RoHS Compliant
HALOGEN-FREE

MagnaChip

MDS1951
Single N-Channel Trench MOSFET 60V, 6A, 45mΩ
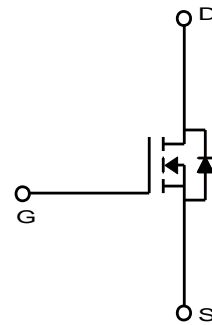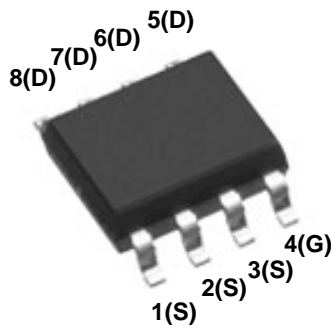
General Description

The MDS1951 uses advanced Magnachip's MOSFET Technology, which provides low on-state resistance, high switching performance and excellent reliability.

Features

- V_{DS} = 60V
- I_D = 6A @ V_{GS} = 10V
- $R_{DS(ON)}$
  < 45mΩ @ V_{GS} = 10V
  < 55mΩ @ 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[2]	T_A=25°C	I_D	6.0	A
	T_A=70°C		4.8	A
Pulsed Drain Current		I_{DM}	30	A
Power Dissipation for Single Operation	T_A=25°C	P_D	2.5	W
	T_A=70°C		1.6	
Single Pulse Avalanche Energy[3]		E_{AS}	25	mJ
Junction and Storage Temperature Range		T_J, T_{stg}	-55~150	^{o}C

Thermal Characteristic

Characteristics	Symbol	Rating	Unit
Thermal Resistance, Junction-to-Ambient (Steady-State)[1]	$R_{\theta JA}$	50	^{o}C/W
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	25	

Ordering Information

Part Number	Temp. Range	Package	Packing	RoHS Status
MDS1951URH	-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	1.9	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	-	37	45	mΩ
		V$_{GS}$ = 4.5V, I$_D$ = 3.0A	-	44	55	
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.
2. P$_D$ is based on T$_{J(MAX)}$=150°C
   a. P$_D$ (T$_C$=25°C) is based on R$_{θJC}$,
   b. P$_D$ (T$_A$=25°C) is based on R$_{θJA,}$ t<10sec
3. Starting T$_J$=25°C, L=1mH, V$_{GS}$=10V,I$_D$=5A, V$_{DD}$=30V, Rated V$_{DS}$=60V
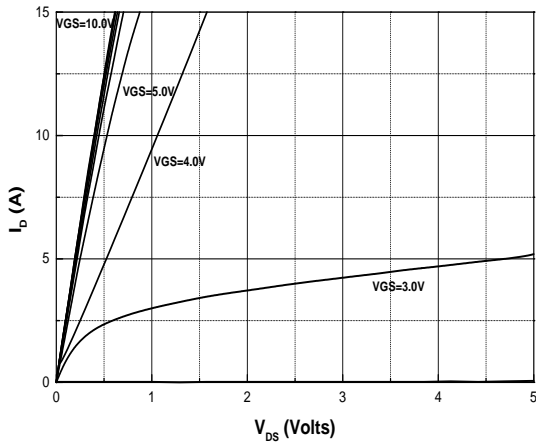
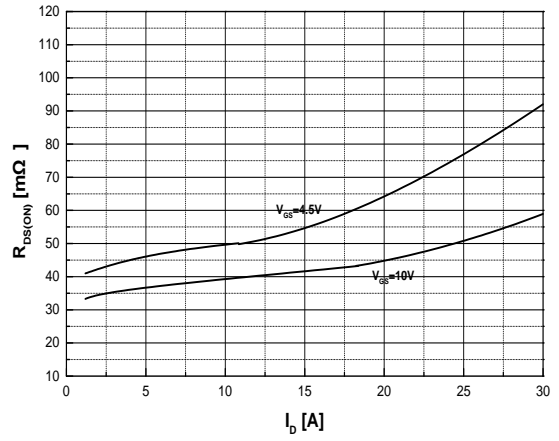**Fig.1 On-Region Characteristics**

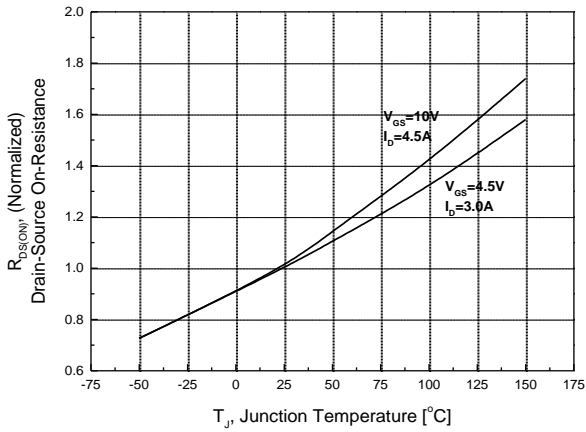**Fig.2 On-Resistance Variation with Drain Current and Gate Voltage**

