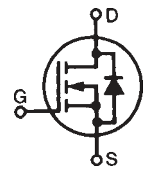
IXYS

PolarHT™ Power MOSFET

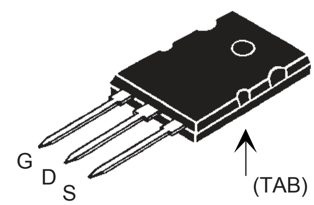
IXTK 120N20P
IXTQ 120N20P

V_{DSS} = 200 V
I_{D25} = 120 A
$R_{DS(on)} \leq$ 22 mΩ

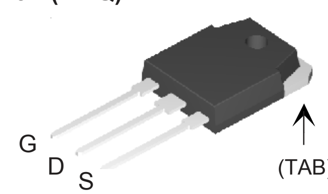
N-Channel Enhancement Mode
Avalanche Rated



TO-264 (IXTK)



TO-3P (IXTQ)



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

Symbol	Test Conditions	Maximum Ratings	
V_{DSS}	T_J = 25° C to 175° C	200	V
V_{DGR}	T_J = 25° C to 175° C; R_{GS} = 1 MΩ	200	V
V_{GS}	Continuous	±20	V
V_{GSM}	Transient	±30	V
I_{D25}	T_C = 25° C	120	A
$I_{D(RMS)}$	External lead current limit	75	A
I_{DM}	T_C = 25° C, pulse width limited by T_{JM}	300	A
I_{AR}	T_C = 25° C	60	A
E_{AR}	T_C = 25° C	60	mJ
E_{AS}	T_C = 25° C	2.0	J
dv/dt	$I_S \leq I_{DM}$, di/dt ≤100 A/µs, $V_{DD} \leq V_{DSS}$, $T_J \leq$175° C, R_G = 4 Ω	10	V/ns
P_D	T_C = 25° C	714	W
T_J		-55 ... +175	° C
T_{JM}		175	° C
T_{stg}		-55 ... +175	° C
T_L	1.6 mm (0.062 in.) from case for 10 s	300	° C
T_{SOLD}	Plastic body for 10 s	260	° C
M_d	Mounting torque	1.13/10	Nm/lb.in.
Weight	TO-3P	5.5	g
	TO-264	10	g

Symbol	Test Conditions (T_J = 25° C, unless otherwise specified)	Characteristic Values Min.	Typ.	Max.	
BV_{DSS}	V_{GS} = 0 V, I_D = 250 µA	200			V
$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250µA	2.5		5.0	V
I_{GSS}	V_{GS} = ±20 V_{DC}, V_{DS} = 0			±100	nA
I_{DSS}	V_{DS} = V_{DSS}			25	µA
	V_{GS} = 0 V T_J = 175° C			500	µA
$R_{DS(on)}$	V_{GS} = 10 V, I_D = 0.5 I_{D25} Pulse test, t ≤300 µs, duty cycle d ≤ 2 %			22	mΩ

Features

- International standard packages
- Unclamped Inductive Switching (UIS) rated
- Low package inductance
  - easy to drive and to protect

