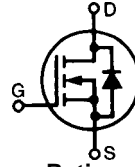


# HiPerFET™ Power MOSFETs

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

Preliminary data sheet

**IXFT10N100**  
**IXFT12N100**  
**IXFT13N100**

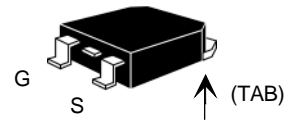


$V_{DSS}$	$I_{D25}$	$R_{DS(on)}$
<b>1000 V</b>	<b>10 A</b>	<b>1.20 <math>\Omega</math></b>
<b>1000 V</b>	<b>12 A</b>	<b>1.05 <math>\Omega</math></b>
<b>1000 V</b>	<b>12.5 A</b>	<b>0.90 <math>\Omega</math></b>

**$t_{rr} \leq 250$  ns**

Symbol	Test Conditions	Maximum Ratings	
$V_{DSS}$	$T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$	1000	V
$V_{DGR}$	$T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$ ; $R_{GS} = 1\text{ M}\Omega$	1000	V
$V_{GS}$	Continuous	$\pm 20$	V
$V_{GSM}$	Transient	$\pm 30$	V
$I_{D25}$	$T_C = 25^\circ\text{C}$	10N100	10 A
		12N100	12 A
		13N100	12.5 A
$I_{DM}$	$T_C = 25^\circ\text{C}$ , pulse width limited by $T_{JM}$	10N100	40 A
		12N100	48 A
		13N100	50 A
		10N100	10 A
$I_{AR}$	$T_C = 25^\circ\text{C}$	10N100	10 A
		12N100	12 A
		13N100	12.5 A
$E_{AR}$	$T_C = 25^\circ\text{C}$	30	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
$P_D$	$T_C = 25^\circ\text{C}$	300	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		TO-268 = 6 g	

## TO-268 Case Style



G = Gate,  
S = Source,  
TAB = Drain

## Features

- International standard package
- 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

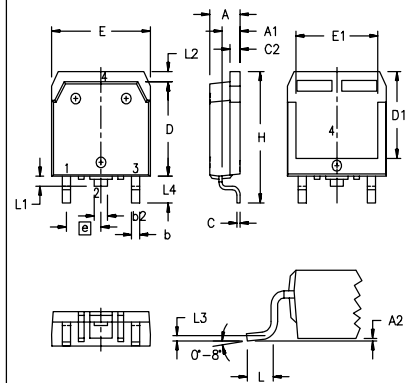
- Surface mountable, high power package
- Space savings
- High power density

Symbol	Test Conditions	Characteristic Values ( $T_J = 25^\circ\text{C}$ , unless otherwise specified)		
		min.	typ.	max.
$V_{DSS}$	$V_{GS} = 0\text{ V}$ , $I_D = 3\text{ mA}$	1000		V
$V_{GS(th)}$	$V_{DS} = V_{GS}$ , $I_D = 4\text{ mA}$	2.0		V
$I_{GSS}$	$V_{GS} = \pm 20\text{ V}_{DC}$ , $V_{DS} = 0$			$\pm 100$ nA
$I_{DSS}$	$V_{DS} = 0.8 \cdot V_{DSS}$ $V_{GS} = 0\text{ V}$	$T_J = 25^\circ\text{C}$		250 $\mu\text{A}$
		$T_J = 125^\circ\text{C}$		1 mA
$R_{DS(on)}$	$V_{GS} = 10\text{ V}$ , $I_D = 0.5 \cdot I_{D25}$  Pulse test, $t \leq 300\ \mu\text{s}$ , duty cycle $d \leq 2\%$	10N100		1.20 $\Omega$
		12N100		1.05 $\Omega$
		13N100		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	10	S	
$C_{iss}$	$V_{GS} = 0\text{ V}, V_{DS} = 25\text{ V}, f = 1\text{ MHz}$		4000	pF	
$C_{oss}$			310	pF	
$C_{rss}$			70	pF	
$t_{d(on)}$	$V_{GS} = 10\text{ V}, V_{DS} = 0.5 \cdot V_{DSS}, I_D = 0.5 \cdot I_{D25}$ $R_G = 2\ \Omega$ (External),		21	50	ns
$t_r$			33	50	ns
$t_{d(off)}$			62	100	ns
$t_f$			32	50	ns
$Q_{g(on)}$	$V_{GS} = 10\text{ V}, V_{DS} = 0.5 \cdot V_{DSS}, I_D = 0.5 \cdot I_{D25}$		122	155	nC
$Q_{gs}$			30	45	nC
$Q_{gd}$			50	80	nC
$R_{thJC}$			0.42	K/W	

