

### General Description

The MDS1651 uses advanced Magnachip's MOSFET Technology, which provides low on-state resistance, high switching performance and excellent reliability.

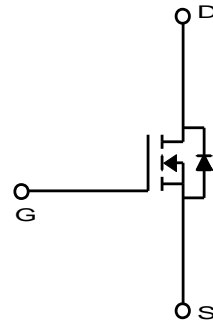
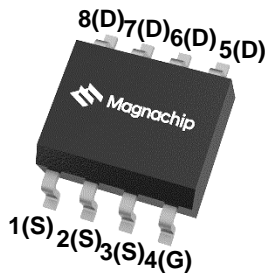
MDS1651 is suitable device for PWM, Load Switching and general purpose applications.

### Features

- $V_{DS} = 30V$
- $I_D = 11.6A @ V_{GS} = 10V$
- $R_{DS(ON)}$   
 $< 17m\Omega @ V_{GS} = 10V$   
 $< 22m\Omega @ V_{GS} = 4.5V$

### Applications

- Portable application



### Absolute Maximum Ratings (Ta = 25°C)

Characteristics	Symbol	Rating	Unit	
Drain-Source Voltage	$V_{DSS}$	30	V	
Gate-Source Voltage	$V_{GSS}$	±20	V	
Continuous Drain Current	$I_D$	$T_C=25^\circ C$	11.6	A
		$T_C=70^\circ C$	9.2	A
Pulsed Drain Current	$I_{DM}$	50	A	
Power Dissipation <sup>(1)</sup>	$P_D$	$T_A=25^\circ C$	3.1	W
		$T_A=70^\circ C$	2	
Single Pulse Avalanche Energy <sup>(2)</sup>	$E_{AS}$	80	mJ	
Junction and Storage Temperature Range	$T_J, T_{stg}$	-55~150	°C	

### Thermal Characteristics

Characteristics	Symbol	Rating	Unit
Thermal Resistance, Junction-to-Ambient <sup>(1)</sup>	$R_{\theta JA}$	40	°C/W
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	24	

## Ordering Information

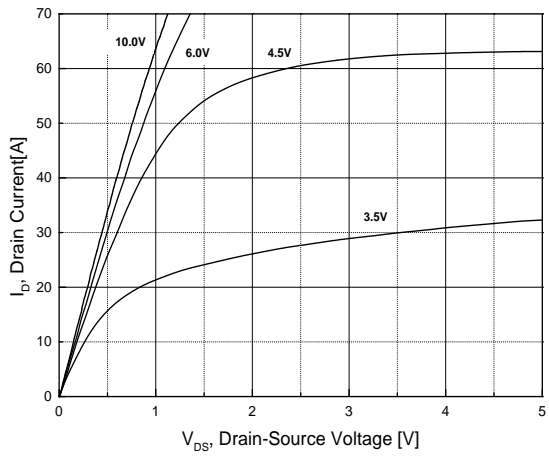
Part Number	Temp. Range	Package	Packing
MDS1651RH	-55~150°C	SOIC-8	Tape & Reel

