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

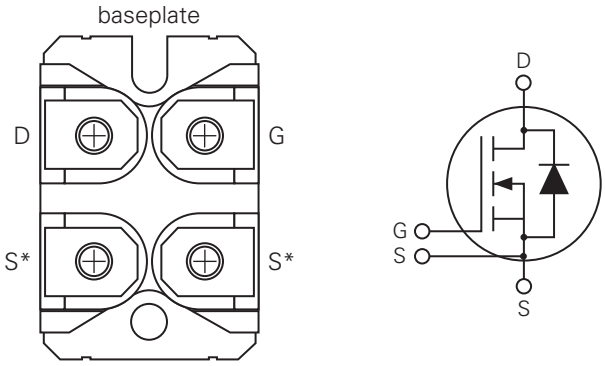
Advantages:

- 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

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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%

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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%

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Characteristic Curves

Fig. 1. Output Characteristics @ T_J = 25ºC

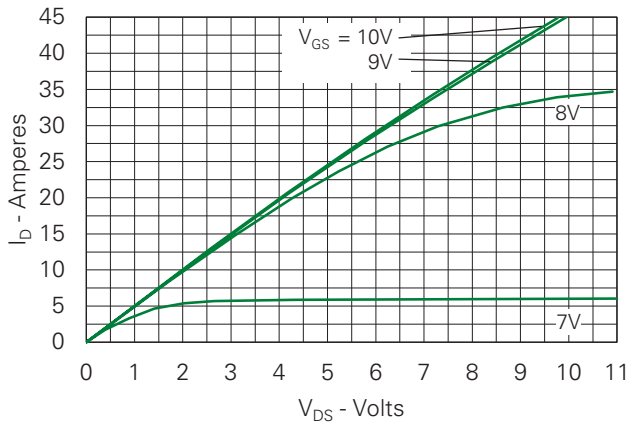

Fig. 2. Extended Output Characteristics @ T_J = 25ºC

