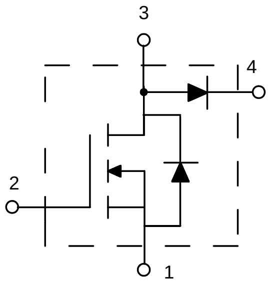
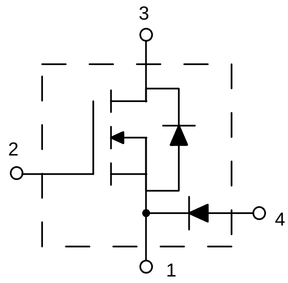
HiPerFET™ Power MOSFETs

	V_{DSS}	$I_{D\ (cont)}$	$R_{DS(on)}$	t_{rr}
IXFN44N50U2 IXFN44N50U3	500 V	44 A	0.12 Ω	35 ns
IXFN48N50U2 IXFN48N50U3	500 V	48 A	0.10 Ω	35 ns

Buck & Boost Configurations for PFC & Motor Control Circuits

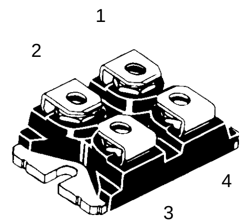
Preliminary data





	Symbol	Test Conditions		Maximum Ratings	
HiPerFET MOSFET	V_{DSS}	T_J = 25°C to 150°C		500	V
	V_{DGR}	T_J = 25°C to 150°C; R_{GS} = 1 MΩ		500	V
	V_{GS} V_{GSM}	Continuous Transient		±20 ±30	V V
	I_{D25}	T_C = 25°C	44N50 48N50	44 48	A A
	I_{DM}	T_C = 25°C, pulse width limited by max. T_{JM}	44N50 48N50	176 192	A A
	I_{AR}	T_C = 25°C		24	A
	E_{AR}	Repetitive		30	mJ
	dv/dt	$I_S \leq I_{DM}$, -di/dt ≤ 100 A/µs, $V_{DD} \leq V_{DSS}$, $T_J \leq$ 150°C, R_G = 2 Ω		5	V/ns
	P_D	T_C = 25°C		520	W
DIODE	V_{RRM}			600	V
	I_{FAVM}	T_C = 70°C; rectangular, d = 0.5		60	A
	I_{FRM}	tp <10 µs; pulse width limited by T_J		800	A
	P_D	T_C = 25°C		180	W
CASE	T_J T_{JM} T_{stg}			-40 ... +150 150 -40 ... +150	°C °C °C
	V_{ISOL}	50/60 Hz, RMS $I_{ISOL} \leq$ 1 mA	t = 1 min t = 1 s	2500 3000	V~ V~
	M_d	Mounting torque Terminal connection torque (M4)		1.5/13 1.5/13	Nm/lb.in. Nm/lb.in.
	Weight			30	g

miniBLOC, SOT-227 B



Features
- Popular Buck & Boost circuit topologies
- International standard package miniBLOC SOT-227B
- Aluminium nitride isolation
  - high power dissipation
- Isolation voltage 3000 V~
- Low $R_{DS\ (on)}$ HDMOS™ process
- Rugged polysilicon gate cell structure
- Low drain-to-case capacitance (<60 pF)
  - reduced RFI
- Ultra-fast FRED diode with soft reverse recovery

Applications
- Power factor controls and buck regulators
- DC servo and robotic drives
- DC choppers
- Switch reluctance motor controls

Advantages
- Easy to mount with 2 screws
- Space savings
- Tightly coupled FRED

IXYS reserves the right to change limits, test conditions, and dimensions. 96535B (7/00)

