

# HiPerFET™ Power MOSFET

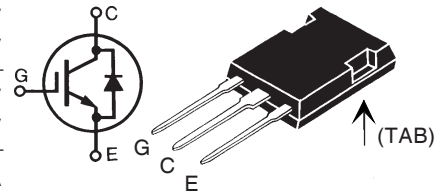
**IXFK 55N50**  
**IXFX 55N50**  
**IXFN 55N50**

**V<sub>DSS</sub> = 500 V**  
**I<sub>D25</sub> = 55 A**  
**R<sub>DS(on)</sub> = 90mΩ**  
**t<sub>rr</sub> ≤ 250 ns**

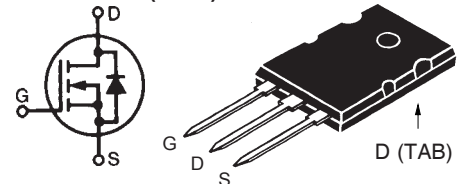
Single Die MOSFET

Symbol	Test Conditions	Maximum Ratings	
V <sub>DSS</sub>	T <sub>J</sub> = 25°C to 150°C	500	V
V <sub>DGR</sub>	T <sub>J</sub> = 25°C to 150°C	500	V
V <sub>GSS</sub>	Continuous	±20	V
V <sub>GSM</sub>	Transient	±30	V
I <sub>D25</sub>	T <sub>C</sub> = 25°C	55	A
I <sub>DM</sub>	T <sub>C</sub> = 25°C, pulse width limited by T <sub>JM</sub>	220	A
I <sub>AR</sub>	T <sub>C</sub> = 25°C	55	A
E <sub>AR</sub>	T <sub>C</sub> = 25°C	60	mJ
dv/dt	I <sub>S</sub> ≤ I <sub>DM</sub> , di/dt ≤ 100 A/μs, V <sub>DD</sub> ≤ V <sub>DSS</sub> T <sub>J</sub> ≤ 150°C, R <sub>G</sub> = 4 Ω	10	V/ns
P <sub>D</sub>	T <sub>C</sub> = 25°C	625	W
T <sub>J</sub>		-55 ... +150	°C
T <sub>JM</sub>		150	°C
T <sub>stg</sub>		-55 ... +150	°C
T <sub>L</sub>	1.6 mm (0.062 in.) from case for 10 s (IXFK, IXFX)	300	°C
M <sub>d</sub>	Mounting torque (IXFK, IXFX) Terminal leads (IXFN)	1.13/10 1.13/10	Nm/lb.in. Nm/lb.in.
V <sub>ISOL</sub>	50/60 Hz, RMS I <sub>ISOL</sub> ≤ 1 mA	(IXFN) t = 1 minute t = 1 s	2500 3000 V~ V~
Weight	PLUS247 TO-264 SOT-227B	5 10 30	g g g

PLUS247(IXFX)

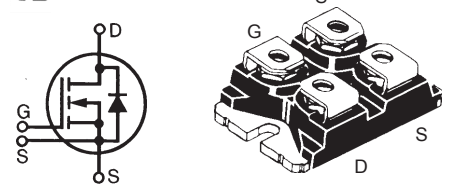


TO-264 AA (IXFK)



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<sub>DS(on)</sub> HDMOS™ process
- Rugged polysilicon gate cell structure
- Unclamped Inductive Switching (UIS) rated
- Low package inductance
- Fast intrinsic Rectifier

### Advantages

- PLUS247 package for clip or spring bar mounting
- Easy to mount
- Space savings
- High power density

