

# HiPerFET™ Power MOSFETs

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

Preliminary data sheet

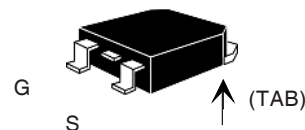
**IXFT 10N100**  
**IXFT 12N100**

$V_{DSS}$	$I_{D25}$	$R_{DS(on)}$
<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>

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



**TO-268 Case Style**



G = Gate,  
S = Source,  
TAB = Drain

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 $150^\circ\text{C}$ ; $R_{GS} = 1$ 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 12N100: 12	A
$I_{DM}$	$T_C = 25^\circ\text{C}$ , pulse width limited by $T_{JM}$	10N100: 40 12N100: 48	A
$I_{AR}$	$T_C = 25^\circ\text{C}$	10N100: 10 12N100: 12	A
$E_{AR}$	$T_C = 25^\circ\text{C}$	30	mJ
dv/dt	$I_S \leq I_{DM}$ , $di/dt \leq 100$ 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.
<b>Weight</b>		TO-268 = 6 g	

## 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

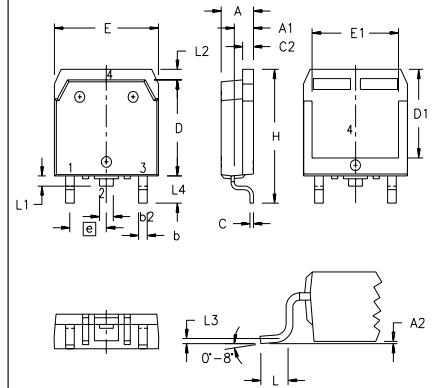
- Surface mountable, high power package
- Space savings
- High power density

Symbol	Test Conditions	Characteristic Values ( $T_J = 25^\circ\text{C}$ , unless otherwise specified)		
		min.	typ.	max.
$V_{DSS}$	$V_{GS} = 0$ V, $I_D = 3$ mA	1000		V
$V_{GS(th)}$	$V_{DS} = V_{GS}$ , $I_D = 4$ mA	2.0		4.5 V
$I_{GSS}$	$V_{GS} = \pm 20$ V <sub>DC</sub> , $V_{DS} = 0$			$\pm 100$ nA
$I_{DSS}$	$V_{DS} = 0.8 \cdot V_{DSS}$ , $T_J = 25^\circ\text{C}$ $V_{GS} = 0$ V, $T_J = 125^\circ\text{C}$			250 $\mu\text{A}$ 1 mA
$R_{DS(on)}$	$V_{GS} = 10$ V, $I_D = 0.5 \cdot I_{D25}$ Pulse test, $t \leq 300$ $\mu\text{s}$ , duty cycle $d \leq 2$ %	10N100 12N100		1.20 $\Omega$ 1.05 $\Omega$

Symbol	Test Conditions	Characteristic Values		
		(T <sub>J</sub> = 25°C, unless otherwise specified)		
		min.	typ.	max.
<b>g<sub>fs</sub></b>	V <sub>DS</sub> = 10 V; I <sub>D</sub> = 0.5 • I <sub>D25</sub> , pulse test	6	10	S
<b>C<sub>iss</sub></b>	V <sub>GS</sub> = 0 V, V <sub>DS</sub> = 25 V, f = 1 MHz		4000	pF
<b>C<sub>oss</sub></b>			310	pF
<b>C<sub>rss</sub></b>			70	pF
<b>t<sub>d(on)</sub></b>	V <sub>GS</sub> = 10 V, V <sub>DS</sub> = 0.5 • V <sub>DSS</sub> , I <sub>D</sub> = 0.5 • I <sub>D25</sub> R <sub>G</sub> = 2 Ω (External),		21	50 ns
<b>t<sub>r</sub></b>			33	50 ns
<b>t<sub>d(off)</sub></b>			62	100 ns
<b>t<sub>f</sub></b>			32	50 ns
<b>Q<sub>g(on)</sub></b>	V <sub>GS</sub> = 10 V, V <sub>DS</sub> = 0.5 • V <sub>DSS</sub> , I <sub>D</sub> = 0.5 • I <sub>D25</sub>		122	155 nC
<b>Q<sub>gs</sub></b>			30	45 nC
<b>Q<sub>gd</sub></b>			50	80 nC
<b>R<sub>thJC</sub></b>			0.42	KW

