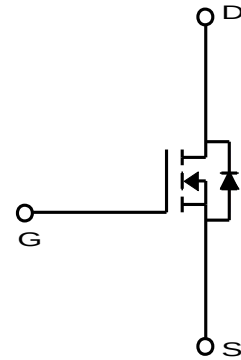


General Description

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



Absolute Maximum Ratings ($T_a = 25^\circ C$)

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	$^\circ C$

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	$R_{\theta JC}$	4.5	

Ordering Information

Part Number	Temp. Range	Package	Packing	RoHS Status
MDF1933TH	-55~150°C	TO-220F	Tube	Halogen Free

Electrical Characteristics ($T_J = 25^\circ\text{C}$)

Characteristics	Symbol	Test Condition	Min	Typ	Max	Unit
Static Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	$I_D = 250\mu\text{A}$, $V_{GS} = 0\text{V}$	80	-	-	V
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}$, $I_D = 250\mu\text{A}$	2.0	-	4.0	
Drain Cut-Off Current	I_{DSS}	$V_{DS} = 64\text{V}$, $V_{GS} = 0\text{V}$	-	-	1.0	μA
Gate Leakage Current	I_{GSS}	$V_{GS} = \pm 20\text{V}$, $V_{DS} = 0\text{V}$	-	-	± 0.1	
Drain-Source ON Resistance	$R_{DS(on)}$	$V_{GS} = 10\text{V}$, $I_D = 50\text{A}$	-	6.0	7.5	$\text{m}\Omega$
Forward Transconductance	g_{fs}	$V_{DS} = 10\text{V}$, $I_D = 50\text{A}$	-	47	-	S
Dynamic Characteristics						
Total Gate Charge	Q_g	$V_{DS} = 40\text{V}$, $I_D = 50\text{A}$, $V_{GS} = 10\text{V}$	-	59.4	-	nC
Gate-Source Charge	Q_{gs}		-	16.5	-	
Gate-Drain Charge	Q_{gd}		-	12.3	-	
Input Capacitance	C_{iss}	$V_{DS} = 40\text{V}$, $V_{GS} = 0\text{V}$, $f = 1.0\text{MHz}$	-	3,841	-	pF
Reverse Transfer Capacitance	C_{rss}		-	34.2	-	
Output Capacitance	C_{oss}		-	651.7	-	
Turn-On Delay Time	$t_{d(on)}$	$V_{GS} = 10\text{V}$, $V_{DS} = 40\text{V}$, $I_D = 50\text{A}$, $R_G = 3.0\Omega$	-	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	$f = 1\text{MHz}$	-	2.5	-	Ω
Drain-Source Body Diode Characteristics						
Source-Drain Diode Forward Voltage	V_{SD}	$I_S = 50\text{A}$, $V_{GS} = 0\text{V}$	-	0.9	1.2	V
Body Diode Reverse Recovery Time	t_{rr}	$I_F = 50\text{A}$, $dI/dt = 100\text{A}/\mu\text{s}$	-	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 $T_C = 25^\circ\text{C}$ is silicon limited
- E_{AS} is tested at starting $T_J = 25^\circ\text{C}$, $L = 1.0\text{mH}$, $I_{AS} = 17.0\text{A}$, $V_{GS} = 10\text{V}$.