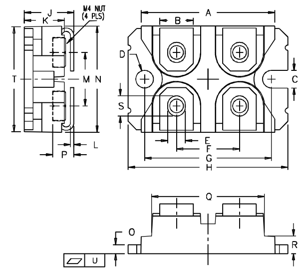
Symbol	Test Conditions		min.	typ.	max.	
		Characteristic Values (T_J = 25°C, unless otherwise specified)				
V_{DSS}	V_{GS} = 0 V, I_D = 1 mA		500			V
$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 8 mA		2		4	V
I_{GSS}	V_{GS} = ±20 V_{DC}, V_{DS} = 0				±200	nA
I_{DSS}	V_{DS} = 0.8 V_{DSS}	T_J = 25°C			400	µA
	V_{GS} = 0 V	T_J = 125°C			2	mA
$R_{DS(on)}$	V_{GS} = 10 V, I_D = 0.5 I_{D25}	44N50			0.12	Ω
		48N50			0.10	Ω
	Pulse test, t ≤ 300 µs, duty cycle δ ≤ 2 %					

Symbol	Test Conditions	min.	typ.	max.	
	Characteristic Values (T_J = 25°C, unless otherwise specified)				
g_{fs}	V_{DS} = 10 V, I_D = 0.5 I_{D25}, pulse test	22	42		S
C_{iss}	V_{GS} = 0 V, V_{DS} = 25 V, f = 1 MHz		8400		pF
C_{oss}			900		pF
C_{rss}			280		pF
$t_{d(on)}$	V_{GS} = 10 V, V_{DS} = 0.5 V_{DSS}, I_D = 0.5 I_{D25}		30		ns
t_r	R_G = 1 Ω (External)		60		ns
$t_{d(off)}$			100		ns
t_f			30		ns
$Q_{g(on)}$	V_{GS} = 10 V, V_{DS} = 0.5 V_{DSS}, I_D = 0.5 I_{D25}		270		nC
Q_{gs}			60		nC
Q_{gd}			135		nC
R_{thJC}			0.24		K/W
R_{thCK}			0.05		K/W

Ultra-fast Diode

Symbol	Test Conditions	min.	typ.	max.	
	Characteristic Values (T_J = 25°C, unless otherwise specified)				
I_R	T_J= 25°C; V_R= V_{RRM}			200	µA
	V_R= 0.8V_{RRM}			100	µA
	T_J= 125°C; V_R= 0.8V_{RRM}			14	mA
V_F	I_F = 70A, V_{GS} = 0 V, T_J= 150°C			1.5	V
	Pulse test, t ≤ 300 µs, duty cycle δ ≤ 2 % T_J= 25°C			1.8	V
t_{rr}	I_I = 1A, di/dt = -200 A/µs, V_R = 30 V, T_J = 25°C		35	50	ns
I_{RM}	I_F= 60A, di/dt = -480 A/µs, V_R = 350 V, T_J = 100°C		19	21	A
R_{thJC}				0.7	K/W
R_{thJK}			0.05		K/W

miniBLOC, SOT-227 B



M4 screws (4x) supplied

Dim.	Millimeter Min.	Millimeter Max.	Inches Min.	Inches 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 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
4,850,072 4,931,844 5,034,796 5,063,307 5,237,481 5,381,025

