IXYS

HiPerFET™ Power MOSFET

IXFK 55N50
IXFX 55N50
IXFN 55N50

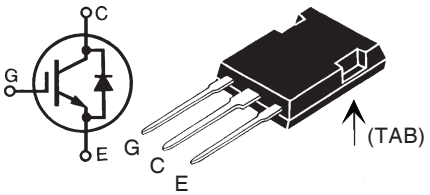
V_{DSS}	=	500 V
I_{D25}	=	55 A
$R_{DS(on)}$	=	90mΩ
t_{rr}	≤	250 ns

Single Die MOSFET

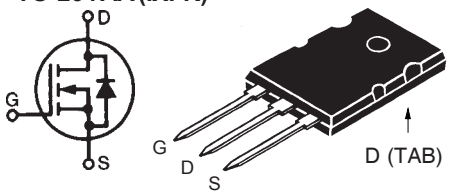
Symbol	Test Conditions	Maximum Ratings	
V_{DSS}	T_J = 25°C to 150°C	500	V
V_{DGR}	T_J = 25°C to 150°C	500	V
V_{GSS}	Continuous	±20	V
V_{GSM}	Transient	±30	V
I_{D25}	T_C = 25°C	55	A
I_{DM}	T_C = 25°C, pulse width limited by T_{JM}	220	A
I_{AR}	T_C = 25°C	55	A
E_{AR}	T_C = 25°C	60	mJ
dv/dt	$I_S \le I_{DM}$, di/dt ≤ 100 A/µs, $V_{DD} \le V_{DSS}$ $T_J \le$ 150°C, R_G = 4 Ω	10	V/ns
P_D	T_C = 25°C	625	W
T_J		-55 ... +150	°C
T_{JM}		150	°C
T_{stg}		-55 ... +150	°C
T_L	1.6 mm (0.062 in.) from case for 10 s (IXFK, IXFX)	300	°C
M_d	Mounting torque (IXFK, IXFX) Terminal leads (IXFN)	1.13/10 1.13/10	Nm/lb.in. Nm/lb.in.
V_{ISOL}	50/60 Hz, RMS (IXFN) t = 1minute $I_{ISOL} \le$ 1 mA t = 1 s	2500 3000	V~ V~
Weight	PLUS247 TO-264 SOT-227B	5 10 30	g g g

Symbol	Test Conditions (T_J = 25°C, unless otherwise specified)	Characteristic Values Min.	Typ.	Max.	
V_{DSS}	V_{GS} = 0 V, I_D = 1 mA	500			V
$V_{GS(th)}$	$V_{DS} = V_{GS}$, I_D = 8 mA	2.5		4.5	V
I_{GSS}	V_{GS} = ±20 V_{DC}, V_{DS} = 0			±200	nA
I_{DSS}	$V_{DS} = V_{DSS}$ V_{GS} = 0 V T_J = 125°C			25 2	µA mA
$R_{DS(on)}$	V_{GS} = 10 V, I_D = 0.5 I_{D25} Pulse test, t ≤ 300 µs, duty cycle d ≤ 2 %			90	mΩ

PLUS247(IXFX)

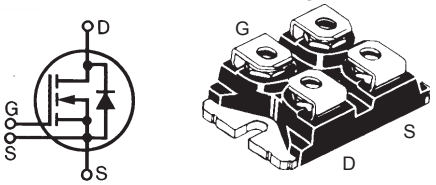


TO-264 AA (IXFK)



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 $R_{DS(on)}$ 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

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Symbol	Test Conditions (T_J = 25°C, unless otherwise specified)	Characteristic Values Min.	Typ.	Max.	
g_{fs}	V_{DS} = 10 V; I_D = 0.5 • I_{D25} Note 1		45		S
C_{iss}			9400		pF
C_{oss}	V_{GS} = 0 V, V_{DS} = 25 V, f = 1 MHz		1280		pF
C_{rss}			460		pF
$t_{d(on)}$			45		ns
t_r	V_{GS} = 10 V, V_{DS} = 0.5 • V_{DSS}, I_D = 0.5 • I_{D25}		60		ns
$t_{d(off)}$	R_G = 1 Ω (External),		120		ns
t_f			45		ns
$Q_{g(on)}$			330		nC
Q_{gs}	V_{GS} = 10 V, V_{DS} = 0.5 • V_{DSS}, I_D = 0.5 • I_{D25}		55		nC
Q_{gd}			155		nC
R_{thJC}				0.20	K/W
R_{thCK}	IXFK, IXFX		0.15		K/W
R_{thCK}			0.05		K/W

