

MDF6N65B

N-Channel MOSFET 650V, 6.0A, 1.45Ω

General Description

The MDF6N65B use advanced Magnachip's MOSFET Technology, which provides low on-state resistance, high switching performance and excellent quality.

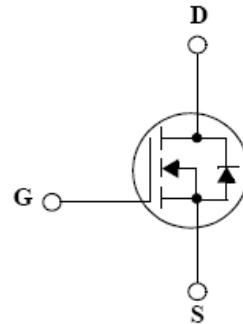
MDF6N65B is suitable device for SMPS, HID and general purpose applications.

Features

- $V_{DS} = 650V$
- $I_D = 6.0A$
- $R_{DS(ON)} \leq 1.45\Omega$
- $@V_{GS} = 10V$
- $@V_{GS} = 10V$

Applications

- Power Supply
- PFC
- Ballast



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

Characteristics	Symbol	Rating	Unit
Drain-Source Voltage	V_{DSS}	650	V
Gate-Source Voltage	V_{GSS}	± 30	V
Continuous Drain Current	I_D	6.0*	A
		3.8*	A
Pulsed Drain Current ⁽¹⁾	I_{DM}	24	A
Power Dissipation	P_D	39	W
		0.31	W/°C
Peak Diode Recovery dv/dt ⁽³⁾	dv/dt	4.5	V/ns
Repetitive Pulse Avalanche Energy ⁽¹⁾	E_{AR}	3.9	mJ
Avalanche current ⁽¹⁾	I_{AR}	6.0	A
Single Pulse Avalanche Energy ⁽⁴⁾	E_{AS}	200	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⁾	$R_{θJA}$	62.5	°C/W
Thermal Resistance, Junction-to-Case ⁽¹⁾	$R_{θJC}$	3.2	°C/W