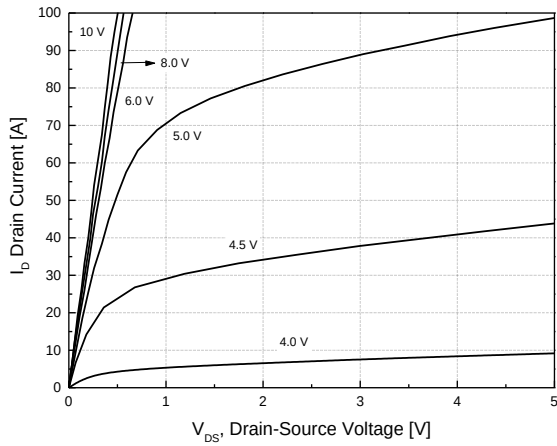


Fig.1 On-Region Characteristics

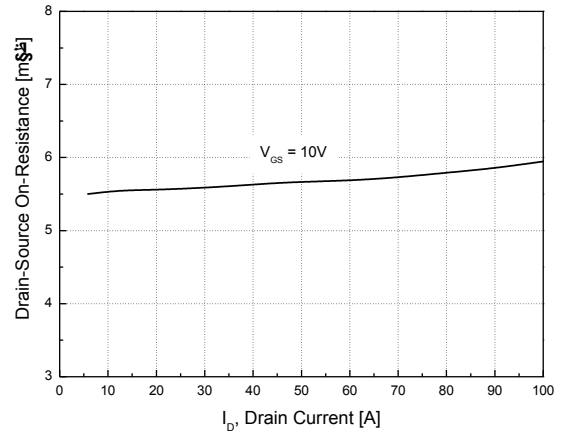


Fig.2 On-Resistance Variation with Drain Current and Gate Voltage

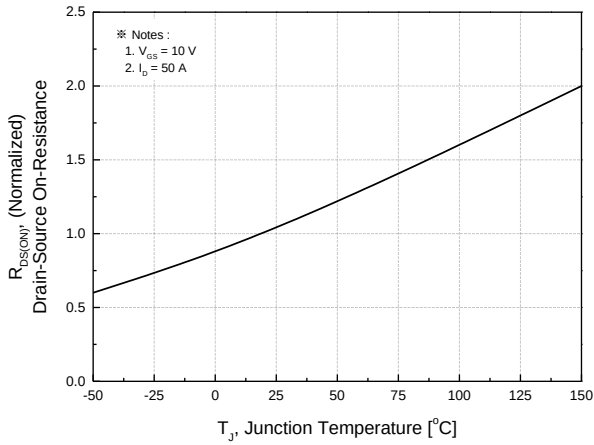


Fig.3 On-Resistance Variation with Temperature

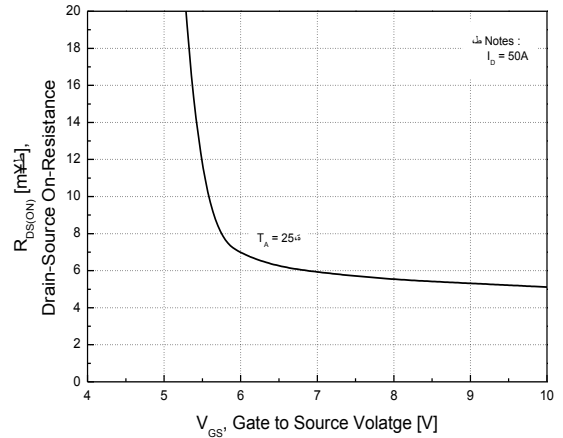


Fig.4 On-Resistance Variation with Gate to Source Voltage

