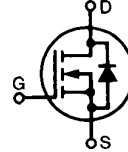


# HiPerFET™ Power MOSFETs

IXFH/IXFT 30N50  
IXFH/IXFT 32N50

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

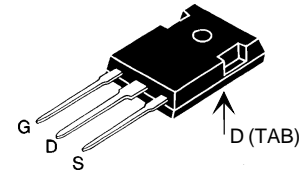


$V_{DSS}$	$I_{D25}$	$R_{DS(on)}$
500 V	30 A	0.16 $\Omega$
500 V	32 A	0.15 $\Omega$

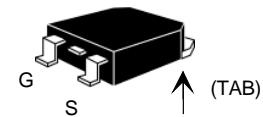
$t_{rr} \leq 250$  ns

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
$I_{D25}$	$T_C = 25^\circ\text{C}$	30N50 32N50	30 32 A
$I_{DM}$	$T_C = 25^\circ\text{C}$ pulse width limited by $T_{JM}$	30N50 32N50	120 128 A
$I_{AR}$	$T_C = 25^\circ\text{C}$	30N50 32N50	30 32 A
$E_{AS}$	$T_C = 25^\circ\text{C}$	1.5	J
$E_{AR}$	$I_D = 25^\circ\text{C}$	45	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
$P_D$	$T_C = 25^\circ\text{C}$	360	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 (0.062 in.) from case for 10 s	300	$^\circ\text{C}$
$M_d$	Mounting torque	1.13/10	Nm/lb.in.
Weight		6	g

TO-247 AD (IXFH)



TO-268 (D3) Case Style



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 Diode

## Applications

- DC-DC converters
- Battery chargers
- Switched-mode and resonant-mode power supplies
- DC choppers
- AC motor control
- Temperature and lighting controls

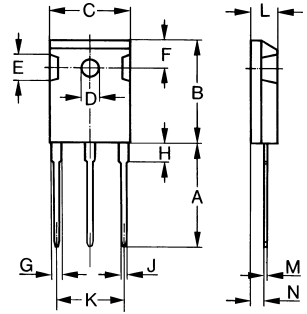
## Advantages

- 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.
$V_{DSS}$	$V_{GS} = 0\text{ V}$ , $I_D = 1\text{ mA}$ $V_{DSS}$ temperature coefficient	500	0.102	V %/K
$V_{GS(th)}$	$V_{DS} = V_{GS}$ , $I_D = 4\text{ mA}$ $V_{GS(th)}$ temperature coefficient	2	-0.206	V %/K
$I_{GSS}$	$V_{GS} = \pm 20\text{ V}_{DC}$ , $V_{DS} = 0$	$\pm 100$		nA
$I_{DSS}$	$V_{DS} = 0.8 \cdot V_{DSS}$ , $T_J = 25^\circ\text{C}$ $V_{GS} = 0\text{ V}$ , $T_J = 125^\circ\text{C}$	200		$\mu\text{A}$ mA
$R_{DS(on)}$	$V_{GS} = 10\text{ V}$ , $I_D = 15\text{ A}$ Pulse test, $t \leq 300\ \mu\text{s}$ , duty cycle $d \leq 2\%$	32N50 30N50		0.15 0.16 $\Omega$

Symbol	Test Conditions	Characteristic Values ( $T_J = 25^\circ\text{C}$ , unless otherwise specified)			S
		min.	typ.	max.	
$g_{fs}$	$V_{DS} = 10\text{ V}; I_D = 0.5 I_{D25}$ pulse test	18	28		
$C_{iss}$ $C_{oss}$ $C_{rss}$	$V_{GS} = 0\text{ V}, V_{DS} = 25\text{ V}, f = 1\text{ MHz}$	5200		5700	pF
		640		750	pF
		240		310	pF
$t_{d(on)}$ $t_r$ $t_{d(off)}$ $t_f$	$V_{GS} = 10\text{ V}, V_{DS} = 0.5 V_{DSS}, I_D = 0.5 I_{D25}$ $R_G = 2\ \Omega$ (External)		35	45	ns
			42	50	ns
			110	140	ns
			26	35	ns
$Q_{g(on)}$ $Q_{gs}$ $Q_{gd}$	$V_{GS} = 10\text{ V}, V_{DS} = 0.5 V_{DSS}, I_D = 0.5 I_{D25}$		227	300	nC
			29	40	nC
			110	145	nC
$R_{thJC}$ $R_{thCK}$	(TO-247 Case Style)			0.35	K/W
			0.25		K/W

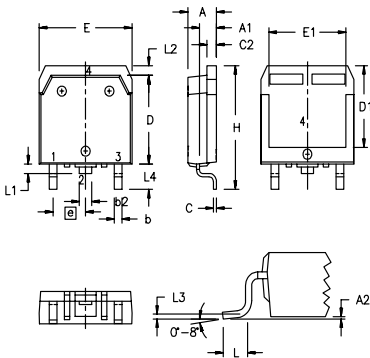
### TO-247 AD (IXFH) Outline



Dim.	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	19.81	20.32	0.780	0.800
B	20.80	21.46	0.819	0.845
C	15.75	16.26	0.610	0.640
D	3.55	3.65	0.140	0.144
E	4.32	5.49	0.170	0.216
F	5.4	6.2	0.212	0.244
G	1.65	2.13	0.065	0.084
H	-	4.5	-	0.177
J	1.0	1.4	0.040	0.055
K	10.8	11.0	0.426	0.433
L	4.7	5.3	0.185	0.209
M	0.4	0.8	0.016	0.031
N	1.5	2.49	0.087	0.102

