RoHS Compliant
HALOGEN-FREE

MagnaChip

MDD3752

P-Channel Trench MOSFET, -40V, -43A, 17mΩ

General Description

The MDD3752 uses advanced MagnaChip's Trench MOSFET Technology to provided high performance in on-state resistance, switching performance and reliability.

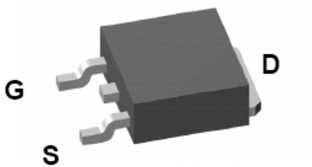
Low $R_{DS(ON)}$, Low Gate Charge can be offering superior benefit in the application.

Features

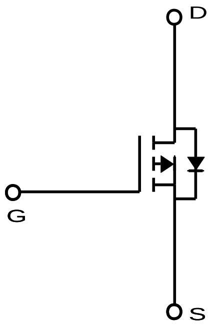
- V_{DS} = -40V
- I_D = -43A @V_{GS} = -10V
- $R_{DS(ON)}$
  < 17mΩ @ V_{GS} = -10V
  < 25mΩ @ V_{GS} = -4.5V

Applications

- Inverters
- General purpose applications



D-PAK
(TO-252)



Absolute Maximum Ratings (T_C =25^o)

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^{o}C	I_D	43	A
		T_C=100^{o}C		27	A
Pulsed Drain Current			I_{DM}	-90	A
Power Dissipation		T_C=25^{o}C	P_D	50	W
		T_C=100^{o}C		20	
Single Pulse Avalanche Energy	(Note 3)		E_{AS}	128	mJ
Junction and Storage Temperature Range			T_J, T_{stg}	-55~+150	^{o}C

Thermal Characteristics

Characteristics		Symbol	Rating	Unit
Thermal Resistance, Junction-to-Ambient	(Note 1)	$R_{\theta JA}$	40	^{o}C/W
Thermal Resistance, Junction-to-Case		$R_{\theta JC}$	2.5	

Ordering Information

Part Number	Temp. Range	Package	Packing	RoHS Status
MDD3752RH	-55~150^{o}C	D-PAK	Tape & Reel	Halogen Free

Electrical Characteristics (T_J =25^{o}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	-2.0	-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 = -20A	-	13	17	mΩ
		V_{GS} = -4.5V, I_D = -10A		19	25	
Forward Transconductance	g_{FS}	V_{DS} = -10V, I_D = -20A		40	-	S
Dynamic Characteristics						
Total Gate Charge	Q_g	V_{DD} = -20V, I_D = -20A, V_{GS} = -10V	-	44.1	-	nC
Gate-Source Charge	Q_{gs}		-	8.6	-	
Gate-Drain Charge	Q_{gd}		-	9.3	-	
Input Capacitance	C_{iss}	V_{DS} = -20V, V_{GS} = 0V, f = 1.0MHz	-	2088	-	pF
Reverse Transfer Capacitance	C_{rss}		-	168	-	
Output Capacitance	C_{oss}		-	290	-	
Turn-On Delay Time	$t_{d(on)}$	V_{GS} = -10V ,V_{DD} = -20V, I_D = -1A, R_{GEN}=6.0Ω	-	17.6	-	ns
Turn-On Rise Time	t_r		-	17.8	-	
Turn-Off Delay Time	$t_{d(off)}$		-	59.0	-	
Turn-Off Fall Time	t_f		-	19.8	-	
Drain-Source Body Diode Characteristics						
Source-Drain Diode Forward Voltage	V_{SD}	I_S = -20A, V_{GS} = 0V	-	-	1.2	V
Reverse Recovery Time	trr	I_S = -20A, di/dt=100A/us	-	40	-	ns
Reverse Recovery Charge	Qrr		-	40	-	nC

Note :

1. Surface mounted RF4 board with 2oz. Copper.
2. P_D is based on $T_{J(MAX)}$=150^{O}C, P_D(T_C=25^{O}C) is based on $R_{\theta JC}$.
3. Starting T_J=25°C, L=1mH, I_{AS}=-16A V_{DD}=-20V, V_{GS}=-10V