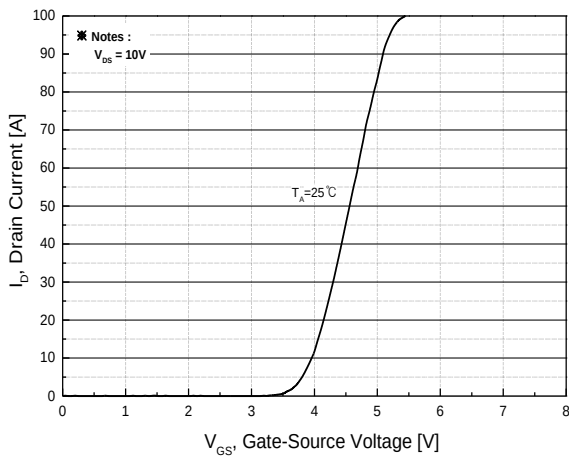


Fig.5 Transfer Characteristics

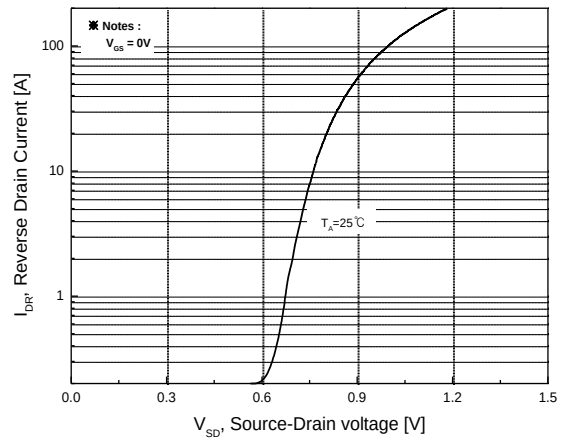
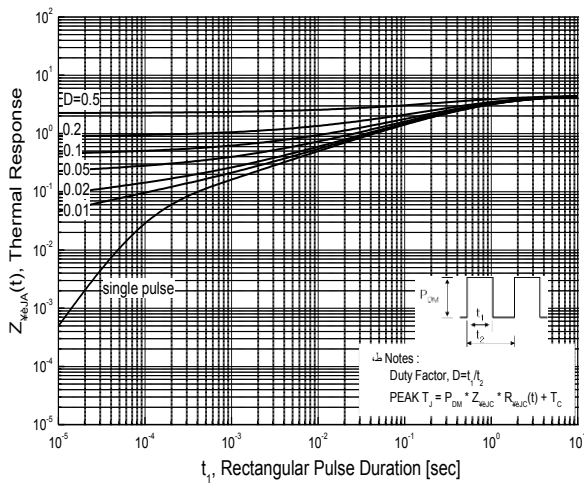
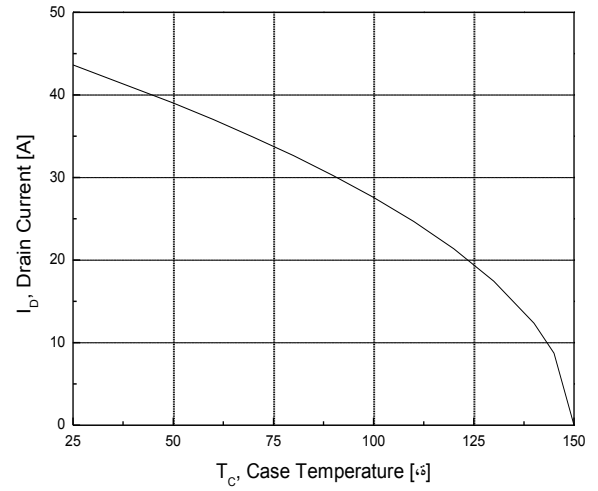
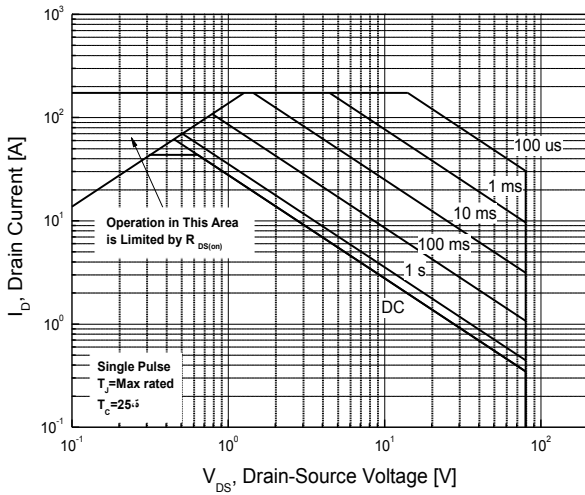
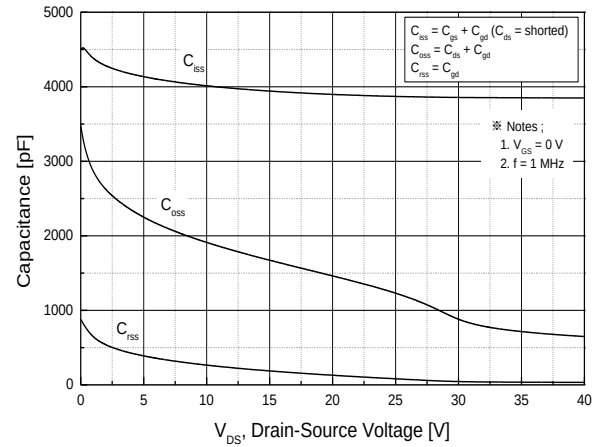
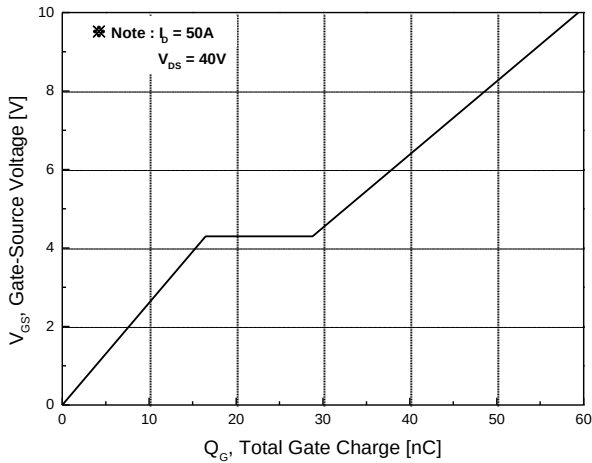


