

MDS1651

Single N-Channel Trench MOSFET 30V, 11.6A, 17mΩ

General Description

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

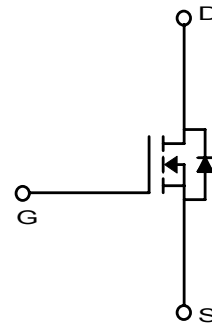
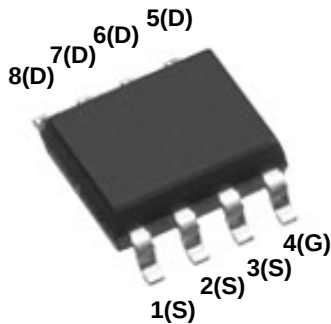
MDS1651 is suitable device for PWM, Load Switching and general purpose applications.

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 ($T_a = 25^\circ C$)

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

Thermal Characteristics

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

Ordering Information

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

Electrical Characteristics (Ta =25°C)

Characteristics	Symbol	Test Condition	Min	Typ	Max	Unit
Static Characteristics						
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	μA
Gate Leakage Current	I_{GSS}	$V_{GS} = \pm 20V, V_{DS} = 0V$	-	-	± 0.1	
Drain-Source ON Resistance	$R_{DS(ON)}$	$V_{GS} = 10V, I_D = 11.6A$	-	12.0	17	m Ω
		$V_{GS} = 4.5V, I_D = 10A$	-	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
Dynamic Characteristics						
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_{rss}		-	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	
Drain-Source Body Diode Characteristics						
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 $T_J = 25^\circ C, L = 1mH, I_{AS} = 5A, V_{DD} = 15V, V_{GS} = 10V$.

