

# MegaMOS™ FET

IXTH/IXTM42N20  
IXTH/IXTM50N20

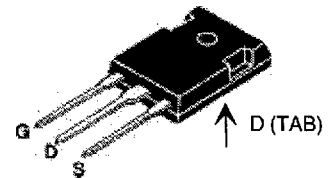
$V_{DSS}$	$I_{D25}$	$R_{DS(on)}$
200 V	42 A	60 mΩ
200 V	50 A	45 mΩ

N-Channel Enhancement Mode

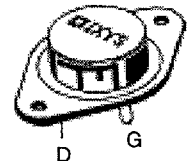


Symbol	Test Conditions	Maximum Ratings	
$V_{DSS}$	$T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$	200	V
$V_{DGR}$	$T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$ ; $R_{GS} = 1\text{ M}\Omega$	200	V
$V_{GS}$	Continuous	$\pm 20$	V
$V_{GSM}$	Transient	$\pm 30$	V
$I_{D25}$	$T_C = 25^\circ\text{C}$	42N20	42 A
		50N20	50 A
$I_{DM}$	$T_C = 25^\circ\text{C}$ , pulse width limited by $T_{JM}$	42N20	168 A
		50N20	200 A
$P_D$	$T_C = 25^\circ\text{C}$	300	W
$T_J$		-55 ... +150	$^\circ\text{C}$
$T_{JM}$		150	$^\circ\text{C}$
$T_{stg}$		-55 ... +150	$^\circ\text{C}$
$M_d$	Mounting torque	1.13/10 Nm/lb.in.	
<b>Weight</b>		TO-204 = 18 g, TO-247 = 6 g	
Maximum lead temperature for soldering 1.6 mm (0.062 in.) from case for 10 s		300	$^\circ\text{C}$

TO-247 AD (IXTH)



TO-204 AE (IXTM)



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

## Features

- \* International standard packages
- \* Low  $R_{DS(on)}$  HDMOS™ process
- \* Rugged polysilicon gate cell structure
- \* Low package inductance (< 5 nH)
  - easy to drive and to protect
- \* Fast switching times

## Applications

- \* Switch-mode and resonant-mode power supplies
- \* Motor controls
- \* Uninterruptible Power Supplies (UPS)
- \* DC choppers

## Advantages

- \* Easy to mount with 1 screw (TO-247) (isolated mounting screw hole)
- \* Space savings
- \* High power density

Symbol	Test Conditions	Characteristic Values ( $T_J = 25^\circ\text{C}$ , unless otherwise specified)		
		min.	typ.	max.
$V_{DSS}$	$V_{GS} = 0\text{ V}$ , $I_D = 250\ \mu\text{A}$	200		V
$V_{GS(th)}$	$V_{DS} = V_{GS}$ , $I_D = 250\ \mu\text{A}$	2		V
$I_{GSS}$	$V_{GS} = \pm 20\text{ V}_{DC}$ , $V_{DS} = 0$			$\pm 100\text{ nA}$
$I_{DSS}$	$V_{DS} = 0.8 \cdot V_{DSS}$ $V_{GS} = 0\text{ V}$	$T_J = 25^\circ\text{C}$		200 $\mu\text{A}$
		$T_J = 125^\circ\text{C}$		1 mA
$R_{DS(on)}$	$V_{GS} = 10\text{ V}$ , $I_D = 0.5 I_{D25}$  Pulse test, $t \leq 300\ \mu\text{s}$ , duty cycle $d \leq 2\%$	42N20		0.060 $\Omega$
		50N20		0.045 $\Omega$

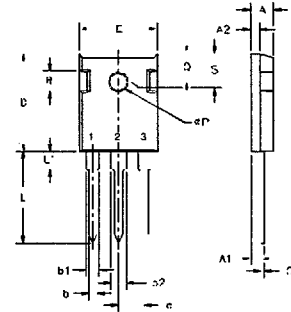
Symbol	Test Conditions	Characteristic Values ( $T_J = 25^\circ\text{C}$ , unless otherwise specified)			
		min.	typ.	max.	
$g_{fs}$	$V_{DS} = 10\text{ V}; I_D = 0.5 \cdot I_{D25}$ , pulse test	20	32	S	
$C_{iss}$	$V_{GS} = 0\text{ V}, V_{DS} = 25\text{ V}, f = 1\text{ MHz}$		4600	pF	
$C_{oss}$			800	pF	
$C_{rss}$			285	pF	
$t_{d(on)}$	$V_{GS} = 10\text{ V}, V_{DS} = 0.5 \cdot V_{DSS}, I_D = 0.5 I_{D25}$ $R_G = 2\ \Omega$ , (External)		18	25	ns
$t_r$			15	20	ns
$t_{d(off)}$			72	90	ns
$t_f$			16	25	ns
$Q_{g(on)}$	$V_{GS} = 10\text{ V}, V_{DS} = 0.5 \cdot V_{DSS}, I_D = 0.5 I_{D25}$		190	220	nC
$Q_{gs}$			35	50	nC
$Q_{gd}$			95	110	nC
$R_{thJC}$			0.42	K/W	
$R_{thCK}$			0.25	K/W	

