

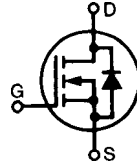
Preliminary Data

HiPerFET™ Power MOSFETs

N-Channel Enhancement Mode
High dv/dt, Low t_{rr} , HDMOS™ Family

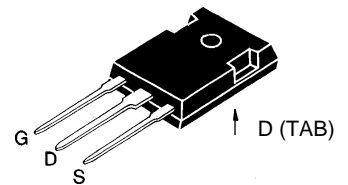
IXFH 76N06
IXFH 76N07-11
IXFH 76N07-12

V_{DSS}	I_{D25}	$R_{DS(on)}$	t_{rr}
60 V	76 A	11 mΩ	150 ns
70 V	76 A	11 mΩ	150 ns
70 V	76 A	12 mΩ	150 ns



Symbol	Test Conditions	Maximum Ratings		
V_{DSS}	$T_J = 25^\circ\text{C}$ to 175°C	N07	70	V
V_{DGR}	$T_J = 25^\circ\text{C}$ to 175°C ; $R_{GS} = 10\text{ k}\Omega$	N06	60	V
		N07	70	V
		N06	60	V
V_{GS}	Continuous		± 20	V
V_{GSM}	Transient		± 30	V
I_{D25}	$T_C = 25^\circ\text{C}$ (Chip capability = 125 A)		76	A
I_{D119}	$T_C = 119^\circ\text{C}$, limited by external leads		76	A
I_{DM}	$T_C = 25^\circ\text{C}$, pulse width limited by T_{JM}		304	A
I_{AR}	$T_C = 25^\circ\text{C}$		100	A
E_{AR}	$T_C = 25^\circ\text{C}$		30	mJ
E_{AS}			2	J
dv/dt	$I_S \leq I_{DM}$, $di/dt \leq 100\text{ A}/\mu\text{s}$, $V_{DD} \leq V_{DSS}$, $T_J \leq 150^\circ\text{C}$, $R_G = 2\ \Omega$		5	V/ns
P_D	$T_C = 25^\circ\text{C}$		360	W
T_J			-55 ... +175	$^\circ\text{C}$
T_{JM}			175	$^\circ\text{C}$
T_{stg}			-55 ... +150	$^\circ\text{C}$
Maximum lead temperature for soldering 1.6 mm (0.062 in.) from case for 10 s			300	$^\circ\text{C}$
M_d	Mounting torque		1.15/10	Nm/lb.in.
Weight			6	g

TO-247 AD



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

Features

- International standard package JEDEC TO-247 AD
- Low $R_{DS(on)}$ HDMOS™ process
- Rugged polysilicon gate cell structure
- Unclamped Inductive Switching (UIS) rated
- Low package inductance (<5 nH)
 - easy to drive and to protect
- Fast intrinsic Rectifier

Applications

- DC-DC converters
- Synchronous rectification
- Battery chargers
- Switched-mode and resonant-mode power supplies
- DC choppers
- Temperature and lighting controls
- Low voltage relays

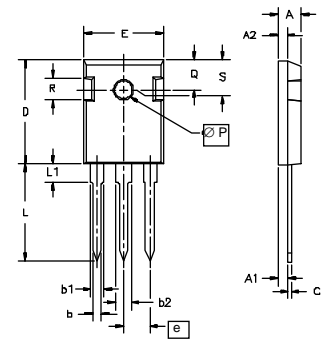
Advantages

- Easy to mount with 1 screw (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}	$V_{GS} = 0\text{ V}$, $I_D = 250\ \mu\text{A}$	N07 N06	70 60	V V
$V_{GS(th)}$	$V_{DS} = V_{GS}$, $I_D = 250\ \mu\text{A}$		2.0	3.4 V
I_{GSS}	$V_{GS} = \pm 20\text{ V}_{DC}$, $V_{DS} = 0$			$\pm 100\text{ nA}$
I_{DSS}	$V_{DS} = 0.8\ V_{DSS}$, $V_{GS} = 0\text{ V}$	$T_J = 25^\circ\text{C}$ $T_J = 125^\circ\text{C}$		100 μA 500 μA
$R_{DS(on)}$	$V_{GS} = 10\text{ V}$, $I_D = 40\text{ A}$ Pulse test, $t \leq 300\ \mu\text{s}$, duty cycle $\delta \leq 2\%$	76N06, 76N07-11 76N07-12		11 mΩ 12 mΩ

Symbol	Test Conditions	Characteristic Values		
		(T _J = 25°C, unless otherwise specified)		
		Min.	Typ.	Max.
g_{fs}	V _{DS} = 10 V; I _D = 40 A, pulse test	30	40	S
C_{iss}	V _{GS} = 0 V, V _{DS} = 25 V, f = 1 MHz		4400	pF
C_{oss}			2000	pF
C_{rss}			1200	pF
t_{d(on)}	V _{GS} = 10 V, V _{DS} = 50 V, I _D = 30 A R _G = 1 Ω (External)		40	ns
t_r			70	ns
t_{d(off)}			130	ns
t_f			55	ns
Q_{g(on)}	V _{GS} = 10 V, V _{DS} = 0.5 V _{DSS} , I _D = 40 A		240	nC
Q_{gs}			30	nC
Q_{gd}			120	nC
R_{thJC}			0.42	K/W
R_{thCK}		0.25		K/W

Symbol	Test Conditions	Characteristic Values		
		(T _J = 25°C, unless otherwise specified)		
		Min.	Typ.	Max.
I_S	V _{GS} = 0			76 A
I_{SM}	Repetitive; pulse width limited by T _{JM}			304 A
V_{SD}	I _F = I _S , V _{GS} = 0 V, Pulse test, t ≤ 300 μs, duty cycle δ ≤ 2 %			1.5 V
t_{rr}	I _F = 25 A, -di/dt = 100 A/μs, T _J = 25°C V _R = 25 V T _J = 125°C		150	ns 250 ns