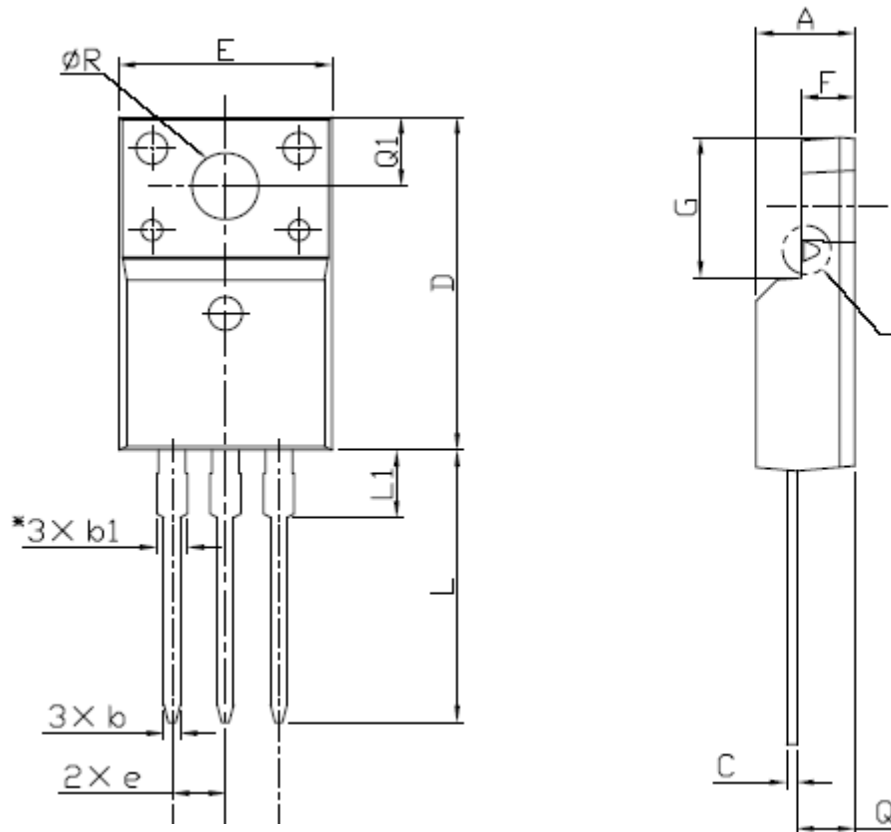
Fig.6 Body Diode Forward Voltage Variation with Source Current and Temperature



Package Dimension

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

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