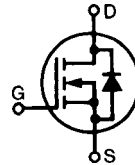


# MegaMOS™ FET

**IXTH 12N90**  
**IXTM 12N90**

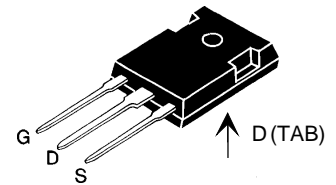
**$V_{DSS} = 900\text{ V}$**   
 **$I_{D25} = 12\text{ A}$**   
 **$R_{DS(on)} = 0.90\ \Omega$**

## N-Channel Enhancement Mode

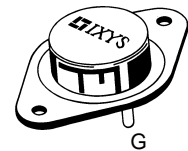


Symbol	Test Conditions	Maximum Ratings	
$V_{DSS}$	$T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$	900	V
$V_{DGR}$	$T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$ ; $R_{GS} = 1\text{ M}\Omega$	900	V
$V_{GS}$	Continuous	$\pm 20$	V
$V_{GSM}$	Transient	$\pm 30$	V
$I_{D25}$	$T_C = 25^\circ\text{C}$	12	A
$I_{DM}$	$T_C = 25^\circ\text{C}$ , pulse width limited by $T_{JM}$	48	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 AA (IXTM)



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

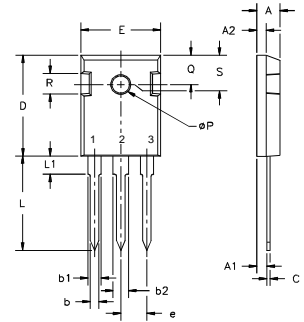
- Easy to mount with 1 screw (TO-247) (isolated mounting screw hole)
- Space savings
- High power density

Symbol	Test Conditions	Characteristic Values ( $T_J = 25^\circ\text{C}$ , unless otherwise specified)		
		min.	typ.	max.
$V_{DSS}$	$V_{GS} = 0\text{ V}$ , $I_D = 3\text{ mA}$	900		V
$V_{GS(th)}$	$V_{DS} = V_{GS}$ , $I_D = 250\ \mu\text{A}$	2		4.5 V
$I_{GSS}$	$V_{GS} = \pm 20\text{ V}_{DC}$ , $V_{DS} = 0$			$\pm 100\text{ nA}$
$I_{DSS}$	$V_{DS} = 0.8 \cdot V_{DSS}$ , $T_J = 25^\circ\text{C}$ $V_{GS} = 0\text{ V}$ , $T_J = 125^\circ\text{C}$			250 $\mu\text{A}$ 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 $d \leq 2\%$			0.90 $\Omega$

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	6	12	S	
$C_{iss}$	$V_{GS} = 0\text{ V}, V_{DS} = 25\text{ V}, f = 1\text{ MHz}$		4500	pF	
$C_{oss}$			315	pF	
$C_{rss}$			65	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)		20	50	ns
$t_r$			33	50	ns
$t_{d(off)}$			63	100	ns
$t_f$			32	50	ns
$Q_{g(on)}$	$V_{GS} = 10\text{ V}, V_{DS} = 0.5 \cdot V_{DSS}, I_D = 0.5 I_{D25}$		145	170	nC
$Q_{gs}$			30	45	nC
$Q_{gd}$			55	80	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.
$I_S$	$V_{GS} = 0\text{ V}$			12 A
$I_{SM}$	Repetitive; pulse width limited by $T_{JM}$			48 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
$t_{rr}$	$I_F = I_S, -di/dt = 100\text{ A}/\mu\text{s}, V_R = 100\text{ V}$		900	ns