Fig.1 Output Characteristics

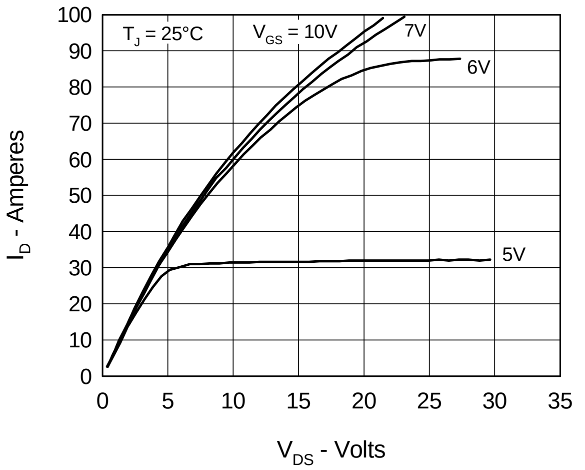


Fig.2 Input Admittance

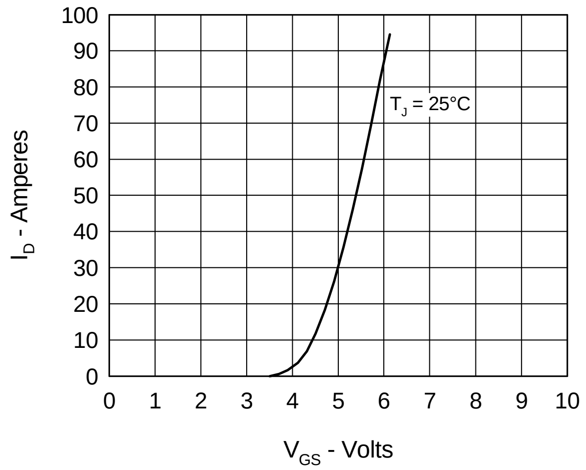


Fig.3 $R_{DS(on)}$ vs. Drain Current

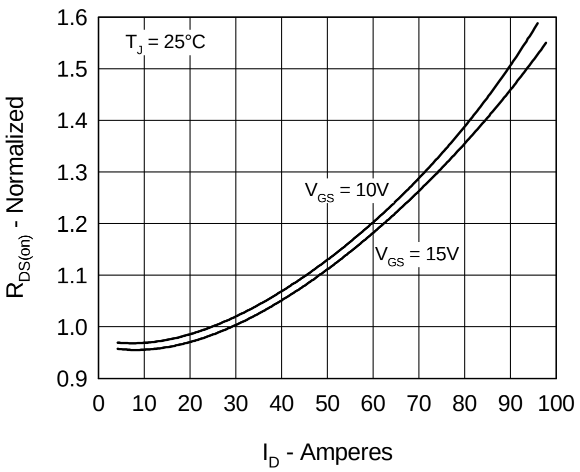


Fig.4 Temperature Dependence of Drain to Source Resistance

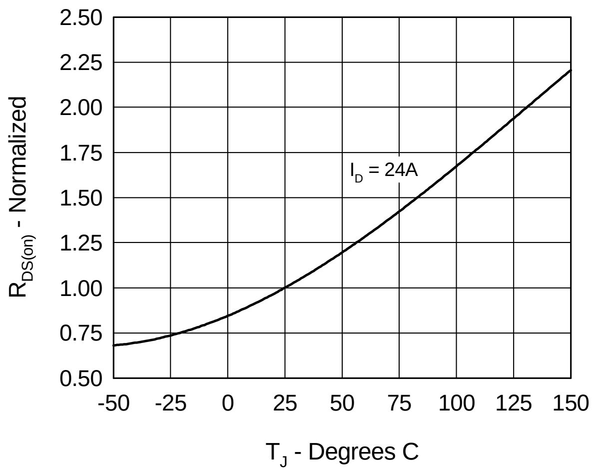