Symbol	Test Conditions (T <sub>J</sub> = 25°C, unless otherwise specified)	Characteristic Values		
		Min.	Typ.	Max.
V <sub>DSS</sub>	V <sub>GS</sub> = 0 V, I <sub>D</sub> = 1 mA	500		V
V <sub>GS(th)</sub>	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 8 mA	2.5		4.5 V
I <sub>GSS</sub>	V <sub>GS</sub> = ±20 V <sub>DC</sub> , V <sub>DS</sub> = 0			±200 nA
I <sub>DSS</sub>	V <sub>DS</sub> = V <sub>DSS</sub> V <sub>GS</sub> = 0 V T <sub>J</sub> = 125°C			25 μA 2 mA
R <sub>DS(on)</sub>	V <sub>GS</sub> = 10 V, I <sub>D</sub> = 0.5 I <sub>D25</sub> Pulse test, t ≤ 300 μs, duty cycle d ≤ 2 %			90 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
$R_{thJC}$	IXFK, IXFX		0.20	K/W
$R_{thCK}$			0.15	K/W
$R_{thCK}$			0.05	K/W

### Source-Drain Diode

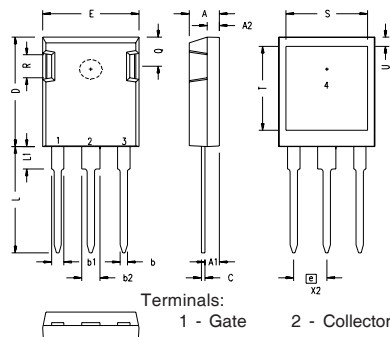
( $T_J = 25^\circ\text{C}$ , unless otherwise specified)

Symbol	Test Conditions	Characteristic Values		
		Min.	Typ.	Max.
$I_s$	$V_{GS} = 0$			55 A
$I_{SM}$	Repetitive; pulse width limited by $T_{JM}$			220 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  $d \leq 2\%$

### PLUS247 Outline

SYM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.190	.205	4.83	5.21
A1	.090	.100	2.29	2.54
A2	.075	.085	1.91	2.16
b	.045	.055	1.14	1.40
b1	.075	.084	1.91	2.13
b2	.115	.123	2.92	3.12
C	.024	.031	0.61	0.80
D	.819	.840	20.80	21.34
E	.620	.635	15.75	16.13
e	.215 BSC		5.45 BSC	
L	.780	.800	19.81	20.32
L1	.150	.170	3.81	4.32
Q	.220	.244	5.59	6.20
R	.170	.190	4.32	4.83
S	.520	.540	13.21	13.72
T	.620	.640	15.75	16.26
U	.065	.080	1.65	2.03

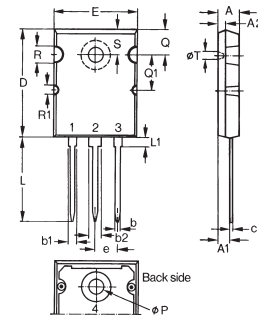


IXYS reserves the right to change limits, test conditions, and dimensions.

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

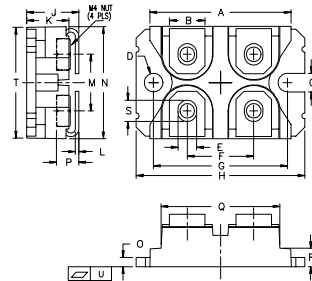
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4,850,072	5,017,508	5,063,307	5,381,025	6,259,123B1	6,534,343
4,881,106	5,034,796	5,187,117	5,486,715	6,306,728 B1	6,583,505