Advantages

- Easy to mount
- Space savings
- High power density

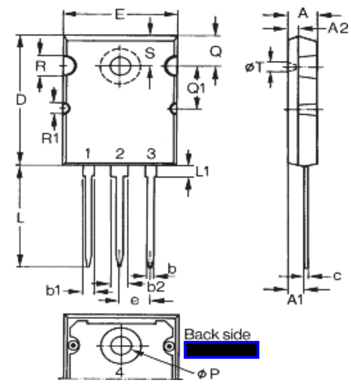
Symbol	Test Conditions	Characteristic Values (T_J = 25° C, unless otherwise specified) Min.	Typ.	Max.	
g_{fs}	V_{DS}= 10 V; I_D = 0.5 I_{D25}, pulse test	40	63		S
C_{iss}	V_{GS} = 0 V, V_{DS} = 25 V, f = 1 MHz		6000		pF
C_{oss}			1300		pF
C_{rss}			265		pF
$t_{d(on)}$	V_{GS} = 10 V, V_{DS} = 0.5 V_{DSS}, I_D = I_{D25} R_G = 3.3 Ω (External)		30		ns
t_r			35		ns
$t_{d(off)}$			100		ns
t_f			31		ns
$Q_{g(on)}$	V_{GS}= 10 V, V_{DS} = 0.5 V_{DSS}, I_D = 0.5 I_{D25}		152		nC
Q_{gs}			40		nC
Q_{gd}			75		nC
R_{thJC}				0.21	°C/W
R_{thCS}	TO-3P		0.21		°C/W
R_{thCS}	TO-264		0.15		°C/W

Source-Drain Diode

Symbol	Test Conditions	Characteristic Values (T_J = 25° C, unless otherwise specified) Min.	Typ.	Max.	
I_S	V_{GS} = 0 V			120	A
I_{SM}	Repetitive			300	A
V_{SD}	I_F = I_S, V_{GS} = 0 V, Pulse test, t ≤300 µs, duty cycle d≤ 2 %			1.5	V
t_{rr}	I_F = 25 A, -di/dt = 100 A/µs		180		ns
Q_{RM}	V_R = 100 V, V_{GS} = 0 V		3.0		µC

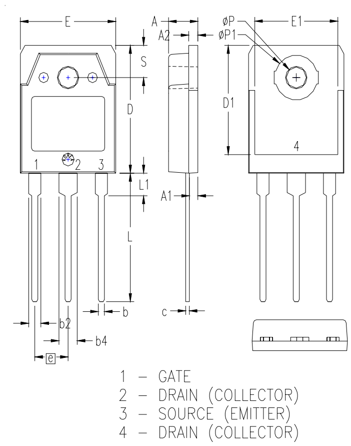
[redacted]

TO-264 (IXTK) Outline



Dim.	Millimeter Min.	Max.	Inches Min.	Max.
A	4.82	5.13	.190	.202
A1	2.54	2.89	.100	.114
A2	2.00	2.10	.079	.083
b	1.12	1.42	.044	.056
b1	2.39	2.69	.094	.106
b2	2.90	3.09	.114	.122
c	0.53	0.83	.021	.033
D	25.91	26.16	1.020	1.030
E	19.81	19.96	.780	.786
e	5.46 BSC		.215 BSC	
J	0.00	0.25	.000	.010
K	0.00	0.25	.000	.010
L	20.32	20.83	.800	.820
L1	2.29	2.59	.090	.102
P	3.17	3.66	.125	.144
Q	6.07	6.27	.239	.247
Q1	8.38	8.69	.330	.342
R	3.81	4.32	.150	.170
R1	1.78	2.29	.070	.090
S	6.04	6.30	.238	.248

TO-3P (IXTQ) Outline



SYM	INCHES MIN	MAX	MILLIMETERS MIN	MAX
A	.185	.193	4.70	4.90
A1	.051	.059	1.30	1.50
A2	.057	.065	1.45	1.65
b	.035	.045	0.90	1.15
b2	.075	.087	1.90	2.20
b4	.114	.126	2.90	3.20
c	.022	.031	0.55	0.80
D	.780	.799	19.80	20.30
D1	.665	.677	16.90	17.20
E	.610	.622	15.50	15.80
E1	.531	.539	13.50	13.70
e	.215 BSC		5.45 BSC	
L	.779	.795	19.80	20.20
L1	.134	.142	3.40	3.60
øP	.126	.134	3.20	3.40
øP1	.272	.280	6.90	7.10
S	.193	.201	4.90	5.10

