

MDV1951B

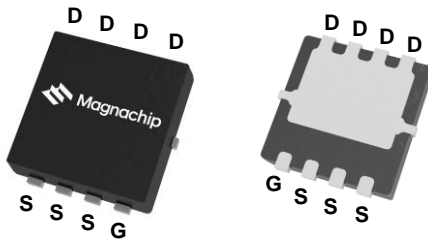
Single N-channel Trench MOSFET 60V, 12A, 45mΩ

General Description

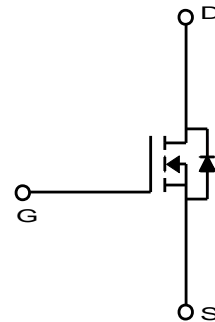
The MDV1951B uses advanced Magnachip’s MOSFET Technology, which provides high performance in on-state resistance, fast switching performance and excellent quality. MDV1951 is suitable for DC/DC converter and general purpose applications.

Features

- $V_{DS} = 60V$
- $I_D = 12A @ V_{GS} = 10V$
- $R_{DS(ON)} < 45m\Omega @ V_{GS} = 10V$
 $< 55m\Omega @ V_{GS} = 4.5V$
- 100% UIL Tested
- 100% Rg Tested



PDFN33



Absolute Maximum Ratings (Ta = 25°C)

Characteristics	Symbol	Rating	Unit
Drain-Source Voltage	V_{DSS}	60	V
Gate-Source Voltage	V_{GSS}	±20	V
Continuous Drain Current ⁽¹⁾	I_D	$T_C=25^\circ C$ (Silicon limited)	14.6
		$T_C=25^\circ C$ (Package limited)	12.0
		$T_C=70^\circ C$	9.5
		$T_A=25^\circ C$	6.6 ⁽³⁾
		$T_A=70^\circ C$	5.3 ⁽³⁾
Pulsed Drain Current	I_{DM}	48.0	A
Power Dissipation	P_D	$T_C=25^\circ C$	24.0
		$T_C=70^\circ C$	15.3
		$T_A=25^\circ C$	3.4 ⁽³⁾
		$T_A=70^\circ C$	2.2 ⁽³⁾
Single Pulse Avalanche Energy ⁽²⁾	E_{AS}	11.2	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⁾	$R_{\theta JA}$	36	°C/W
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	5.2	

Ordering Information

Part Number	Temp. Range	Package	Packing	RoHS Status
MDV1951BURH	-55~150°C	PowerDFN33	Tape & Reel	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	60	-	-	V
Gate Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250μA	1.0	1.9	3.0	
Drain Cut-Off Current	I _{DSS}	V _{DS} = 60V, 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 = 4.5A	-	37	45	mΩ
		V _{GS} = 4.5V, I _D = 3.0A	-	44	55	
Forward Transconductance	g _{fs}	V _{DS} = 10V, I _D = 3.3A	-	11	-	S
Dynamic Characteristics						
Total Gate Charge	Q _{g(10V)}	V _{DS} = 30V, I _D = 4.5A, V _{GS} = 10V	-	9.0	10.5	nC
Total Gate Charge	Q _{g(4.5V)}		-	4.4	-	
Gate-Source Charge	Q _{gs}		-	1.5	-	
Gate-Drain Charge	Q _{gd}		-	2.0	-	
Input Capacitance	C _{iss}	V _{DS} = 30V, V _{GS} = 0V, f = 1.0MHz	-	420	-	pF
Reverse Transfer Capacitance	C _{rss}		-	25	-	
Output Capacitance	C _{oss}		-	50	-	
Turn-On Delay Time	t _{d(on)}	V _{GS} = 10V, V _{DS} = 30V, I _D = 4.4A, R _G = 5.0Ω	-	5	-	ns
Rise Time	t _r		-	20	-	
Turn-Off Delay Time	t _{d(off)}		-	15	-	
Fall Time	t _f		-	10	-	
Gate Resistance	R _g	f=1 MHz	-	2.5	3.5	Ω
Drain-Source Body Diode Characteristics						
Source-Drain Diode Forward Voltage	V _{SD}	I _S = 1A, V _{GS} = 0V	-	0.7	1.1	V
Body Diode Reverse Recovery Time	t _{rr}	I _F = 4.5A, di/dt = 100A/μs	-	21	30	ns
Body Diode Reverse Recovery Charge	Q _{rr}		-	25	-	nC

Note :

- Surface mounted FR-4 board by JEDEC (jesd51-7)
- E_{AS} is tested at starting T_J = 25°C, V_{DD} = 40V, L = 0.1mH, I_{AS} = 15.0A, V_{GS} = 10V
- T < 10sec.