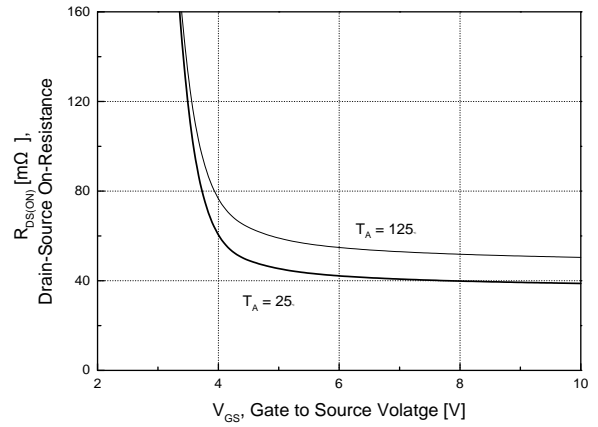**Fig.3 On-Resistance Variation with Temperature**

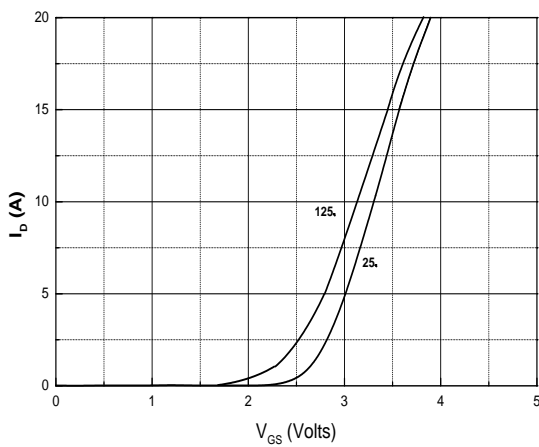**Fig.4 On-Resistance Variation with Gate to Source Voltage**
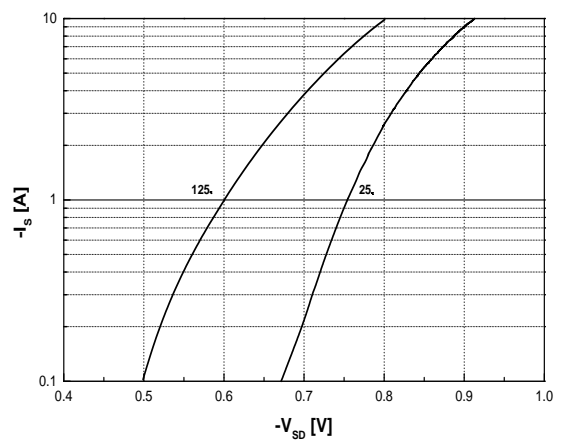
Fig.5 Transfer Characteristics

Fig.6 Body Diode Forward Voltage Variation with Source Current and Temperature
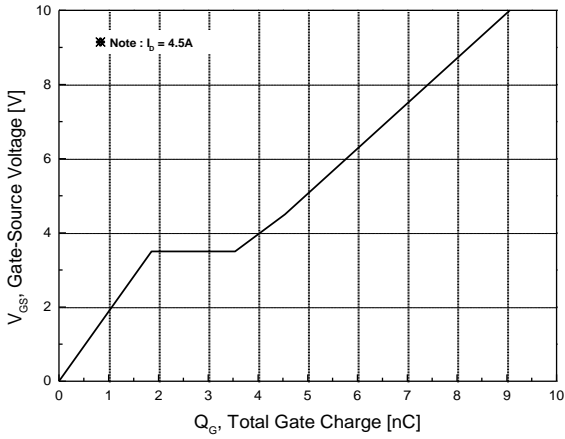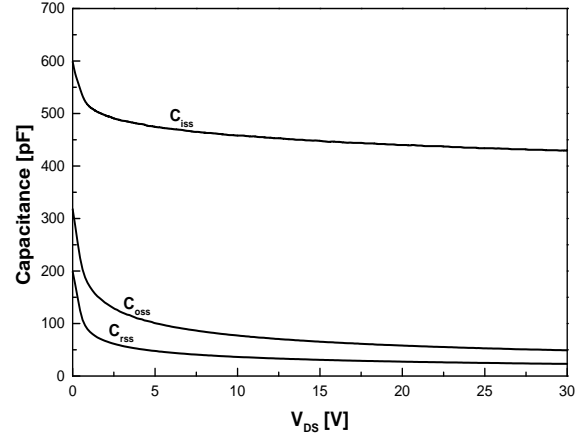
Fig.7 Gate Charge Characteristics
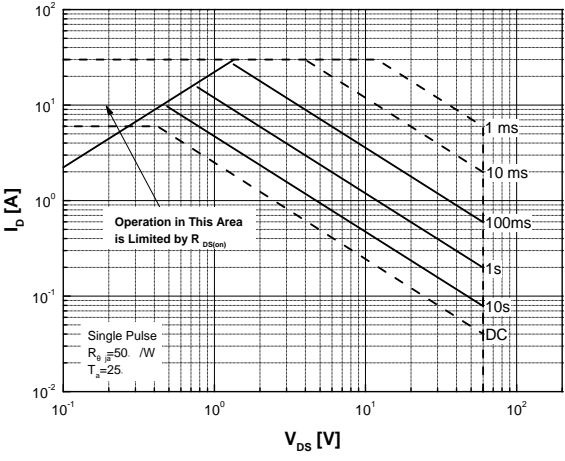
Fig.8 Capacitance Characteristics
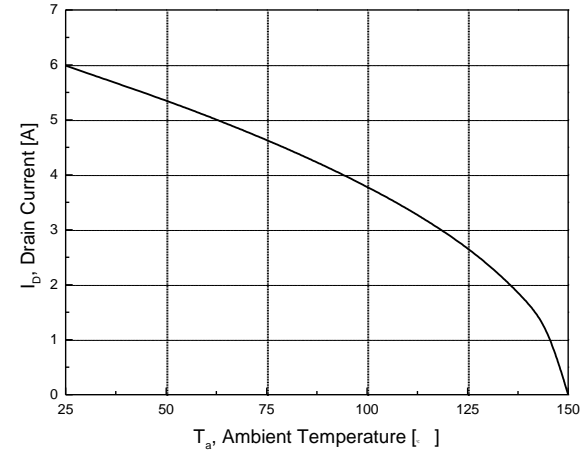
Fig.9 Maximum Safe Operating Area