Fig. 1. Output Characteristics @ 25ºC

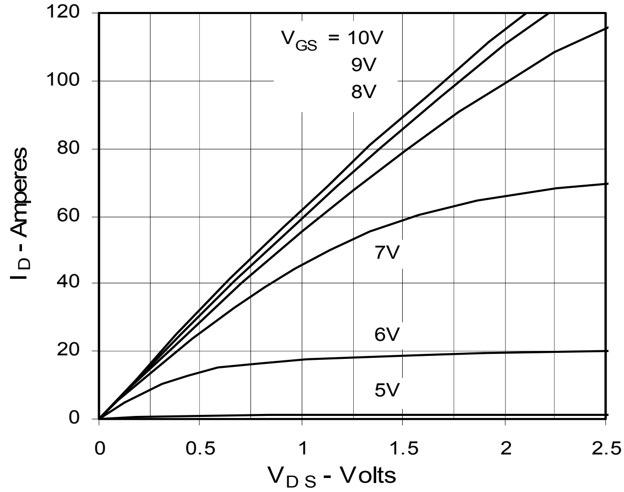


Fig. 2. Extended Output Characteristics @ 25ºC

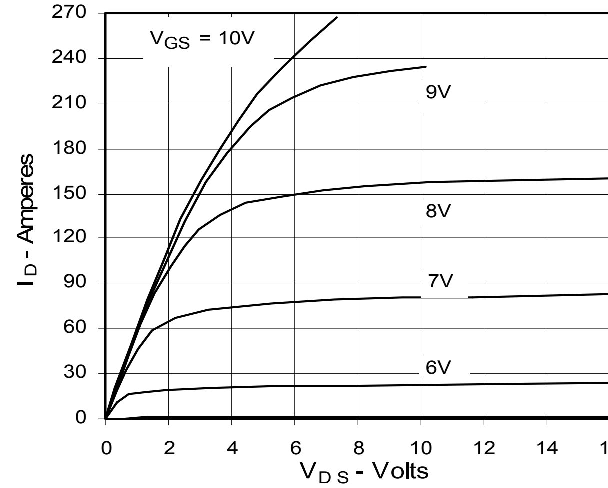


Fig. 3. Output Characteristics @ 150ºC

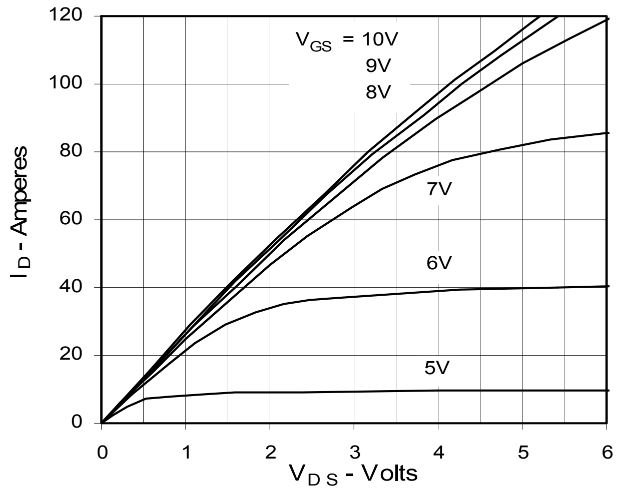


