

# HiPerFET™ Power MOSFET

Single Die MOSFET

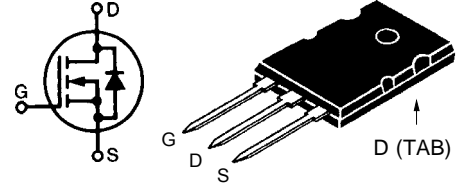
Preliminary data sheet

**IXFN 55N50**  
**IXFN 50N50**  
**IXFK 55N50**  
**IXFK 50N50**

$V_{DSS}$	$I_{D25}$	$R_{DS(on)}$	$t_{rr}$
500V	55A	80mΩ	250ns
500V	50A	100mΩ	250ns
500V	55A	80mΩ	250ns
500V	50A	100mΩ	250ns

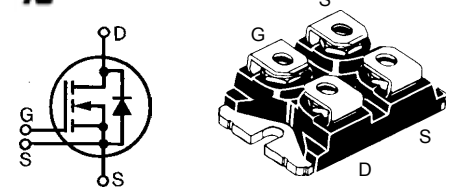
Symbol	Test Conditions	Maximum Ratings			
		IXFK 55N50	IXFK 50N50	IXFN 55N50	IXFN 50N50
$V_{DSS}$	$T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$	500		500	V
$V_{DGR}$	$T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$	500		500	V
$V_{GS}$	Continuous	±20		±20	V
$V_{GSM}$	Transient	±30		±30	V
$I_{D25}$	$T_C = 25^\circ\text{C}$	55	50	55	50 A
$I_{DM}$	$T_C = 25^\circ\text{C}$ ,	220	200	220	200 A
$I_{AR}$	$T_C = 25^\circ\text{C}$	55	50	55	50 A
$E_{AR}$	$T_C = 25^\circ\text{C}$	60		60	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		5	V/ns
$P_D$	$T_C = 25^\circ\text{C}$	560		600	W
$T_J$			-55 ... +150		°C
$T_{JM}$			150		°C
$T_{stg}$			-55 ... +150		°C
$T_L$	1.6 mm (0.063 in) from case for 10 s	300		N/A	°C
$V_{ISOL}$	50/60 Hz, RMS $t = 1 \text{ min}$ $I_{ISOL} \leq 1 \text{ mA}$ $t = 1 \text{ s}$		N/A	2500	V~
			N/A	3000	V~
$M_d$	Mounting torque		0.9/6	1.5/13	Nm/lb.in.
	Terminal connection torque		N/A	1.5/13	Nm/lb.in.
<b>Weight</b>		10		30	g

TO-264 AA (IXFK)



miniBLOC, SOT-227 B (IXFN)

**E153432**



G = Gate      D = Drain  
S = Source      TAB = Drain

Either Source terminal at miniBLOC can be used as Main or Kelvin Source

### Features

- International standard packages
- Encapsulating epoxy meets UL 94 V-0, flammability classification
- miniBLOC with Aluminium nitride isolation
- Low  $R_{DS(on)}$  HDMOS™ process
- Rugged polysilicon gate cell structure
- Unclamped Inductive Switching (UIS) rated
- Low package inductance
- Fast intrinsic Rectifier

### Applications

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

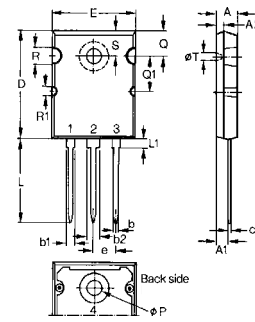
### Advantages

- Easy to mount
- Space savings
- High power density

Symbol	Test Conditions ( $T_J = 25^\circ\text{C}$ , unless otherwise specified)	Characteristic Values		
		Min.	Typ.	Max.
$V_{DSS}$	$V_{GS} = 0 \text{ V}$ , $I_D = 1 \text{ mA}$	500		V
$V_{GS(th)}$	$V_{DS} = V_{GS}$ , $I_D = 8 \text{ mA}$	2.5		4.5 V
$I_{GSS}$	$V_{GS} = \pm 20 \text{ V}$ ; $V_{DS} = 0 \text{ V}$			±200 nA
$I_{DSS}$	$V_{DS} = V_{DSS}$ , $V_{GS} = 0 \text{ V}$		$T_J = 25^\circ\text{C}$ $T_J = 125^\circ\text{C}$	25 $\mu\text{A}$ 2 mA
$R_{DS(on)}$	$V_{GS} = 10 \text{ V}$ , $I_D = 0.5 \cdot I_{D25}$ Note 1	55N50 50N50		80 mΩ 100 mΩ

