

General Description

The MDF3752 uses advanced MagnaChip's Trench MOSFET Technology to provided high performance in on-state resistance, switching performance and reliability.

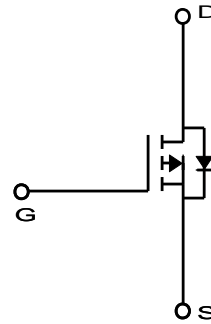
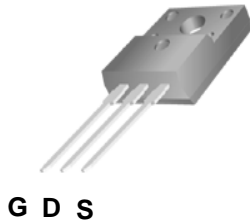
Low $R_{DS(ON)}$, Low Gate Charge can be offering superior benefit in the application.

Features

- $V_{DS} = -40V$
- $I_D = -36.5A$ @ $V_{GS} = -10V$
- $R_{DS(ON)} < 17m\Omega$ @ $V_{GS} = -10V$
- $R_{DS(ON)} < 25m\Omega$ @ $V_{GS} = -4.5V$

Applications

- Inverters
- General purpose applications



Absolute Maximum Ratings ($T_C = 25^\circ$)

Characteristics		Symbol	Rating	Unit
Drain-Source Voltage		V_{DSS}	-40	V
Gate-Source Voltage		V_{GSS}	± 20	V
Continuous Drain Current	$T_C = 25^\circ C$	I_D	-36.5	A
	$T_C = 100^\circ C$		-23.1	A
Pulsed Drain Current		I_{DM}	-90	A
Power Dissipation	$T_C = 25^\circ C$	P_D	35.7	W
	$T_C = 100^\circ C$		14.3	
Single Pulse Avalanche Energy		E_{AS}	128	mJ
Junction and Storage Temperature Range		T_J, T_{stg}	-55~+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	$R_{\theta JC}$	3.5	

Ordering Information

Part Number	Temp. Range	Package	Packing	RoHS Status
MDF3752TH	-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	-2.0	-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 = -20A	-	13	17	mΩ
		V _{GS} = -4.5V, I _D = -10A	-	19	25	
Forward Transconductance	g _{FS}	V _{DS} = -10V, I _D = -20A	-	40	-	S
Dynamic Characteristics						
Total Gate Charge	Q _g	V _{DD} = -20V, I _D = -20A, V _{GS} = -10V	-	44.1	-	nC
Gate-Source Charge	Q _{gs}		-	8.6	-	
Gate-Drain Charge	Q _{gd}		-	9.3	-	
Input Capacitance	C _{iss}	V _{DS} = -20V, V _{GS} = 0V, f = 1.0MHz	-	2088	-	pF
Reverse Transfer Capacitance	C _{rss}		-	168	-	
Output Capacitance	C _{oss}		-	290	-	
Turn-On Delay Time	t _{d(on)}	V _{GS} = -10V, V _{DD} = -20V, I _D = -1A, R _{GEN} = 6.0Ω	-	17.6	-	ns
Turn-On Rise Time	t _r		-	17.8	-	
Turn-Off Delay Time	t _{d(off)}		-	59.0	-	
Turn-Off Fall Time	t _f		-	19.8	-	
Drain-Source Body Diode Characteristics						
Source-Drain Diode Forward Voltage	V _{SD}	I _S = -20A, V _{GS} = 0V	-	-	1.2	V
Reverse Recovery Time	t _{rr}	I _S = -20A, di/dt = 100A/us	-	40	-	ns
Reverse Recovery Charge	Q _{rr}		-	40	-	nC

Note :

- P_D is based on T_{J(MAX)} = 150°C, P_D(T_C = 25°C) is based on R_{θJC}.
- Starting T_J = 25°C, L = 1mH, I_{AS} = -16A, V_{DD} = -20V, V_{GS} = -10V