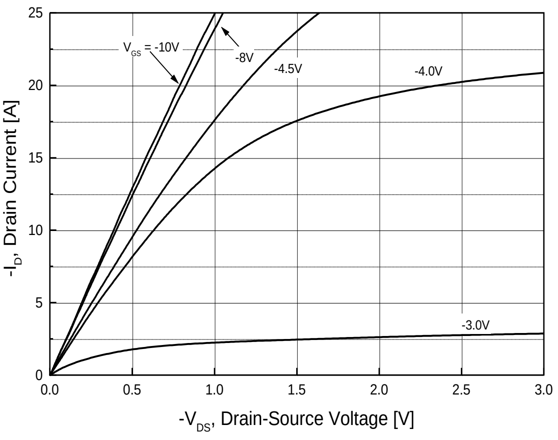


Fig.1 On-Region Characteristics

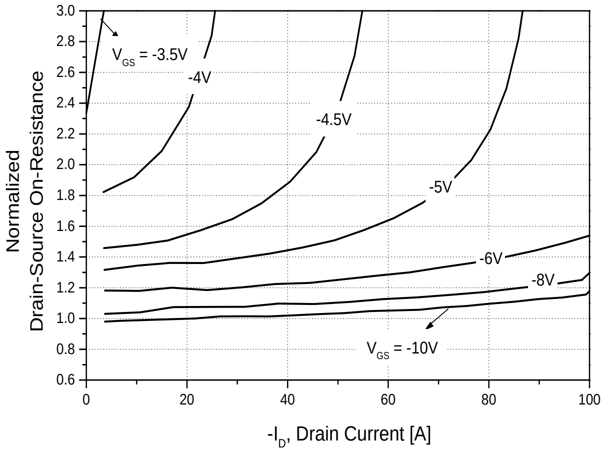


Fig.2 On-Resistance Variation with Drain Current and Gate Voltage

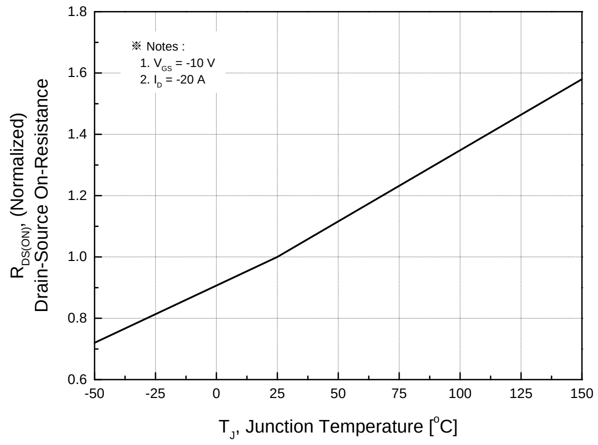


Fig.3 On-Resistance Variation with Temperature

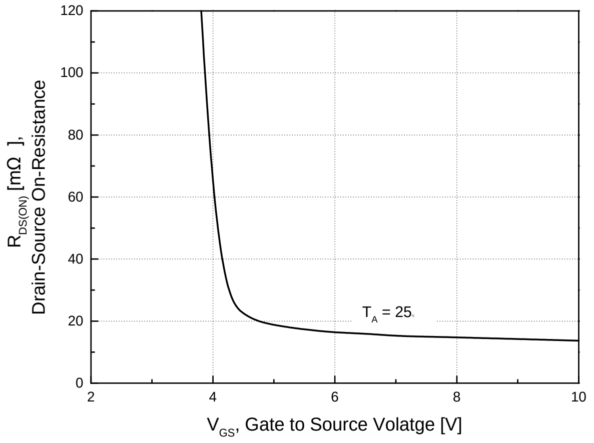


Fig.4 On-Resistance Variation with Gate to Source Voltage

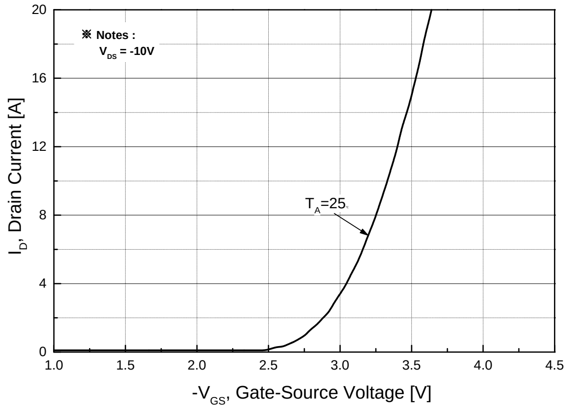


Fig.5 Transfer Characteristics