Symbol	Test Conditions	Characteristic Values		
		Min.	Typ.	Max.
$g_{fs}$	$V_{DS} = 10\text{ V}; I_D = 0.5 \cdot I_{D25}$ Note 1		45	S
$C_{iss}$			9400	pF
$C_{oss}$	$V_{GS} = 0\text{ V}, V_{DS} = 25\text{ V}, f = 1\text{ MHz}$		1280	pF
$C_{rss}$			460	pF
$t_{d(on)}$	$V_{GS} = 10\text{ V}, V_{DS} = 0.5 \cdot V_{DSS}, I_D = 0.5 \cdot I_{D25}$ $R_G = 1\ \Omega$ (External),		45	ns
$t_r$			60	ns
$t_{d(off)}$			120	ns
$t_f$			45	ns
$Q_{g(on)}$	$V_{GS} = 10\text{ V}, V_{DS} = 0.5 \cdot V_{DSS}, I_D = 0.5 \cdot I_{D25}$		330	nC
$Q_{gs}$			55	nC
$Q_{gd}$			155	nC
$R_{thJC}$	TO-264 AA		0.22	K/W
$R_{thCK}$	TO-264 AA		0.15	K/W
$R_{thJC}$	miniBLOC, SOT-227 B		0.21	K/W
$R_{thCK}$	miniBLOC, SOT-227 B		0.05	K/W

### TO-264 AA Outline



Dim.	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	4.82	5.13	.190	.202
A1	2.54	2.89	.100	.114
A2	2.00	2.10	.079	.083
b	1.12	1.42	.044	.056
b1	2.39	2.69	.094	.106
b2	2.90	3.09	.114	.122
c	0.53	0.83	.021	.033
D	25.91	26.16	1.020	1.030
E	19.81	19.96	.780	.786
e	5.46 BSC		.215 BSC	
J	0.00	0.25	.000	.010
K	0.00	0.25	.000	.010
L	20.32	20.83	.800	.820
L1	2.29	2.59	.090	.102
P	3.17	3.66	.125	.144
Q	6.07	6.27	.239	.247
Q1	8.38	8.69	.330	.342
R	3.81	4.32	.150	.170
R1	1.78	2.29	.070	.090
S	6.04	6.30	.238	.248
T	1.57	1.83	.062	.072

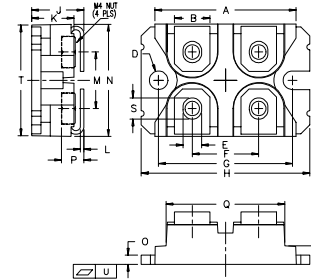
### Source-Drain Diode

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

Symbol	Test Conditions	Characteristic Values			
		Min.	Typ.	Max.	
$I_S$	$V_{GS} = 0$	55N50 50N50		55 50	A A
$I_{SM}$	Repetitive; pulse width limited by $T_{JM}$	55N50 50N50		220 200	A A
$V_{SD}$	$I_F = 100\text{ A}, V_{GS} = 0\text{ V}$	Note 1		1.5	V
$t_{rr}$	$I_F = 25\text{ A}, -di/dt = 100\text{ A}/\mu\text{s}, V_R = 100\text{ V}$			250	ns
$Q_{RM}$			1.0	$\mu\text{C}$	
$I_{RM}$			10	A	

Notes: 1. Pulse test,  $t \leq 300\ \mu\text{s}$ , duty cycle  $d \leq 2\%$

### miniBLOC, SOT-227 B



M4 screws (4x) supplied

Dim.	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	31.50	31.88	1.240	1.255
B	7.80	8.20	0.307	0.323
C	4.09	4.29	0.161	0.169
D	4.09	4.29	0.161	0.169
E	4.09	4.29	0.161	0.169
F	14.91	15.11	0.587	0.595
G	30.12	30.30	1.186	1.193
H	38.00	38.23	1.496	1.505
J	11.68	12.22	0.460	0.481
K	8.92	9.60	0.351	0.378
L	0.76	0.84	0.030	0.033
M	12.60	12.85	0.496	0.506
N	25.15	25.42	0.990	1.001
O	1.98	2.13	0.078	0.084
P	4.95	5.97	0.195	0.235
Q	26.54	26.90	1.045	1.059
R	3.94	4.42	0.155	0.174
S	4.72	4.85	0.186	0.191
T	24.59	25.07	0.968	0.987
U	-0.05	0.1	-0.002	0.004

