

HiPerFET™ Power MOSFET

Single Die MOSFET

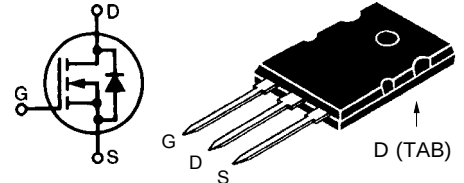
Preliminary data sheet

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

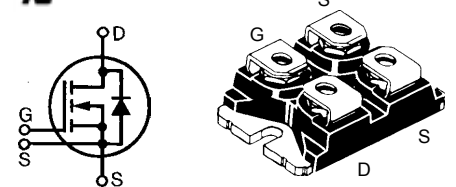
Symbol	Test Conditions	IXFK 55N50	IXFK 50N50	IXFN 55N50	IXFN 50N50
V_{DSS}	$T_J = 25^\circ\text{C}$ to 150°C	500		500	V
V_{DGR}	$T_J = 25^\circ\text{C}$ to 150°C	500		500	V
V_{GS}	Continuous	±20		±20	V
V_{GSM}	Transient	±30		±30	V
I_{D25}	$T_C = 25^\circ\text{C}$	55	50	55	50 A
I_{DM}	$T_C = 25^\circ\text{C}$	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			$^\circ\text{C}$
T_{JM}		150			$^\circ\text{C}$
T_{stg}		-55 ... +150			$^\circ\text{C}$
T_L	1.6 mm (0.063 in) from case for 10 s	300		N/A	$^\circ\text{C}$
V_{ISOL}	50/60 Hz, RMS $t = 1 \text{ min}$ $I_{ISOL} \leq 1 \text{ mA}$ $t = 1 \text{ s}$	N/A		2500 3000	V~ V~
M_d	Mounting torque Terminal connection torque	0.9/6 N/A		1.5/13 Nm/lb.in. 1.5/13 Nm/lb.in.	
Weight		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	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
$V_{GS(th)}$	$V_{DS} = V_{GS}$, $I_D = 8 \text{ mA}$	2.5		4.5 V
I_{GSS}	$V_{GS} = \pm 20 \text{ V}$; $V_{DS} = 0 \text{ V}$			±200 nA
I_{DSS}	$V_{DS} = V_{DSS}$, $V_{GS} = 0 \text{ V}$			25 μA 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}	$V_{GS} = 0\text{ V}, V_{DS} = 25\text{ V}, f = 1\text{ MHz}$		9400	pF
C_{oss}			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

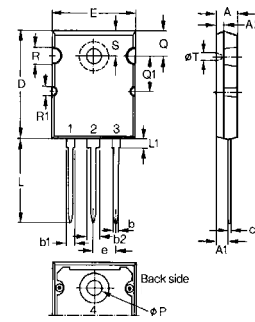
Source-Drain Diode

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

Symbol	Test Conditions	Characteristic Values		
		Min.	Typ.	Max.
I_S	$V_{GS} = 0$	55N50 50N50		55 50 A
I_{SM}	Repetitive; pulse width limited by T_{JM}	55N50 50N50		220 200 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	μC
I_{RM}			10	A

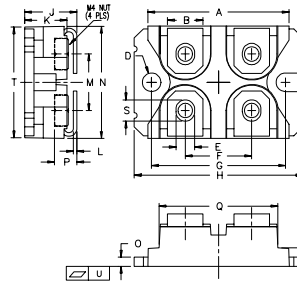
Notes: 1. Pulse test, $t \leq 300\ \mu\text{s}$, duty cycle $d \leq 2\%$

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

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.

