RoHS Compliant
HALOGEN-FREE

MagnaChip

MDD1754

N-Channel Trench MOSFET, 40V, 20.5A, 27mΩ

General Description

The MDD1754 uses advanced MagnaChip's Trench MOSFET Technology to provided high performance in on-state resistance, switching performance and reliability.

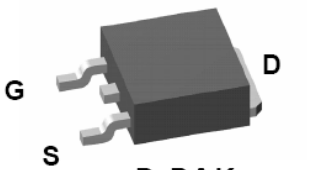
Low $R_{DS(ON)}$, Low Gate Charge can be offering superior benefit in the application.

Features

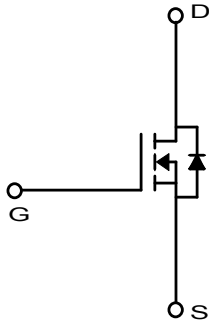
- V_{DS} = 40V
- I_D=20.5A(V_{GS}=10V)
- $R_{DS(ON)}$
  <27mΩ @ V_{GS} = 10V
  <35mΩ @ V_{GS} = 4.5V

Applications

- Inverters
- General purpose applications



D-PAK
(TO-252)



Absolute Maximum Ratings (T_C =25°)

Characteristics			Symbol	Rating	Unit
Drain-Source Voltage			V_{DSS}	40	V
Gate-Source Voltage			V_{GSS}	±20	V
Continuous Drain Current	(Note 2)	T_C=25°C	I_D	20.5	A
		T_C=100°C		13	A
Pulsed Drain Current			I_{DM}	50	A
Power Dissipation		T_C=25°C	P_D	16.7	W
		T_C=100°C		6.7	
Single Pulse Avalanche Energy		(Note 3)	E_{AS}	18	mJ
Junction and Storage Temperature Range			T_J, T_{stg}	-55~+150	°C

Thermal Characteristics

Characteristics		Symbol	Rating	Unit
Thermal Resistance, Junction-to-Ambient	(Note 1)	$R_{\theta JA}$	60	°C/W
Thermal Resistance, Junction-to-Case		$R_{\theta JC}$	7.5	

Ordering Information

Part Number	Temp. Range	Package	Packing	RoHS Status
MDD1754RH	-55~150°C	TO-252	Tape & Reel	Halogen Free

Electrical Characteristics (TJ =25°C unless otherwise noted)

Characteristics	Symbol	Test Condition	Min	Typ	Max	Unit
Static Characteristics						
Drain-Source Breakdown Voltage	BV_{DSS}	I_D = 250μA, V_{GS} = 0V	40	-	-	V
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 250μA	1.0	1.8	3.0	
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS} = 32V, V_{GS} = 0V	-		1	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 = 8A	-	20	27	mΩ
		V_{GS} = 4.5V, I_D = 6A		26	35	
Forward Transconductance	g_{FS}	V_{DS} = 10V, I_D = 8A		20	-	S
Dynamic Characteristics						
Total Gate Charge	Q_g	V_{DD} = 28V, I_D = 8A, V_{GS} = 10V	-	9.2	-	nC
Gate-Source Charge	Q_{gs}		-	1.7	-	
Gate-Drain Charge	Q_{gd}		-	2.2	-	
Input Capacitance	C_{iss}	V_{DS} = 25V, V_{GS} = 0V, f = 1.0MHz	-	440	-	pF
Reverse Transfer Capacitance	C_{rss}		-	38	-	
Output Capacitance	C_{oss}		-	76	-	
Turn-On Delay Time	$t_{d(on)}$	V_{GS} = 10V ,V_{DD} = 20V, I_D = 1A, R_{GEN}=3.3Ω	-	5.9	-	ns
Turn-On Rise Time	t_r		-	17.3	-	
Turn-Off Delay Time	$t_{d(off)}$		-	16.5	-	
Turn-Off Fall Time	t_f		-	10.7	-	
Drain-Source Body Diode Characteristics						
Source-Drain Diode Forward Voltage	V_{SD}	I_S = 8A, V_{GS} = 0V	-	0.86	1.2	V
Reverse Recovery Time	t_{rr}	I_S = 8A, di/dt=100A/us	-	35	-	ns
Reverse Recovery Charge	Q_{rr}		-	8.8	-	nC

