

### General Description

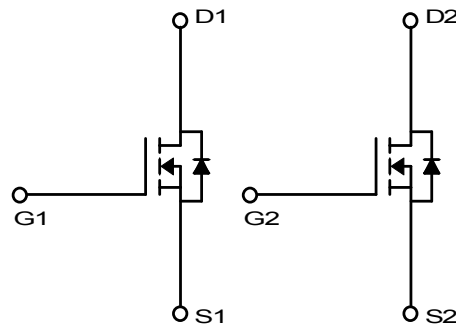
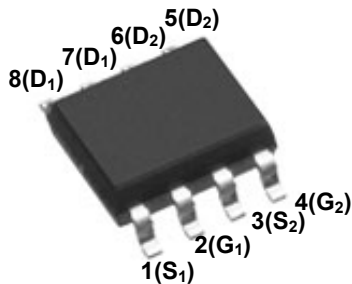
The MDS5652 uses advanced MagnaChip's MOSFET Technology, which provides low on-state resistance, high switching performance and excellent reliability.

### Features

- $V_{DS} = 30V$
- $I_D = 7.5A$  @  $V_{GS} = 10V$
- $R_{DS(ON)} < 22m\Omega$  @  $V_{GS} = 10V$   
 $< 35m\Omega$  @  $V_{GS} = 4.5V$

### Applications

- Portable Equipment Applications
- DC-DC Converter applications
- General purpose applications



### Absolute Maximum Ratings ( $T_a = 25^\circ C$ unless otherwise noted)

Characteristics	Symbol	Rating	Unit
Drain-Source Voltage	$V_{DSS}$	30	V
Gate-Source Voltage	$V_{GSS}$	$\pm 20$	V
Continuous Drain Current	$I_D$	$T_a = 25^\circ C$	7.5
		$T_a = 100^\circ C$	4.8
Pulsed Drain Current	$I_{DM}$	30	A
Power Dissipation <sup>(1)</sup>	$P_D$	$T_a = 25^\circ C$	2.0
		$T_a = 100^\circ C$	0.8
Single Pulse Avalanche Energy <sup>(2)</sup>	$E_{AS}$	12	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(Steady-State) <sup>(1)</sup>	$R_{\theta JA}$	62.5	$^\circ C/W$
Thermal Resistance, Junction-to-Case	$R_{\theta JC}$	50	

## Ordering Information

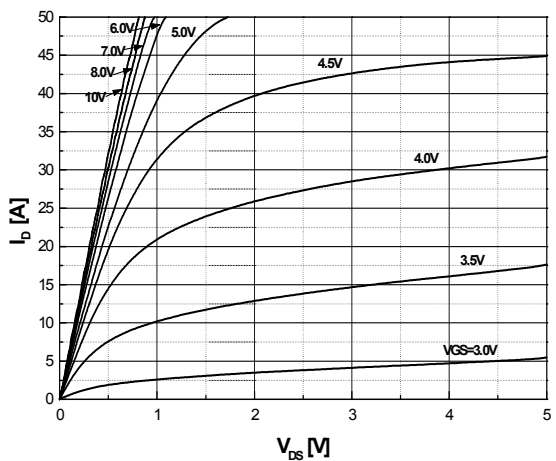
Part Number	Temp. Range	Package	Packing	RoHS Status
MDS5652URH	-55~150°C	SOIC-8	Tape & Reel	Halogen Free

