

MDF11N65B

N-Channel MOSFET 650V, 12A, 0.65Ω

MDF11N65B N-channel MOSFET 650V

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.

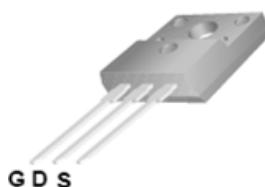
These devices are suitable device for SMPS, high Speed switching and general purpose applications.

Features

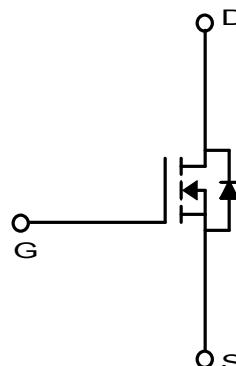
- $V_{DS} = 650V$
- $I_D = 12A$
- $R_{DS(ON)} \leq 0.65\Omega$ @ $V_{GS} = 10V$
- $R_{DS(ON)} \leq 0.65\Omega$ @ $V_{GS} = 10V$

Applications

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



TO-220F
MDF Series



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	12*	A
$T_c=25^\circ C$		7.7*	A
Pulsed Drain Current ⁽¹⁾	I_{DM}	48*	A
Power Dissipation	P_D	49.6	W
$T_c=25^\circ C$		0.4	$W^\circ C$
Repetitive Avalanche Energy ⁽¹⁾	E_{AR}	18.1	mJ
Peak Diode Recovery dv/dt ⁽³⁾	dv/dt	4.5	V/ns
Single Pulse Avalanche Energy ⁽⁴⁾	E_{AS}	750	mJ
Junction and Storage Temperature Range	T_J, T_{stg}	-55~150	$^\circ C$

* I_d limited by maximum junction temperature

Thermal Characteristics

Characteristics	Symbol	Rating	Unit
Thermal Resistance, Junction-to-Ambient ⁽¹⁾	$R_{\theta JA}$	62.5	$^\circ C/W$
Thermal Resistance, Junction-to-Case ⁽¹⁾	$R_{\theta JC}$	2.52	

Ordering Information

Part Number	Temp. Range	Package	Packing	RoHS Status
MDF11N65BTH	-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 = 6A		0.55	0.65	Ω
Forward Transconductance	g _f	V _{DS} = 30V, I _D = 6A	-	8.7	-	S
Dynamic Characteristics						
Total Gate Charge	Q _g	V _{DS} = 520V, I _D = 12.0A, V _{GS} = 10V ⁽³⁾	-	31	-	nC
Gate-Source Charge	Q _{gs}		-	9.2	-	
Gate-Drain Charge	Q _{gd}		-	12.6	-	
Input Capacitance	C _{iss}	V _{DS} = 25V, V _{GS} = 0V, f = 1.0MHz	-	1650	-	pF
Reverse Transfer Capacitance	C _{rss}		-	7.7	-	
Output Capacitance	C _{oss}		-	180	-	
Turn-On Delay Time	t _{d(on)}	V _{GS} = 10V, V _{DS} = 325V, I _D = 12.0A, R _G = 25Ω ⁽³⁾	-	27	-	ns
Rise Time	t _r		-	52	-	
Turn-Off Delay Time	t _{d(off)}		-	132	-	
Fall Time	t _f		-	48	-	
Drain-Source Body Diode Characteristics						
Maximum Continuous Drain to Source Diode Forward Current	I _S		-	12	-	A
Source-Drain Diode Forward Voltage	V _{SD}	I _S = 12.0A, V _{GS} = 0V	-	-	1.4	V
Body Diode Reverse Recovery Time	t _{rr}	I _F = 12.0A, di/dt = 100A/μs	-	355	-	ns
Body Diode Reverse Recovery Charge	Q _{rr}		-	3.6	-	μC

Note :

1. Pulse width is based on R_{ESC} & R_{aja}, 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} ≤12.0A, di/dt≤200A/us, V_{DD}≤BVdss, R_g =25Ω, Starting T_j=25°C
4. L=9.62mH, I_{AS}=12.0A, V_{DD}=50V, R_g =25Ω, Starting T_j=25°C,

