

General Description

The MDP9N50F uses advanced Magnachip's MOSFET Technology, which provides low on-state resistance, high switching performance and excellent quality.

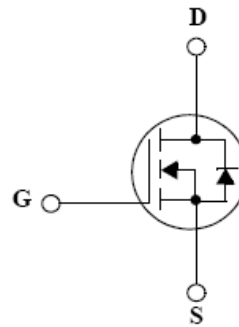
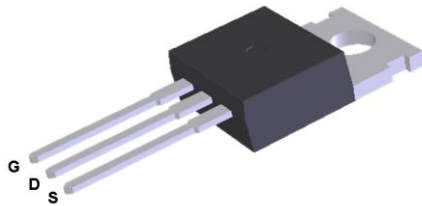
MDP9N50F is suitable device for SMPS, HID and general purpose applications.

Features

- $V_{DS} = 500V$
- $I_D = 8.0A$ @ $V_{GS} = 10V$
- $R_{DS(ON)} \leq 0.97\Omega$ @ $V_{GS} = 10V$

Applications

- Power Supply
- HID
- Lighting



Absolute Maximum Ratings ($T_a = 25^\circ C$)

Characteristics		Symbol	Rating	Unit
Drain-Source Voltage		V_{DSS}	500	V
Gate-Source Voltage		V_{GSS}	± 30	V
Continuous Drain Current	$T_C = 25^\circ C$	I_D	8.0	A
	$T_C = 100^\circ C$		4.8	A
Pulsed Drain Current ⁽¹⁾		I_{DM}	32	A
Power Dissipation	$T_C = 25^\circ C$	P_D	119	W
	Derate above 25 °C		0.95	W/°C
Peak Diode Recovery dv/dt ⁽³⁾		Dv/dt	4.5	V/ns
Single Pulse Avalanche Energy ⁽⁴⁾		E_{AS}	300	mJ
Junction and Storage Temperature Range		T_J, T_{stg}	-55~150	°C

Thermal Characteristics

Characteristics	Symbol	Rating	Unit
Thermal Resistance, Junction-to-Ambient ⁽¹⁾	$R_{\theta JA}$	62.5	°C/W
Thermal Resistance, Junction-to-Case ⁽¹⁾	$R_{\theta JC}$	1.05	

Ordering Information

Part Number	Temp. Range	Package	Packing	RoHS Status
MDP9N50FTH	-55~150°C	TO-220	Tube	Halogen Free

Electrical Characteristics (T_a =25°C)

Characteristics	Symbol	Test Condition	Min	Typ	Max	Unit
Static Characteristics						
Drain-Source Breakdown Voltage	BV _{DSS}	I _D = 250μA, V _{GS} = 0V	500	-	-	V
Gate Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250μA	2.5	-	4.5	V
Drain Cut-Off Current	I _{DSS}	V _{DS} = 500V, V _{GS} = 0V	-	-	10	μA
Gate Leakage Current	I _{GSS}	V _{GS} = ±30V, V _{DS} = 0V	-	-	100	nA
Drain-Source ON Resistance	R _{DS(ON)}	V _{GS} = 10V, I _D = 4.0A		0.75	0.97	Ω
Forward Transconductance	g _{fs}	V _{DS} = 30V, I _D = 4.0A	-	4.2	-	S
Dynamic Characteristics						
Total Gate Charge	Q _g	V _{DS} = 400V, I _D = 8.0 A, V _{GS} = 10V ⁽³⁾	-	16.3	-	nC
Gate-Source Charge	Q _{gs}		-	5.8	-	
Gate-Drain Charge	Q _{gd}		-	6.1	-	
Input Capacitance	C _{iss}	V _{DS} = 25V, V _{GS} = 0V, f = 1.0MHz	-	781	-	pF
Reverse Transfer Capacitance	C _{rss}		-	1.83	-	
Output Capacitance	C _{oss}		-	96.1	-	
Turn-On Delay Time	t _{d(on)}	V _{GS} = 10V, V _{DS} = 250V, I _D = 8.0A, R _G = 25Ω ⁽³⁾	-	20.0	-	ns
Rise Time	t _r		-	47.5	-	
Turn-Off Delay Time	t _{d(off)}		-	28.0	-	
Fall Time	t _f		-	24.0	-	
Drain-Source Body Diode Characteristics						
Maximum Continuous Drain to Source Diode Forward Current	I _S		-	8.0	-	A
Source-Drain Diode Forward Voltage	V _{SD}	I _S = 8.0A, V _{GS} = 0V	-	-	1.4	V
Body Diode Reverse Recovery Time	t _{rr}	I _F = 8.0A, di/dt = 100A/μs ⁽³⁾	-	94.5	-	ns
Body Diode Reverse Recovery Charge	Q _{rr}		-	0.24	-	μC

