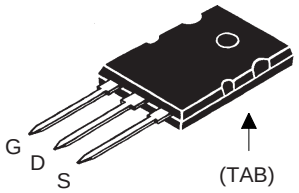
IXTK40P50P
IXTX40P50P

V_{DSS} = - 500V
I_{D25} = - 40A
$R_{DS(on)}$ ≤ 230mΩ

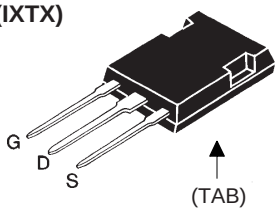
P-Channel Enhancement Mode
Avalanche Rated



TO-264 (IXTK)



PLUS247 (IXTX)



G = Gate D = Drain
S = Source TAB = Drain

Symbol	Test Conditions	Maximum Ratings	
V_{DSS}	T_J = 25°C to 150°C	- 500	V
V_{DGR}	T_J = 25°C to 150°C, R_{GS} = 1MΩ	- 500	V
V_{GSS}	Continuous	±20	V
V_{GSM}	Transient	±30	V
I_{D25}	T_C = 25°C	- 40	A
I_{DM}	T_C = 25°C, Pulse Width Limited by T_{JM}	- 120	A
I_A	T_C = 25°C	- 40	A
E_{AS}	T_C = 25°C	3.5	J
dV/dt	$I_S \le I_{DM}$, $V_{DD} \le V_{DSS}$, $T_J \le 150°C$	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
T_L	1.6mm (0.062 in.) from Case for 10s	300	°C
T_{SOLD}	Plastic Body for 10s	260	°C
M_d	Mounting Force (PLUS247)	20..120/4.5..27	N/lb.
	Mounting Torque (TO-264)	1.13/10	Nm/lb.in.
Weight	PLUS247	6	g
	TO-264	10	g

Symbol	Test Conditions (T_J = 25°C, Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max.	
BV_{DSS}	V_{GS} = 0V, I_D = - 250μA	- 500			V
$V_{GS(th)}$	$V_{DS} = V_{GS}$, I_D = - 1mA	- 2.0		- 4.0	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, $I_D = 0.5 \bullet I_{D25}$, Note 1			230	mΩ

Features

- International Standard Packages
- Rugged PolarP™ Process
- Avalanche Rated
- Fast Intrinsic Diode
- 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

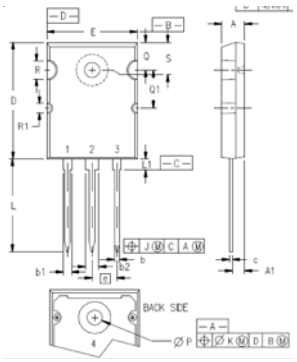
Symbol	Test Conditions (T_J = 25°C, Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max.	
g_{fs}	V_{DS} = -10V, I_D = 0.5 • I_{D25}, Note 1	23	38		S
C_{iss}	V_{GS} = 0V, V_{DS} = - 25V, f = 1MHz		11.5		nF
C_{oss}			1150		pF
C_{rss}			93		pF
$t_{d(on)}$	**Resistive Switching Times**		37		ns
t_r	V_{GS} = -10V, V_{DS} = 0.5 • V_{DSS}, I_D = 0.5 • I_{D25}		59		ns
$t_{d(off)}$	R_G = 1Ω (External)		90		ns
t_f			34		ns
$Q_{g(on)}$	V_{GS} = -10V, V_{DS} = 0.5 • V_{DSS}, I_D = 0.5 • I_{D25}		205		nC
Q_{gs}			55		nC
Q_{gd}			75		nC
R_{thJC}				0.14	°C/W
R_{thCS}			0.15		°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			- 40	A
I_{SM}	Repetitive, Pulse Width Limited by T_{JM}			- 160	A
V_{SD}	I_F = - 20A, V_{GS} = 0V, Note 1			- 3.0	V
t_{rr}	I_F = - 20A, -di/dt = -150A/µs		477		nS
Q_{RM}	V_R = -100V, V_{GS} = 0V		14.5		µC
I_{RM}			- 61		A

Note 1: Pulse Test, t ≤ 300µs; Duty Cycle, d ≤ 2%.