TO-247 AD Outline


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

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:

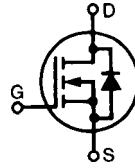
 4,835,592 4,881,106 5,017,508 5,049,961 5,187,117 5,486,715
 4,850,072 4,931,844 5,034,796 5,063,307 5,237,481 5,381,025

HiPerFET™ Power MOSFETs

N-Channel Enhancement Mode
High dv/dt, Low t_{rr}, HDMOS™ Family

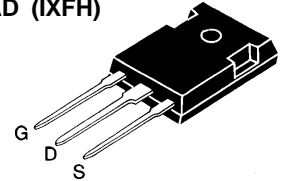
IXFH/FM 21N50
IXFH/FM 24N50
IXFH 26N50

V _{DSS}	I _{D25}	R _{DS(on)}	t _{rr}
500 V	21 A	0.25 Ω	250 ns
500 V	24 A	0.23 Ω	250 ns
500 V	26 A	0.20 Ω	250 ns

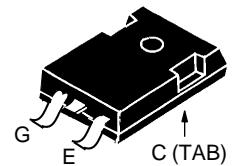


Symbol	Test Conditions	Maximum Ratings	
V _{DSS}	T _J = 25°C to 150°C	500	V
V _{DGR}	T _J = 25°C to 150°C; R _{GS} = 1 MΩ	500	V
V _{GS}	Continuous	±20	V
V _{GSM}	Transient	±30	V
I _{D25}	T _C = 25°C	21N50	21 A
		24N50	24 A
		26N50	26 A
I _{DM}	T _C = 25°C, pulse width limited by T _{JM}	21N50	84 A
		24N50	96 A
		26N50	104 A
I _{AR}	T _C = 25°C	21N50	21 A
		24N50	24 A
		26N50	26 A
E _{AR}	T _C = 25°C	30	mJ
dv/dt	I _S ≤ I _{DM} , di/dt ≤ 100 A/μs, V _{DD} ≤ V _{DSS} T _J ≤ 150°C, R _G = 2 Ω	5	V/ns
P _D	T _C = 25°C	300	W
T _J		-55 ... +150	°C
T _{JM}		150	°C
T _{stg}		-55 ... +150	°C
M _d	Mounting torque	1.13/10	Nm/lb.in.
Weight	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	°C

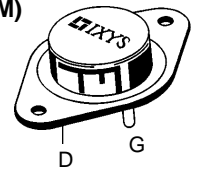
TO-247 AD (IXFH)



TO-247 SMD
("S" Suffix)
(Note 1)



TO-204 AE (IXFM)



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

Features

- International standard packages
- Low R_{DS(on)} HDMOS™ process
- Rugged polysilicon gate cell structure
- Unclamped Inductive Switching (UIS) rated
- Low package inductance
- easy to drive and to protect
- Fast intrinsic rectifier

Applications

- DC-DC converters
- Synchronous rectification
- Battery chargers
- Switched-mode and resonant-mode power supplies
- DC choppers
- AC motor control
- Temperature and lighting controls
- Low voltage relays

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°C, unless otherwise specified)		
		Min.	Typ.	Max.
V _{DSS}	V _{GS} = 0 V, I _D = 250 μA	500		V
V _{GS(th)}	V _{DS} = V _{GS} , I _D = 4 mA	2		V
I _{GSS}	V _{GS} = ±20 V _{DC} , V _{DS} = 0			±100 nA
I _{DSS}	V _{DS} = 0.8 V _{DSS} V _{GS} = 0 V	T _J = 25°C		200 μA
		T _J = 125°C		1 mA

Symbol	Test Conditions ($T_J = 25^\circ\text{C}$, unless otherwise specified)	Characteristic Values		
		Min.	Typ.	Max.
$R_{DS(on)}$	$V_{GS} = 10\text{ V}$, $I_D = 0.5 I_{D25}$ Pulse test, $t \leq 300\ \mu\text{s}$, duty cycle $\delta \leq 2\%$	21N50		0.25 Ω
		24N50		0.23 Ω
		26N50		0.20 Ω
g_{fs}	$V_{DS} = 10\text{ V}$; $I_D = 0.5 I_{D25}$, pulse test	15	21	S
C_{iss}	$V_{GS} = 0\text{ V}$, $V_{DS} = 25\text{ V}$, $f = 1\text{ MHz}$		4200	pF
C_{oss}			450	pF
C_{rss}			135	pF
$t_{d(on)}$	$V_{GS} = 10\text{ V}$, $V_{DS} = 0.5 V_{DSS}$, $I_D = 0.5 I_{D25}$ $R_G = 2\ \Omega$ (External)		16	25 ns
t_r			33	45 ns
$t_{d(off)}$			65	80 ns
t_f			30	40 ns
$Q_{g(on)}$	$V_{GS} = 10\text{ V}$, $V_{DS} = 0.5 V_{DSS}$, $I_D = 0.5 I_{D25}$		135	160 nC
Q_{gs}			28	40 nC
Q_{gd}			62	85 nC
R_{thJC}			0.42	K/W
R_{thCK}			0.25	K/W

Source-Drain Diode

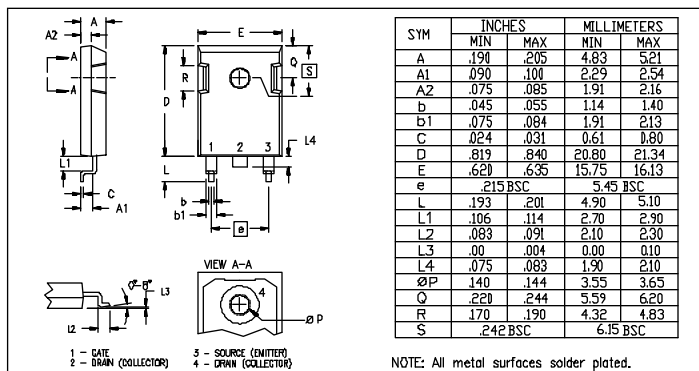
Characteristic Values

($T_J = 25^\circ\text{C}$, unless otherwise specified)

