

To all our customers

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Renesas Technology Corp.  
Customer Support Dept.  
April 1, 2003

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Keep safety first in your circuit designs!

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Remember to give due consideration to safety when making your circuit designs, with appropriate measures such as (i) placement of substitutive, auxiliary circuits, (ii) use of nonflammable material or (iii) prevention against any malfunction or mishap.

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# HAT2053M

## Silicon N Channel Power MOS FET Power Switching

# RENESAS

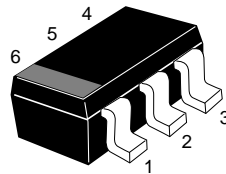
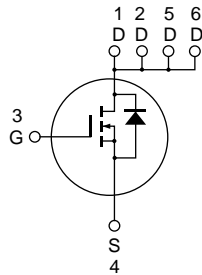
ADE-208-755C (Z)  
Preliminary  
4th. Edition  
Mar. 2001

### Features

- Low on-resistance
- Low drive current
- High density mounting
- 2.5V gate drive device can be driven from 3V source

### Outline

TSOP-6



4 Source  
3 Gate  
1, 2, 5, 6 Drain

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

Item	Symbol	Ratings	Unit
Drain to source voltage	$V_{DSS}$	20	V
Gate to source voltage	$V_{GSS}$	±12	V
Drain current	$I_D^{*2}$	6.1	A
Drain peak current	$I_{D(pulse)}^{*1}$	24.4	A
Body-drain diode reverse drain current	$I_{DR}^{*2}$	6.1	A
Channel dissipation	$Pch_{(pulse)}^{*2}$	2.0	W
	$Pch_{(continuous)}^{*3}$	1.05	W
Channel temperature	Tch	150	°C
Storage temperature	Tstg	-55 to +150	°C

Notes: 1.  $PW \leq 10\mu s$ , duty cycle  $\leq 1\%$

2. When using the alumina ceramic board (50 x 50 x 0.7 mm),  $PW \leq 5s, Ta=25^\circ C$

3. When using the alumina ceramic board (50 x 50 x 0.7 mm),  $Ta=25^\circ C$

## Electrical Characteristics (Ta = 25°C)

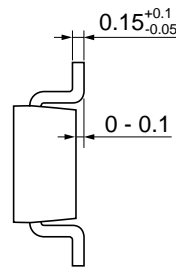
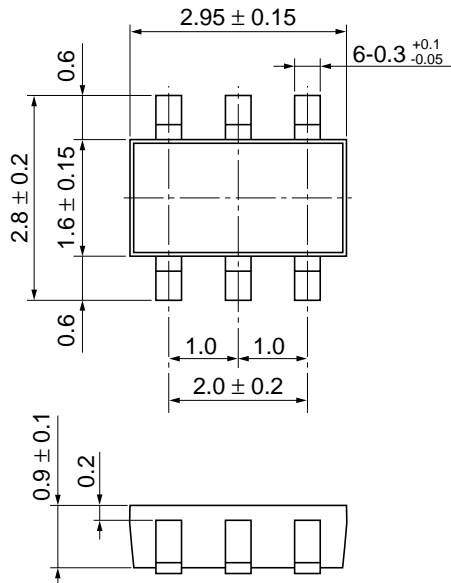
Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Drain to source breakdown voltage	$V_{(BR)DSS}$	20	—	—	V	$I_D = 10mA, V_{GS} = 0$
Gate to source leak current	$I_{GSS}$	—	—	±0.1	μA	$V_{GS} = \pm 12V, V_{DS} = 0$
Zero gate voltage drain current	$I_{DSS}$	—	—	1	μA	$V_{DS} = 20V, V_{GS} = 0$
Gate to source cutoff voltage	$V_{GS(off)}$	0.4	—	1.4	V	$V_{DS} = 10V, I_D = 1mA$
Static drain to source on state resistance	$R_{DS(on)}$	—	28	33	mΩ	$I_D = 3A, V_{GS} = 4.5V^{*1}$
	$R_{DS(on)}$	—	37	48	mΩ	$I_D = 3A, V_{GS} = 2.5V^{*1}$
Forward transfer admittance	$ y_{fs} $	6.0	10	—	S	$I_D = 3A, V_{DS} = 10V^{*1}$
Input capacitance	Ciss	—	570	—	pF	$V_{DS} = 10V$
Output capacitance	Coss	—	220	—	pF	$V_{GS} = 0$
Reverse transfer capacitance	Crss	—	160	—	pF	$f = 1MHz$
Turn-on delay time	$t_{d(on)}$	—	15	—	ns	$V_{GS} = 4.5V, I_D = 3A$
Rise time	$t_r$	—	100	—	ns	$R_L = 3.3\Omega$
Turn-off delay time	$t_{d(off)}$	—	90	—	ns	
Fall time	$t_f$	—	105	—	ns	
Body-drain diode forward voltage	$V_{DF}$	—	0.95	—	V	$IF = 6.1A, V_{GS} = 0^{*1}$
Body-drain diode reverse recovery time	$t_{rr}$	—	(50)	—	ns	$IF = 6.1A, V_{GS} = 0$ $diF/dt = 20A/\mu s$

Note: 1. Pulse test

Package Dimensions

As of January, 2001

Unit: mm



Hitachi Code	TSOP-6
JEDEC	—
EIAJ	—
Mass (reference value)	0.012 g

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# HITACHI

## Hitachi, Ltd.

Semiconductor & Integrated Circuits.

Nippon Bldg., 2-6-2, Ohte-machi, Chiyoda-ku, Tokyo 100-0004, Japan

Tel: Tokyo (03) 3270-2111 Fax: (03) 3270-5109

URL        NorthAmerica        : <http://semiconductor.hitachi.com/>  
             Europe                : <http://www.hitachi-eu.com/hel/ecg>  
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## For further information write to:

Hitachi Semiconductor  
(America) Inc.  
179 East Tasman Drive,  
San Jose, CA 95134  
Tel: <1> (408) 433-1990  
Fax: <1> (408) 433-0223

Hitachi Europe GmbH  
Electronic Components Group  
Dornacher Straße 3  
D-85622 Feldkirchen, Munich  
Germany  
Tel: <49> (89) 9 9180-0  
Fax: <49> (89) 9 29 30 00

Hitachi Europe Ltd.  
Electronic Components Group.  
Whitebrook Park  
Lower Cookham Road  
Maidenhead  
Berkshire SL6 8YA, United Kingdom  
Tel: <44> (1628) 585000  
Fax: <44> (1628) 585160

Hitachi Asia Ltd.  
Hitachi Tower  
16 Collyer Quay #20-00,  
Singapore 049318  
Tel : <65>-538-6533/538-8577  
Fax : <65>-538-6933/538-3877  
URL : <http://www.hitachi.com.sg>

Hitachi Asia Ltd.  
(Taipei Branch Office)  
4/F, No. 167, Tun Hwa North Road,  
Hung-Kuo Building,  
Taipei (105), Taiwan  
Tel : <886>-(2)-2718-3666  
Fax : <886>-(2)-2718-8180  
Telex : 23222 HAS-TP  
URL : <http://www.hitachi.com.tw>

Hitachi Asia (Hong Kong) Ltd.  
Group III (Electronic Components)  
7/F., North Tower,  
World Finance Centre,  
Harbour City, Canton Road  
Tsim Sha Tsui, Kowloon,  
Hong Kong  
Tel : <852>-(2)-735-9218  
Fax : <852>-(2)-730-0281  
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