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IXYS

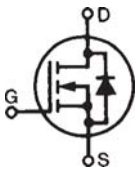
High Voltage MOSFET

N-Channel, Depletion Mode

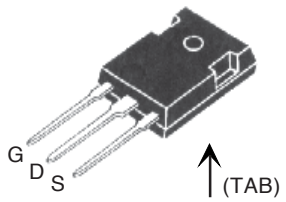
IXTH 20N50D
IXTT 20N50D

V_{DSS} = 500 V
I_{D25} = 20 A
$R_{DS(on)}$ = 0.33 Ω

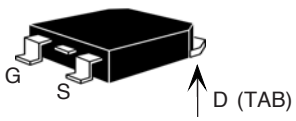
Preliminary Data Sheet



TO-247 (IXFH)



TO-268 (IXTT)



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

Symbol	Test Conditions	Maximum Ratings	
V_{DSX}	T_J = 25°C to 150°C	500	V
V_{DGX}	T_J = 25°C to 150°C	500	V
V_{GS}	Continuous	± 30	V
V_{GSM}	Transient	± 40	V
I_{D25}	T_C = 25°C	20	A
I_{DM}	T_C = 25°C; pulse width limited by T_{JM}	50	A
P_D	T_C = 25°C	400	W
T_J		-55 ... + 150	°C
T_{JM}		150	°C
T_{stg}		-55 ... + 150	°C
T_L	1.6 mm (0.063 in) from case for 10 seconds	300	°C
T_{ISOL}	Plastic case for 10 seconds	300	°C
M_d	Mounting torque	1.13/10	Nm/lb.in.
Weight	TO-247	6	g
	TO-268	4	g

Symbol	Test Conditions		Characteristic Values (T_J = 25°C, unless otherwise specified) min.	typ.	max.	
V_{DSX}	V_{GS} = -10 V, I_D = 250 mA		500			V
$V_{GS(off)}$	V_{DS} = 25 V, I_D = 250 mA		-1.5		-3.5	V
I_{GSS}	V_{GS} = ± 30 V_{DC}, V_{DS} = 0				± 100	nA
$I_{DSX(off)}$	V_{DS} = V_{DSS}	T_J = 25°C			25	μA
	V_{GS} = -10 V	T_J = 125°C			500	μA
$R_{DS(on)}$	V_{GS} = 10 V, I_D = 10 A	Note 1			0.33	Ω
$I_{D(on)}$	V_{GS} = 0 V, V_{DS} = 25 V	Note 1		1.5		A

Features

- Normally ON Mode
- International standard packages
- Molding epoxies meet UL 94 V-0 flammability classification

Applications

- Level shifting
- Triggers
- Solid State Relays
- Current Regulators
- Active load

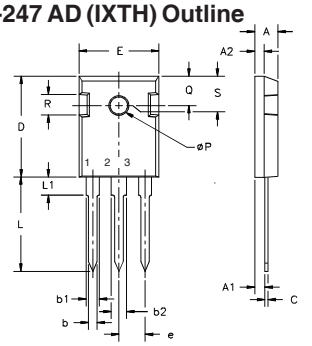
Symbol	Test Conditions (T$_J$ = 25°C, unless otherwise specified)	Characteristic Values min.	typ.	max.	
g_{fs}	V_{DS}= 30 V, I_D =10 A, Note 1	4.0	7.5		S
C_{iss}	V_{GS} = -10 V, V_{DS} = 25 V, f = 1 MHz		2500		pF
C_{oss}			400		pF
C_{rss}			100		pF
$t_{d(on)}$	V_{GS}= 0 V to -10 V, V_{DS} = 0.5 • V_{DSX} I_D = 10 A, R_G = 4.7 Ω (External),		35		ns
t_r			85		ns
$t_{d(off)}$			110		ns
t_f			75		ns
$Q_{g(on)}$	V_{GS} = 10 V, V_{DS} = 0.5 • V_{DSX}, I_D = 0.5 • I_{D25}		125		nC
Q_{gs}			35		nC
Q_{gd}			51		nC
R_{thJC}				0.31	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.	
V_{SD}	I_F = I_{D25}, V_{GS} = -10 V, Note 1		0.85	1.5	V
t_{rr}	I_F = 20A, -di/dt = 100 A/μs, V_R = 100 V v_{GS}= -10 V		510		ns

