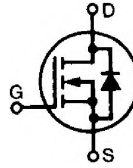


# HiPerFET™ Power MOSFETs

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

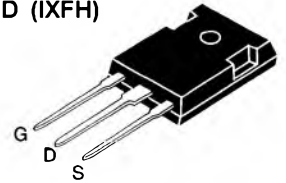
IXFH/FM 21N50  
 IXFH/FM 24N50  
 IXFH 26N50

$V_{DSS}$	$I_{D25}$	$R_{DS(on)}$	$t_{rr}$
500 V	21 A	0.25 $\Omega$	250 ns
500 V	24 A	0.23 $\Omega$	250 ns
500 V	26 A	0.20 $\Omega$	250 ns

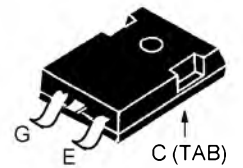


Symbol	Test Conditions	Maximum Ratings	
$V_{DSS}$	$T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$	500	V
$V_{DGR}$	$T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$ ; $R_{GS} = 1 \text{ M}\Omega$	500	V
$V_{GS}$	Continuous	$\pm 20$	V
$V_{GSM}$	Transient	$\pm 30$	V
$I_{D25}$	$T_C = 25^\circ\text{C}$	21N50	21 A
		24N50	24 A
		26N50	26 A
$I_{DM}$	$T_C = 25^\circ\text{C}$ , pulse width limited by $T_{JM}$	21N50	84 A
		24N50	96 A
		26N50	104 A
$I_{AR}$	$T_C = 25^\circ\text{C}$	21N50	21 A
		24N50	24 A
		26N50	26 A
$E_{AR}$	$T_C = 25^\circ\text{C}$	30	mJ
<b>dv/dt</b>	$I_S \leq I_{DM}$ , $di/dt \leq 100 \text{ A}/\mu\text{s}$ , $V_{DD} \leq V_{DSS}$ $T_J \leq 150^\circ\text{C}$ , $R_G = 2 \Omega$	5	V/ns
$P_D$	$T_C = 25^\circ\text{C}$	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	$^\circ\text{C}$

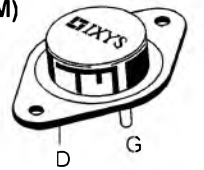
TO-247 AD (IXFH)



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 ( $T_J = 25^\circ\text{C}$ , unless otherwise specified)		
		Min.	Typ.	Max.
$V_{DSS}$	$V_{GS} = 0 \text{ V}$ , $I_D = 250 \mu\text{A}$	500		V
$V_{GS(th)}$	$V_{DS} = V_{GS}$ , $I_D = 4 \text{ mA}$	2		V
$I_{GSS}$	$V_{GS} = \pm 20 \text{ V}_{DC}$ , $V_{DS} = 0$			$\pm 100 \text{ nA}$
$I_{DSS}$	$V_{DS} = 0.8 V_{DSS}$ $V_{GS} = 0 \text{ V}$	$T_J = 25^\circ\text{C}$		200 $\mu\text{A}$
		$T_J = 125^\circ\text{C}$		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 24N50 26N50		0.25 $\Omega$ 0.23 $\Omega$ 0.20 $\Omega$
$g_{fs}$	$V_{DS} = 10\text{ V}$ ; $I_D = 0.5 I_{D25}$ , 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
$C_{riss}$			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
$R_{thJC}$			0.25	K/W
$R_{thCK}$				K/W

