RoHS Compliant

MDD1503

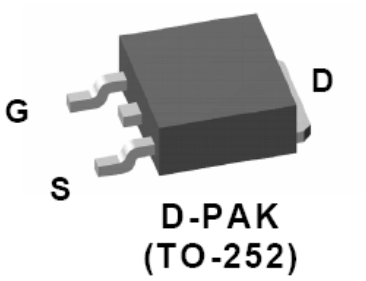
Single N-channel Trench MOSFET 30V, 87.5A, 4.7mΩ

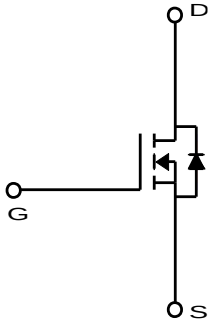
General Description

The MDD1503 uses advanced Magnachip's MOSFET Technology, which provides high performance in on-state resistance, fast switching performance and excellent quality. MDD1503 is suitable device for DC to DC converter and general purpose applications.

Features

- V_{DS} = 30V
- I_D = 87.5A @V_{GS} = 10V
- $R_{DS(ON)\ (MAX)}$
  < 4.7mΩ @V_{GS} = 10V
  < 6.8mΩ @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°C	I_D	87.5	A
	T_C=70°C		70.0	
	T_A=25°C		28.2(3)	
	T_A=70°C		22.7(3)	
Pulsed Drain Current		I_{DM}	350	A
Power Dissipation	T_C=25°C	P_D	59.5	W
	T_C=70°C		38.0	
	T_A=25°C		6.2(3)	
	T_A=70°C		4.0(3)	
Single Pulse Avalanche Energy (2)		E_{AS}	146	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	$R_{\theta JC}$	2.1	

Ordering Information

Part Number	Temp. Range	Package	Packing	Quantity	Rohs Status
MDD1503RH	-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	1.3	1.9	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 = 22A	-	4.1	4.7	mΩ
		T_J=125°C	-	5.9	6.8	
		V_{GS} = 4.5V, I_D = 18A	-	5.7	6.8	
Forward Transconductance	g_{fs}	V_{DS} = 5V, I_D = 10A	-	27	-	S
Dynamic Characteristics						
Total Gate Charge	$Q_{g(10V)}$	V_{DS} = 15.0V, I_D = 22A, V_{GS} = 10V	21	28	35	nC
Total Gate Charge	$Q_{g(4.5V)}$		10	13.3	16.6	
Gate-Source Charge	Q_{gs}		-	5.9	-	
Gate-Drain Charge	Q_{gd}		-	4.2	-	
Input Capacitance	C_{iss}	V_{DS} = 15.0V, V_{GS} = 0V, f = 1.0MHz	1349	1799	2249	pF
Reverse Transfer Capacitance	C_{rss}		132	177	221	
Output Capacitance	C_{oss}		266	354	443	
Turn-On Delay Time	$t_{d(on)}$	V_{GS} = 10V, V_{DS} = 15.0V, I_D = 22A , R_G = 3.0Ω	-	12	-	ns
Rise Time	t_r		-	12.7	-	
Turn-Off Delay Time	$t_{d(off)}$		-	30.6	-	
Fall Time	t_f		-	9.2	-	
Gate Resistance	Rg	f=1 MHz	-	1.2	2.0	Ω
Drain-Source Body Diode Characteristics						
Source-Drain Diode Forward Voltage	V_{SD}	I_S = 22A, V_{GS} = 0V	-	0.84	1.1	V
Body Diode Reverse Recovery Time	t_{rr}	I_F = 22A, dI/dt = 100A/μs	-	27.1	40.7	ns
Body Diode Reverse Recovery Charge	Q_{rr}		-	20.6	30.9	nC

Note :

1. Surface mounted FR-4 board by JEDEC (jesd51-7)
2. E_{AS} is tested at starting Tj = 25℃, L = 0.1mH, I_{AS} = 30.0A, V_{DD} = 27V, V_{GS} = 10V.
3. T < 10sec.

