

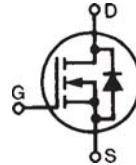
High Voltage MOSFET

N-Channel, Depletion Mode

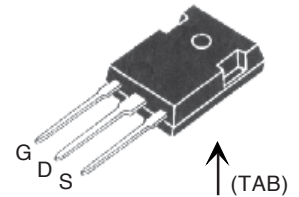
IXTH 20N50D
IXTT 20N50D

$$\begin{aligned} V_{DSS} &= 500 \text{ V} \\ I_{D25} &= 20 \text{ A} \\ R_{DS(on)} &= 0.33 \Omega \end{aligned}$$

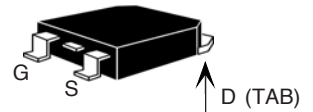
Preliminary Data Sheet



TO-247 (IXFH)



TO-268 (IXTT)



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

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

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

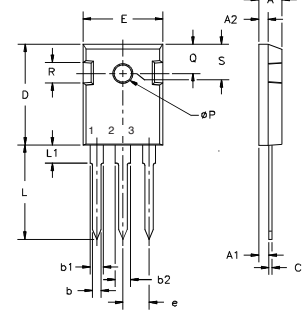
Symbol	Test Conditions	Characteristic Values ($T_J = 25^\circ\text{C}$, unless otherwise specified)		
		min.	typ.	max.
V_{DSX}	$V_{GS} = -10 \text{ V}$, $I_D = 250 \text{ mA}$	500		V
$V_{GS(off)}$	$V_{DS} = 25 \text{ V}$, $I_D = 250 \text{ mA}$	-1.5		-3.5 V
I_{GSS}	$V_{GS} = \pm 30 \text{ V}_{DC}$, $V_{DS}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

Symbol	Test Conditions	Characteristic Values ($T_J = 25^\circ\text{C}$, unless otherwise specified)		
		min.	typ.	max.
g_{fs}	$V_{DS} = 30\text{ V}$, $I_D = 10\text{ A}$, Note 1	4.0	7.5	S
C_{iss}	$V_{GS} = -10\text{ V}$, $V_{DS} = 25\text{ V}$, $f = 1\text{ MHz}$		2500	pF
C_{oss}			400	pF
C_{rss}			100	pF
$t_{d(on)}$	$V_{GS} = 0\text{ V to } -10\text{ V}$, $V_{DS} = 0.5 \cdot V_{DSX}$ $I_D = 10\text{ A}$, $R_G = 4.7\ \Omega$ (External),		35	ns
t_r			85	ns
$t_{d(off)}$			110	ns
t_f			75	ns
$Q_{g(on)}$	$V_{GS} = 10\text{ V}$, $V_{DS} = 0.5 \cdot V_{DSX}$, $I_D = 0.5 \cdot I_{D25}$		125	nC
Q_{gs}			35	nC
Q_{gd}			51	nC
R_{thJC}		0.25	0.31	K/W
R_{thCK}				K/W

Source-Drain Diode

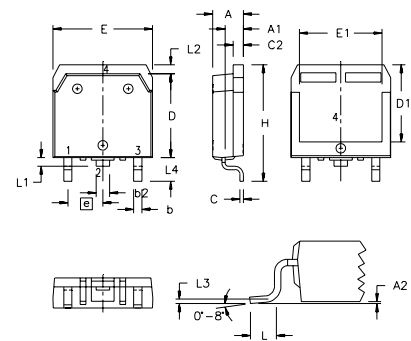
Symbol	Test Conditions	Characteristic Values ($T_J = 25^\circ\text{C}$, unless otherwise specified)		
		min.	typ.	max.
V_{SD}	$I_F = I_{D25}$, $V_{GS} = -10\text{ V}$, Note 1		0.85	1.5 V
t_{rr}	$I_F = 20\text{ A}$, $-di/dt = 100\text{ A}/\mu\text{s}$, $V_R = 100\text{ V}$ $V_{GS} = -10\text{ V}$		510	ns

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

TO-247 AD (IXTH) Outline


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

Dim.	Millimeter		Inches	
	Min.	Max.	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		MILLIMETERS	
	MIN	MAX	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

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
	4,850,072	5,017,508	5,063,307	5,381,025	6,259,123 B1	6,534,343	6,710,405 B2	
	4,881,106	5,034,796	5,187,117	5,486,715	6,306,728 B1	6,583,505	6,710,463	