Fig.5 Drain Current vs. Case Temperature

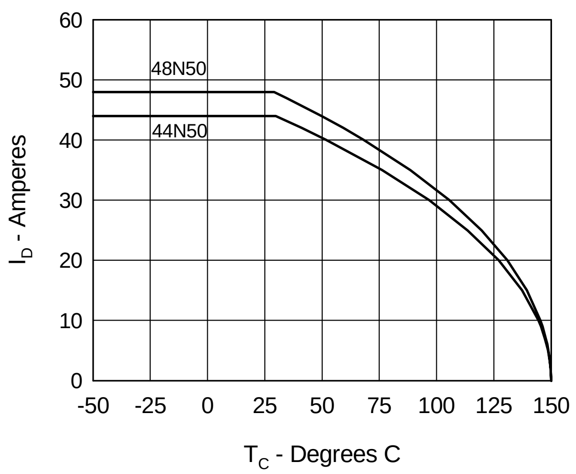


Fig.6 Temperature Dependence of Breakdown and Threshold Voltage

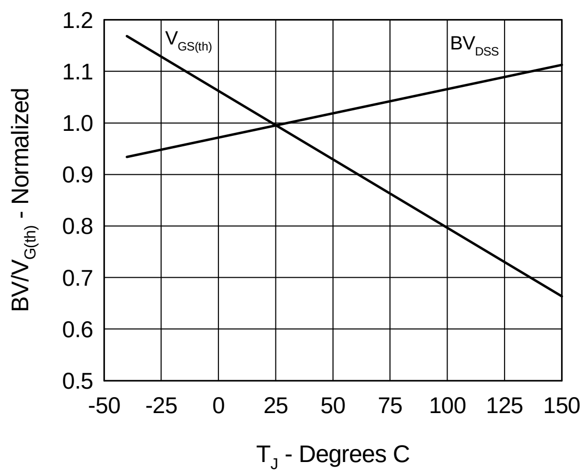


Fig.7 Gate Charge Characteristic Curve

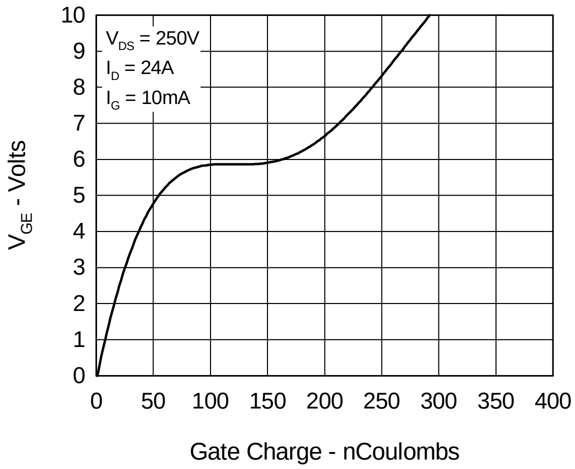


Fig.8 Capacitance Curves

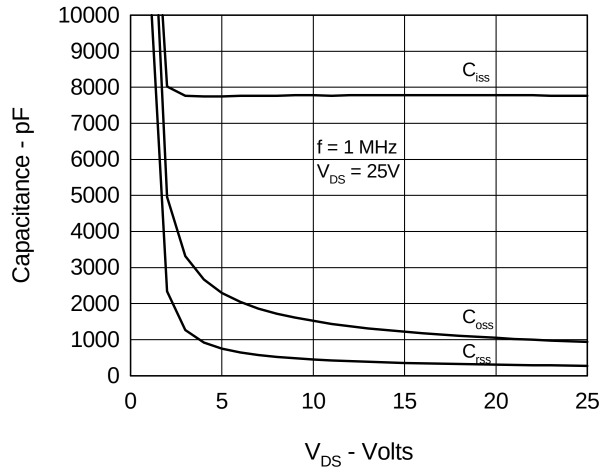