## Electrical Characteristics (Ta =25°C)

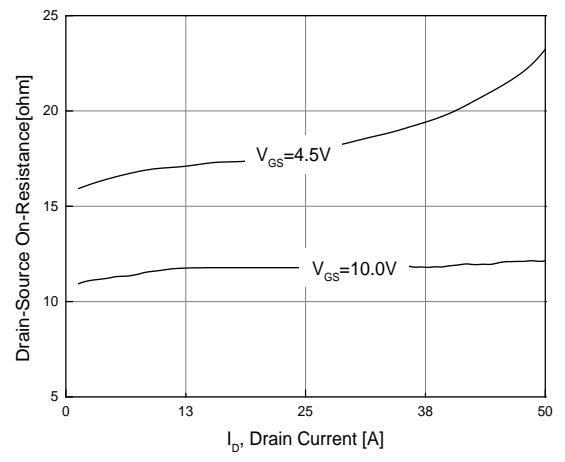
Characteristics	Symbol	Test Condition	Min	Typ	Max	Unit
<b>Static Characteristics</b>						
Drain-Source Breakdown Voltage	$BV_{DSS}$	$I_D = 250\mu A, V_{GS} = 0V$	30	-	-	V
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 250\mu A$	1.4	1.7	3	
Drain Cut-Off Current	$I_{DSS}$	$V_{DS} = 30V, V_{GS} = 0V$	-	-	1	$\mu A$
Gate Leakage Current	$I_{GSS}$	$V_{GS} = \pm 20V, V_{DS} = 0V$	-	-	$\pm 0.1$	
Drain-Source ON Resistance	$R_{DS(on)}$	$V_{GS} = 10V, I_D = 11.6A$	-	12.0	17	$m\Omega$
		$V_{GS} = 4.5V, I_D = 10A$	-	16.0	22	
On-State Drain Current	$I_{D(on)}$	$V_{DS} = 5V, V_{GS} = 10V$	50	-	-	A
Forward Transconductance	$g_{fs}$	$V_{DS} = 5V, I_D = 11.0A$	-	19	-	S
<b>Dynamic Characteristics</b>						
Total Gate Charge	$Q_{g(10V)}$	$V_{DS} = 15V, I_D = 11.6A, V_{GS} = 10V$	-	13.7	19.0	nC
Total Gate Charge	$Q_{g(4.5V)}$		-	6.8	9.5	
Gate-Source Charge	$Q_{gs}$		-	2.0	-	
Gate-Drain Charge	$Q_{gd}$		-	3.5	-	
Input Capacitance	$C_{iss}$	$V_{DS} = 15V, V_{GS} = 0V, f = 1.0MHz$	-	669		pF
Reverse Transfer Capacitance	$C_{riss}$		-	108		
Output Capacitance	$C_{oss}$		-	165		
Turn-On Delay Time	$t_{d(on)}$	$V_{GS} = 10V, V_{DS} = 15V, R_L = 1.3\Omega, R_G = 3\Omega$	-	5.0	6.5	ns
Rise Time	$t_r$		-	6.0	7.5	
Turn-Off Delay Time	$t_{d(off)}$		-	19.0	25.0	
Fall Time	$t_f$		-	4.5	6.0	
<b>Drain-Source Body Diode Characteristics</b>						
Source-Drain Diode Forward Voltage	$V_{SD}$	$I_S = 1A, V_{GS} = 0V$	-	0.7	1.0	V
Source-Drain Diode Forward Voltage	$V_{SD}$	$I_S = 4.5A, V_{GS} = 0V$	-	0.8	1.1	V
Body Diode Reverse Recovery Time	$t_{rr}$	$I_F = 11.6A, di/dt = 100A/\mu s$	-	19	21	ns
Body Diode Reverse Recovery Charge	$Q_{rr}$		-	9	12	nC

Note :

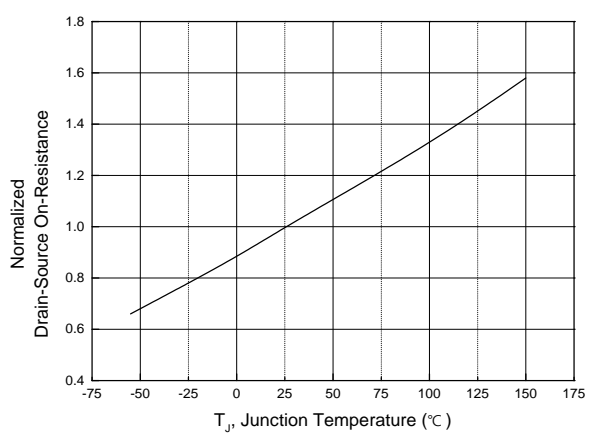
1. Surface mounted FR-4 board with 2oz. Copper.
2. Starting  $T_J = 25^\circ C, L = 1mH, I_{AS} = 5A, V_{DD} = 15V, V_{GS} = 10V.$



