RoHS Compliant
HALOGEN-FREE

MagnaChip

MDI1752

N-Channel Trench MOSFET 40V, 50A, 8.0mΩ

General Description

The MDI1752 uses advanced MagnaChip's trench MOSFET Technology to provide high performance in on-state resistance, switching performance and reliability

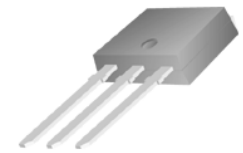
Low $R_{DS(ON)}$, low gate charge can be offering superior benefit in the application.

Features

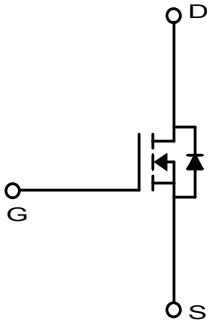
- V_{DS} = 40V
- I_D = 50A @V_{GS} = 10V
- $R_{DS(ON)}$
  < 8.0mΩ @ V_{GS} = 10V
  < 10.5mΩ @ V_{GS} = 4.5V

Applications

- Inverters
- General purpose applications



(TO251)



Absolute Maximum Ratings (T_C =25°C unless otherwise noted)

Characteristics			Symbol	Rating	Unit
Drain-Source Voltage			V_{DSS}	40	V
Gate-Source Voltage			V_{GSS}	±20	V
Continuous Drain Current	(Note 1)	T_C=25°C (a)	I_D	50	A
		T_A=25°C (b)		9.9	A
Pulsed Drain Current			I_{DM}	100	A
Power Dissipation for Single Operation		T_C=25°C	P_D	45	W
		T_A=25°C		1.25	
Single Pulse Avalanche Energy		(Note 2)	E_{AS}	153	mJ
Junction and Storage Temperature Range			T_J, T_{stg}	-55~+150	°C

Thermal Characteristics

Characteristics	Symbol	Rating	Unit
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	100	°C/W
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	2.8	

Ordering Information

Part Number	Temp. Range	Package	Packing	RoHS Status
MDI1752TH	-55~150°C	TO-251	Tube	Halogen Free

Electrical Characteristics (T_J =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	1.7	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 = 14A	-	6.1	8.0	mΩ
		V_{GS} = 4.5V, I_D = 11A	-	8.2	10.5	
Forward Transconductance	g_{FS}	V_{DS} = 5V, I_D = 14A	-	58	-	S
Dynamic Characteristics						
Total Gate Charge	Q_g	V_{DS} = 20V, I_D = 14A, V_{GS} = 10V	-	26.4	-	nC
Gate-Source Charge	Q_{gs}		-	3.6	-	
Gate-Drain Charge	Q_{gd}		-	6.8	-	
Input Capacitance	C_{iss}	V_{DS} = 20V, V_{GS} = 0V, f = 1.0MHz	-	1480	-	pF
Reverse Transfer Capacitance	C_{rss}		-	113	-	
Output Capacitance	C_{oss}		-	243	-	
Turn-On Delay Time	$t_{d(on)}$	V_{GS} = 10V ,V_{DS} = 20V, I_D = 1A , R_{GEN} = 6Ω	-	9	-	ns
Turn-On Rise Time	t_r		-	21	-	
Trun-Off Delay Time	$t_{d(off)}$		-	31	-	
Trun-Off Fall Time	t_f		-	18	-	
Drain-Source Body Diode Characteristics						
Source-Drain Diode Forward Voltage	V_{SD}	I_S = 14A, V_{GS} = 0V	-	0.8	1.2	V
Body Diode Reverse Recovery Time	t_{rr}	I_F = 14A, di/dt = 100A/μs	-	26	-	ns
Body Diode Reverse Recovery Charge	Q_{rr}		-	11	-	nC

Note :

1. P_D is based on $T_{J(MAX)}$=150°C
   a. P_D (T_C=25°C) is based on $R_{\theta JC}$,
   b. P_D (T_A=25°C) is based on $R_{\theta JA}$
2. Starting T_J=25°C, L=1mH, I_{AS}=17.5A, V_{DD}=40V, V_{GS}=10V