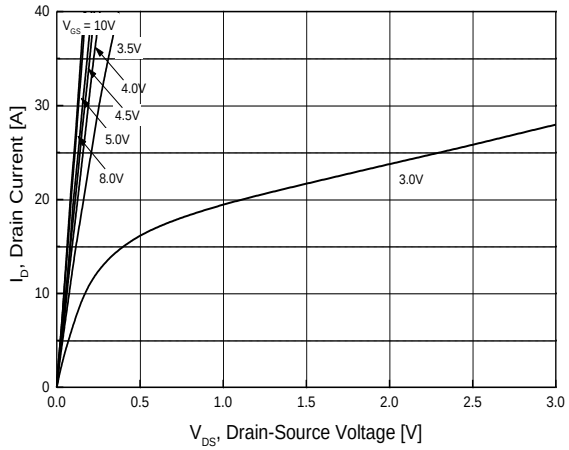


Fig.1 On-Region Characteristics

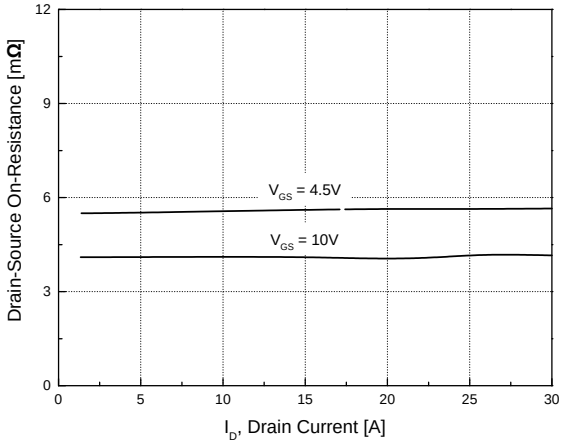


Fig.2 On-Resistance Variation with Drain Current and Gate Voltage

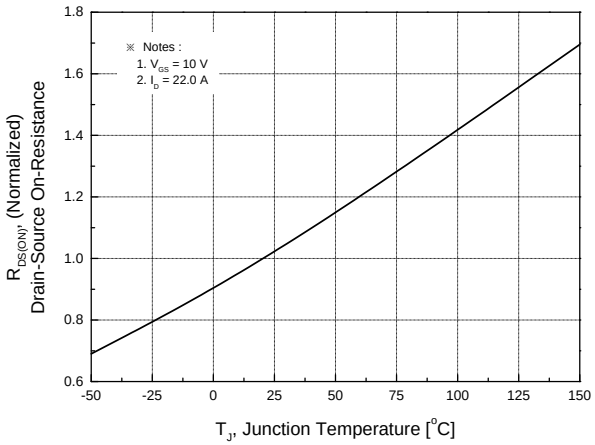


Fig.3 On-Resistance Variation with Temperature

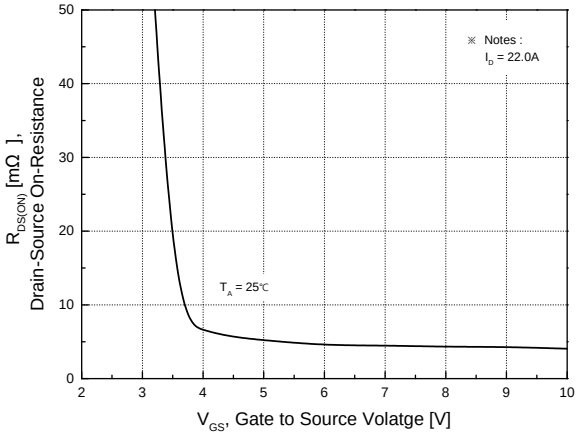


Fig.4 On-Resistance Variation with Gate to Source Voltage

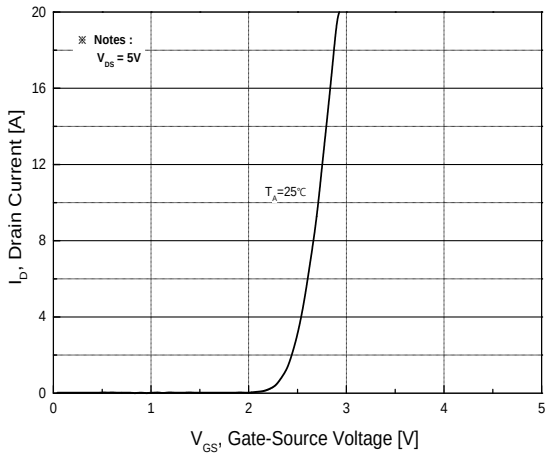