Fig. 4. $R_{DS(on)}$ Normalized to 0.5 I_{D25} Value vs. Junction Temperature

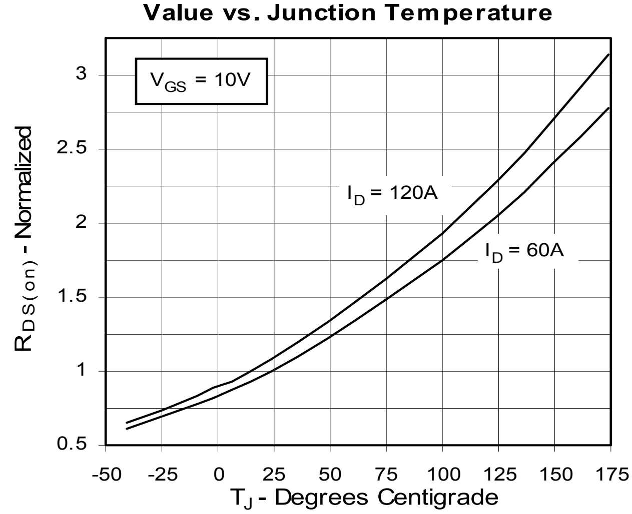


Fig. 5. $R_{DS(on)}$ Normalized to 0.5 I_{D25} Value vs. Drain Current

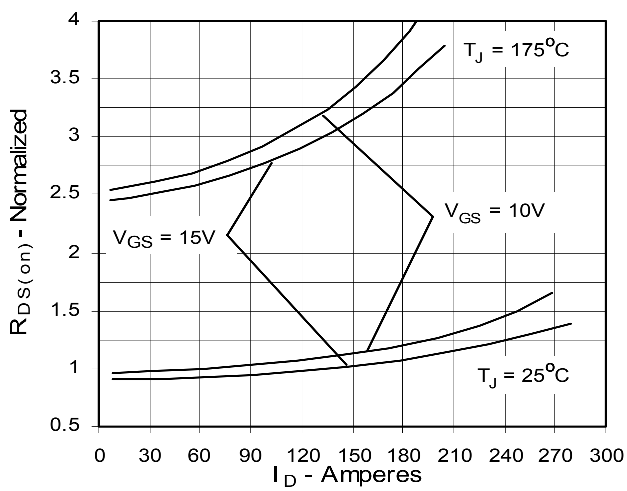


Fig. 6. Drain Current vs. Case Temperature

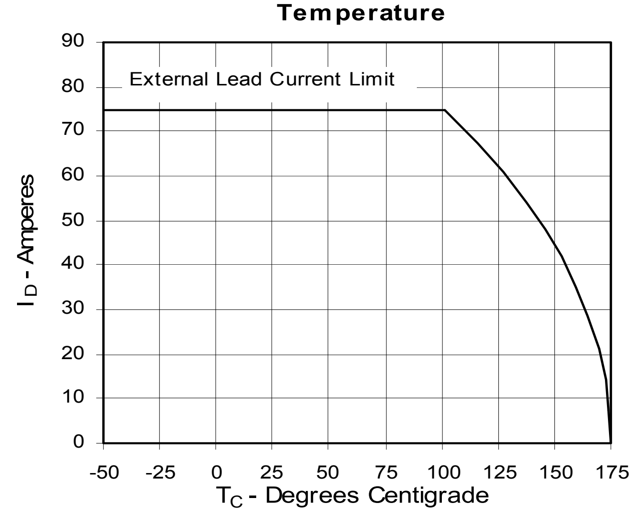