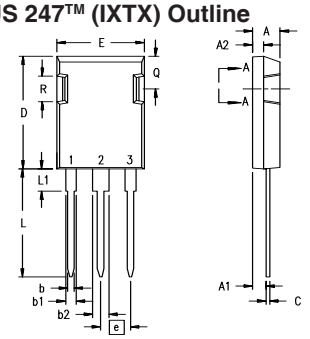
TO-264 (IXTK) Outline



1 – GATE
2, 4 – DRAIN (COLLECTOR)
3 – SOURCE (EMITTER)

SYM	INCHES MIN	INCHES MAX	MILLIMETERS MIN	MILLIMETERS MAX
A	.185	.209	4.70	5.31
A1	.102	.118	2.59	3.00
b	.037	.055	0.94	1.40
b1	.087	.102	2.21	2.59
b2	.110	.126	2.79	3.20
c	.017	.029	0.43	0.74
D	1.007	1.047	25.58	26.59
E	.760	.799	19.30	20.29
e	.215BSC		5.46 BSC	
J	.000	.010	0.00	0.25
K	.000	.010	0.00	0.25
L	.779	.842	19.79	21.39
L1	.087	.102	2.21	2.59
ØP	.122	.138	3.10	3.51
Q	.240	.256	6.10	6.50
Q1	.330	.346	8.38	8.79
ØR	.155	.187	3.94	4.75
ØR1	.085	.093	2.16	2.36
S	.243	.253	6.17	6.43

PLUS 247™ (IXTX) Outline



Terminals: 1 - Gate
2 - Drain (Collector)
3 - Source (Emitter)
4 - Drain (Collector)

Dim.	Millimeter Min.	Millimeter Max.	Inches Min.	Inches Max.
A	4.83	5.21	.190	.205
A_1	2.29	2.54	.090	.100
A_2	1.91	2.16	.075	.085
b	1.14	1.40	.045	.055
b_1	1.91	2.13	.075	.084
b_2	2.92	3.12	.115	.123
C	0.61	0.80	.024	.031
D	20.80	21.34	.819	.840
E	15.75	16.13	.620	.635
e	5.45 BSC		.215 BSC	
L	19.81	20.32	.780	.800
L1	3.81	4.32	.150	.170
Q	5.59	6.20	.220	0.244
R	4.32	4.83	.170	.190

