

MDB5951

Dual N-Channel Trench MOSFET, 60V, 4.5A, 50mΩ

General Description

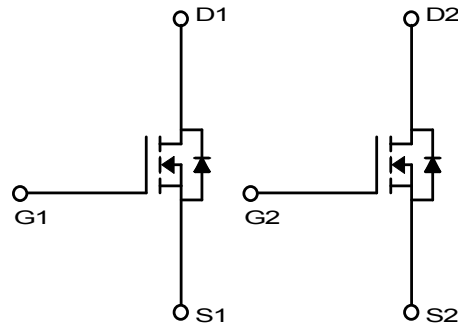
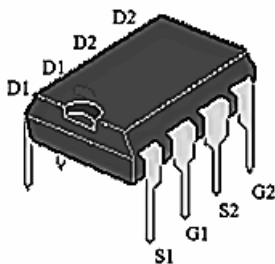
The MDB5951 uses advanced MagnaChip's MOSFET Technology, which provides low on-state resistance, high switching performance and excellent reliability.

Features

- $V_{DS} = 60V$
- $I_D = 4.5A$ @ $V_{GS} = 10V$
- $R_{DS(ON)} < 50m\Omega$ @ $V_{GS} = 10V$
- $< 60m\Omega$ @ $V_{GS} = 4.5V$

Applications

- Inverters
- General purpose applications



Absolute Maximum Ratings ($T_C = 25^\circ$)

Characteristics		Symbol	Rating	Unit
Drain-Source Voltage		V_{DSS}	60	V
Gate-Source Voltage		V_{GSS}	± 20	V
Continuous Drain Current ⁽⁴⁾	$T_C = 25^\circ C$	I_D	4.5	A
	$T_C = 70^\circ C$		3.6	A
Pulsed Drain Current ⁽³⁾		I_{DM}	20	A
Power Dissipation ⁽²⁾	$T_C = 25^\circ C$	P_D	2	W
	$T_C = 70^\circ C$		1.28	
Junction and Storage Temperature Range		T_J, T_{stg}	-55~+150	$^\circ C$

Thermal Characteristics

Characteristics	Symbol	Rating	Unit
Thermal Resistance, Junction-to-Ambient(Steady-State) ⁽¹⁾	$R_{\theta JA}$	62.5	$^\circ C/W$
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	34.0	

Ordering Information

Part Number	Temp. Range	Package	Packing	RoHS Status
MDB5951T	-55~150°C	DIP-8	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}	$I_D = 250\mu A, V_{GS} = 0V$	60	-	-	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS} = 60V, V_{GS} = 0V$			1	μA
Gate to Source Leakage Current	I_{GSS}	$V_{GS} = \pm 20V, V_{DS} = 0V$	-	-	100	nA
Gate to Source Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	1	2.1	3	V
Static Drain to Source On Resistance	$R_{DS(on)}$	$V_{GS} = 10V, I_D = 4.5A$	-	38	50	mΩ
		$V_{GS} = 4.5V, I_D = 3.0A$		46	60	
Forward Transconductance	g_{FS}	$V_{DS} = 10V, I_D = 3.3A$		11	-	S
Dynamic Characteristics						
Total Gate Charge	Q_g	$V_{DD} = 30V, I_D = 4.5A, V_{GS} = 10.0V$	-	9.0	10.5	nC
Gate to Source Charge	Q_{gs}		-	1.5	-	
Gate to 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_{riss}		-	25	-	
Output Capacitance	C_{oss}		-	50	-	
Turn-On Delay Time	$t_{d(on)}$	$V_{GS} = 10V, V_{DD} = 30V, R_L = 6.7\Omega, R_{GEN} = 3\Omega$	-	4.5	-	ns
Turn-On Rise Time	t_r		-	20	-	
Turn-Off Delay Time	$t_{d(off)}$		-	15	-	
Turn-Off Fall Time	t_f		-	9.5	-	
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}	$I_F = 4.5A, di/dt = 100A/\mu s$	-	21	30	ns
Body Diode Reverse Recovery Charge	Q_{rr}		-	25		nC

Note :

1. Surface mounted FR4 board with 2oz. Copper. PDSM is based on R θJA and the maximum allowed junction temperature of 150°C.
2. PD is based on T_{J(MAX)}=175(150)°C, using R θJA,
3. Pulse test: pulse width ≤300us, duty cycle≤2%, pulse width limited by junction temperature T_{J(MAX)}=175(150)°C.
4. Static characteristics are obtained using <300 μs pulses, duty cycle 0.5% max.

