

### General Description

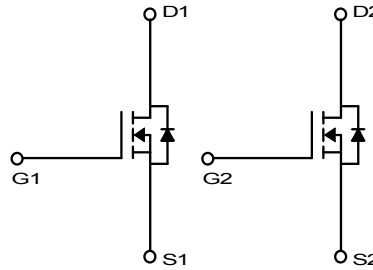
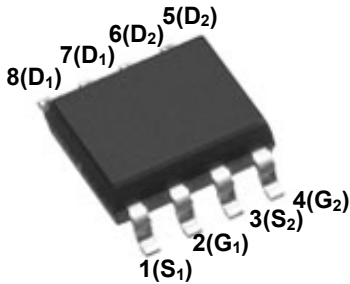
The MDS5951 uses advanced Magnachip's MOSFET Technology, which provides low on-state resistance, high switching performance and excellent reliability.

### 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	$V_{GSS}$	$\pm 20$	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

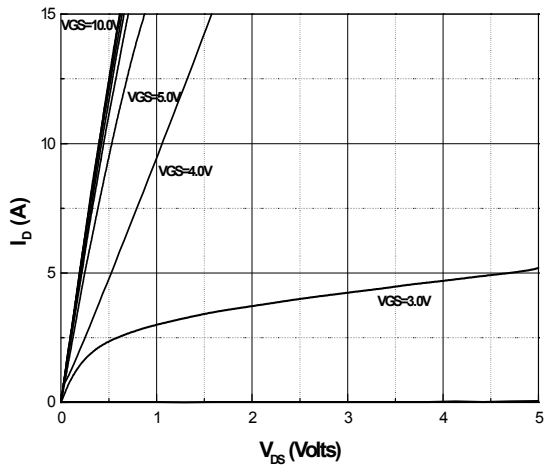
Part Number	Temp. Range	Package	Packing	RoHS Status
MDS5951URH	-55~150°C	SOIC-8	Tape & Reel	Halogen Free

## Electrical Characteristics (T<sub>A</sub> =25°C unless otherwise noted)

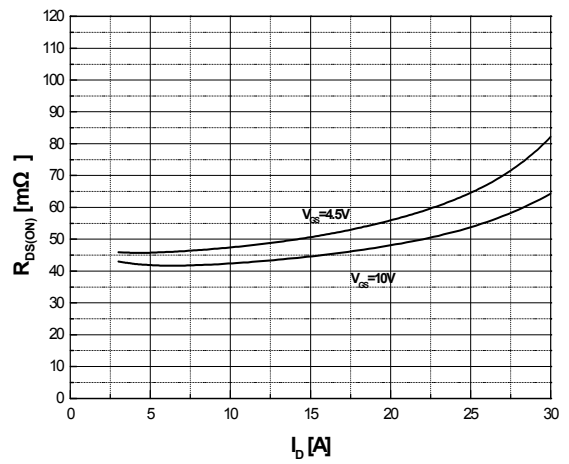
Characteristics	Symbol	Test Condition	Min	Typ	Max	Unit	
<b>Static Characteristics</b>							
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	I <sub>D</sub> = 250μA, V <sub>GS</sub> = 0V	60	-	-	V	
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250μA	1.0	2.0	3.0		
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> = 60V, V <sub>GS</sub> = 0V	-	-	1	μA	
Gate Leakage Current	I <sub>GSS</sub>	V <sub>GS</sub> = ±20V, V <sub>DS</sub> = 0V	-	-	0.1		
Drain-Source ON Resistance	R <sub>DS(ON)</sub>	V <sub>GS</sub> = 10V, I <sub>D</sub> = 4.5A	-	38	50	mΩ	
		V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 3.0A	-	46	60		
Forward Transconductance	g <sub>FS</sub>	V <sub>DS</sub> = 10V, I <sub>D</sub> = 3.3A	-	11	-	S	
<b>Dynamic Characteristics</b>							
Total Gate Charge (V <sub>GS</sub> =10V)	Q <sub>g</sub>	V <sub>DS</sub> = 30V, I <sub>D</sub> = 4.5A, V <sub>GS</sub> = 10V	-	9.0	10.5	nC	
Total Gate Charge (V <sub>GS</sub> =4.5V)			4.4	-	-		
Gate-Source Charge			Q <sub>gs</sub>	-	1.5		-
Gate-Drain Charge			Q <sub>gd</sub>	-	2.0		-
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> = 30V, V <sub>GS</sub> = 0V, f = 1.0MHz	-	420	-	pF	
Reverse Transfer Capacitance	C <sub>rss</sub>		-	25	-		
Output Capacitance	C <sub>oss</sub>		-	50	-		
Turn-On Delay Time	t <sub>d(on)</sub>	V <sub>GS</sub> = 10V, V <sub>DS</sub> = 30V, R <sub>L</sub> = 6.7Ω, R <sub>GEN</sub> = 5Ω	-	4.5	-	ns	
Turn-On Rise Time	t <sub>r</sub>		-	20	-		
Turn-Off Delay Time	t <sub>d(off)</sub>		-	15	-		
Turn-Off Fall Time	t <sub>f</sub>		-	9.5	-		
<b>Drain-Source Body Diode Characteristics</b>							
Source-Drain Diode Forward Voltage	V <sub>SD</sub>	I <sub>S</sub> = 1.0A, V <sub>GS</sub> = 0V	-	0.7	1.1	V	
Body Diode Reverse Recovery Time	t <sub>rr</sub>	I <sub>F</sub> = 4.5A, di/dt = 100A/μs	-	21	30	ns	
Body Diode Reverse Recovery Charge	Q <sub>rr</sub>		-	25	-	nC	