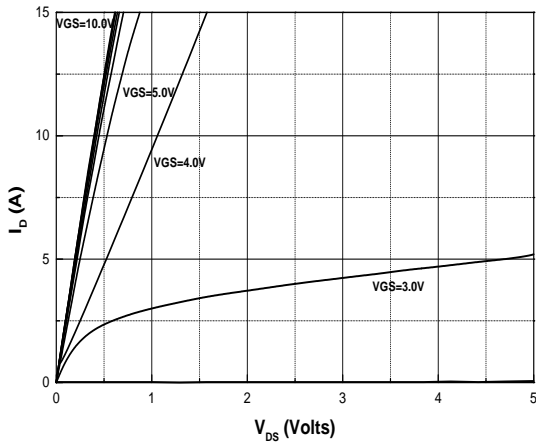


Fig.1 On-Region Characteristics

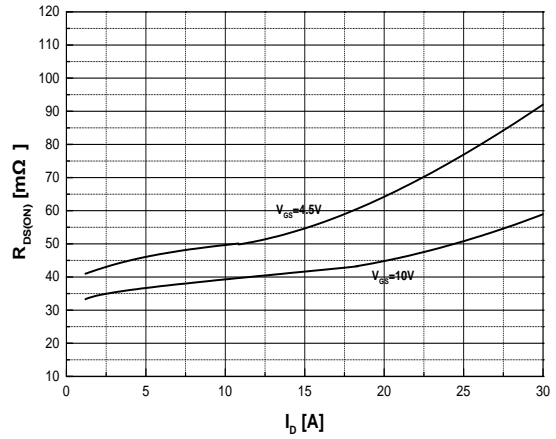


Fig.2 On-Resistance Variation with Drain Current and Gate Voltage

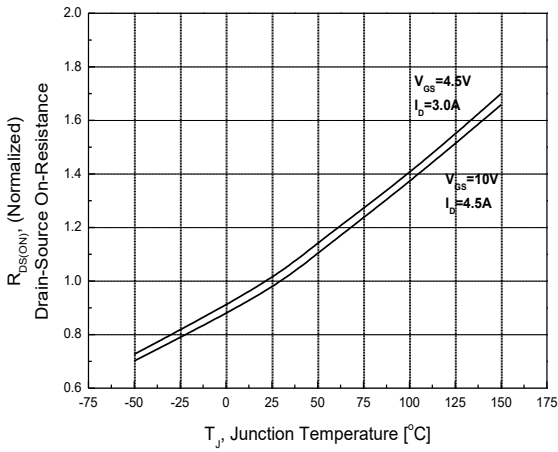


Fig.3 On-Resistance Variation with Temperature

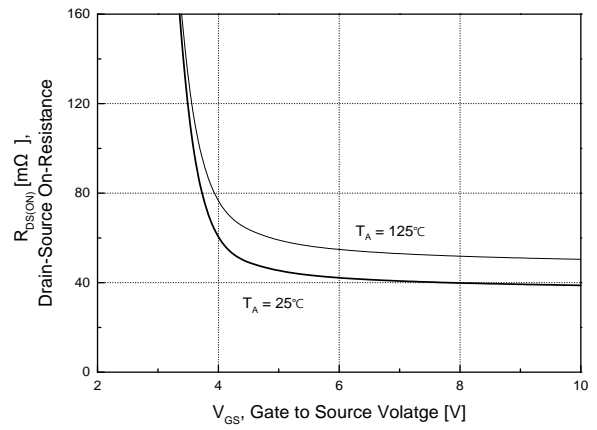


Fig.4 On-Resistance Variation with Gate to Source Voltage

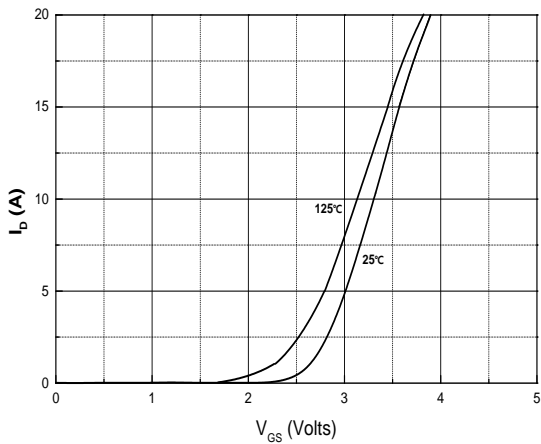


Fig.5 Transfer Characteristics

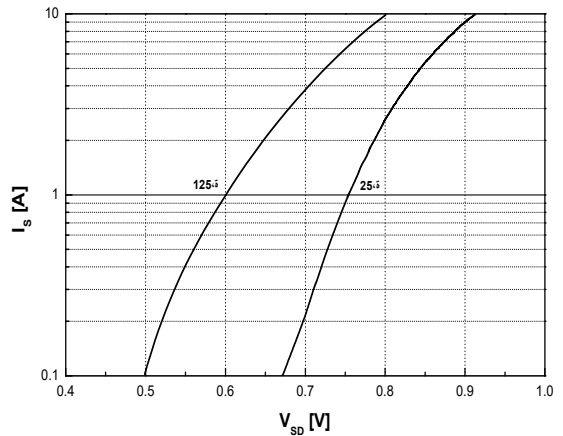


Fig.6 Body Diode Forward Voltage Variation with Source Current and Temperature

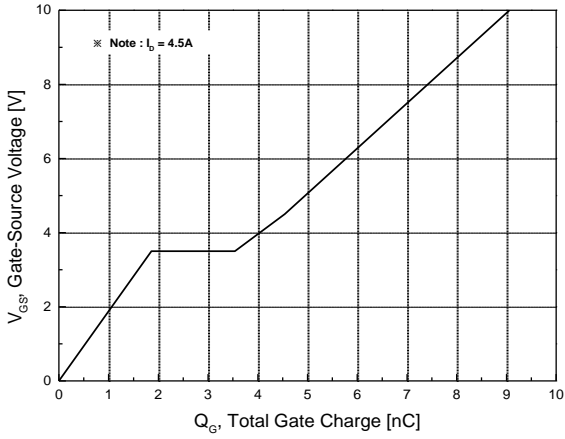


Fig.7 Gate Charge Characteristics