### Source-Drain Diode

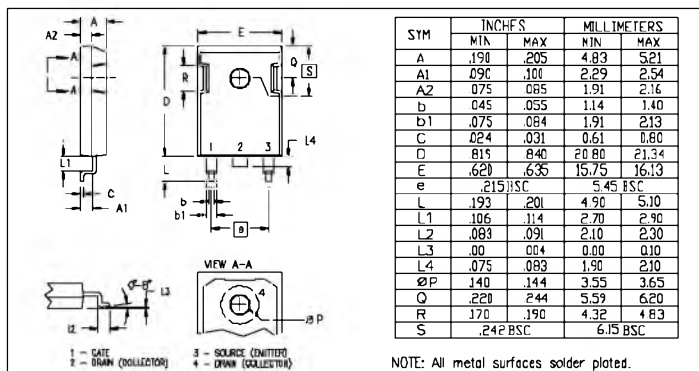
### Characteristic Values

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

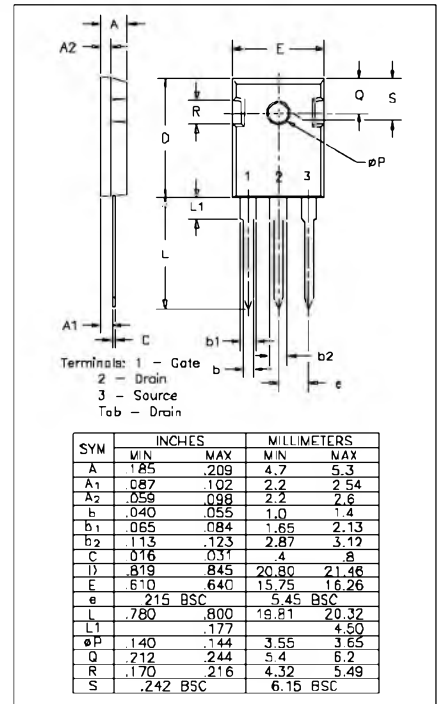
Symbol	Test Conditions	Characteristic Values		
		Min.	Typ.	Max.
$I_s$	$V_{GS} = 0$	21N50 24N50 26N50		21 A 24 A 26 A
$I_{SM}$	Repetitive; pulse width limited by $T_{JM}$	21N50 24N50 26N50		84 A 96 A 104 A
$V_{SD}$	$I_F = I_s$ , $V_{GS} = 0\text{ V}$ , Pulse test, $t \leq 300\ \mu\text{s}$ , duty cycle $\delta \leq 2\%$			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	$\mu\text{C}$
		$T_J = 125^\circ\text{C}$	2	$\mu\text{C}$
$I_{RM}$		$T_J = 25^\circ\text{C}$	10	A
		$T_J = 125^\circ\text{C}$	15	A