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

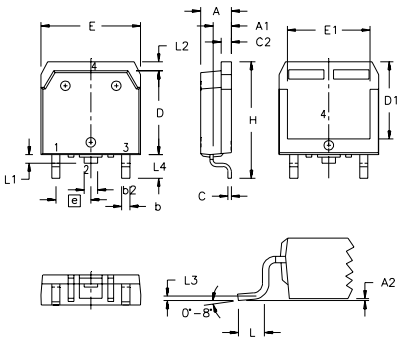
TO-247 AD (IXTH) Outline



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
ØP	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

TO-268 (IXTTH) Outline



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

SYM	INCHES MIN	MAX	MILLIMETERS MIN	MAX
A	.193	.201	4.90	5.10
A1	.106	.114	2.70	2.90
A2	.001	.010	0.02	0.25
b	.045	.057	1.15	1.45
b2	.075	.083	1.90	2.10
C	.016	.026	0.40	0.65
C2	.057	.063	1.45	1.60
D	.543	.551	13.80	14.00
D1	.488	.500	12.40	12.70
E	.624	.632	15.85	16.05
E1	.524	.535	13.30	13.60
e	.215 BSC		5.45 BSC	
H	.736	.752	18.70	19.10
L	.094	.106	2.40	2.70
L1	.047	.055	1.20	1.40
L2	.039	.045	1.00	1.15
L3	.010 BSC		0.25 BSC	
L4	.150	.161	3.80	4.10