Note :

1. Pulse width is based on R_{θJC} & R_{θJA} and the maximum allowed junction temperature of 150°C.
2. Pulse test: pulse width ≤300us, duty cycle≤2%, pulse width limited by junction temperature T_{J(MAX)}=150°C.
3. I_{SD} ≤8.0A, di/dt ≤200A/us, V_{DD} = 50V, R_g = 25Ω, Starting T_J = 25°C
4. L = 6.5mH, I_{AS} = 8.0A, V_{DD} = 50V, , R_g = 25Ω, Starting T_J = 25°C

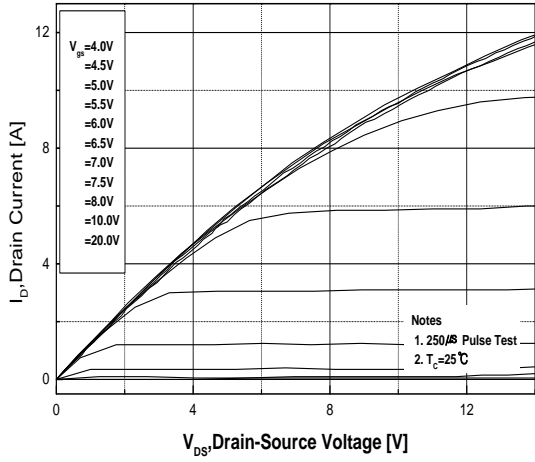


Fig.1 On-Region Characteristics

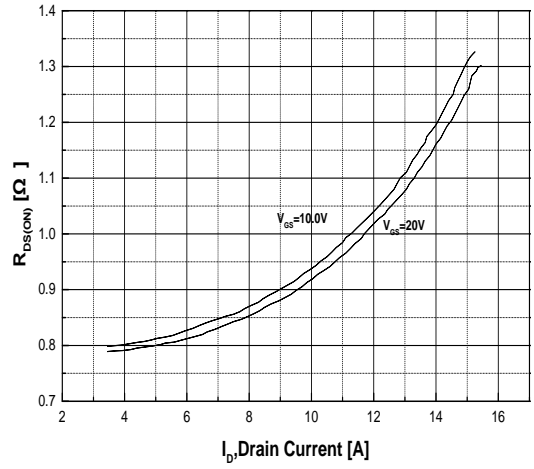


Fig.2 On-Resistance Variation with Drain Current and Gate Voltage