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

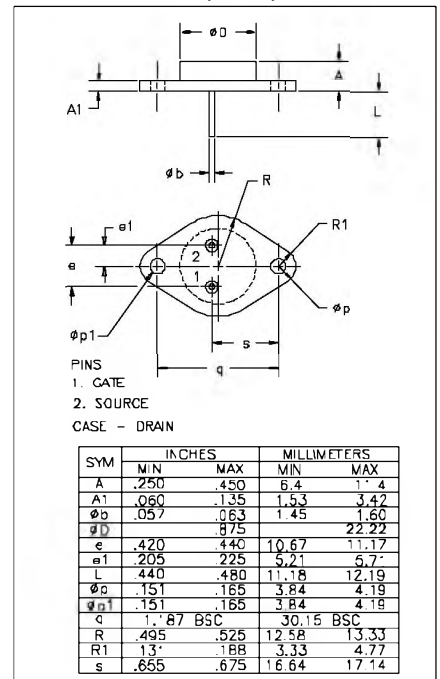
### TO-247 SMD Outline



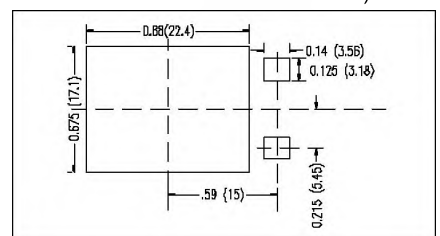
### TO-247 AD (IXFH) Outline



### 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

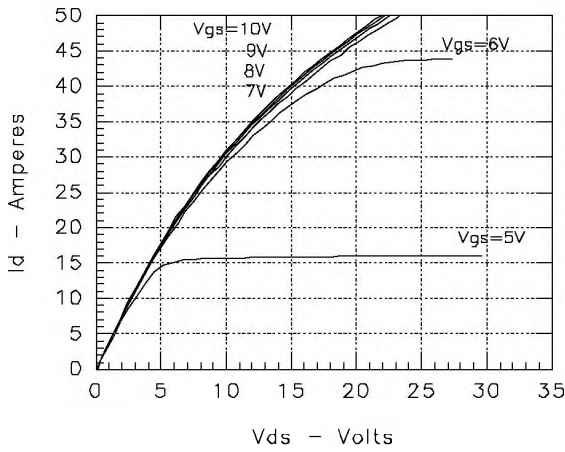


Fig. 2. Input Admittance

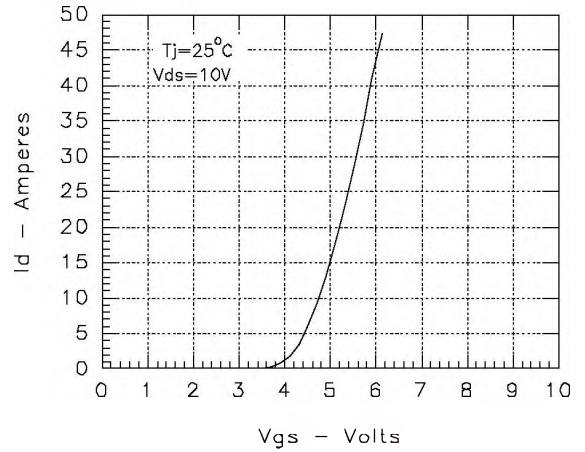


Fig. 3. Rds(on) vs. Drain Current

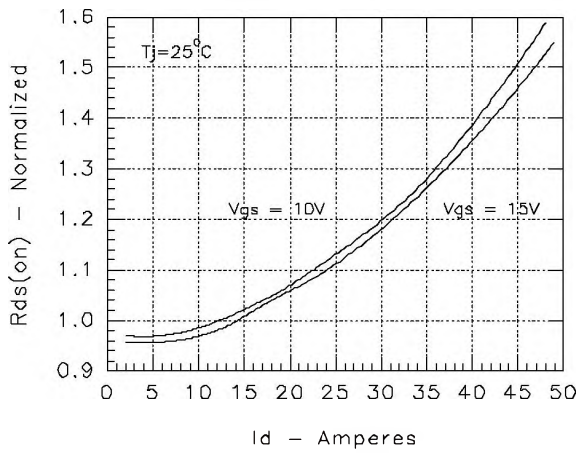


Fig. 4. Temperature Dependence of Drain to Source Resistance

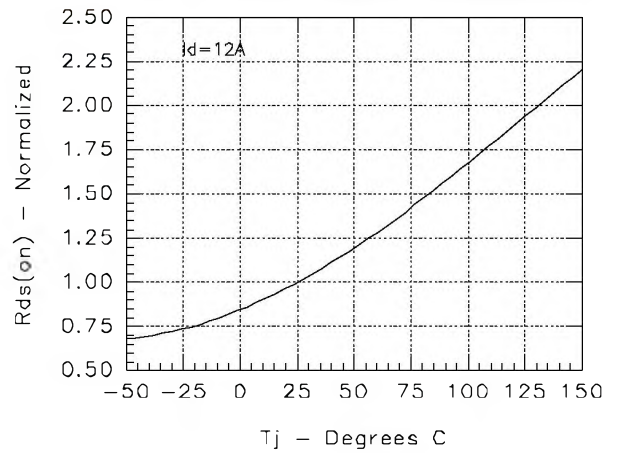


Fig. 5. Drain Current vs. Case Temperature

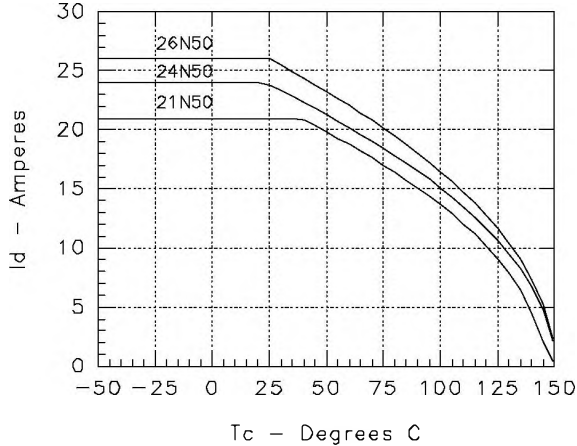
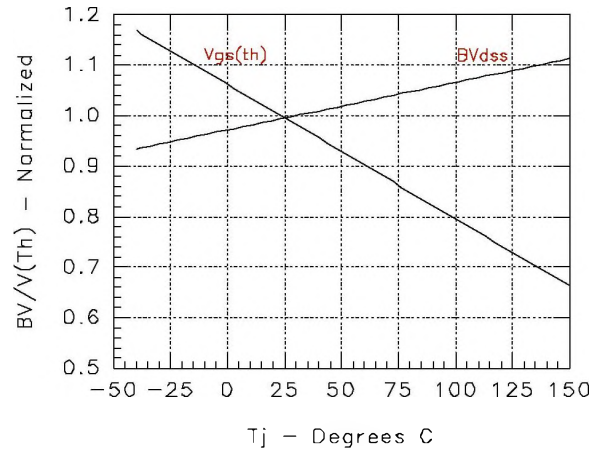