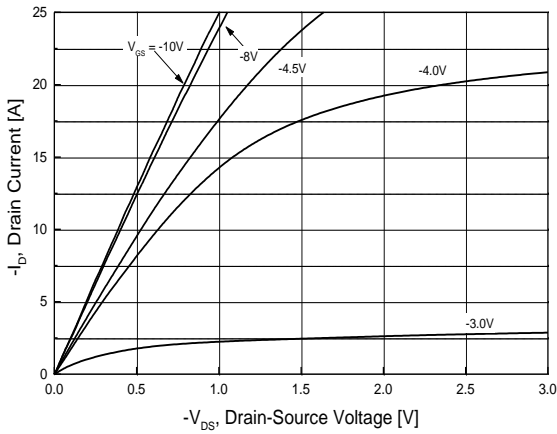


Fig.1 On-Region Characteristics

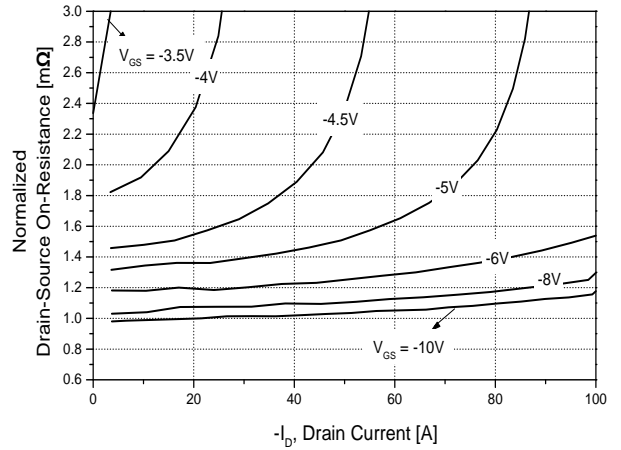


Fig.2 On-Resistance Variation with Drain Current and Gate Voltage

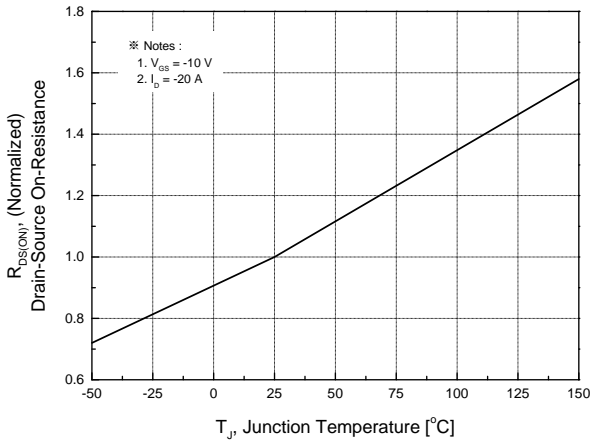


Fig.3 On-Resistance Variation with Temperature

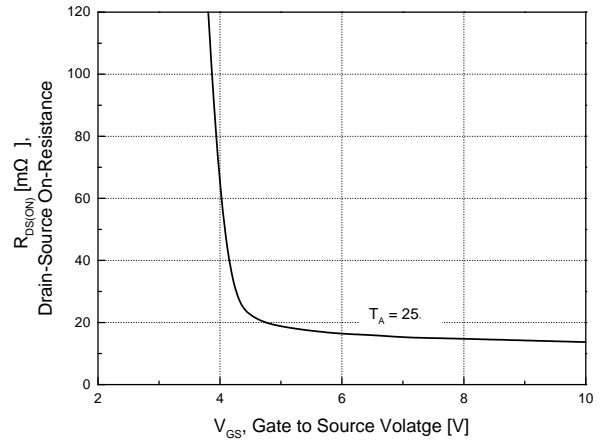


Fig.4 On-Resistance Variation with Gate to Source Voltage

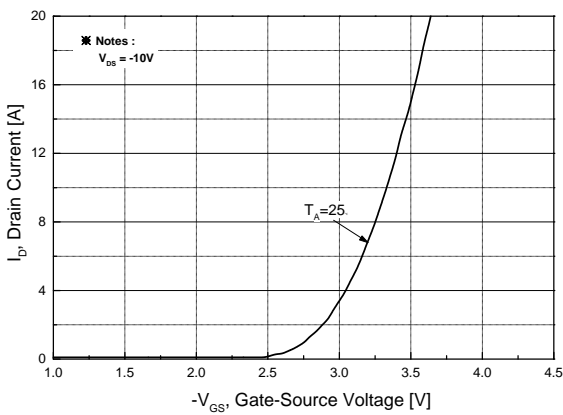