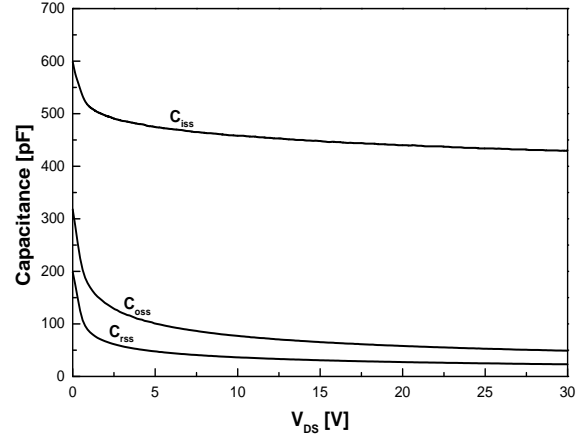


Fig.8 Capacitance Characteristics

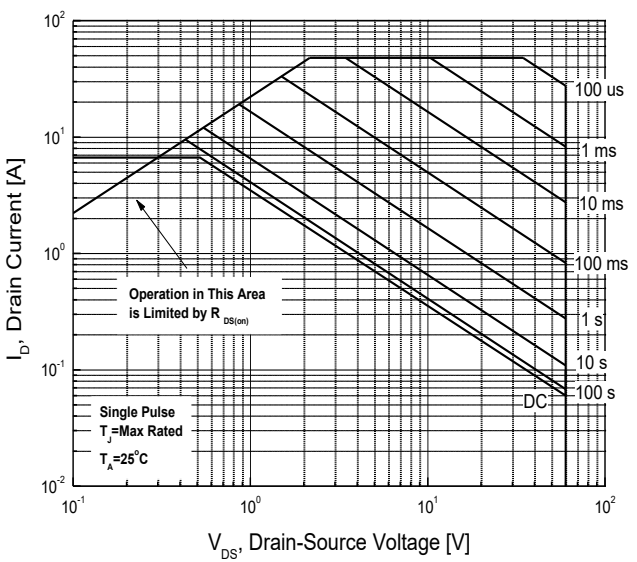


Fig.9 Maximum Safe Operating Area

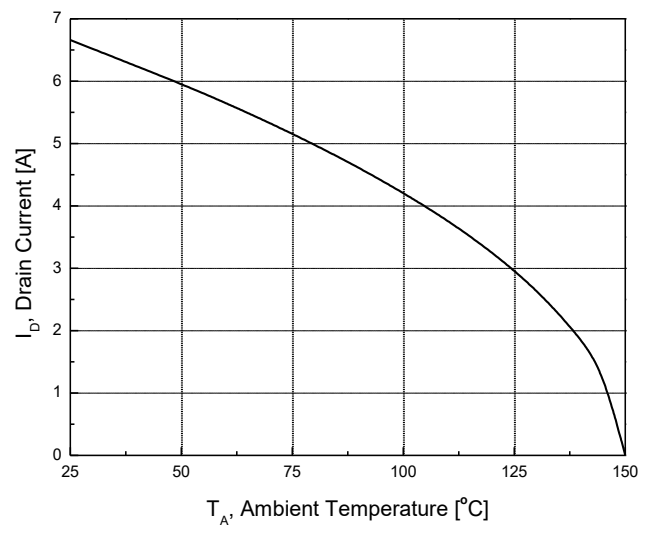


Fig.10 Maximum Drain Current vs. Ambient Temperature

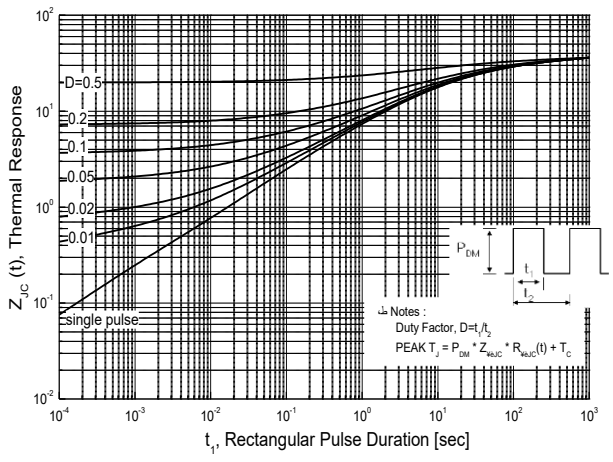
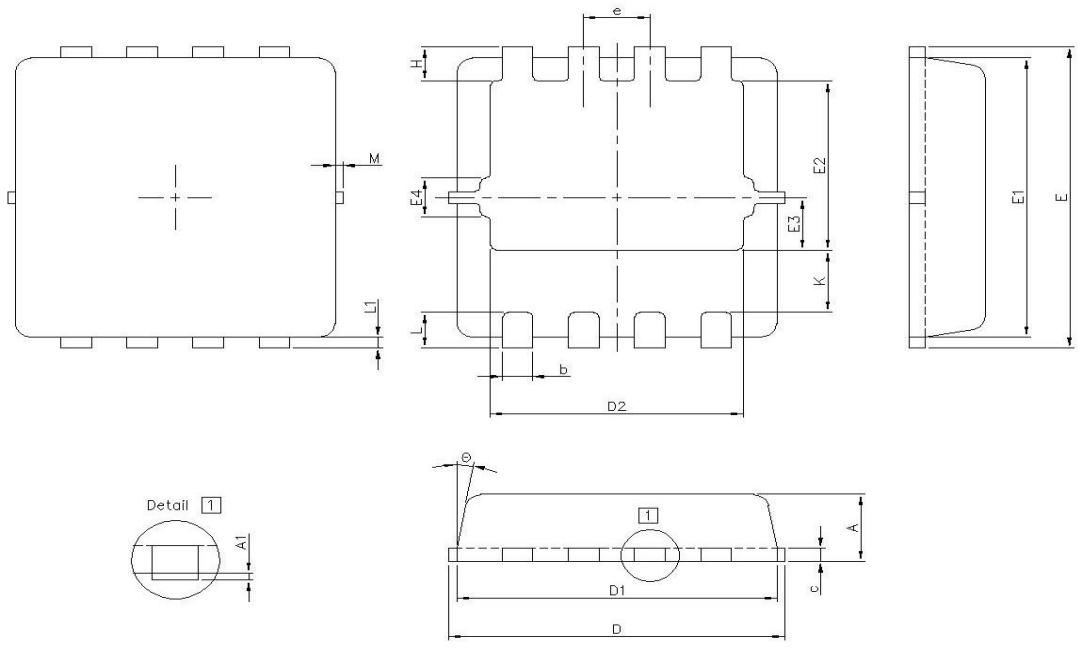


Fig.11 Transient Thermal Response Curve

Package Dimension

PowerDFN33 (3.3x3.3mm)

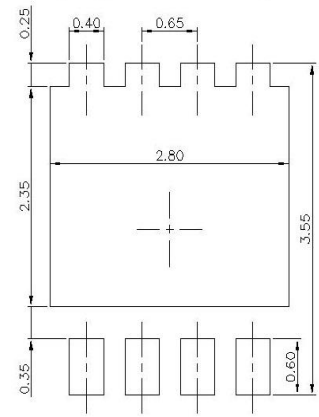
Dimensions are in millimeters, unless otherwise specified



(Unit: mm)

DIM	Min	Max	DIM	Min	Max
A	0.70	0.80	E2	1.78	1.98
A1	0.00	0.05	E3	0.49	0.69
b	0.25	0.35	E4	0.35 TYP.	
c	0.10	0.25	e	0.65 BSC	
D	3.20	3.40	K	0.70 TYP.	
D1	3.00	3.20	L	0.30	0.50
D2	2.39	2.59	L1	0.13 TYP.	
E	3.25	3.45	H	0.27	0.47
E1	3.00	3.20	Ø	0	12


Land Pattern
(Only for Reference)



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

DISCLAIMER:

The Products are not designed for use in hostile environments, including, without limitation, aircraft, nuclear power generation, medical appliances, and devices or systems in which malfunction of any Product can reasonably be expected to result in a personal injury. Seller's customers using or selling Seller's products for use in such applications do so at their own risk and agree to fully defend and indemnify Seller.

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