Symbol	Test Conditions	Characteristic Values ( $T_J = 25^\circ\text{C}$ , unless otherwise specified)			
		min.	typ.	max.	
$I_S$	$V_{GS} = 0\text{ V}$	42N20 50N20		42 50	A A
$I_{SM}$	Repetitive; pulse width limited by $T_{JM}$	42N20 50N20		168 200	A A
$V_{SD}$	$I_F = I_S, V_{GS} = 0\text{ V}$ , Pulse test, $t \leq 300\ \mu\text{s}$ , duty cycle $d \leq 2\%$			1.5	V
$t_{tr}$	$I_F = I_S, -di/dt = 100\text{ A}/\mu\text{s}, V_R = 100\text{ V}$		400		ns

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 4,881,106 5,017,508 5,049,961 5,187,117 5,486,715  
4,850,072 4,931,844 5,034,796 5,063,307 5,237,481 5,381,025

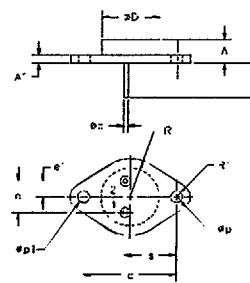
TO-247 AD (IXTH) Outline



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

Dim.	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	4.7	5.3	.185	.209
A <sub>1</sub>	2.2	2.54	.087	.102
A <sub>2</sub>	2.2	2.6	.059	.098
b	1.0	1.4	.040	.055
b <sub>1</sub>	1.65	2.13	.065	.084
b <sub>2</sub>	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

TO-204AE (IXTM) Outline



Pins 1 - Gate Case - Drain 2 - Source

Dim.	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	6.4	11.4	.250	.450
A1	1.53	3.42	.060	.135
∅b	1.45	1.60	.057	.063
∅D		22.22		.875
e	10.67	11.17	.420	.440
e1	5.21	5.71	.205	.225
L	11.18	12.19	.440	.480
∅p	3.84	4.19	.151	.165
∅p1	3.84	4.19	.151	.165
q		30.15 BSC		1.187 BSC
R	12.58	13.33	.495	.525
R1	3.33	4.77	.131	.188
s	16.64	17.14	.655	.675