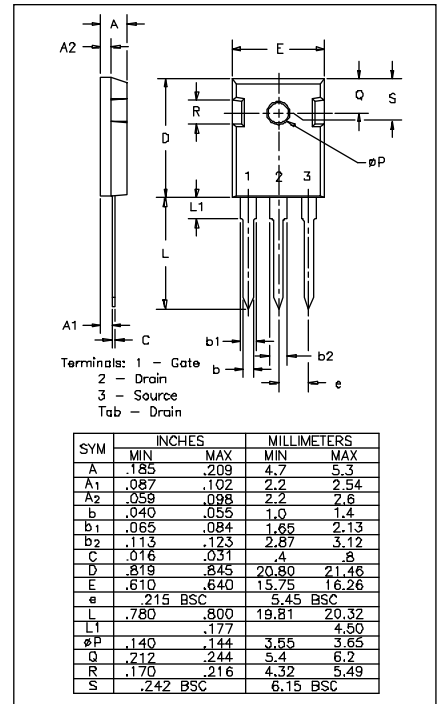
Symbol	Test Conditions	Characteristic Values		
		Min.	Typ.	Max.
I_S	$V_{GS} = 0$	21N50		21 A
		24N50		24 A
		26N50		26 A
I_{SM}	Repetitive; pulse width limited by T_{JM}	21N50		84 A
		24N50		96 A
		26N50		104 A
V_{SD}	$I_F = I_S$, $V_{GS} = 0\text{ V}$, Pulse test, $t \leq 300\ \mu\text{s}$, duty cycle $\delta \leq 2\%$			1.5 V
t_{rr}	$I_F = I_S$	$T_J = 25^\circ\text{C}$		250 ns
		$T_J = 125^\circ\text{C}$		400 ns
Q_{RM}	$-di/dt = 100\text{ A}/\mu\text{s}$, $V_R = 100\text{ V}$	$T_J = 25^\circ\text{C}$	1	μC
		$T_J = 125^\circ\text{C}$	2	μC
I_{RM}		$T_J = 25^\circ\text{C}$	10	A
		$T_J = 125^\circ\text{C}$	15	A

Note 1: Add "S" suffix for TO-247 SMD PACKAGE OPTION (EX: IXFH24N50S)

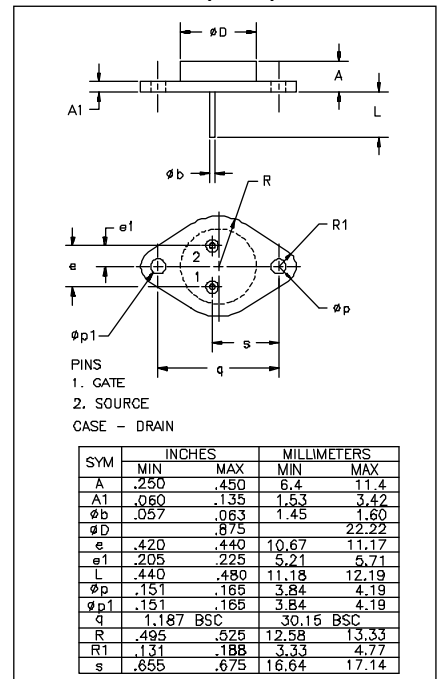
TO-247 SMD Outline



TO-247 AD (IXFH) Outline

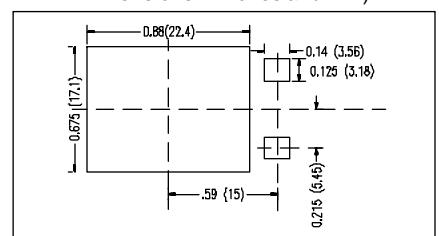


TO-204AE (IXFM) Outline



Min. Recommended Footprint

Dimensions in inches and mm



IXYS reserves the right to change limits, test conditions, and dimensions.

