RoHS Compliant

MagnaChip

MDF1921

Single N-channel Trench MOSFET 100V, 60A, 4.8mΩ

General Description

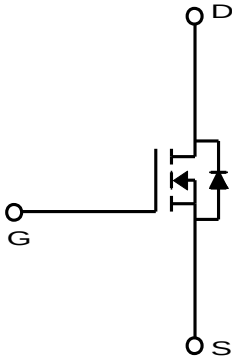
The MDF1921 uses advanced MagnaChip's MOSFET Technology, which provides high performance in on-state resistance, fast switching performance and excellent quality. MDF1921 is suitable device for Synchronous Rectification for Server / Adapter and general purpose applications.

Features

- V_{DS} = 100V
- I_D = 60A @V_{GS} = 10V
- $R_{DS(ON)}$ < 4.8 mΩ @V_{GS} = 10V
- 100% UIL Tested
- 100% Rg Tested



TO-220F



Absolute Maximum Ratings (Ta = 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°C	I_D	60	A
	T_C=100°C		38	
Pulsed Drain Current		I_{DM}	240	
Power Dissipation	T_C=25°C	P_D	36	W
	T_C=100°C		15	
Single Pulse Avalanche Energy (2)		E_{AS}	200	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	$R_{\theta JC}$	3.5	

Ordering Information

Part Number	Temp. Range	Package	Packing	RoHS Status
MDF1921TH	-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 = 250μA, V_{GS} = 0V	100	-	-	V
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250μA	2.0	2.9	4.0	
Drain Cut-Off Current	I_{DSS}	V_{DS} = 80V, V_{GS} = 0V	-	-	1.0	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 = 50A	-	4.5	4.8	mΩ
Forward Transconductance	g_{fs}	V_{DS} = 10V, I_D = 50A	-	120	-	S
Dynamic Characteristics						
Total Gate Charge	Q_g	V_{DS} = 50V, I_D = 50A, V_{GS} = 10V	-	100	-	nC
Gate-Source Charge	Q_{gs}		-	27	-	
Gate-Drain Charge	Q_{gd}		-	26	-	
Input Capacitance	C_{iss}	V_{DS} = 40V, V_{GS} = 0V, f = 1.0MHz	-	6750	-	pF
Reverse Transfer Capacitance	C_{rss}		-	50	-	
Output Capacitance	C_{oss}		-	1300	-	
Turn-On Delay Time	$t_{d(on)}$	V_{GS} = 10V, V_{DS} = 50V, I_D = 50A , R_G = 3.0Ω	-	30.4	-	ns
Rise Time	t_r		-	28.8	-	
Turn-Off Delay Time	$t_{d(off)}$		-	93.0	-	
Fall Time	t_f		-	34.2	-	
Gate Resistance	Rg	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/μs	-	73		ns
Body Diode Reverse Recovery Charge	Q_{rr}		-	150		nC

Note :

1. Surface mounted FR-4 board by JEDEC (jesd51-7). Continuous current at T_C=25℃ is silicon limited
2. E_{AS} is tested at starting Tj = 25℃, L = 1 mH, I_{AS} = 20 A, V_{GS} = 10V.