Source-Drain Diode

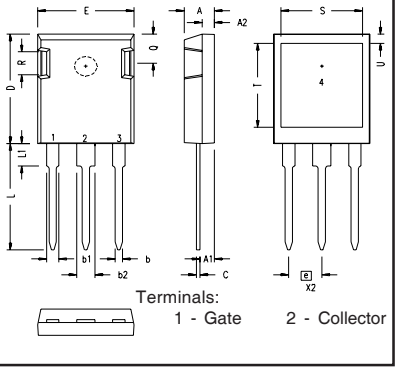
(T_J = 25°C, unless otherwise specified)

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 A, V_{GS} = 0 V Note 1			1.5	V
t_{rr}				250	ns
Q_{RM}	I_F = 25 A, -di/dt = 100 A/µs, V_R = 100 V		1.0		µC
I_{RM}			10		A

Notes: 1. Pulse test, t ≤ 300 µs, duty cycle d ≤ 2 %

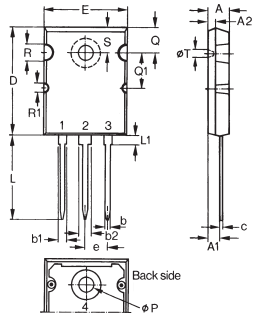
PLUS247 Outline

SYM	INCHES MIN	MAX	MILLIMETERS 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



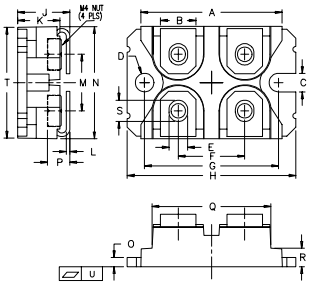
Terminals: 1 - Gate 2 - Collector

TO-264 AA Outline



Dim.	Millimeter Min.	Max.	Inches 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 Min.	Max.	Inches 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.

IXYS MOSFETs and IGBTs are covered by one or more of the following U.S. patents: 4,835,592 4,931,844 5,049,961 5,237,481 6,162,665 6,404,065 B1 6,683,344 6,727,585 4,850,072 5,017,508 5,063,307 5,381,025 6,259,123 B1 6,534,343 6,710,405 B2 6,759,692 4,881,106 5,034,796 5,187,117 5,486,715 6,306,728 B1 6,583,505 6,710,463

