IXFN44N100P

1000 V, 220 mΩ Polar™ HiperFET™ Power MOSFET

Features:

- International Standard Package
- Low Intrinsic Gate Resistance
- miniBLOC with Aluminum Nitride Isolation
- Low Package Inductance
- Fast Intrinsic Rectifier
- Low $R_{DS(on)}$ and Q_G

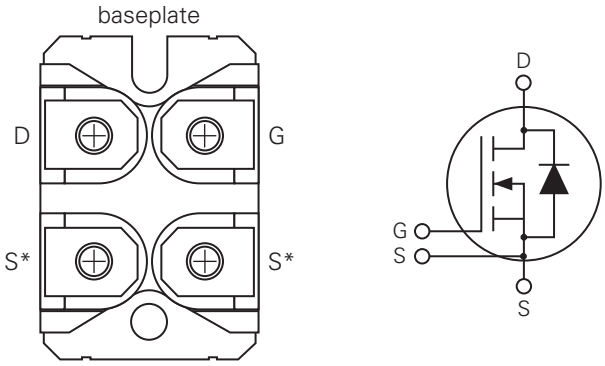
Advantages:

- High Power Density
- Easy to Mount
- Space Savings

Applications:

- DC-DC Converters
- Battery Chargers
- Switch-Mode and Resonant-Mode Power Supplies
- AC Motor Control
- High Speed Power Switching Application

Pinout Diagram (SOT-227B)



G: Gate; **D:** Drain; **S:** Source; **baseplate:** Isolated
* Either Source terminal can be used as main or Kelvin Source

Product Summary

Characteristic	Value	Unit
V_{DSS}	1000	V
I_{D25}	37	A
$R_{DS(on)}$	≤ 220	mΩ
t_{rr}	≤ 300	ns

Revised: XZ 05/01/2023

Maximum Ratings

Symbol	Characteristics	Conditions		Value	Units
V_{DSS}	Drain-Source Voltage	T_J = 25°C to 150°C		1000	V
V_{DGR}	Drain-Gate Voltage	T_J = 25°C to 150°C, R_{GS} = 1 mΩ		1000	V
V_{GSS}	Gate-Source Voltage	Continuous		±30	V
V_{GSM}		Transient		±40	
I_{D25}	Drain Current	T_C = 25°C		37	A
I_{DM}		T_C = 25°C, Pulse width limited by T_{JM}		110	
I_A	Avalanche Current	T_C = 25°C		22	A
E_{AS}	Avalanche Energy	T_C = 25°C		2	J
dV/dt	Reverse Diode dV/dt	$I_S \le I_{DM}$, $V_{DD} \le V_{DSS}$, $T_J \le 150°C$		20	V/ns
P_D	Power Dissipation	T_C = 25°C		890	W
T_J	Operating Junction Temperature	–		-55 to +150	°C
T_{JM}	Maximum Junction Temperature	–		150	
T_{stg}	Storage Temperature	–		-55 to +150	
V_{ISOL}	Isolation Voltage	50/60 Hz, RMS, $I_{ISOL} \le 1$ mA	t = 1 min	2500	V~
			t = 1 s	3000	
M_d	Mounting Torque for Base Plate	–		1.5/13	Nm/lb.in
	Terminal Connection Torque	–		1.3/11.5	Nm/lb.in
W	Weight	–		30	g

Thermal Characteristics

Symbol	Characteristic	Value			Unit
		Min.	Typ.	Max.	
$R_{th, JC}$	Thermal Resistance, junction-to-case	–	–	0.14	°C/W
$R_{th, CS}$	Thermal Resistance, case to heat sink	–	0.05	–	°C/W

Electrical Characteristics – Static (T_J = 25°C unless otherwise specified)

Symbol	Characteristic	Conditions	Value			Unit
			Min.	Typ.	Max.	
BV_{DSS}	Drain-Source Breakdown Voltage	I_D = 3 mA, V_{GS} = 0 V	1000	–	–	V
$V_{GS(th)}$	Gate Threshold Voltage	I_D = 1 mA, $V_{GS} = V_{DS}$	3.5	–	6.5	V
I_{GSS}	Gate-Source Leakage Current	V_{DS} = 0 V, V_{GS} = ±30 V	–	–	±200	nA
I_{DSS}	Drain-Source Current	$V_{DS} = V_{DSS}$, V_{GS} = 0 V	–	–	50	μA
		$V_{DS} = V_{DSS}$, V_{GS} = 0 V, T_J = 125°C	–	–	3	mA
$R_{DS(on)}$	Drain-Source On-Resistance[1]	V_{GS} = 10 V, I_D = 22 A	–	–	220	mΩ