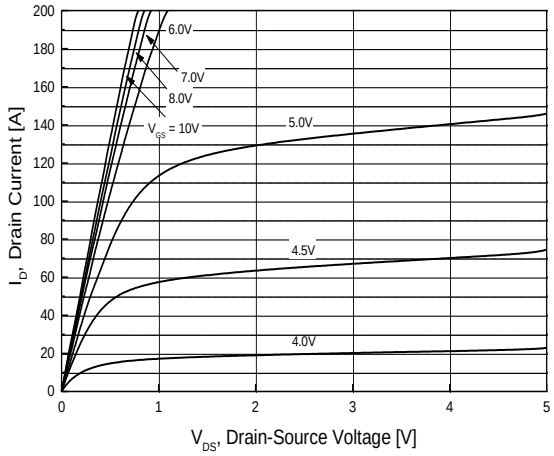


Fig.1 On-Region Characteristics

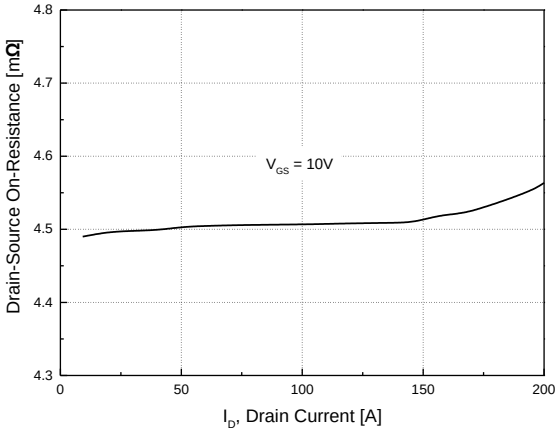


Fig.2 On-Resistance Variation with Drain Current and Gate Voltage

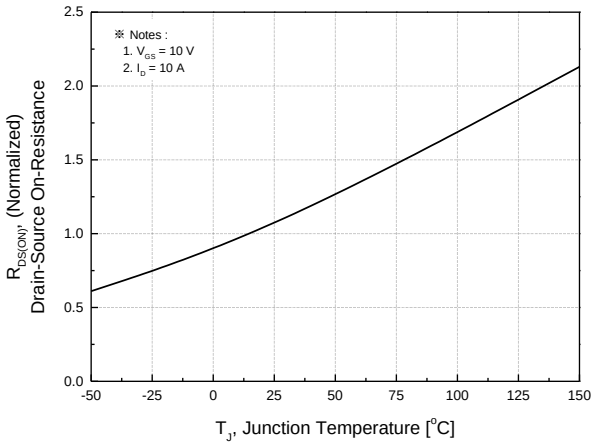


Fig.3 On-Resistance Variation with Temperature

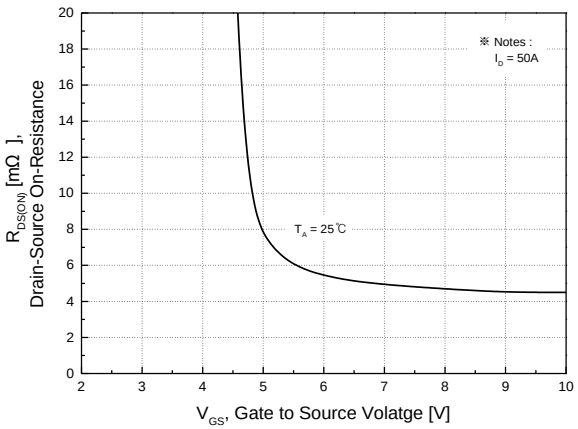


Fig.4 On-Resistance Variation with Gate to Source Voltage

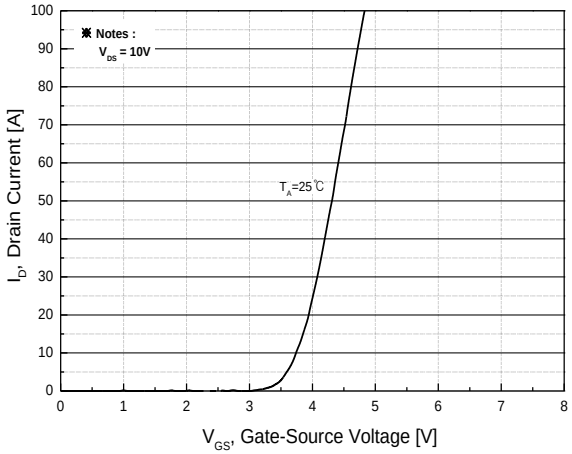