Fig.9 Source Current vs. Source to Drain Voltage

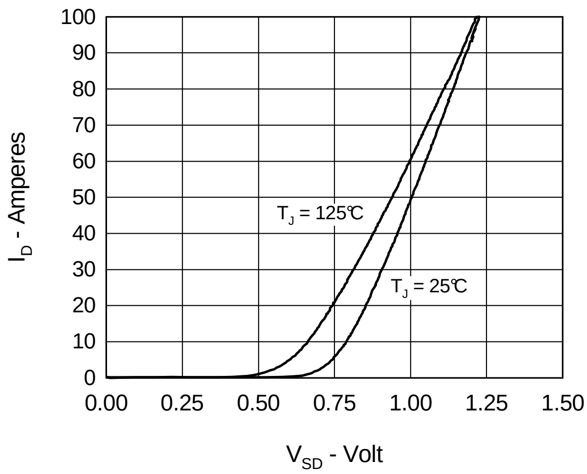
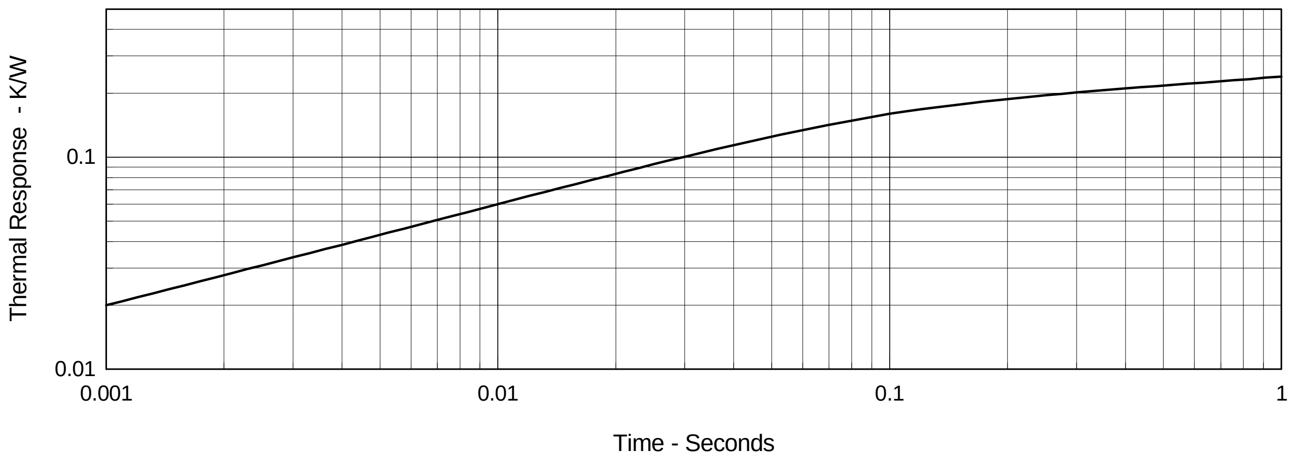


Fig.10 Transient Thermal Impedance



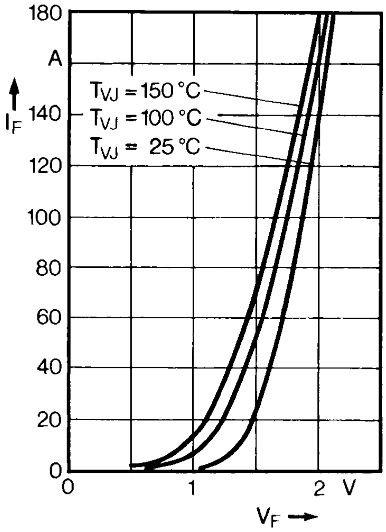


Fig. 11. Forward voltage drop.

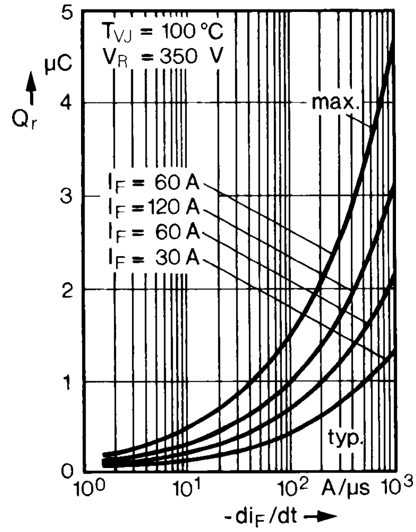


Fig. 12. Recovery charge versus $-di_F/dt$.