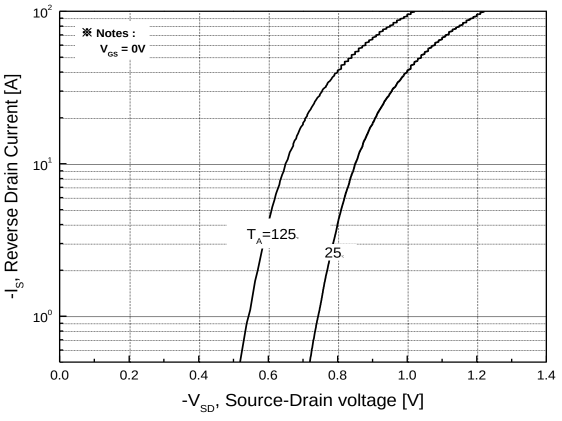


Fig.6 Body Diode Forward Voltage Variation with Source Current and Temperature

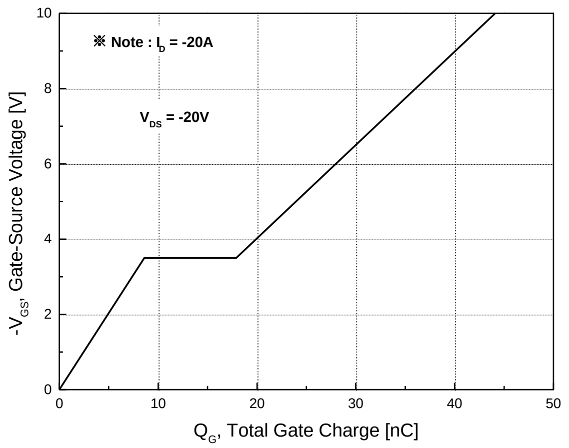


Fig.7 Gate Charge Characteristics

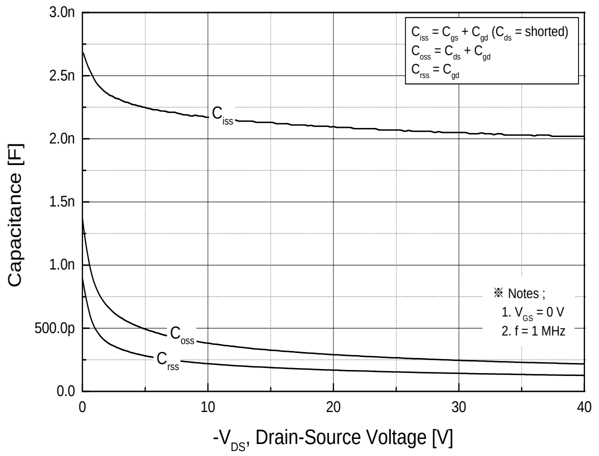


Fig.8 Capacitance Characteristics

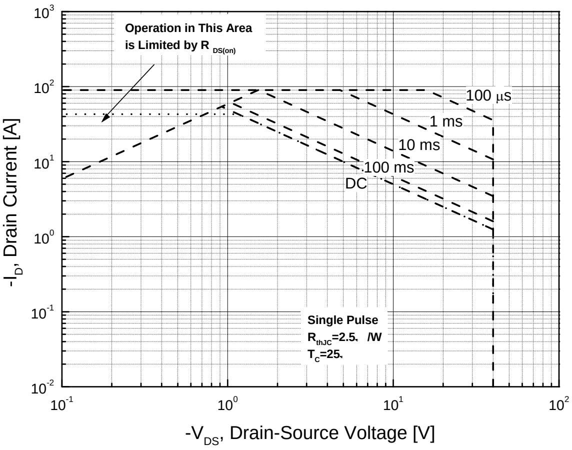


Fig.9 Maximum Safe Operating Area

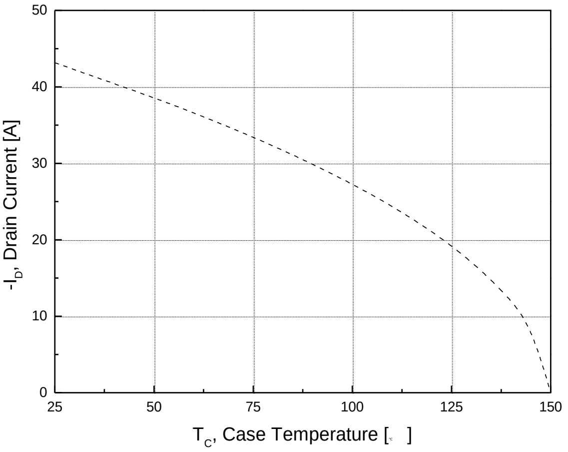


Fig.10 Maximum Drain Current vs. Case Temperature