Symbol	Test Conditions	Characteristic Values ( $T_J = 25^\circ\text{C}$ , unless otherwise specified)			A
		min.	typ.	max.	
$I_S$	$V_{GS} = 0\text{ V}$	30N50 32N50		30 32	A
$I_{SM}$	Repetitive; pulse width limited by $T_{JM}$	30N50 32N50		120 128	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
$t_{rr}$	$I_F = I_S$ $-di/dt = 100\text{ A}/\mu\text{s},$ $V_R = 100\text{ V}$	$T_J = 25^\circ\text{C}$		250	ns
		$T_J = 125^\circ\text{C}$		400	ns
$Q_{RM}$		$T_J = 25^\circ\text{C}$	0.85		$\mu\text{C}$
$I_{RM}$		$T_J = 25^\circ\text{C}$		8	A

### TO-268AA (D<sup>3</sup> PAK)



Dim.	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	4.9	5.1	.193	.201
A <sub>1</sub>	2.7	2.9	.106	.114
A <sub>2</sub>	.02	.25	.001	.010
b	1.15	1.45	.045	.057
b <sub>2</sub>	1.9	2.1	.75	.83
C	.4	.65	.016	.026
D	13.80	14.00	.543	.551
E	15.85	16.05	.624	.632
E <sub>1</sub>	13.3	13.6	.524	.535
e	5.45 BSC		.215 BSC	
H	18.70	19.10	.736	.752
L	2.40	2.70	.094	.106
L <sub>1</sub>	1.20	1.40	.047	.055
L <sub>2</sub>	1.00	1.15	.039	.045
L <sub>3</sub>	0.25 BSC		.010 BSC	
L <sub>4</sub>	3.80	4.10	.150	.161