**Source-Drain Diode**

Symbol	Test Conditions	Characteristic Values ( $T_J = 25^\circ\text{C}$ , unless otherwise specified)			
		min.	typ.	max.	
$I_S$	$V_{GS} = 0\text{ V}$	10N100 12N100 13N100		10 12 12.5	A A A
$I_{SM}$	Repetitive; pulse width limited by $T_{JM}$	10N100 12N100 13N100		40 48 50	A A 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
$Q_{RM}$	$I_F = I_S$ $-di/dt = 100\text{ A}/\mu\text{s}$ , $V_R = 100\text{ V}$	$T_J = 25^\circ\text{C}$	1		$\mu\text{C}$
		$T_J = 125^\circ\text{C}$	2		$\mu\text{C}$
$I_{RM}$	$I_F = I_S$ $-di/dt = 100\text{ A}/\mu\text{s}$ , $V_R = 100\text{ V}$	$T_J = 25^\circ\text{C}$	10		A
		$T_J = 125^\circ\text{C}$	15		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

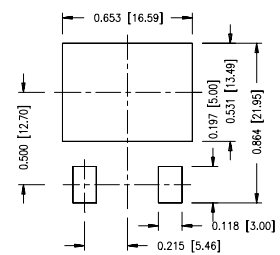
**Min. Recommended Footprint**


Fig. 1. Output Characteristics