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

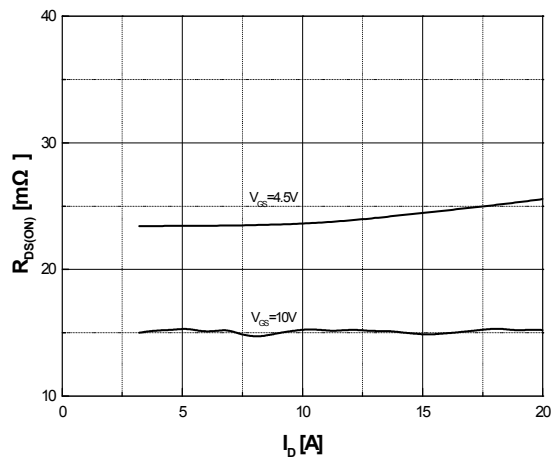
Characteristics	Symbol	Test Condition	Min	Typ	Max	Unit
<b>Static Characteristics</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	I <sub>D</sub> = 250μA, V <sub>GS</sub> = 0V	30	-	-	V
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> = 24V, V <sub>GS</sub> = 0V			1	μA
Gate to Source Leakage Current	I <sub>GSS</sub>	V <sub>GS</sub> = ±20V, V <sub>DS</sub> = 0V	-	-	100	nA
Gate to Source Threshold Voltage	V <sub>GS(th)</sub>	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250μA	1	1.9	3	V
Static Drain to Source On Resistance	R <sub>DS(on)</sub>	V <sub>GS</sub> = 10V, I <sub>D</sub> = 7.5A	-	16	22	mΩ
		V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 5.0A		23	35	
Forward Transconductance	g <sub>FS</sub>	V <sub>DS</sub> = 5V, I <sub>D</sub> = 7.5A		25	-	S
<b>Dynamic Characteristics</b>						
Total Gate Charge	Q <sub>g(10V)</sub>	V <sub>DD</sub> = 30V, I <sub>D</sub> = 7.5A, V <sub>GS</sub> = 10V	-	11.7	-	nC
Total Gate Charge	Q <sub>g(4.5V)</sub>			6.1		
Gate to Source Charge	Q <sub>gs</sub>			2.1		
Gate to Drain Charge	Q <sub>gd</sub>			3.2		
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> = 30V, V <sub>GS</sub> = 0V, f = 1.0MHz	-	460	-	pF
Reverse Transfer Capacitance	C <sub>rss</sub>			58		
Output Capacitance	C <sub>oss</sub>			154		
Turn-On Delay Time	t <sub>d(on)</sub>	V <sub>GS</sub> = 10V, V <sub>DD</sub> = 15V, R <sub>L</sub> = 2.1Ω, R <sub>GEN</sub> = 3Ω	-	3.8	-	ns
Turn-On Rise Time	t <sub>r</sub>			24.6		
Turn-Off Delay Time	t <sub>d(off)</sub>			17.4		
Turn-Off Fall Time	t <sub>f</sub>			10.6		
<b>Drain-Source Body Diode Characteristics</b>						
Source-Drain Diode Forward Voltage	V <sub>SD</sub>	I <sub>S</sub> = 1A, V <sub>GS</sub> = 0V	-	0.75		V
Body Diode Reverse Recovery Time	t <sub>rr</sub>	I <sub>F</sub> = 7.5A, di/dt = 100A/μs	-	16	-	ns
Body Diode Reverse Recovery Charge	Q <sub>rr</sub>			-	7.5	-

Note :

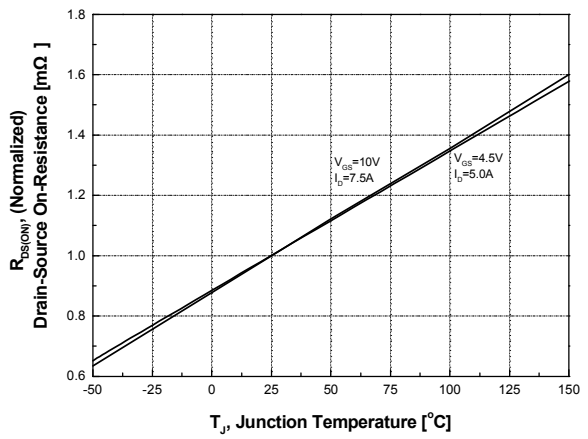
- Surface mounted FR-4 board with 2oz. Copper.
- Starting T<sub>J</sub> = 25°C, L = 1mH, I<sub>AS</sub> = 5A, V<sub>DD</sub> = 15V, V<sub>GS</sub> = 10V