### 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-227B) Outline



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

6,683,344  
6,710,405B2  
6,710,463

6,727,585  
6,759,692

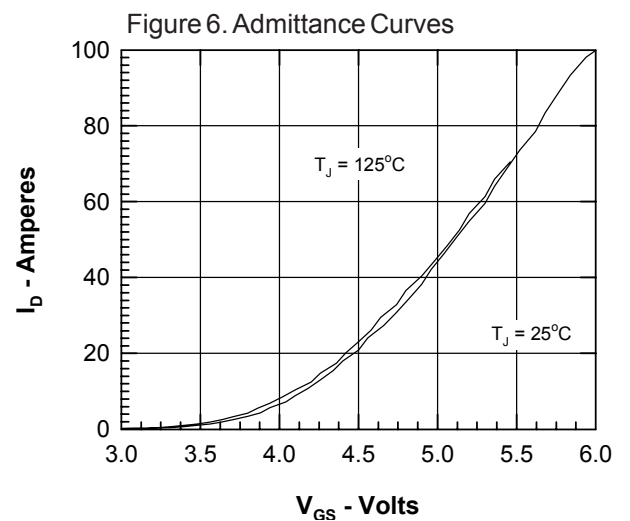
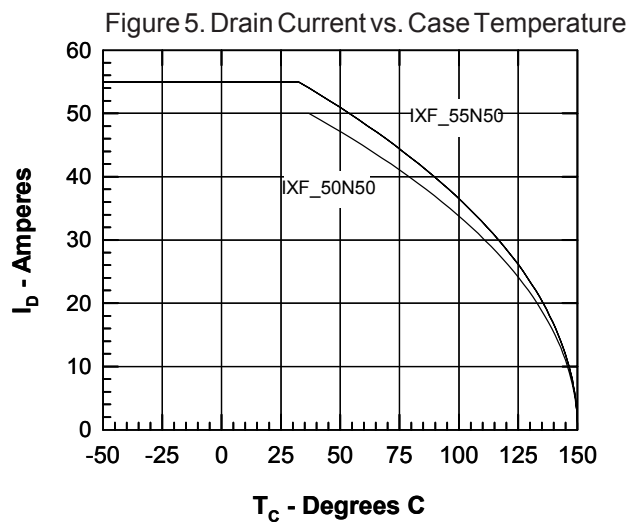
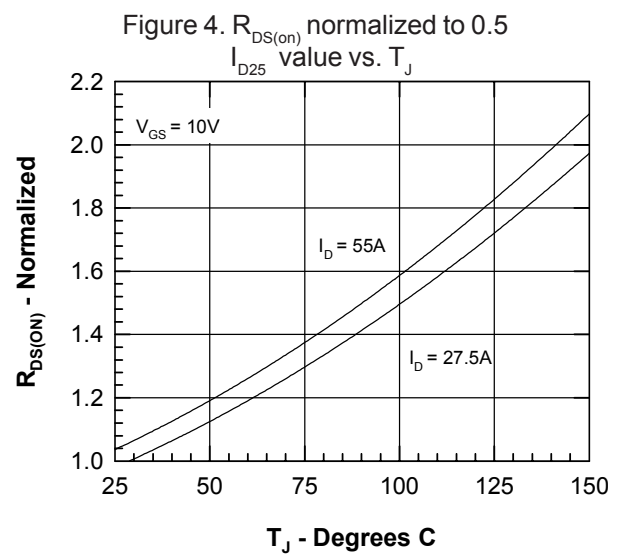
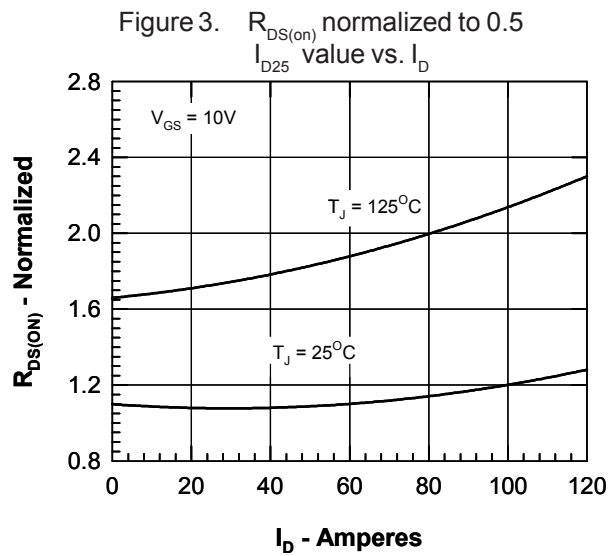
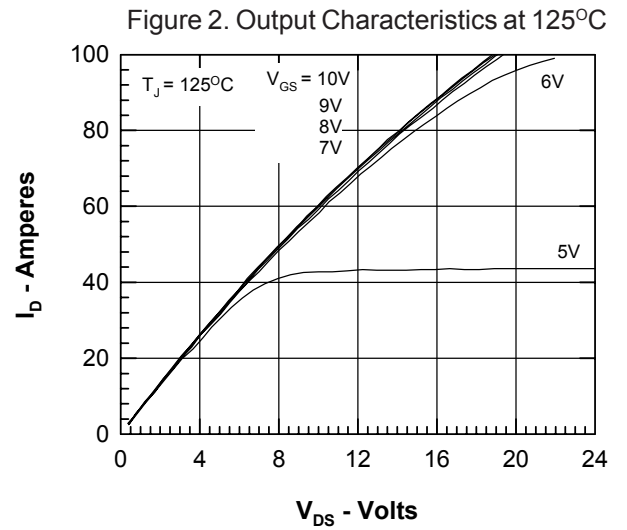
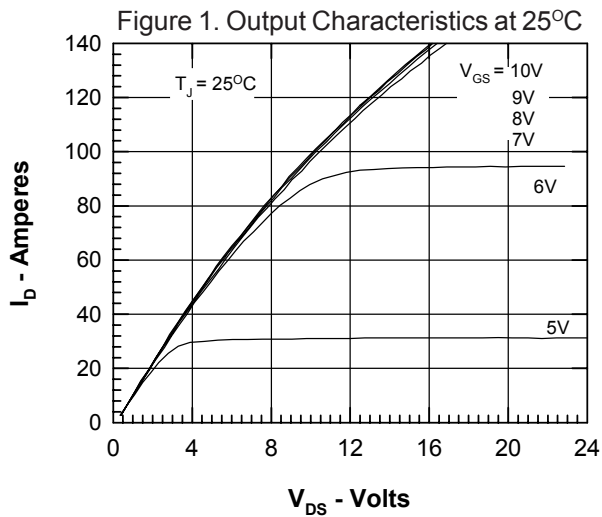