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

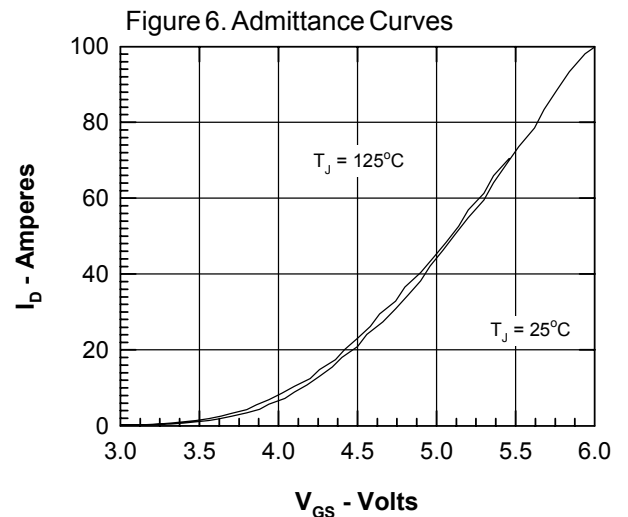
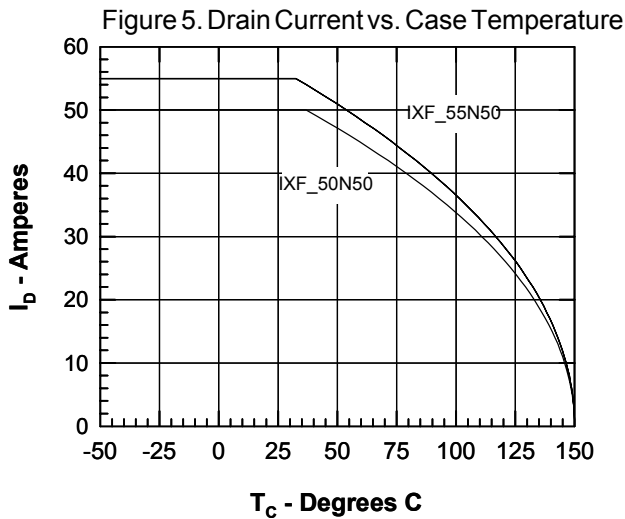
