RoHS Compliant
HALOGEN-FREE

Magnachip

MDS5951

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

General Description

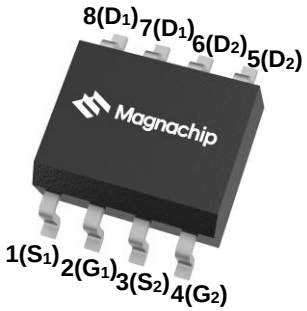
The MDS5951 uses advanced Magnachip's MOSFET Technology, which provides low on-state resistance, high switching performance and excellent reliability.

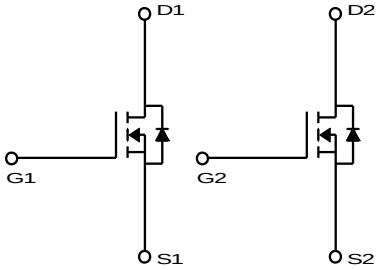
Features

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

Applications

- Inverters
- General purpose applications





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

Characteristics		Symbol	Rating	Unit
Drain-Source Voltage		V_{DSS}	60	V
Gate-Source Voltage		V_{GSS}	±20	V
Continuous Drain Current (Note 4)	T_A=25°C	I_D	4.5	A
	T_A=70°C		3.6	A
Pulsed Drain Current (Note 3)		I_{DM}	20	A
Power Dissipation for Single Operation (Note 2)	T_A=25°C	P_D	2.0	W
	T_A=70°C		1.28	
Junction and Storage Temperature Range		T_J, T_{stg}	-55~150	°C

Thermal Characteristics

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

Ordering Information

Part Number	Temp. Range	Package	Packing	RoHS Status
MDS5951URH	-55~150ºC	SOIC-8	Tape & Reel	Halogen Free

Electrical Characteristics (T_A =25ºC 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	60	-	-	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} = 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	-	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 (V_{gs}=10V)	Q_g	V_{DS} = 30V, I_D = 4.5A, V_{GS} = 10V	-	9.0	10.5	nC
Total Gate Charge (V_{gs}=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, R_L = 6.7Ω, R_{GEN} = 5Ω	-	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 = 1.0A, 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 :

1. Surface mounted RF4 board with 2oz. Copper. PDSM is based on $R_{\theta JA}$ and the maximum allowed junction temperature of 150°C.
2. PD is based on $T_{J(MAX)}$ =150°C, using $R_{\theta JA,}$
3. Pulse test: pulse width ≤300us, duty cycle≤2%, pulse width limited by junction temperature $T_{J(MAX)}$ =150°C.
4. Static characteristics are obtained using <300 μs pulses, duty cycle 0.5% max.