Figure 7. Gate Charge

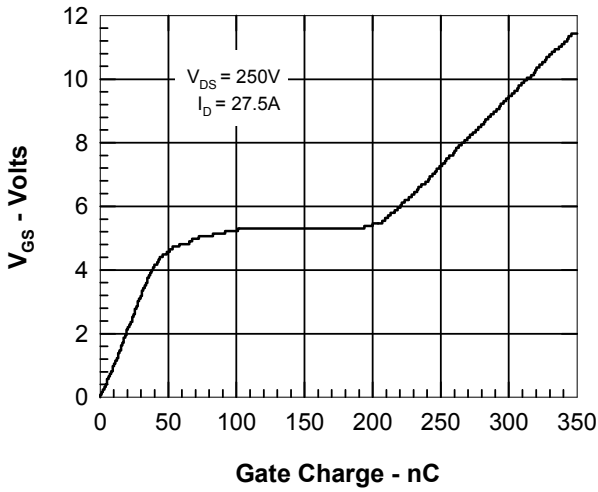


Figure 8. Capacitance Curves

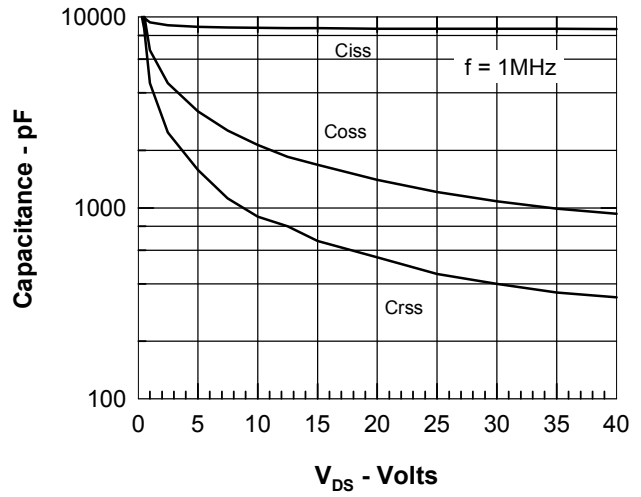


Figure 9. Forward Voltage Drop of the Intrinsic Diode

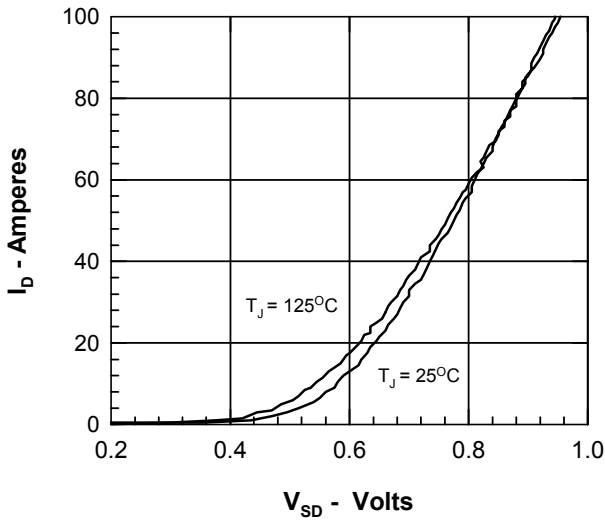
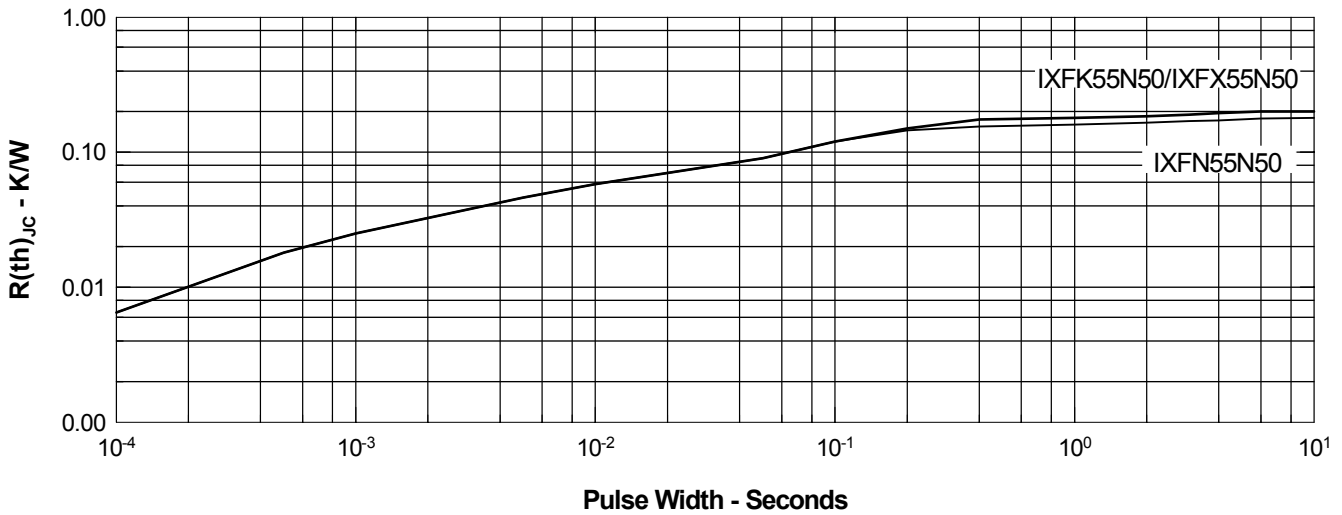


Figure 10. Transient Thermal Resistance



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