Fig. 1. Output Characteristics
@ 25°C

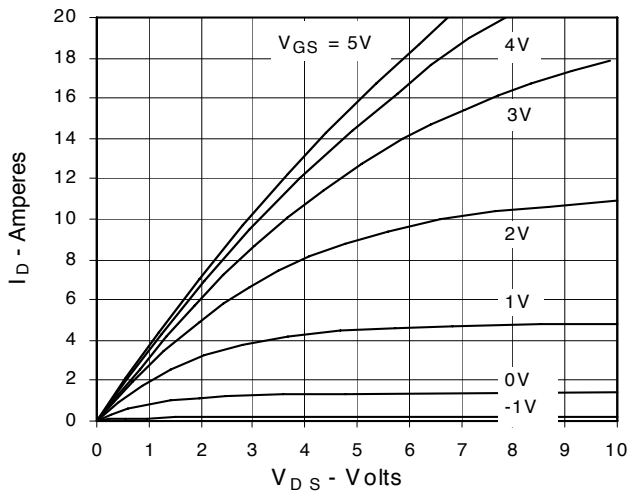


Fig. 2. Extended Output Characteristics
@ 25°C

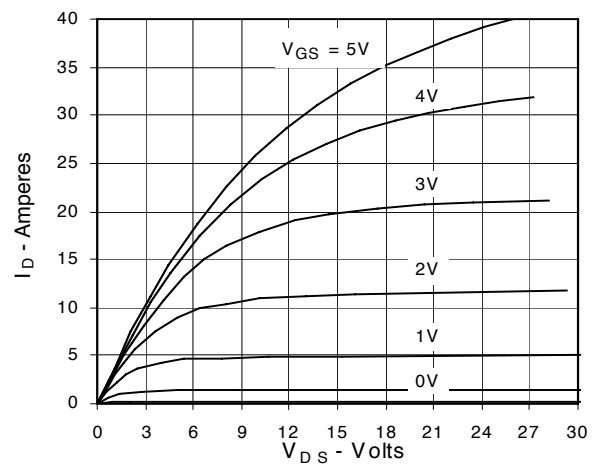


Fig. 3. Output Characteristics
@ 125°C

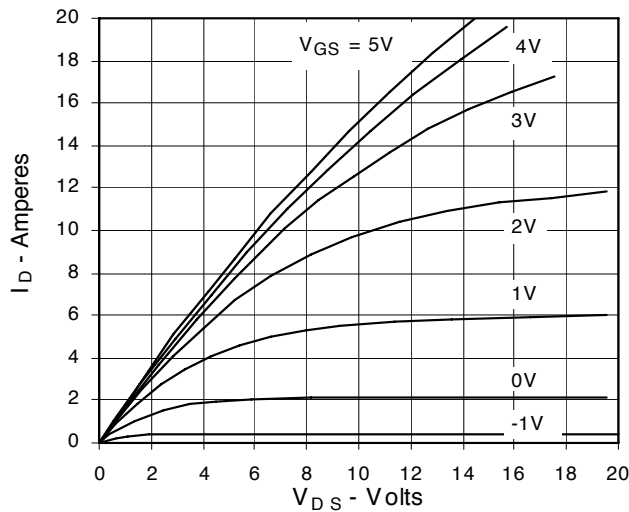


Fig. 4. $R_{DS(on)}$ Normalized to $0.5 I_{D25}$ Value vs. Junction Temperature

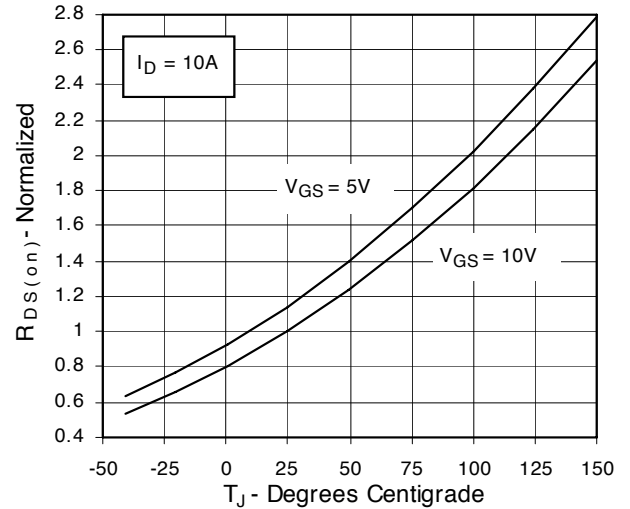