Figure 1. Output Characteristics at 25°C

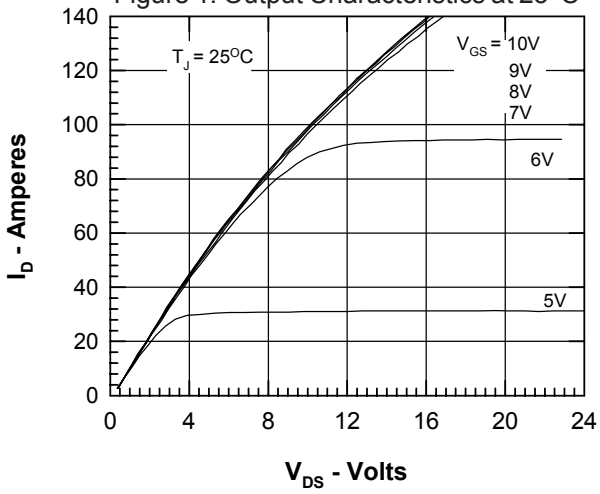


Figure 2. Output Characteristics at 125°C

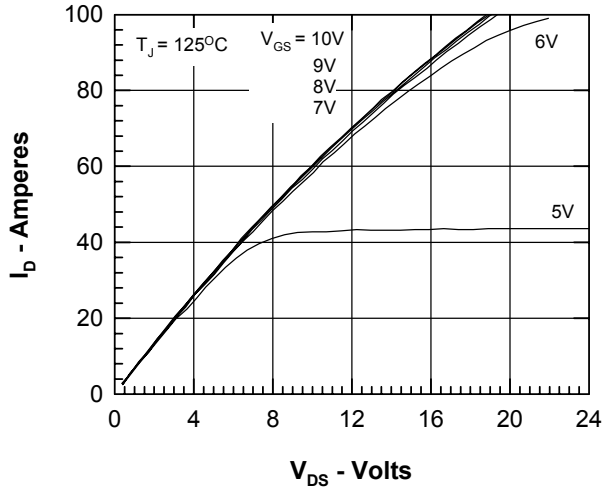


Figure 3. $R_{DS(on)}$ normalized to 0.5 I_{D25} value vs. I_D

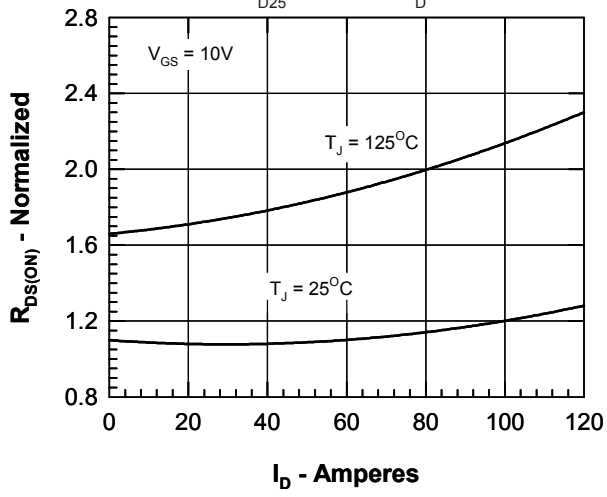


Figure 4. $R_{DS(on)}$ normalized to 0.5 I_{D25} value vs. T_J

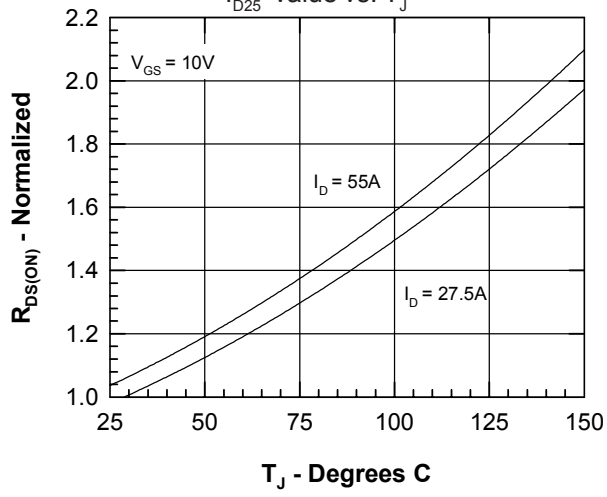


Figure 5. Drain Current vs. Case Temperature

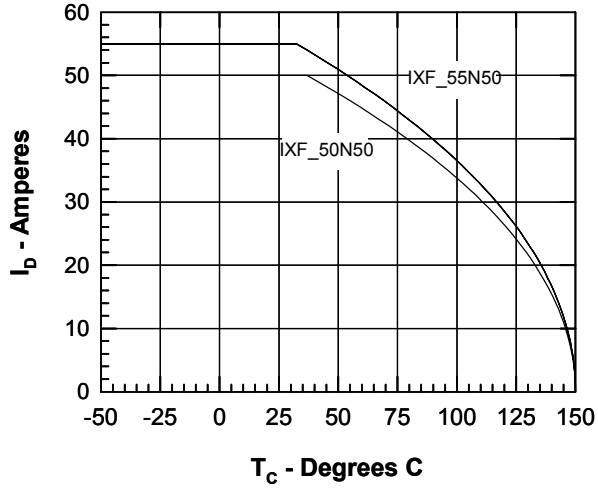