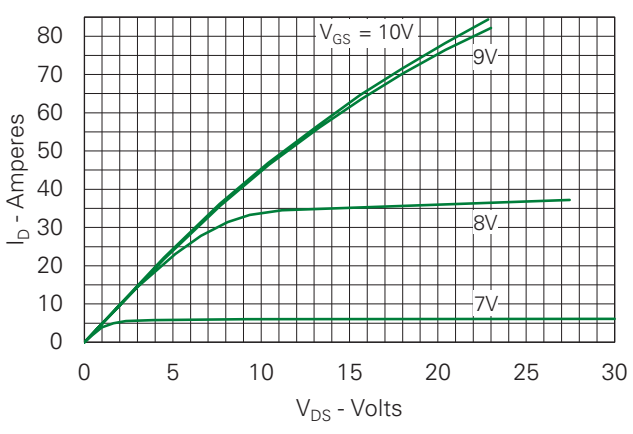

Fig. 3. Output Characteristics @ T_J = 125ºC

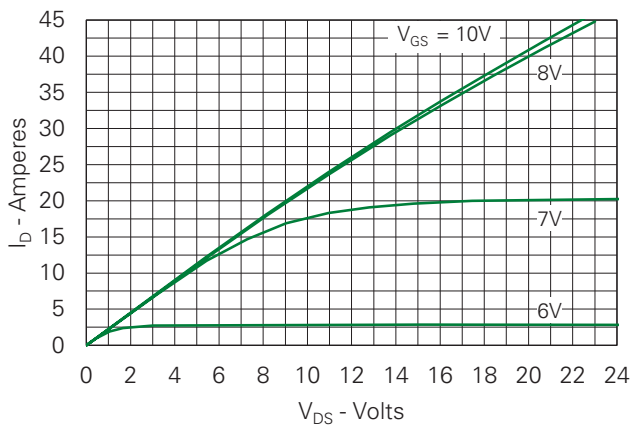

Fig. 4. $R_{DS(on)}$ Normalized to I_D = 22A Value vs. Junction Temperature

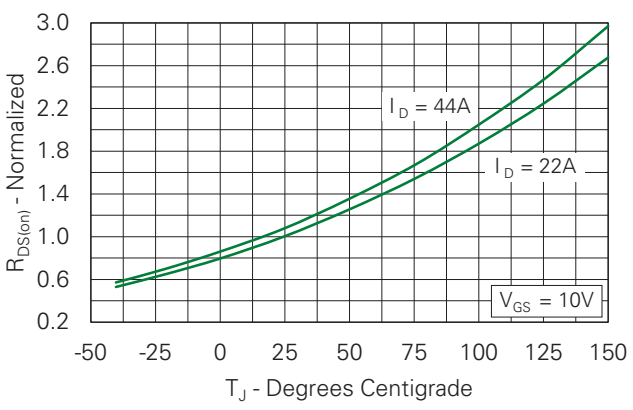

Fig. 5. $R_{DS(on)}$ Normalized to I_D = 22A Value vs. Drain Current

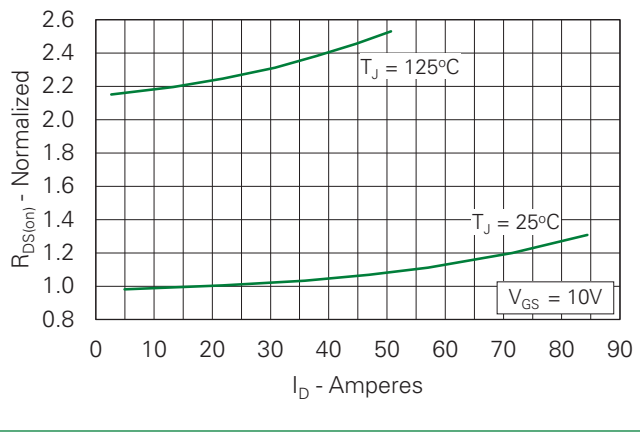

Fig. 6. Maximum Drain Current vs. Case Temperature

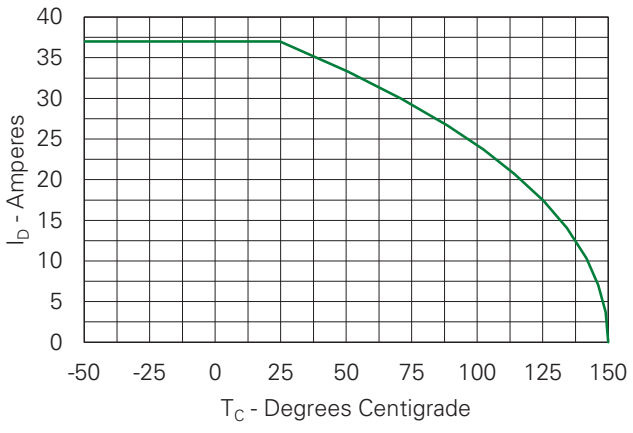

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Fig. 7. Input Admittance

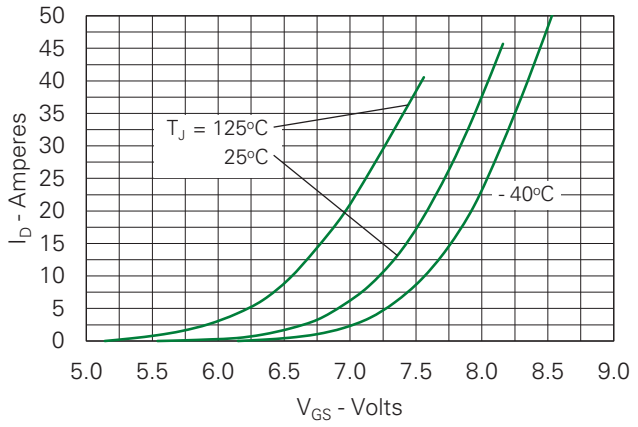


Fig. 8. Transconductance