Fig. 5. $R_{DS(on)}$ Normalized to $0.5 I_{D25}$ Value vs. I_D

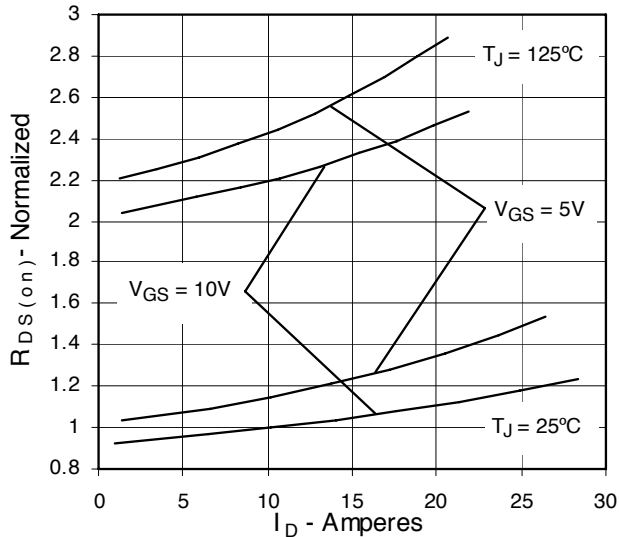


Fig. 6. Drain Current vs. Case Temperature

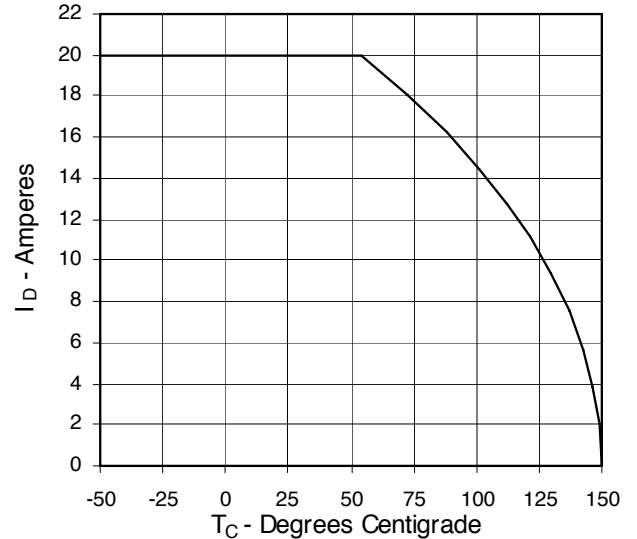
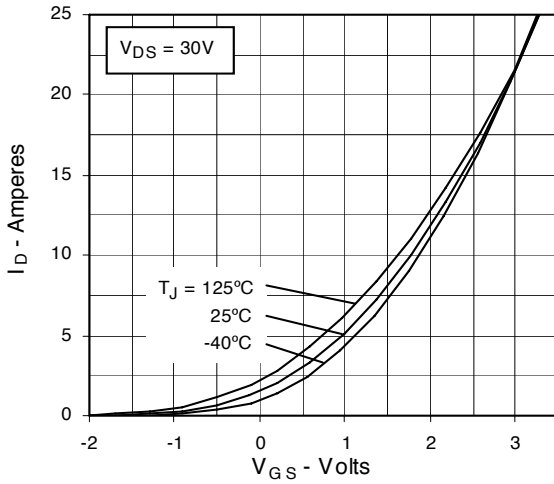
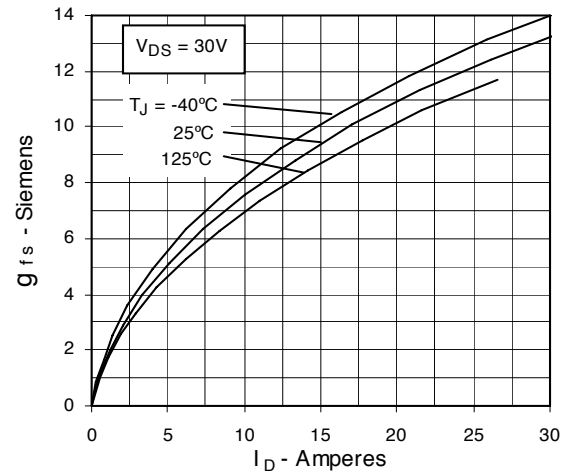
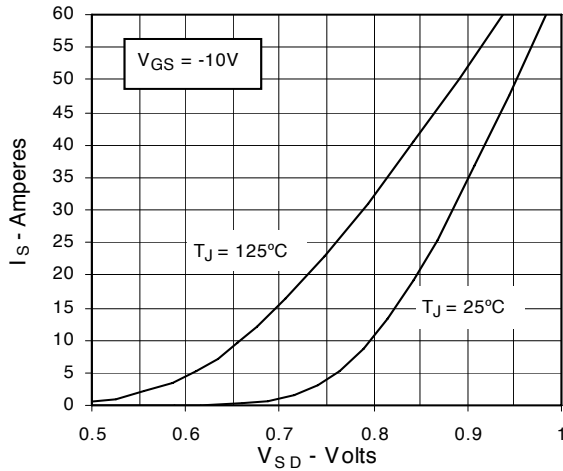
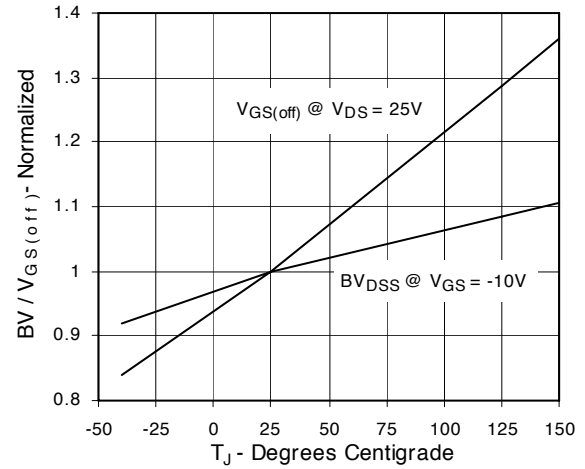
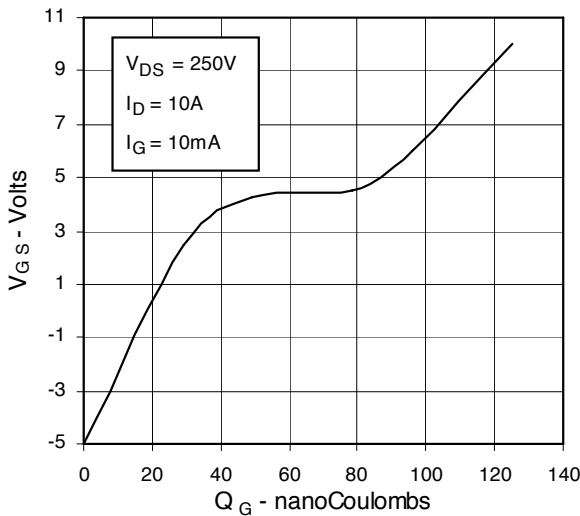
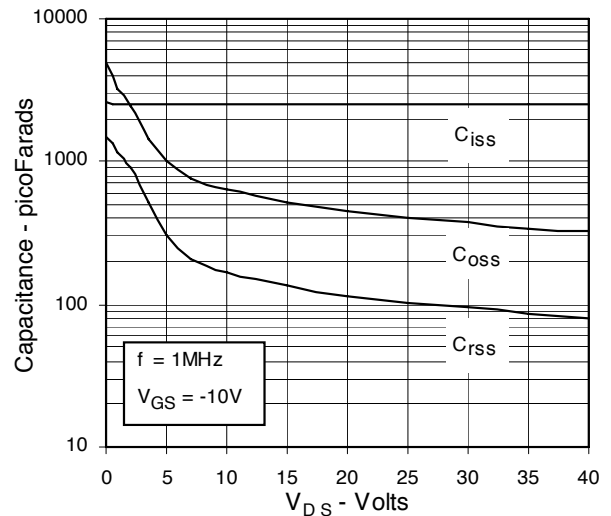


