

General Description

The MDF1752 uses advanced Magnachip's trench MOSFET Technology to provide high performance in on-state resistance, switching performance and reliability

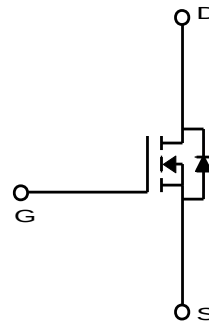
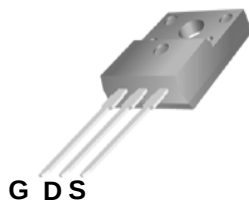
Low $R_{DS(ON)}$, low gate charge can be offering superior benefit in the application.

Features

- $V_{DS} = 40V$
- $I_D = 50A$ @ $V_{GS} = 10V$
- $R_{DS(ON)} < 8.0m\Omega$ @ $V_{GS} = 10V$
 $< 10.5m\Omega$ @ $V_{GS} = 4.5V$

Applications

- Inverters
- General purpose applications



Absolute Maximum Ratings ($T_C = 25^\circ C$ unless otherwise noted)

Characteristics		Symbol	Rating	Unit
Drain-Source Voltage		V_{DSS}	40	V
Gate-Source Voltage		V_{GSS}	± 20	V
Continuous Drain Current (Note 1)	$T_C = 25^\circ C$ (a)	I_D	50	A
	$T_C = 100^\circ C$		31.8	
	$T_A = 25^\circ C$ (b)		12.6	
	$T_A = 100^\circ C$		8.0	
Pulsed Drain Current		I_{DM}	100	A
Power Dissipation for Single Operation	$T_C = 25^\circ C$	P_D	32	W
	$T_C = 100^\circ C$		12.8	
	$T_A = 25^\circ C$		2	
	$T_A = 100^\circ C$		0.8	
Single Pulse Avalanche Energy (Note 2)		E_{AS}	153	mJ
Junction and Storage Temperature Range		T_J, T_{stg}	$-55 \sim +150$	$^\circ C$

Thermal Characteristics

Characteristics	Symbol	Rating	Unit
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	62.5	$^\circ C/W$
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	3.9	

Ordering Information

Part Number	Temp. Range	Package	Packing	RoHS Status
MDF1752TH	-55~150°C	TO-220F	Tube	Halogen Free

Electrical Characteristics (T_J =25°C unless otherwise noted)

Characteristics	Symbol	Test Condition	Min	Typ	Max	Unit
Static Characteristics						
Drain-Source Breakdown Voltage	BV _{DSS}	I _D = 250μA, V _{GS} = 0V	40	-	-	V
Gate Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250μA	1.0	1.7	3.0	
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 32V, V _{GS} = 0V	-	-	1	μA
Gate Leakage Current	I _{GSS}	V _{GS} = ±20V, V _{DS} = 0V	-	-	0.1	
Drain-Source ON Resistance	R _{DS(ON)}	V _{GS} = 10V, I _D = 14A	-	6.1	8.0	mΩ
		V _{GS} = 4.5V, I _D = 11A	-	8.2	10.5	
Forward Transconductance	g _{FS}	V _{DS} = 5V, I _D = 14A	-	58	-	S
Dynamic Characteristics						
Total Gate Charge	Q _g	V _{DS} = 20V, I _D = 14A, V _{GS} = 10V	-	26.4	-	nC
Gate-Source Charge	Q _{gs}		-	3.6	-	
Gate-Drain Charge	Q _{gd}		-	6.8	-	
Input Capacitance	C _{iSS}	V _{DS} = 20V, V _{GS} = 0V, f = 1.0MHz	-	1480	-	pF
Reverse Transfer Capacitance	C _{rSS}		-	113	-	
Output Capacitance	C _{oss}		-	243	-	
Turn-On Delay Time	t _{d(on)}	V _{GS} = 10V ,V _{DS} = 20V, I _D = 1A , R _{GEN} = 6Ω	-	9	-	ns
Turn-On Rise Time	t _r		-	21	-	
Trun-Off Delay Time	t _{d(off)}		-	31	-	
Trun-Off Fall Time	t _f		-	18	-	
Drain-Source Body Diode Characteristics						
Source-Drain Diode Forward Voltage	V _{SD}	I _S = 14A, V _{GS} = 0V	-	0.8	1.2	V
Body Diode Reverse Recovery Time	t _{rr}	I _F = 14A, di/dt = 100A/μs	-	26	-	ns
Body Diode Reverse Recovery Charge	Q _{rr}		-	11	-	nC

