IXYS

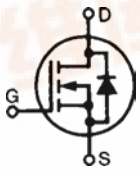
High Voltage Power MOSFETs

IXTH 3N120

V_{DSS} = 1200 V
I_{D25} = 3 A
$V_{DS(on)}$ = 4.5 Ω

N-Channel Enhancement Mode
Avalanche Rated, High dv/dt

Preliminary Data Sheet



Symbol	Test Conditions		Maximum Ratings	
V_{DSS}	T_J = 25°C to 150°C	3N120	1200	V
		3N110	1100	V
V_{DGR}	T_J = 25°C to 150°C; R_{GS} = 1 MΩ	3N120	1200	V
		3N110	1100	V
V_{GS}	Continuous		±20	V
V_{GSM}	Transient		±30	V
I_{D25}	T_C = 25°C		3	A
I_{DM}	T_C = 25°C, pulse width limited by T_{JM}		12	A
I_{AR}	T_C = 25°C		3	A
E_{AR}	T_C = 25°C		20	mJ
E_{AS}			700	mJ
dv/dt	$I_S \le I_{DM}$, di/dt ≤ 100 A/µs, $V_{DD} \le V_{DSS}$, $T_J \le 150°C$, R_G = 2 Ω		5	V/ns
P_D	T_C = 25°C		150	W
T_J			-55 to +150	°C
T_{JM}			150	°C
T_{stg}			-55 to +150	°C
T_L	1.6 mm (0.063 in) from case for 10 s		300	°C
M_d	Mounting torque		1.13/10	Nm/lb.in.
Weight			6	g

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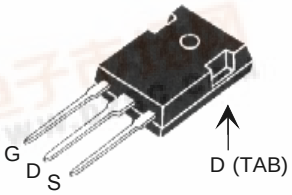


G = Gate D = Drain
S = Source TAB = Drain

Features

- International standard packages
- Low $R_{DS(on)}$
- Rated for unclamped Inductive load Switching (UIS)
- Molding epoxies meet UL 94 V-0 flammability classification

Advantages

- Easy to mount
- Space savings
- High power density

Symbol	Test Conditions		Characteristic Values (T_J = 25°C, unless otherwise specified) min.	typ.	max.	
V_{DSS}	V_{GS} = 0 V, I_D = 1 mA		1200			V
$V_{GS(th)}$	$V_{DS} = V_{GS}$, I_D = 250 µA		2.5		4.5	V
I_{GSS}	V_{GS} = ±20 V_{DC}, V_{DS} = 0				±100	nA
I_{DSS}	V_{DS} = 0.8 V_{DSS}	T_J = 25°C			25	µA
	V_{GS} = 0 V	T_J = 125°C			1	mA
$R_{DS(on)}$	V_{GS} = 10 V, I_D = 0.5 I_{D25} Note 1				4.5	Ω

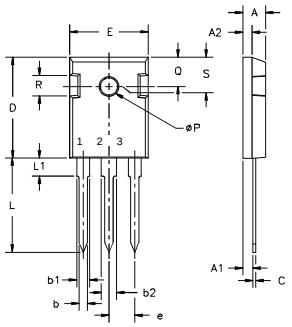
Symbol	Test Conditions (T_J = 25°C, unless otherwise specified)	Characteristic Values min.	typ.	max.	
g_{fs}	V_{DS} = 10 V; I_D = 0.5 • I_{D25}, Note 1	1.5	2.2		S
C_{iss}	V_{GS} = 0 V, V_{DS} = 25 V, f = 1 MHz		1050	1300	pF
C_{oss}			100	125	pF
C_{rss}			25	50	pF
$t_{d(on)}$	V_{GS} = 10 V, V_{DS} = 0.5 • V_{DSS}, I_D = 0.5 • I_{D25} R_G = 4.7 Ω (External),		17		ns
t_r			15		ns
$t_{d(off)}$			32		ns
t_f			18		ns
$Q_{g(on)}$	V_{GS} = 10 V, V_{DS} = 0.5 • V_{DSS}, I_D = 0.5 • I_{D25}		39		nC
Q_{gs}			9		nC
Q_{gd}			22		nC
R_{thJC}				0.8	K/W
R_{thCK}			0.25		K/W