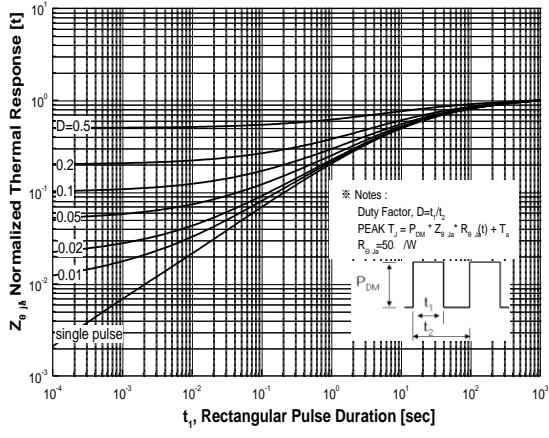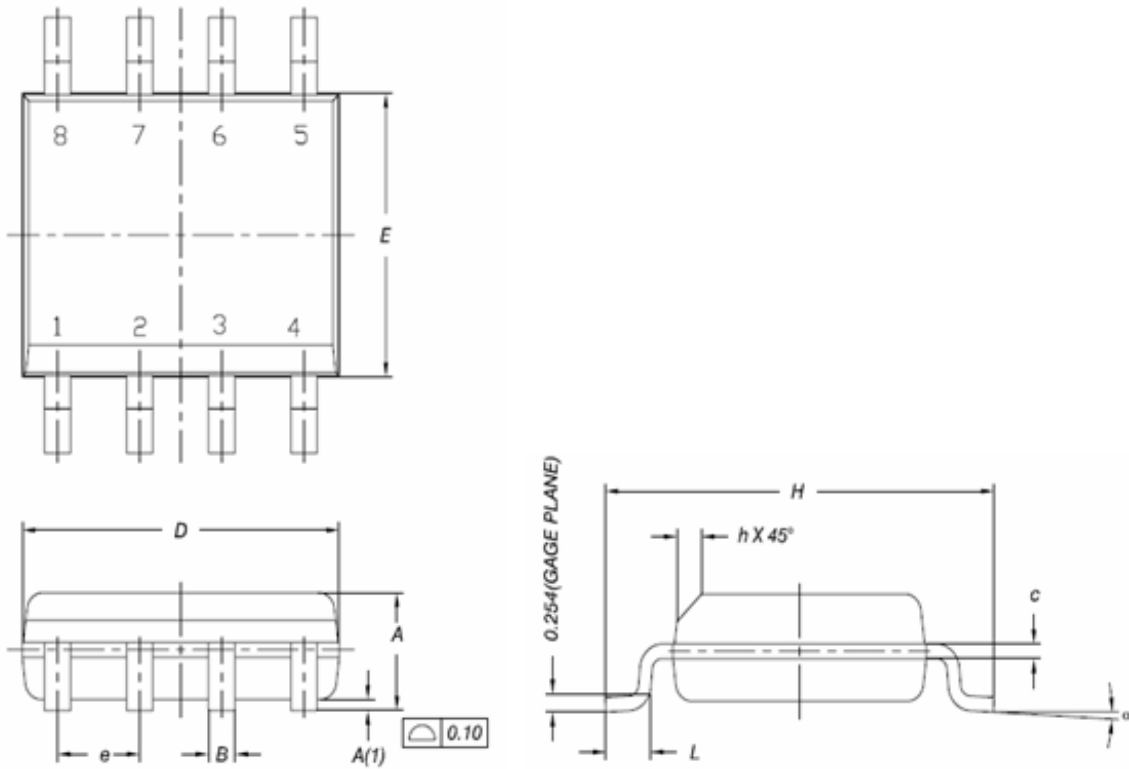**Fig.10 Maximum Drain Current vs. Ambient Temperature**

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	

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.