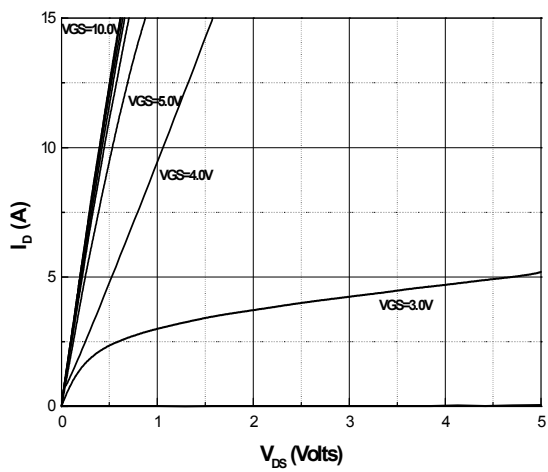


Fig.1 On-Region Characteristics

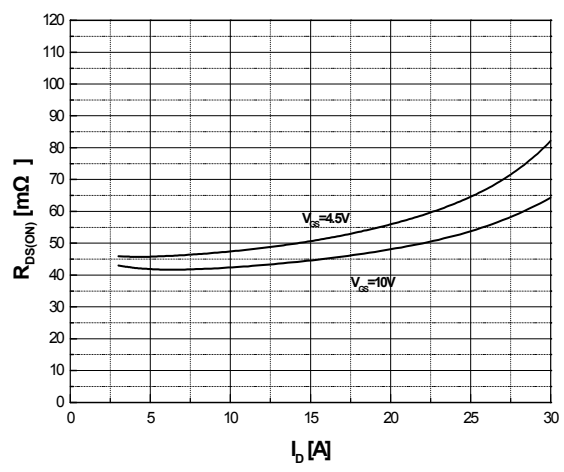


Fig.2 On-Resistance Variation with Drain Current and Gate Voltage

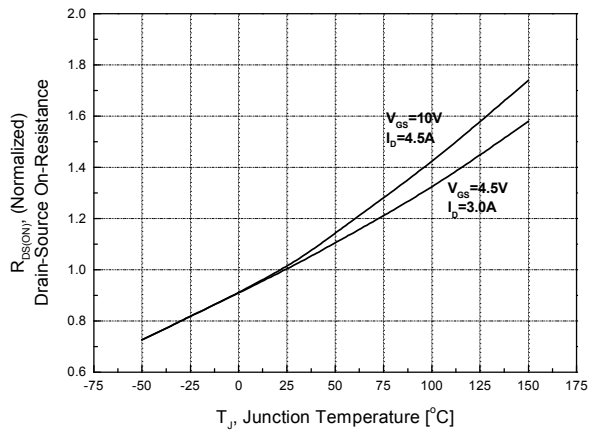


Fig.3 On-Resistance Variation with Temperature

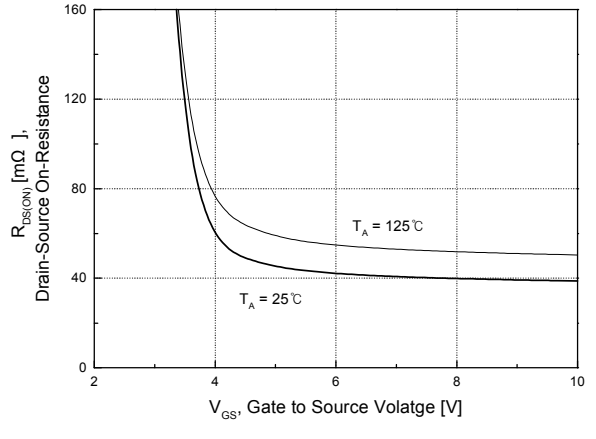


Fig.4 On-Resistance Variation with Gate to Source Voltage

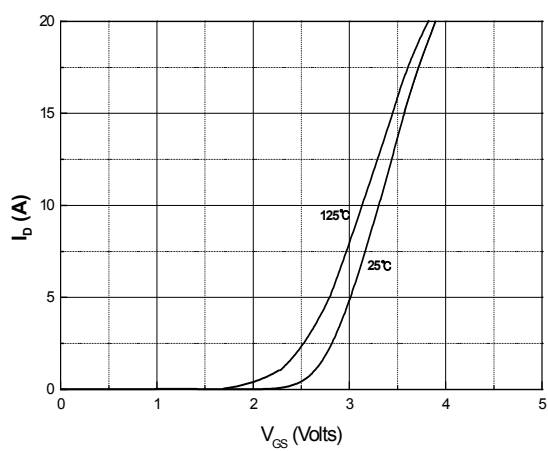


Fig.5 Transfer Characteristics

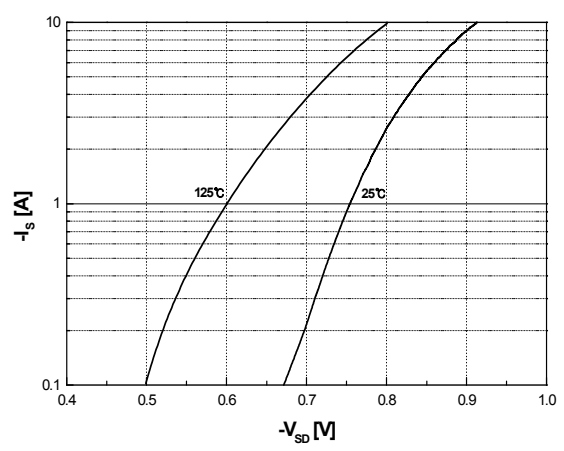