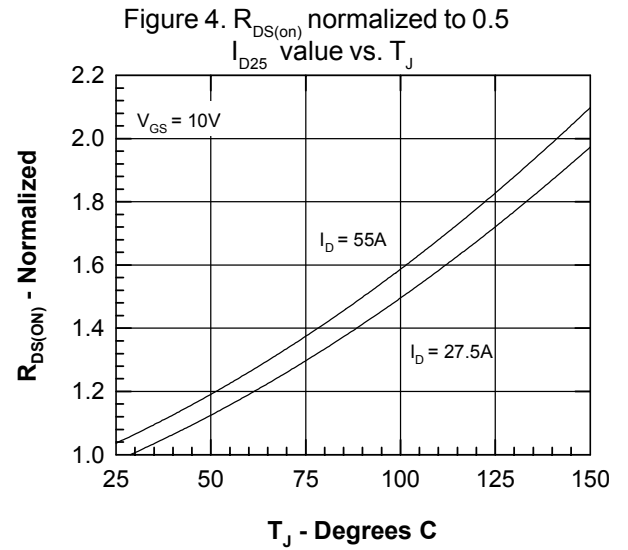
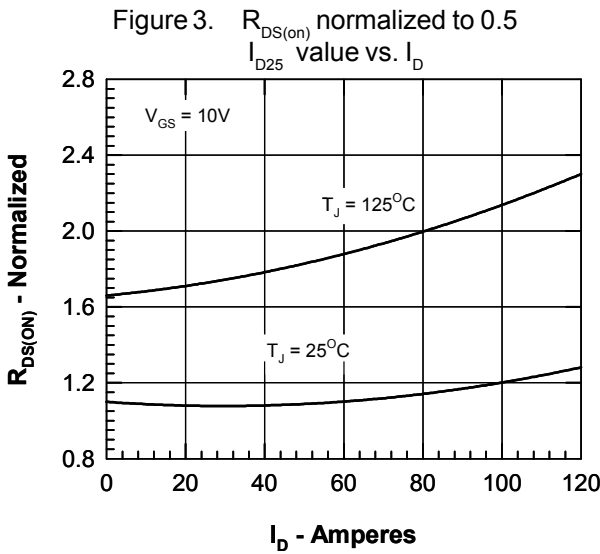
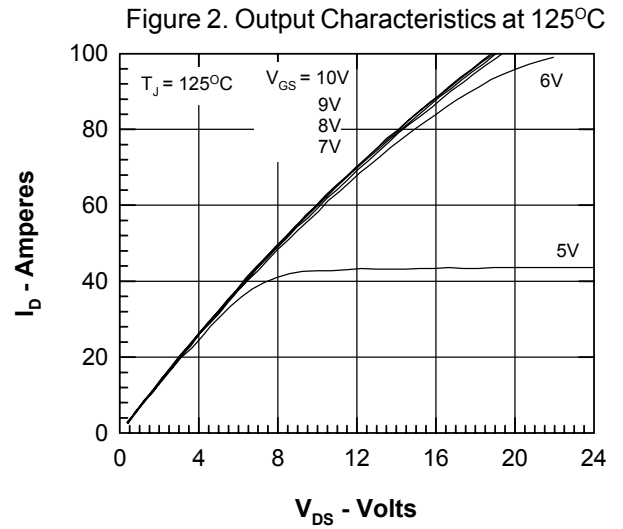
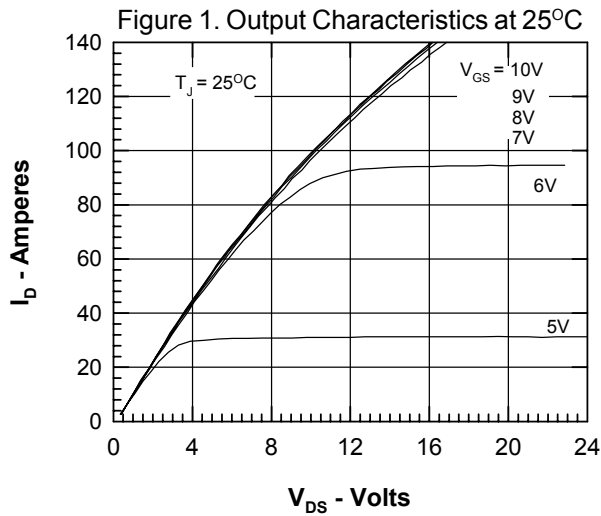