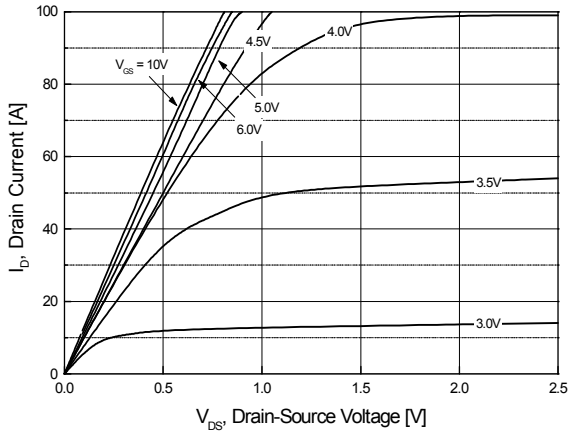


Fig.1 On-Region Characteristics

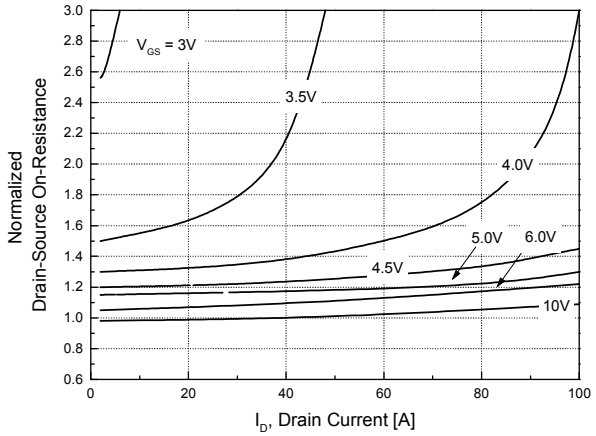


Fig.2 On-Resistance Variation with Drain Current and Gate Voltage

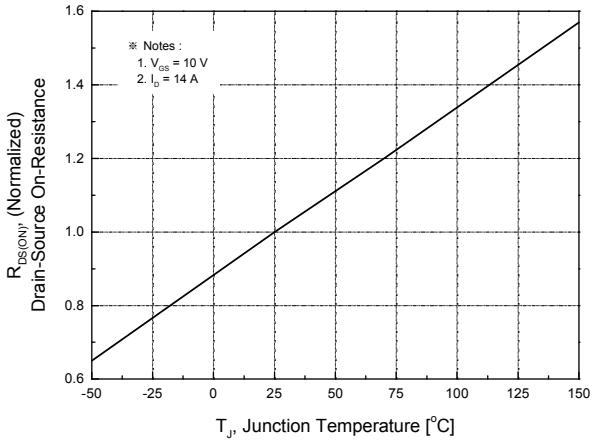


Fig.3 On-Resistance Variation with Temperature

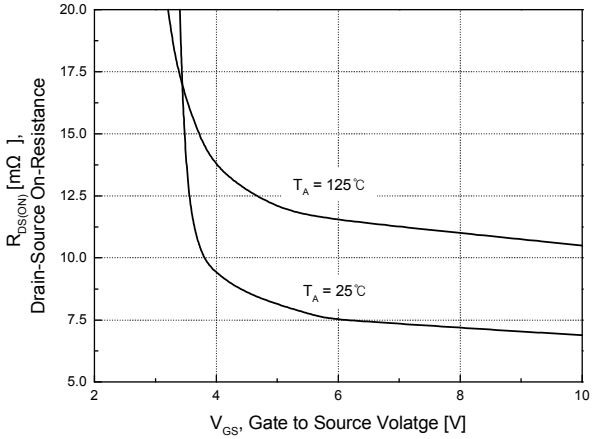


Fig.4 On-Resistance Variation with Gate to Source Voltage

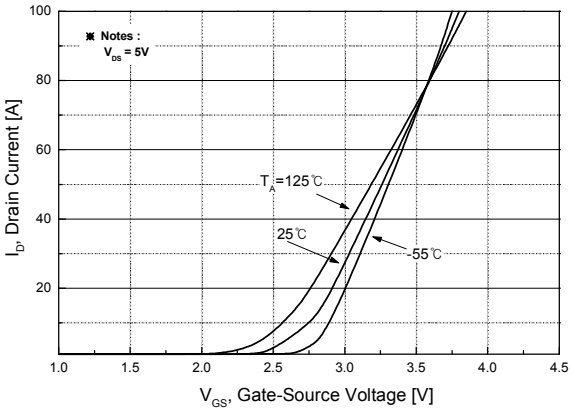


Fig.5 Transfer Characteristics

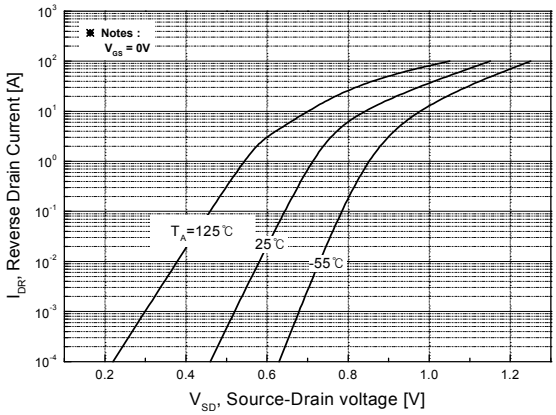