Notes :

1. Surface mounted RF4 board with 2oz. Copper.
2. P_D is based on $T_{J(MAX)}$=150°C
   P_D (T_C=25°C) is based on $R_{\theta JC}$,
3. Starting T_J=25°C, L=1mH, I_{AS}=6A V_{DD}=20V, V_{GS}=10V

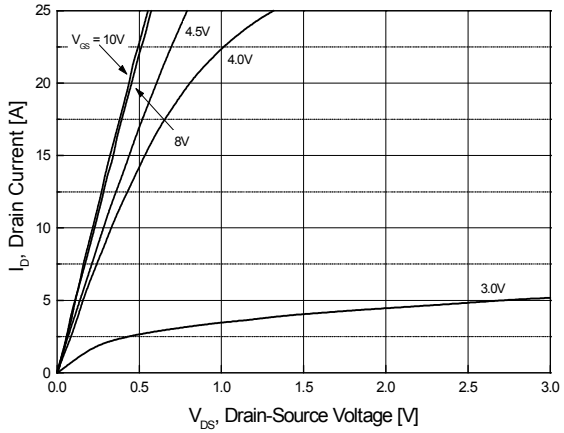


Fig.1 On-Region Characteristics

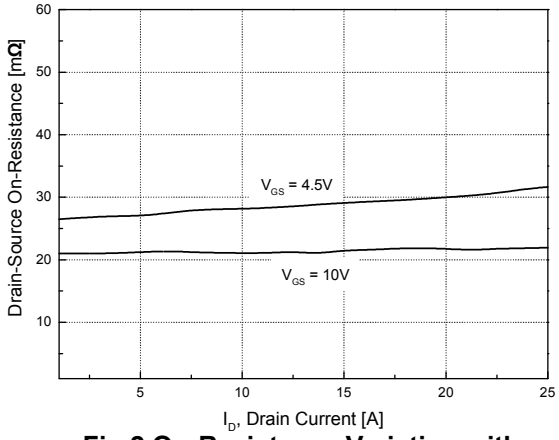


Fig.2 On-Resistance Variation with Drain Current and Gate Voltage