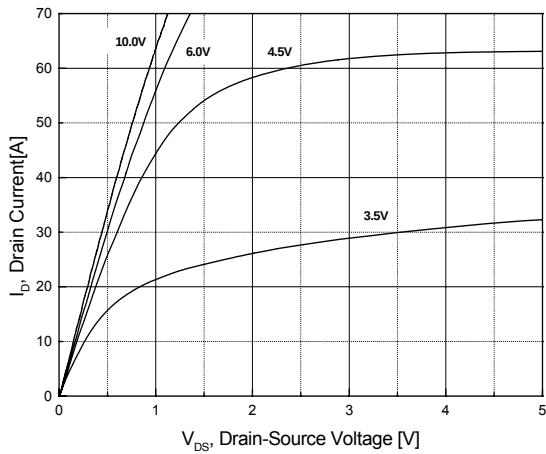


Fig.1 On-Region Characteristics

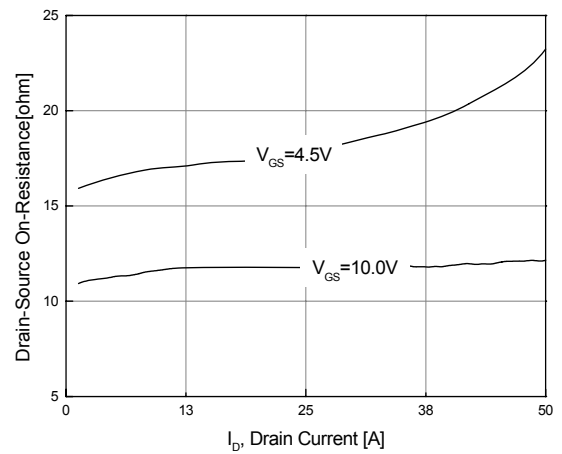


Fig.2 On-Resistance Variation with Drain Current and Gate Voltage

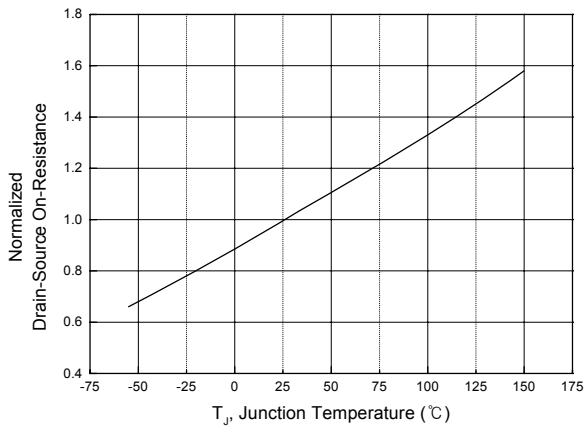


Fig.3 On-Resistance Variation with Temperature

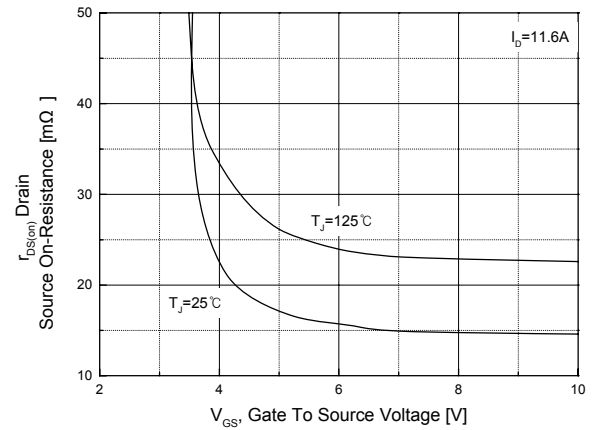


Fig.4 On-Resistance Variation with Gate to Source Voltage

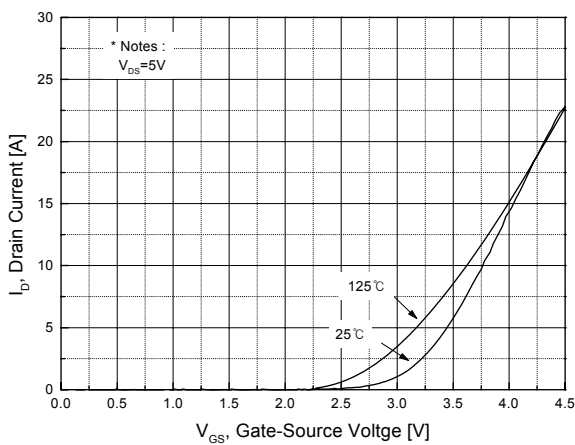


Fig.5 Transfer Characteristics

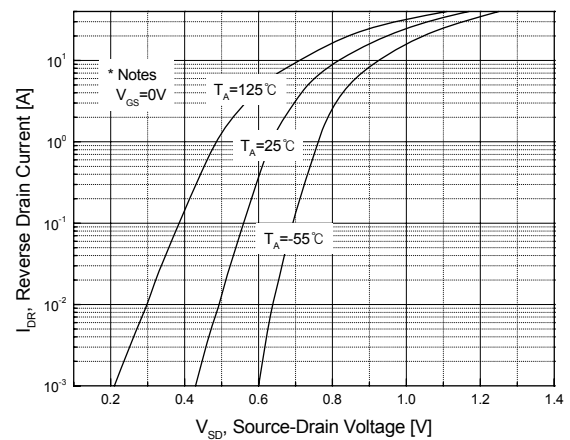
