

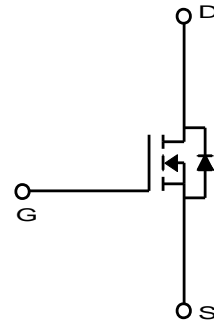
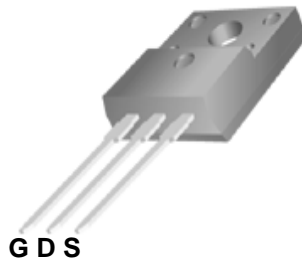
General Description

The MDF1903 uses advanced MagnaChip's MOSFET Technology, which provides high performance in on-state resistance, fast switching performance and excellent quality. MDF1903 is suitable device for DC to DC converter and general purpose applications.

Features

- $V_{DS} = 100V$
- $I_D = 12A @ V_{GS} = 10V$
- $R_{DS(ON) (MAX)} < 110m\Omega @ V_{GS} = 10V$
 $< 115m\Omega @ V_{GS} = 6.0V$

100% UIL Tested



Absolute Maximum Ratings (Tc = 25°C)

Characteristics		Symbol	Rating	Unit
Drain-Source Voltage		V_{DSS}	100	V
Gate-Source Voltage		V_{GSS}	±20	V
Continuous Drain Current ⁽¹⁾	$T_C=25^\circ C$	I_D	12	A
	$T_C=70^\circ C$		9.6	
Pulsed Drain Current		I_{DM}	40	A
Power Dissipation	$T_C=25^\circ C$	P_D	33.8	W
	$T_C=70^\circ C$		21.7	
Single Pulse Avalanche Energy ⁽²⁾		E_{AS}	25.9	mJ
Junction and Storage Temperature Range		T_J, T_{stg}	-55~150	°C

Thermal Characteristics

Characteristics	Symbol	Rating	Unit
Thermal Resistance, Junction-to-Ambient ⁽¹⁾	$R_{\theta JA}$	62.5	°C/W
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	3.7	

Ordering Information

Part Number	Temp. Range	Package	Packing	Rohs Status
MDF1903TH	-55~150°C	TO-220F	Tube	Halogen Free

Electrical Characteristics (T_J = 25°C)

Characteristics	Symbol	Test Condition	Min	Typ	Max	Unit
Static Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	$I_D = 250\mu A, V_{GS} = 0V$	100	-	-	V
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	1.0	2.0	3.0	
Drain Cut-Off Current	I_{DSS}	$V_{DS} = 80V, V_{GS} = 0V$	-	-	1	μA
Gate Leakage Current	I_{GSS}	$V_{GS} = \pm 20V, V_{DS} = 0V$	-	-	± 0.1	
Drain-Source ON Resistance	$R_{DS(on)}$	$V_{GS} = 10V, I_D = 9A$	-	90	110	$m\Omega$
		$V_{GS} = 6.0V, I_D = 9A$	-	95	115	
Forward Transconductance	g_{fs}	$V_{DS} = 10V, I_D = 9A$	-	16	-	S
Dynamic Characteristics						
Total Gate Charge	$Q_{g(10V)}$	$V_{DS} = 50.0V, I_D = 9A, V_{GS} = 10V$	-	8.8	-	nC
Gate-Source Charge	Q_{gs}		-	1.7	-	
Gate-Drain Charge	Q_{gd}		-	2.3	-	
Input Capacitance	C_{iss}	$V_{DS} = 25.0V, V_{GS} = 0V, f = 1.0MHz$	-	475	800	μF
Reverse Transfer Capacitance	C_{riss}		-	20	-	
Output Capacitance	C_{oss}		-	60	-	
Turn-On Delay Time	$t_{d(on)}$	$V_{GS} = 10V, V_{DS} = 50V, I_D = 9A, R_G = 3.0\Omega$	-	6.8	-	ns
Rise Time	t_r		-	10.6	-	
Turn-Off Delay Time	$t_{d(off)}$		-	16.2	-	
Fall Time	t_f		-	5.5	-	
Drain-Source Body Diode Characteristics						
Source-Drain Diode Forward Voltage	V_{SD}	$I_S = 9A, V_{GS} = 0V$	-	0.75	1.2	V
Body Diode Reverse Recovery Time	t_{rr}	$I_F = 9A, di/dt = 100A/\mu s$	-	41	-	ns
Body Diode Reverse Recovery Charge	Q_{rr}		-	68	-	nC

Note :

