

MDF8N60B

N-Channel MOSFET 600V, 8A, 1.05Ω

MDF8N60B N-channel MOSFET 600V

General Description

These N-channel MOSFET are produced using advanced Magnachip's MOSFET Technology, which provides low on-state resistance, high switching performance and excellent quality.

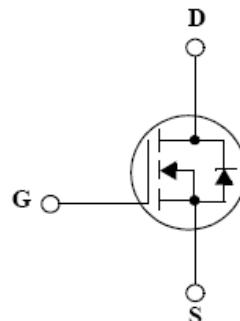
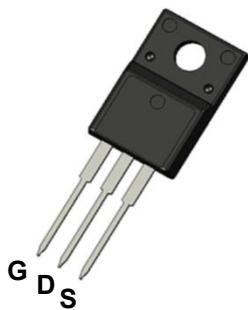
These devices are suitable device for SMPS, high Speed switching and general purpose applications.

Features

- $V_{DS} = 600V$
- $I_D = 8.0A$ @ $V_{GS} = 10V$
- $R_{DS(ON)} \leq 1.05\Omega$ @ $V_{GS} = 10V$

Applications

- Power Supply
- PFC
- High Current, High Speed Switching



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

Characteristics	Symbol	Rating	Unit
Drain-Source Voltage	V_{DSS}	600	V
Gate-Source Voltage	V_{GSS}	± 30	V
Continuous Drain Current(※)	I_D	8.0*	A
		4.9*	A
Pulsed Drain Current ⁽¹⁾	I_{DM}	32*	A
Power Dissipation	P_D	46	W
		0.37	W/ °C
Repetitive Avalanche Energy ⁽¹⁾	E_{AR}	4.6	mJ
Peak Diode Recovery dv/dt ⁽³⁾	dv/dt	4.5	V/ns
Single Pulse Avalanche Energy ⁽⁴⁾	E_{AS}	320	mJ
Junction and Storage Temperature Range	T_J, T_{stg}	-55~150	°C

※ I_D limited by maximum junction temperature

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⁾	$R_{\theta JC}$	2.71	

Ordering Information

Part Number	Temp. Range	Package	Packing	RoHS Status
MDF8N60BTH	-55~150°C	TO-220F	Tube	Halogen Free

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	600	-	-	V
Gate Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250μA	2.0	-	4.0	
Drain Cut-Off Current	I _{DSS}	V _{DS} = 600V, V _{GS} = 0V	-	-	1	μA
Gate Leakage Current	I _{GSS}	V _{GS} = ±30V, V _{DS} = 0V	-	-	100	nA
Drain-Source ON Resistance	R _{DSON}	V _{GS} = 10V, I _D = 4.0A		0.85	1.05	Ω
Forward Transconductance	g _f	V _{DS} = 30V, I _D = 4.0A	-	8.5	-	S
Dynamic Characteristics						
Total Gate Charge	Q _g	V _{DS} = 480V, I _D = 8.0A, V _{GS} = 10V ⁽³⁾	-	18.1		nC
Gate-Source Charge	Q _{gs}		-	4.0		
Gate-Drain Charge	Q _{gd}		-	6.2		
Input Capacitance	C _{iss}	V _{DS} = 25V, V _{GS} = 0V, f = 1.0MHz	-	945		pF
Reverse Transfer Capacitance	C _{rss}		-	4.7		
Output Capacitance	C _{oss}		-	108		
Turn-On Delay Time	t _{d(on)}	V _{GS} = 10V, V _{DS} = 300V, I _D = 8.0A, R _G = 25Ω ⁽³⁾	-	17.7		ns
Rise Time	t _r		-	26.0		
Turn-Off Delay Time	t _{d(off)}		-	73.6		
Fall Time	t _f		-	33.7		
Drain-Source Body Diode Characteristics						
Maximum Continuous Drain to Source Diode Forward Current	I _S	I _S = 8.0A, V _{GS} = 0V	-	8	-	A
Source-Drain Diode Forward Voltage	V _{SD}		-		1.4	V
Body Diode Reverse Recovery Time	t _{rr}		-	350		ns
Body Diode Reverse Recovery Charge	Q _{rr}		-	3.3		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 ≤300μs, 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}≤BV_{DSS}, R_G =25Ω, Starting T_J=25°C
4. L=9.0mH, I_{AS}=8.0A, V_{DD}=50V, R_G =25Ω, Starting T_J=25°C,