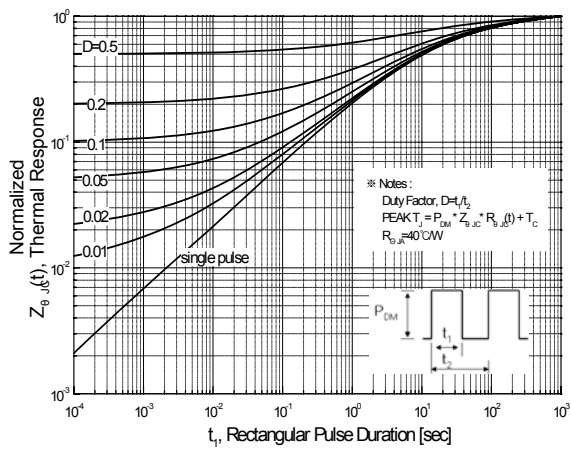
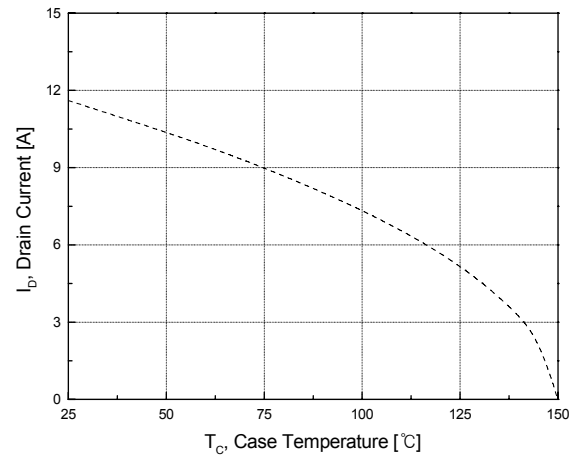
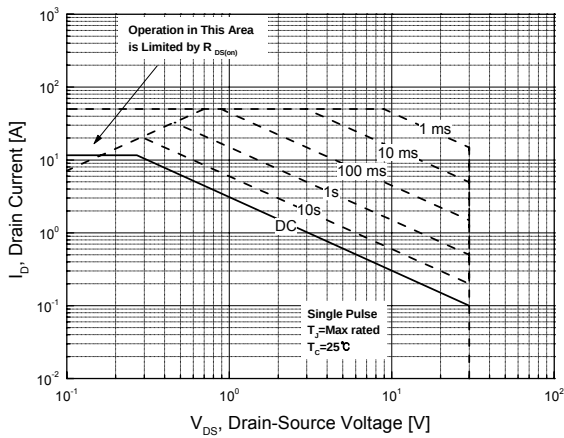
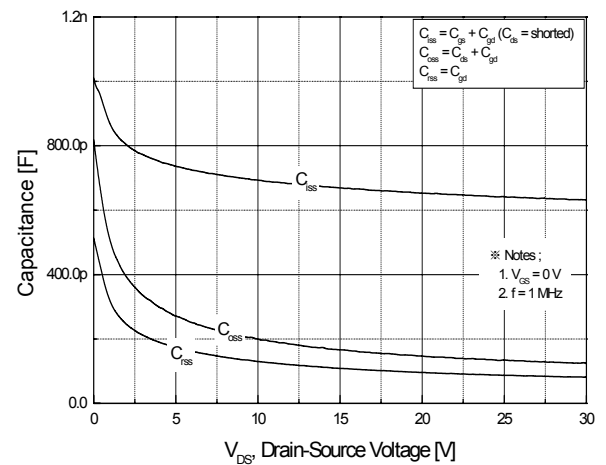
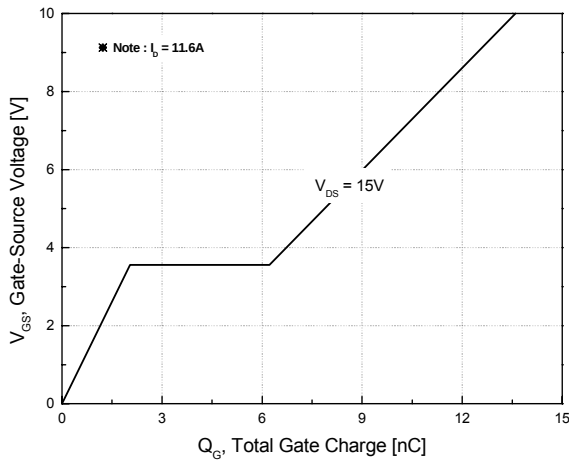


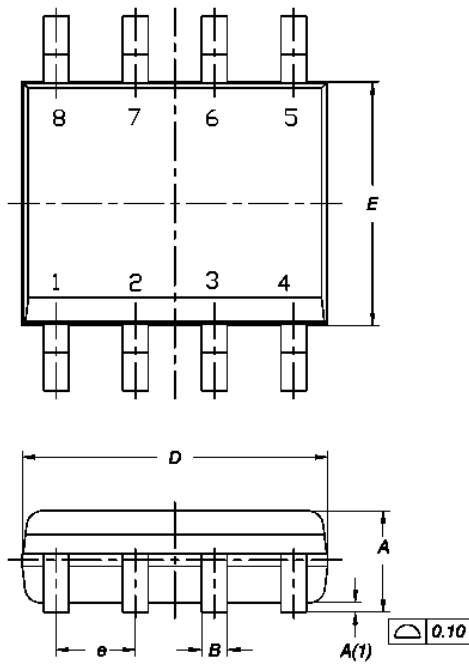
Fig.6 Body Diode Forward Voltage Variation with Source Current and Temperature



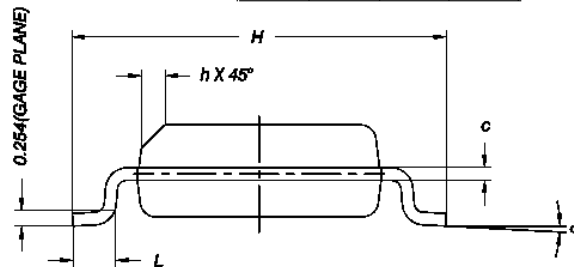
Physical Dimensions

8 Leads SOIC

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



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