Fig.5 Transfer Characteristics

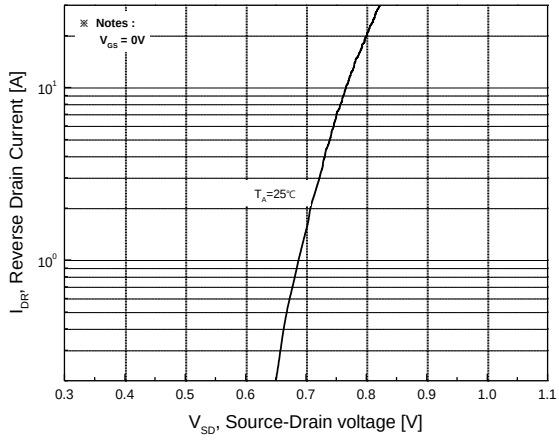


Fig.6 Body Diode Forward Voltage Variation with Source Current and Temperature

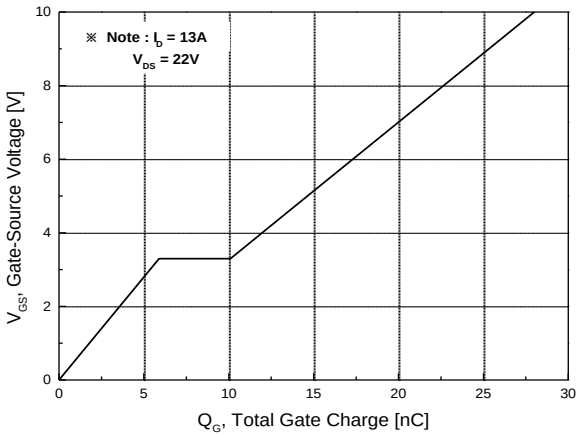


Fig.7 Gate Charge Characteristics

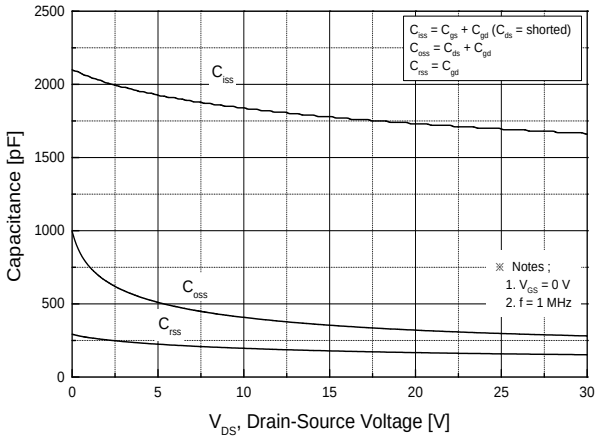


Fig.8 Capacitance Characteristics

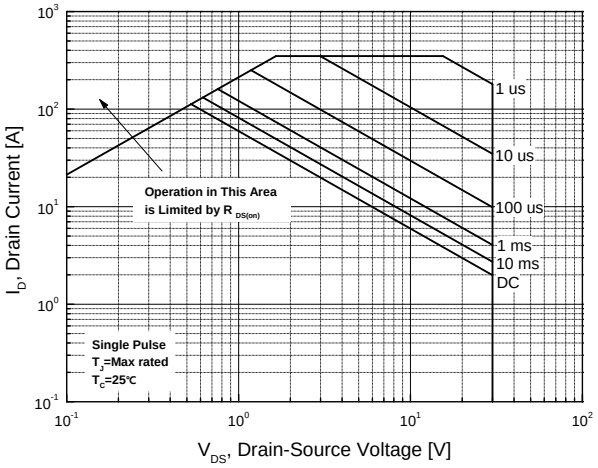


Fig.9 Maximum Safe Operating Area