Fig. 7. Input Admittance

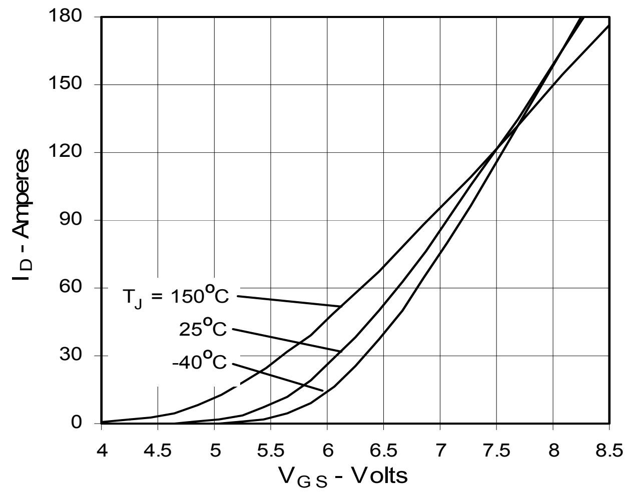


Fig. 8. Transconductance

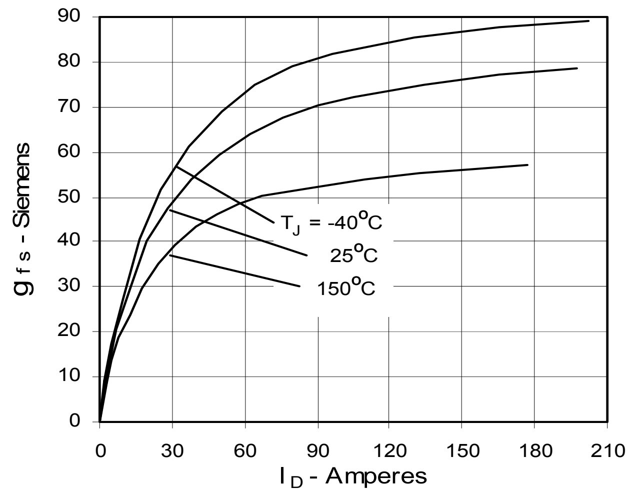


Fig. 9. Source Current vs. Source-To-Drain Voltage

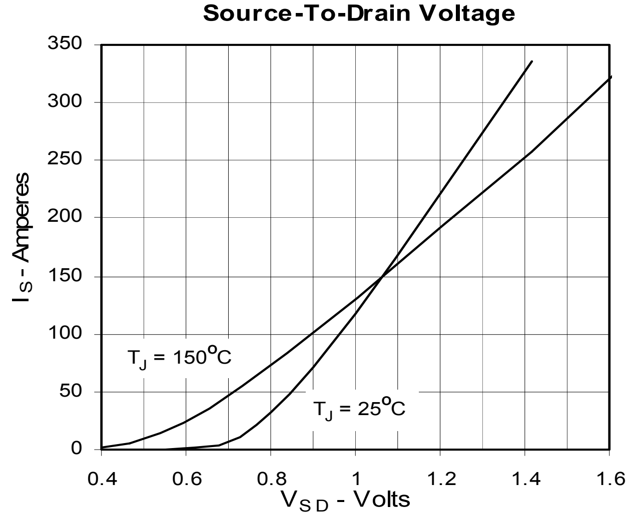


Fig. 10. Gate Charge

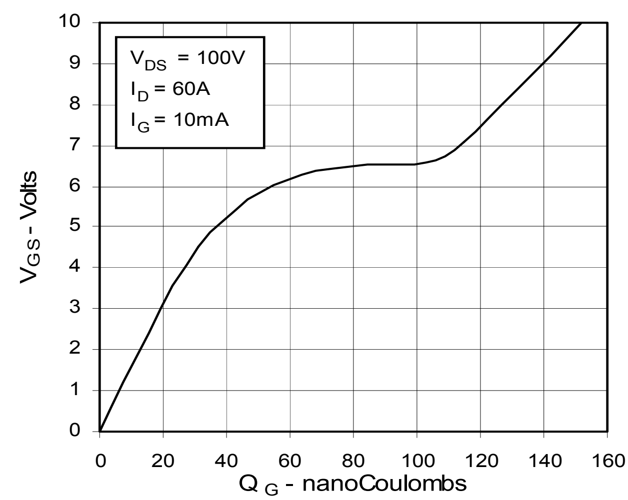


