

General Description

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

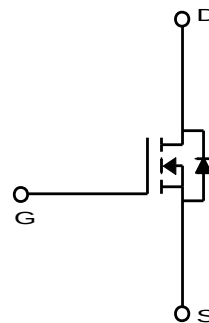
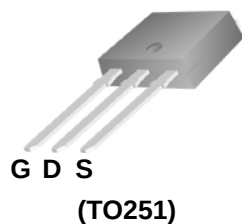
Low $R_{DS(ON)}$, low gate charge can be offering superior benefit in the application.

Features

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

Applications

- Inverters
- General purpose applications



Absolute Maximum Ratings ($T_C = 25^\circ C$ 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)	$T_C = 25^\circ C$ (a)	I_D	50	A
	$T_A = 25^\circ C$ (b)		9.9	A
Pulsed Drain Current		I_{DM}	100	A
Power Dissipation for Single Operation	$T_C = 25^\circ C$	P_D	45	W
	$T_A = 25^\circ C$		1.25	
Single Pulse Avalanche Energy (Note 2)		E_{AS}	153	mJ
Junction and Storage Temperature Range		T_J, T_{stg}	-55~+150	$^\circ C$

Thermal Characteristics

Characteristics	Symbol	Rating	Unit
Thermal Resistance, Junction-to-Ambient	$R_{\theta JA}$	100	$^\circ C/W$
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 :

- P_D is based on T_{J(MAX)}=150°C
 - P_D (T_C=25°C) is based on R_{θJC},
 - P_D (T_A=25°C) is based on R_{θJA}
- Starting T_J=25°C, L=1mH, I_{AS}=17.5A, V_{DD}=40V, V_{GS}=10V