Fig.1 Output Characteristics

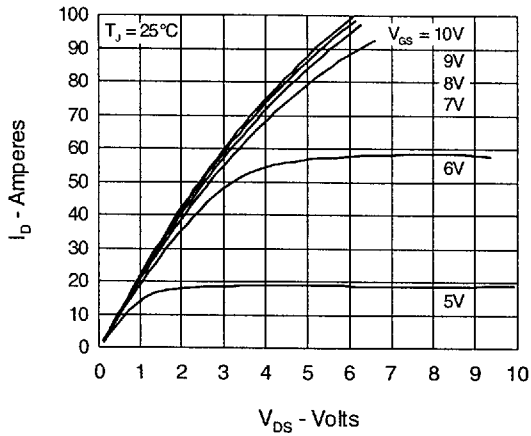


Fig.2 Input Admittance

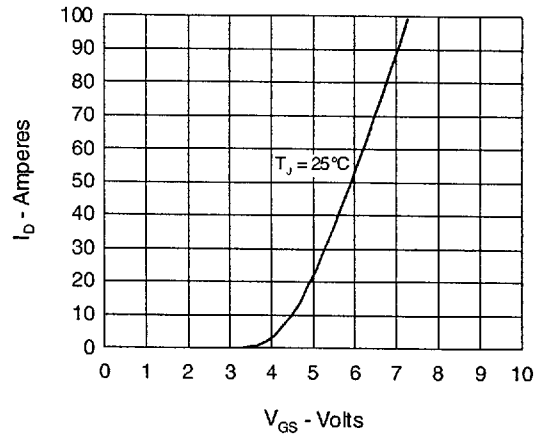


Fig.3  $R_{DS(on)}$  vs. Drain Current

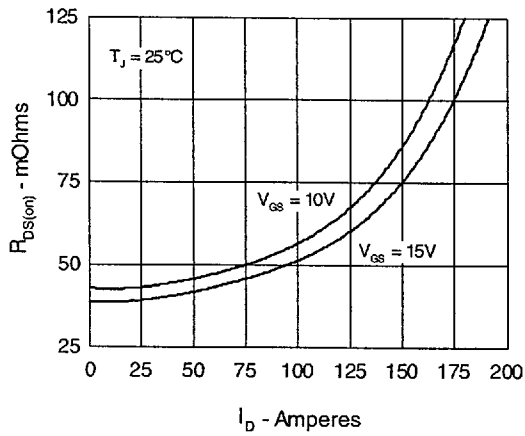


Fig.4 Temperature Dependence of Drain to Source Resistance

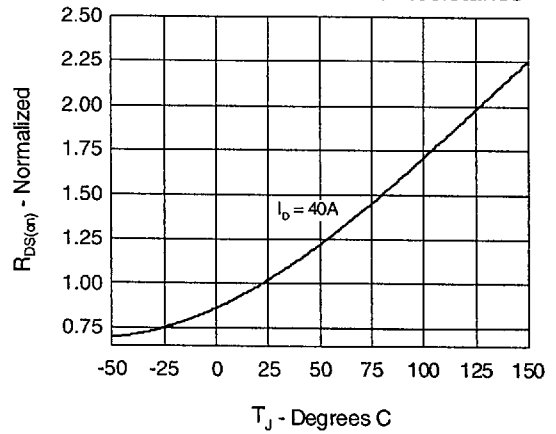


Fig.5 Drain Current vs. Case Temperature

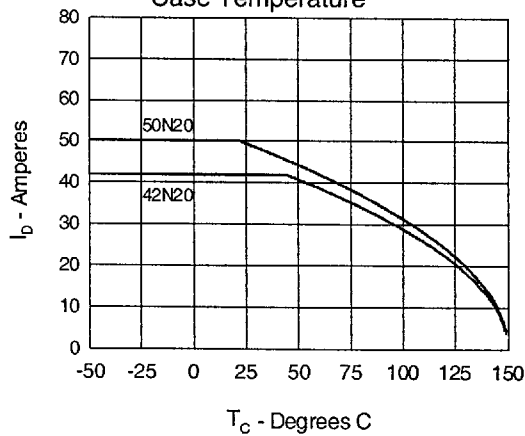


Fig.6 Temperature Dependence of Breakdown and Threshold Voltage