Fig. 1. Output Characteristics

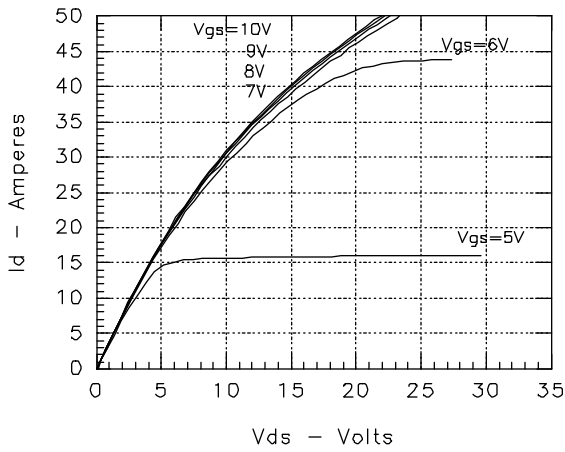


Fig. 2. Input Admittance

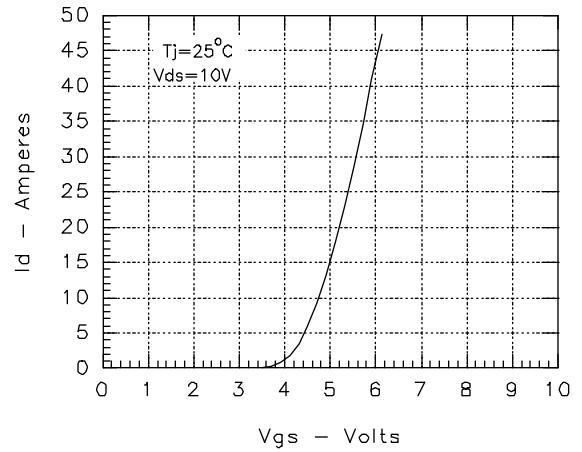


Fig. 3. Rds(on) vs. Drain Current

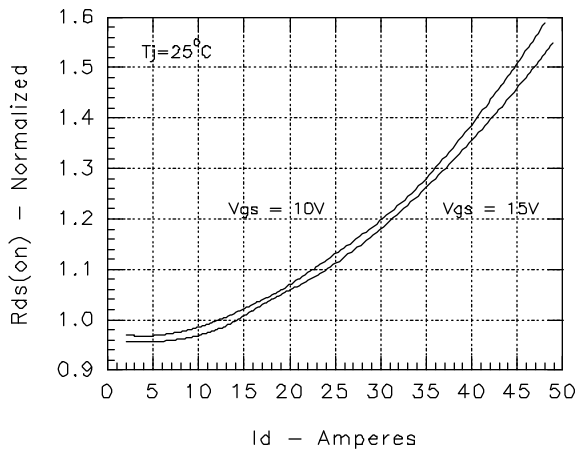


Fig. 4. Temperature Dependence of Drain to Source Resistance

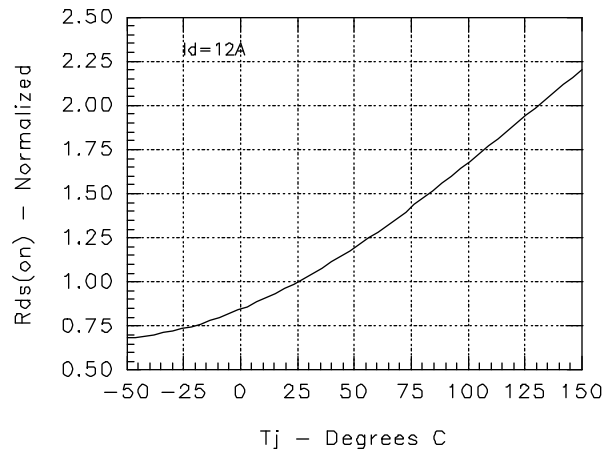


Fig. 5. Drain Current vs. Case Temperature

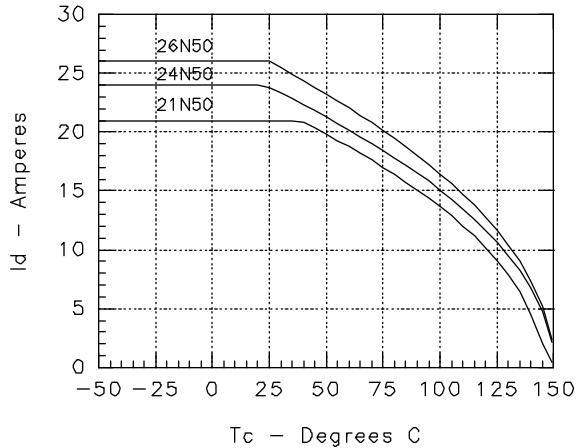
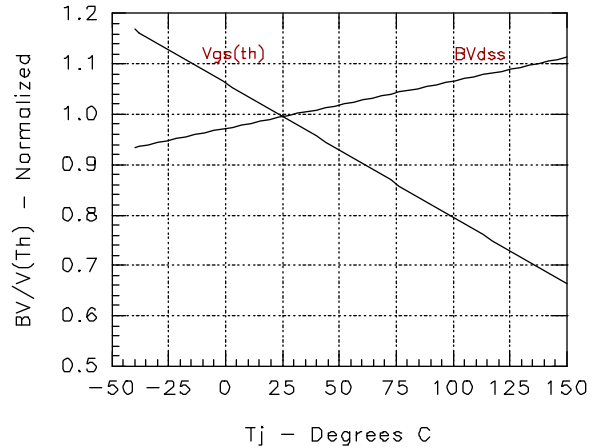


Fig. 6. Temperature Dependence of Breakdown Voltage and Threshold Voltage



IXYS reserves the right to change limits, test conditions, and dimensions.

