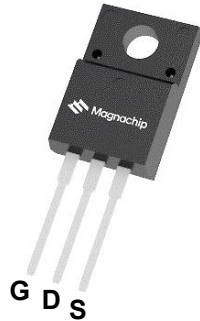


General Description

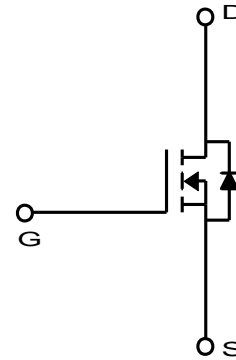
The MDF1933 uses advanced Magnachip's MOSFET Technology, which provides high performance in on-state resistance, fast switching performance and excellent quality. MDF1933 is suitable device for Synchronous Rectification for Server / Adapter and general purpose applications.

Features

- $V_{DS} = 80V$
- $I_D = 43A @ V_{GS} = 10V$
- $R_{DS(ON)} < 7.5 m\Omega @ V_{GS} = 10V$
- 100% UIL Tested



TO-220F



Absolute Maximum Ratings (Ta = 25°C)

Characteristics		Symbol	Rating	Unit
Drain-Source Voltage		V_{DSS}	80	V
Gate-Source Voltage		V_{GSS}	±20	V
Continuous Drain Current ⁽¹⁾	$T_C=25^\circ C$ (Silicon Limited)	I_D	43	A
	$T_C=100^\circ C$		27	
Pulsed Drain Current		I_{DM}	173	
Power Dissipation	$T_C=25^\circ C$	P_D	27.7	W
	$T_C=100^\circ C$		11.1	
Single Pulse Avalanche Energy ⁽²⁾		E_{AS}	144.5	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	$R_{\theta JC}$	4.5	

Ordering Information

Part Number	Temp. Range	Package	Packing	RoHS Status
MDF1933TH	-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}	$I_D = 250\mu A, V_{GS} = 0V$	80	-	-	V
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	2.0	-	4.0	
Drain Cut-Off Current	I_{DSS}	$V_{DS} = 64V, V_{GS} = 0V$	-	-	1.0	μA
Gate Leakage Current	I_{GSS}	$V_{GS} = \pm 20V, V_{DS} = 0V$	-	-	± 0.1	
Drain-Source ON Resistance	$R_{DS(on)}$	$V_{GS} = 10V, I_D = 50A$	-	6.0	7.5	m Ω
Forward Transconductance	g_{fs}	$V_{DS} = 10V, I_D = 50A$	-	47	-	S
Dynamic Characteristics						
Total Gate Charge	Q_g	$V_{DS} = 40V, I_D = 50A, V_{GS} = 10V$	-	59.4	-	nC
Gate-Source Charge	Q_{gs}		-	16.5	-	
Gate-Drain Charge	Q_{gd}		-	12.3	-	
Input Capacitance	C_{iss}	$V_{DS} = 40V, V_{GS} = 0V, f = 1.0MHz$	-	3,841	-	pF
Reverse Transfer Capacitance	C_{rss}		-	34.2	-	
Output Capacitance	C_{oss}		-	651.7	-	
Turn-On Delay Time	$t_{d(on)}$	$V_{GS} = 10V, V_{DS} = 40V, I_D = 50A, R_G = 3.0\Omega$	-	15.6	-	ns
Rise Time	t_r		-	32.7	-	
Turn-Off Delay Time	$t_{d(off)}$		-	24.2	-	
Fall Time	t_f		-	15.1	-	
Gate Resistance	R_g	$f = 1 MHz$	-	2.5	-	Ω
Drain-Source Body Diode Characteristics						
Source-Drain Diode Forward Voltage	V_{SD}	$I_S = 50A, V_{GS} = 0V$	-	0.9	1.2	V
Body Diode Reverse Recovery Time	t_{rr}	$I_F = 50A, di/dt = 100A/\mu s$	-	64.3	-	ns
Body Diode Reverse Recovery Charge	Q_{rr}		-	152.7	-	nC

Note :

- Surface mounted FR-4 board by JEDEC (jesd51-7). Continuous current at T_c=25°C is silicon limited
- E_{AS} is tested at starting T_j = 25°C, L = 1.0mH, I_{AS} = 17.0A, V_{GS} = 10V.