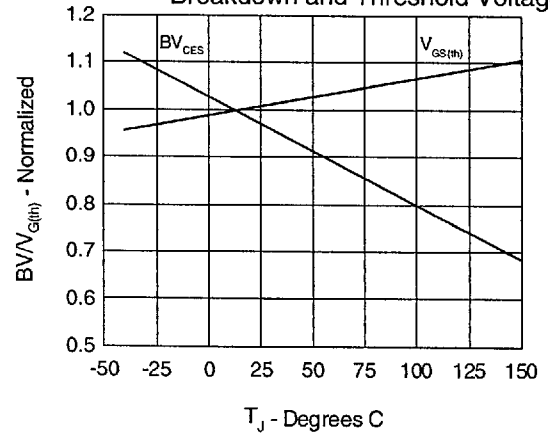


Fig.7 Gate Charge Characteristic Curve

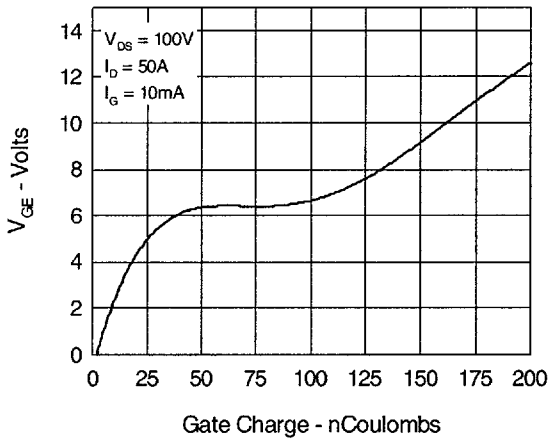


Fig.8 Forward Bias Safe Operating Area

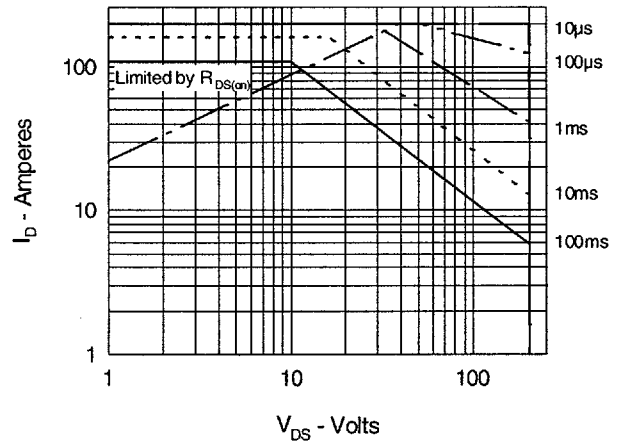


Fig.9 Capacitance Curves

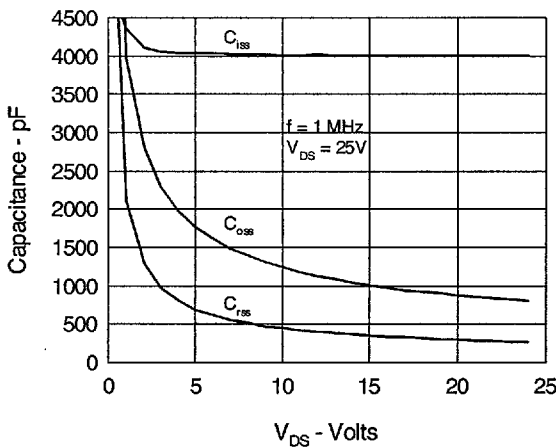


Fig.10 Source Current vs. Source to Drain Voltage

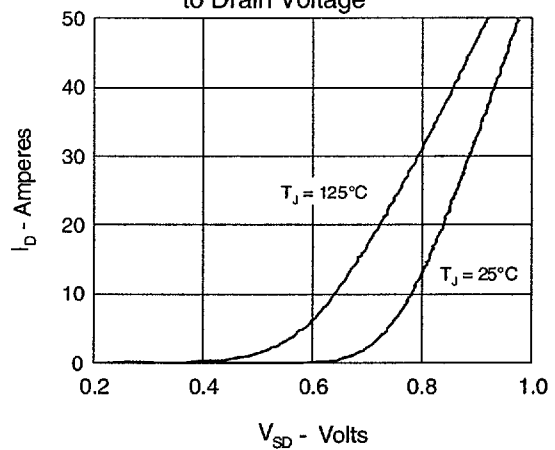
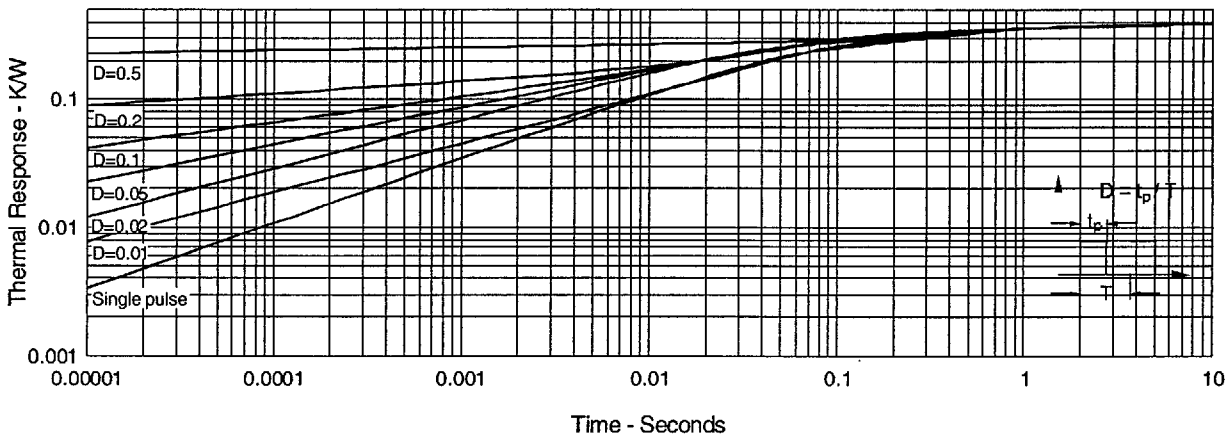


Fig.11 Transient Thermal Impedance



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