

General Description

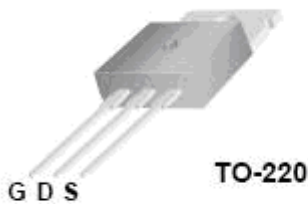
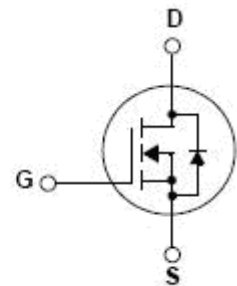
The MDP18N50 uses advanced Magnachip's MOSFET Technology, which provides low on-state resistance, high switching performance and excellent quality. MDP18N50 is suitable device for SMPS, HID and general purpose applications.

Features

- $V_{DS} = 500V$
- $I_D = 18.0A$ @ $V_{GS} = 10V$
- $R_{DS(ON)} < 0.27\Omega$ @ $V_{GS} = 10V$

Applications

- Power Supply
- HID
- Lighting



Absolute Maximum Ratings (Ta = 25°C)

Characteristics	Symbol	Rating	Unit
Drain-Source Voltage	V_{DSS}	500	V
Gate-Source Voltage	V_{GSS}	±30	V
Continuous Drain Current	I_D	18	A
		11	A
Pulsed Drain Current ⁽¹⁾	I_{DM}	72	72
Power Dissipation	P_D	236	W
		1.89	W/°C
Peak Diode Recovery dv/dt ⁽³⁾	Dv/dt	4.5	V/ns
Single Pulse Avalanche Energy ⁽⁴⁾	E_{AS}	950	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⁾	$R_{\theta JC}$	0.53	

Ordering Information

Part Number	Temp. Range	Package	Packing
MDP18N50TH	-55~150°C	TO-220	Tube

Electrical Characteristics (Ta =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	3.0	-	5.0	
Drain Cut-Off Current	I _{DSS}	V _{DS} = 500V, V _{GS} = 0V	-	-	1	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 = 9A		0.22	0.27	Ω
Forward Transconductance	g _{fs}	V _{DS} = 40V, I _D = 9A	-	13	-	S
Dynamic Characteristics						
Total Gate Charge	Q _g	V _{DS} = 400V, I _D = 18A, V _{GS} = 10V ⁽³⁾	-	48		nC
Gate-Source Charge	Q _{gs}		-	12		
Gate-Drain Charge	Q _{gd}		-	15		
Input Capacitance	C _{iss}	V _{DS} = 25V, V _{GS} = 0V, f = 1.0MHz	-	2430		pF
Reverse Transfer Capacitance	C _{rss}		-	10		
Output Capacitance	C _{oss}		-	302		
Turn-On Delay Time	t _{d(on)}	V _{GS} = 10V, V _{DS} = 250V, I _D = 18A, R _G = 25Ω ⁽³⁾	-	58		ns
Rise Time	t _r		-	74		
Turn-Off Delay Time	t _{d(off)}		-	110		
Fall Time	t _f		-	44		
Drain-Source Body Diode Characteristics						
Maximum Continuous Drain to Source Diode Forward Current	I _S	I _S = 18A, V _{GS} = 0V	-	18	-	A
Source-Drain Diode Forward Voltage	V _{SD}		-		1.4	V
Body Diode Reverse Recovery Time	t _{rr}	I _F = 18A, di/dt = 100A/μs ⁽³⁾	-	375		ns
Body Diode Reverse Recovery Charge	Q _{rr}		-	4.2		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 TJ(MAX)=150°C.
3. I_{SD} ≤9.0A, di/dt≤200A/us, V_{DD}=50V, R_G=25Ω, Starting TJ=25°C
4. L=5.3mH, I_{AS}=18.0A, V_{DD}=50V, , R_G=25Ω, Starting TJ=25°C