Source-Drain Diode

Symbol	Test Conditions (T_J = 25°C, unless otherwise specified)	Characteristic Values min.	typ.	max.	
I_S	V_{GS} = 0 V			3	A
I_{SM}	Repetitive; pulse width limited by T_{JM}			12	A
V_{SD}	I_F = I_S, V_{GS} = 0 V, Note 1			1.5	V
t_{rr}	I_F = I_S, -di/dt = 100 A/µs, V_R = 100 V		700		ns

Notes: 1. Pulse test, t ≤ 300 µs, duty cycle d ≤ 2 %

TO-247 AD Outline



Terminals: 1 - Gate 2 - Drain
3 - Source Tab - Drain

Dim.	Millimeter Min.	Max.	Inches Min.	Max.
A	4.7	5.3	.185	.209
A_1	2.2	2.54	.087	.102
A_2	2.2	2.6	.059	.098
b	1.0	1.4	.040	.055
b_1	1.65	2.13	.065	.084
b_2	2.87	3.12	.113	.123
C	.4	.8	.016	.031
D	20.80	21.46	.819	.845
E	15.75	16.26	.610	.640
e	5.20	5.72	0.205	0.225
L	19.81	20.32	.780	.800
L1		4.50		.177
∅P	3.55	3.65	.140	.144
Q	5.89	6.40	0.232	0.252
R	4.32	5.49	.170	.216
S	6.15 BSC		242 BSC	