Fig. 6. Temperature Dependence of Breakdown Voltage and Threshold Voltage



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Fig. 7. Gate Charge

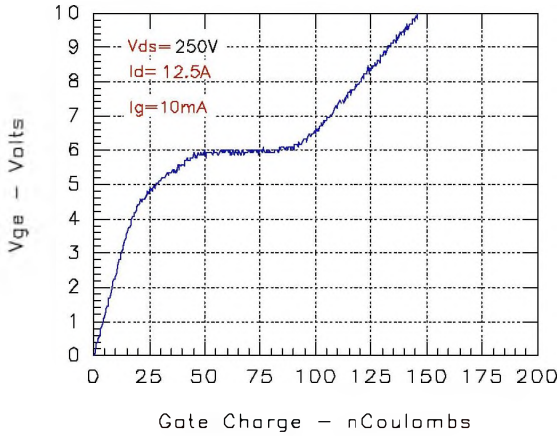


Fig. 8. Forward Bias Safe Operating Area

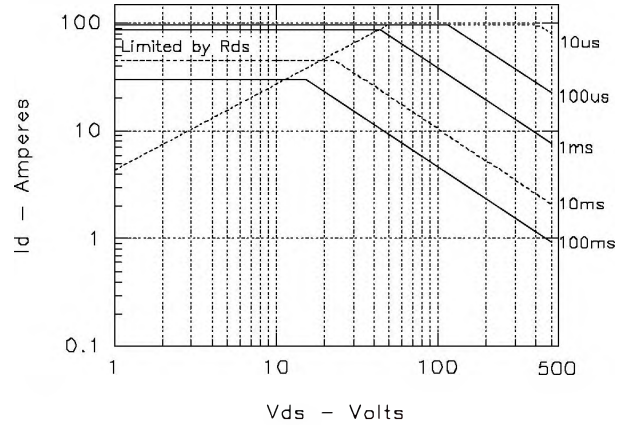


Fig. 9. Capacitance Curves

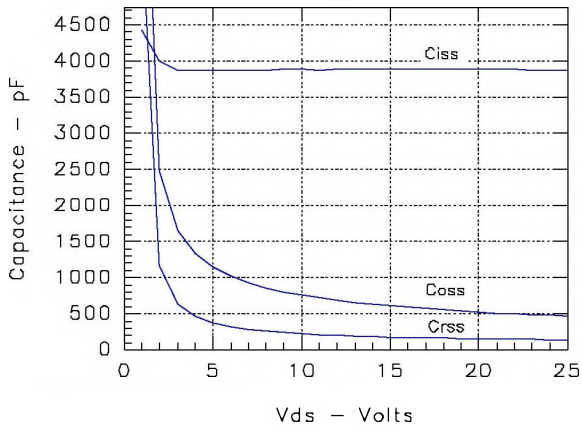


Fig. 10. Source Current vs. Source to Drain Voltage

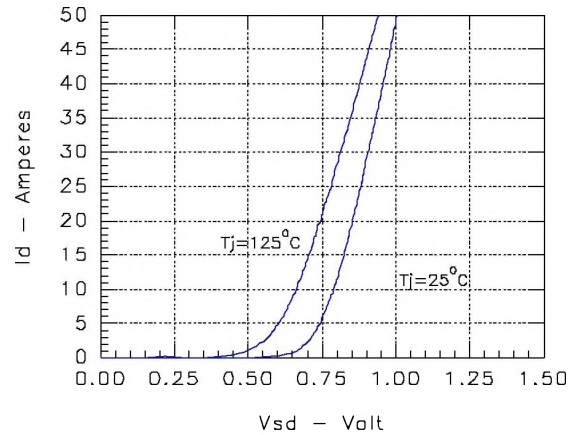
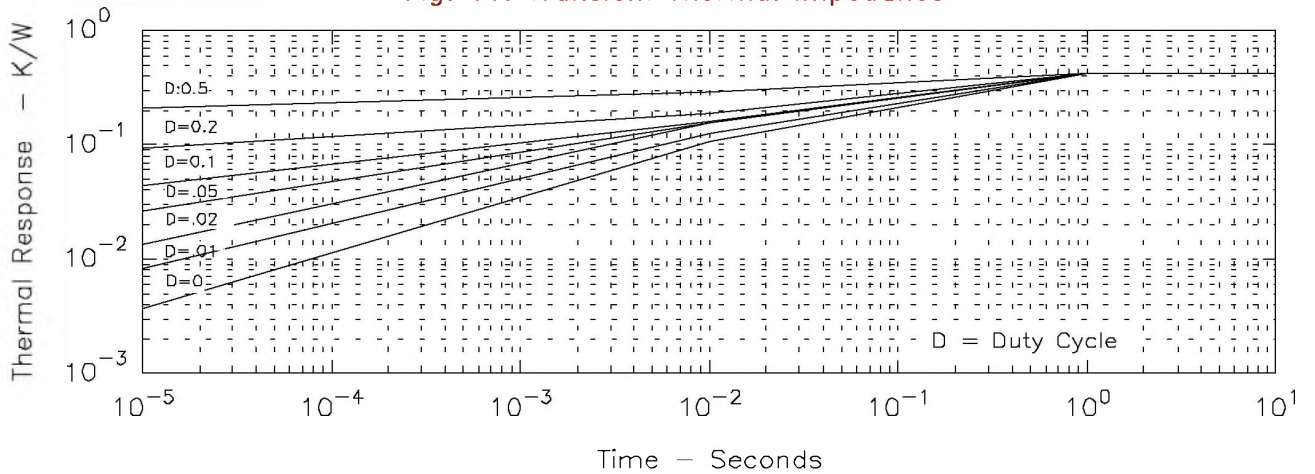


Fig. 11. Transient Thermal Impedance



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