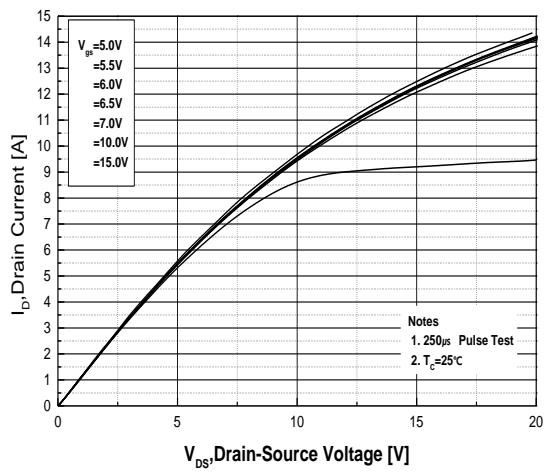


Fig.1 On-Region Characteristics

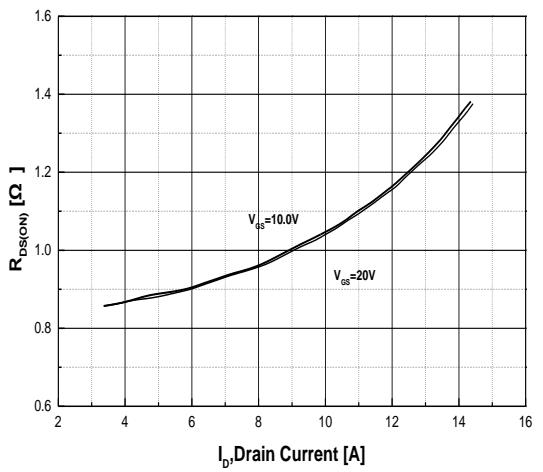


Fig.2 On-Resistance Variation with Drain Current and Gate Voltage

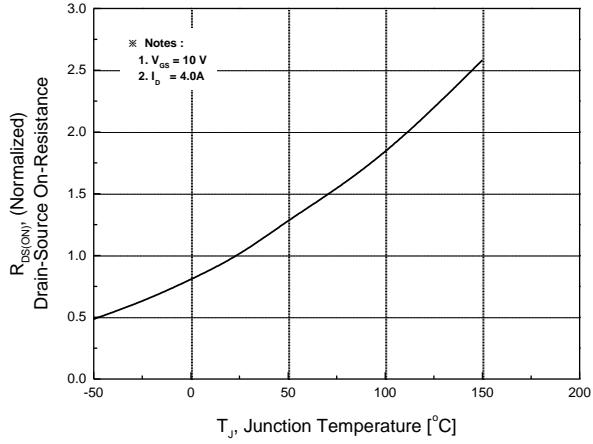


Fig.3 On-Resistance Variation with Temperature

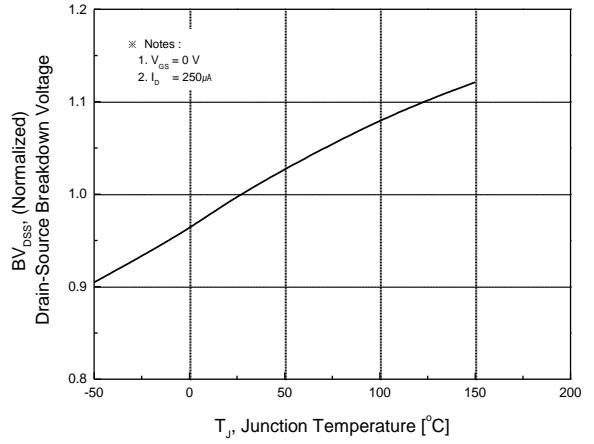


Fig.4 Breakdown Voltage Variation vs. Temperature

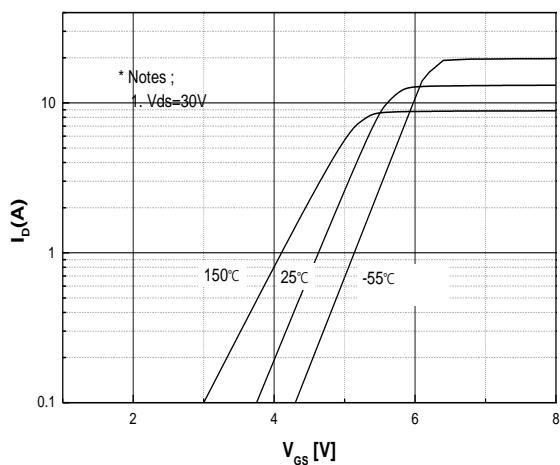


Fig.5 Transfer Characteristics

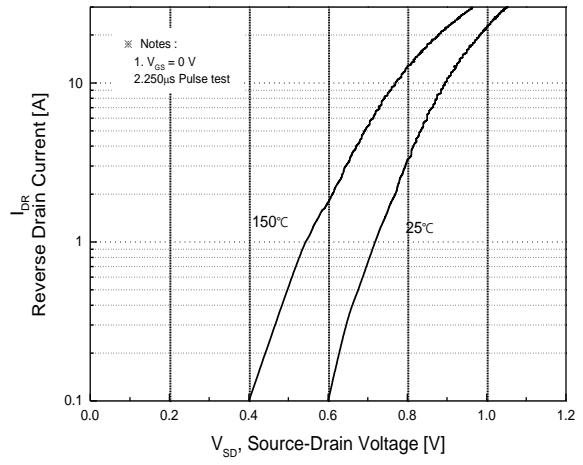