- Surface mounted FR-4 board by JEDEC (jesd51-7)
- E_{AS} is tested at starting $T_J = 25^\circ C$, $L = 1.0mH$, $I_{AS} = 5.5A$, $V_{DD} = 50V$, $V_{GS} = 10V$

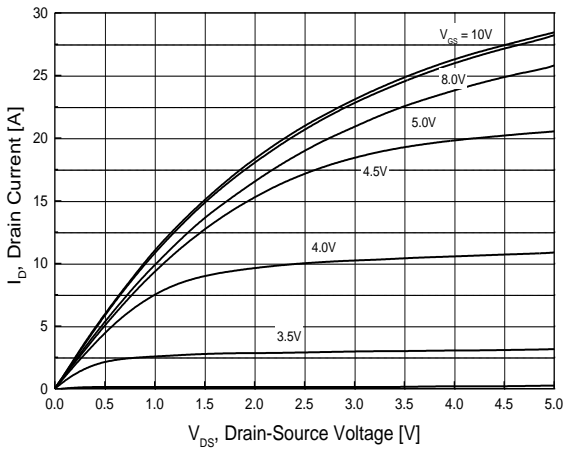


Fig.1 On-Region Characteristics

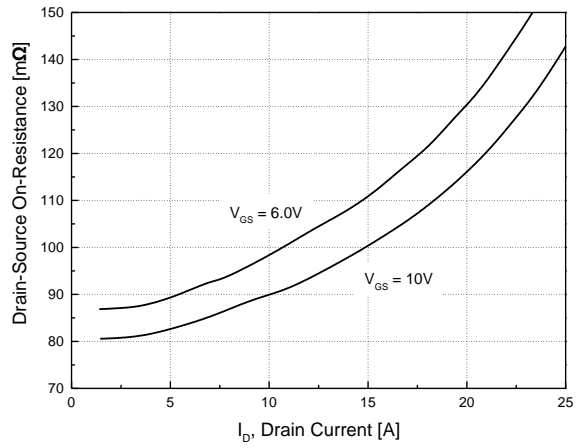


Fig.2 On-Resistance Variation with Drain Current and Gate Voltage

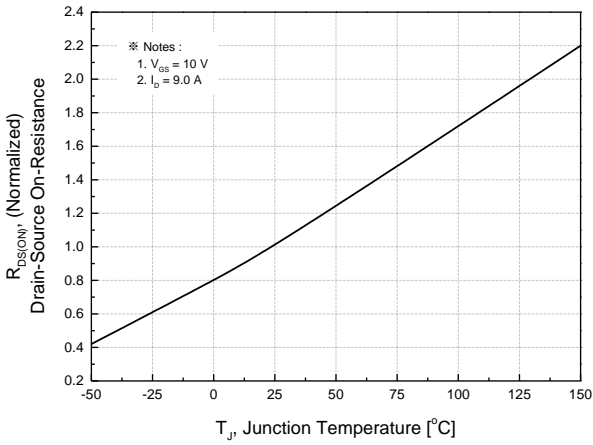


Fig.3 On-Resistance Variation with Temperature

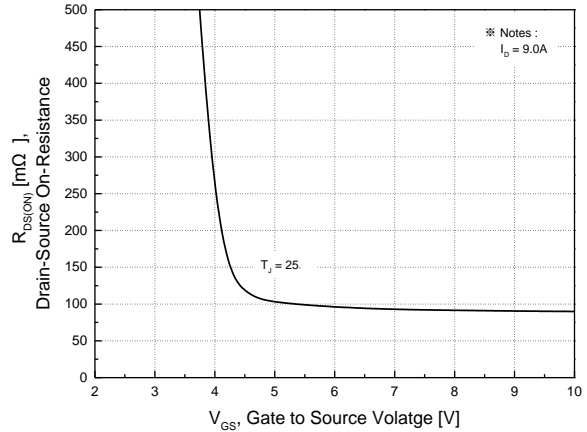


Fig.4 On-Resistance Variation with Gate to Source Voltage

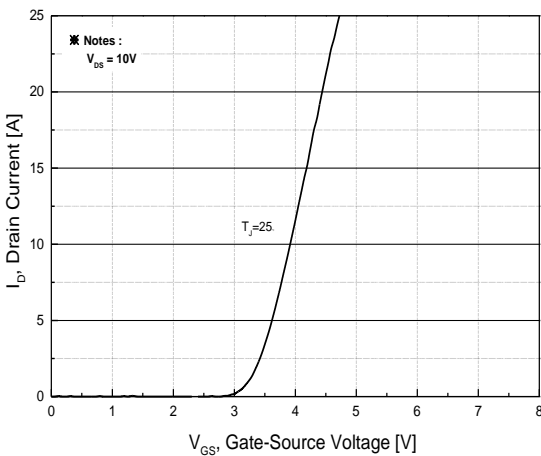


Fig.5 Transfer Characteristics

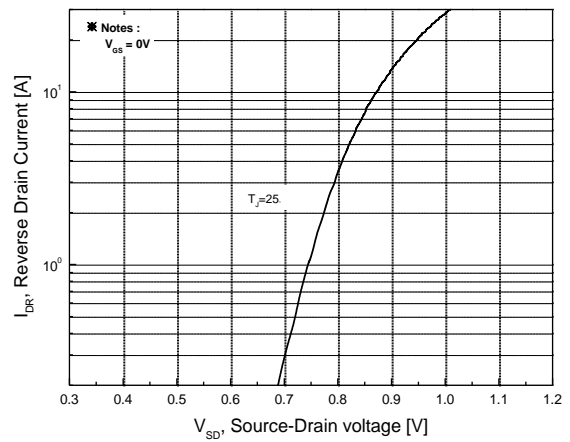