Fig. 7. Input Admittance

Fig. 8. Transconductance

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

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

Fig. 11. Gate Charge

Fig. 12. Capacitance


**Fig. 13. Forward-Bias
Safe Operating Area**

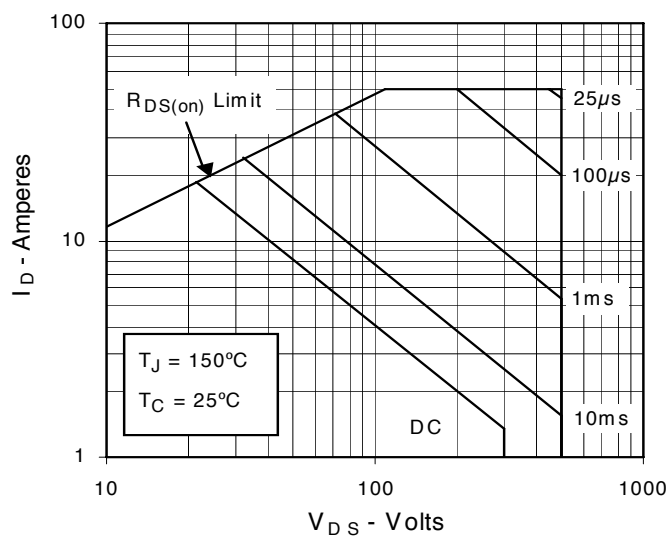


Fig. 14. Maximum Transient Thermal Resistance

