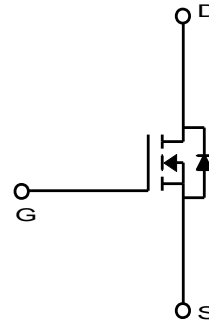


General Description

The MDD1501 uses advanced Magnachip's MOSFET Technology, which provides high performance in on-state resistance, fast switching performance and excellent quality. MDD1501 is suitable device for DC to DC converter and general purpose applications.

Features

- $V_{DS} = 30V$
- $I_D = 67.4A @ V_{GS} = 10V$
- $R_{DS(ON)(MAX)} < 5.6m\Omega @ V_{GS} = 10V$
- $< 8.6m\Omega @ V_{GS} = 4.5V$
- 100% UIL Tested
- 100% Rg Tested



Absolute Maximum Ratings (Ta = 25°C)

Characteristics		Symbol	Rating	Unit
Drain-Source Voltage		V_{DSS}	30	V
Gate-Source Voltage		V_{GSS}	±20	V
Continuous Drain Current ⁽¹⁾	$T_C=25^\circ C$	I_D	67.4	A
	$T_C=70^\circ C$		53.9	
	$T_A=25^\circ C$		25.1 ⁽³⁾	
	$T_A=70^\circ C$		20.2 ⁽³⁾	
Pulsed Drain Current		I_{DM}	270	A
Power Dissipation	$T_C=25^\circ C$	P_D	44.6	W
	$T_C=70^\circ C$		28.5	
	$T_A=25^\circ C$		6.2 ⁽³⁾	
	$T_A=70^\circ C$		4.0 ⁽³⁾	
Single Pulse Avalanche Energy ⁽²⁾		E_{AS}	94	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⁾	$R_{\theta JA}$	20.0	°C/W
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	2.8	

Ordering Information

Part Number	Temp. Range	Package	Packing	Quantity	RoHS Status
MDD1501RH	-55~150°C	D-PAK	Tape & Reel	3000 units	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	30	-	-	V
Gate Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250μA	1.55	1.95	2.7	
Drain Cut-Off Current	I _{DSS}	V _{DS} = 30V, V _{GS} = 0V	-	-	1	μA
		T _J =55°C	-	-	5	
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	-	4.9	5.6	mΩ
		T _J =125°C	-	7.1	8.1	
		V _{GS} = 4.5V, I _D = 16A	-	7.2	8.6	
Forward Transconductance	g _{fs}	V _{DS} = 5V, I _D = 10A	-	35	-	S
Dynamic Characteristics						
Total Gate Charge	Q _{g(10V)}	V _{DS} = 15.0V, I _D = 20A, V _{GS} = 10V	15.5	20.7	25.9	nC
Total Gate Charge	Q _{g(4.5V)}		7.6	10.1	12.6	
Gate-Source Charge	Q _{gs}		-	3.7	-	
Gate-Drain Charge	Q _{gd}		-	2.9	-	
Input Capacitance	C _{iss}	V _{DS} = 15.0V, V _{GS} = 0V, f = 1.0MHz	1013	1350	1688	pF
Reverse Transfer Capacitance	C _{rss}		99	132	165	
Output Capacitance	C _{oss}		195	261	326	
Turn-On Delay Time	t _{d(on)}	V _{GS} = 10V, V _{DS} = 15.0V, I _D = 20A, R _G = 3.0Ω	-	8.8	-	ns
Rise Time	t _r		-	12.2	-	
Turn-Off Delay Time	t _{d(off)}		-	29.5	-	
Fall Time	t _f		-	8.6	-	
Gate Resistance	R _g	f=1 MHz	-	1.5	2.5	Ω
Drain-Source Body Diode Characteristics						
Source-Drain Diode Forward Voltage	V _{SD}	I _S = 20A, V _{GS} = 0V	-	0.8	1.1	V
Body Diode Reverse Recovery Time	t _{rr}	I _F = 20A, di/dt = 100A/μs	-	22.4	33.6	ns
Body Diode Reverse Recovery Charge	Q _{rr}		-	14.0	21.0	nC

Note :

- Surface mounted FR-4 board by JEDEC (jesd51-7)
- E_{AS} is tested at starting T_J = 25°C, L = 0.1mH, I_{AS} = 24.0A, V_{DD} = 27V, V_{GS} = 10V.
- T < 10sec.