Fig. 1. Output Characteristics @ 25ºC

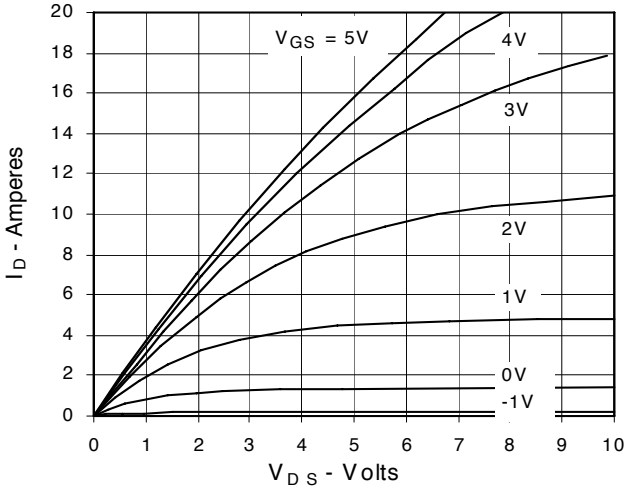


Fig. 2. Extended Output Characteristics @ 25ºC

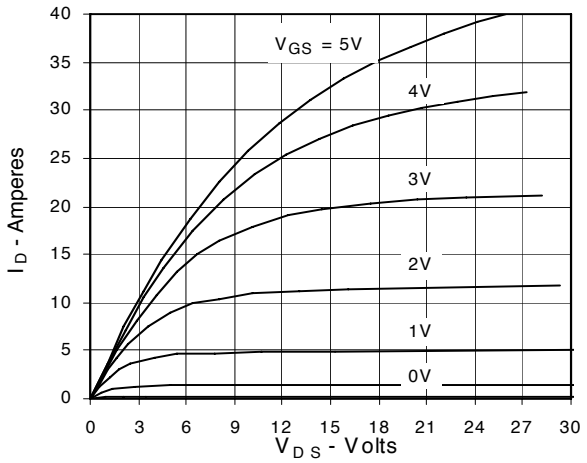


Fig. 3. Output Characteristics @ 125ºC

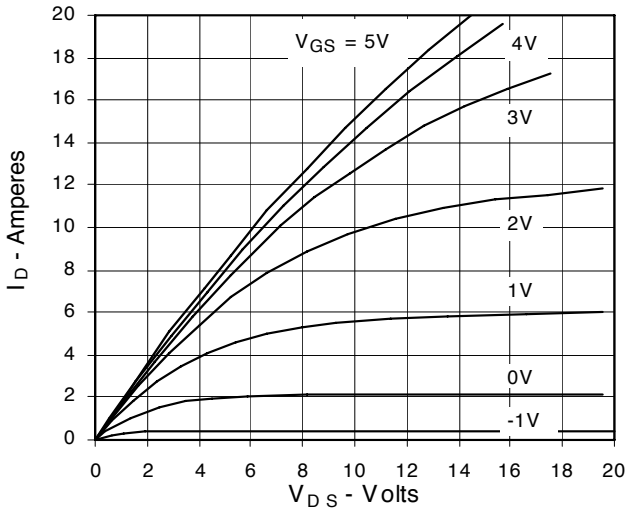


Fig. 4. $R_{DS(on)}$ Normalized to 0.5 I_{D25} Value vs. Junction Temperature

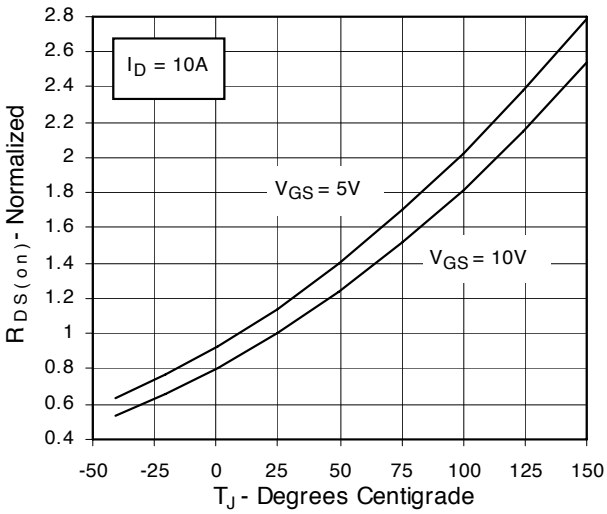