Fig.5 Transfer Characteristics

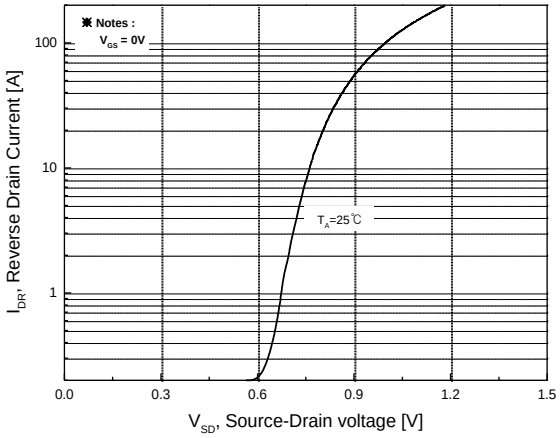


Fig.6 Body Diode Forward Voltage Variation with Source Current and Temperature

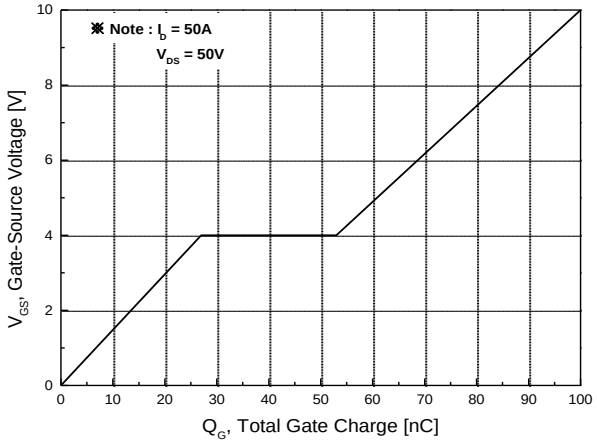


Fig.7 Gate Charge Characteristics

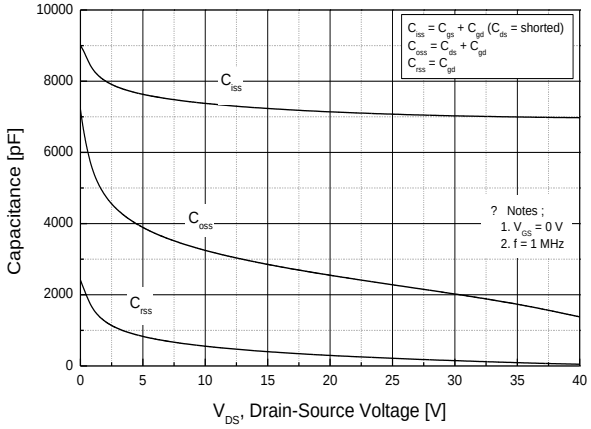


Fig.8 Capacitance Characteristics

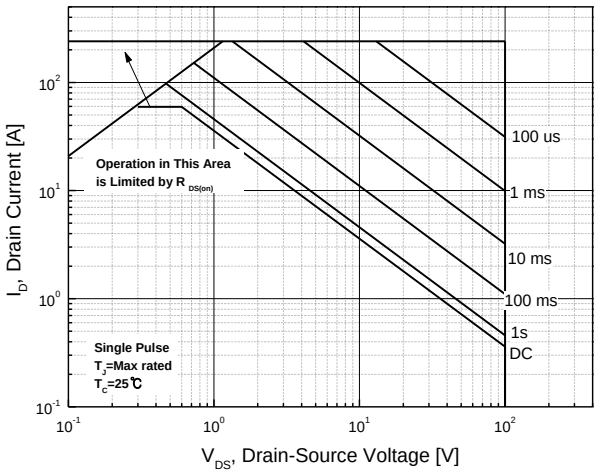


Fig.9 Maximum Safe Operating Area

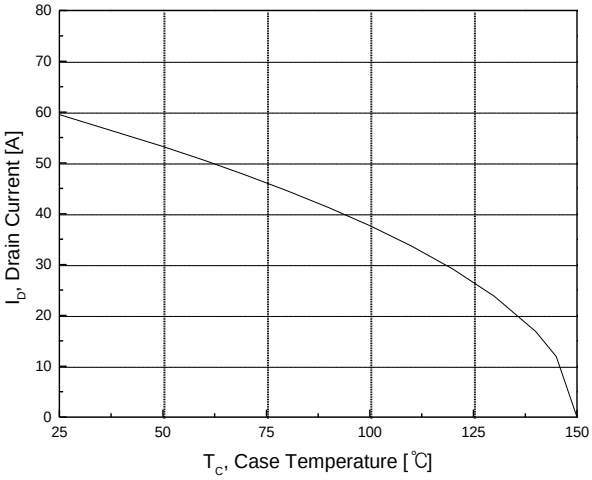