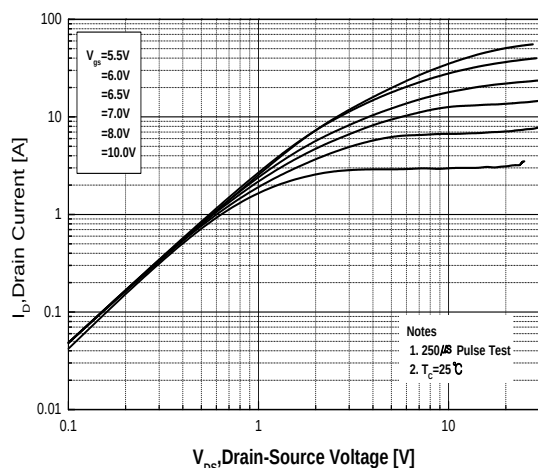


Fig.1 On-Region Characteristics

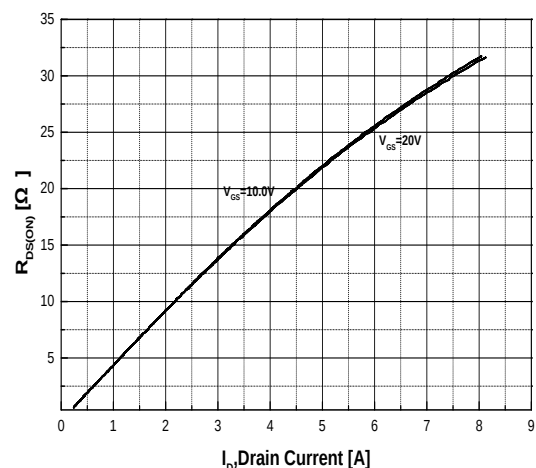


Fig.2 On-Resistance Variation with Drain Current and Gate Voltage

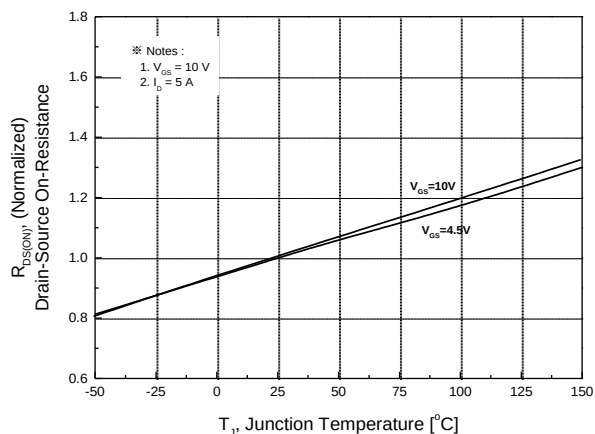


Fig.3 On-Resistance Variation with Temperature

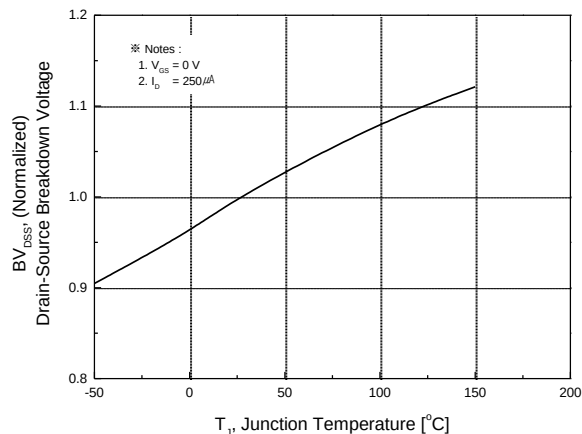


Fig.4 Breakdown Voltage Variation vs. Temperature

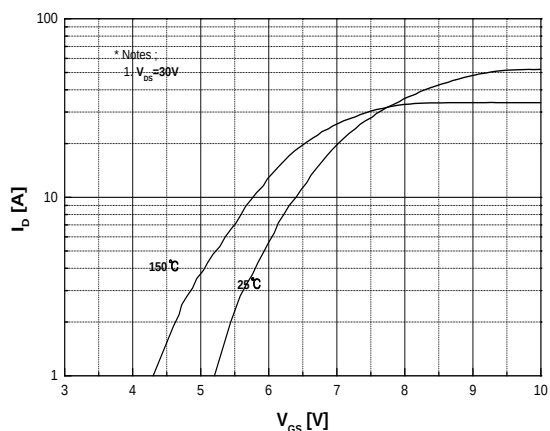


Fig.5 Transfer Characteristics

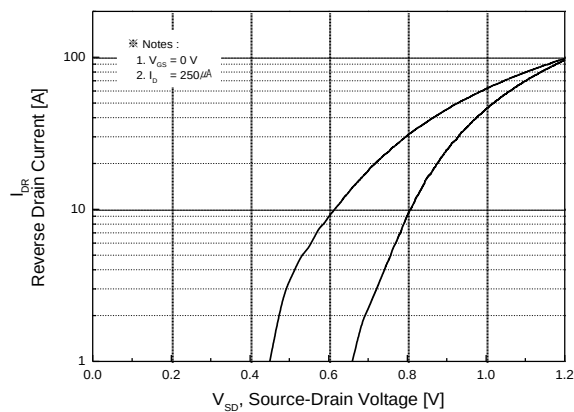


Fig.6 Body Diode Forward Voltage Variation with Source Current and Temperature

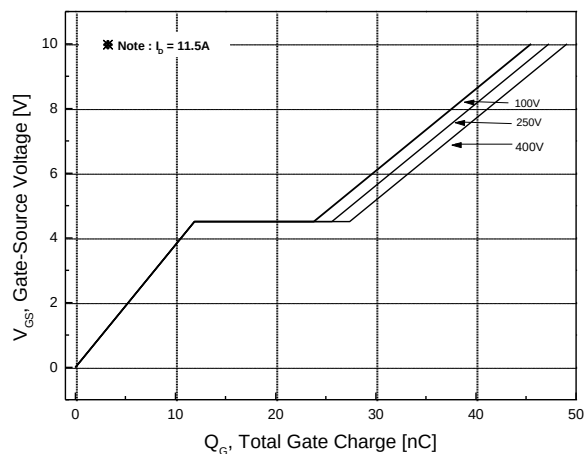


Fig.7 Gate Charge Characteristics