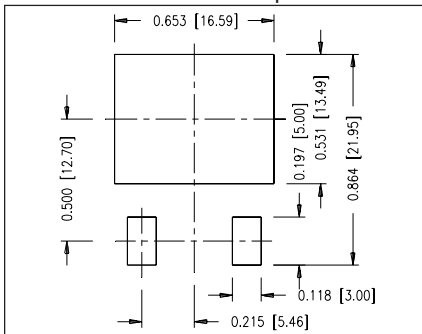
Source-Drain Diode		Characteristic Values		
		(T <sub>J</sub> = 25°C, unless otherwise specified)		
Symbol	Test Conditions	min.	typ.	max.
<b>I<sub>S</sub></b>	V <sub>GS</sub> = 0 V	10N100 12N100		10 A 12 A
<b>I<sub>SM</sub></b>	Repetitive; pulse width limited by T <sub>JM</sub>	10N100 12N100		40 A 48 A
<b>V<sub>SD</sub></b>	I <sub>F</sub> = I <sub>S</sub> , V <sub>GS</sub> = 0 V, Pulse test, t ≤ 300 μs, duty cycle d ≤ 2 %			1.5 V
<b>t<sub>rr</sub></b>	I <sub>F</sub> = I <sub>S</sub> -di/dt = 100 A/μs, V <sub>R</sub> = 100 V	T <sub>J</sub> = 25°C		250 ns
		T <sub>J</sub> = 125°C		400 ns
<b>Q<sub>RM</sub></b>		T <sub>J</sub> = 25°C	1	μC
		T <sub>J</sub> = 125°C	2	μC
<b>I<sub>RM</sub></b>		T <sub>J</sub> = 25°C	10	A
		T <sub>J</sub> = 125°C	15	A

### TO-268 Outline



SYM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.193	.201	4.90	5.10
A1	.106	.114	2.70	2.90
A2	.001	.010	0.02	0.25
b	.045	.057	1.15	1.45
b2	.075	.083	1.90	2.10
C	.016	.026	0.40	0.65
C2	.057	.063	1.45	1.60
D	.543	.551	13.80	14.00
D1	.488	.500	12.40	12.70
E	.624	.632	15.85	16.05
E1	.524	.535	13.30	13.60
e	.215 BSC		5.45 BSC	
H	.736	.752	18.70	19.10
L	.094	.106	2.40	2.70
L1	.047	.055	1.20	1.40
L2	.039	.045	1.00	1.15
L3	.010 BSC		0.25 BSC	
L4	.150	.161	3.80	4.10