Ordering Information

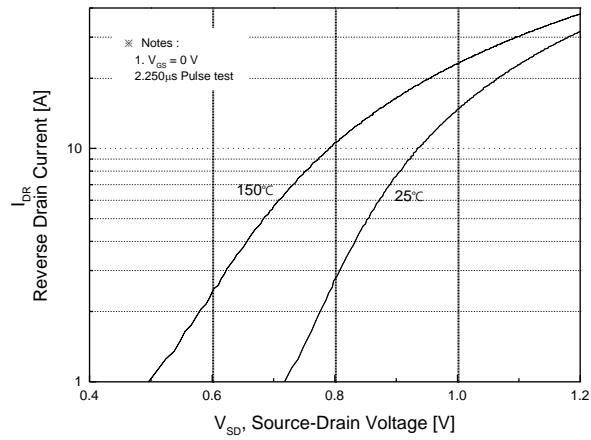
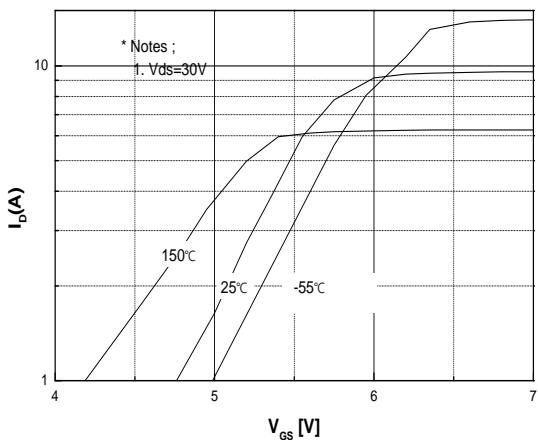
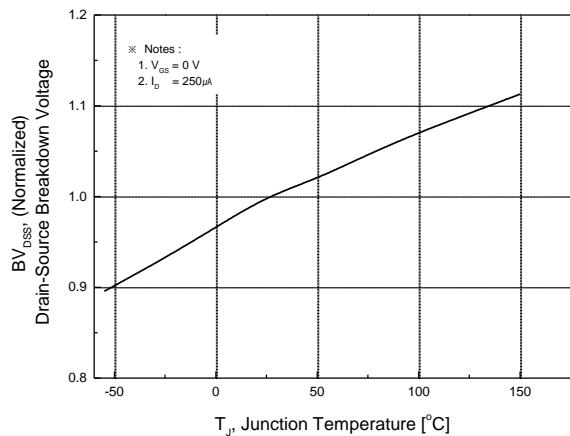
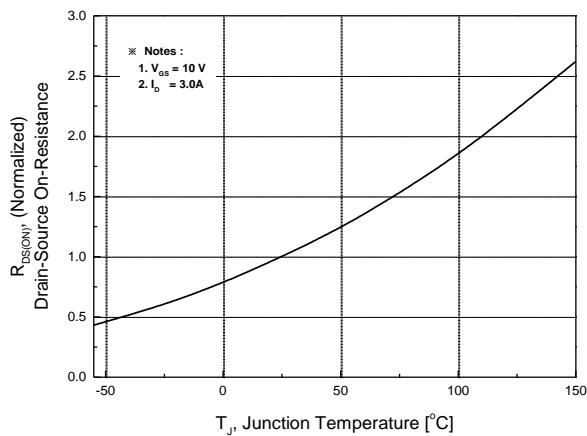
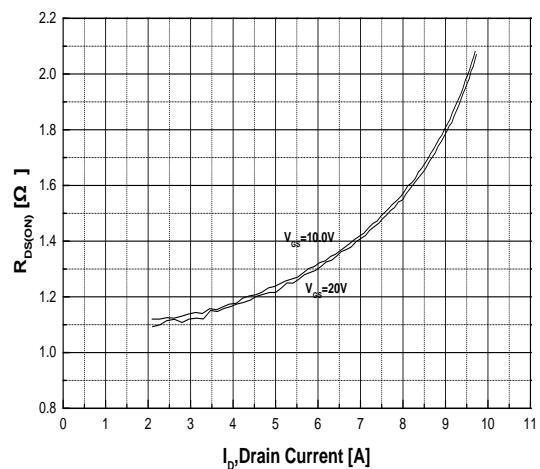
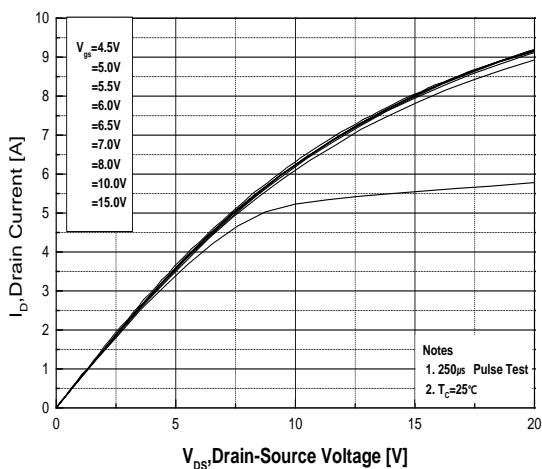
Part Number	Temp. Range	Package	Packing	RoHS Status
MDF6N65BTH	-55~150°C	TO-220F	Tube	Halogen Free

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	650	-	-	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} = 650V, 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 = 3.0A		1.22	1.45	Ω
Forward Transconductance	g _{fs}	V _{DS} = 30V, I _D = 3.0A	-	7	-	S
Dynamic Characteristics						
Total Gate Charge	Q _g	V _{DS} = 520V, I _D = 6.0A, V _{GS} = 10V	-	19.4	25.2	nC
Gate-Source Charge	Q _{gs}		-	3.75	-	
Gate-Drain Charge	Q _{gd}		-	8	-	
Input Capacitance	C _{iss}	V _{DS} = 25V, V _{GS} = 0V, f = 1.0MHz	-	780	-	pF
Reverse Transfer Capacitance	C _{rss}		-	7	-	
Output Capacitance	C _{oss}		-	85	-	
Turn-On Delay Time	t _{d(on)}	V _{GS} = 10V, V _{DS} = 325V, I _D = 6.0A, R _G = 25Ω	-	16	-	ns
Rise Time	t _r		-	30	-	
Turn-Off Delay Time	t _{d(off)}		-	66	140	
Fall Time	t _f		-	47	105	
Drain-Source Body Diode Characteristics						
Maximum Continuous Drain to Source Diode Forward Current	I _S	-	-	-	6.0	A
Source-Drain Diode Forward Voltage	V _{SD}	I _S = 6.0, V _{GS} = 0V	-	-	1.4	V
Body Diode Reverse Recovery Time	t _{rr}	I _F = 6.0A, di/dt = 100A/μs	-	275	450	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 T_{J(MAX)}=150°C
3. I_{SD} ≤6.0A, di/dt≤200A/us, V_{DD}≤BV_{DSS}, R_g=25Ω, Starting T_J=25°C
4. L=10.3mH, I_{AS}=6.0A, V_{DD}=50V, R_g=25Ω, Starting T_J=25°C