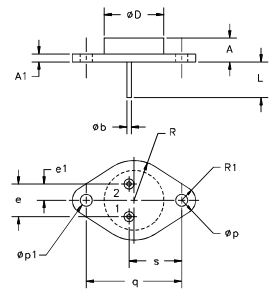
### TO-247 AD (IXTH) Outline



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

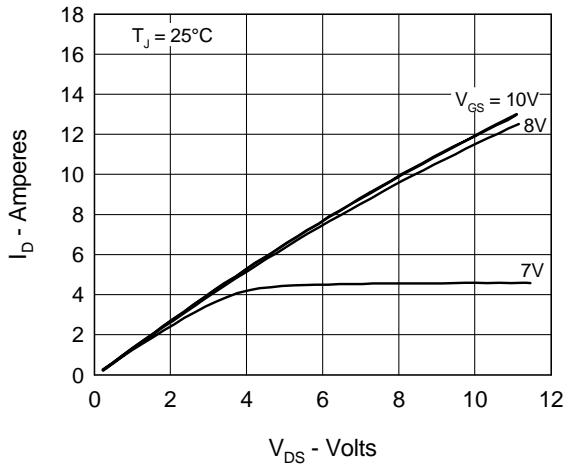
### TO-204AA (IXTM) Outline



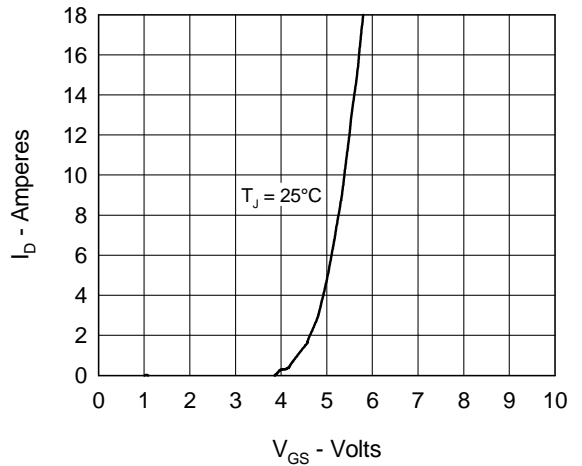
Pins 1 - Gate 2 - Source  
Case - Drain

Dim.	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	6.4	11.4	.250	.450
A <sub>1</sub>		3.42		.135
∅b	.97	1.09	.038	.043
∅D		22.22		.875
e	10.67	11.17	.420	.440
e <sub>1</sub>	5.21	5.71	.205	.225
L	7.93		.312	
∅p	3.84	4.19	.151	.165
∅p <sub>1</sub>	3.84	4.19	.151	.165
q	30.15	BSC	1.187	BSC
R		13.33		.525
R <sub>1</sub>		4.77		.188
s	16.64	17.14	.655	.675

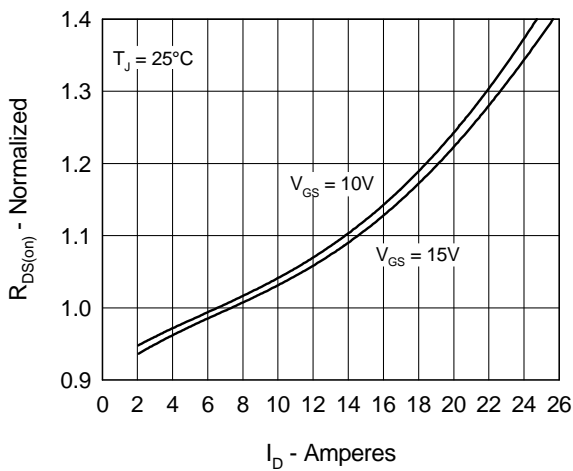
**Fig. 1 Output Characteristics**



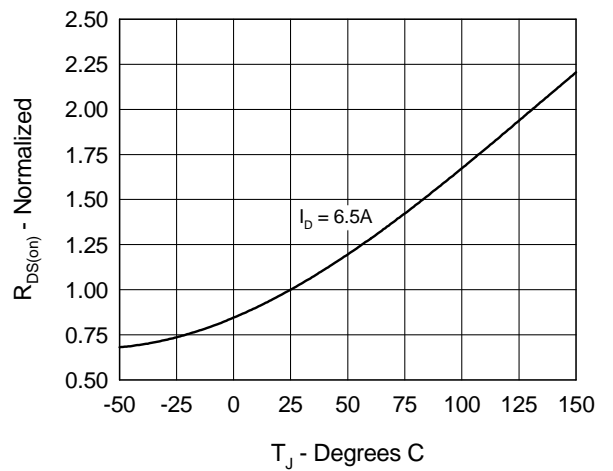
**Fig. 2 Input Admittance**



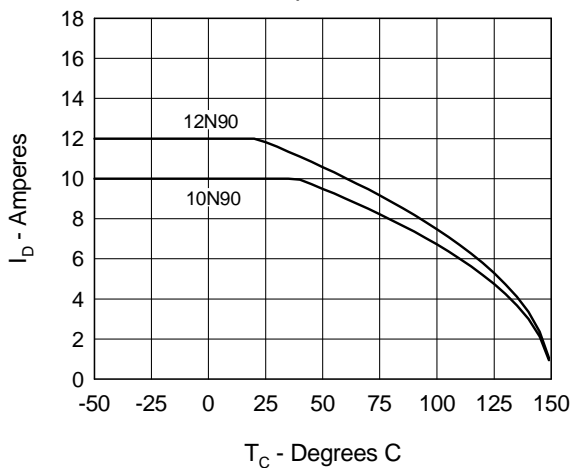
**Fig. 3  $R_{DS(on)}$  vs. Drain Current**