Note :

- P_D is based on T_{J(MAX)}=150°C
 - P_D (T_C=25°C) is based on R_{θJC},
 - P_D (T_A=25°C) is based on R_{θJA}
- Starting T_J=25°C, L=1mH, I_{AS}=17.5A, V_{DD}=40V, V_{GS}=10V

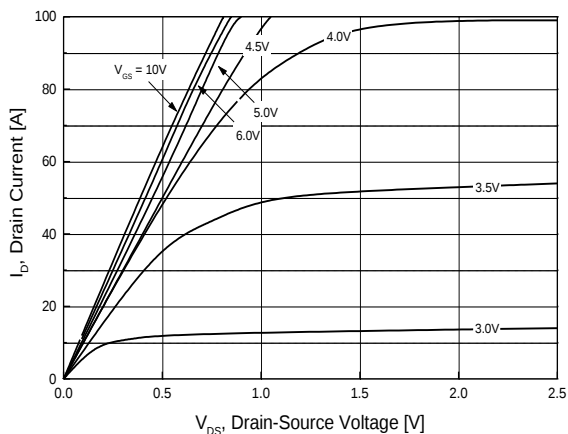


Fig.1 On-Region Characteristics

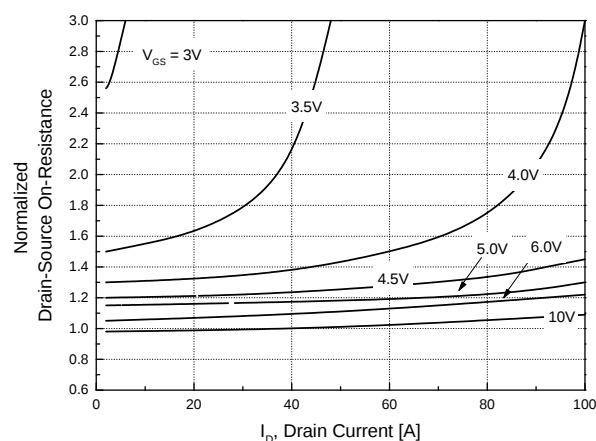