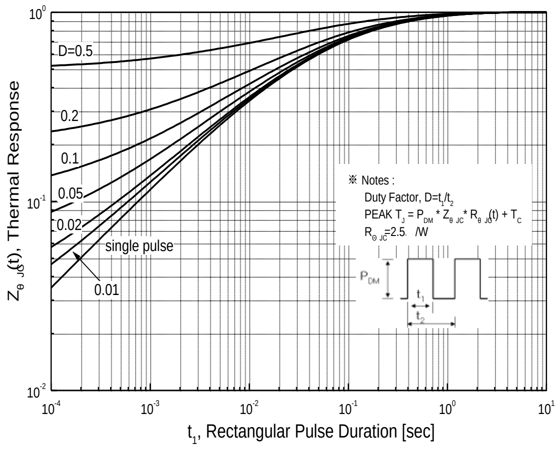
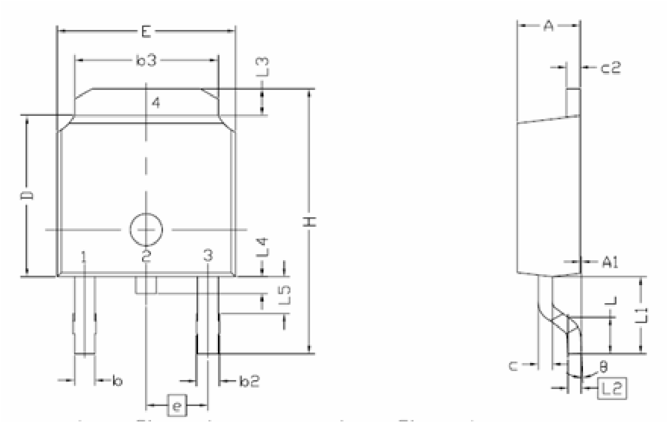


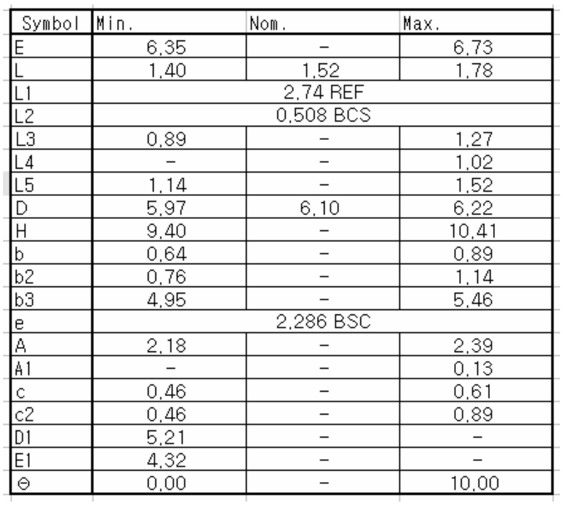
Fig.11 Transient Thermal Response Curve

Physical Dimensions

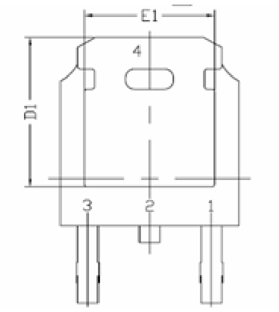
2 Leads, DPAK (TO252)

Dimensions are in millimeters unless otherwise specified





Symbol	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



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