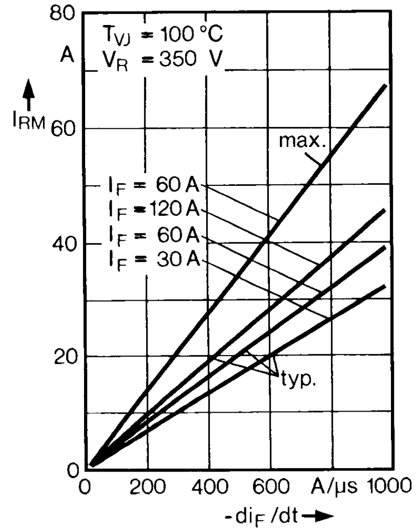


Fig. 13. Peak reverse current vs. $-di_F/dt$.

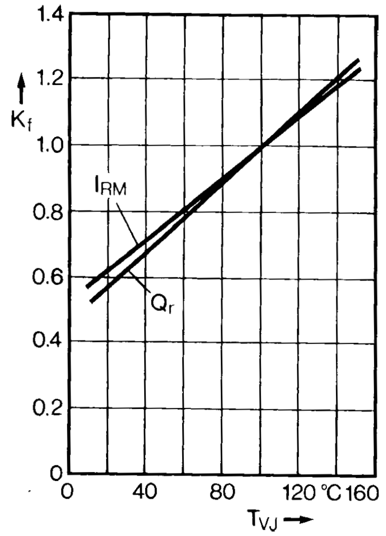


Fig. 14. Dynamic parameters versus junction temperature.

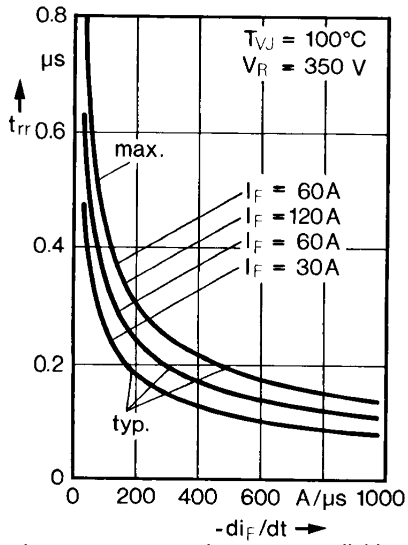


Fig. 15. Recovery time versus $-di_F/dt$.

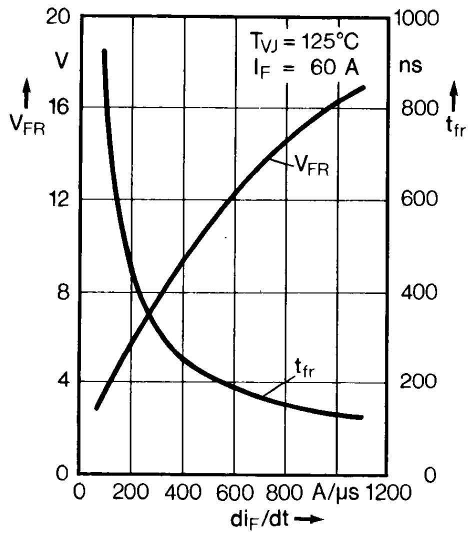


Fig. 16. Peak forward voltage and forward recovery time vs. di_F/dt.

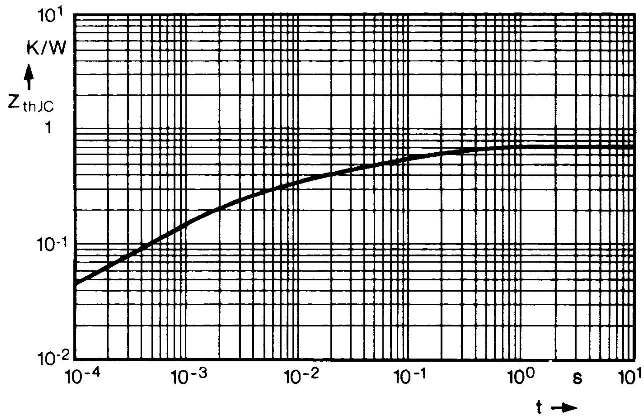


Fig. 17. Transient thermal impedance junction to case.