Fig.2 On-Resistance Variation with Drain Current and Gate Voltage

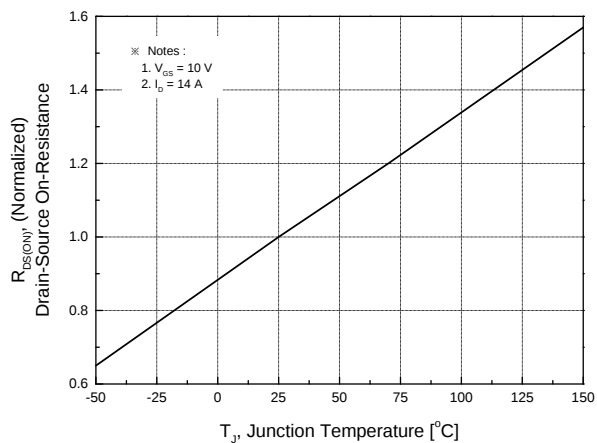


Fig.3 On-Resistance Variation with Temperature

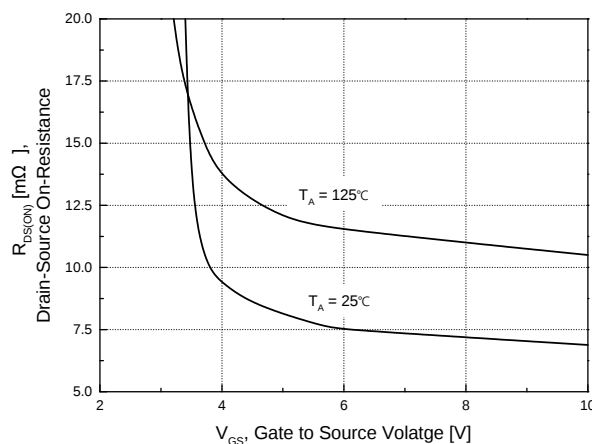


Fig.4 On-Resistance Variation with Gate to Source Voltage

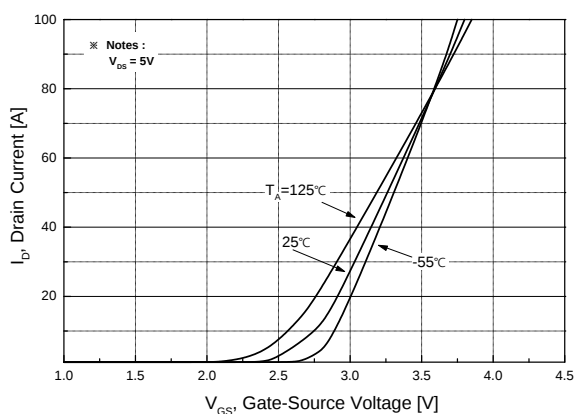