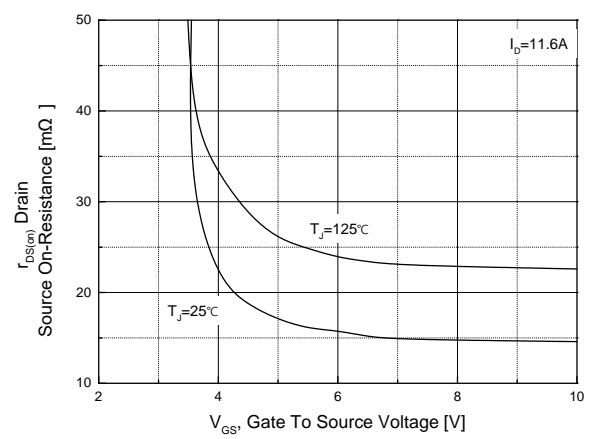
**Fig.1 On-Region Characteristics**



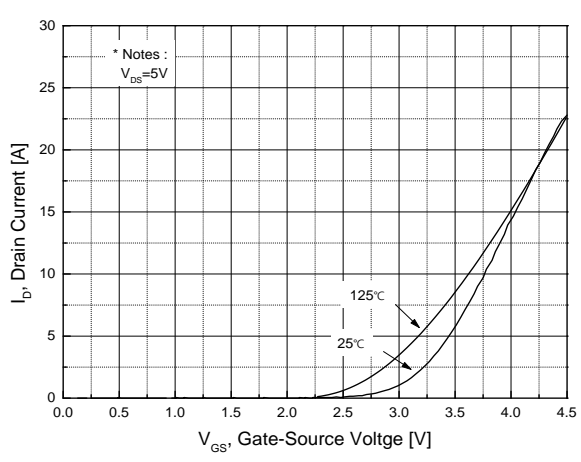
**Fig.2 On-Resistance Variation with Drain Current and Gate Voltage**



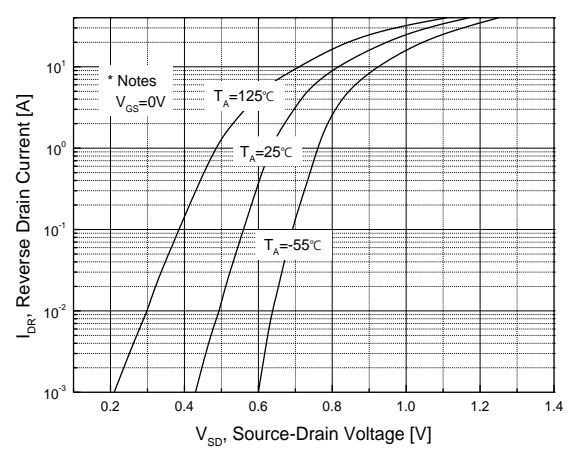
**Fig.3 On-Resistance Variation with Temperature**



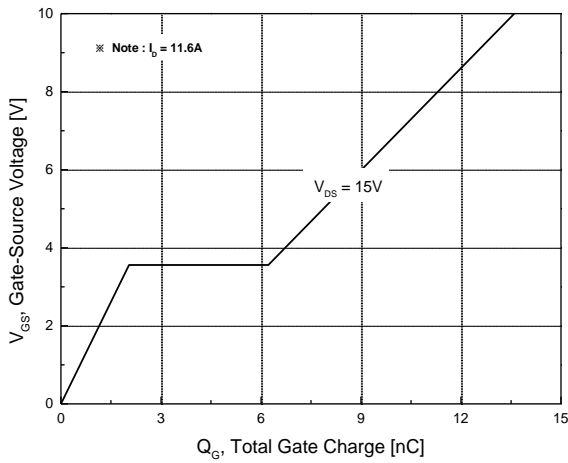
**Fig.4 On-Resistance Variation with Gate to Source Voltage**