Note :

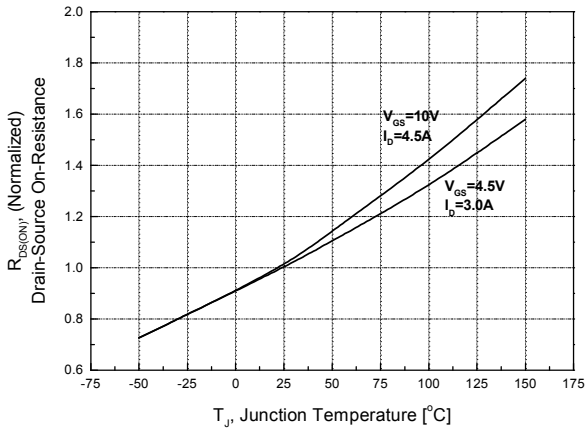
1. Surface mounted RF4 board with 2oz. Copper. PDSM is based on R<sub>θJA</sub> and the maximum allowed junction temperature of 150°C.
2. PD is based on T<sub>J(MAX)</sub> = 150°C, using R<sub>θJA</sub>.
3. Pulse test: pulse width ≤ 300us, duty cycle ≤ 2%, pulse width limited by junction temperature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



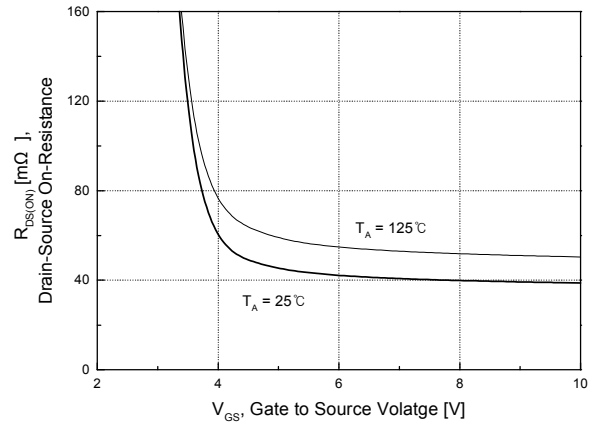
**Fig.1 On-Region Characteristics**



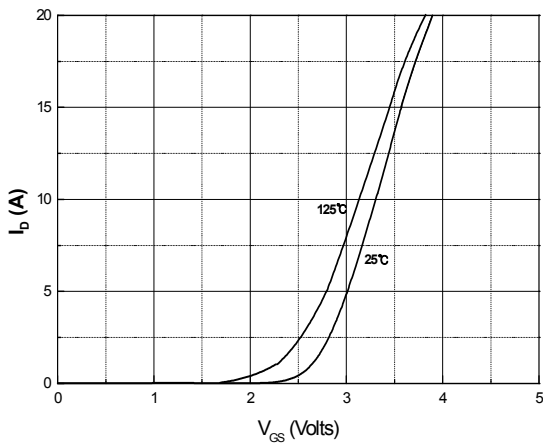
**Fig.2 On-Resistance Variation with Drain Current and Gate Voltage**