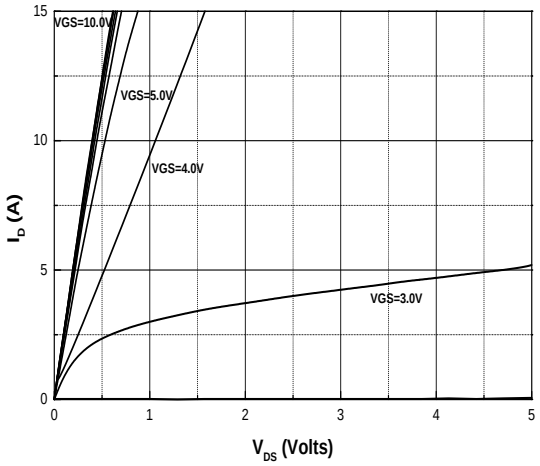


Fig.1 On-Region Characteristics

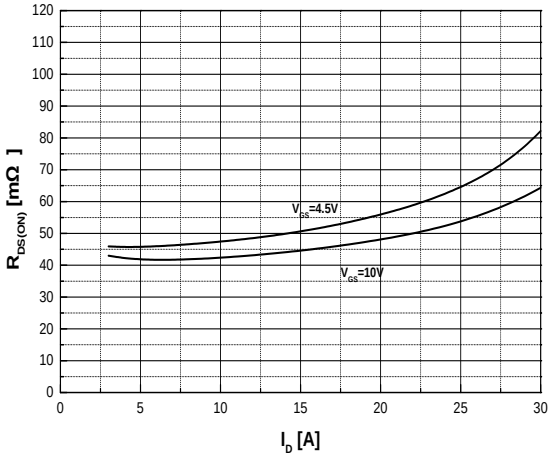


Fig.2 On-Resistance Variation with Drain Current and Gate Voltage

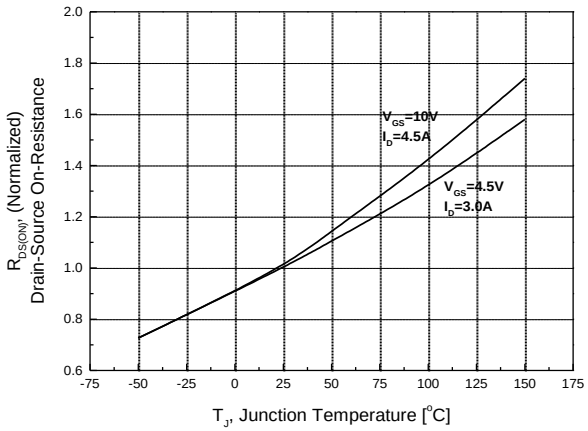


Fig.3 On-Resistance Variation with Temperature

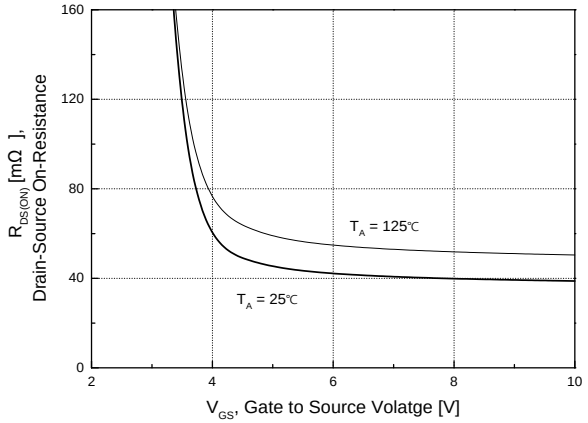


Fig.4 On-Resistance Variation with Gate to Source Voltage

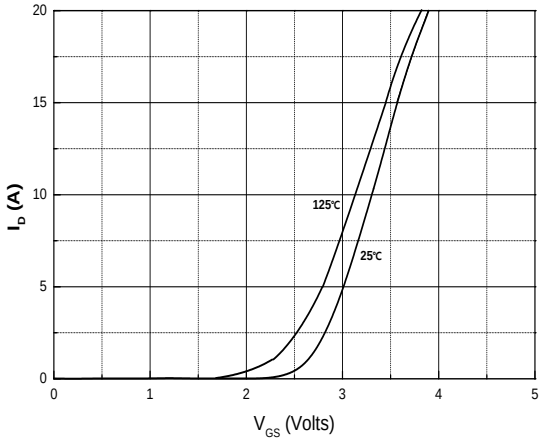


Fig.5 Transfer Characteristics

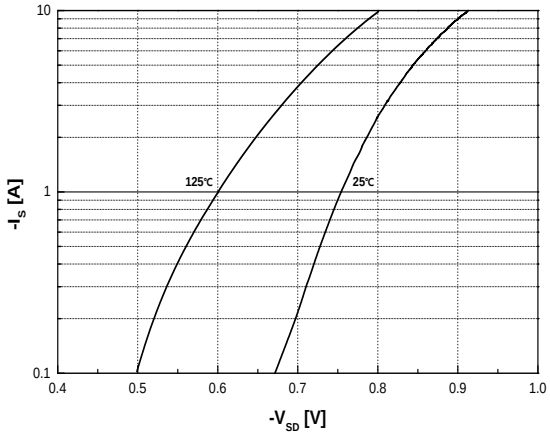


Fig.6 Body Diode Forward Voltage Variation with Source Current and Temperature

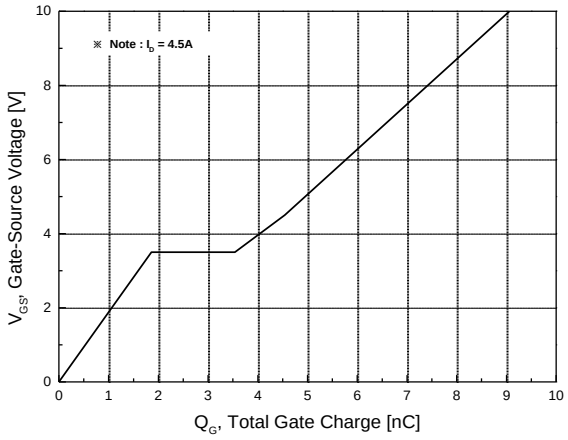


Fig.7 Gate Charge Characteristics

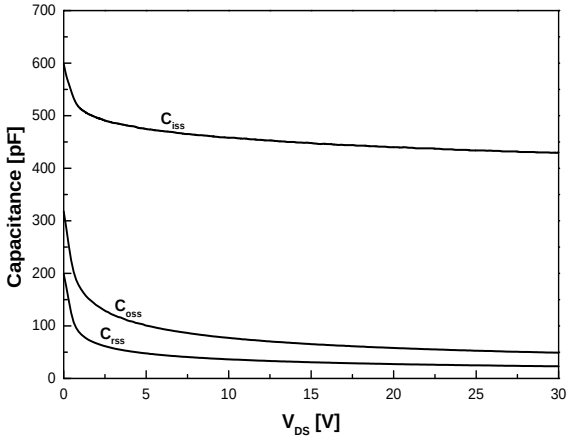


Fig.8 Capacitance Characteristics