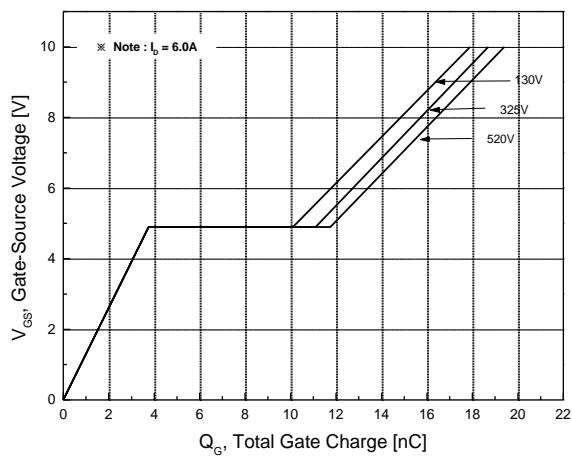


Fig.7 Gate Charge Characteristics

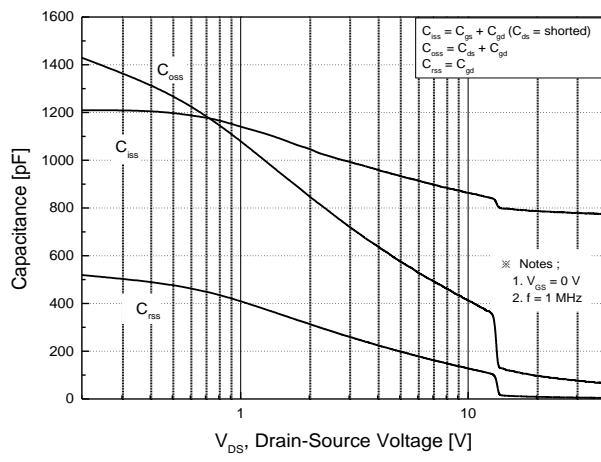


Fig.8 Capacitance Characteristics

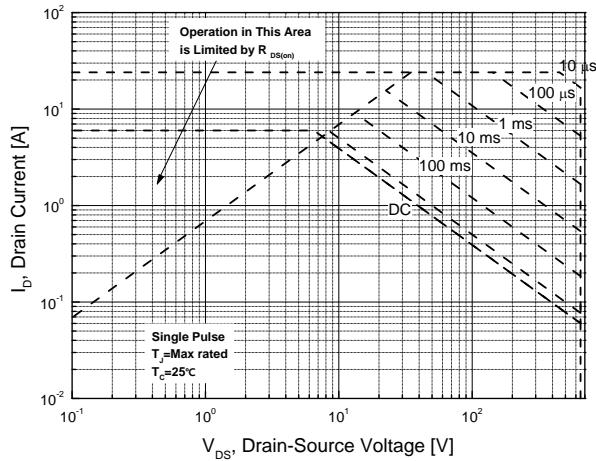


Fig.9 Maximum Safe Operating Area

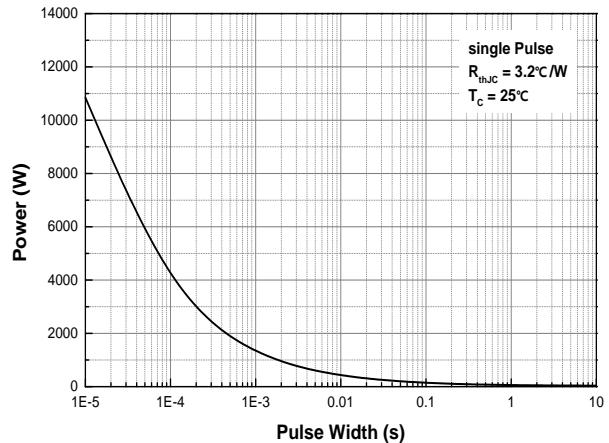


Fig.10 Single Pulse Maximum Power Dissipation

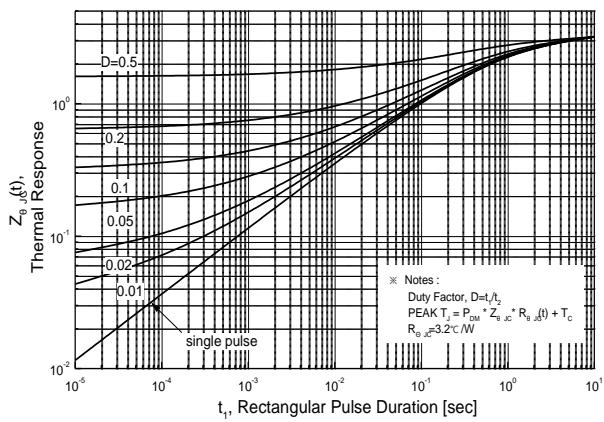


