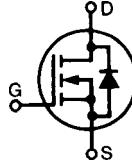


# HiPerFET™ Power MOSFETs

IXFH/IXFT 30N50  
IXFH/IXFT 32N50

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

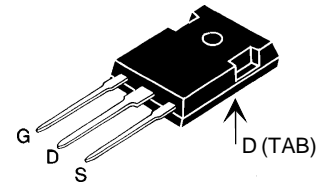


$V_{DSS}$	$I_{D25}$	$R_{DS(on)}$
500 V	30 A	0.16 $\Omega$
500 V	32 A	0.15 $\Omega$

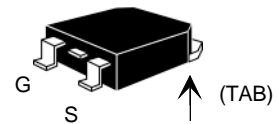
$t_{rr} \leq 250$  ns

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	30 A
		32N50	32 A
$I_{DM}$	$T_C = 25^\circ\text{C}$ pulse width limited by $T_{JM}$	30N50	120 A
		32N50	128 A
$I_{AR}$	$T_C = 25^\circ\text{C}$	30N50	30 A
		32N50	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

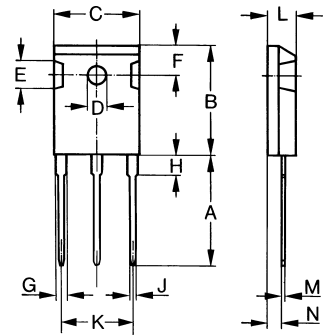
## Advantages

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

Symbol	Test Conditions	Characteristic Values			
		$(T_J = 25^\circ\text{C}, \text{ unless otherwise specified})$			
		min.	typ.	max.	
$g_{fs}$	$V_{DS} = 10\text{ V}; I_D = 0.5 I_{D25}$ pulse test	18	28		S
$C_{iss}$	$V_{GS} = 0\text{ V}, V_{DS} = 25\text{ V}, f = 1\text{ MHz}$	5200		5700	pF
$C_{oss}$		640		750	pF
$C_{rss}$		240		310	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)		35	45	ns
$t_r$			42	50	ns
$t_{d(off)}$			110	140	ns
$t_f$			26	35	ns
$Q_{g(on)}$	$V_{GS} = 10\text{ V}, V_{DS} = 0.5 V_{DSS}, I_D = 0.5 I_{D25}$		227	300	nC
$Q_{gs}$			29	40	nC
$Q_{gd}$			110	145	nC
$R_{thJC}$	(TO-247 Case Style)			0.35	K/W
$R_{thCK}$			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			
		$(T_J = 25^\circ\text{C}, \text{ unless otherwise specified})$			
		min.	typ.	max.	
$I_S$	$V_{GS} = 0\text{ V}$				
		30N50		30	A
		32N50		32	A
$I_{SM}$	Repetitive; pulse width limited by $T_{JM}$	30N50		120	A
		32N50		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		$\mu\text{C}$
		$T_J = 25^\circ\text{C}$		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**