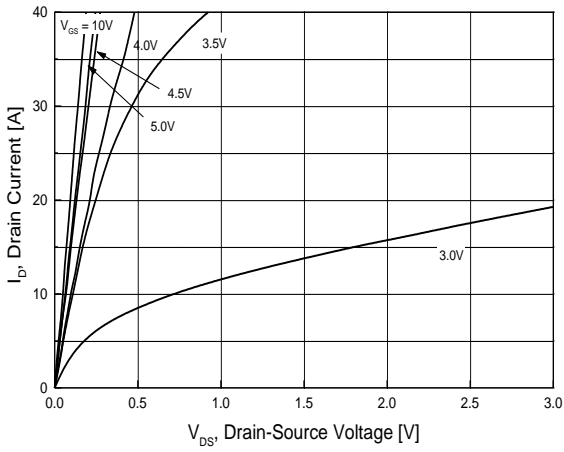


Fig.1 On-Region Characteristics

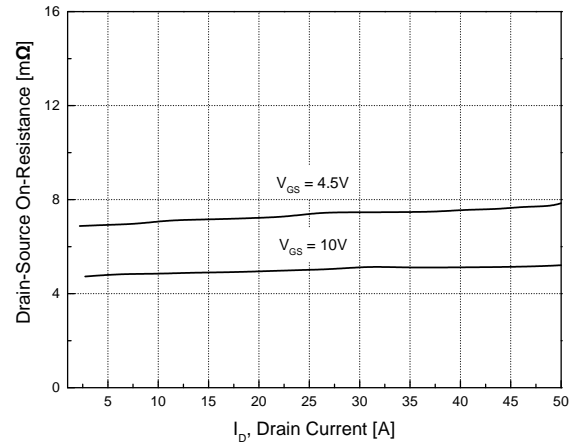


Fig.2 On-Resistance Variation with Drain Current and Gate Voltage

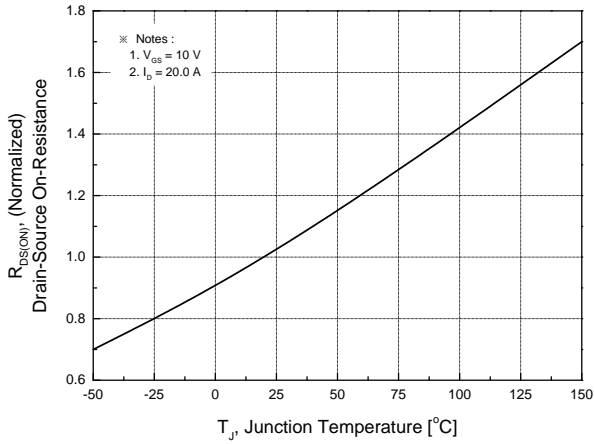


Fig.3 On-Resistance Variation with Temperature

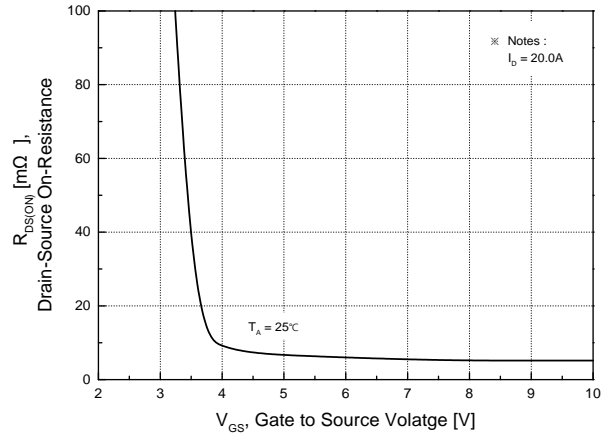


Fig.4 On-Resistance Variation with Gate to Source Voltage

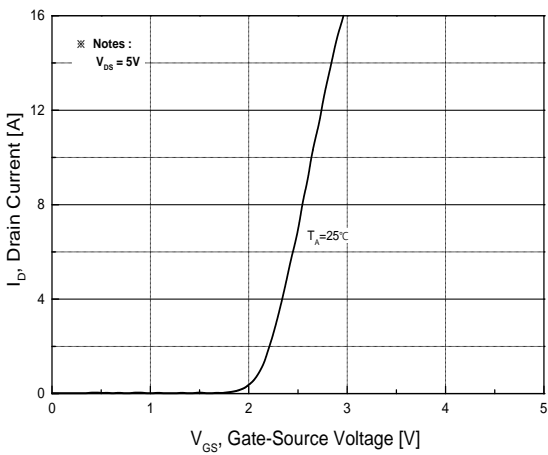


Fig.5 Transfer Characteristics

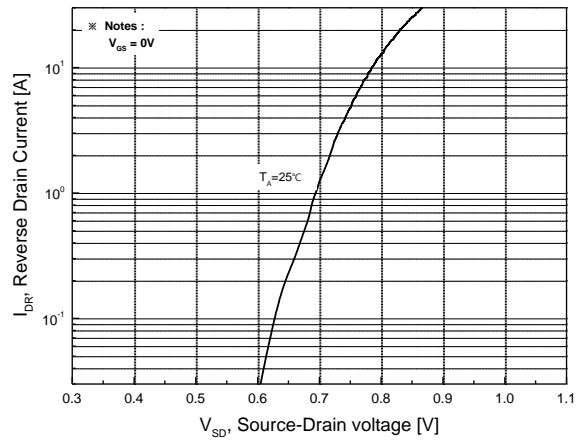