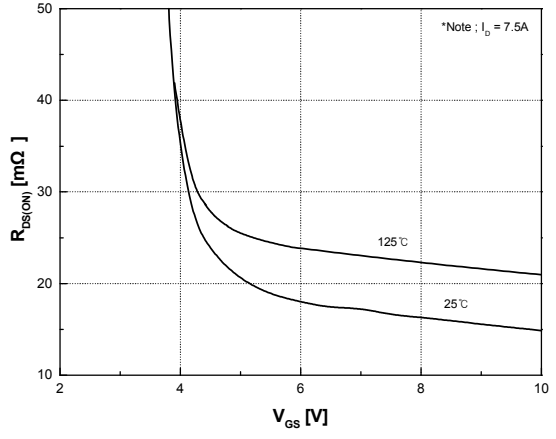
**Fig.1 On-Region Characteristics**



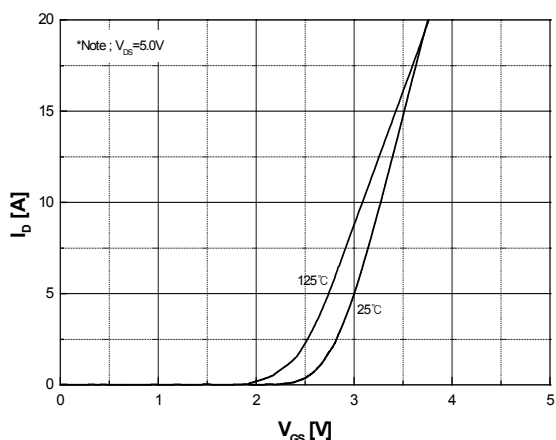
**Fig.2 On-Resistance Variation with Drain Current and Gate Voltage**



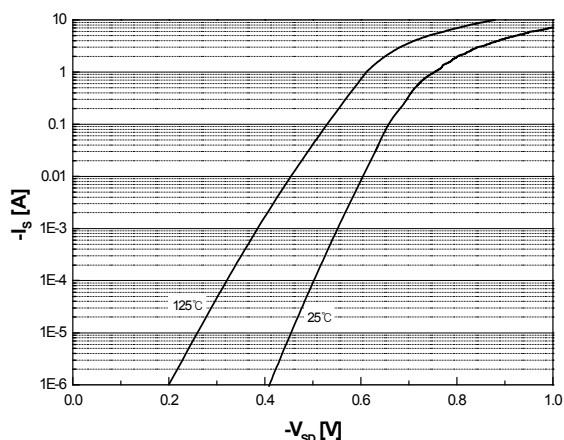
**Fig.3 On-Resistance Variation with Temperature**



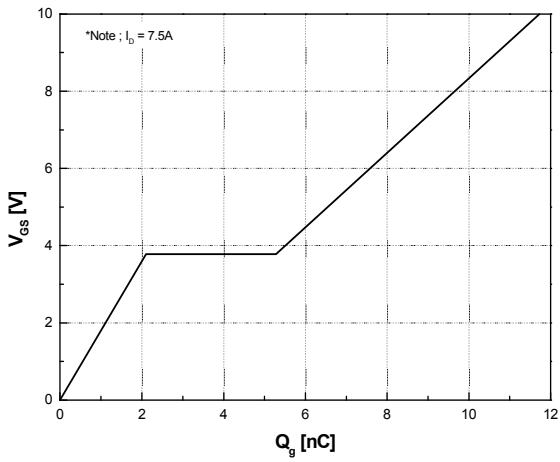
**Fig.4 On-Resistance Variation with Gate to Source Voltage**



