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# HAT2053M

Silicon N Channel Power MOS FET  
Power Switching

# HITACHI

ADE-208-755B(Z)  
Preliminary, 3rd. Edition  
Dec. 1, 1998

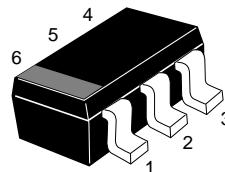
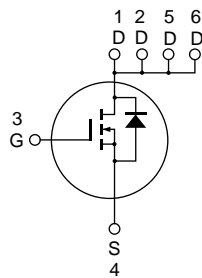
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## Features

- 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

# HAT2053M

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

Item	Symbol	Ratings	Unit
Drain to source voltage	$V_{DSS}$	20	V
Gate to source voltage	$V_{GSS}$	$\pm 12$	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	$P_{ch(pulse)}^{*2}$	2.0	W
	$P_{ch(continuous)}^{*3}$	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),  $PW \leq 5s$ ,  $T_a = 25^\circ C$

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

## 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	$I_{GSS}$	—	—	$\pm 0.1$	$\mu A$	$V_{GS} = \pm 12V$ , $V_{DS} = 0$
Zero gate voltage drain current	$I_{DSS}$	—	—	1	$\mu A$	$V_{DS} = 20V$ , $V_{GS} = 0$
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	$m\Omega$	$I_D = 3A$ , $V_{GS} = 4.5V^{*1}$
	$R_{DS(on)}$	—	37	48	$m\Omega$	$I_D = 3A$ , $V_{GS} = 2.5V^{*1}$
Forward transfer admittance	$ y_{fs} $	6.5	11	—	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



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