Figure 7. Gate Charge

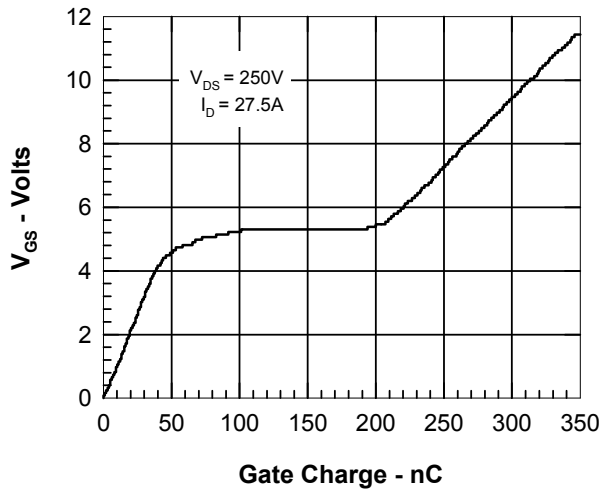


Figure 8. Capacitance Curves

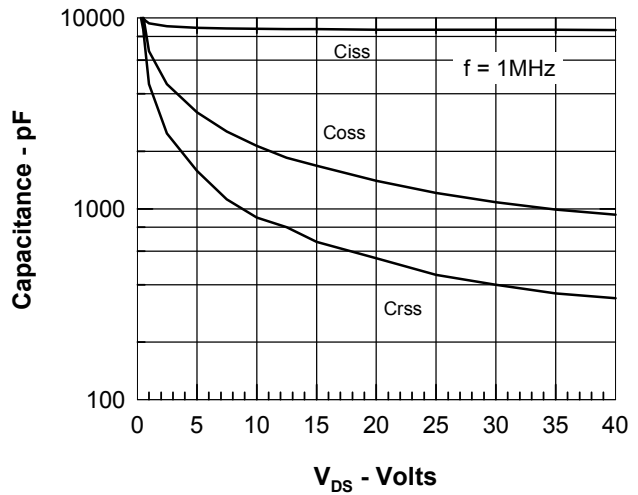


Figure 9. Forward Voltage Drop of the Intrinsic Diode

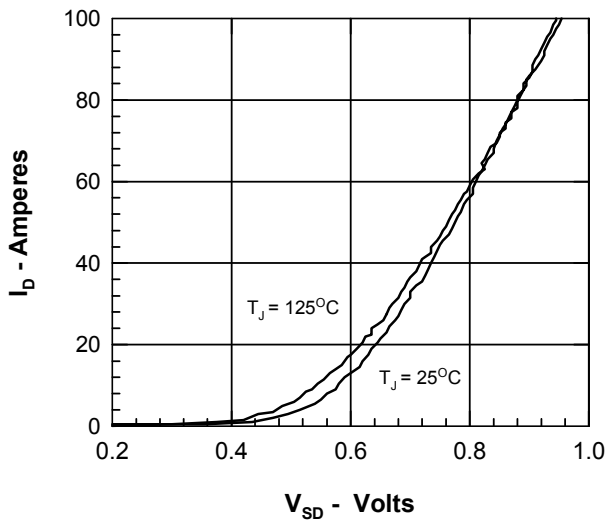
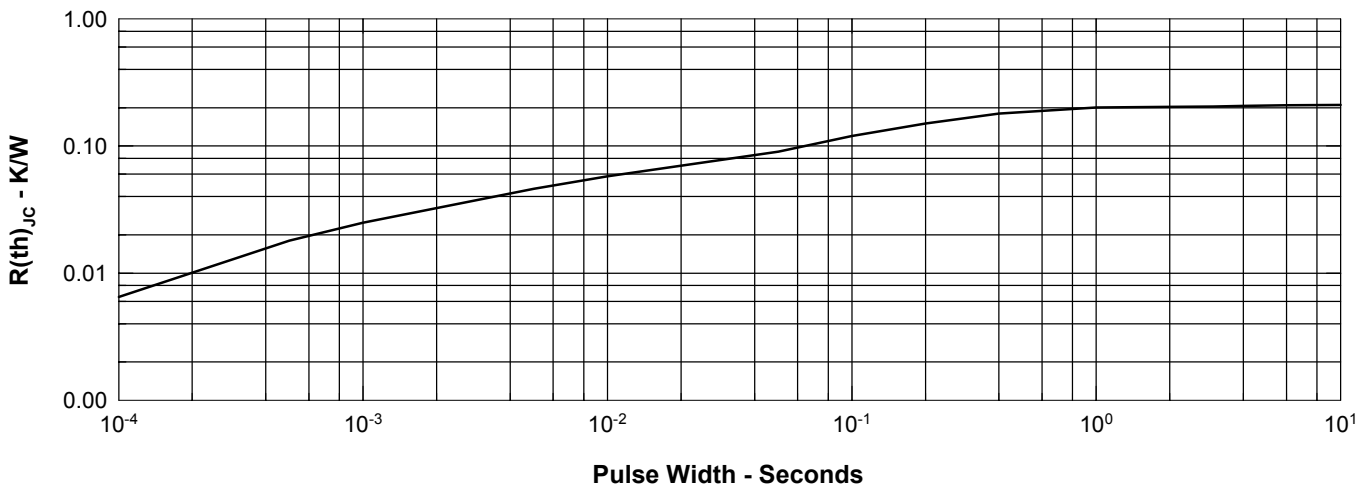


Figure 10. Transient Thermal Resistance



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IXYS MOSFETs and IGBTs are covered by one or more of the following U.S. patents:

4,835,592	4,881,106	5,017,508	5,049,961	5,187,117	5,486,715	6,306,728B1
4,850,072	4,931,844	5,034,796	5,063,307	5,237,481	5,381,025	