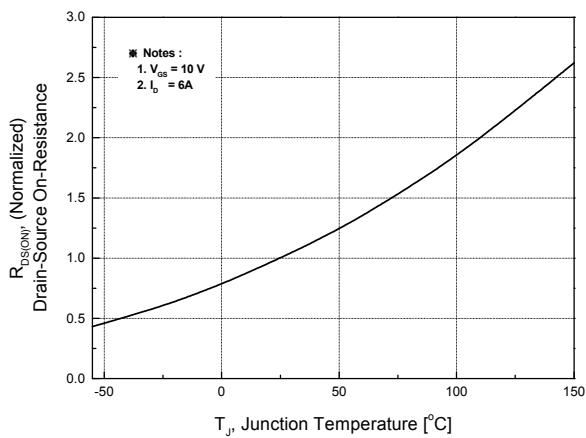
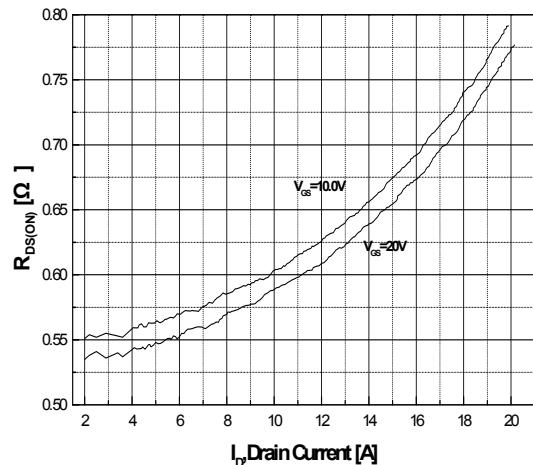
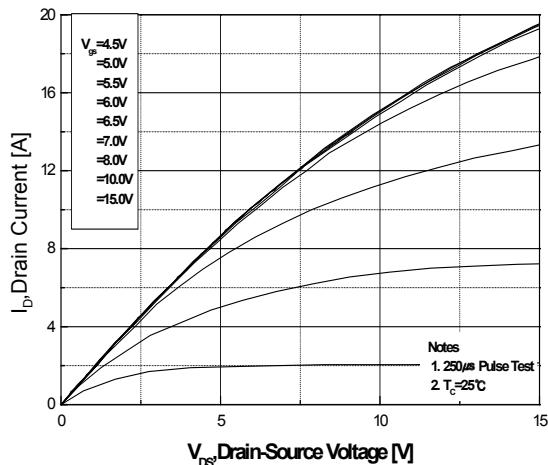