Fig.5 Transfer Characteristics

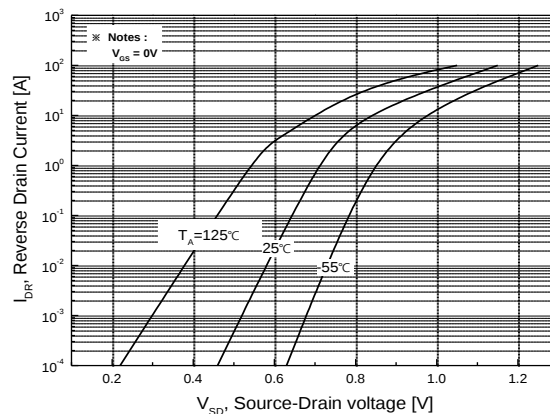
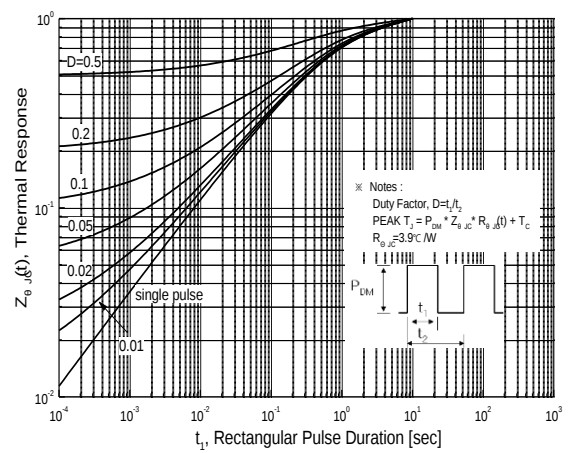
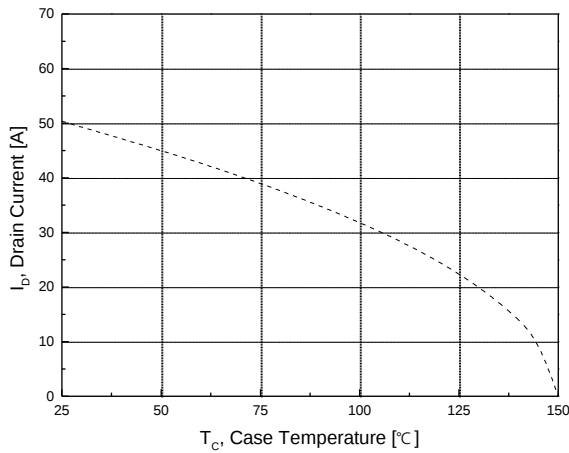
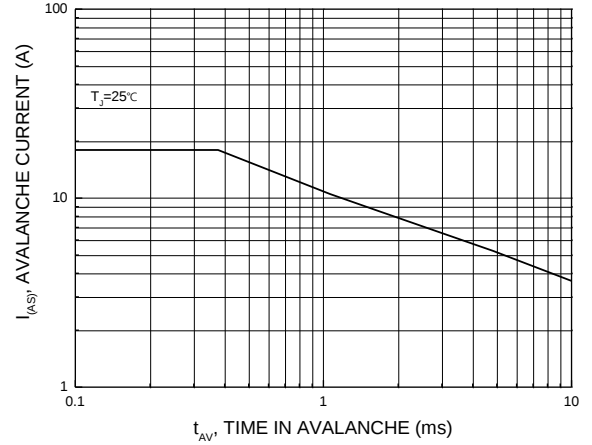
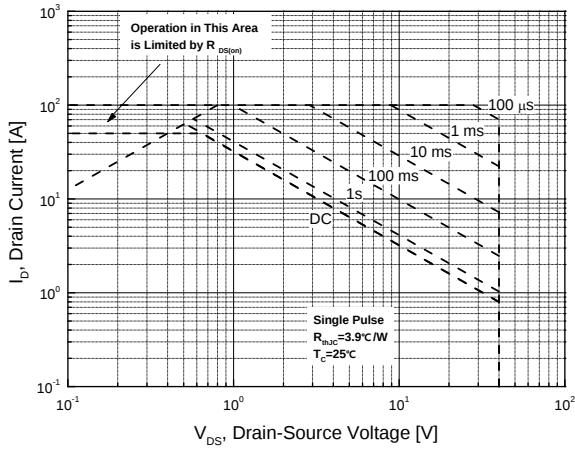
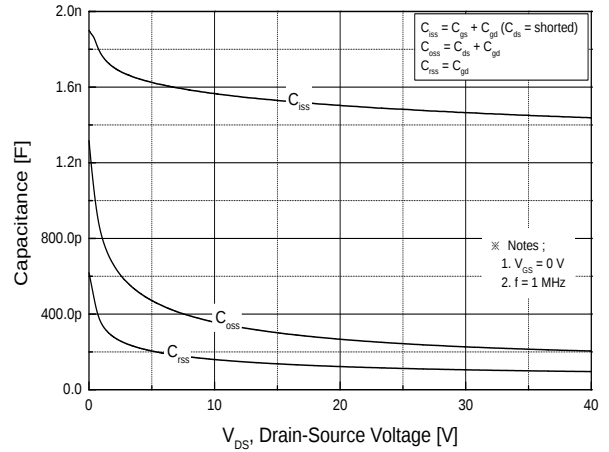
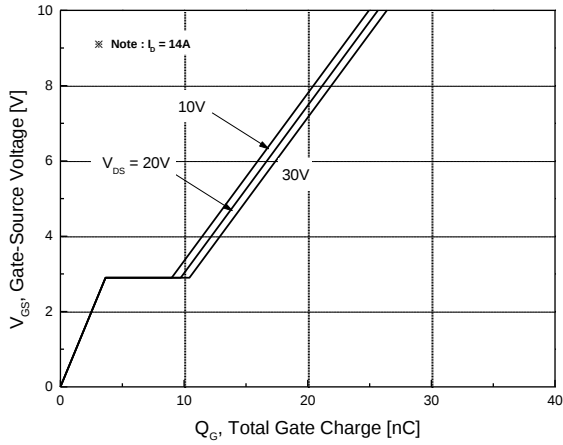