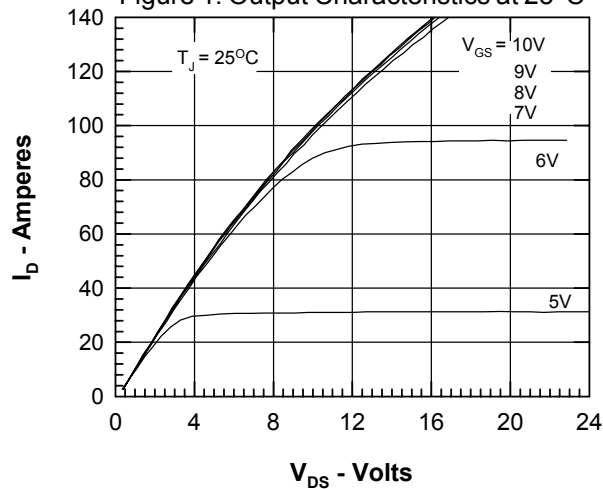
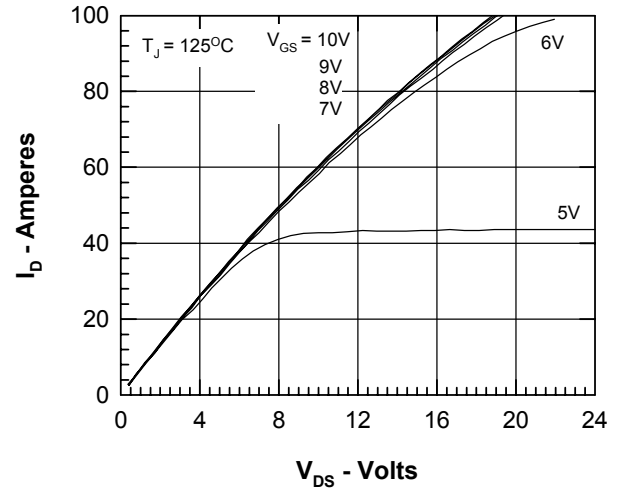
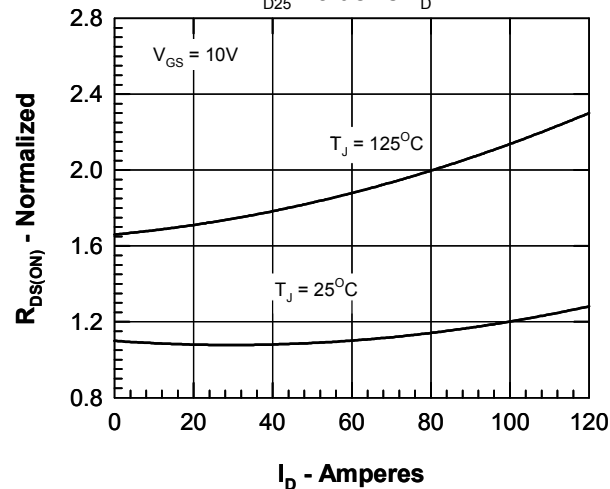
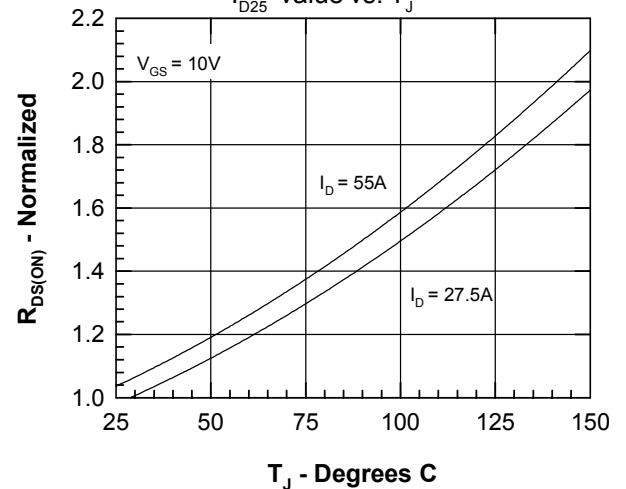