Fig. 1. Output Characteristics @ 25ºC

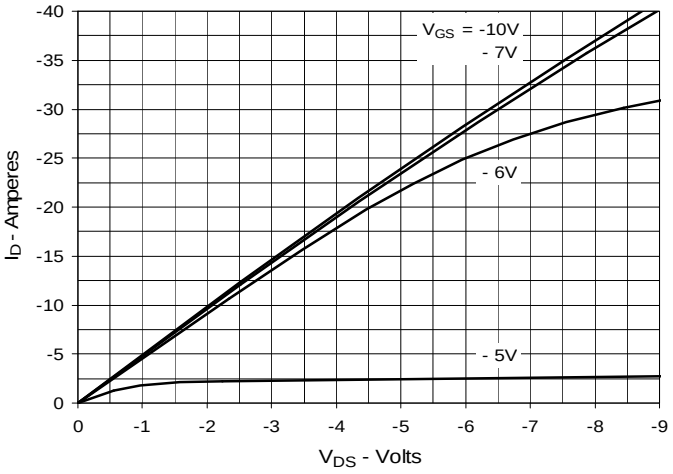


Fig. 2. Extended Output Characteristics @ 25ºC

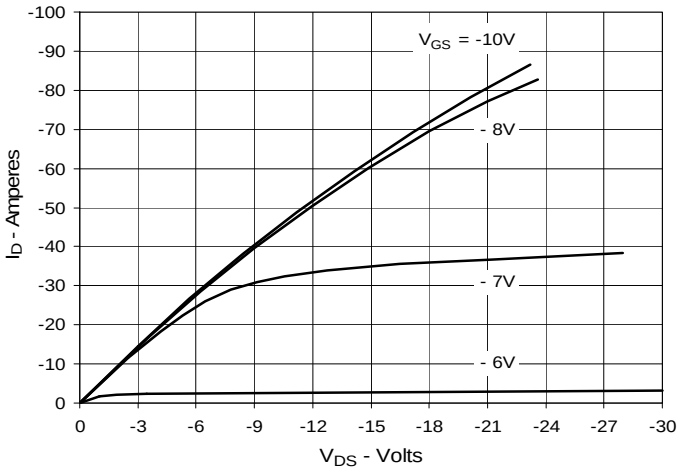


Fig. 3. Output Characteristics @ 125ºC

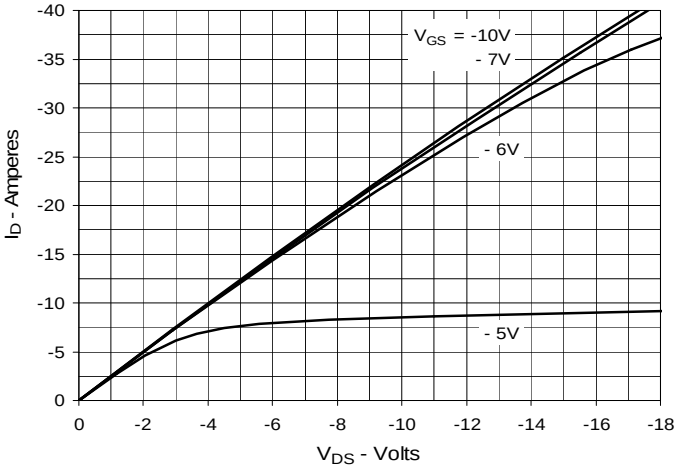


Fig. 4. $R_{DS(on)}$ Normalized to I_D = - 20A vs. Junction Temperature

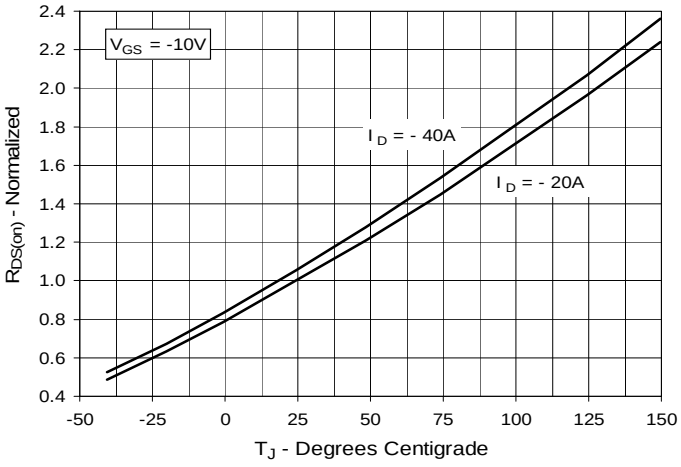