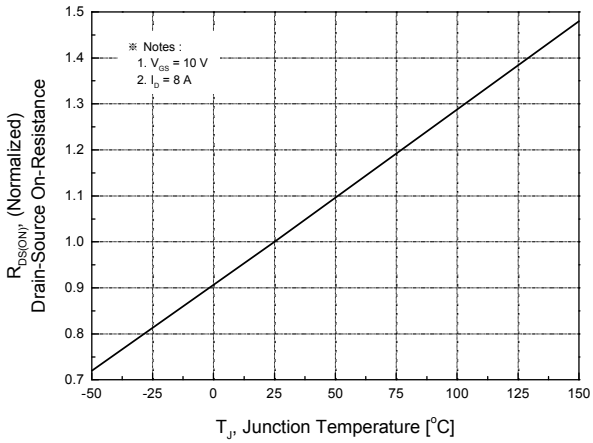


Fig.3 On-Resistance Variation with Temperature

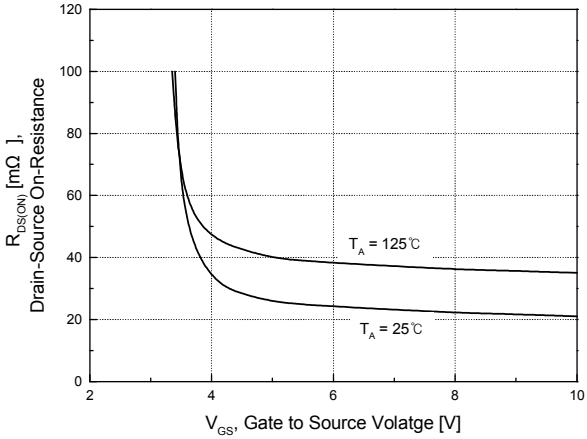


Fig.4 On-Resistance Variation with Gate to Source Voltage

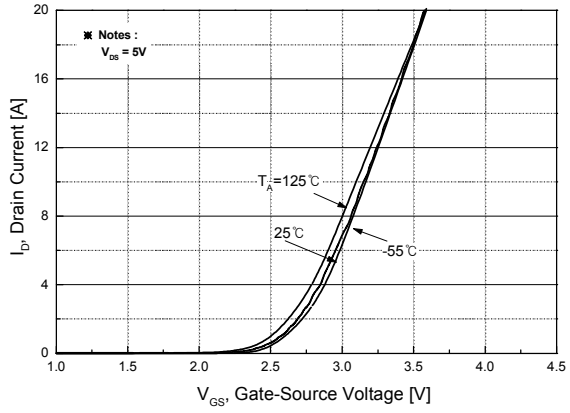


Fig.5 Transfer Characteristics

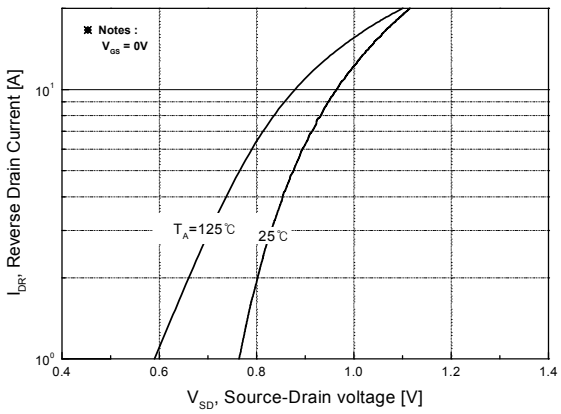


Fig.6 Body Diode Forward Voltage Variation with Source Current and Temperature