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

Electrical Characteristics – Dynamic (T_J = 25°C unless otherwise specified)

Symbol	Characteristic	Conditions	Value			Unit
			Min.	Typ.	Max.	
g_{fs}	Transconductance[1]	V_{DS} = 20 V, I_D = 22 A	20	35	–	S
R_{Gi}	Gate Input Resistance	–	–	1.4	–	Ω
C_{iss}	Input Capacitance	V_{GS} = 0 V, V_{DS} = 25 V, f = 1 MHz	–	16.9	–	nF
C_{oss}	Output Capacitance		–	1100	–	pF
C_{rss}	Reverse Transfer Capacitance		–	184	–	pF
$Q_{g(on)}$	Total Gate Charge	V_{GS} = 10 V, V_{DS} = 0.5 x V_{DSS}, I_D = 22 A	–	350	–	nC
Q_{gs}	Gate-Source Charge		–	104	–	
Q_{gd}	Gate-Drain Charge		–	126	–	
$t_{d(on)}$	Turn-on Delay Time	**Resistive Switching** V_{GS} = 10 V, V_{DS} = 0.5 x V_{DSS}, I_D = 22 A, $R_{G(ext)}$ = 1 Ω	–	60	–	ns
t_r	Rise Time		–	68	–	
$t_{d(off)}$	Turn-off Delay Time		–	90	–	
t_f	Fall Time		–	54	–	

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

Source-Drain Diode Characteristics (T_J = 25°C unless otherwise specified)

Symbol	Characteristic	Conditions	Value			Unit
			Min.	Typ.	Max.	
I_S	Continuous Diode Forward Current	V_{GS} = 0 V	–	–	44	A
I_{SM}	Diode Pulse Current	Repetitive, Pusle width limited by T_{JM}	–	–	176	A
V_{SD}	Diode Forward Voltage[1]	I_F = I_S, V_{GS} = 0 V	–	–	1.5	V
t_{rr}	Reverse Recovery Time	I_F = 22 A, –di/dt = 100 A/µs, V_r = 100 V, V_{GS} = 0 V	–	–	300	ns
Q_{rm}	Reverse Recovery Charge		–	2.5	–	µC
I_{rm}	Reverse Recovery Current		–	17.0	–	A