Fig. 7. Gate Charge

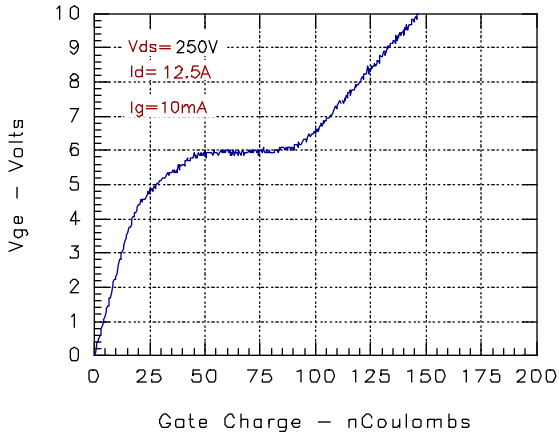


Fig. 8. Forward Bias Safe Operating Area

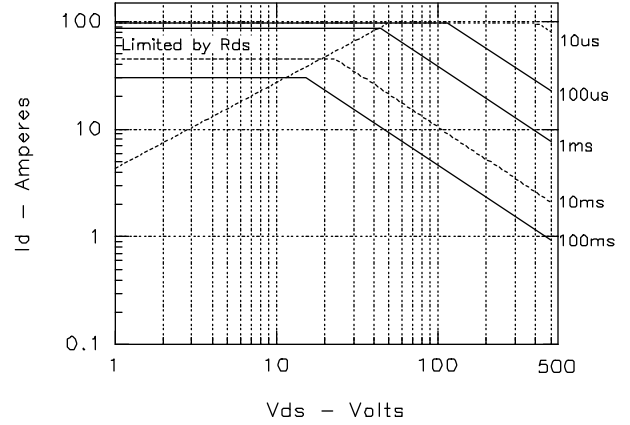


Fig. 9. Capacitance Curves

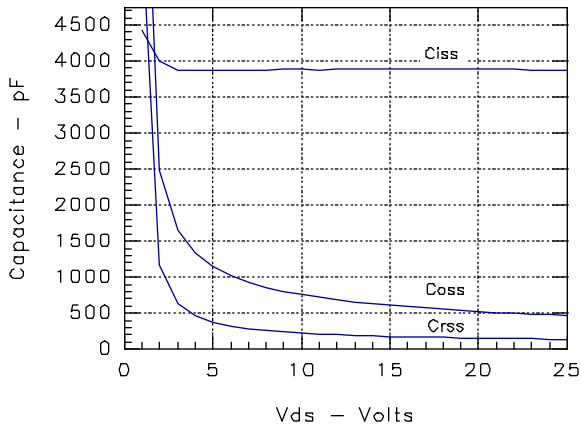


Fig. 10. Source Current vs. Source to Drain Voltage

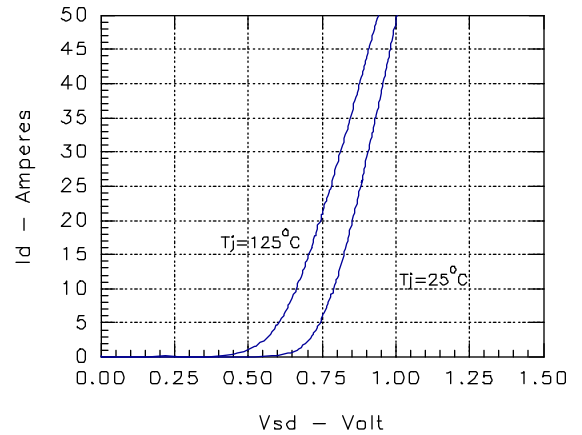
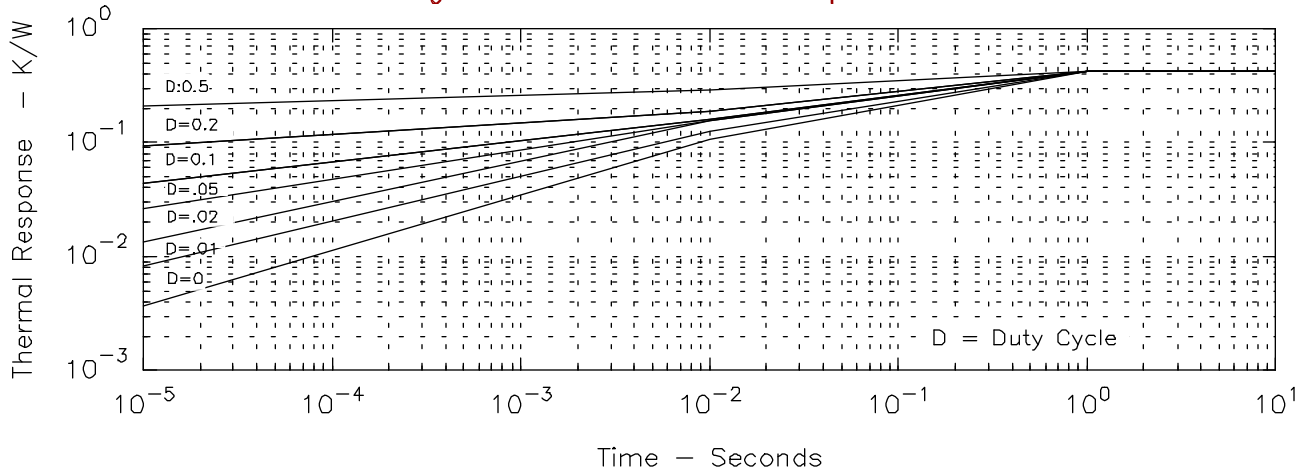


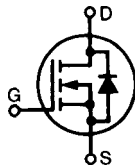
Fig. 11. Transient Thermal Impedance



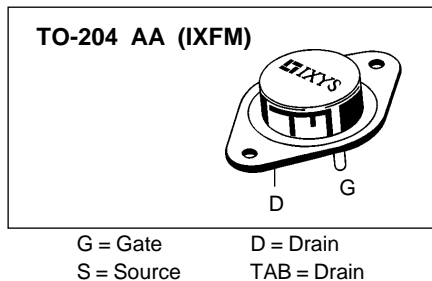
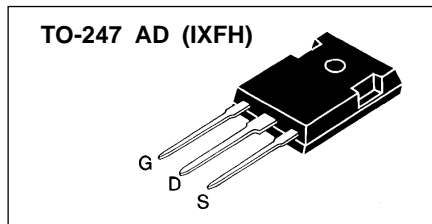
HiPerFET™ Power MOSFET

N-Channel Enhancement Mode
High dv/dt, Low t_{rr} , HDMOS™ Family

	V_{DSS}	I_{D25}	$R_{DS(on)}$	t_{rr}
IXFH/FM 6N90	900 V	6 A	1.8 Ω	250 ns
IXFH/FM 6N100	1000 V	6 A	2.0 Ω	250 ns



Symbol	Test Conditions	Maximum Ratings	
V_{DSS}	$T_J = 25^\circ\text{C}$ to 150°C	6N90	900 V
V_{DGR}	$T_J = 25^\circ\text{C}$ to 150°C ; $R_{GS} = 1\text{ M}\Omega$	6N100	1000 V
V_{GS}	Continuous		± 20 V
V_{GSM}	Transient		± 30 V
I_{D25}	$T_C = 25^\circ\text{C}$		6 A
I_{DM}	$T_C = 25^\circ\text{C}$, pulse width limited by T_{JM}		24 A
I_{AR}	$T_C = 25^\circ\text{C}$		6 A
E_{AR}	$T_C = 25^\circ\text{C}$		18 mJ
dv/dt	$I_S \leq I_{DM}$, $di/dt \leq 100\text{ A}/\mu\text{s}$, $V_{DD} \leq V_{DSS}$, $T_J \leq 150^\circ\text{C}$, $R_G = 2\ \Omega$		5 V/ns
P_D	$T_C = 25^\circ\text{C}$		180 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.
Weight			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 $^\circ\text{C}$