Fig. 5. $R_{DS(on)}$ Normalized to I_D = - 20A vs. Drain Current

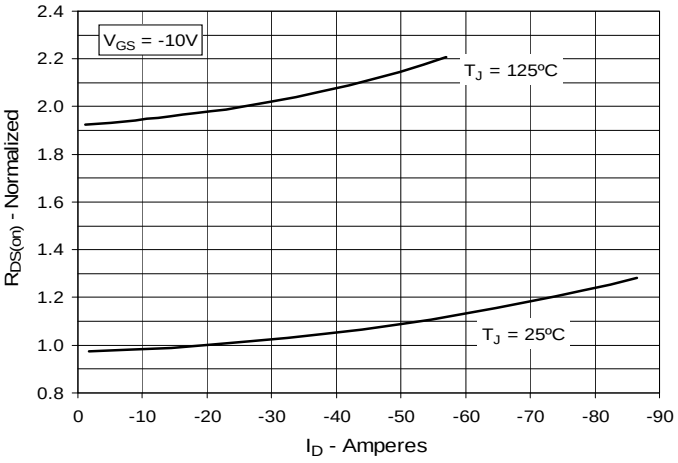


Fig. 6. Maximum Drain Current vs. Case Temperature

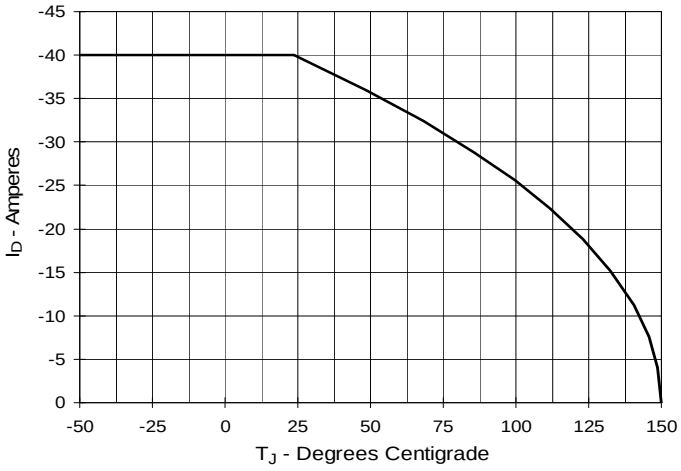


Fig. 7. Input Admittance

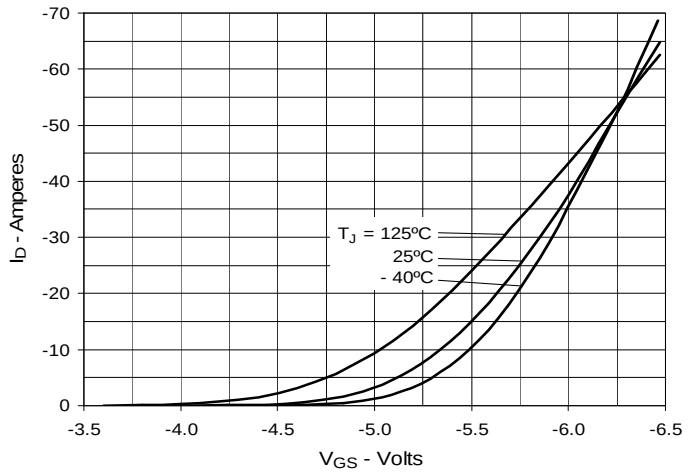


Fig. 8. Transconductance

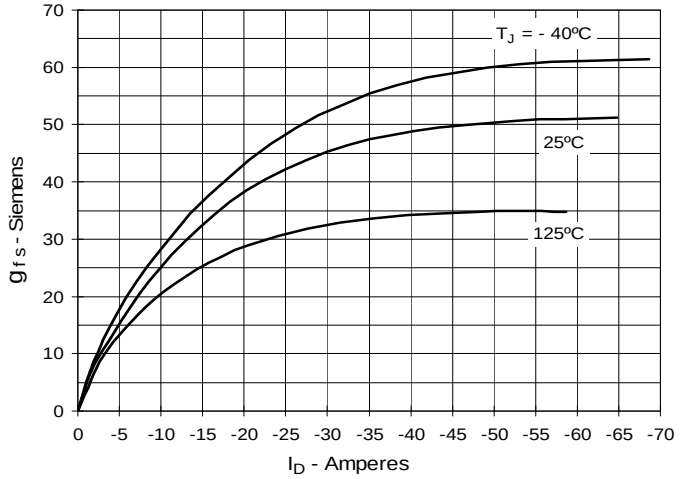