Fig. 5. $R_{DS(on)}$ Normalized to 0.5 I_{D25} Value vs. I_D

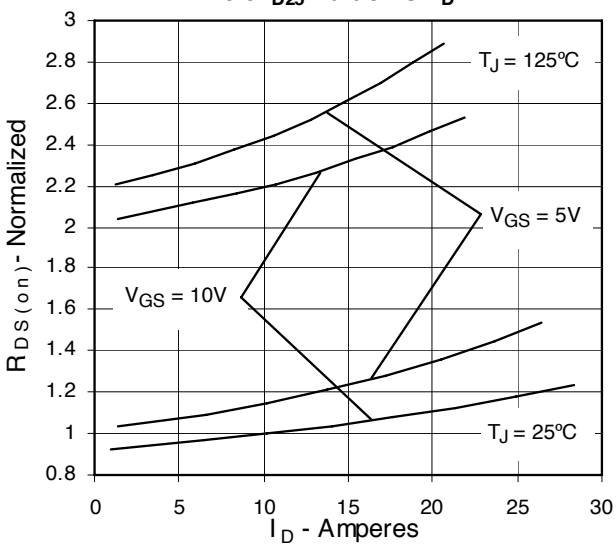


Fig. 6. Drain Current vs. Case Temperature

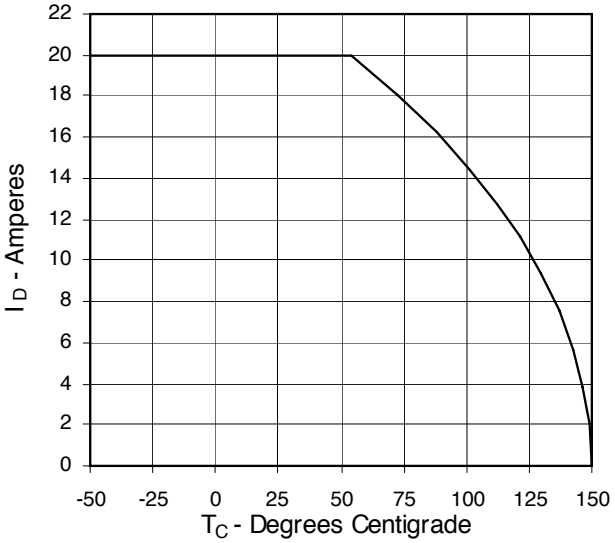


Fig. 7. Input Admittance

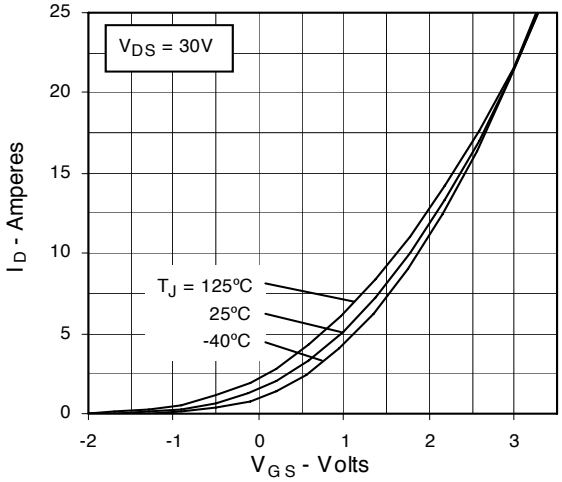


Fig. 8. Transconductance

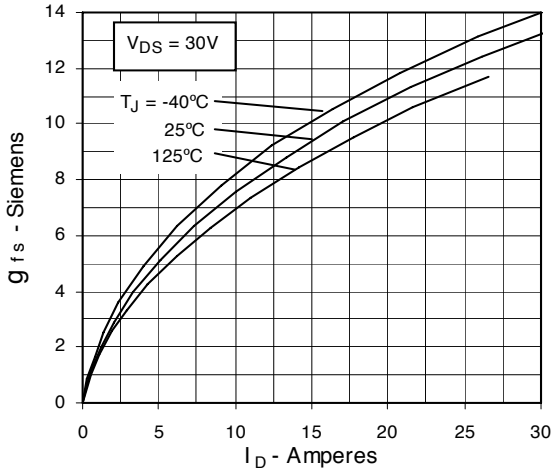


Fig. 9. Source Current vs. Source-To-Drain Voltage

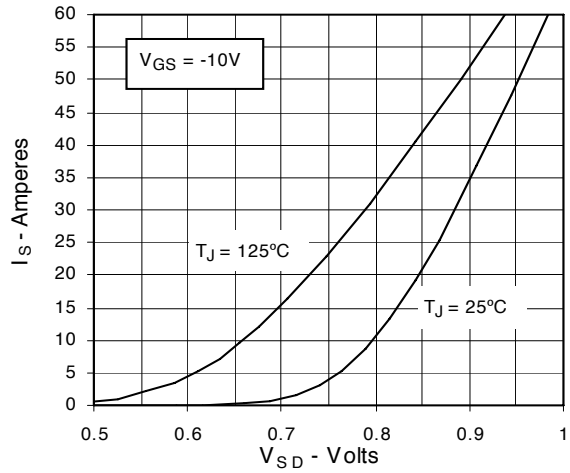


