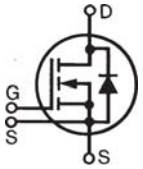
IXYS

HiPerFET™ Power MOSFET Single MOSFET Die

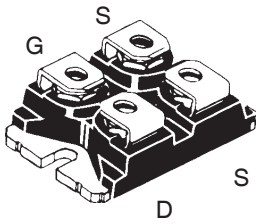
IXFN39N90

V_{DSS} = 900V
I_{D25} = 39A
$R_{DS(on)}$ ≤ 220mΩ
t_{rr} ≤ 250ns

N-Channel Enhancement Mode
Avalanche Rated



miniBLOC, SOT-227
E153432



G = Gate D = Drain
S = Source

Either Source Terminal at miniBLOC can be used as Main or Kelvin Source.

Symbol	Test Conditions		Maximum Ratings	
V_{DSS}	T_J = 25°C to 150°C		900	V
V_{DGR}	T_J = 25°C to 150°C, R_{GS} = 1MΩ		900	V
V_{GSS}	Continuous		±20	V
V_{GSM}	Transient		±30	V
I_{D25}	T_C = 25°C		39	A
I_{DM}	T_C = 25°C, Pulse Width Limited by T_{JM}		154	A
I_A	T_C = 25°C		39	A
E_{AS}	T_C = 25°C		4	J
dv/dt	$I_S \le I_{DM}$, $V_{DD} \le V_{DSS}$, $T_J \le 150°C$		5	V/ns
P_D	T_C = 25°C		694	W
T_J			-55 ... +150	°C
T_{JM}			150	°C
T_{stg}			-55 ... +150	°C
V_{ISOL}	50/60 Hz, RMS	t = 1 minute	2500	V~
	$I_{ISOL} \le$ 1mA	t = 1 second	3000	V~
M_d	Mounting Torque		1.5/13	Nm/lb.in.
	Terminal Connection Torque		1.3/11.5	Nm/lb.in.
Weight			30	g

Symbol	Test Conditions (T_J = 25°C, Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max.	
V_{DSS}	V_{GS} = 0V, I_D = 3mA	900			V
BV_{DSS}	**Temperature Dependence**		3.68		V/K
$V_{GS(th)}$	$V_{DS} = V_{GS}$, I_D = 8mA	3.0		5.5	V
$V_{GS(th)}$	**Temperature Dependence**		-0.009		V/K
I_{GSS}	V_{GS} = ±20V, V_{DS} = 0V			±200	nA
I_{DSS}	$V_{DS} = V_{DSS}$, V_{GS} = 0V			100	μA
	T_J = 125°C			2	mA
$R_{DS(on)}$	V_{GS} = 10V, $I_D = 0.5 \bullet I_{D25}$, Note 1			220	mΩ

Features

- International Standard Package
- miniBLOC, with Aluminium Nitride Isolation
- High Current Handling Capability
- Fast Intrinsic Diode
- Avalanche Rated
- Low Package Inductance

Advantages

- Easy to Mount
- Space Savings
- High Power Density

Applications

- DC-DC Converters
- Battery Chargers
- Switch-Mode and Resonant-Mode Power Supplies
- DC Choppers
- Temperture and Lighting Controls

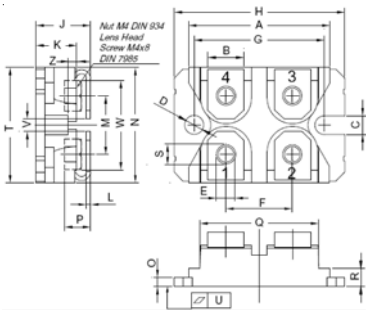
Symbol	Test Conditions (T_J = 25°C, Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max.	
g_{fs}	V_{DS} = 15V, I_D = 0.5 • I_{D25}, Note 1	30	45		S
C_{iss}	V_{GS} = 0V, V_{DS} = 25V, f = 1MHz		9200		pF
C_{oss}			1360		pF
C_{rss}			380		pF
$t_{d(on)}$	**Resistive Switching Times**		45		ns
t_r	V_{GS} = 10V, V_{DS} = 0.5 • V_{DSS}, I_D = 0 .5 • I_{D25}		68		ns
$t_{d(off)}$	R_G = 1Ω (External)		125		ns
t_f			30		ns
$Q_{g(on)}$	V_{GS} = 10V, V_{DS} = 0.5 • V_{DSS}, I_D = 0.5 • I_{D25}		390		nC
Q_{gs}			65		nC
Q_{gd}			190		nC
R_{thJC}				0.18	°C/W
R_{thCS}			0.05		°C/W

Source-Drain Diode

Symbol	Test Conditions (T_J = 25°C, Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max.	
I_S	V_{GS} = 0V			39	A
I_{SM}	Repetitive, Pulse Width Limited by T_{JM}			154	A
V_{SD}	I_F = I_S, V_{GS} = 0V, Note 1			1.3	V
t_{rr}	I_F = 39A, -di/dt = -100A/μs			250	ns
Q_{RM}	V_R = 100V, V_{GS} = 0V		2.0		μC
I_{RM}			9.0		A

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

SOT-227B miniBLOC (IXFN)



(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	37.80	38.23	1.488	1.505
J	11.68	12.22	0.460	0.481
K	8.92	9.60	0.351	0.378
L	0.74	0.84	0.029	0.033
M	12.50	13.10	0.492	0.516
N	25.15	25.42	0.990	1.001
O	1.95	2.13	0.077	0.084
P	4.95	6.20	0.195	0.244
Q	26.54	26.90	1.045	1.059
R	3.94	4.42	0.155	0.174
S	4.55	4.85	0.179	0.191
T	24.59	25.25	0.968	0.994
U	-0.05	0.10	-0.002	0.004
V	3.20	5.50	0.126	0.217
W	19.81	21.08	0.780	0.830
Z	2.50	2.70	0.098	0.106