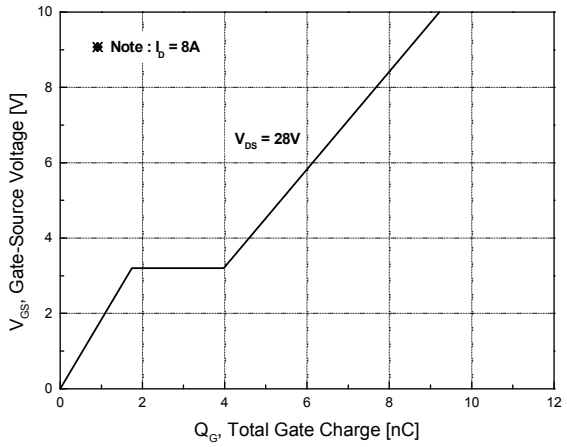


Fig.7 Gate Charge Characteristics

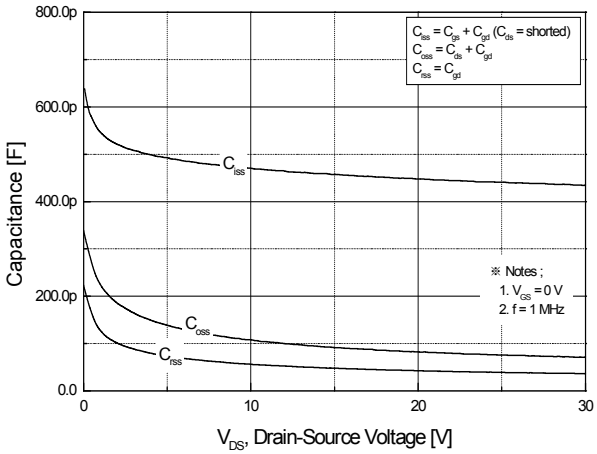


Fig.8 Capacitance Characteristics

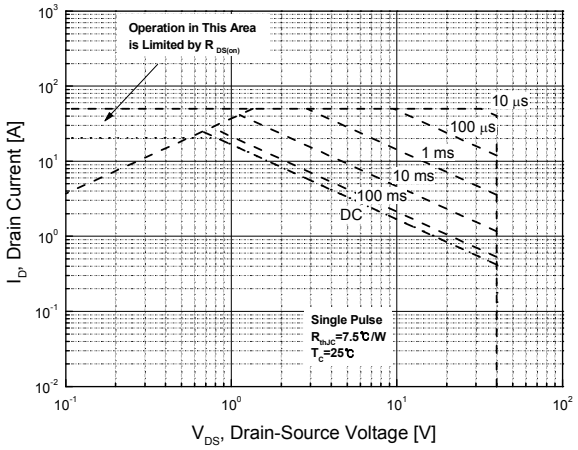


Fig.9 Maximum Safe Operating Area

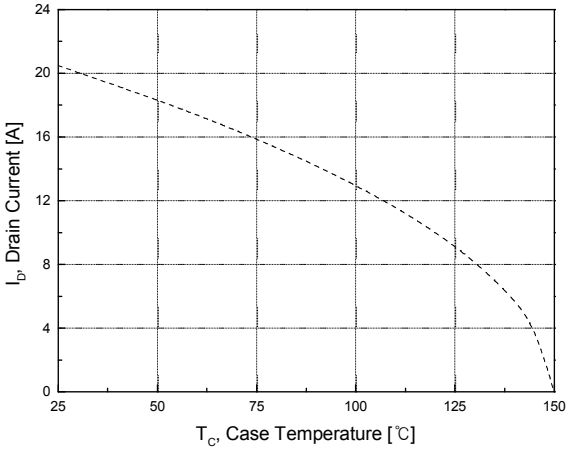


Fig.10 Maximum Drain Current vs. Case Temperature

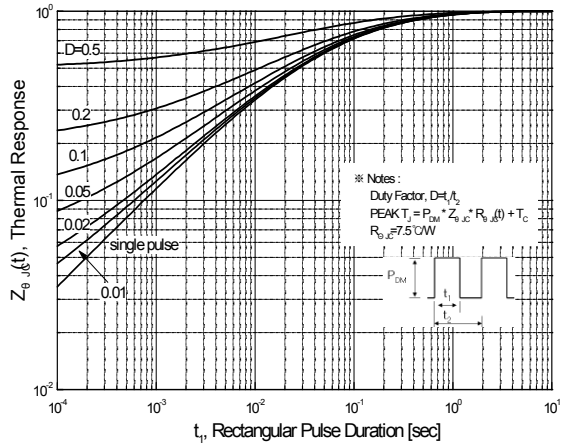
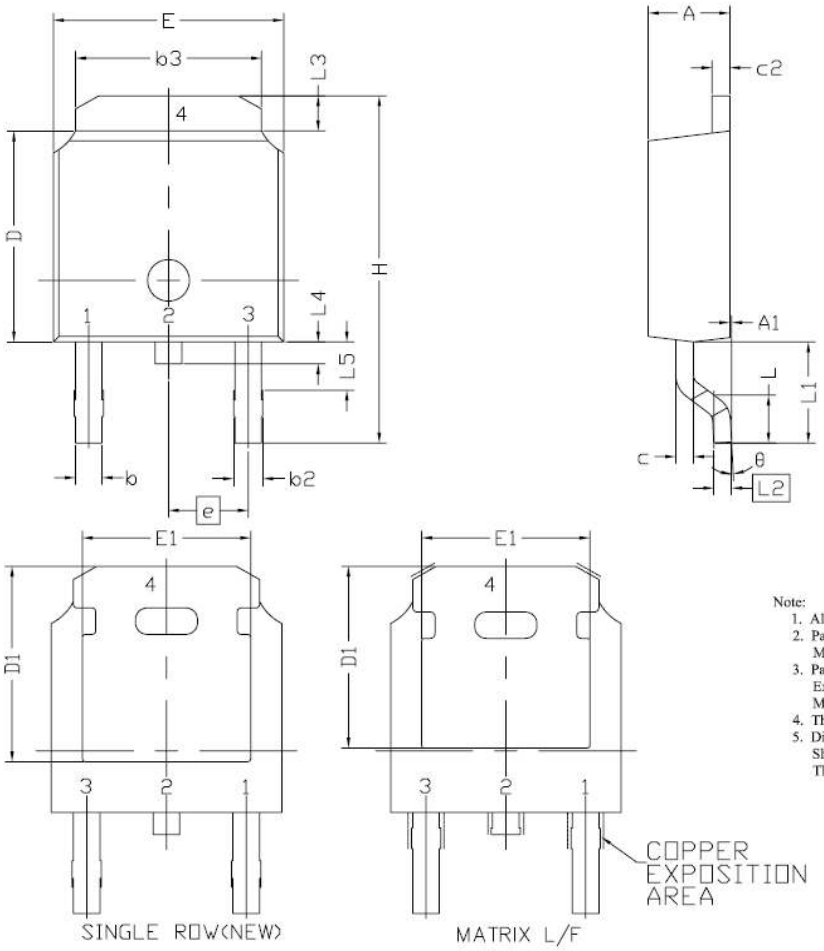