Fig. 11. Capacitance

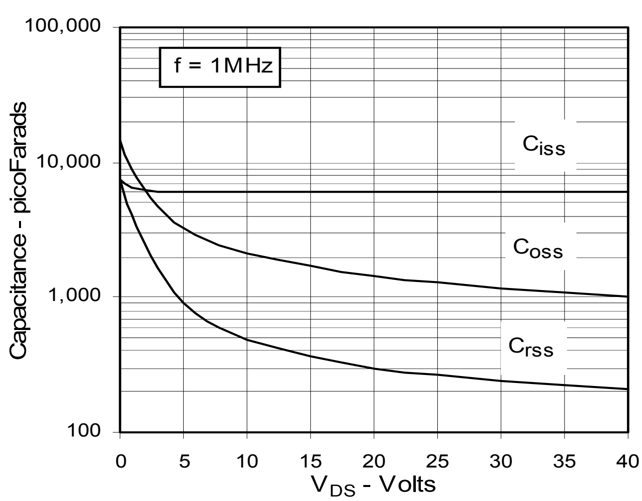


Fig. 12. Forward-Bias Safe Operating Area

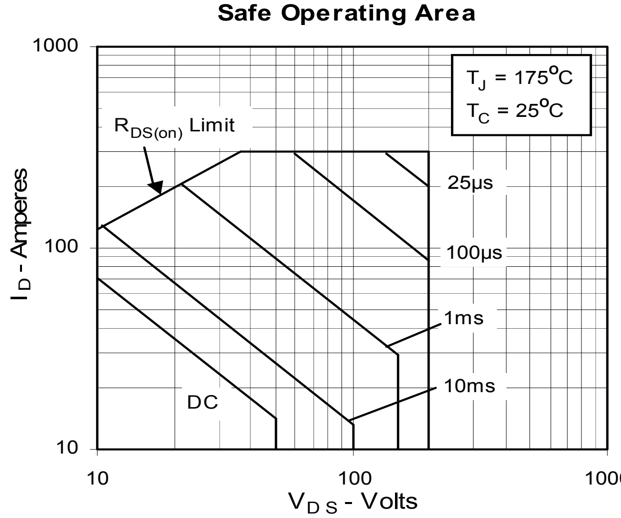
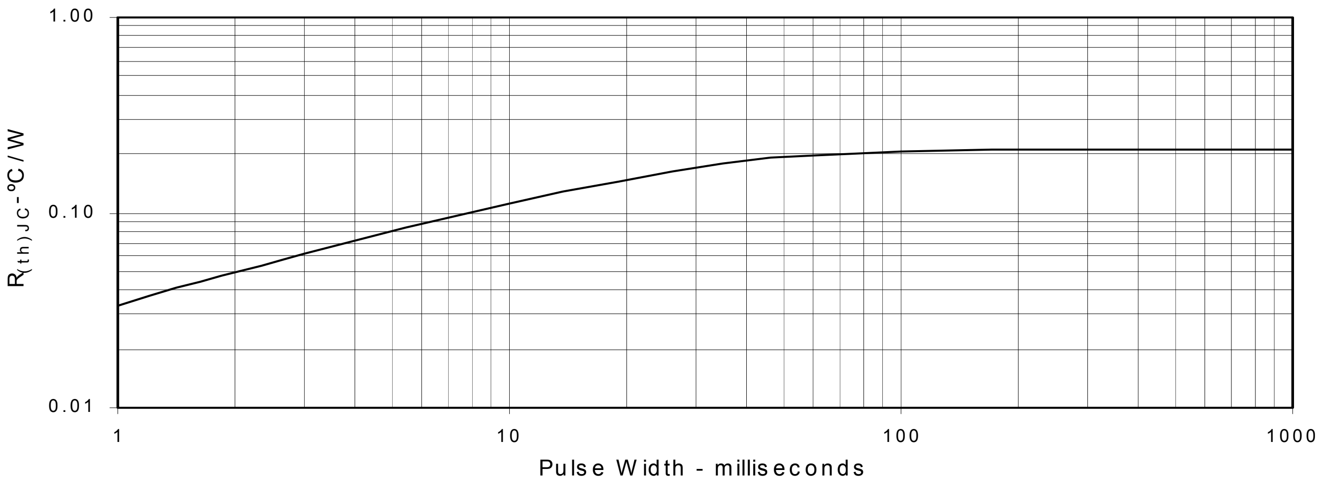


Fig. 13. Maximum Transient Thermal Resistance



IXYS
A Littelfuse Technology