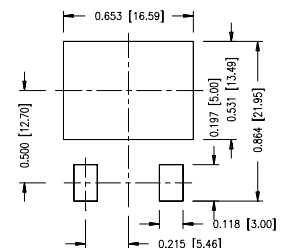


Figure 1. Output Characteristics at 25°C

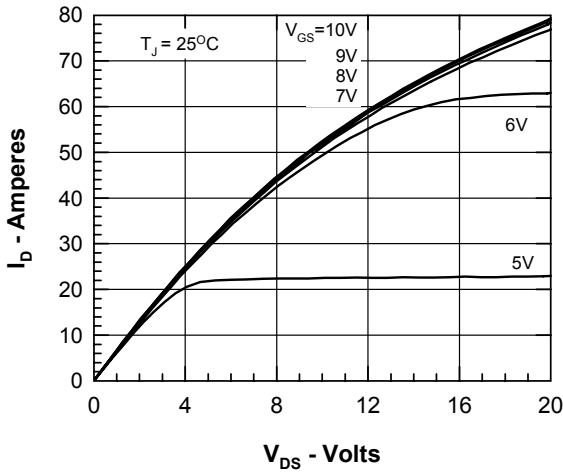


Figure 2. Output Characteristics at 125°C

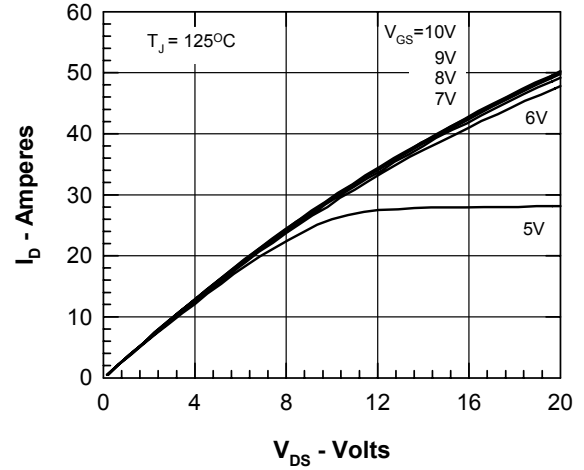


Figure 3.  $R_{DS(on)}$  normalized to 15A/25°C vs.  $I_D$

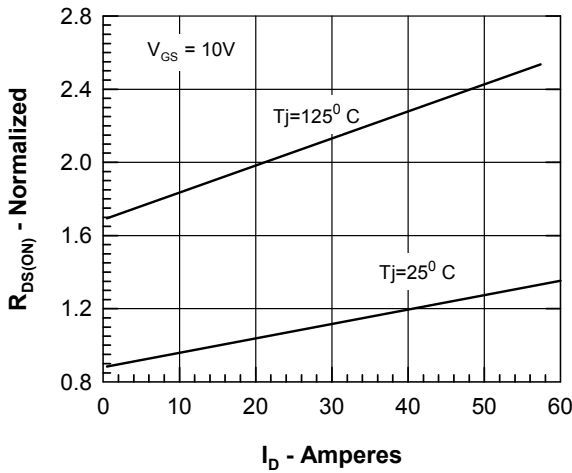


Figure 4.  $R_{DS(on)}$  normalized to 15A/25°C vs.  $T_J$

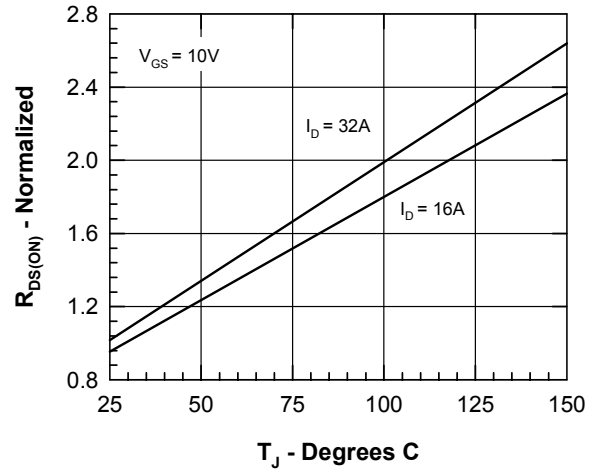


Figure 5. Drain Current vs. Case Temperature