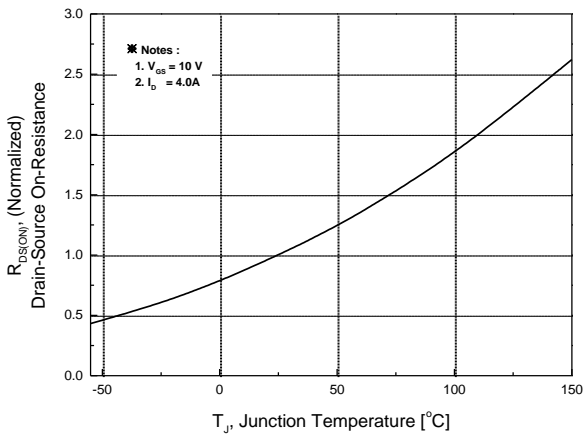


Fig.3 On-Resistance Variation with Temperature

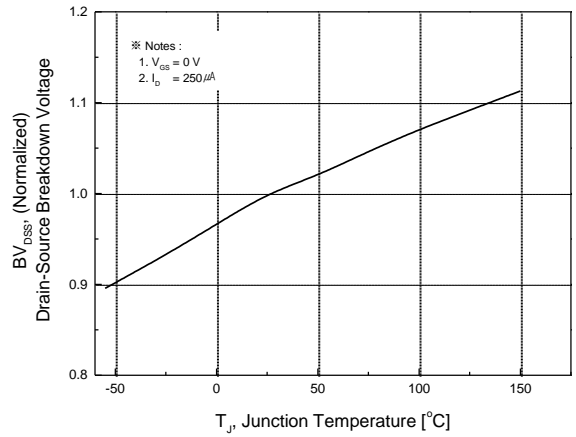


Fig.4 Breakdown Voltage Variation vs. Temperature

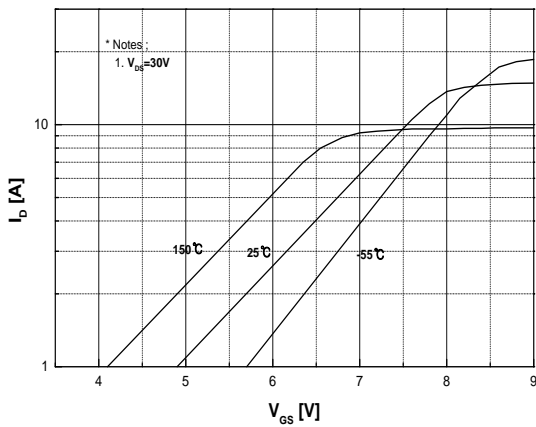


Fig.5 Transfer Characteristics

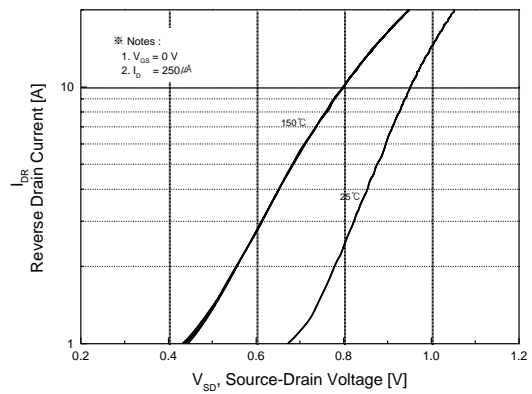
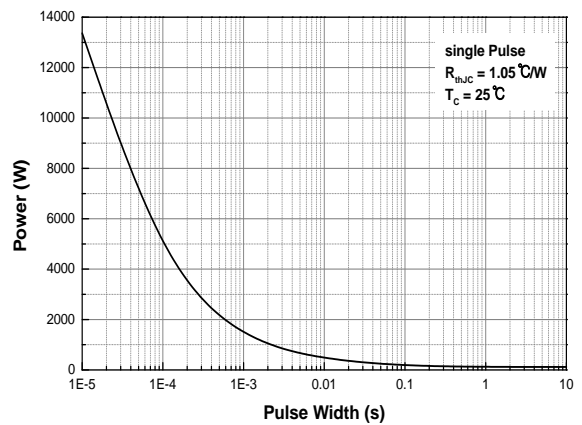
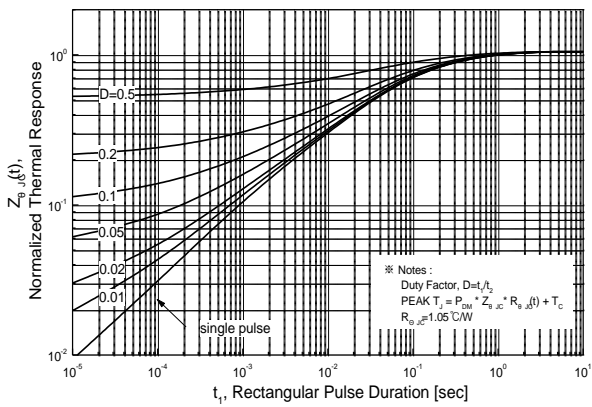
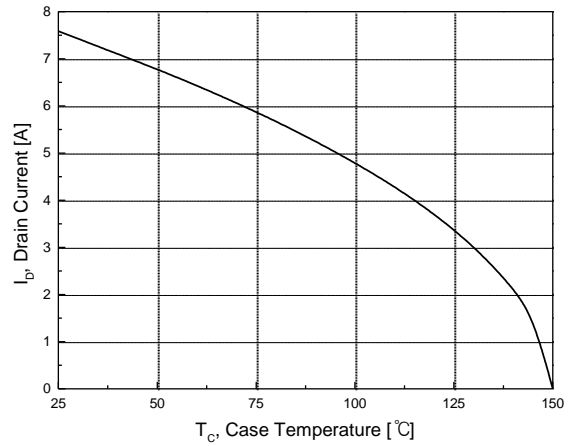
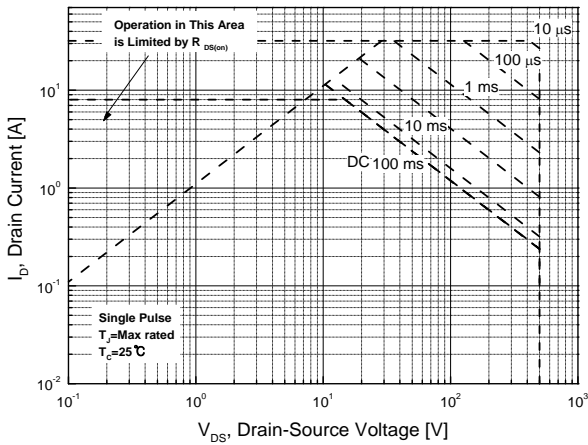
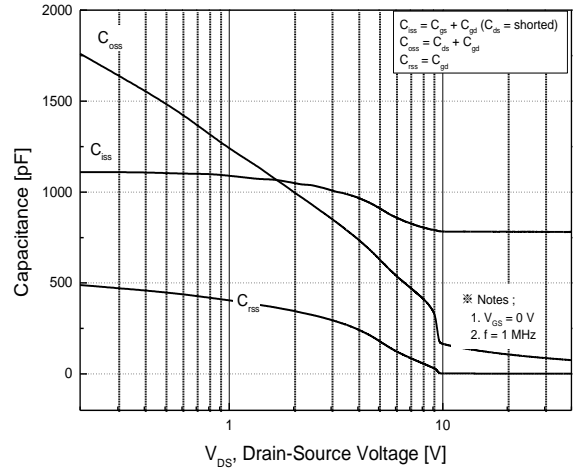
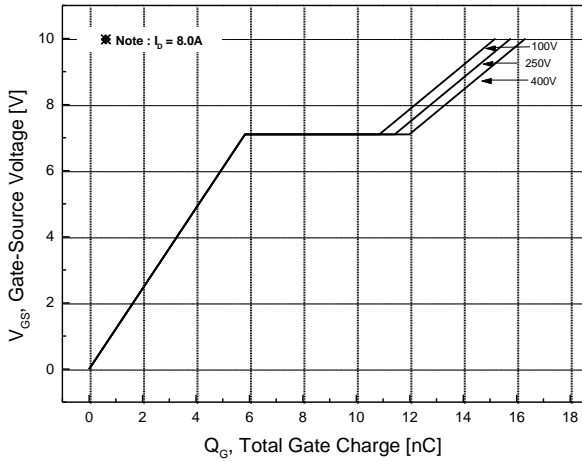