Figure 1. Output Characteristics at 25°C

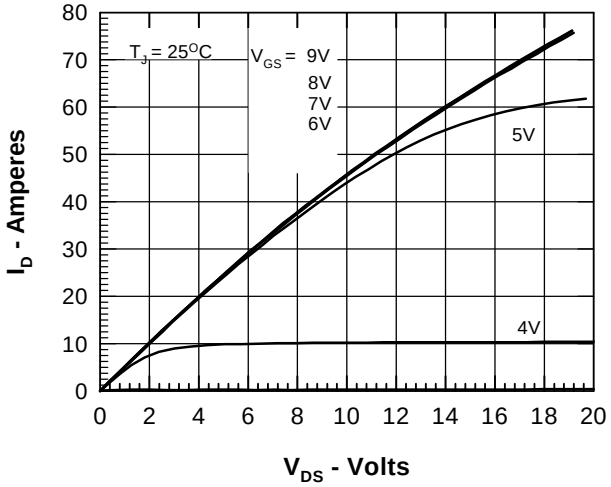


Figure 2. Output Characteristics at 125°C

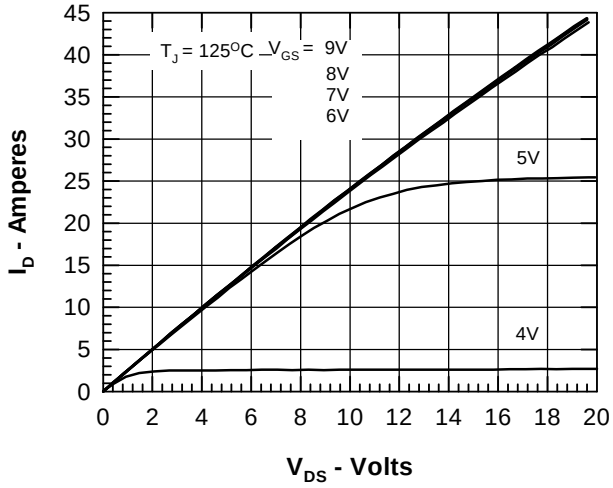
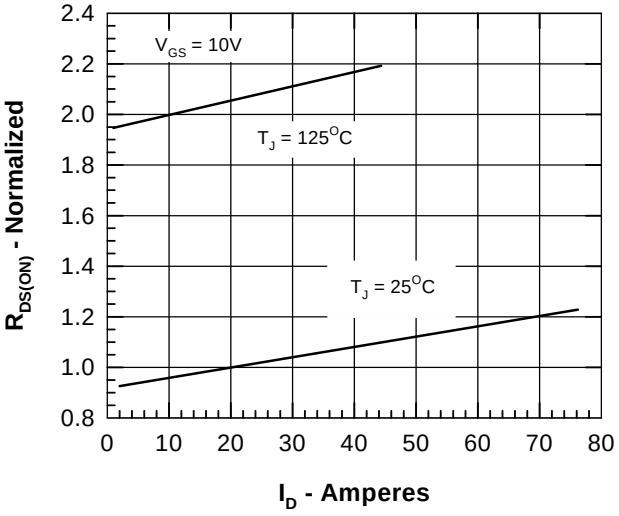


Figure 3. $R_{DS(on)}$ normalized to 0.5 I_{D25} value vs. I_D



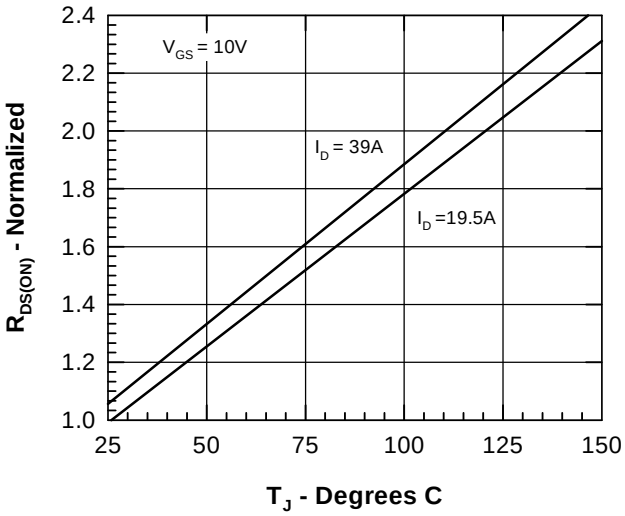


Figure 5. Drain Current vs. Case Temperature

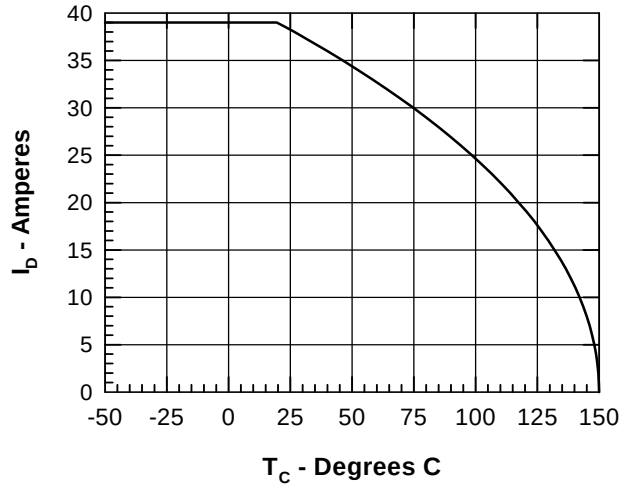


Figure 6. Admittance Curves