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

Characteristic Curves

Fig. 1. Output Characteristics @ T_J = 25ºC

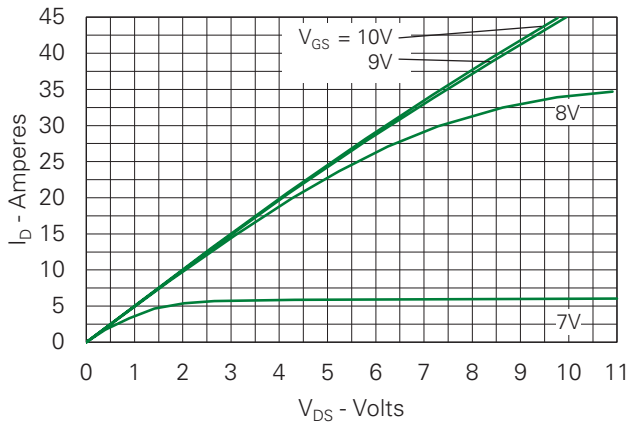


Fig. 2. Extended Output Characteristics @ T_J = 25ºC

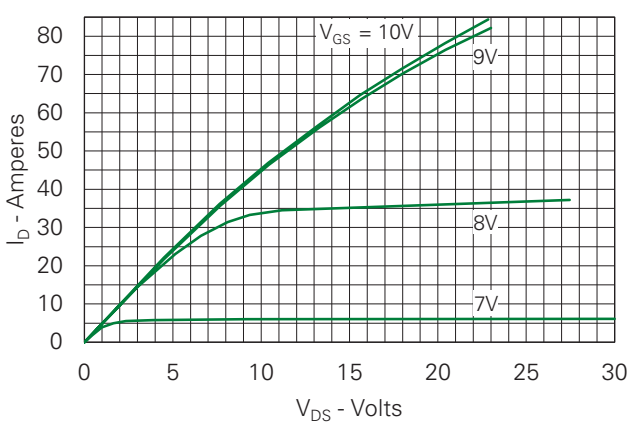


Fig. 3. Output Characteristics @ T_J = 125ºC

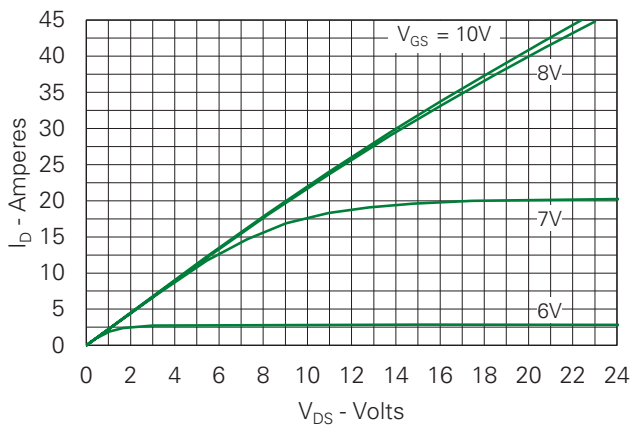


Fig. 4. $R_{DS(on)}$ Normalized to I_D = 22A Value vs. Junction Temperature

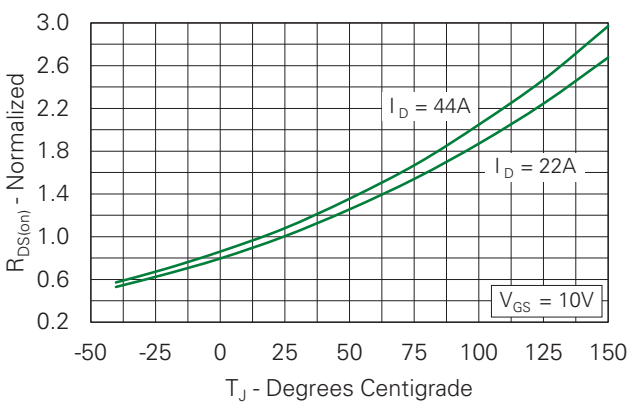


Fig. 5. $R_{DS(on)}$ Normalized to I_D = 22A Value vs. Drain Current

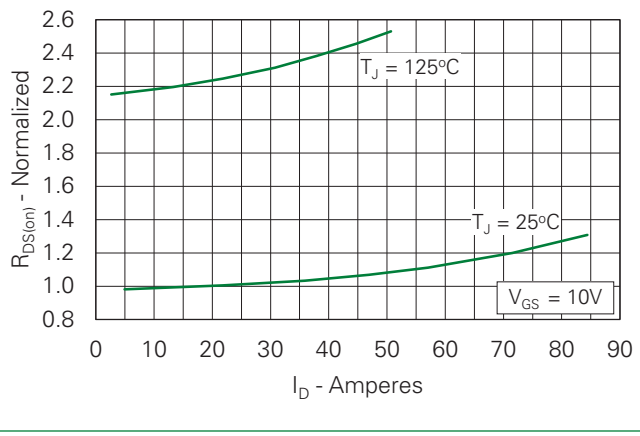