Fig.6 Body Diode Forward Voltage Variation with Source Current and Temperature

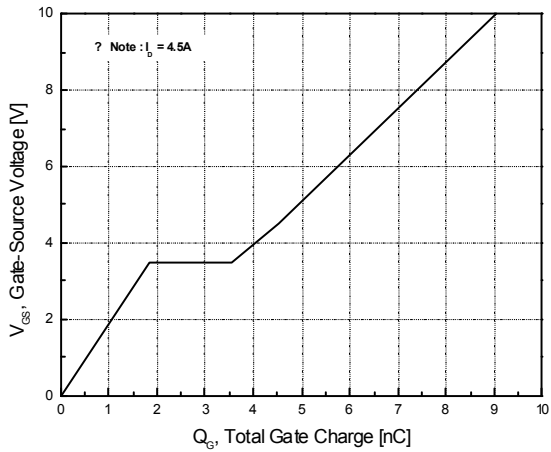


Fig.7 Gate Charge Characteristics

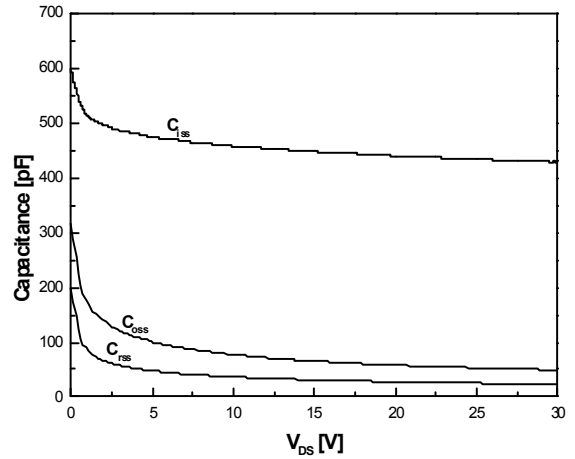


Fig.8 Capacitance Characteristics

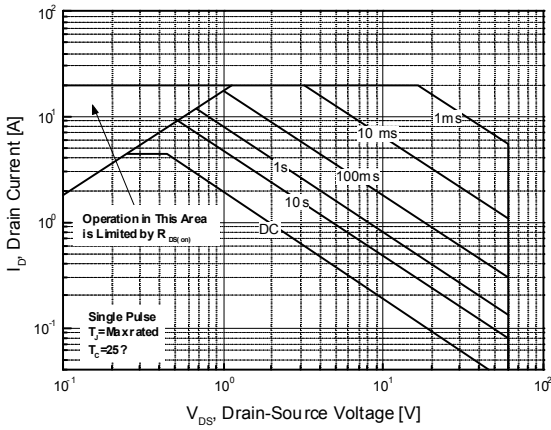


Fig.9 Maximum Safe Operating Area

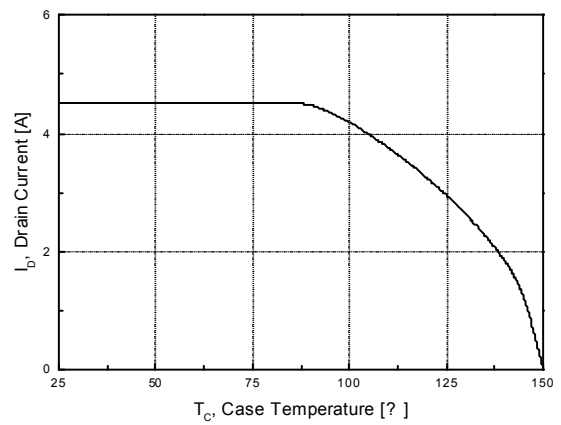


Fig.10 Maximum Drain Current vs. Case Temperature

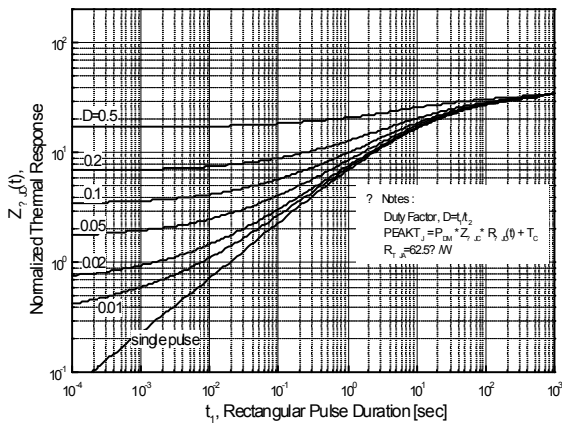
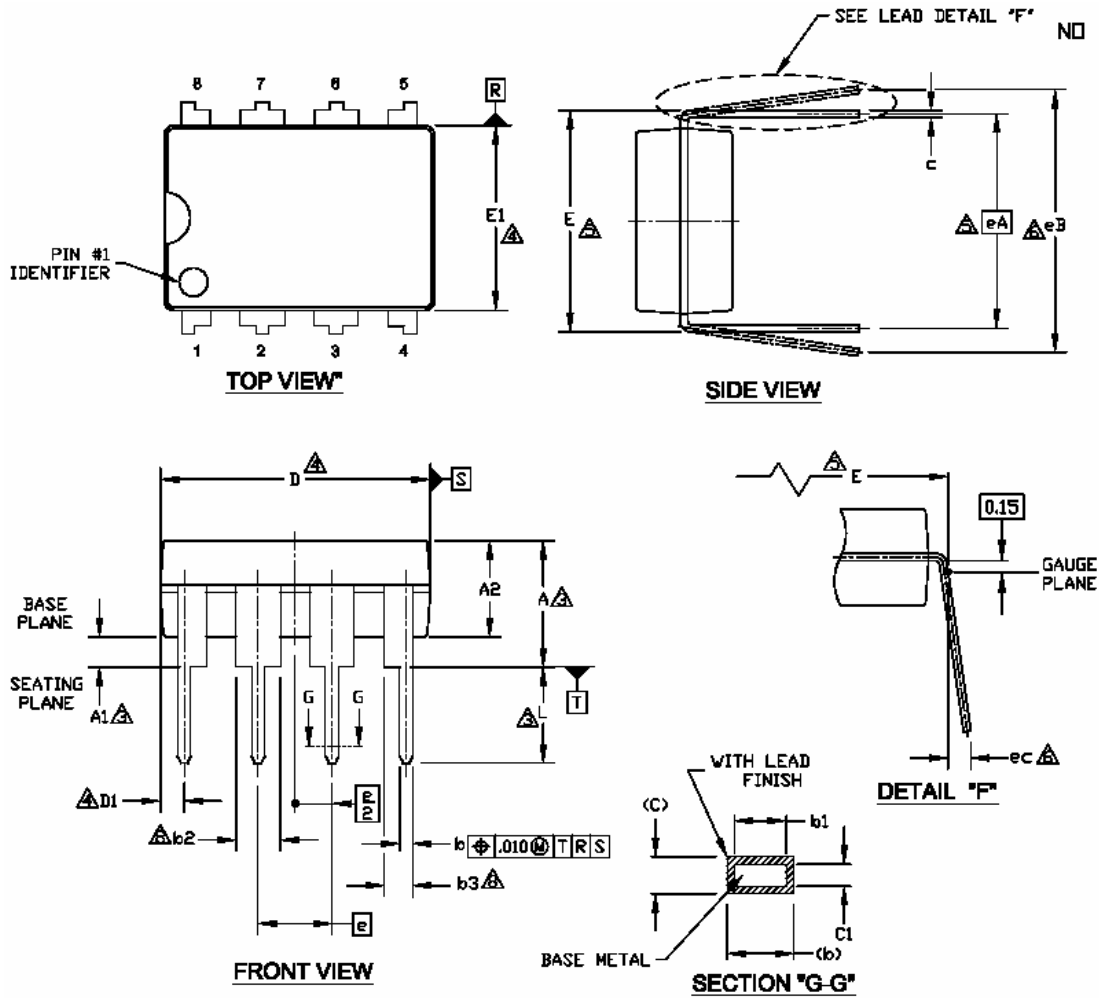


Fig.11 Transient Thermal Response Curve

Physical Dimensions

8 Leads, PDIP

Dimensions are in millimeters unless otherwise specified



SYMBOL	DIMENSIONS IN MM		
	MIN.	NOM.	MAX.
A	3.68	4.37	5.08
A1	0.51	-	-
A2	3.18	3.30	3.43
b	0.38	0.46	0.53
b1	0.36	0.46	0.51
b2	1.14	1.52	1.78
b3	0.79	0.99	1.14
c	0.23	0.30	0.38
c1	0.20	0.25	0.28
D	9.47	9.80	10.16
D1	0.76	1.14	1.52
E	7.62	7.87	8.13
E1	6.22	6.35	6.48
e	2.29	2.54	2.79
eA	7.32	-	-
eB	7.87	8.26	9.27
eC	0.00	0.51	1.02
L	3.15	3.35	3.56

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