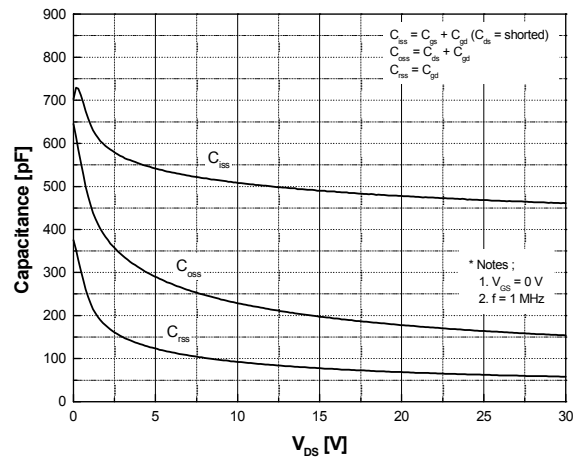
**Fig.5 Transfer Characteristics**



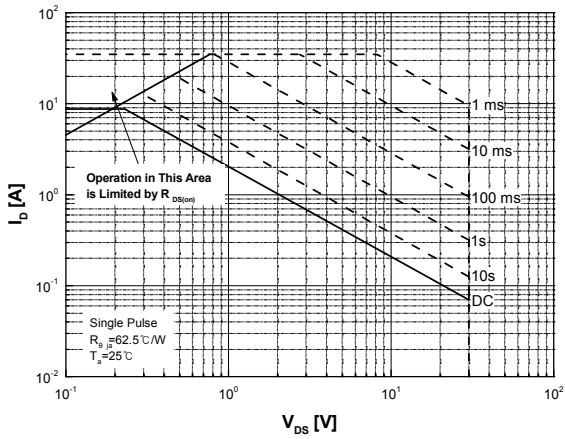
**Fig.6 Body Diode Forward Voltage Variation with Source Current and Temperature**