Fig.10 Maximum Drain Current vs. Case Temperature

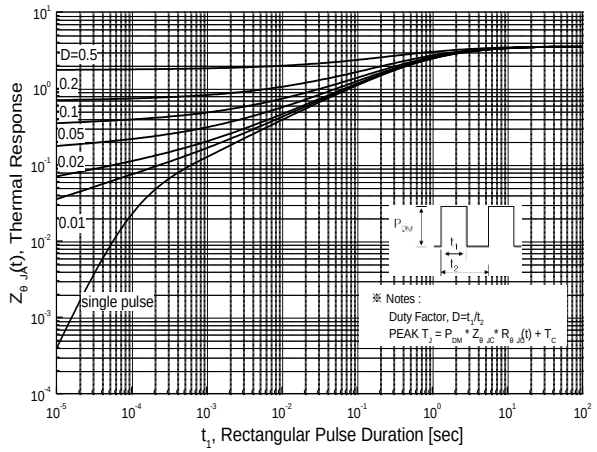
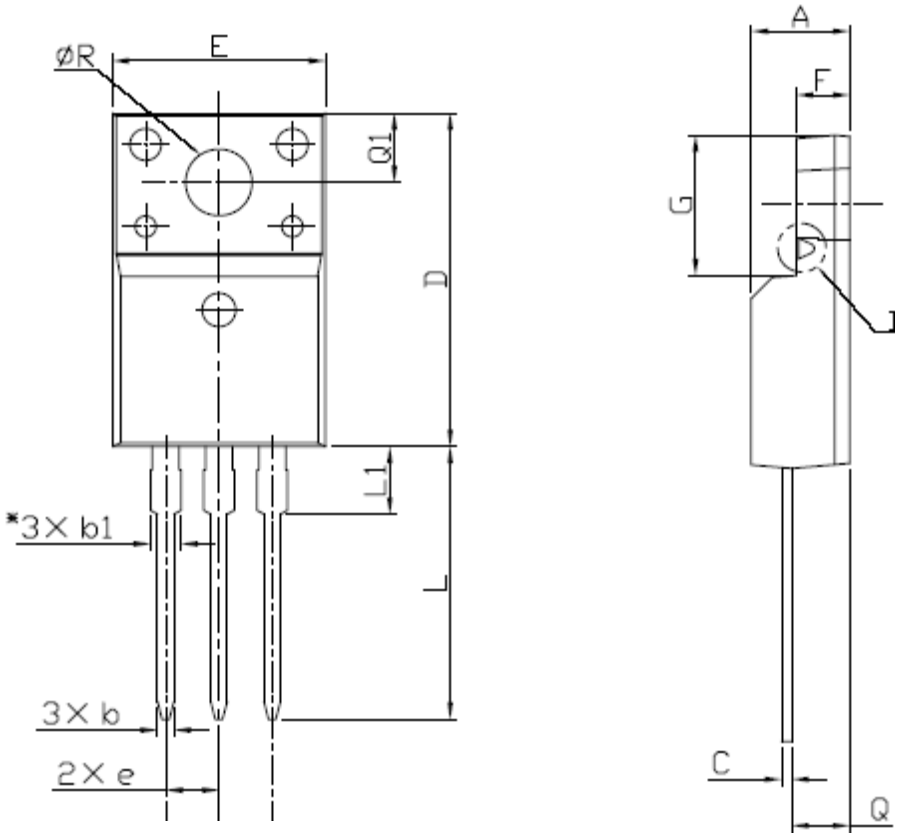


Fig.11 Transient Thermal Response Curve

Package Dimension

3 Leads, TO-220F

Dimensions are in millimeters unless otherwise specified



Symbol	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
ØR	3.00		3.55

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