Fig.6 Body Diode Forward Voltage Variation with Source Current and Temperature

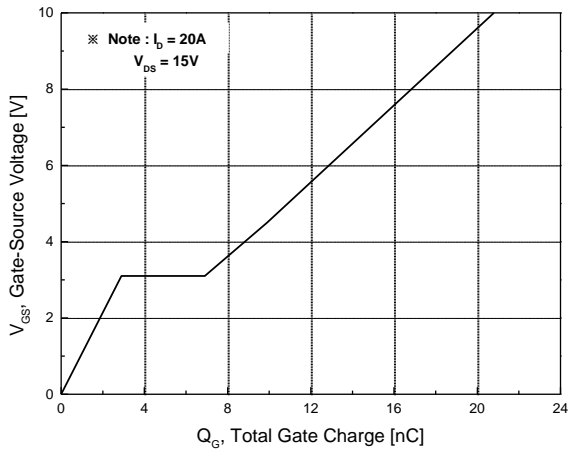


Fig.7 Gate Charge Characteristics

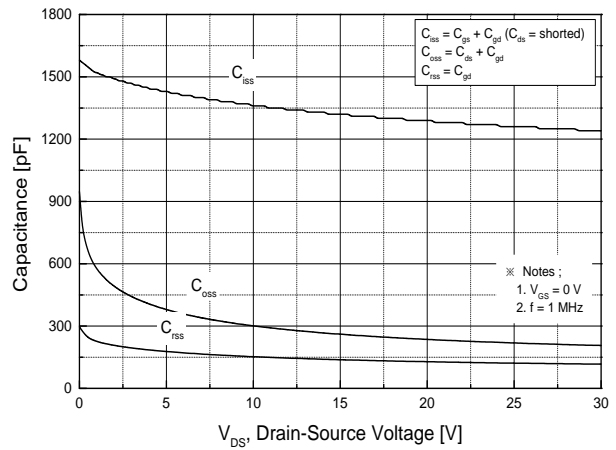


Fig.8 Capacitance Characteristics

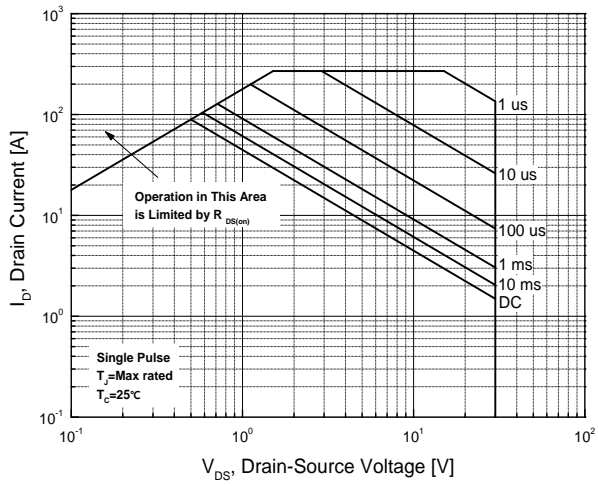


Fig.9 Maximum Safe Operating Area

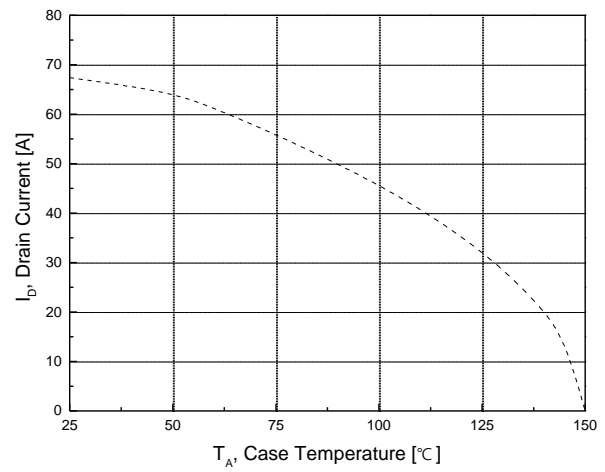


Fig.10 Maximum Drain Current vs. Case Temperature

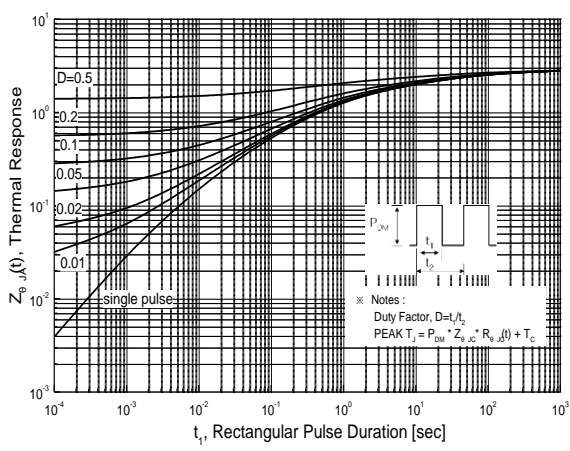
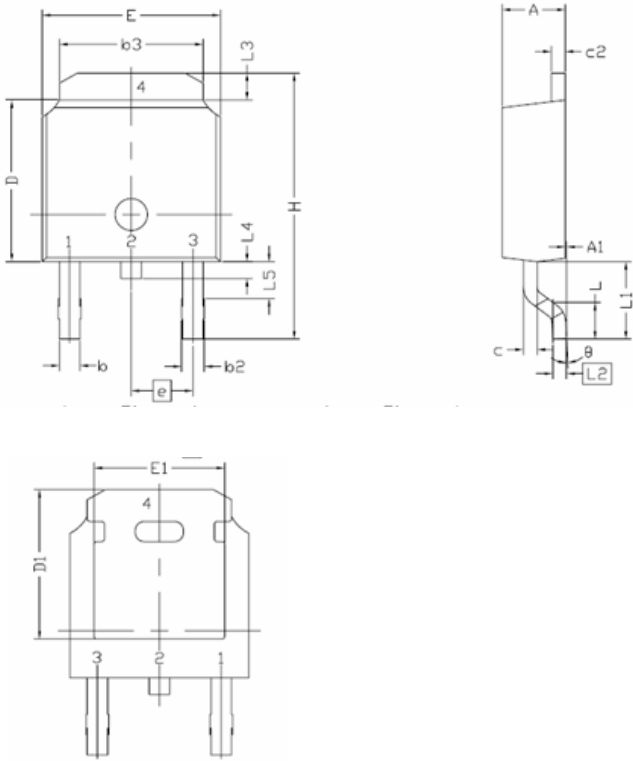


Fig.11 Transient Thermal Response Curve

Package Dimension

TO-252

Dimensions are in millimeters, unless otherwise specified




Symbol	Min.	Nom.	Max.
E	6,35	-	6,73
L	1,40	1,52	1,78
L1	2,74 REF		
L2	0,508 BCS		
L3	0,89	-	1,27
L4	-	-	1,02
L5	1,14	-	1,52
D	5,97	6,10	6,22
H	9,40	-	10,41
b	0,64	-	0,89
b2	0,76	-	1,14
b3	4,95	-	5,46
e	2,286 BSC		
A	2,18	-	2,39
A1	-	-	0,13
c	0,46	-	0,61
c2	0,46	-	0,89
D1	5,21	-	-
E1	4,32	-	-
⌀	0,00	-	10,00

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

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