

General Description

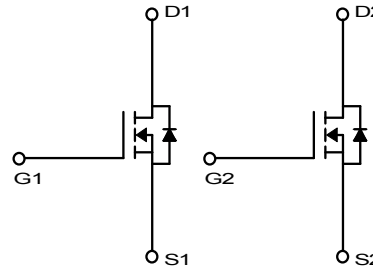
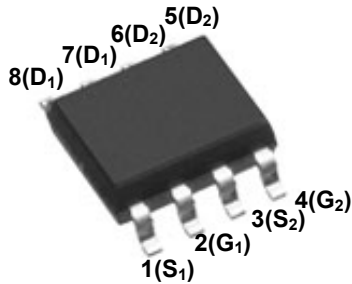
The MDS5951 uses advanced Magnachip's MOSFET Technology, which provides low on-state resistance, high switching performance and excellent reliability.

Features

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

Applications

- Inverters
- General purpose applications



Absolute Maximum Ratings ($T_A = 25^\circ C$ 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)	I_D	$T_A = 25^\circ C$	4.5	A
		$T_A = 70^\circ C$	3.6	A
Pulsed Drain Current (Note 3)	I_{DM}	20	A	
Power Dissipation for Single Operation (Note 2)	P_D	$T_A = 25^\circ C$	2.0	W
		$T_A = 70^\circ C$	1.28	
Junction and Storage Temperature Range	T_J, T_{slg}	-55~150	$^\circ C$	

Thermal Characteristics

Characteristics	Symbol	Rating	Unit
Thermal Resistance, Junction-to-Ambient (Steady-State) (Note 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
MDS5951URH	-55~150°C	SOIC-8	Tape & Reel	Halogen Free

Electrical Characteristics (T_A =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	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_{θJA} and the maximum allowed junction temperature of 150°C.
2. PD is based on T_{J(MAX)} = 150°C, using R_{θJA}.
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.