Features

- International standard packages
- Low $R_{DS(on)}$ HDMOS™ process
- Rugged polysilicon gate cell structure
- Unclamped Inductive Switching (UIS) rated
- Low package inductance
 - easy to drive and to protect
- Fast intrinsic Rectifier

Applications

- DC-DC converters
- Synchronous rectification
- Battery chargers
- Switched-mode and resonant-mode power supplies
- DC choppers
- AC motor control
- Temperature and lighting controls
- Low voltage relays

Advantages

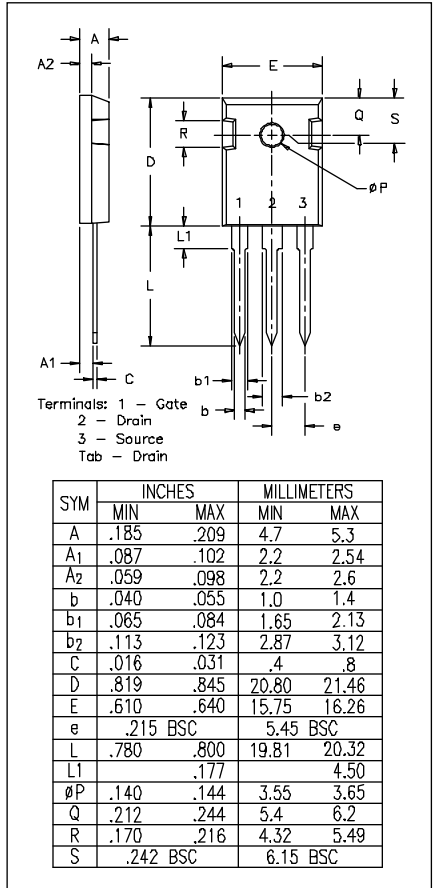
- Easy to mount with 1 screw (TO-247) (isolated mounting screw hole)
- Space savings
- High power density

Symbol	Test Conditions	Characteristic Values ($T_J = 25^\circ\text{C}$, unless otherwise specified)		
		Min.	Typ.	Max.
V_{DSS}	$V_{GS} = 0\text{ V}$, $I_D = 3\text{ mA}$	6N90 6N100	900 1000	V V
$V_{GS(th)}$	$V_{DS} = V_{GS}$, $I_D = 2.5\text{ mA}$		2.0	4.5 V
I_{GSS}	$V_{GS} = \pm 20\text{ V}_{DC}$, $V_{DS} = 0$			± 100 nA
I_{BSS}	$V_{DS} = 0.8 V_{DSS}$, $V_{GS} = 0\text{ V}$	$T_J = 25^\circ\text{C}$ $T_J = 125^\circ\text{C}$		250 μA 1 mA
$R_{DS(on)}$	$V_{GS} = 10\text{ V}$, $I_D = 0.5 I_{D25}$	6N90 6N100		1.8 Ω 2.0 Ω
Pulse test, $t \leq 300\ \mu\text{s}$, duty cycle $\delta \leq 2\%$				

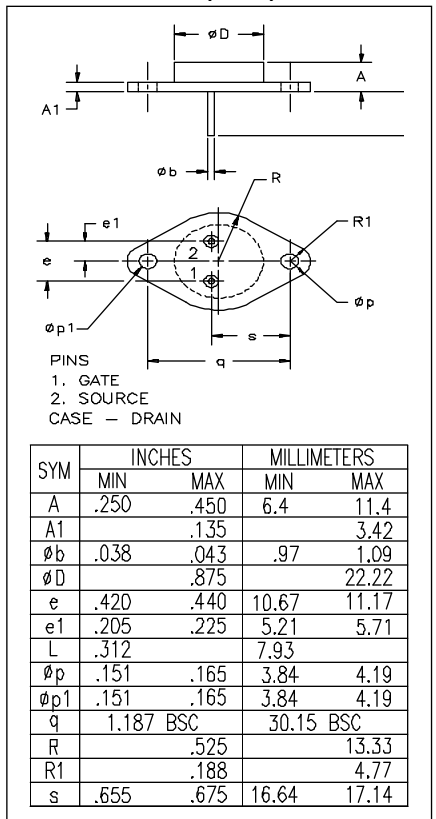
Symbol	Test Conditions	Characteristic Values ($T_J = 25^\circ\text{C}$, unless otherwise specified)			
		Min.	Typ.	Max.	
g_{fs}	$V_{DS} = 10\text{ V}; I_D = 0.5 I_{D25}$, pulse test	4	6	S	
C_{iss}	$V_{GS} = 0\text{ V}, V_{DS} = 25\text{ V}, f = 1\text{ MHz}$		2600	pF	
C_{oss}			180	pF	
C_{rss}			45	pF	
$t_{d(on)}$	$V_{GS} = 10\text{ V}, V_{DS} = 0.5 V_{DSS}, I_D = 0.5 I_{D25}$ $R_G = 4.7\ \Omega$ (External)		35	100	ns
t_r			40	110	ns
$t_{d(off)}$			100	200	ns
t_f			60	100	ns
$Q_{g(on)}$	$V_{GS} = 10\text{ V}, V_{DS} = 0.5 V_{DSS}, I_D = 0.5 I_{D25}$		88	130	nC
Q_{gs}			21	30	nC
Q_{gd}			38	70	nC
R_{thJC}				0.7	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	$V_{GS} = 0$			6	A
I_{SM}	Repetitive; pulse width limited by T_{JM}			24	A
V_{SD}	$I_F = I_S, V_{GS} = 0\text{ V}$, Pulse test, $t \leq 300\ \mu\text{s}$, duty cycle $\delta \leq 2\%$			1.5	V
t_{rr}	$I_F = I_S$ $-di/dt = 100\text{ A}/\mu\text{s}$, $V_R = 100\text{ V}$	$T_J = 25^\circ\text{C}$		250	ns
		$T_J = 125^\circ\text{C}$		400	ns
Q_{RM}	$I_F = I_S$ $-di/dt = 100\text{ A}/\mu\text{s}$, $V_R = 100\text{ V}$	$T_J = 25^\circ\text{C}$	0.5		μC
		$T_J = 125^\circ\text{C}$	1.0		μC
I_{RM}	$I_F = I_S$ $-di/dt = 100\text{ A}/\mu\text{s}$, $V_R = 100\text{ V}$	$T_J = 25^\circ\text{C}$	7.5		A
		$T_J = 125^\circ\text{C}$	9.0		A