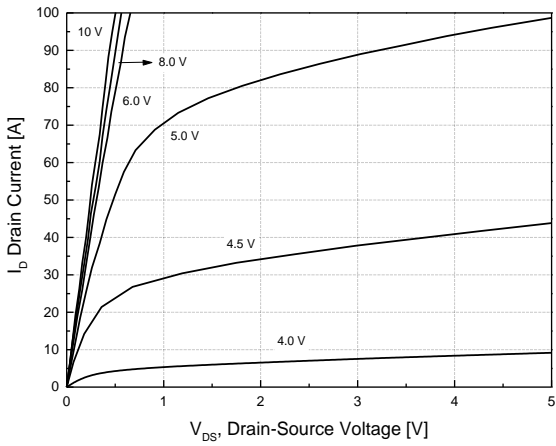


Fig.1 On-Region Characteristics

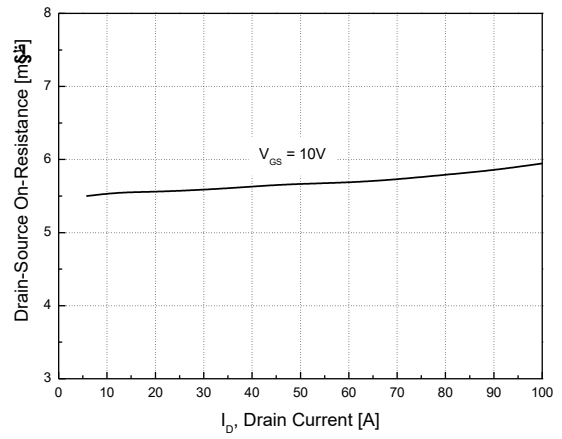


Fig.2 On-Resistance Variation with Drain Current and Gate Voltage

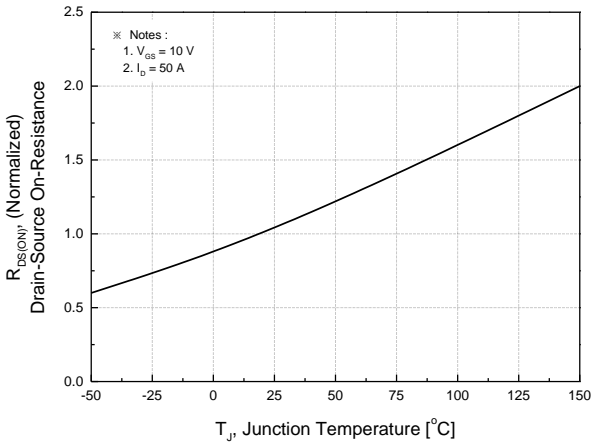


Fig.3 On-Resistance Variation with Temperature

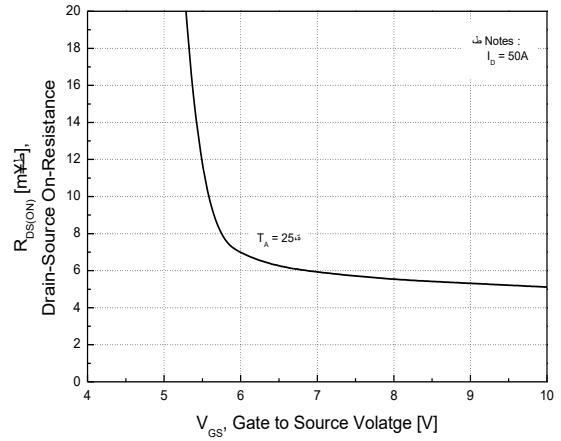


Fig.4 On-Resistance Variation with Gate to Source Voltage

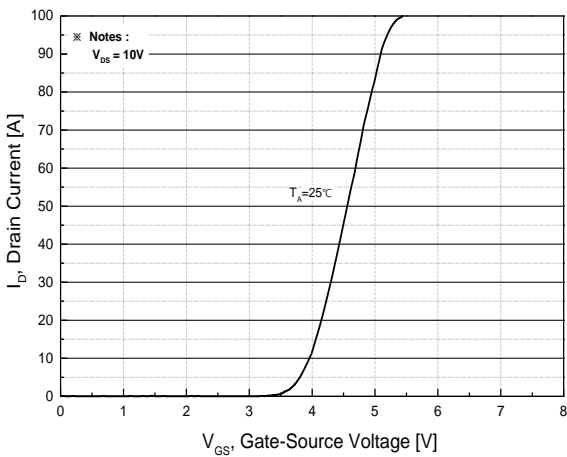