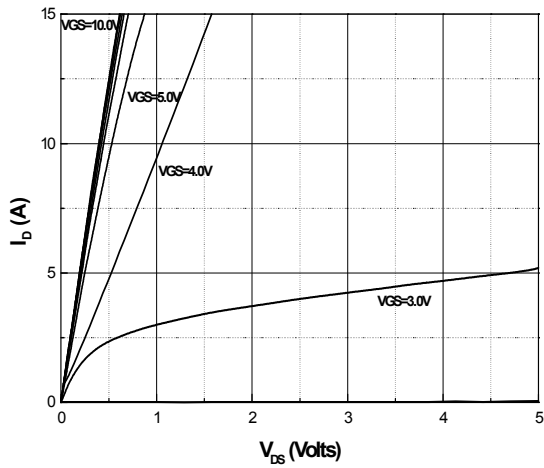


Fig.1 On-Region Characteristics

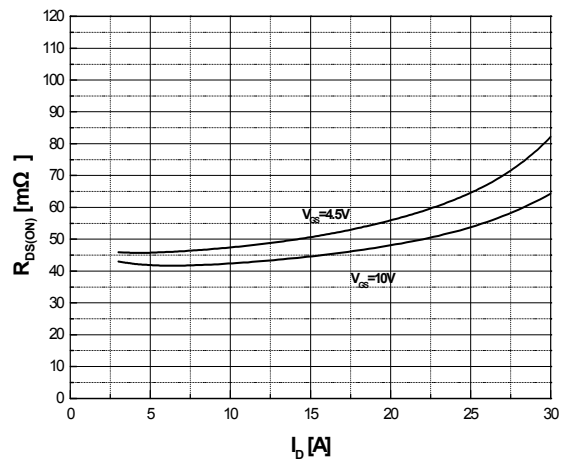


Fig.2 On-Resistance Variation with Drain Current and Gate Voltage

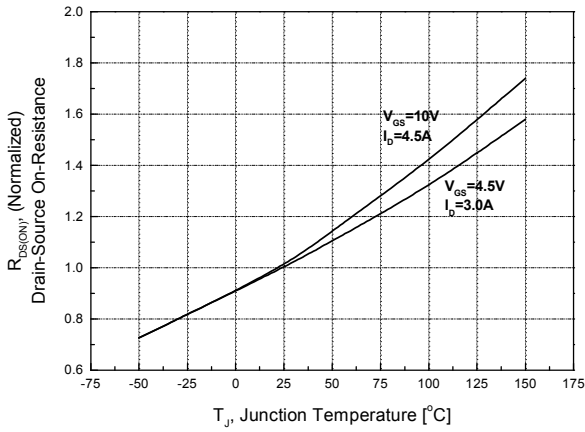


Fig.3 On-Resistance Variation with Temperature

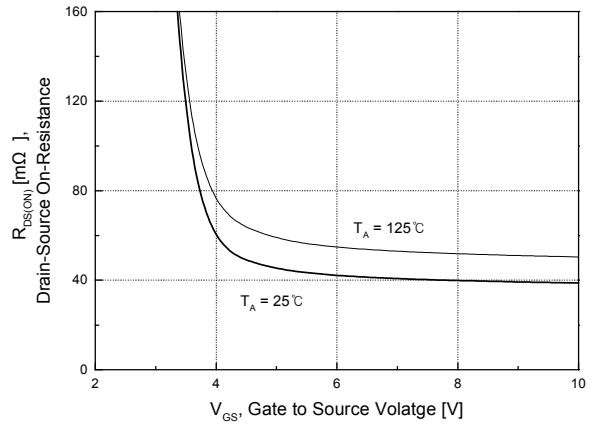


Fig.4 On-Resistance Variation with Gate to Source Voltage

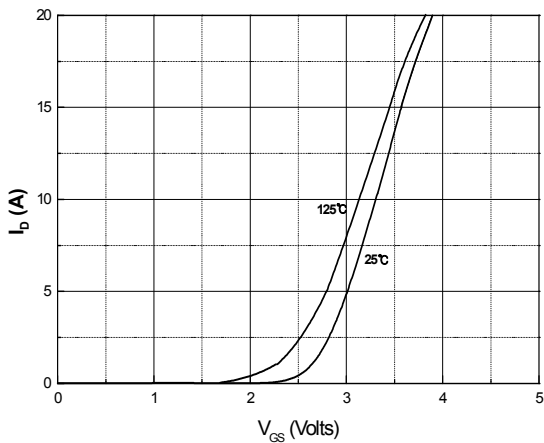


Fig.5 Transfer Characteristics

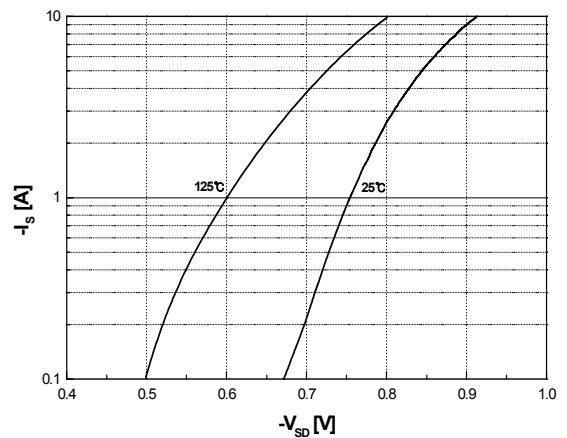


Fig.6 Body Diode Forward Voltage Variation with Source Current and Temperature

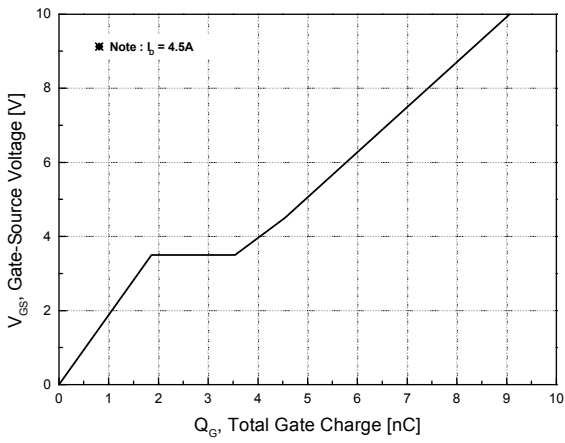


Fig.7 Gate Charge Characteristics

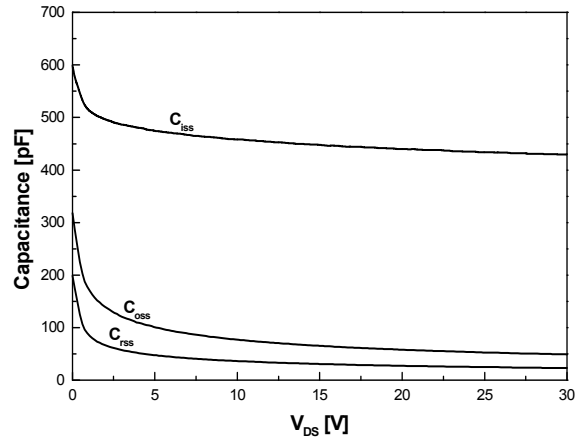