### Min Recommended Footprint



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

Fig. 1. Output Characteristics

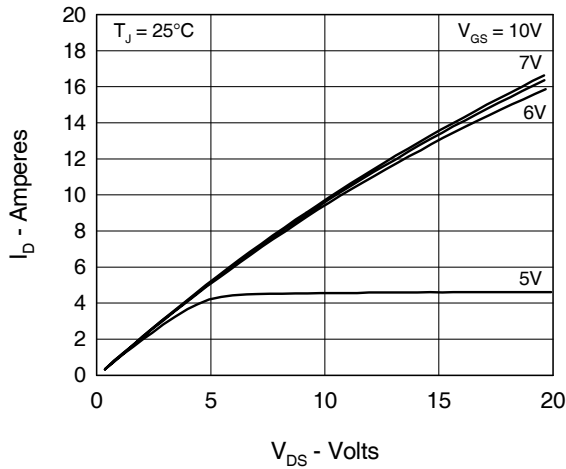


Fig. 2. Input Admittance

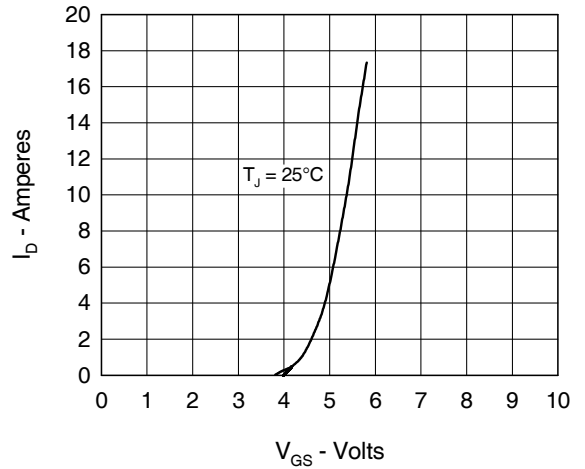


Fig. 3.  $R_{DS(on)}$  vs. Drain Current

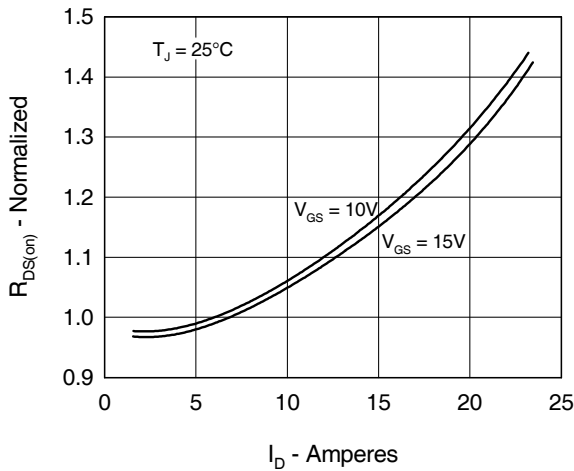


Fig. 4. Temperature Dependence of Drain to Source Resistance

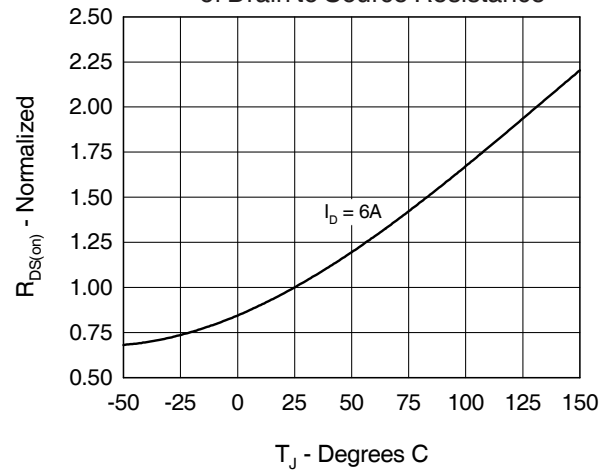


Fig. 5. Drain vs. Case Temperature

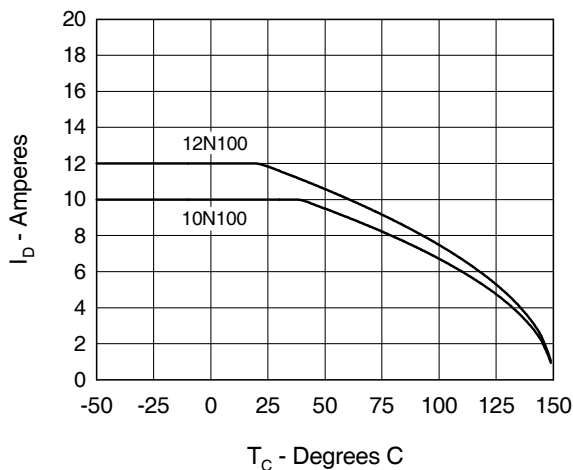