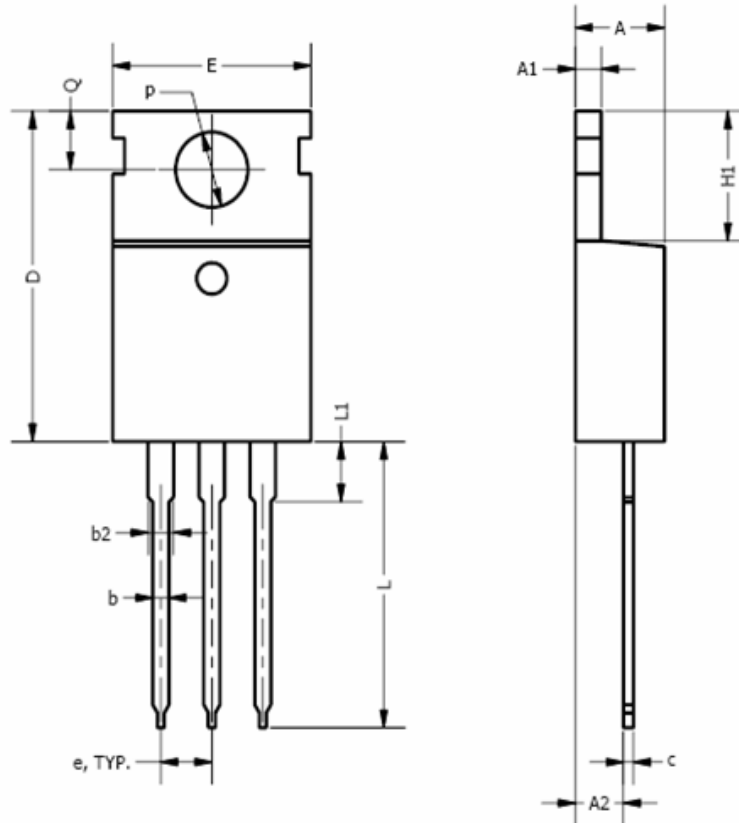
Fig.6 Body Diode Forward Voltage Variation with Source Current and Temperature



Physical Dimensions

3 Leads, TO-220

Dimensions are in millimeters unless otherwise specified



Symbol	Min	Nom	Max
A	3.56		4.83
A1	0.50		1.40
A2	2.03		2.92
b	0.38	0.69	1.02
b2	1.14	1.45	1.78
c	0.36		0.61
D	14.22		16.51
e	2.54 TYP		
E	9.65		10.67
H1	5.84		6.86
L	12.70		14.73
L1			6.35
φP	3.53		4.09
Q	2.54		3.43

DISCLAIMER:

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