Fig.8 Capacitance Characteristics

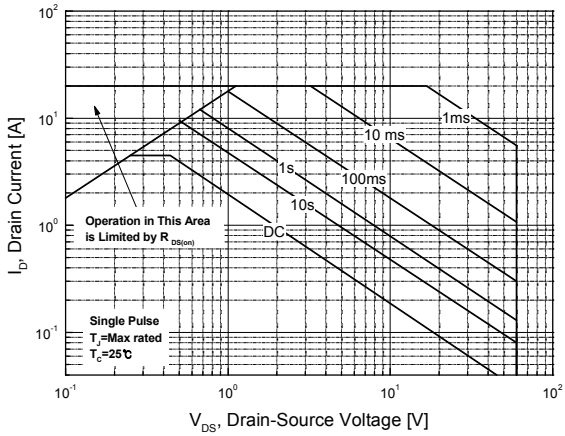


Fig.9 Maximum Safe Operating Area

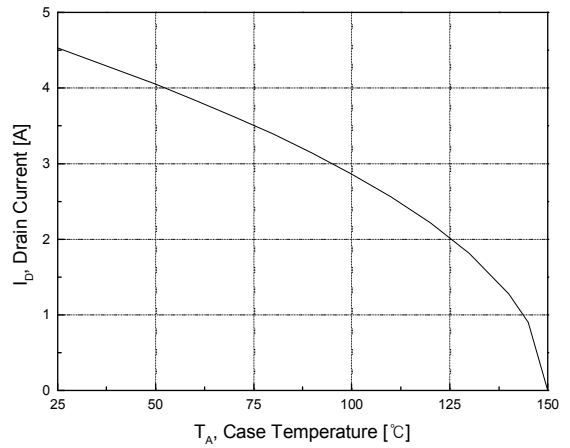


Fig.10 Maximum Drain Current vs. Ambient Temperature

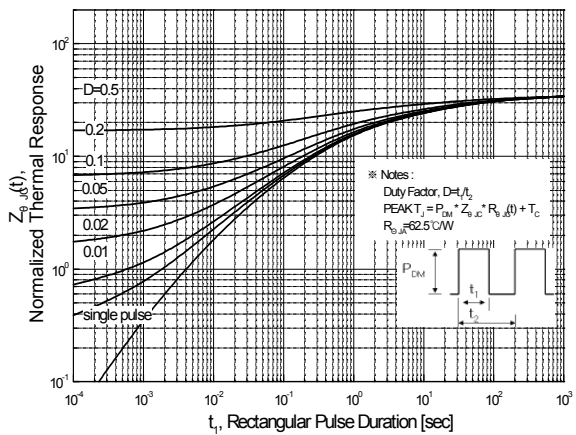
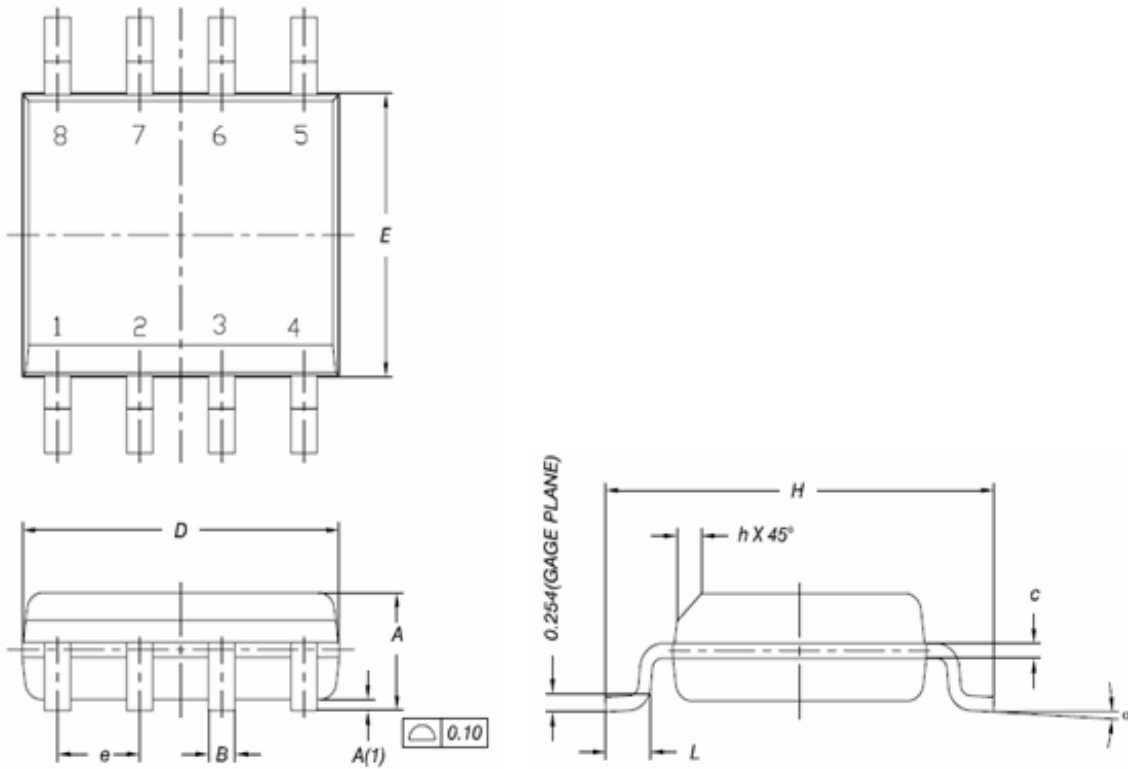


Fig.11 Transient Thermal Response Curve

Physical Dimensions

8 Leads SOIC

Dimensions are in millimeters unless otherwise specified



Symbol	Min.	Nom.	Max.
A	-	-	1.75
A(1)	0.10	-	0.25
B	0.31	-	0.51
C	0.10	-	0.25
D	-	4.9 BSC	-
E	-	3.9 BSC	-
e	1.27BSC		
H	-	6.0 BSC	-
L	0.40	-	1.27
a	0	-	8
h	0.250	-	0.500
L2(Gage Plane)	0.25 BSC		

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