Figure 6. Admittance Curves

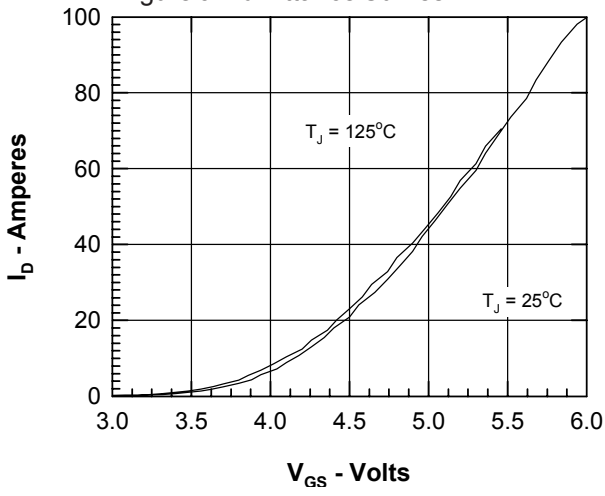


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Figure 7. Gate Charge

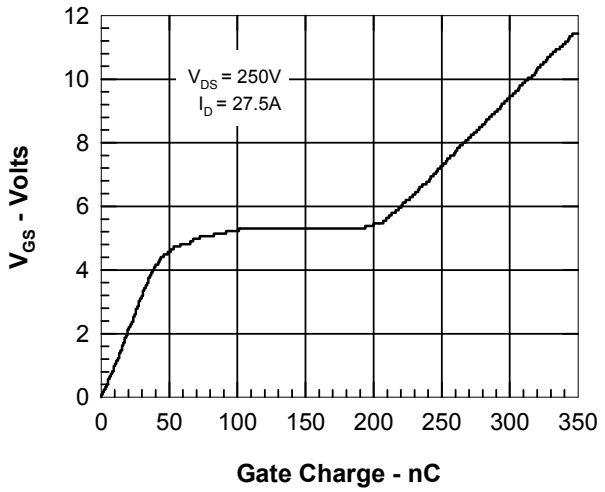


Figure 8. Capacitance Curves

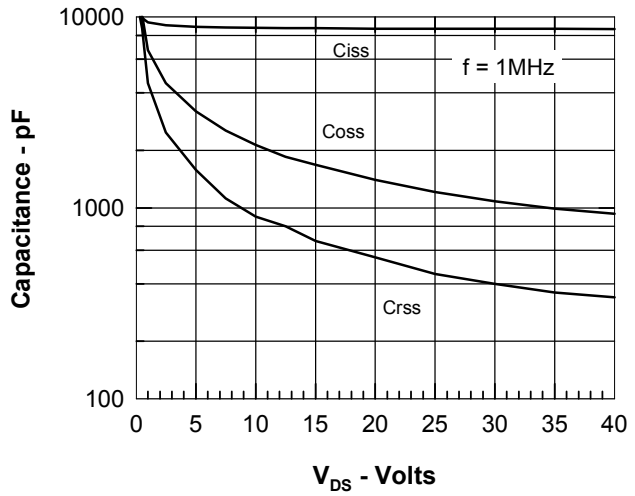


Figure 9. Forward Voltage Drop of the Intrinsic Diode

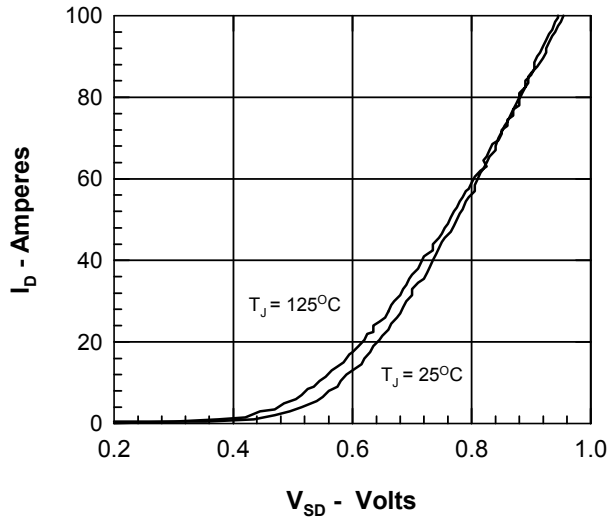
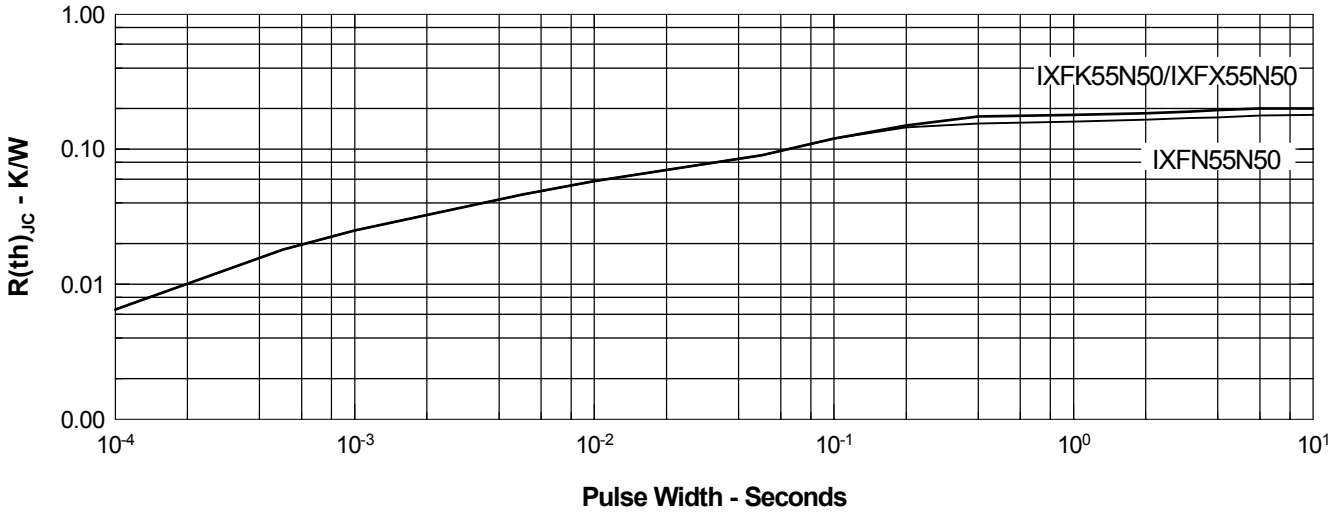


Figure 10. Transient Thermal Resistance



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