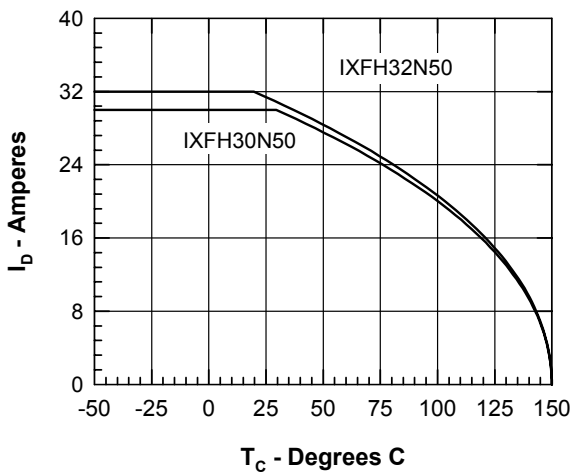


Figure 6. Admittance Curves

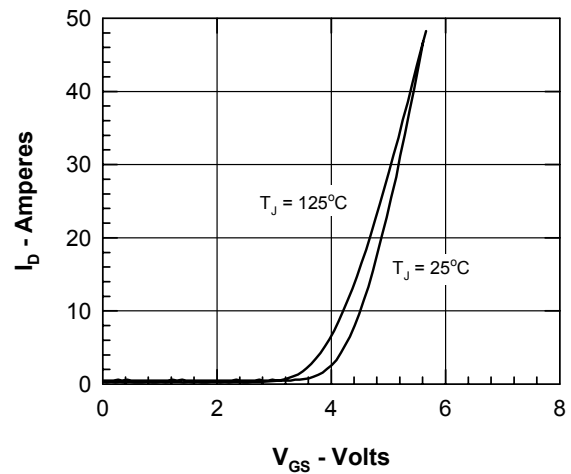


Figure 7. Gate Charge

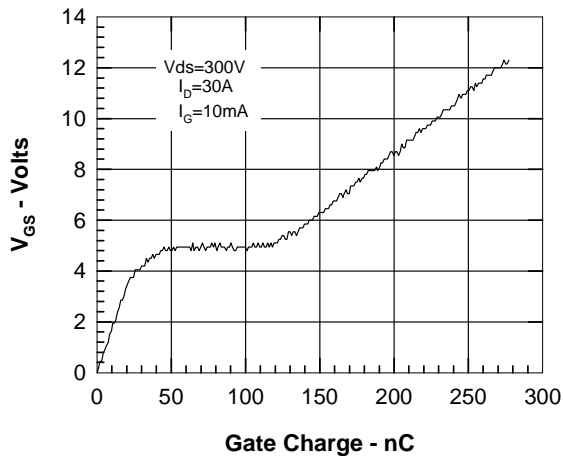


Figure 8. Capacitance Curves

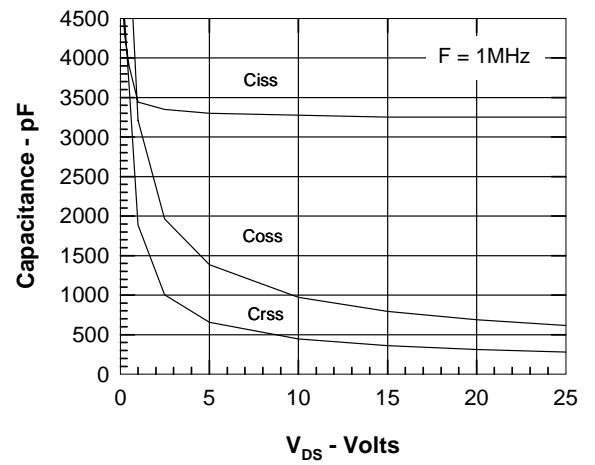


Figure 9. Forward Voltage Drop of the Intrinsic Diode

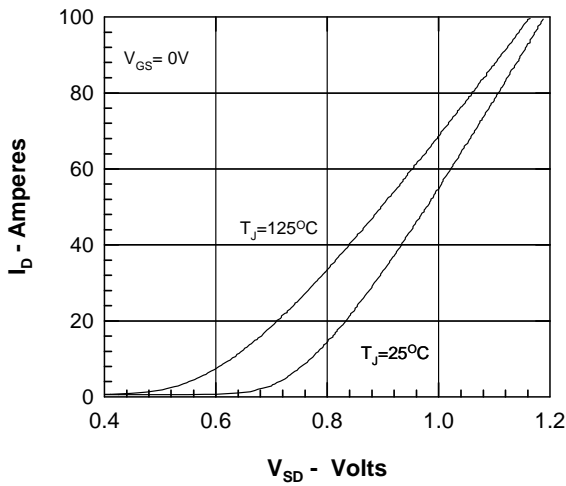
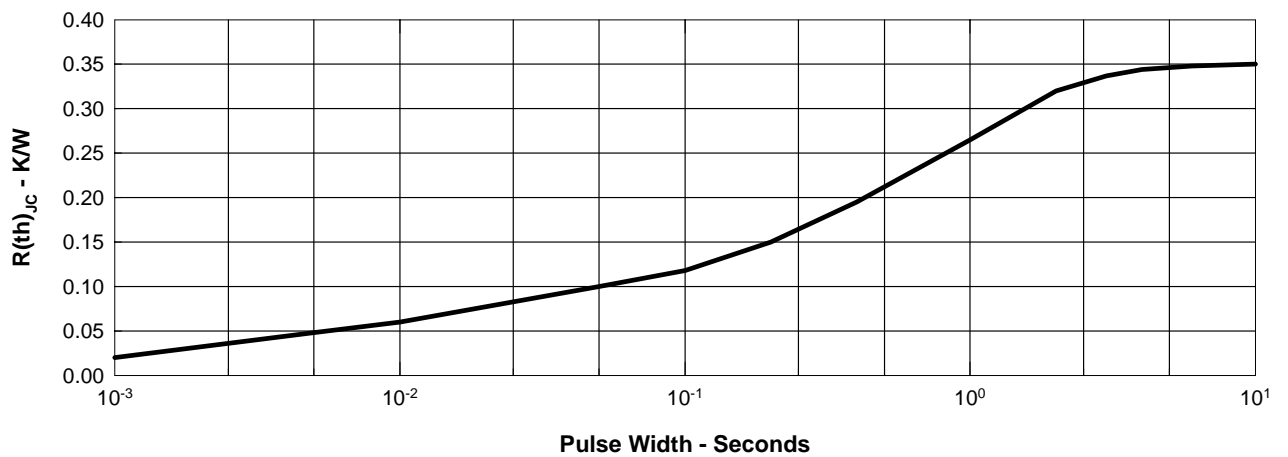


Figure 10. Transient Thermal Resistance



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