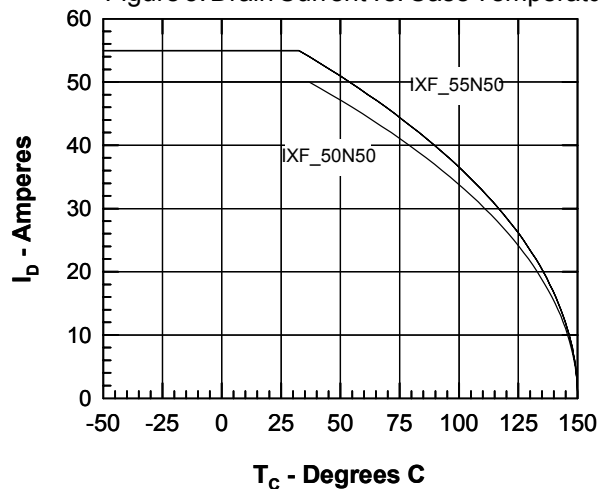
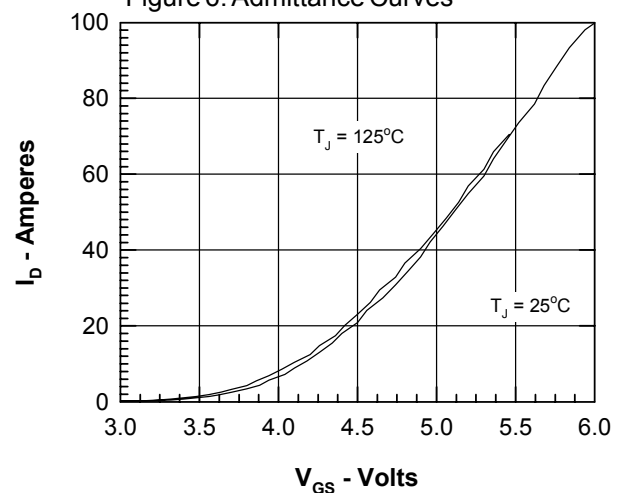
Figure 1. Output Characteristics at 25°C