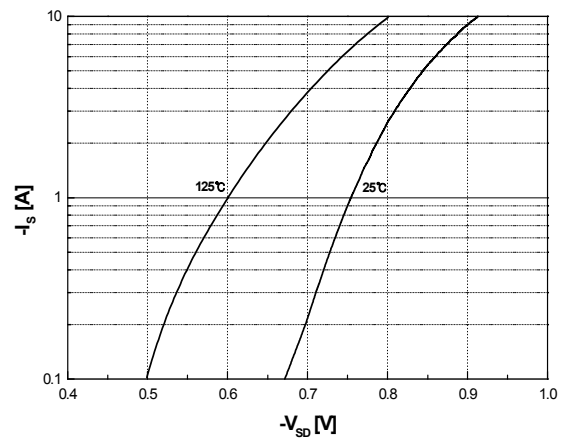
**Fig.3 On-Resistance Variation with Temperature**



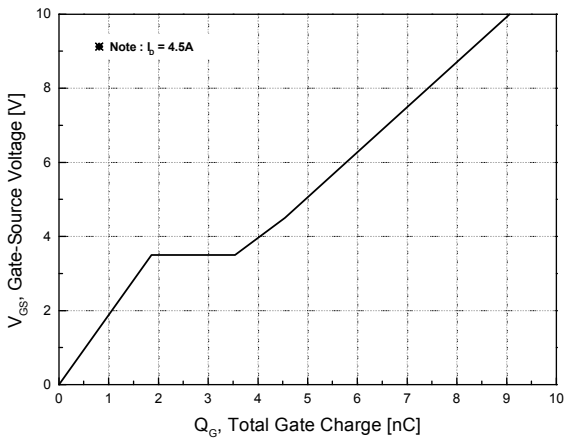
**Fig.4 On-Resistance Variation with Gate to Source Voltage**



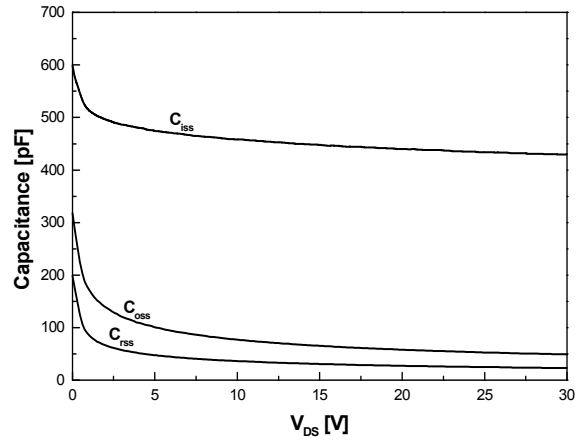
**Fig.5 Transfer Characteristics**



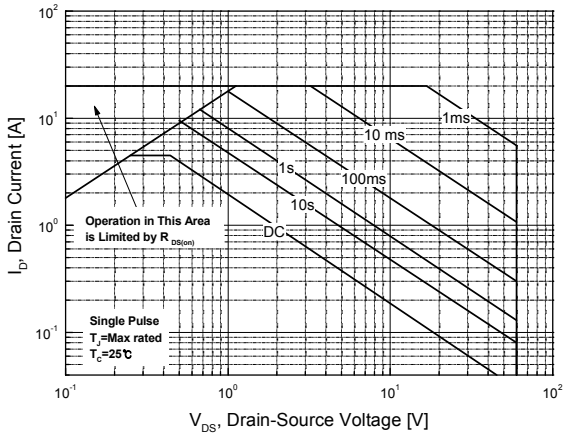
**Fig.6 Body Diode Forward Voltage Variation with Source Current and Temperature**