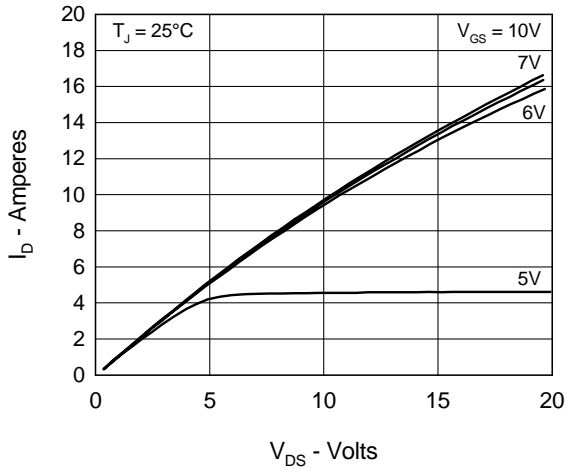


Fig. 2. Input Admittance

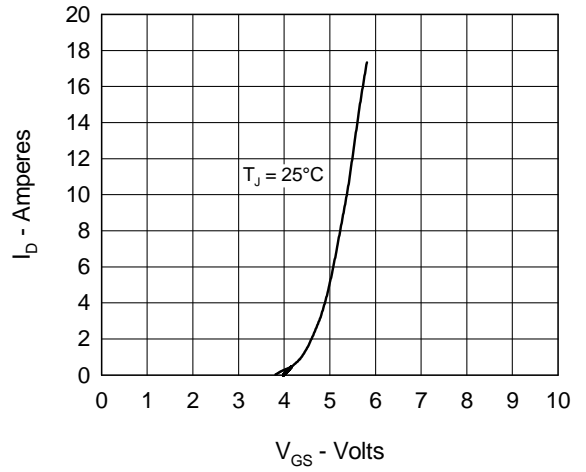


Fig. 3.  $R_{DS(on)}$  vs. Drain Current

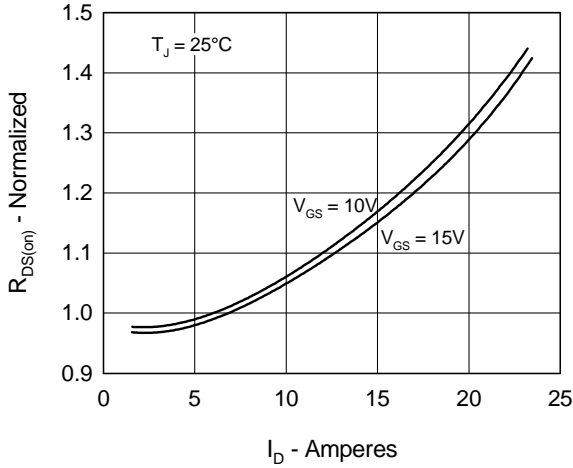


Fig. 4. Temperature Dependence of Drain to Source Resistance

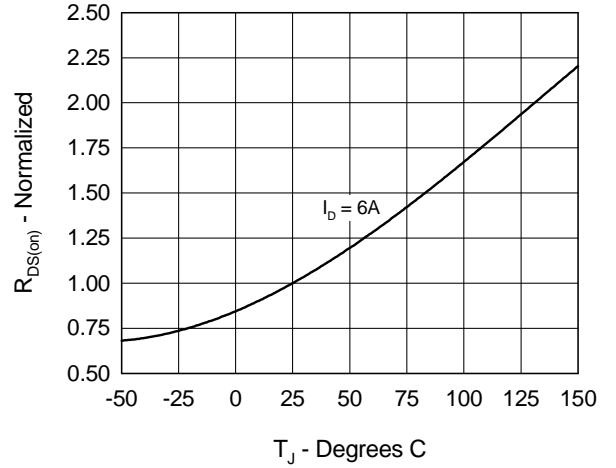


Fig. 5. Drain vs. Case Temperature

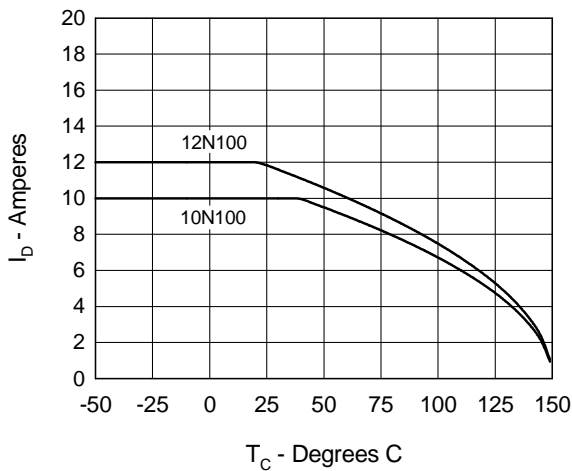


Fig. 6. Temperature Dependence of Breakdown and Threshold Voltage

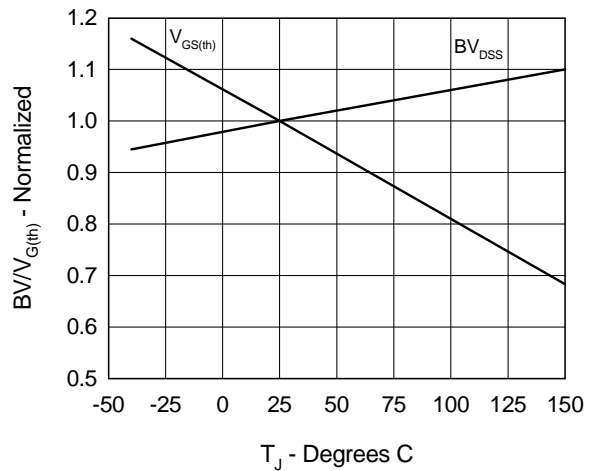


Fig. 7. Gate Charge Characteristic Curve

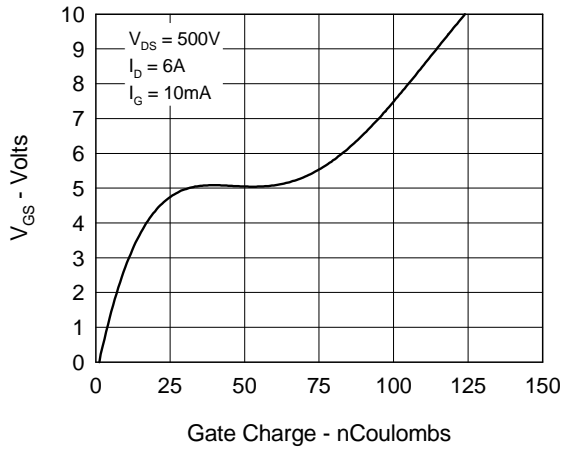


Fig. 8. Capacitance Curves

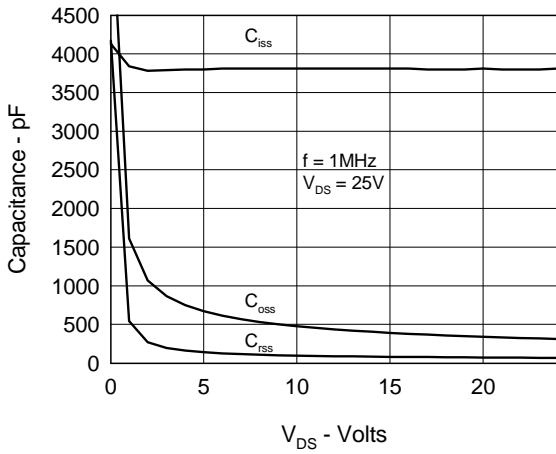


Fig. 9. Source Current vs. Source to Drain Voltage

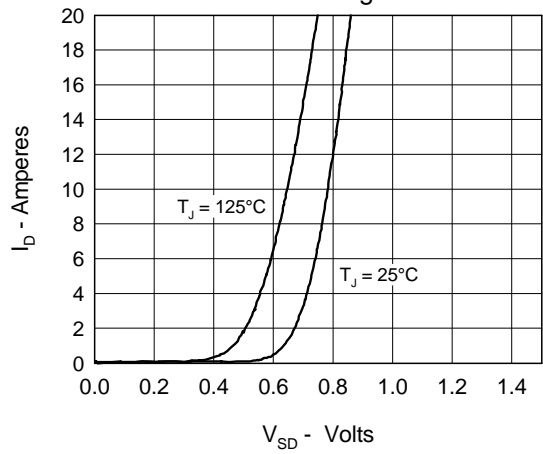


Fig.10. Transient Thermal Impedance