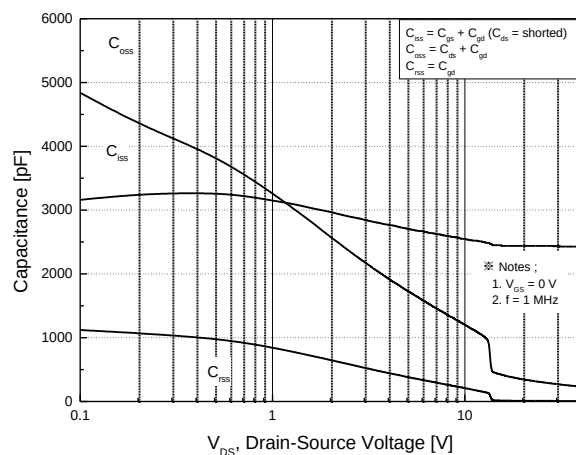


Fig.8 Capacitance Characteristics

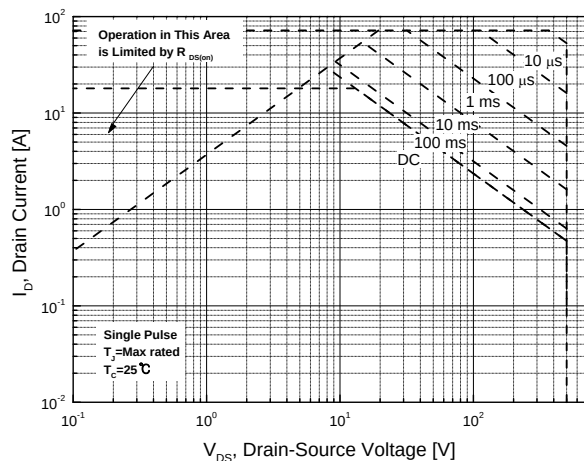


Fig.9 Maximum Safe Operating Area

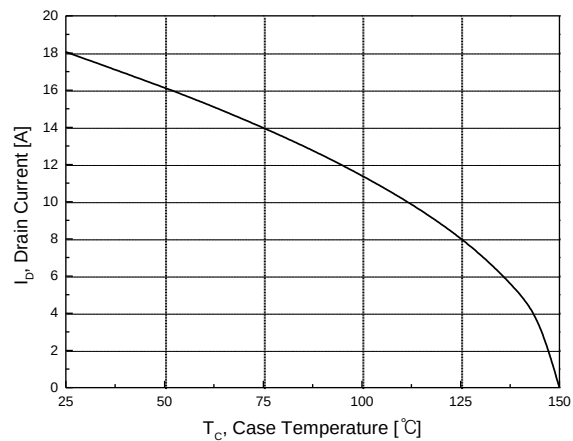


Fig.10 Maximum Drain Current vs. Case Temperature

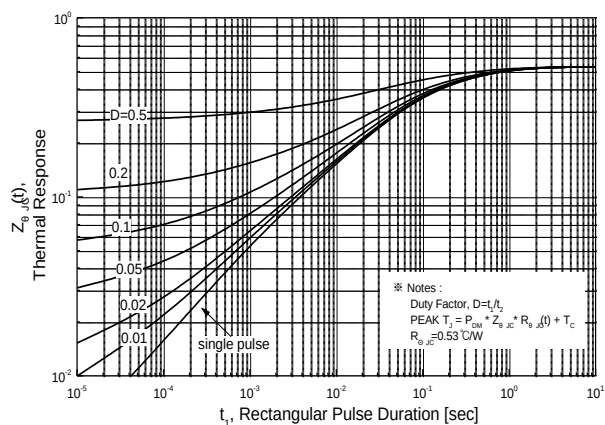


Fig.11 Transient Thermal Response Curve

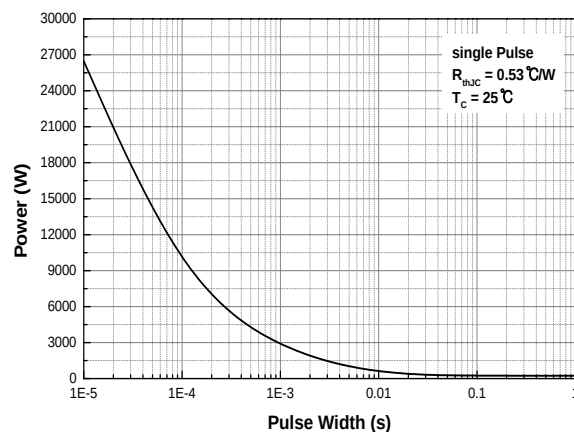
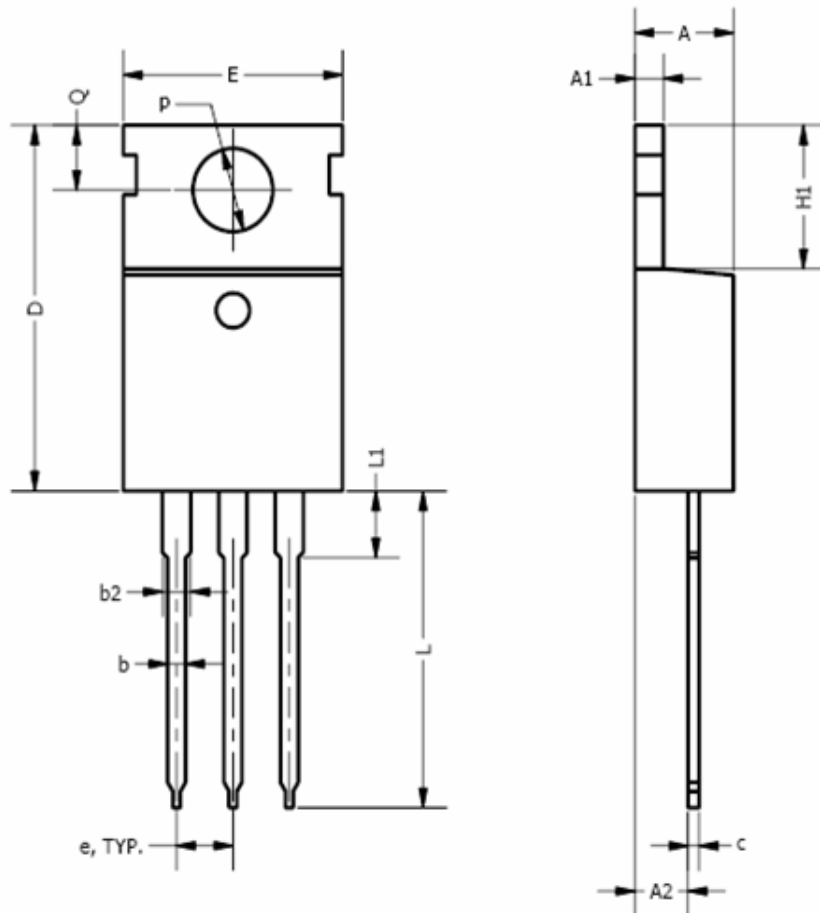


Fig.12 Single Pulse Maximum Power Dissipation

■ Physical Dimension

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:

The Products are not designed for use in hostile environments, including, without limitation, aircraft, nuclear power generation, medical appliances, and devices or systems in which malfunction of any Product can reasonably be expected to result in a personal injury. Seller's customers using or selling Seller's products for use in such applications do so at their own risk and agree to fully defend and indemnify Seller.

MagnaChip reserves the right to change the specifications and circuitry without notice at any time. MagnaChip does not consider responsibility for use of any circuitry other than circuitry entirely included in a MagnaChip product.  is a registered trademark of MagnaChip Semiconductor Ltd.