TO-247 AD (IXFH) Outline



TO-204 AA (IXFM) Outline



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

Fig. 1. Output Characteristics

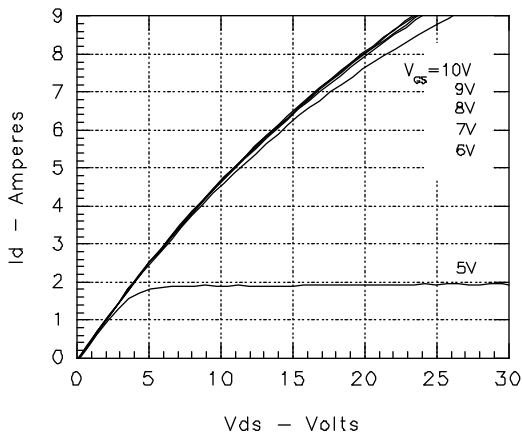


Fig. 2. Input Admittance

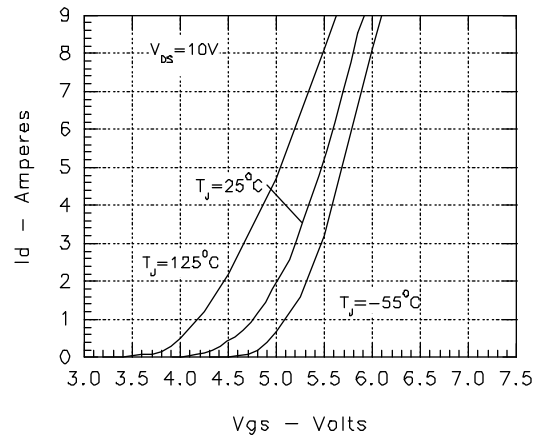


Fig. 3. Rds(on) vs. Drain Current

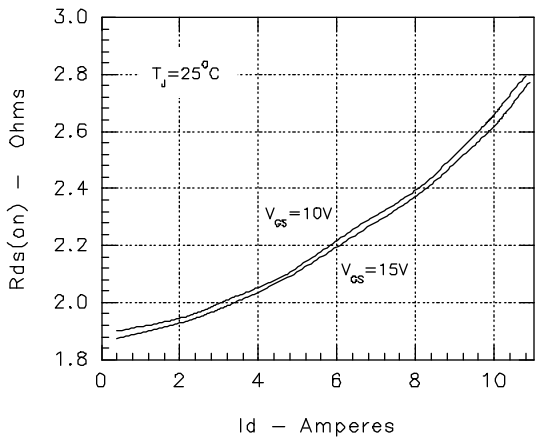


Fig. 4. Temperature Dependence of Drain to Source Resistance

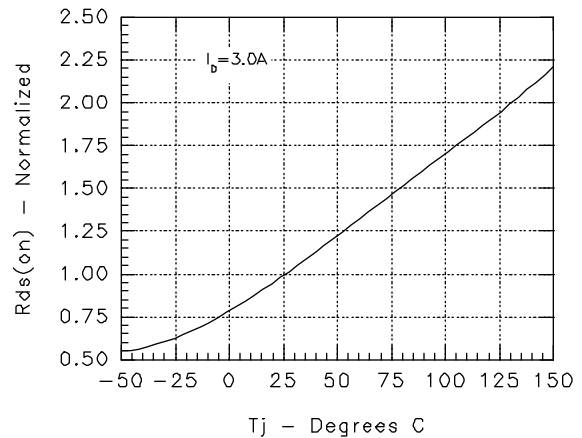


Fig. 5. Drain Current vs. Case Temperature

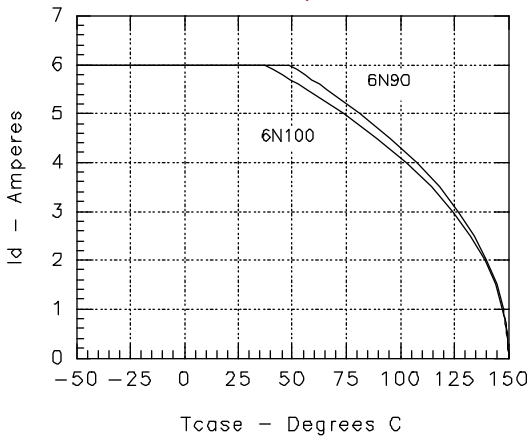