Fig. 9. Forward Voltage Drop of Intrinsic Diode

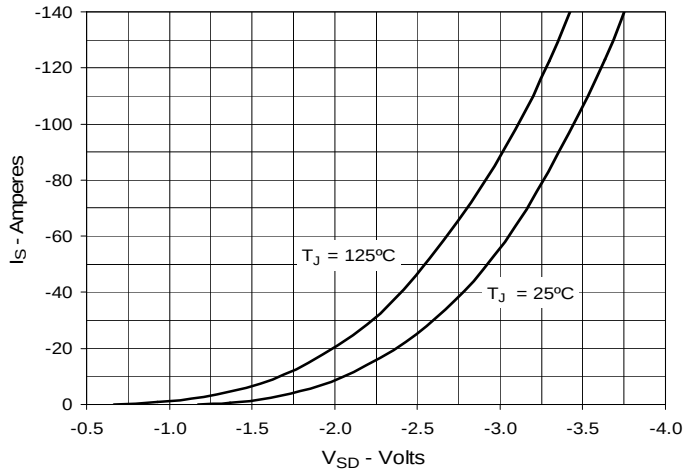


Fig. 10. Gate Charge

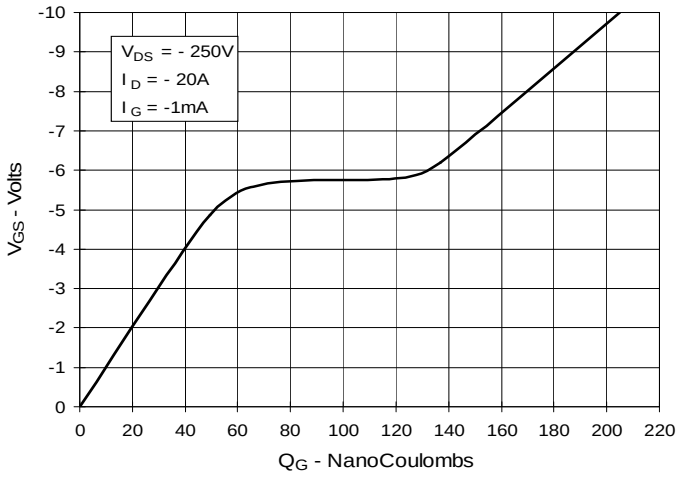


Fig. 11. Capacitance

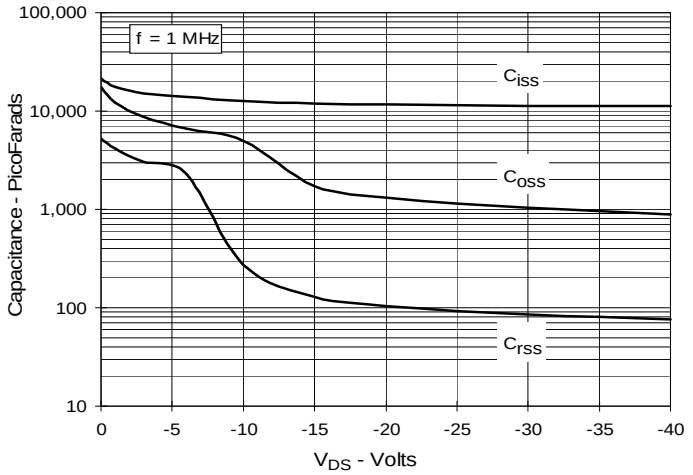


Fig. 12. Forward-Bias Safe Operating Area

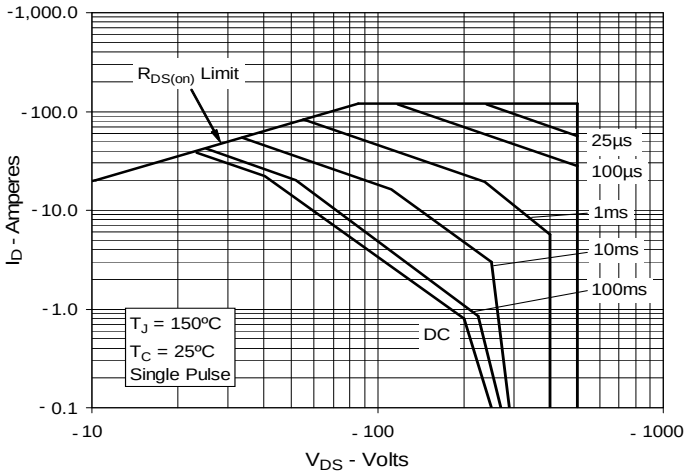


Fig. 13. Maximum Transient Thermal Impedance