### Min. Recommended Footprint

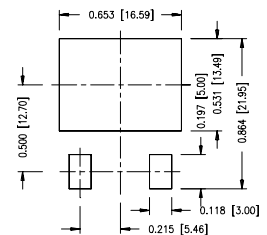


Figure 1. Output Characteristics at 25°C

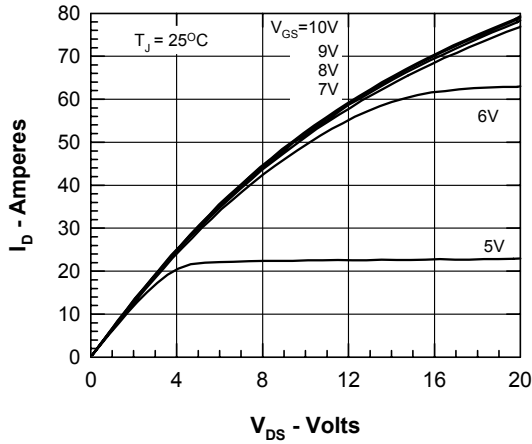


Figure 2. Output Characteristics at 125°C

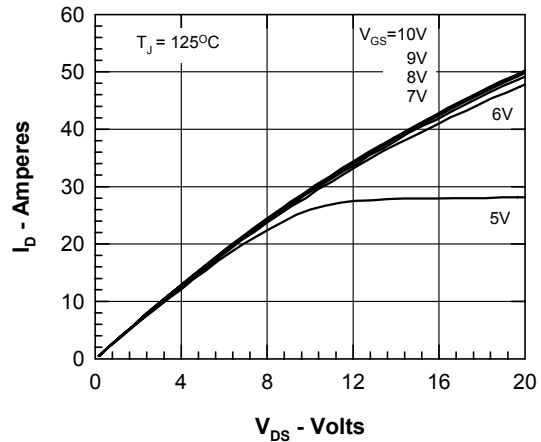


Figure 3.  $R_{DS(on)}$  normalized to 15A/25°C vs.  $I_D$

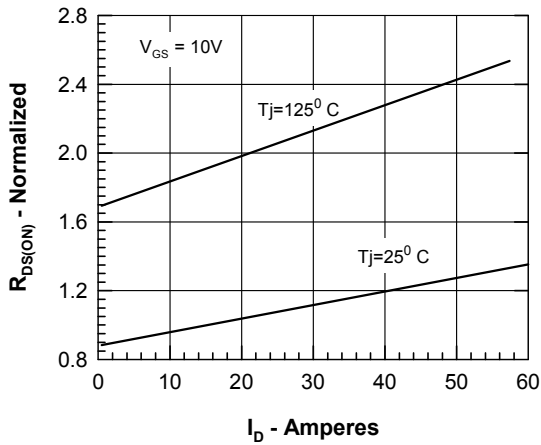


Figure 4.  $R_{DS(on)}$  normalized to 15A/25°C vs.  $T_J$

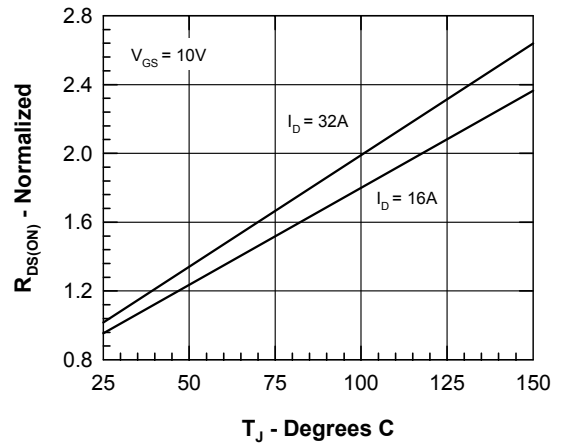


Figure 5. Drain Current vs. Case Temperature

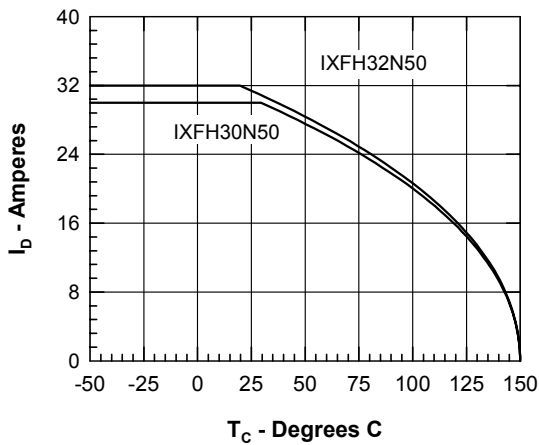


Figure 6. Admittance Curves

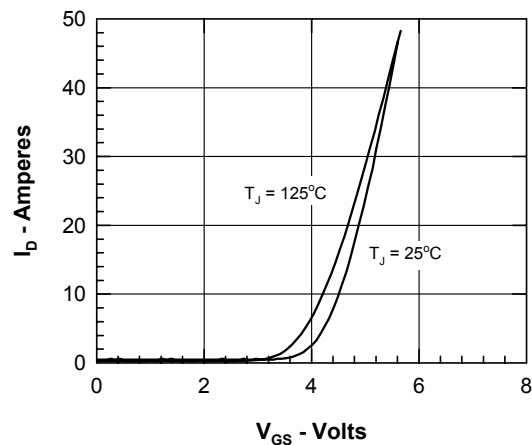


Figure 7. Gate Charge

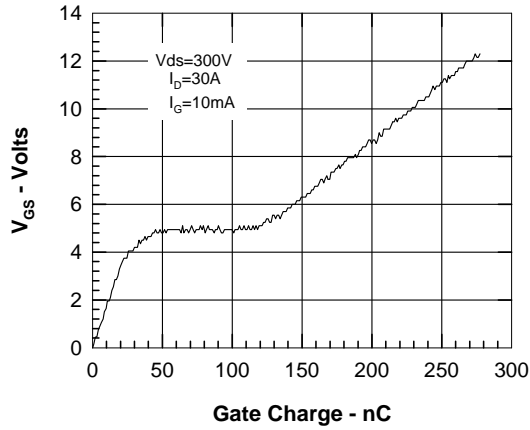


Figure 8. Capacitance Curves

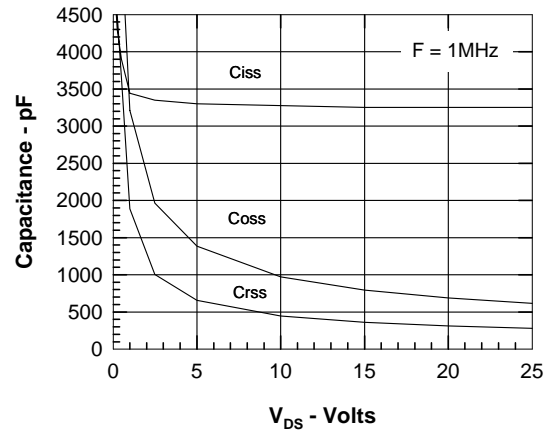


Figure 9. Forward Voltage Drop of the Intrinsic Diode

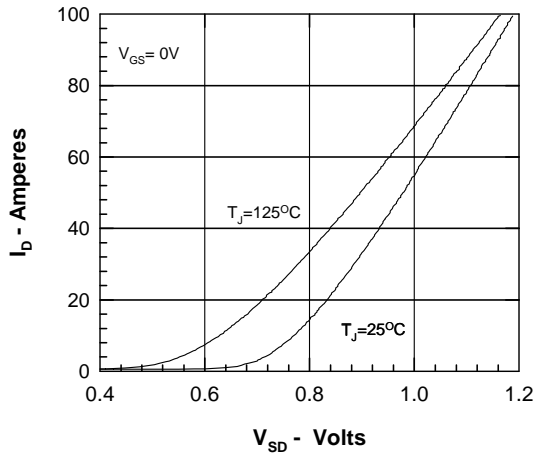


Figure 10. Transient Thermal Resistance