Fig. 6. Temperature Dependence of Breakdown and Threshold Voltage

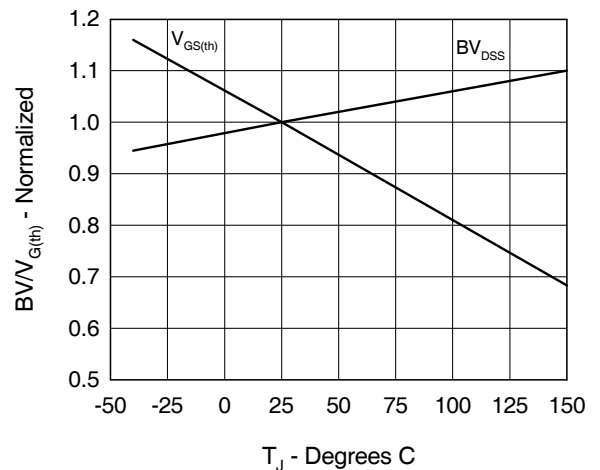


Fig. 7. Gate Charge Characteristic Curve

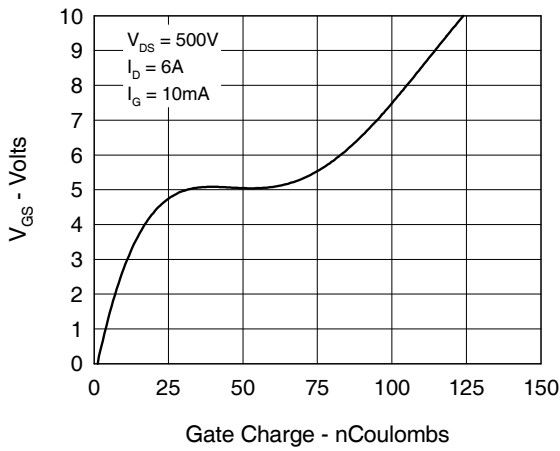


Fig. 8. Capacitance Curves

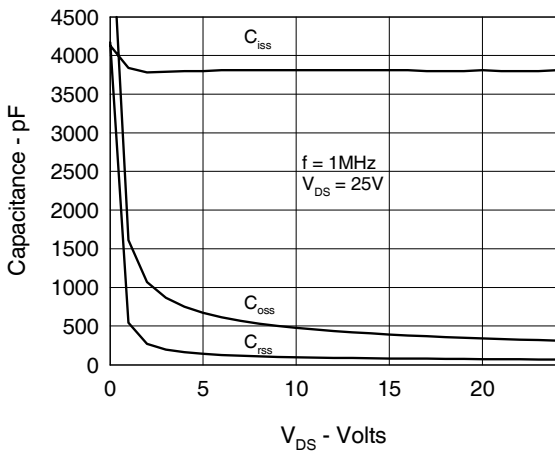


Fig. 9. Source Current vs. Source to Drain Voltage

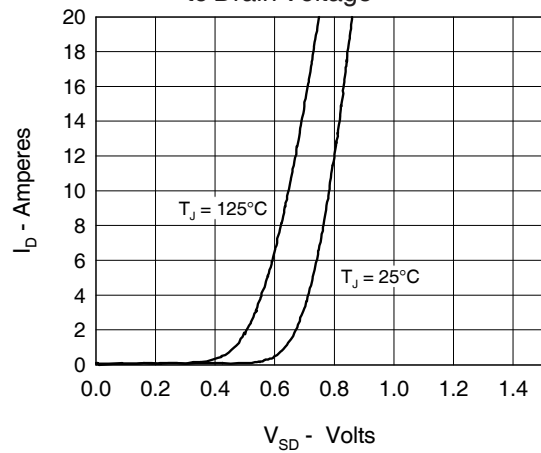
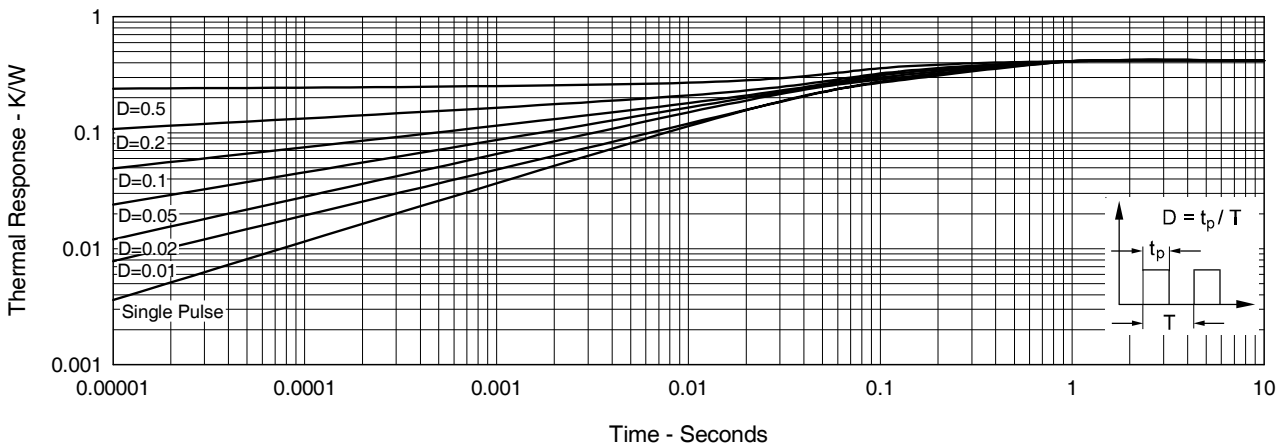


Fig.10.

Transient Thermal Impedance



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