Fig.11 Transient Thermal Response Curve

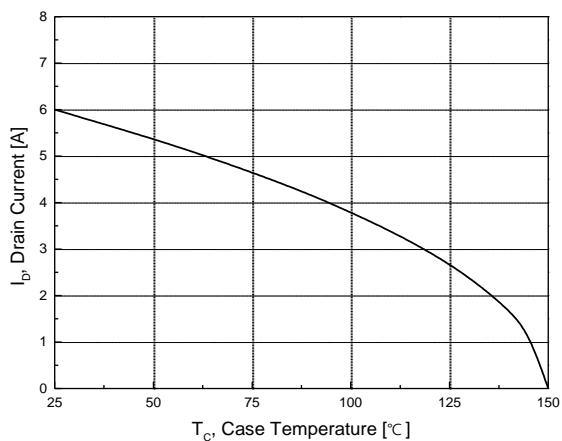
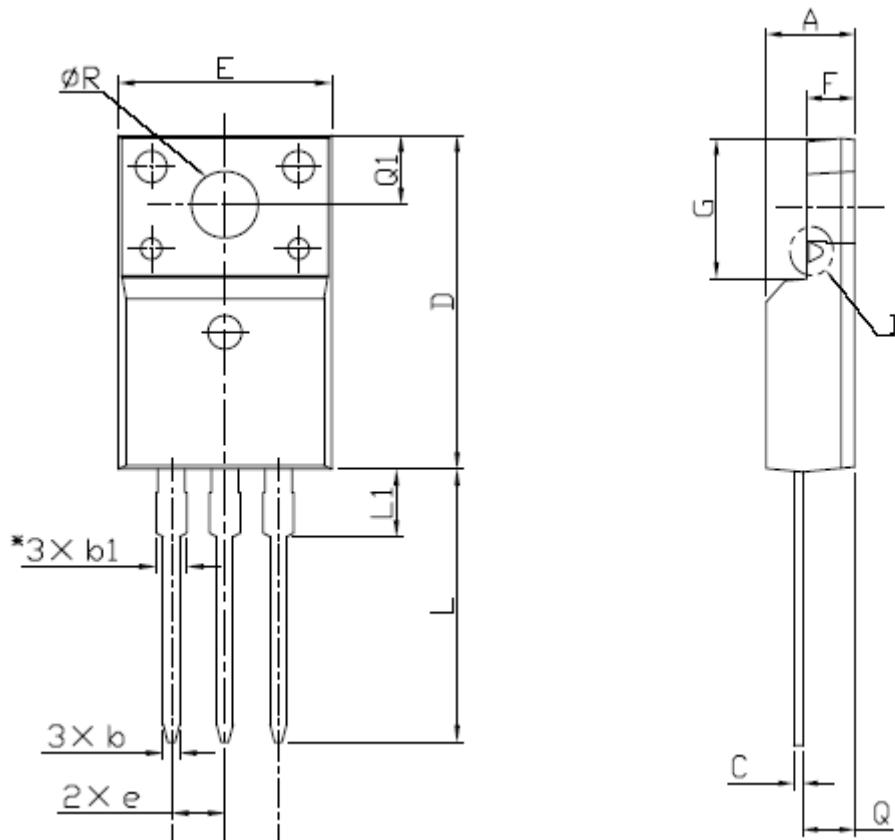


Fig.15 Maximum Drain Current vs. Case Temperature

Physical Dimensions

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

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.

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