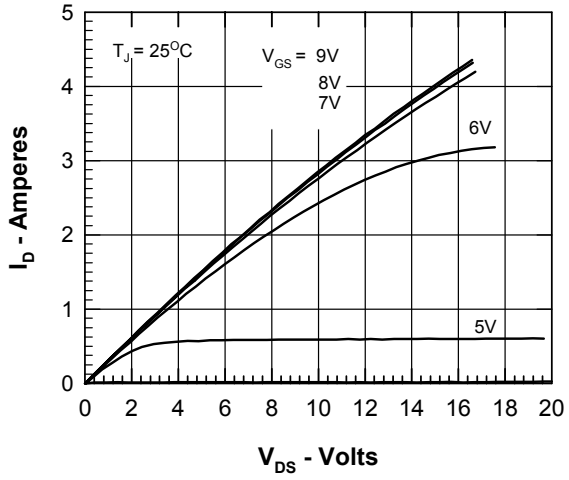


Fig.1 Output Characteristics @ T_j = 25°C

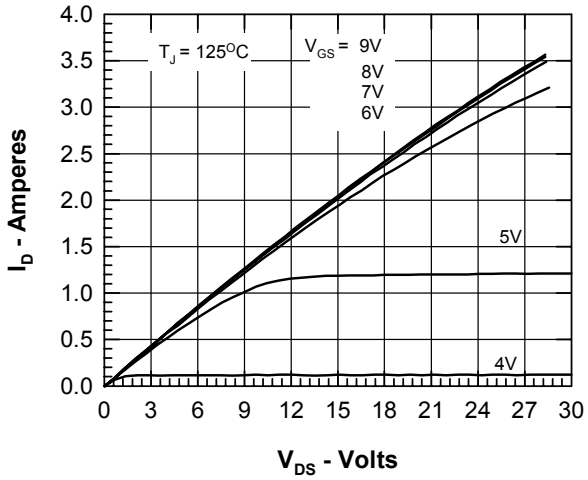


Fig. 2 Output Characteristics @ T_j = 125°C

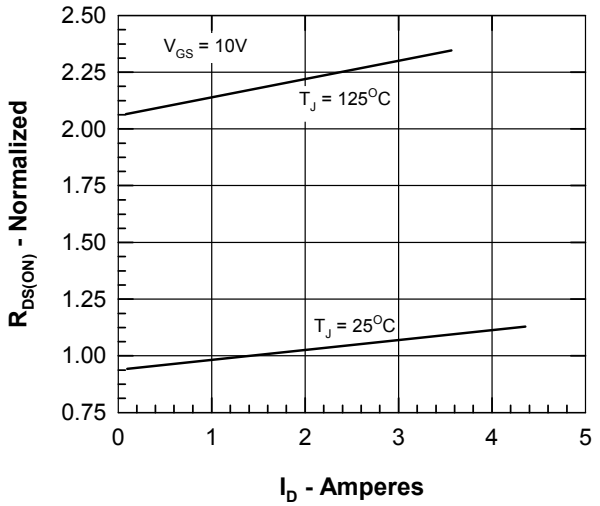


Fig. 3 $R_{DS(on)}$ vs. Drain Current

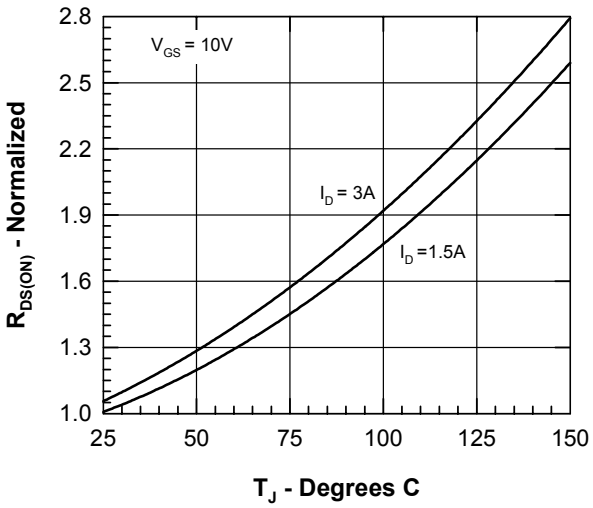


Fig. 4 Temperature Dependence of Drain to Source Resistance

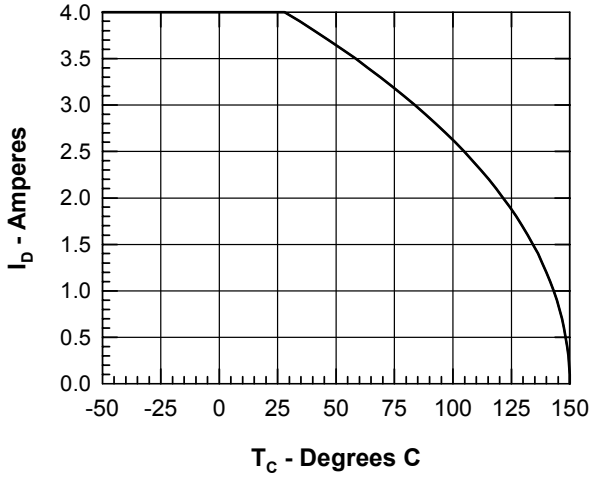


Fig. 5 Drain Current vs. Case Temperature

