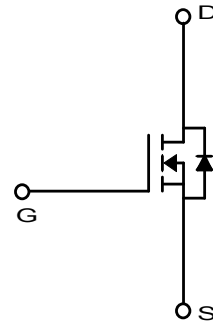
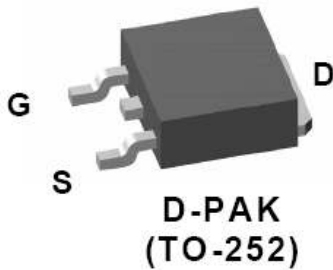


General Description

The MDD1504 uses advanced MagnaChip's MOSFET Technology, which provides high performance in on-state resistance, fast switching performance and excellent quality. MDD1504 is suitable device for DC to DC converter and general purpose applications.

Features

- $V_{DS} = 30V$
- $I_D = 31.5A @ V_{GS} = 10V$
- $R_{DS(ON) (MAX)} < 12.7m\Omega @ V_{GS} = 10V$
- $< 18.8m\Omega @ V_{GS} = 4.5V$
- 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⁾	I_D	$T_C=25^\circ C$	31.5
		$T_C=70^\circ C$	25.1
		$T_A=25^\circ C$	17.2 ⁽³⁾
		$T_A=70^\circ C$	13.8 ⁽³⁾
Pulsed Drain Current	I_{DM}	100	A
Power Dissipation	P_D	$T_C=25^\circ C$	20.8
		$T_C=70^\circ C$	13.3
		$T_A=25^\circ C$	6.2 ⁽³⁾
		$T_A=70^\circ C$	4.0 ⁽³⁾
Single Pulse Avalanche Energy ⁽²⁾	E_{AS}	23	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	$R_{\theta JC}$	6.0	

Ordering Information

Part Number	Temp. Range	Package	Packing	Quantity	Rohs Status
MDD1504RH	-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 T _J =55°C	-	-	1 5	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 = 13A T _J =125°C	-	11.0 16.0	12.7 18.4	mΩ
		V _{GS} = 4.5V, I _D = 11A	-	15.7	18.8	
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 = 13A, V _{GS} = 10V	7.3	9.7	12.1	nC
Total Gate Charge	Q _{g(4.5V)}		3.3	4.5	5.6	
Gate-Source Charge	Q _{gs}		-	1.8	-	
Gate-Drain Charge	Q _{gd}		-	3.3	-	
Input Capacitance	C _{iss}	V _{DS} = 15.0V, V _{GS} = 0V, f = 1.0MHz	435	580	725	pF
Reverse Transfer Capacitance	C _{rss}		43	57	71	
Output Capacitance	C _{oss}		94	126	158	
Turn-On Delay Time	t _{d(on)}	V _{GS} = 10V, V _{DS} = 15.0V, I _D = 13A, R _G = 3.0Ω	-	6.7	-	ns
Rise Time	t _r		-	11.7	-	
Turn-Off Delay Time	t _{d(off)}		-	13.5	-	
Fall Time	t _f		-	7.0	-	
Gate Resistance	R _g	f=1 MHz	-	6.6	8.5	Ω
Drain-Source Body Diode Characteristics						
Source-Drain Diode Forward Voltage	V _{SD}	I _S = 13A, V _{GS} = 0V	-	0.87	1.1	V
Body Diode Reverse Recovery Time	t _{rr}	I _F = 13A, di/dt = 100A/μs	-	17.5	26.3	ns
Body Diode Reverse Recovery Charge	Q _{rr}		-	9.8	14.7	nC

Note :

1. Surface mounted FR-4 board by JEDEC (jesd51-7)
2. E_{AS} is tested at starting T_J = 25°C, L = 0.1mH, I_{AS} = 12.0A, V_{DD} = 27V, V_{GS} = 10V
3. T < 10sec.