Fig.3 On-Resistance Variation with Temperature

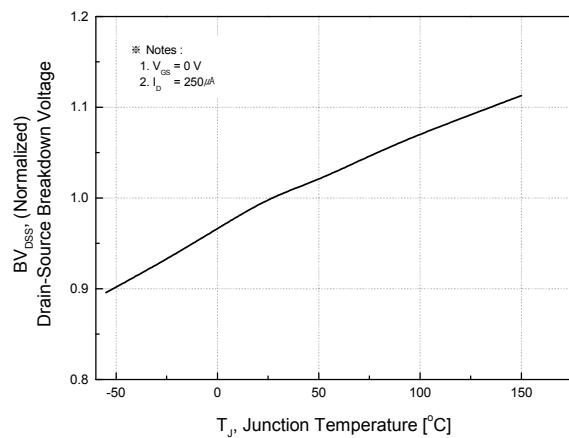


Fig.4 Breakdown Voltage Variation vs. Temperature

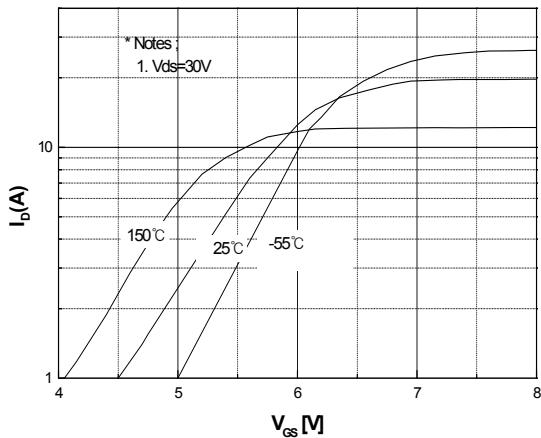


Fig.5 Transfer Characteristics

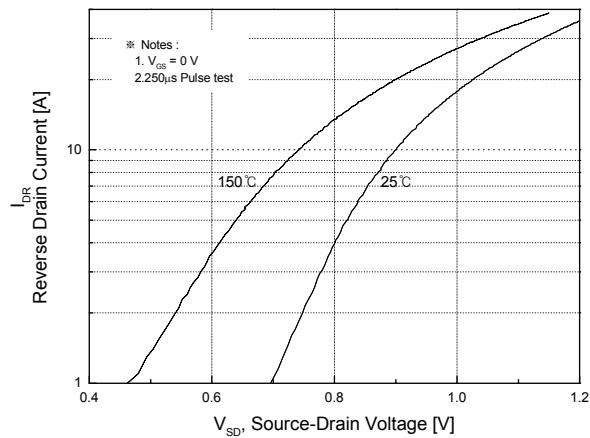


Fig.6 Body Diode Forward Voltage Variation with Source Current and Temperature

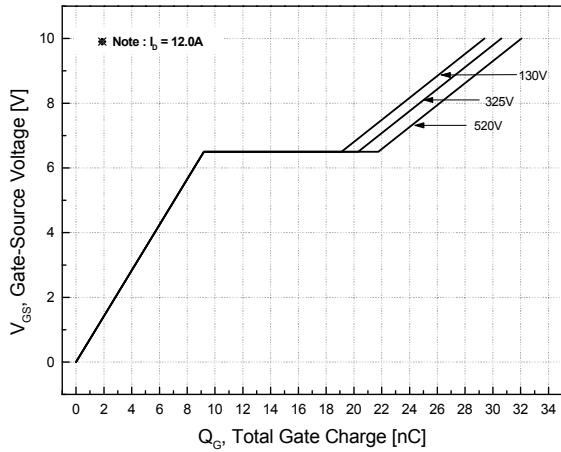


Fig.7 Gate Charge Characteristics

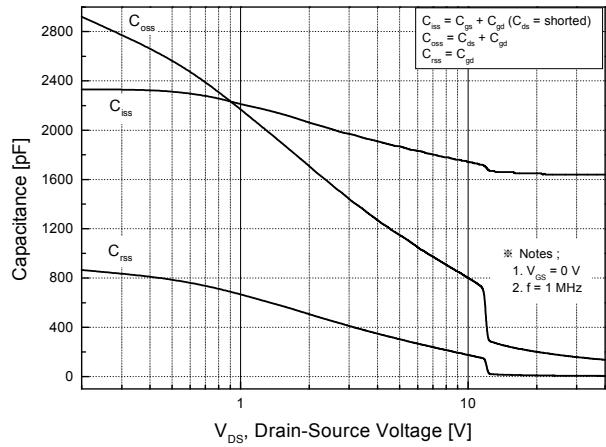


Fig.8 Capacitance Characteristics