Fig.5 Transfer Characteristics

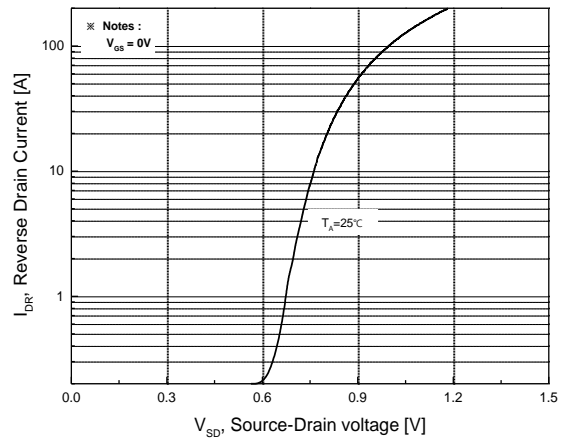


Fig.6 Body Diode Forward Voltage Variation with Source Current and Temperature

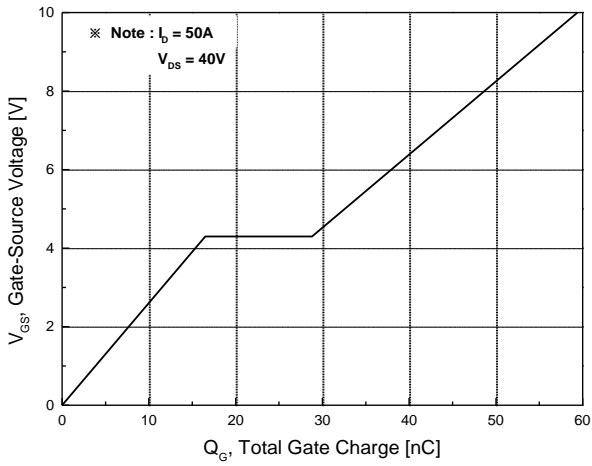


Fig.7 Gate Charge Characteristics

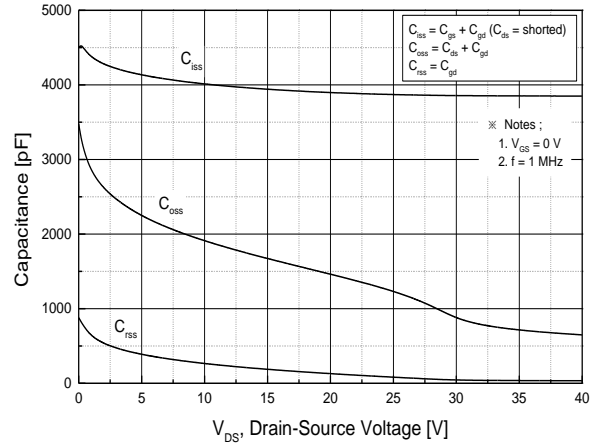


Fig.8 Capacitance Characteristics

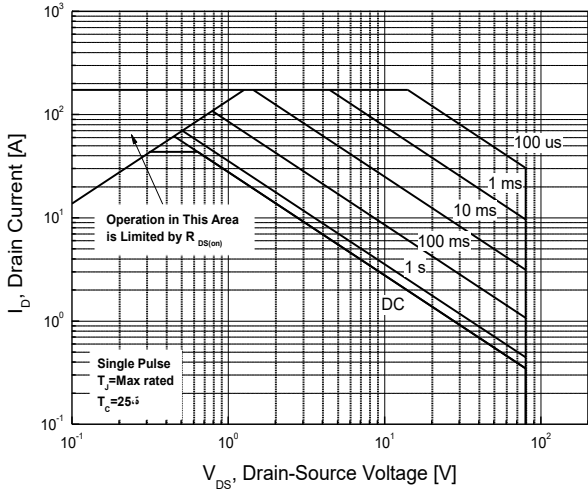


Fig.9 Maximum Safe Operating Area