Fig. 6. Temperature Dependence of Breakdown Voltage and Threshold Voltage

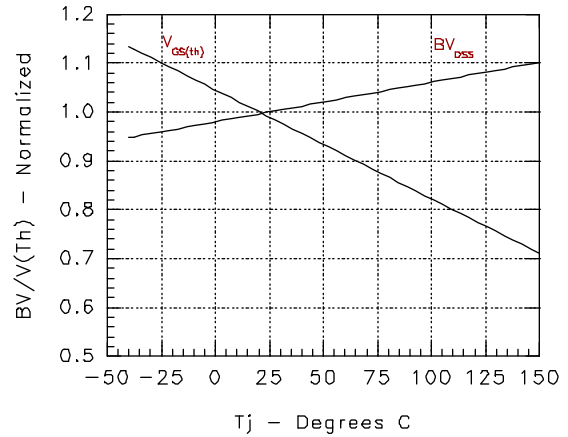


Fig. 7. Gate Charge

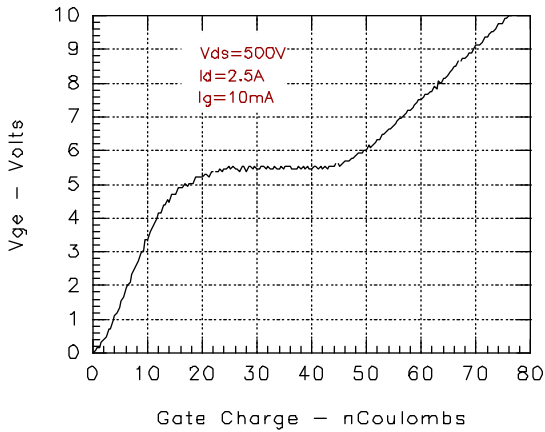


Fig. 8. Forward Bias Safe Operating Area

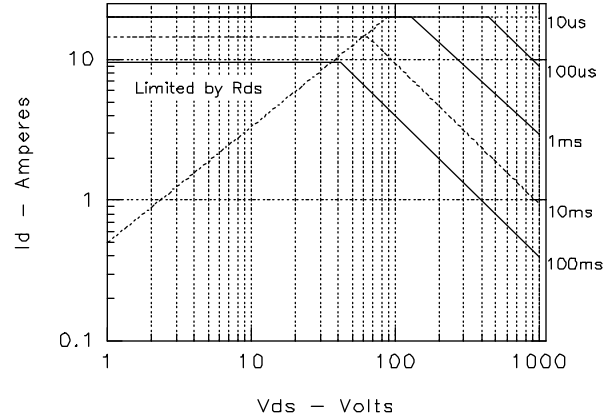


Fig. 9. Capacitance Curves

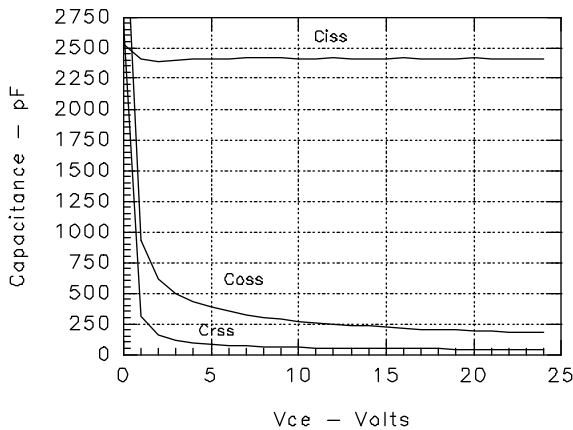


Fig. 10. Source Current vs. Source to Drain Voltage

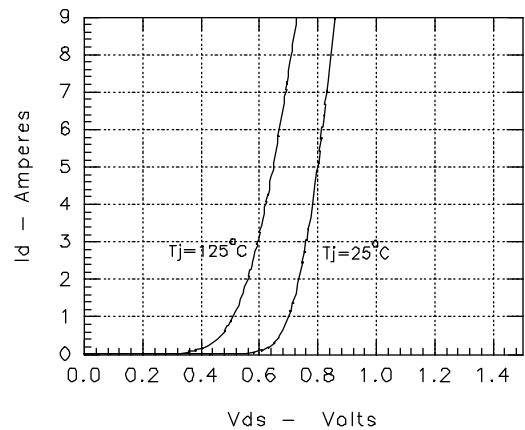
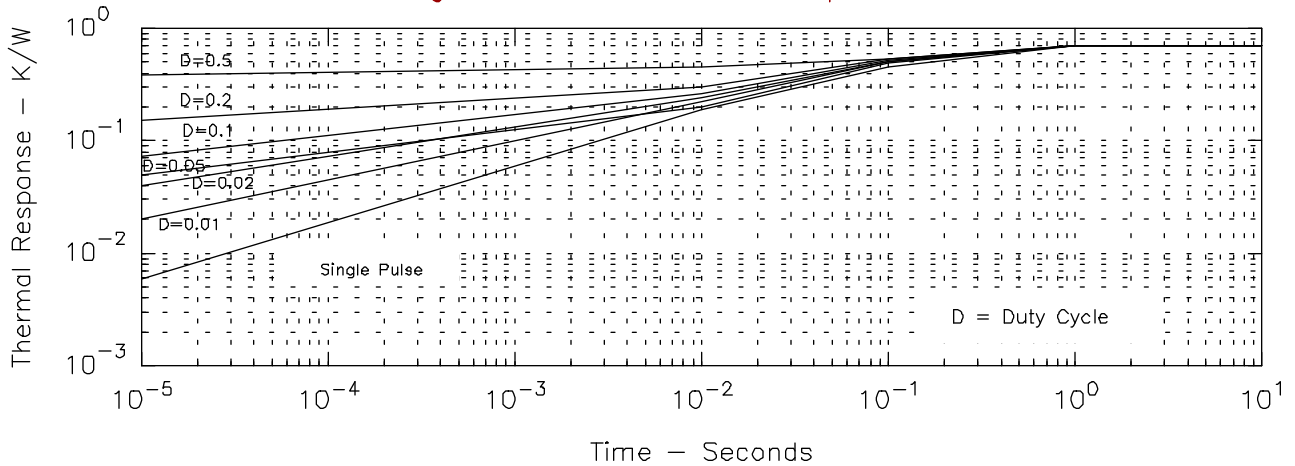


Fig. 11. Transient Thermal Impedance



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