Fig.6 Body Diode Forward Voltage Variation with Source Current and Temperature

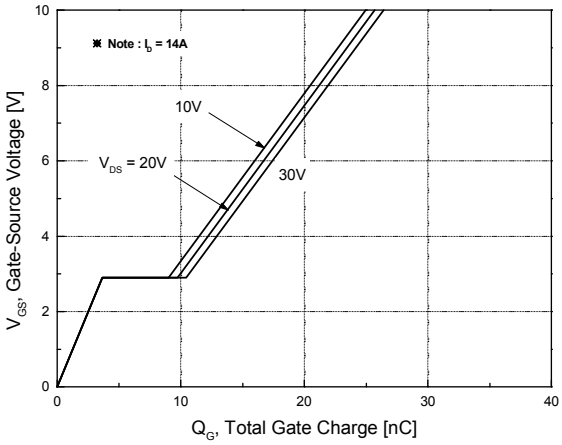


Fig.7 Gate Charge Characteristics

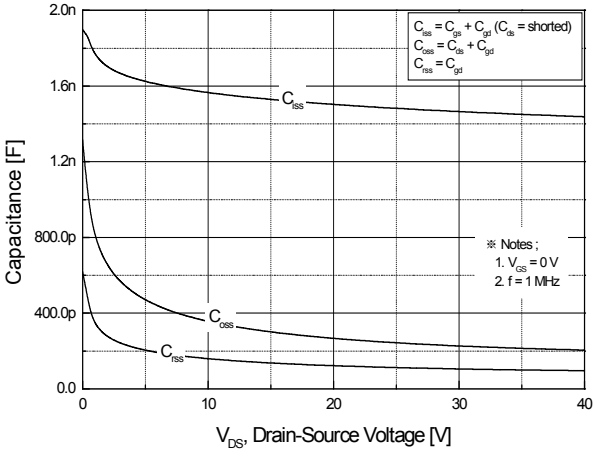


Fig.8 Capacitance Characteristics

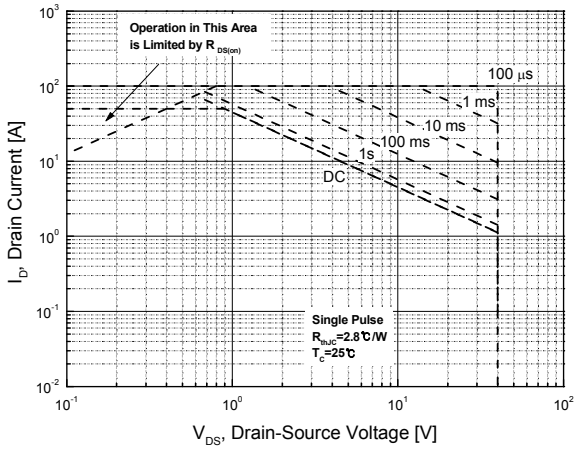


Fig.9 Maximum Safe Operating Area

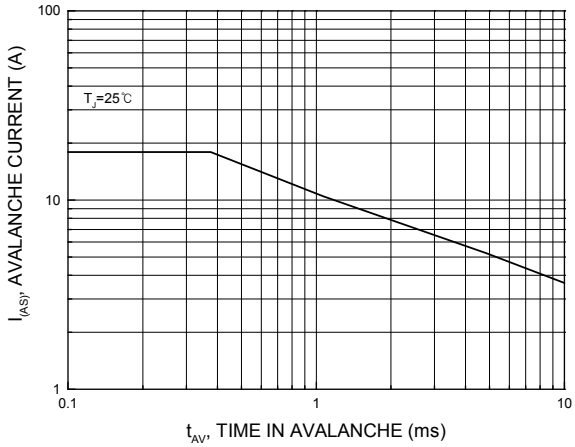


Fig.10 Unclamped Inductive Switching Capability

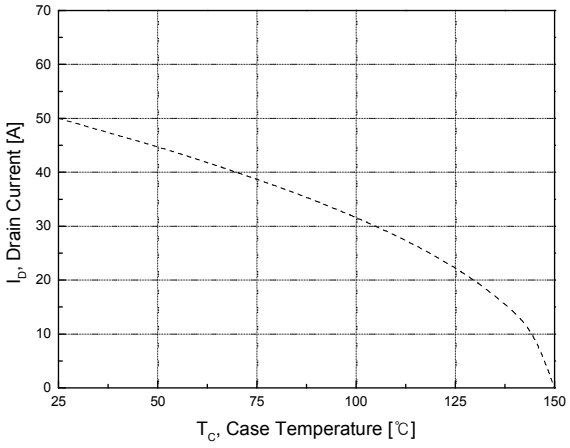


Fig.11 Maximum Drain Current vs. Case Temperature

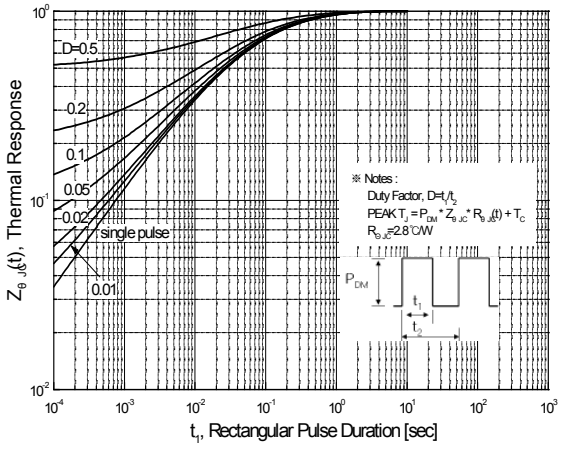
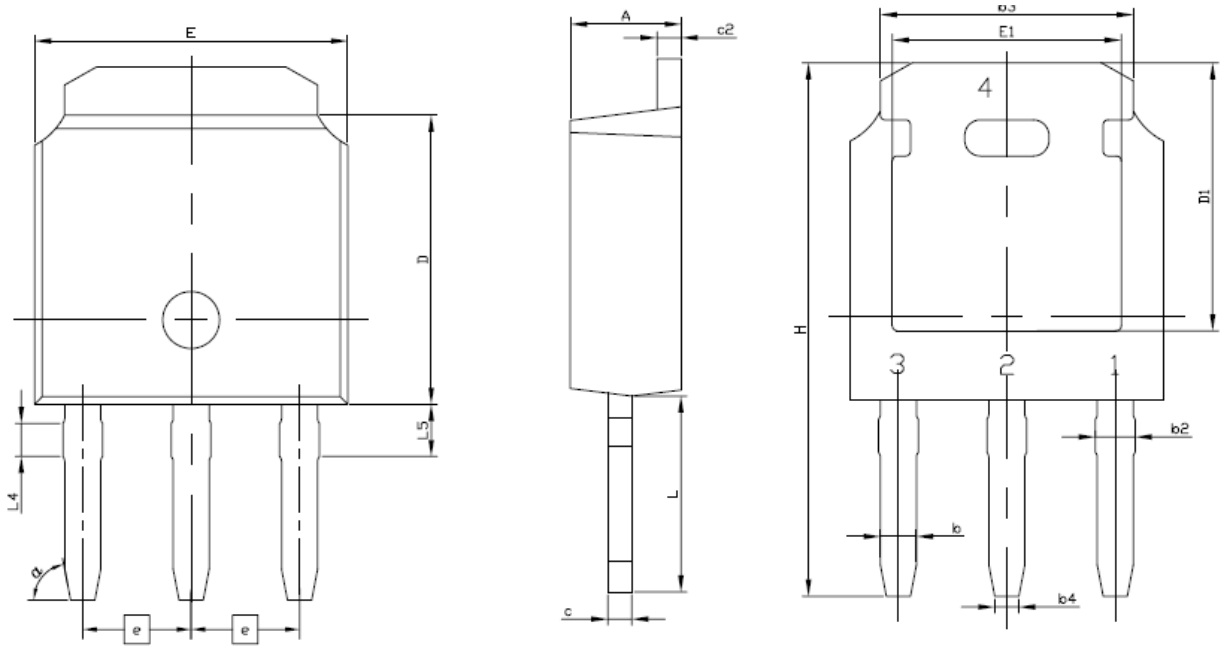


Fig.12 Transient Thermal Response Curve

Physical Dimension

TO251 (IPAK)

Dimensions are in millimeters unless otherwise specified



SYMBOL	DIMENSIONAL REQMTS		
	MIN	NOM	MAX
E	6.40	6.60	6.731
L	3.98	4.13	4.28
L4		0.698 REF	
L5	0.972	1.099	1.226
D	6.00	6.10	6.223
H	11.05	11.25	11.45
b	0.64	0.76	0.88
b2	0.77	0.84	1.14
b3	5.21	5.34	5.46
b4	0.45	0.50	0.55
e		2.286 BSC	
A	2.20	2.30	2.38
c	0.40	0.50	0.60
c2	0.40	0.50	0.60
D1	5.10	--	--
E1	4.40	--	--
α		79° REF	

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