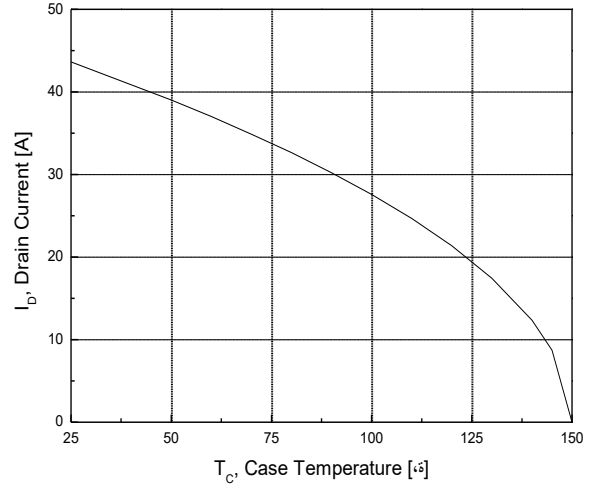


Fig.10 Maximum Drain Current vs. Case Temperature

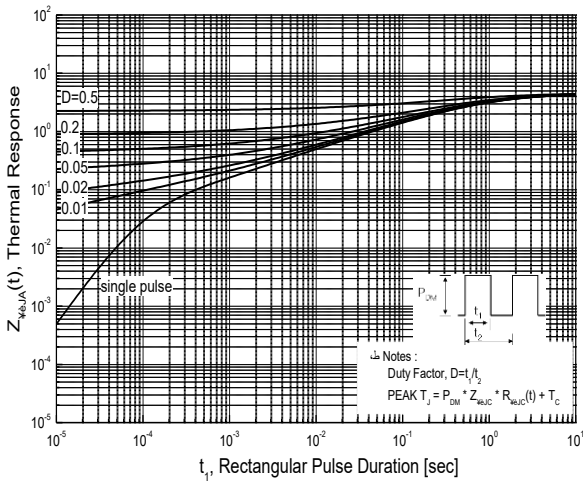
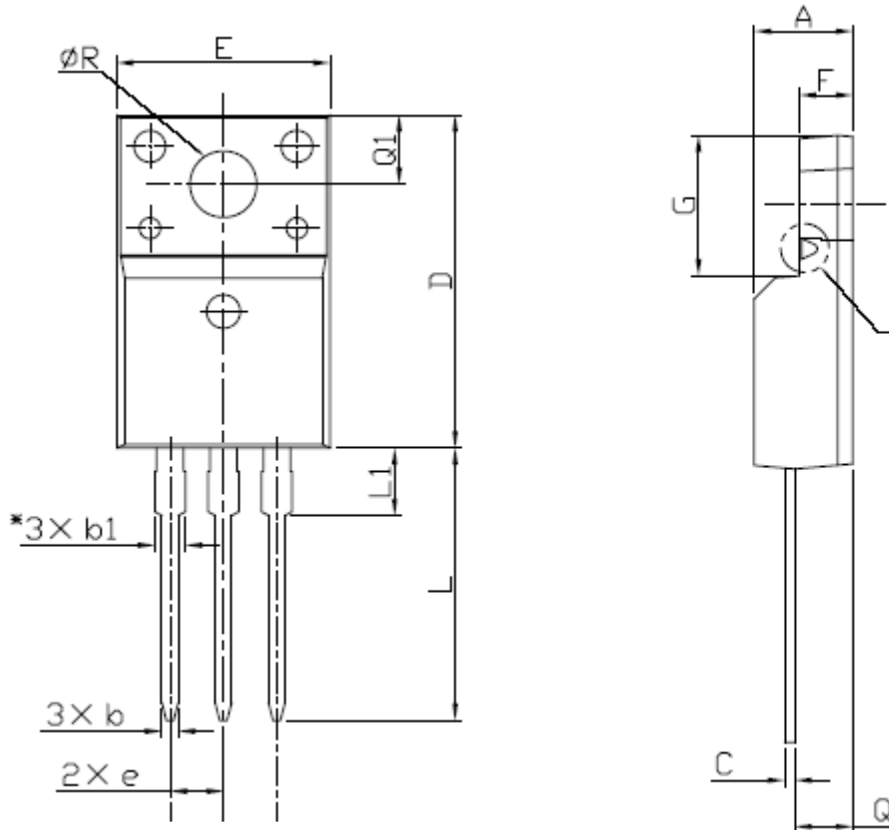


Fig.11 Transient Thermal Response Curve

Package Dimension

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

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

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.