Fig.5 Transfer Characteristics

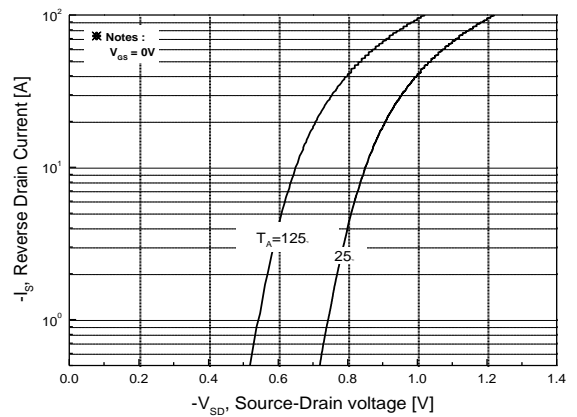


Fig.6 Body Diode Forward Voltage Variation with Source Current and Temperature

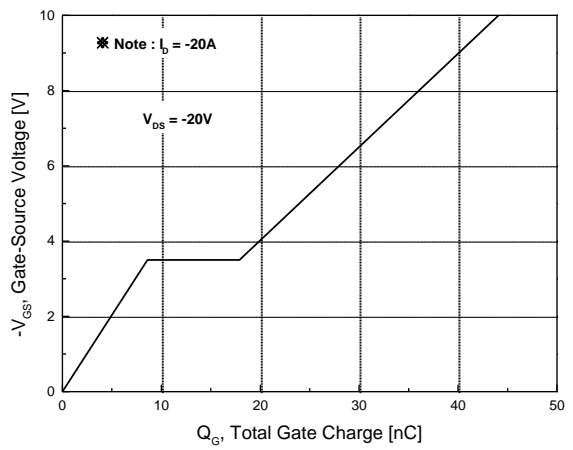


Fig.7 Gate Charge Characteristics

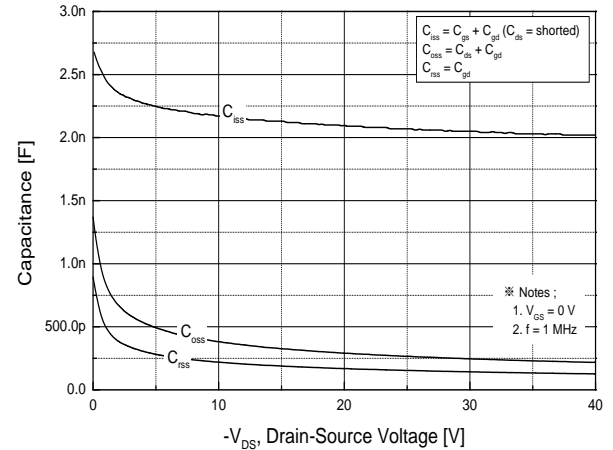


Fig.8 Capacitance Characteristics

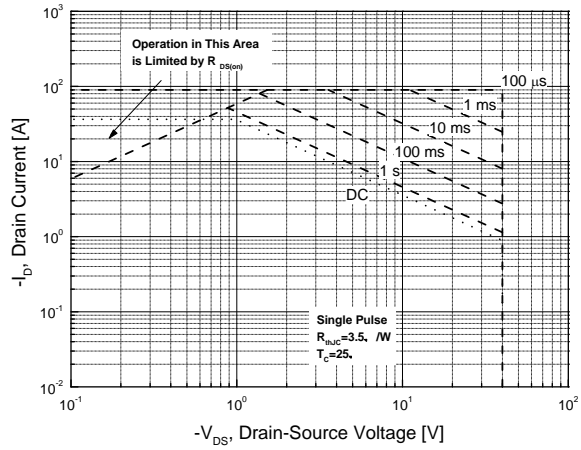


Fig.9 Maximum Safe Operating Area