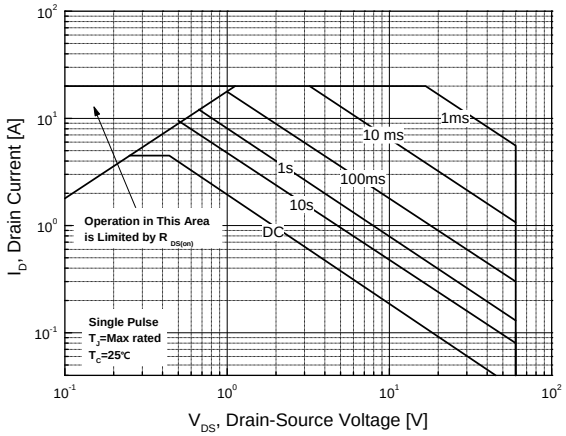


Fig.9 Maximum Safe Operating Area

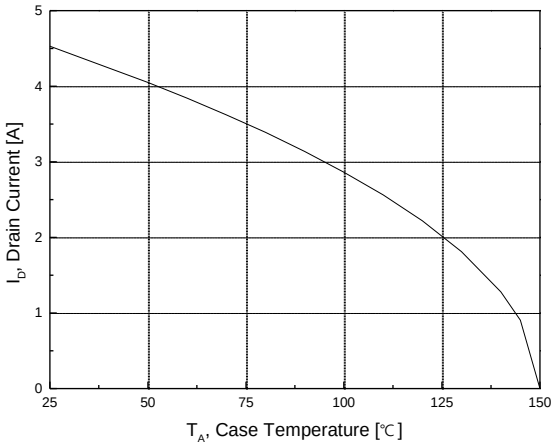


Fig.10 Maximum Drain Current vs. Ambient Temperature

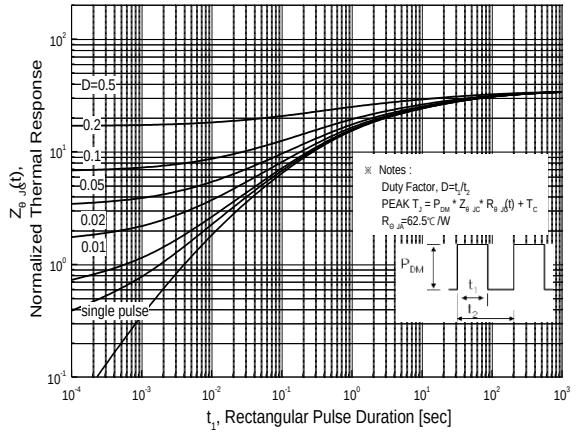
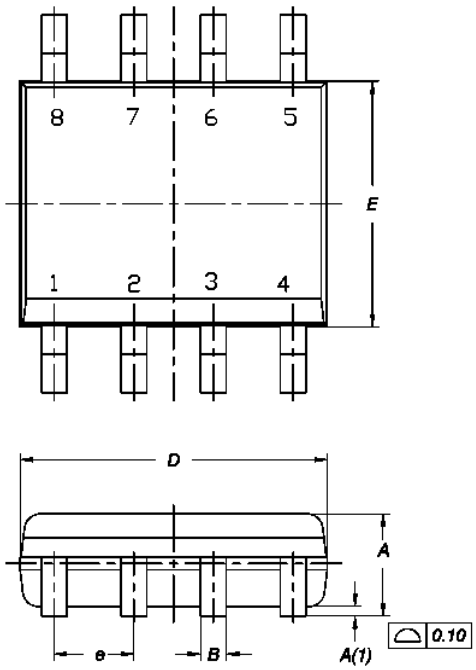


Fig.11 Transient Thermal Response Curve

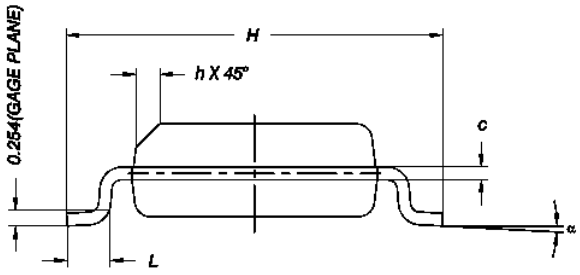
Physical Dimensions

SOIC-8L

Dimensions are in millimeters unless otherwise specified



DIM.	MILLIMETERS		
	MIN.	NOM.	MAX.
A	1.35	1.55	1.75
A(1)	0.10	0.175	0.25
B	0.38	0.445	0.51
C	0.19	0.22	0.25
D	4.80	4.90	5.00
E	3.80	3.90	4.00
e	1.27 BSC		
H	5.80	6.00	6.20
L	0.50	0.715	0.93
α	0°	4°	8°
h	0.25	0.375	0.50



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.