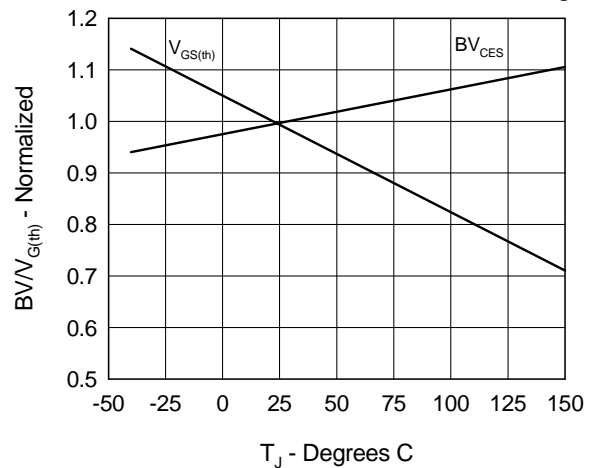
**Fig. 4 Temperature Dependence of Drain to Source Resistance**



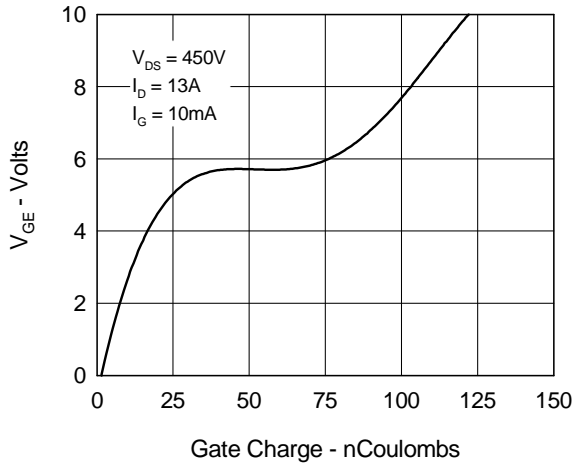
**Fig. 5 Drain Current vs. Case Temperature**



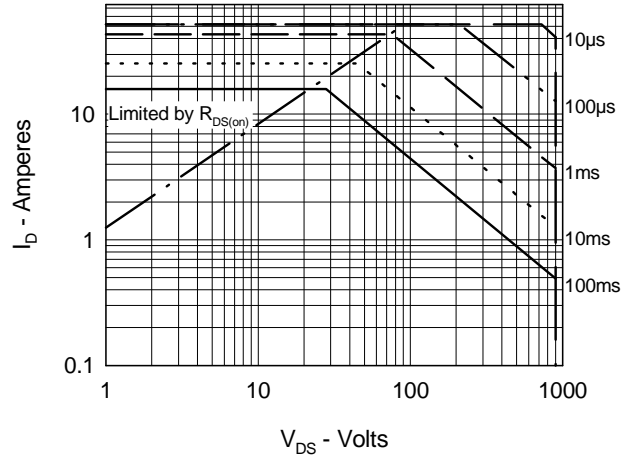
**Fig. 6 Temperature Dependence of Breakdown and Threshold Voltage**



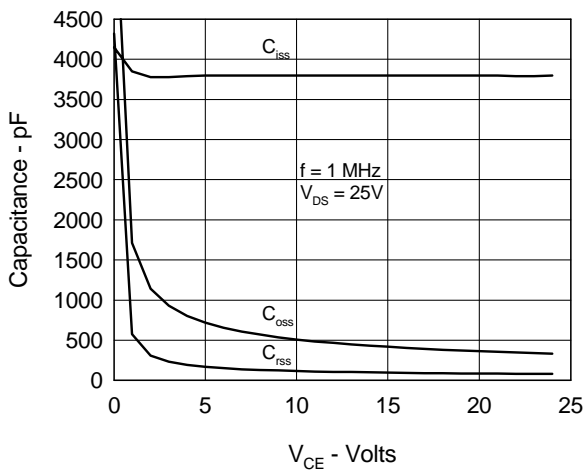
**Fig.7 Gate Charge Characteristic Curve**



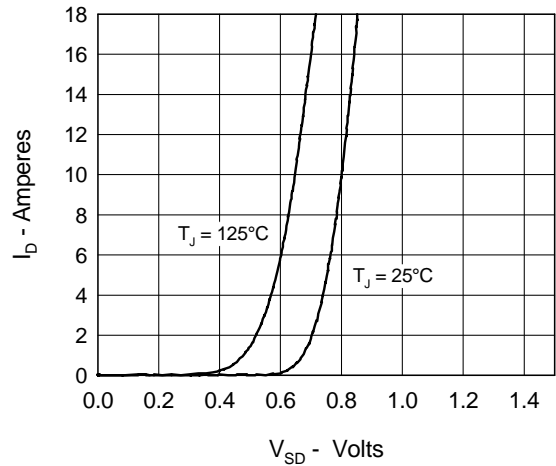
**Fig.8 Forward Bias Safe Operating Area**



**Fig.9 Capacitance Curves**



**Fig.10 Source Current vs. Source to Drain Voltage**



**Fig.11 Transient Thermal Impedance**