Fig.6 Body Diode Forward Voltage Variation with Source Current and Temperature

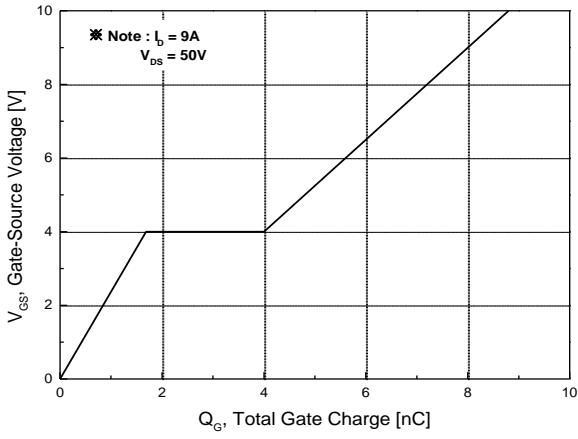


Fig.7 Gate Charge Characteristics

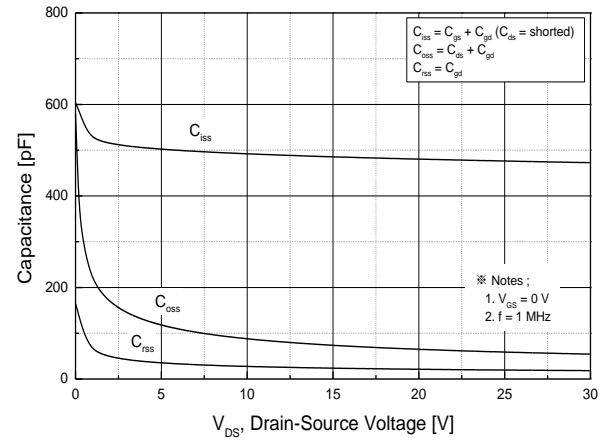


Fig.8 Capacitance Characteristics

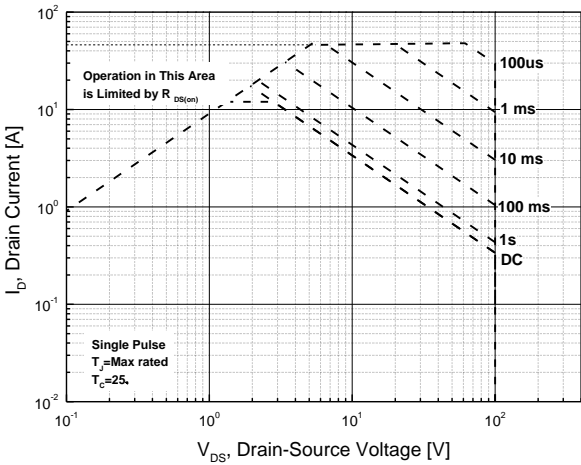


Fig.9 Maximum Safe Operating Area

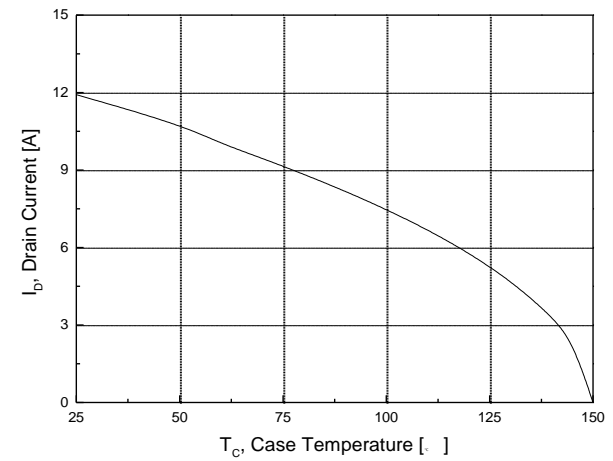


Fig.10 Maximum Drain Current vs. Case Temperature

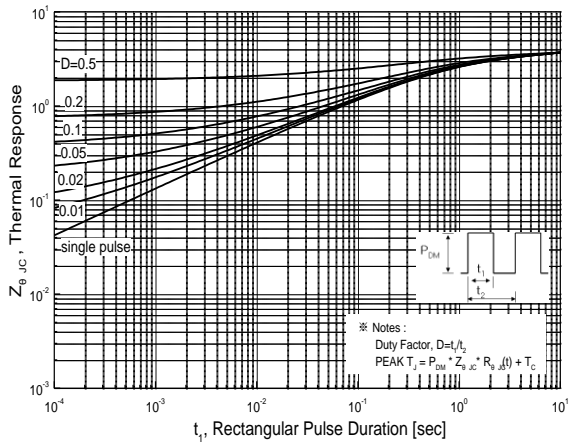
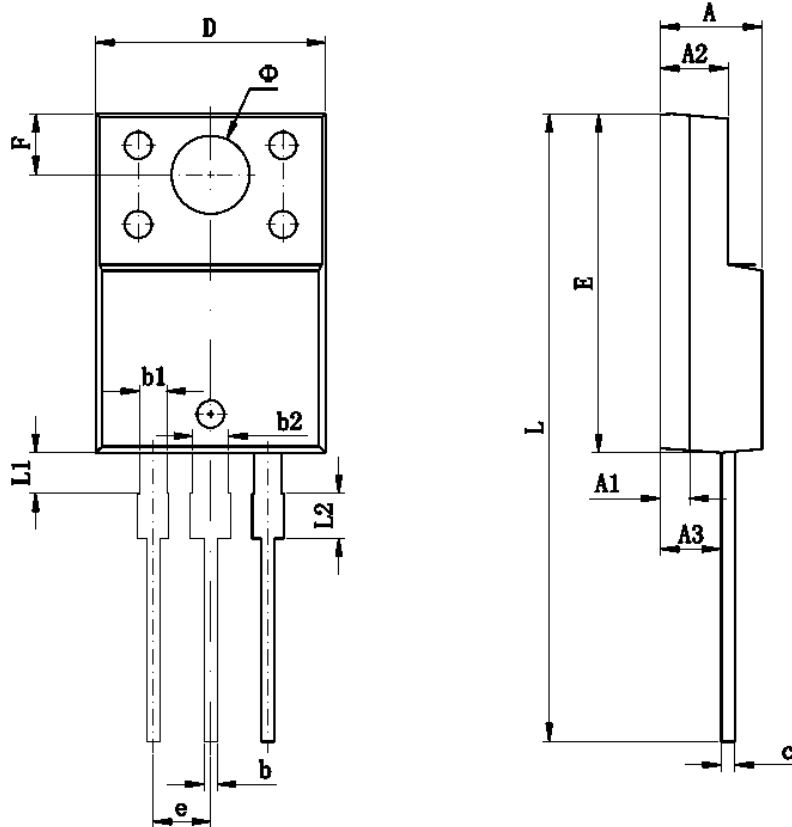


Fig.11 Transient Thermal Response Curve

Package Dimension

3 Leads, TO-220F

Dimensions are in millimeters, unless otherwise specified



Symbol	Dimensions in Millimeters		Dimensions in Inches	
	Min	Max	Min	Max
A	4.300	4.700	0.169	0.185
A1	1.300 REF		0.051 REF	
A2	2.800	3.200	0.110	0.126
A3	2.500	2.900	0.098	0.114
b	0.500	0.750	0.020	0.030
b1	1.100	1.350	0.043	0.053
b2	1.500	1.750	0.059	0.069
c	0.500	0.750	0.020	0.030
D	9.960	10.360	0.392	0.408
E	14.800	15.200	0.583	0.598
e	2.540 TYP		0.100 TYP	
F	2.700 REF		0.106 REF	
Φ	3.500 REF		0.138 REF	
h	0.000	0.300	0.000	0.012
L	28.000	28.400	1.102	1.118
L1	1.700	1.900	0.067	0.075
L2	1.900	2.100	0.075	0.083

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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