Fig. 6. Maximum Drain Current vs. Case Temperature

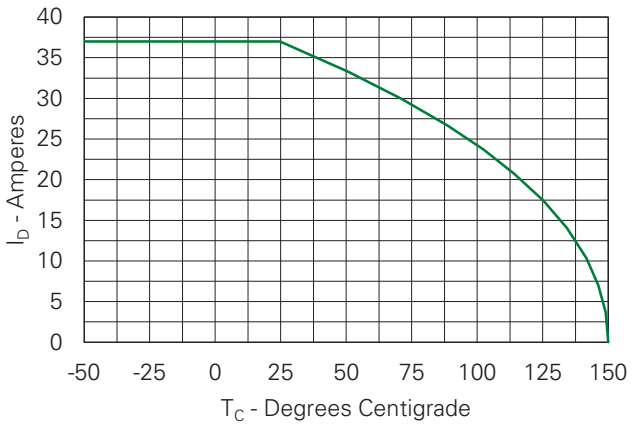


Fig. 7. Input Admittance

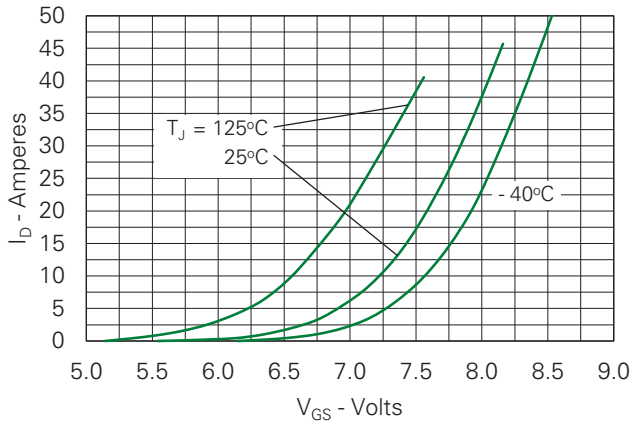


Fig. 8. Transconductance

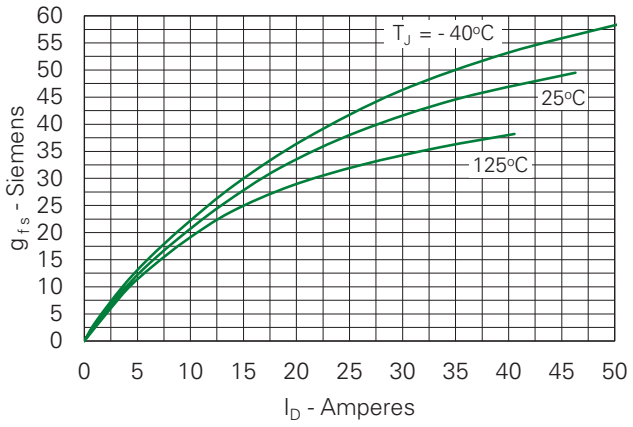


Fig. 9. Forward Voltage Drop of Intrinsic Diode

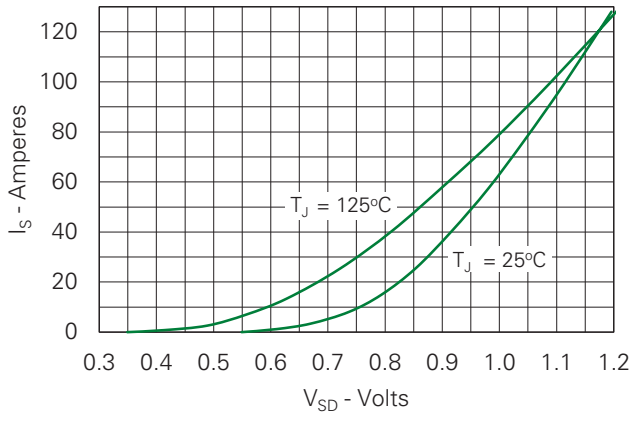


Fig. 10. Gate Charge

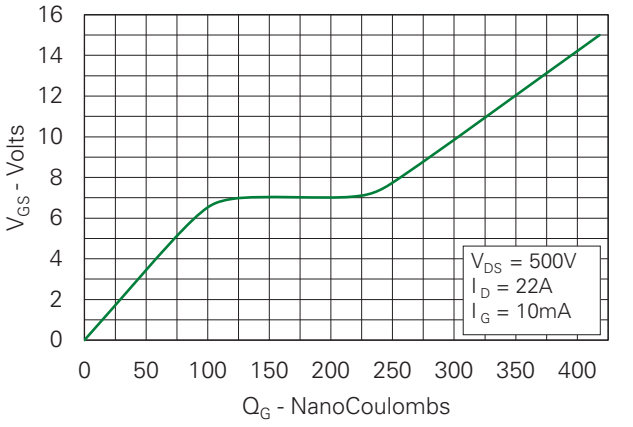


Fig. 11. Capacitance

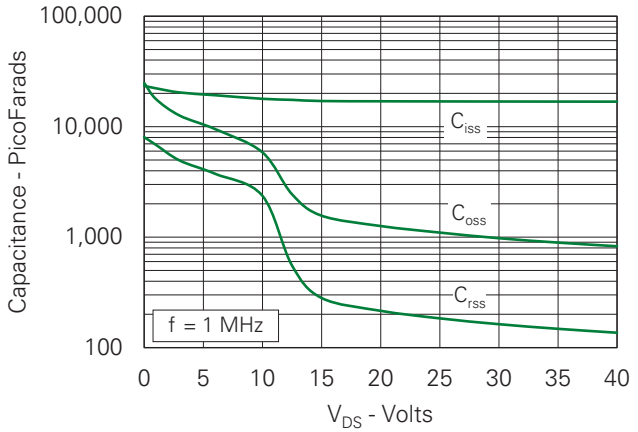
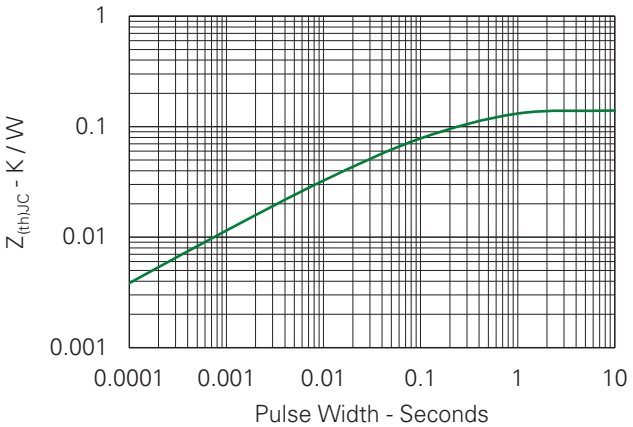
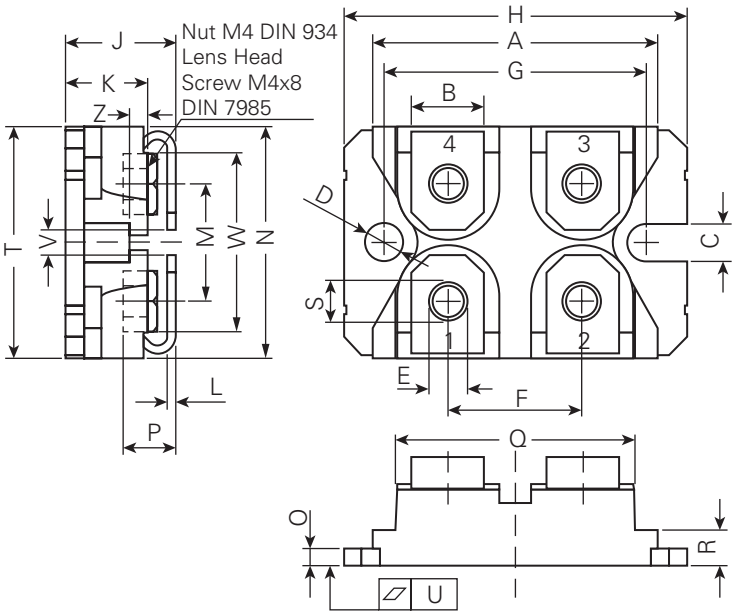


Fig. 12. Maximum Transient Thermal Impedance



Part Outline Drawing (SOT-227B)



Symbol	Inches		Millimeters	
	Min.	Max.	Min.	Max
A	1.240	1.255	31.50	31.88
B	0.307	0.323	7.80	8.20
C	0.161	0.169	4.09	4.29
D	0.161	0.169	4.09	4.29
E	0.161	0.169	4.09	4.29
F	0.587	0.595	14.91	15.11
G	1.186	1.193	30.12	30.30
H	1.488	1.505	37.80	38.23
J	0.460	0.481	11.68	12.22
K	0.351	0.378	8.92	9.60
L	0.029	0.033	0.74	0.84
M	0.492	0.516	12.50	13.10
N	0.990	1.001	25.15	25.42
O	0.077	0.084	1.95	2.13
P	0.195	0.244	4.95	6.20
Q	1.045	1.059	26.54	26.90
R	0.155	0.167	3.94	4.42
S	0.179	0.191	4.55	4.85
T	0.968	0.994	24.59	25.25
U	– 0.002	0.004	– 0.05	0.10
V	0.126	0.217	3.20	5.50
W	0.780	0.830	19.81	21.08
Z	.098	0.106	2.50	2.70