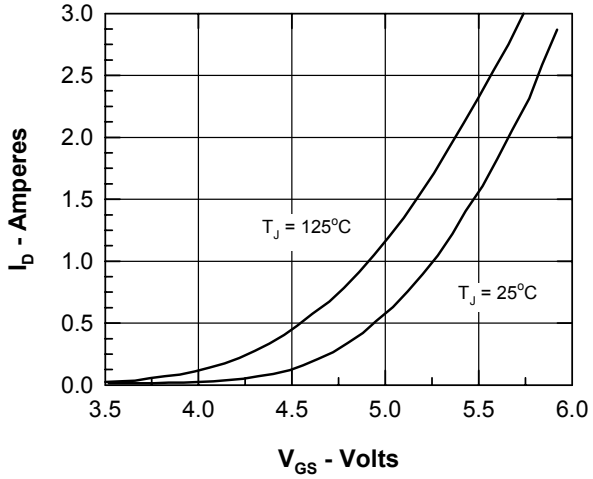


Fig. 6 Drain Current vs Gate Source Voltage

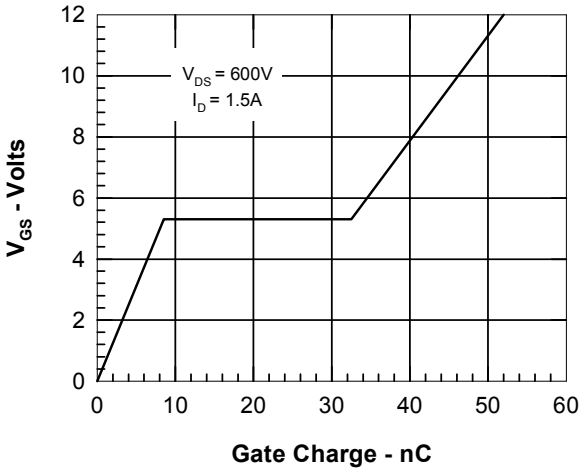


Fig. 7 Gate Charge Characteristic Curve

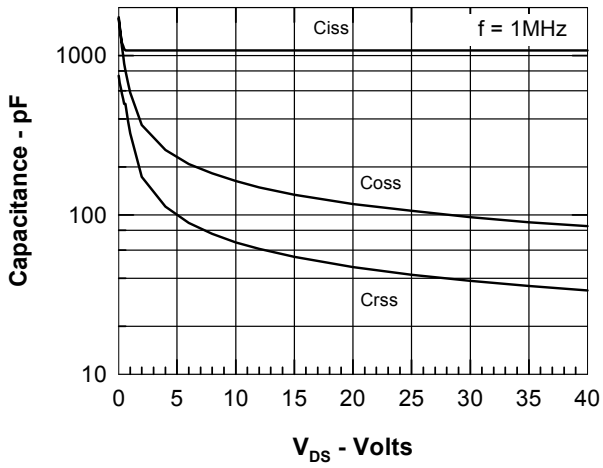


Fig. 8 Capacitance Curves

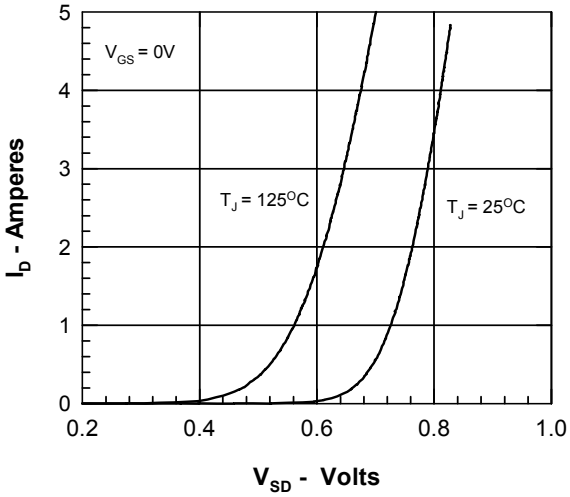


Fig. 9 Drain Current vs Drain to Source Voltage

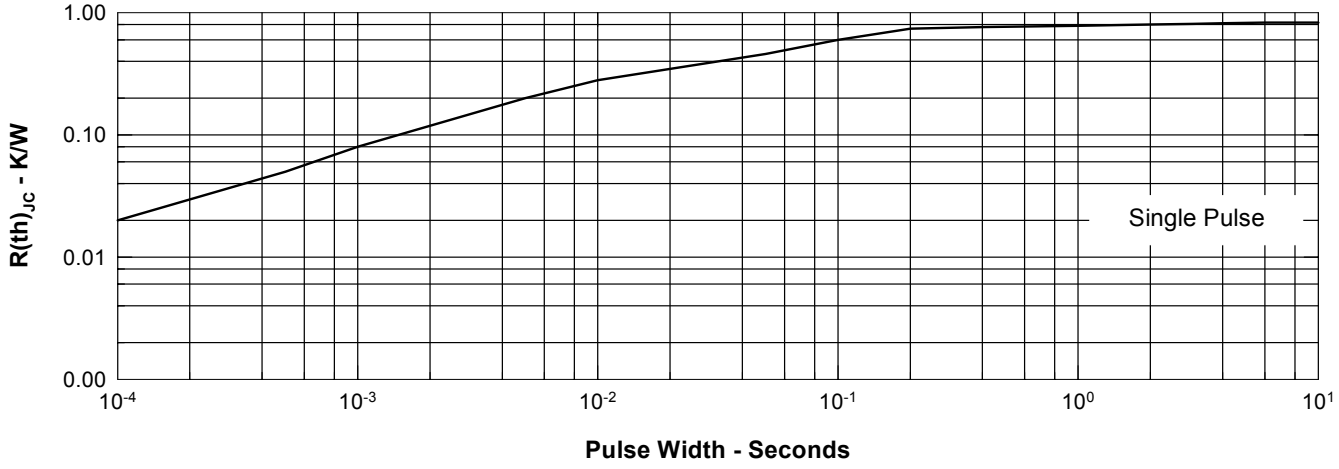


Fig.10 Transient Thermal Impedance