Fig.6 Body Diode Forward Voltage Variation with Source Current and Temperature

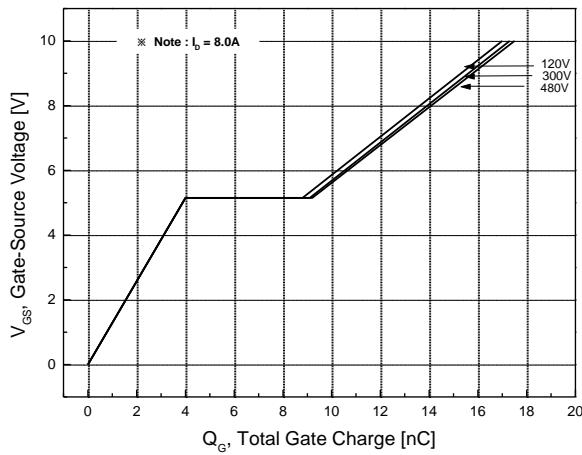


Fig.7 Gate Charge Characteristics

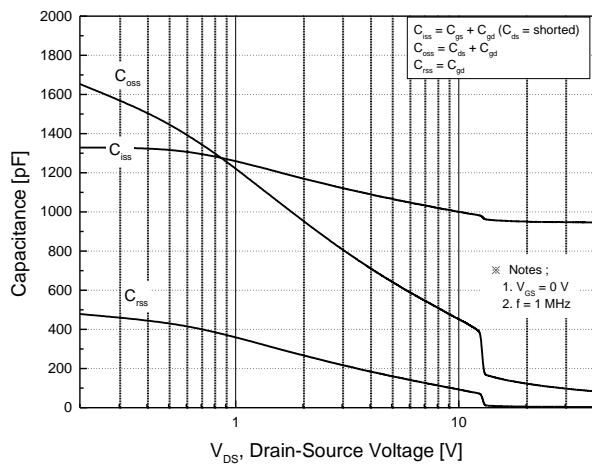


Fig.8 Capacitance Characteristics

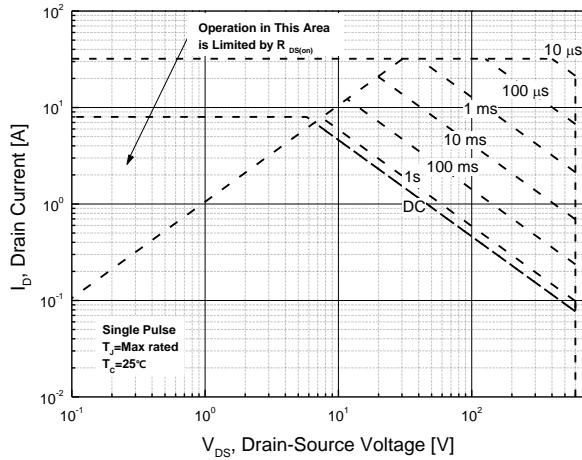


Fig.9 Maximum Safe Operating Area

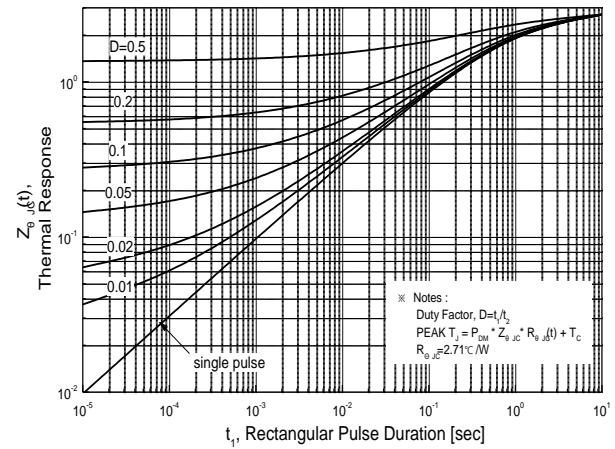


Fig.10 Transient Thermal Response Curve

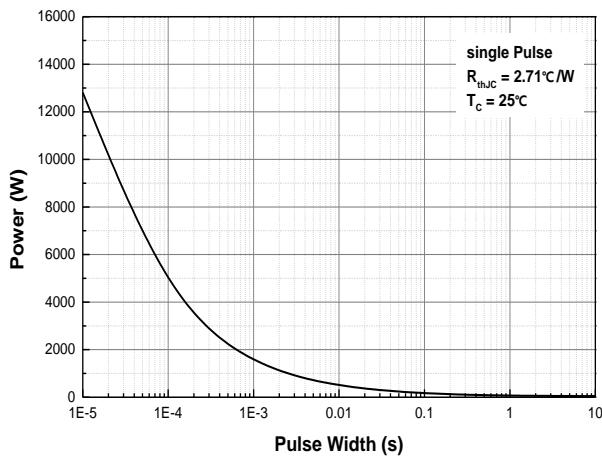


Fig.11 Single Pulse Maximum Power Dissipation

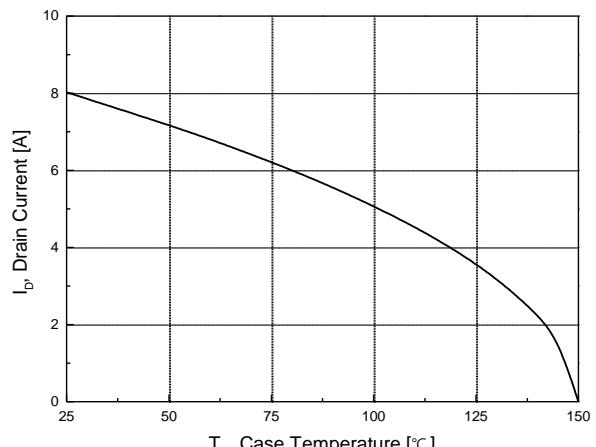
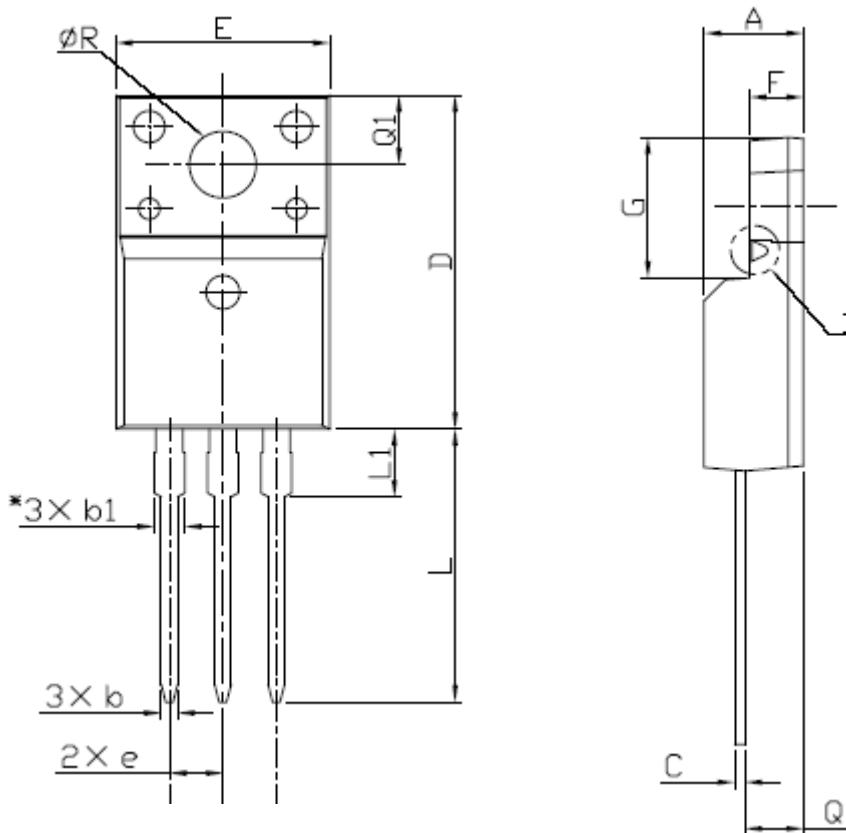


Fig.12 Maximum Drain Current vs. Case Temperature

Physical Dimensions

3 Leads, TO-220F

Dimensions are in millimeters unless otherwise specified



Symbol	Min	Nom	Max
A	4.50		4.93
b	0.63		0.91
b1	1.15		1.47
C	0.33		0.63
D	15.47		16.13
E	9.60		10.71
e		2.54	
F	2.34		2.84
G	6.48		6.90
L	12.24		13.72
L1	2.79		3.67
Q	2.52		2.96
Q1	3.10		3.50
ØR	3.00		3.55

Note : Package body size, length and width do not include mold flash, protrusions and gate burrs.

DISCLAIMER:

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