Fig.11 Transient Thermal Response Curve

Physical Dimensions

2 Leads, DPAK (TO252)

Dimensions are in millimeters unless otherwise specified



SYMBOL	DIMENSIONAL REQMTS		
	MIN	NOM	MAX
E	6.40	6.60	6.731
L	1.40	1.52	1.77
L1	2.743 REF		
L2	0.508 BSC		
L3	0.89	--	1.27
L4	0.64	--	1.01
L5	--	--	--
D	6.00	6.10	6.223
H	9.40	10.00	10.40
b	0.64	0.76	0.88
b2	0.77	0.84	1.14
b3	5.21	5.34	5.46
e	2.286 BSC		
A	2.20	2.30	2.38
A1	0	--	0.127
c	0.45	0.50	0.60
c2	0.45	0.50	0.58
D1	5.30	--	--
E1	4.40	--	--
θ	0°	--	10°

Note:
1. All Dimension Are In mm.
2. Package Body Sizes Exclude Mold Flash, Protrusion Or Gate Burrs. Mold Flash, Protrusion Or Gate Burrs Shall Not Exceed 0.10 mm Per Side.
3. Package Body Sizes Determined At The Outermost Extremes Of The Plastic Body Exclusive Of Mold Flash, Gate Burrs And Interlead Flash, But Including Any Mismatch Between The Top And Bottom Of The Plastic Body.
4. The Package Top May Be Smaller Than The Package Bottom.
5. Dimension "b" Does Not Include Dambar Protrusion. Allowable Dambar Protrusion Shall Be 0.10 mm Total In Excess Of "b" Dimension At Maximum Material Condition. The Dambar Cannot Be Located On The Lower Radius Of The Foot.

Worldwide Sales Support Locations

U.S.A
Sunnyvale Office
787 N. Mary Ave. Sunnyvale
CA 94085 U.S.A
Tel : 1-408-636-5200
Fax : 1-408-213-2450
E-Mail : americasales@magnachip.com

Chicago Office
2300 Barrington Road, Suite 330
Hoffman Estates, IL 60195 U.S.A
Tel : 1-847-882-0951
Fax :1-847-882-0998

U.K
Knyvett House The Causeway,
Staines Middx, TW18 3BA,U.K.
Tel : +44 (0) 1784-898-8000
Fax : +44 (0) 1784-895-115
E-Mail : europesales@magnachip.com

Japan
Tokyo Office
Shinbashi 2-chome MT bldg
4F 2-5-5 Shinbashi, Minato-ku
Tokyo, 105-0004 Japan
Tel : 81-3-3595-0632
Fax : 81-3-3595-0671
E-Mail : japansales@magnachip.com

Osaka Office
3F, Shin-Osaka MT-2 Bldg
3-5-36 Miyahara Yodogawa-Ku
Osaka, 532-0003 Japan
Tel : 81-6-6394-8224
Fax : 81-6-6394-8282
E-Mail : osakasales@magnachip.com

Taiwan R.O.C
2F, No.61, Chowize Street, Nei Hu
Taipei,114 Taiwan R.O.C
Tel : 886-2-2657-7898
Fax : 886-2-2657-8751
E-Mail : taiwansales@magnachip.com

China
Hong Kong Office
Office 03, 42/F, Office Tower Convention Plaza
1 Harbour Road, Wanchai, Hong Kong
Tel : 852-2828-9700
Fax : 852-2802-8183
E-Mail : chinasales@magnachip.com

Shenzhen Office
Room 1803, 18/F
International Chamber of Commerce Tower
Fuhua 3Road, Futian District
ShenZhen, China
Tel : 86-755-8831-5561
Fax : 86-755-8831-5565

Shanghai Office
Ste 1902, 1 Huaihai Rd. (C) 20021
Shanghai, China
Tel : 86-21-6373-5181
Fax : 86-21-6373-6640

Korea
891, Daechi-Dong, Kangnam-Gu
Seoul, 135-738 Korea
Tel : 82-2-6903-3451
Fax : 82-2-6903-3668 ~9
Email : koreasales@magnachip.com

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