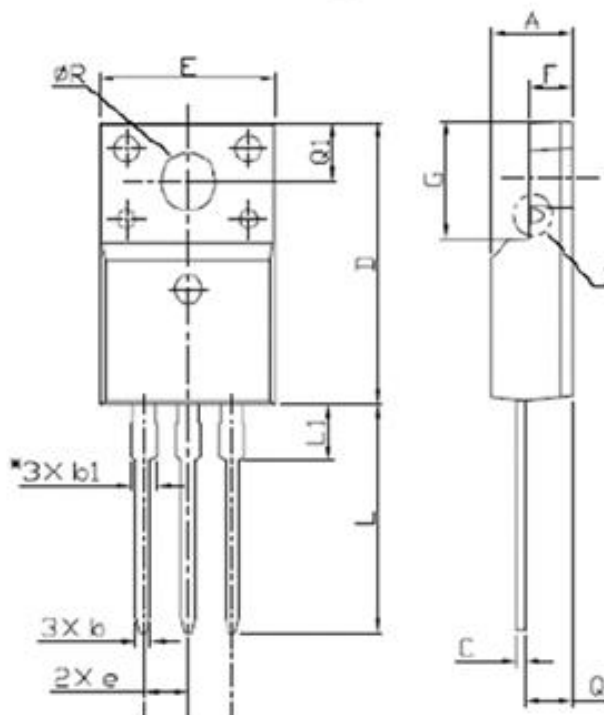
Fig.6 Body Diode Forward Voltage Variation with Source Current and Temperature



Physical Dimensions

Dimensions are in millimeters unless otherwise specified

TO-220F Package Outline Drawing



※Note1 : PKG Body Sizes exclude Mold Flash & Gate Burrs

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 BSC		
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

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

Worldwide Sales Support Locations

U.S.A

Sunnyvale Office

787 N. Mary Ave. Sunnyvale
CA 94085 U.S.A

Tel : 1-408-636-5200

Fax : 1-408-213-2450

E-Mail : americasales@magnachip.com

Chicago Office

2300 Barrington Road, Suite 330
Hoffman Estates, IL 60195 U.S.A

Tel : 1-847-882-0951

Fax : 1-847-882-0998

U.K

Knyvett House The Causeway,
Staines Middx, TW18 3BA, U.K.

Tel : +44 (0) 1784-898-8000

Fax : +44 (0) 1784-895-115

E-Mail : europesales@magnachip.com

Japan

Tokyo Office

Shinbashi 2-chome MT bldg
4F 2-5-5 Shinbashi, Minato-ku

Tokyo, 105-0004 Japan

Tel : 81-3-3595-0632

Fax : 81-3-3595-0671

E-Mail : japansales@magnachip.com

Osaka Office

3F, Shin-Osaka MT-2 Bldg
3-5-36 Miyahara Yodogawa-Ku

Osaka, 532-0003 Japan

Tel : 81-6-6394-8224

Fax : 81-6-6394-8282

E-Mail : osakasales@magnachip.com

Taiwan R.O.C

2F, No.61, Chowize Street, Nei Hu

Taipei, 114 Taiwan R.O.C

Tel : 886-2-2657-7898

Fax : 886-2-2657-8751

E-Mail : taiwansales@magnachip.com

China

Hong Kong Office

Office 03, 42/F, Office Tower Convention Plaza

1 Harbour Road, Wanchai, Hong Kong

Tel : 852-2828-9700

Fax : 852-2802-8183

E-Mail : chinasales@magnachip.com

Shenzhen Office

Room 1803, 18/F

International Chamber of Commerce Tower

Fuhua 3 Road, Futian District

ShenZhen, China

Tel : 86-755-8831-5561

Fax : 86-755-8831-5565

Shanghai Office

Ste 1902, 1 Huaihai Rd. (C) 20021

Shanghai, China

Tel : 86-21-6373-5181

Fax : 86-21-6373-6640

Korea

891, Daechi-Dong, Kangnam-Gu

Seoul, 135-738 Korea

Tel : 82-2-6903-3451

Fax : 82-2-6903-3668 ~9

Email : koreasales@magnachip.com

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.  Magnachip is a registered trademark of Magnachip Semiconductor Ltd.