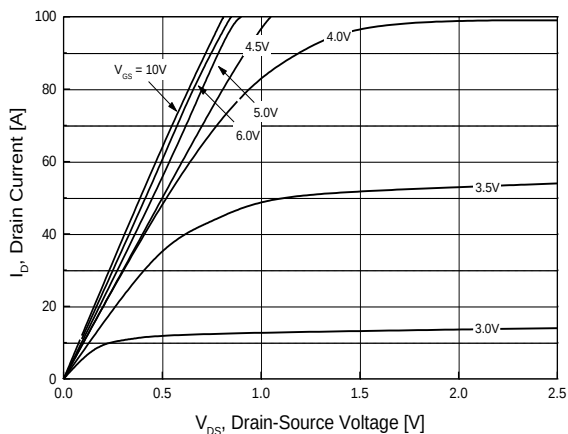


Fig.1 On-Region Characteristics

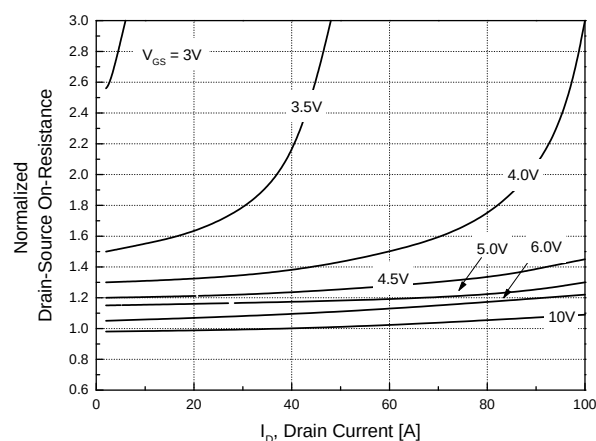


Fig.2 On-Resistance Variation with Drain Current and Gate Voltage

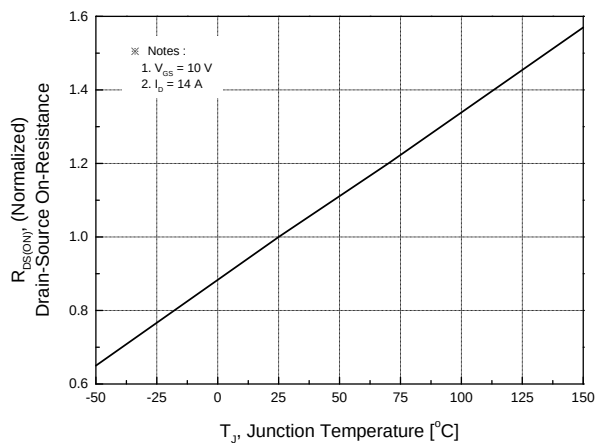


Fig.3 On-Resistance Variation with Temperature

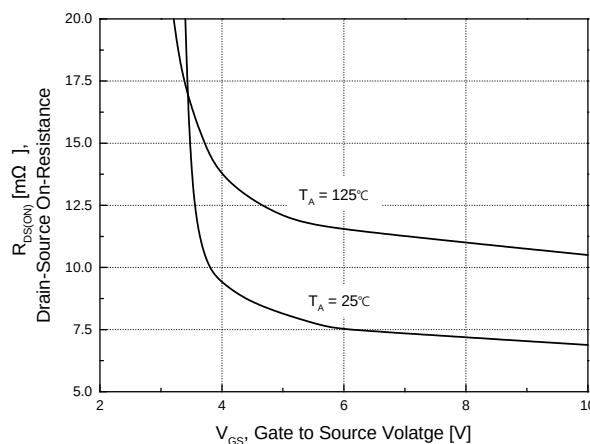


Fig.4 On-Resistance Variation with Gate to Source Voltage

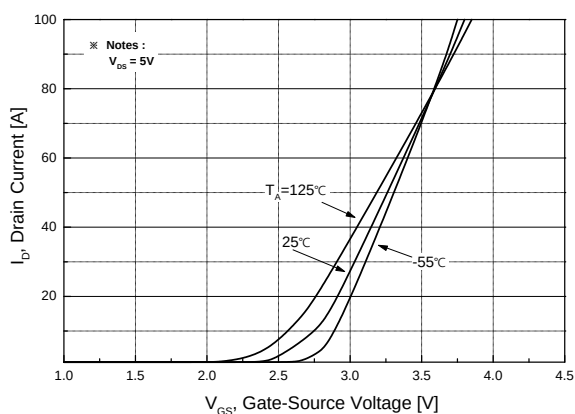


Fig.5 Transfer Characteristics

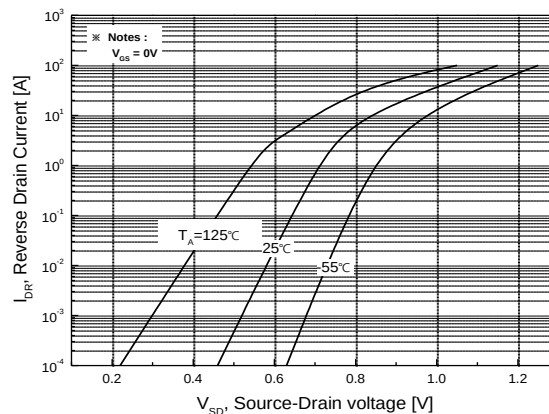
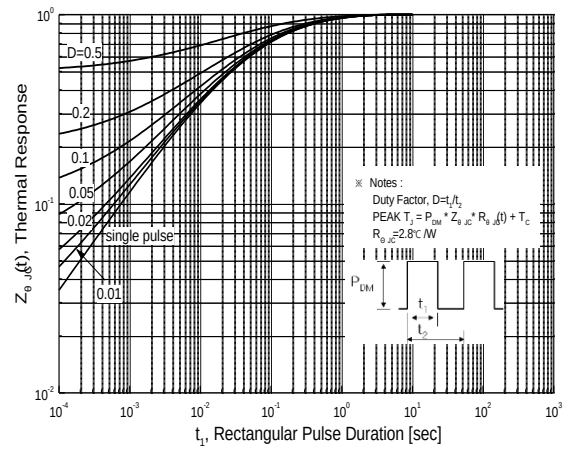
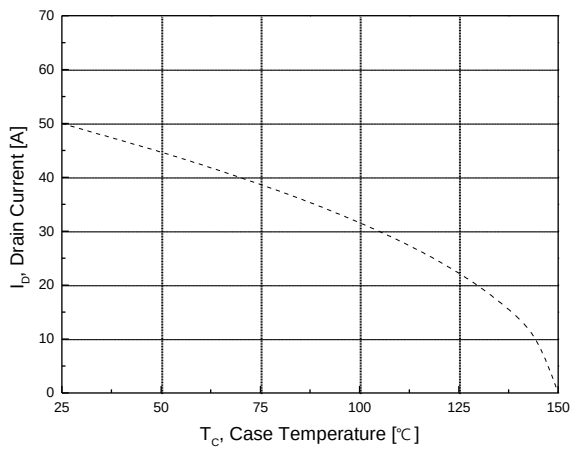
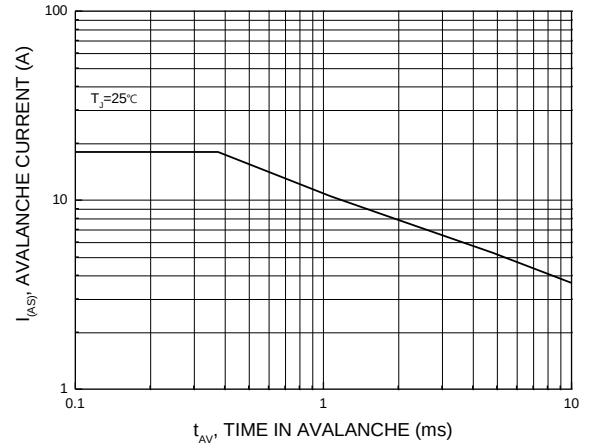
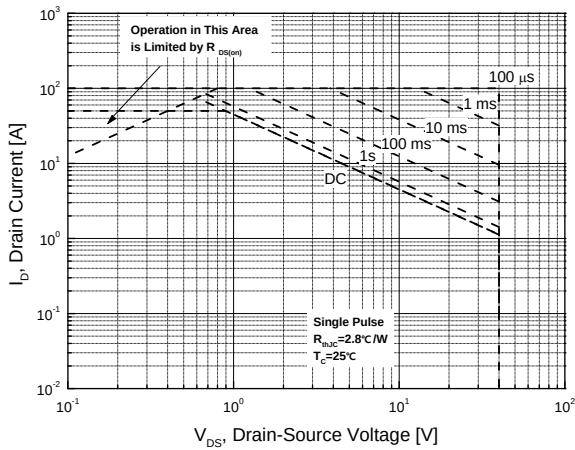
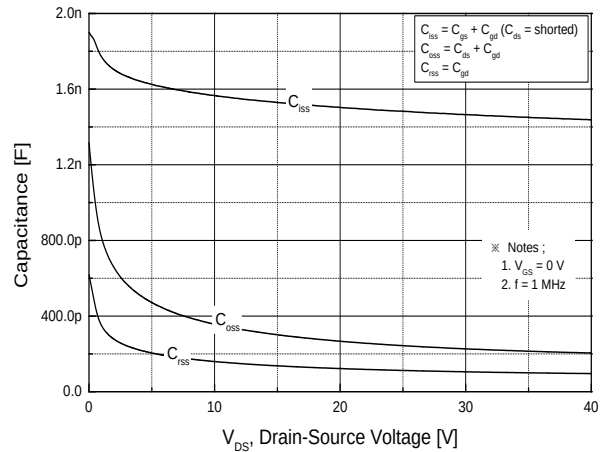
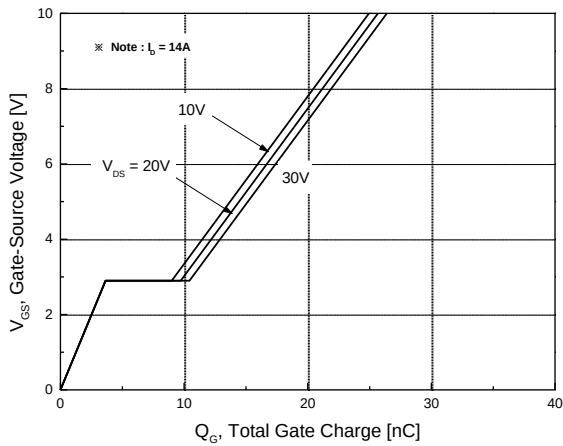