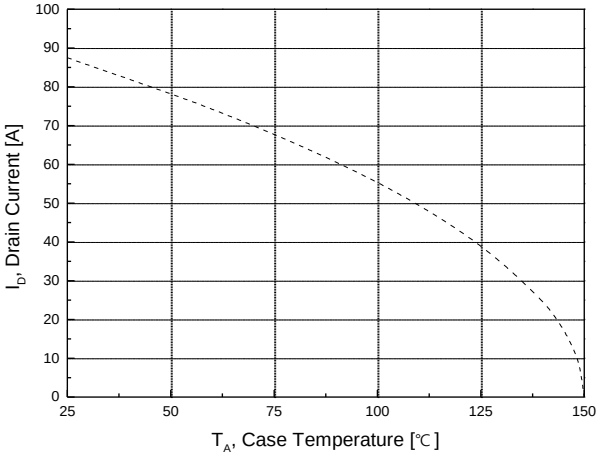


Fig.10 Maximum Drain Current vs. Case Temperature

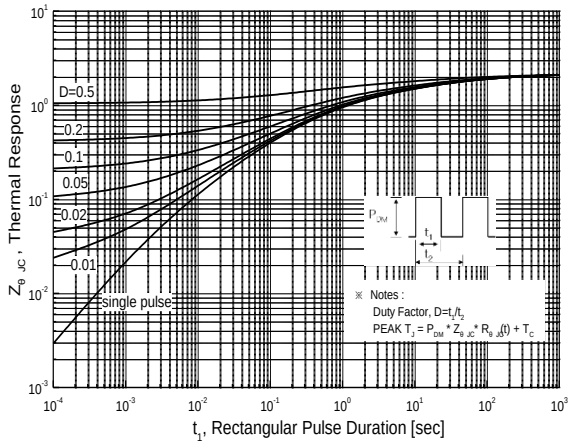
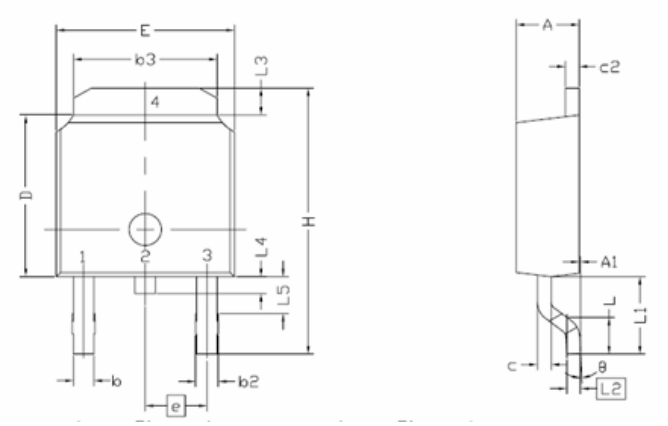


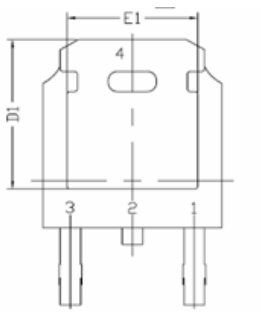
Fig.11 Transient Thermal Response Curve

Package Dimension

D-PAK (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	–	–
θ	0,00	–	10,00

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.