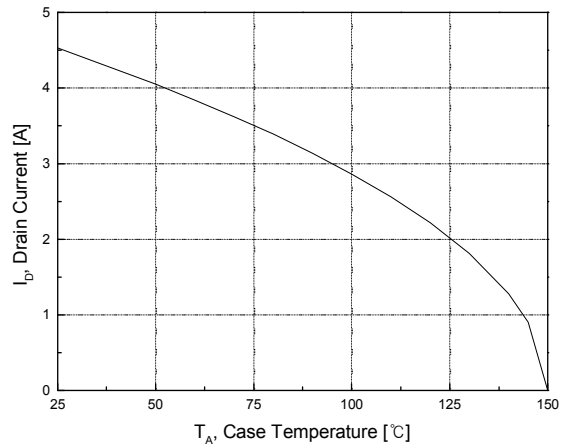
**Fig.7 Gate Charge Characteristics**



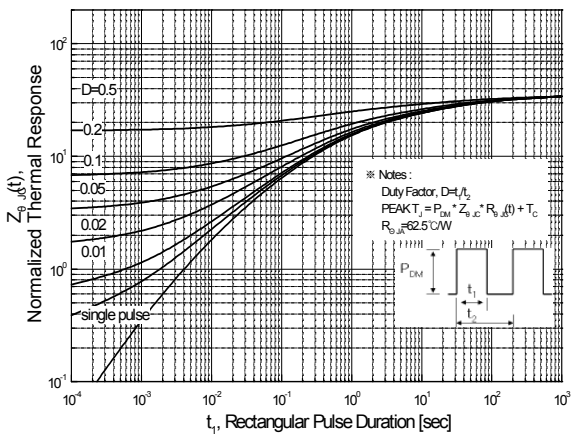
**Fig.8 Capacitance Characteristics**



**Fig.9 Maximum Safe Operating Area**



**Fig.10 Maximum Drain Current vs. Ambient Temperature**

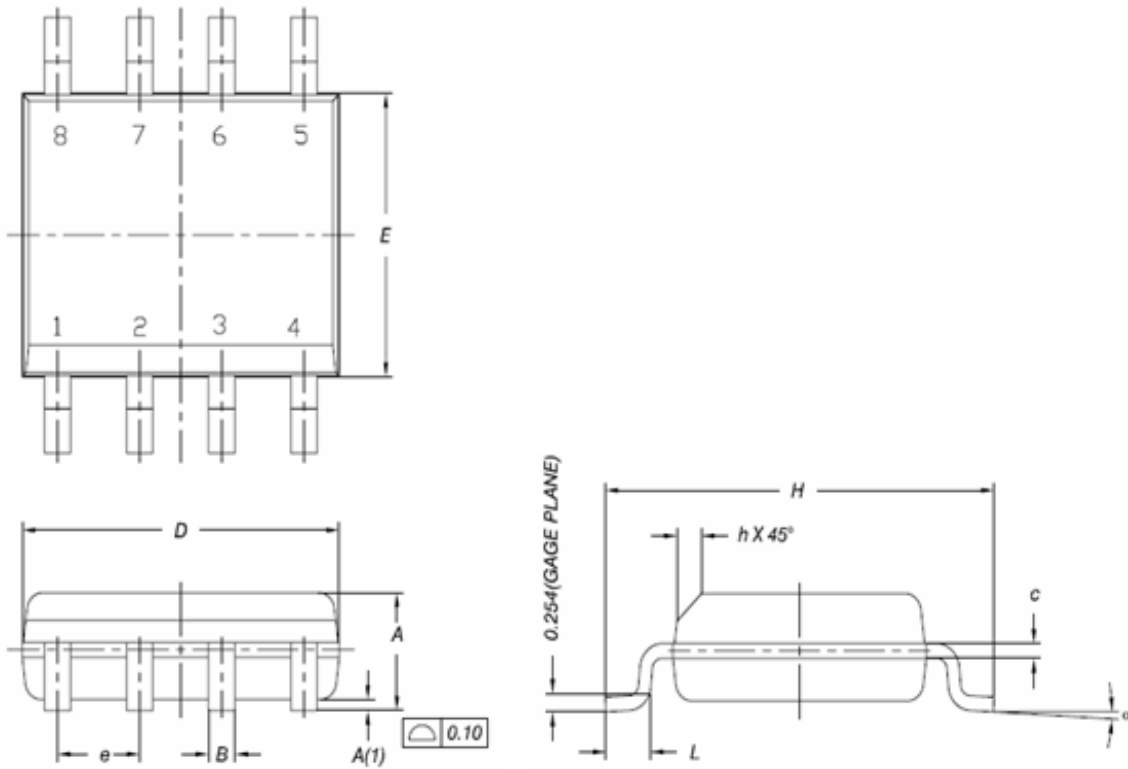


**Fig.11 Transient Thermal Response Curve**

## 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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