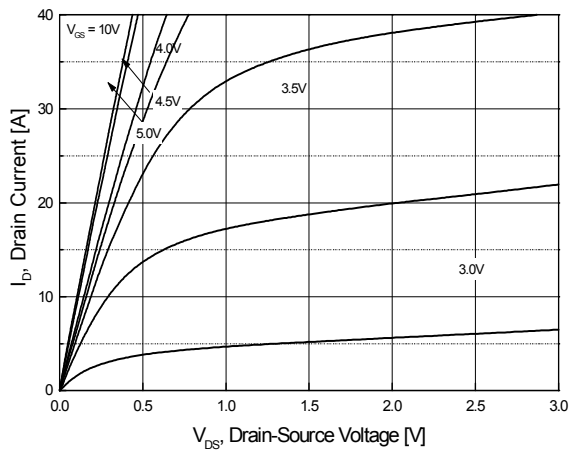


Fig.1 On-Region Characteristics

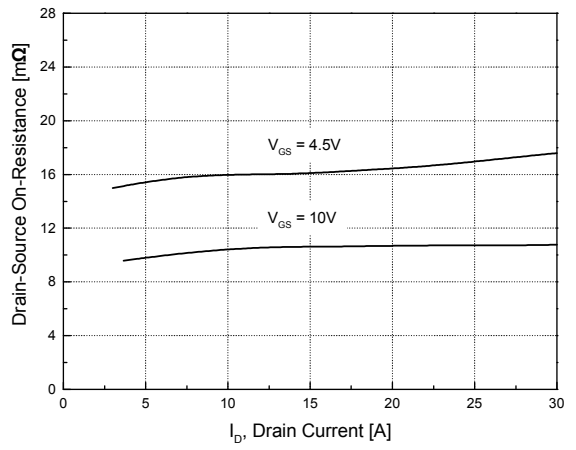


Fig.2 On-Resistance Variation with Drain Current and Gate Voltage

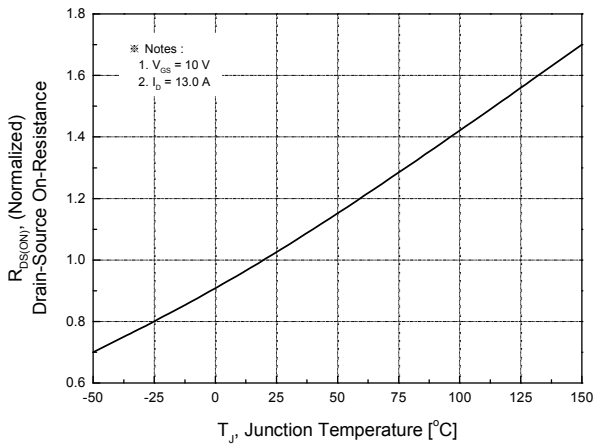


Fig.3 On-Resistance Variation with Temperature

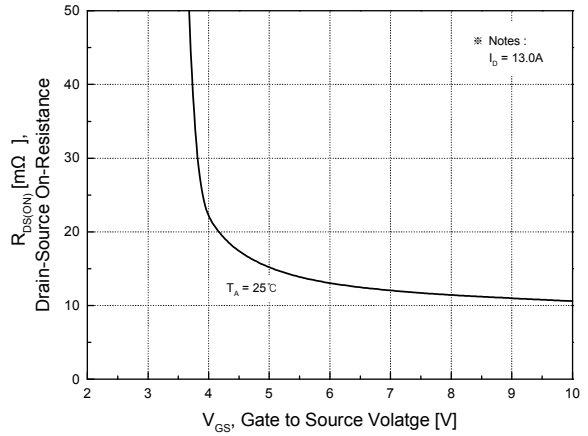


Fig.4 On-Resistance Variation with Gate to Source Voltage

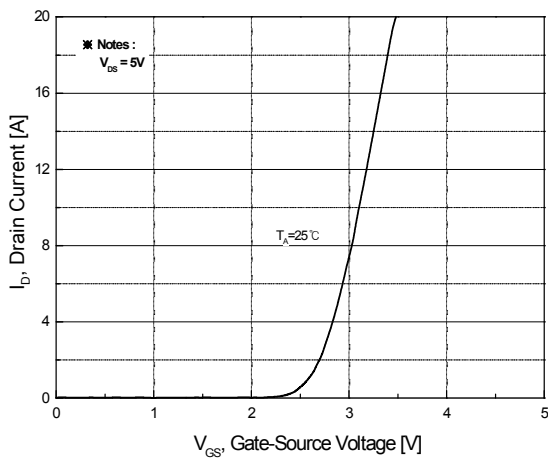


Fig.5 Transfer Characteristics

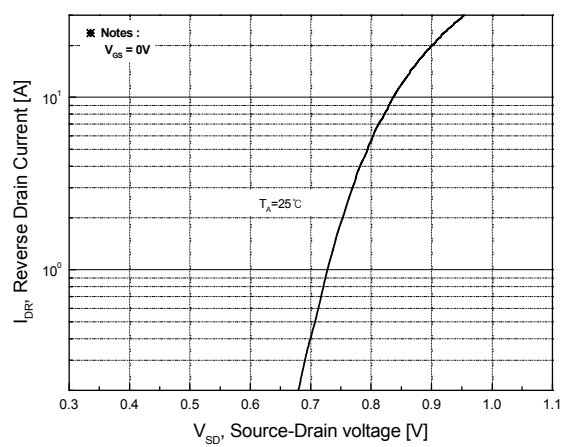


Fig.6 Body Diode Forward Voltage Variation with Source Current and Temperature

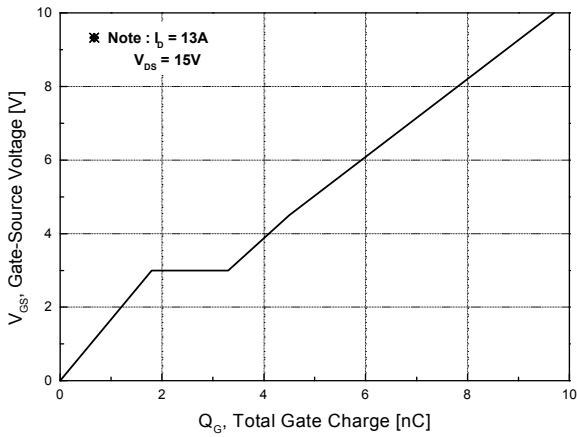


Fig.7 Gate Charge Characteristics