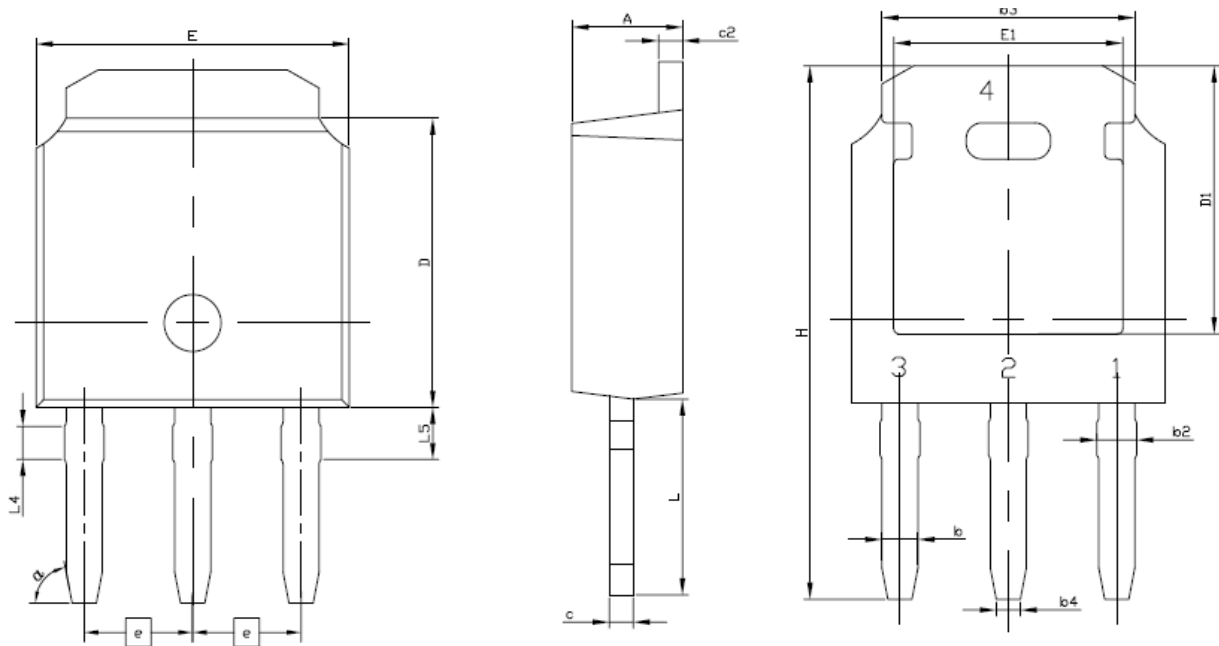
Fig.6 Body Diode Forward Voltage Variation with Source Current and Temperature



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	--	--
a	79° REF		

Note : Package body size, length and width do not include mold flash, protrusions and gate burrs.

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