Fig. 10. Dependence of Breakdown and Threshole Voltages on Temperature

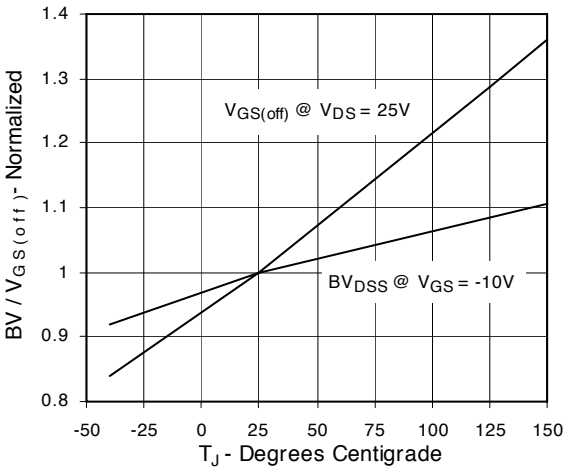


Fig. 11. Gate Charge

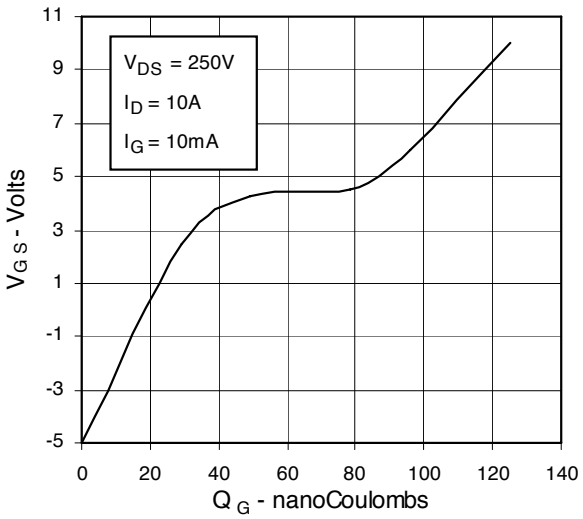


Fig. 12. Capacitance

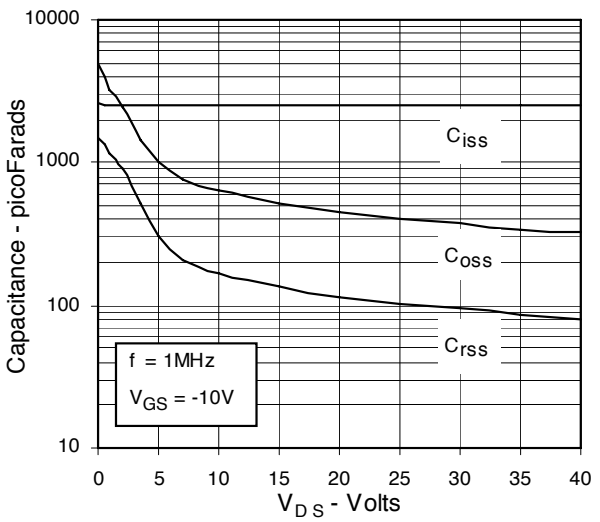


Fig. 13. Forward-Bias Safe Operating Area

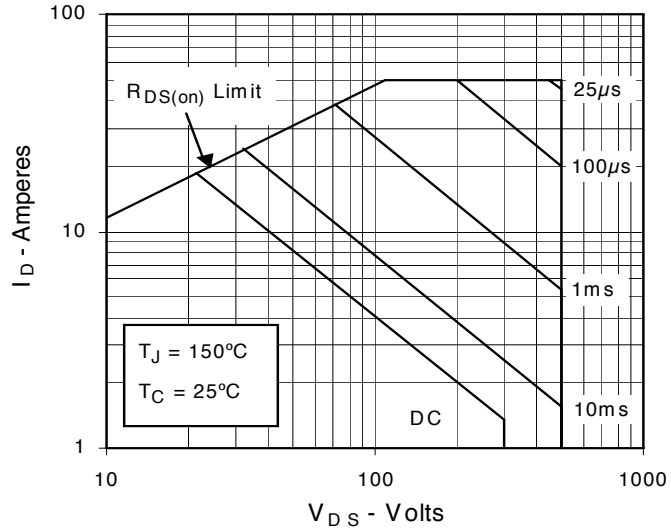


Fig. 14. Maximum Transient Thermal Resistance