Figure 2. Output Characteristics at 125°C

Figure 3. $R_{DS(on)}$ normalized to 0.5 value vs. I_D

Figure 4. $R_{DS(on)}$ normalized to 0.5 value vs. T_J

Figure 5. Drain Current vs. Case Temperature

Figure 6. Admittance Curves


Figure 7. Gate Charge

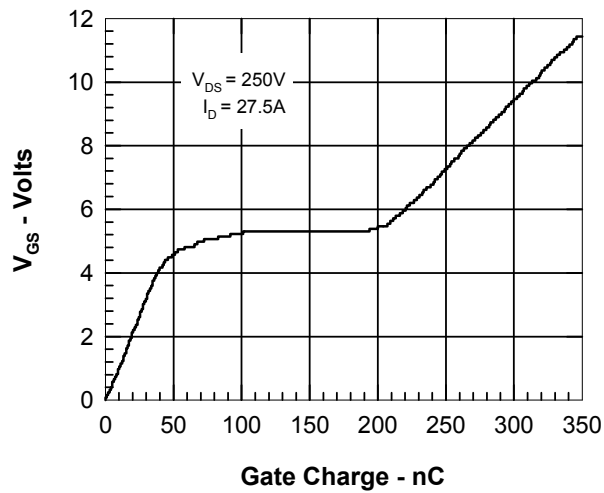


Figure 8. Capacitance Curves

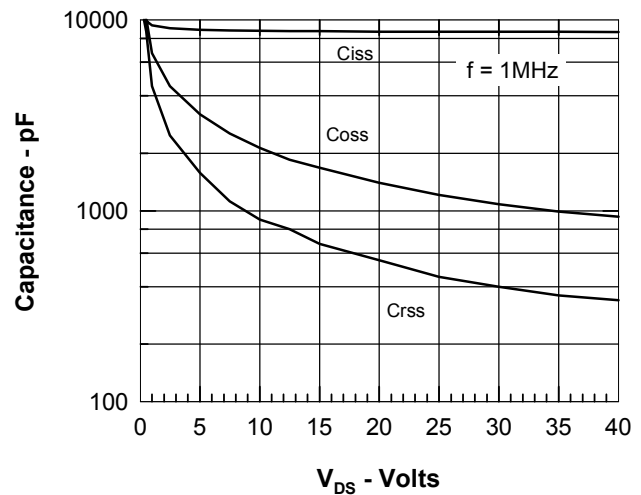


Figure 9. Forward Voltage Drop of the Intrinsic Diode

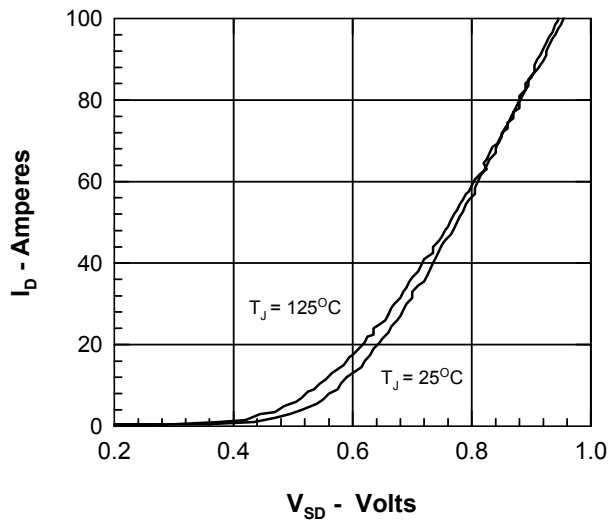
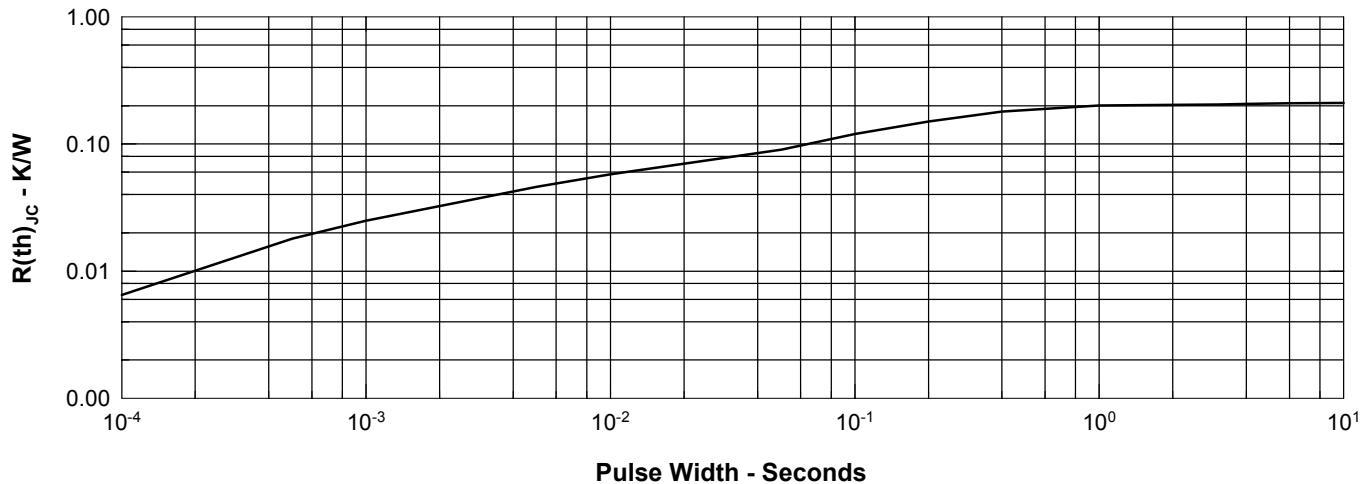


Figure 10. Transient Thermal Resistance



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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	