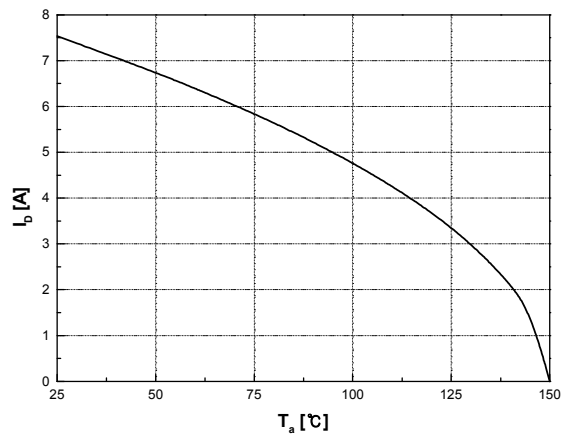
**Fig.7 Gate Charge Characteristics**



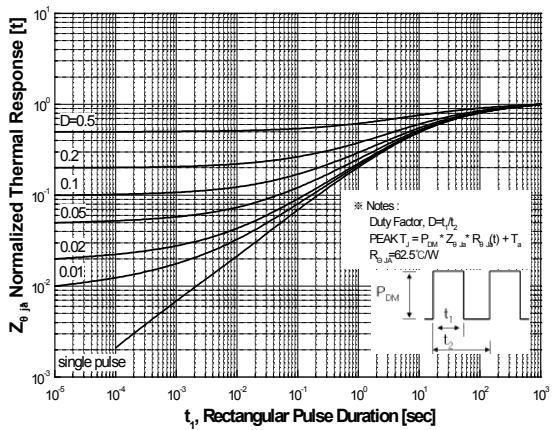
**Fig.8 Capacitance Characteristics**



**Fig.9 Maximum Safe Operating Area**



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

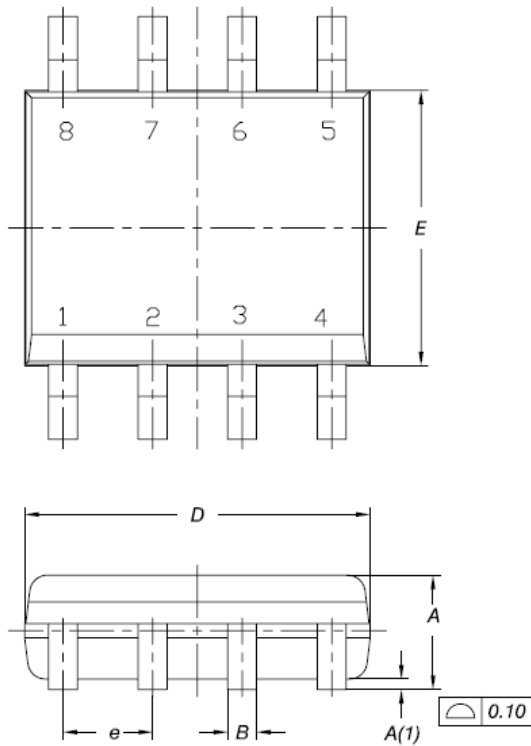


**Fig.11 Transient Thermal Response Curve**

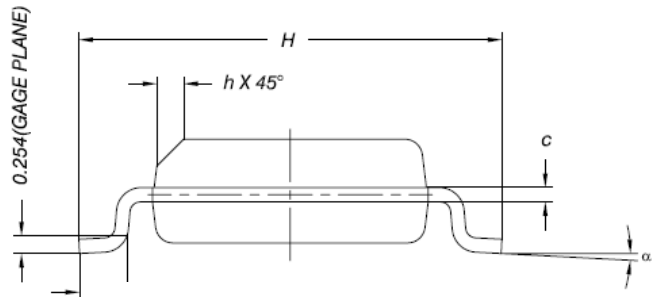
## Physical Dimensions

### 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
$\alpha$	0°	4°	8°
h	0.25	0.375	0.50



## Worldwide Sales Support Locations

### U.S.A

#### Sunnyvale Office

787 N. Mary Ave. Sunnyvale  
CA 94085 U.S.A  
Tel : 1-408-636-5200  
Fax : 1-408-213-2450  
E-Mail : americasales@magnachip.com

#### Chicago Office

2300 Barrington Road, Suite 330  
Hoffman Estates, IL 60195 U.S.A  
Tel : 1-847-882-0951  
Fax : 1-847-882-0998

### U.K

Knyvett House The Causeway,  
Staines Middx, TW18 3BA, U.K.  
Tel : +44 (0) 1784-898-8000  
Fax : +44 (0) 1784-895-115  
E-Mail : europesales@magnachip.com

### Japan

#### Tokyo Office

Shinbashi 2-chome MT bldg  
4F 2-5-5 Shinbashi, Minato-ku  
Tokyo, 105-0004 Japan  
Tel : 81-3-3595-0632  
Fax : 81-3-3595-0671  
E-Mail : japansales@magnachip.com

#### Osaka Office

3F, Shin-Osaka MT-2 Bldg  
3-5-36 Miyahara Yodogawa-Ku  
Osaka, 532-0003 Japan  
Tel : 81-6-6394-8224  
Fax : 81-6-6394-8282  
E-Mail : osakasales@magnachip.com

### Taiwan R.O.C

2F, No.61, Chowize Street, Nei Hu  
Taipei, 114 Taiwan R.O.C  
Tel : 886-2-2657-7898  
Fax : 886-2-2657-8751  
E-Mail : taiwansales@magnachip.com

### China

#### Hong Kong Office

Office 03, 42/F, Office Tower Convention Plaza  
1 Harbour Road, Wanchai, Hong Kong  
Tel : 852-2828-9700  
Fax : 852-2802-8183  
E-Mail : chinasales@magnachip.com

#### Shenzhen Office

Room 1803, 18/F  
International Chamber of Commerce Tower  
Fuhua 3Road, Futian District  
ShenZhen, China  
Tel : 86-755-8831-5561  
Fax : 86-755-8831-5565

#### Shanghai Office

Ste 1902, 1 Huaihai Rd. (C) 20021  
Shanghai, China  
Tel : 86-21-6373-5181  
Fax : 86-21-6373-6640

### Korea

891, Daechi-Dong, Kangnam-Gu  
Seoul, 135-738 Korea  
Tel : 82-2-6903-3451  
Fax : 82-2-6903-3668 ~9  
Email : koreasales@magnachip.com

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