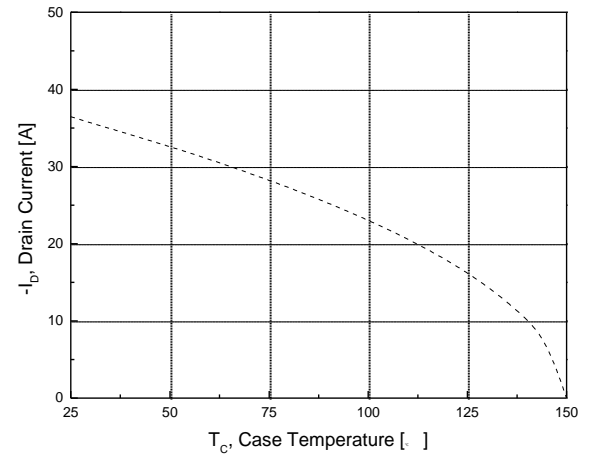


Fig.10 Maximum Drain Current vs. Case Temperature

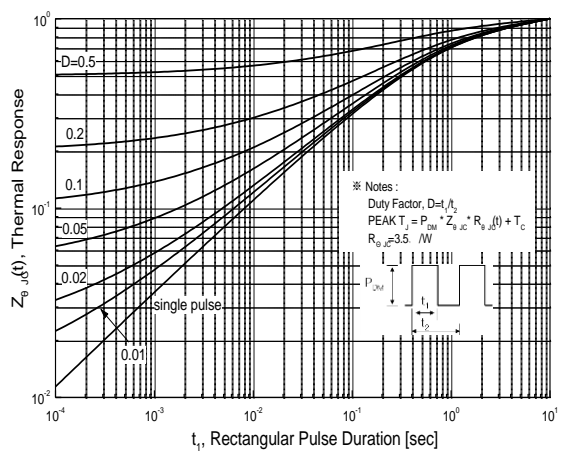
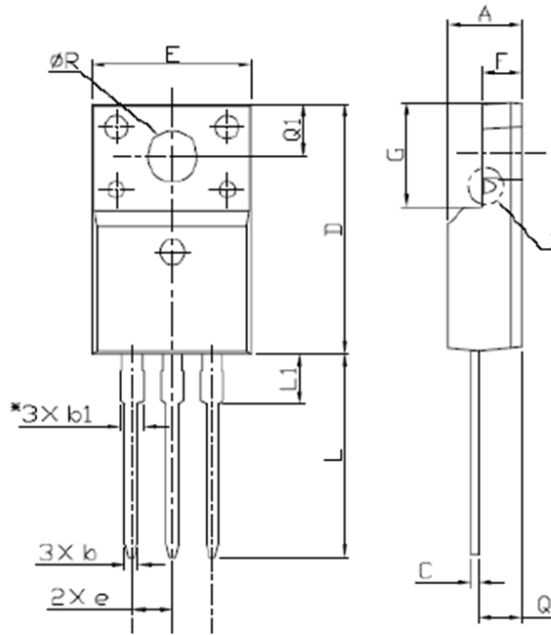


Fig.11 Transient Thermal Response Curve

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	12.50	-	13.72
L1	2.79	-	3.67
Q	2.52	-	2.96
Q1	3.10	-	3.50
ϕR	3.00	-	3.55

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