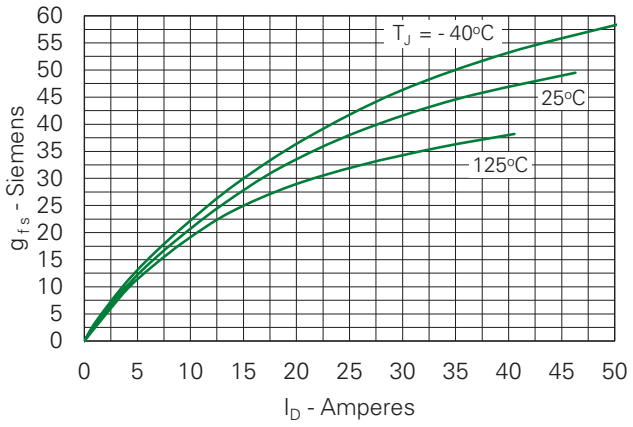


Fig. 9. Forward Voltage Drop of Intrinsic Diode

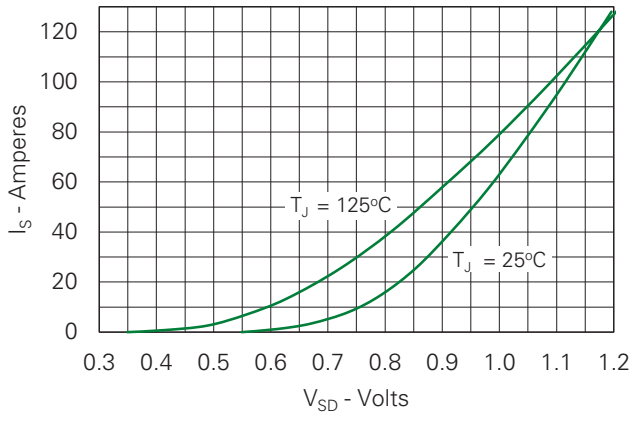


Fig. 10. Gate Charge

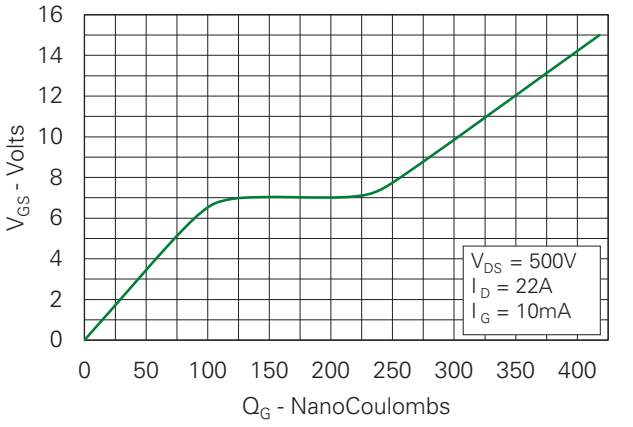


Fig. 11. Capacitance

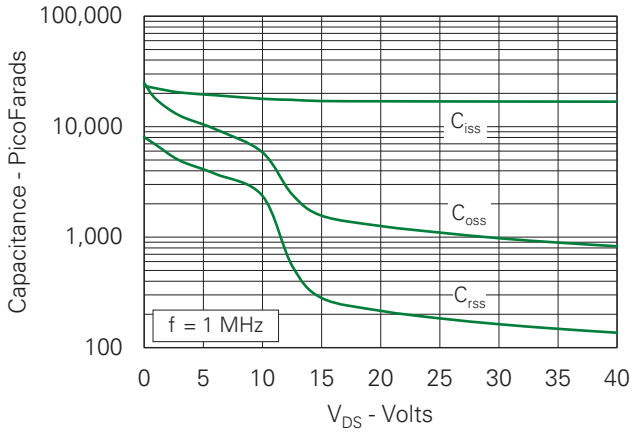
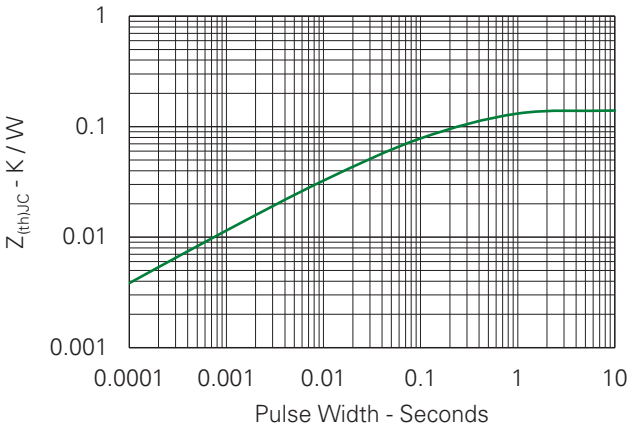


Fig. 12. Maximum Transient Thermal Impedance



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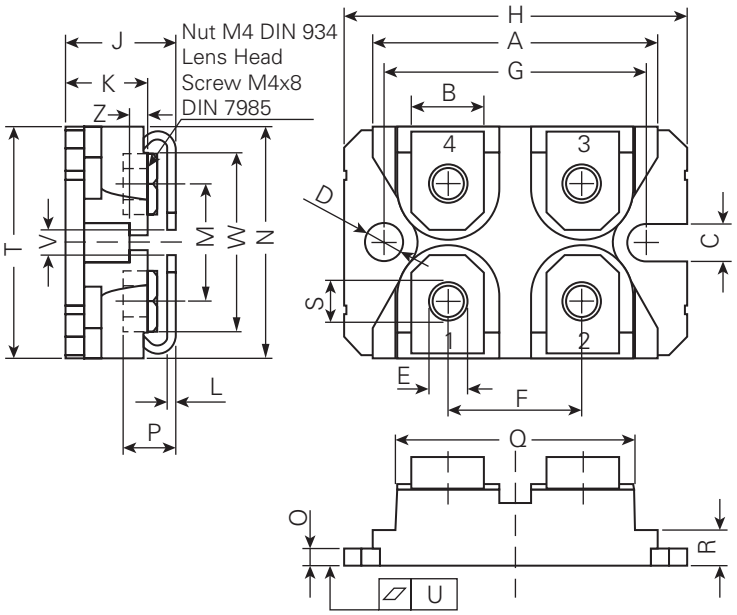
Part Outline Drawing (SOT-227B)



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

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