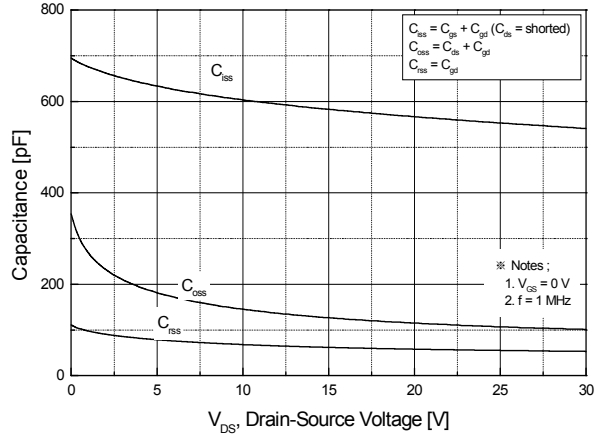


Fig.8 Capacitance Characteristics

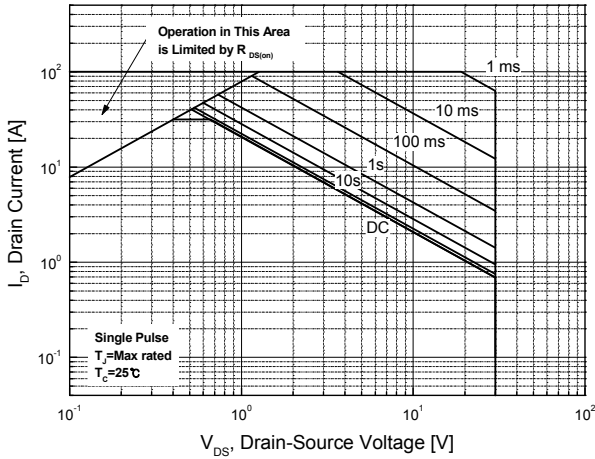


Fig.9 Maximum Safe Operating Area

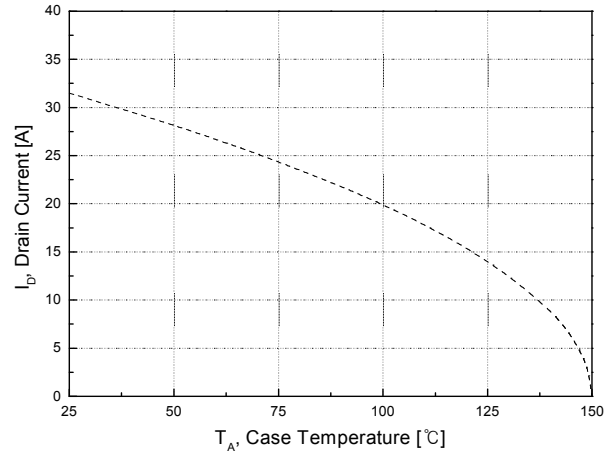


Fig.10 Maximum Drain Current vs. Case Temperature

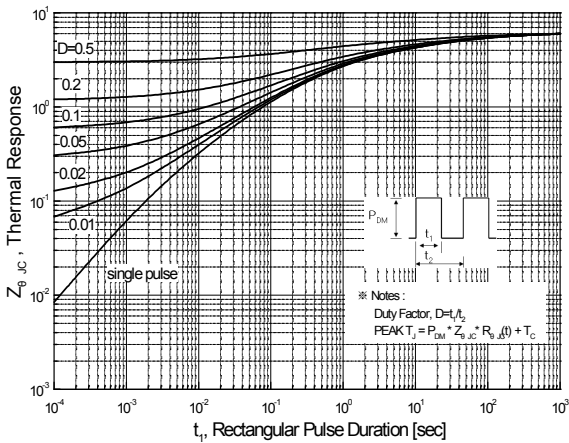
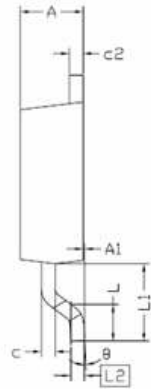
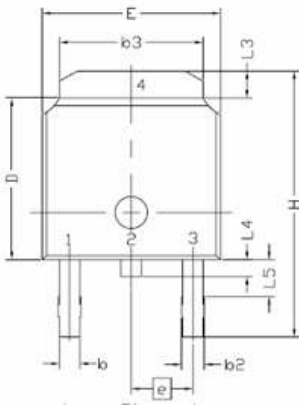


Fig.11 Transient Thermal Response Curve

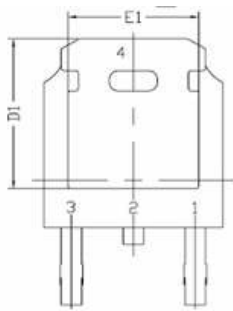
Package Dimension

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 BCS		
A	2,18	-	2,39
A1	-	-	0,13
c	0,46	-	0,61
c2	0,46	-	0,89
D1	5,21	-	-
E1	4,32	-	-
ϕ	0,00	-	10,00



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