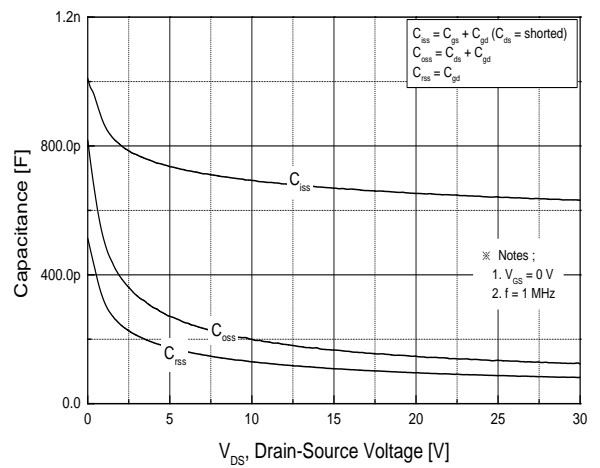
**Fig.5 Transfer Characteristics**



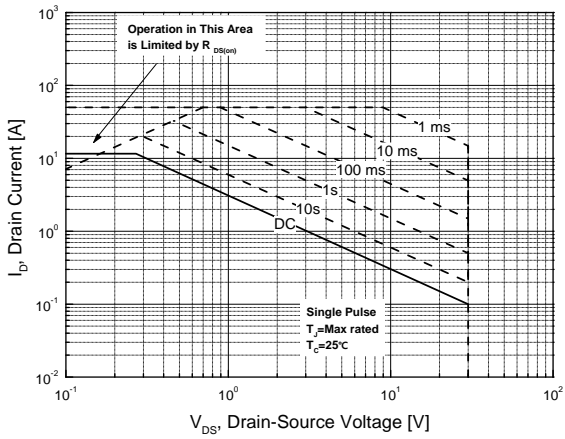
**Fig.6 Body Diode Forward Voltage Variation with Source Current and Temperature**



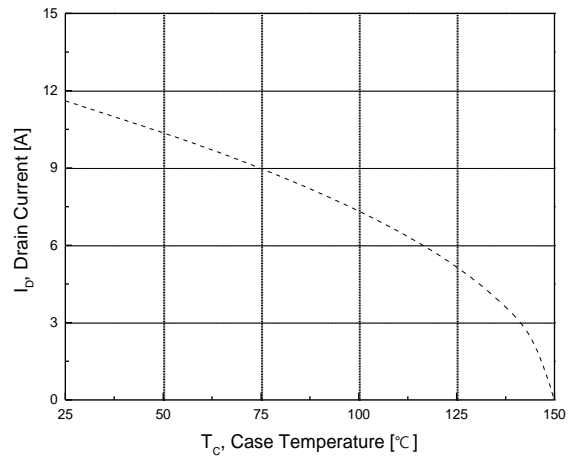
**Fig.7 Gate Charge Characteristics**



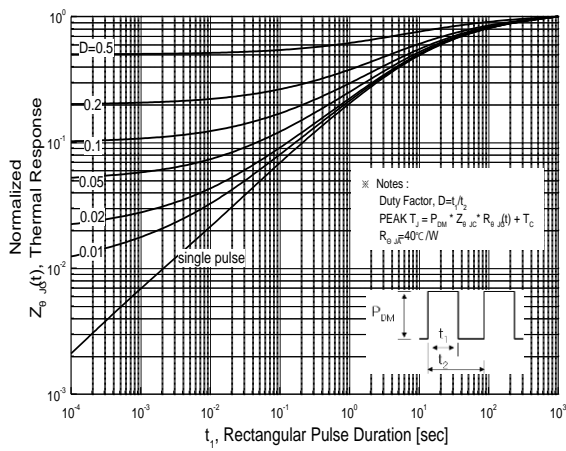
**Fig.8 Capacitance Characteristics**



**Fig.9 Maximum Safe Operating Area**



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

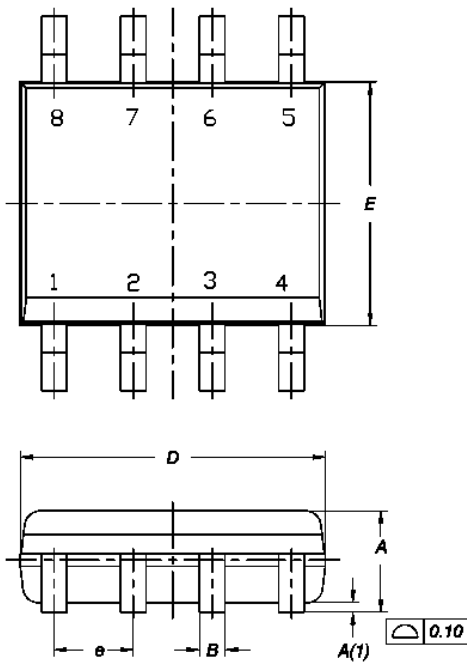


**Fig.11 Transient Thermal Response Curve**

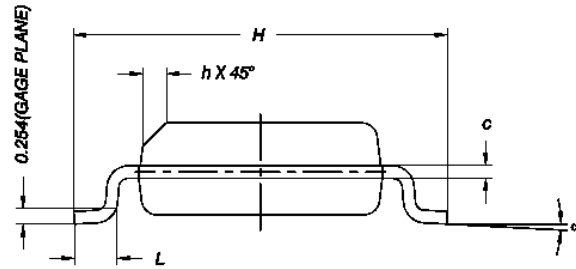
## Physical Dimensions

### 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
$\alpha$	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.

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