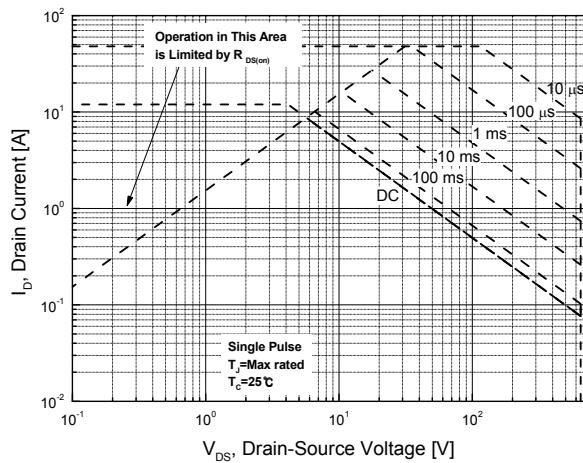


Fig.9 Maximum Safe Operating Area

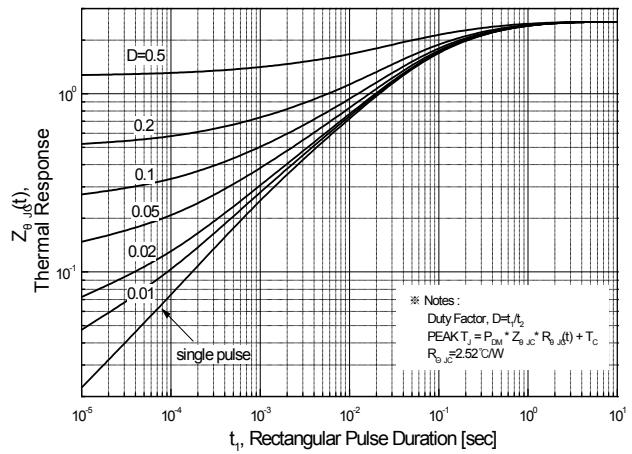


Fig.10 Transient Thermal Response Curve

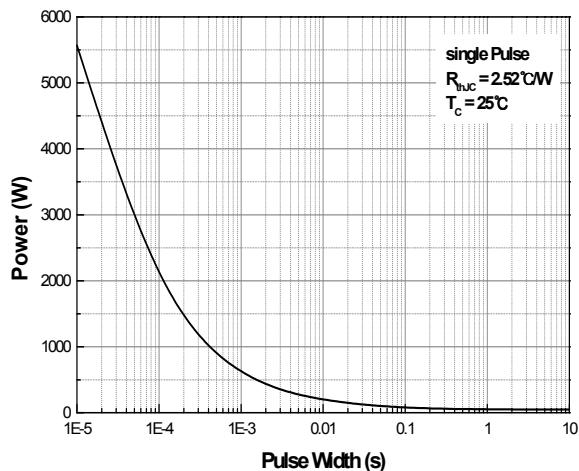


Fig.11 Single Pulse Maximum Power Dissipation

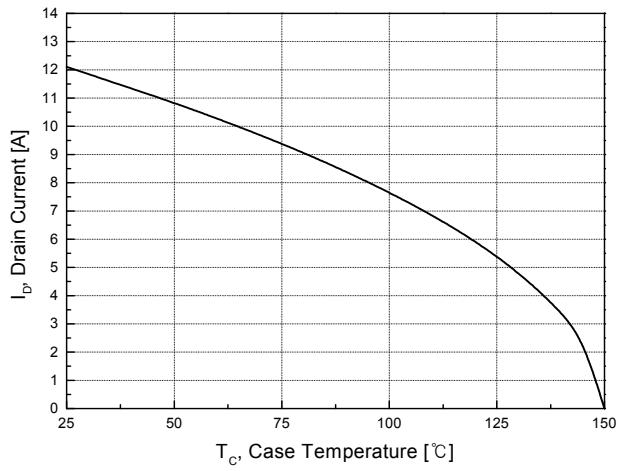
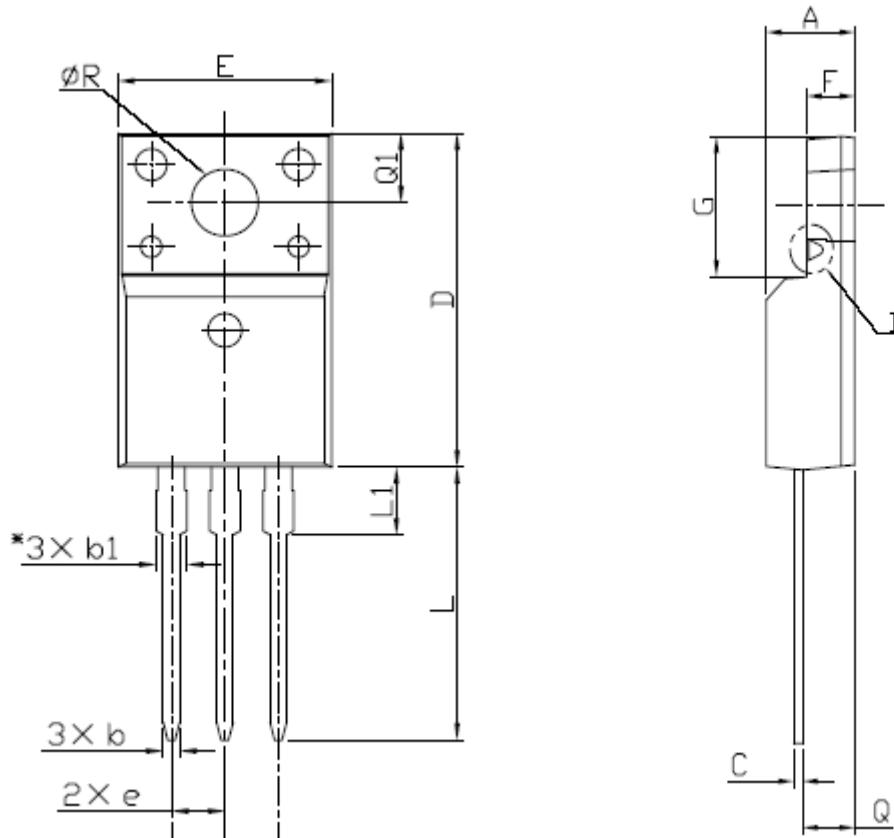


Fig.12 Maximum Drain Current vs. Case Temperature

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
ϕR	3.00		3.55

DISCLAIMER:

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