

# HAT2093R

## Silicon N Channel Power MOS FET High Speed Power Switching

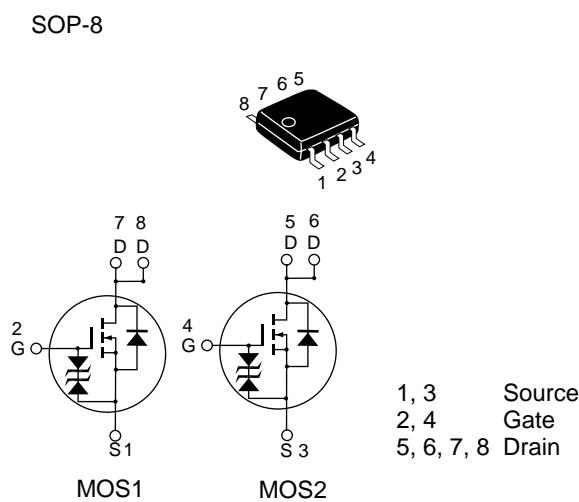
**HITACHI**

ADE-208-1237A (Z)  
2nd. Edition  
Jan. 2001

## Features

- Low on-resistance
- Capable of 4.5 V gate drive
- Low drive current
- High density mounting

## Outline



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

Item	Symbol	Ratings	Unit
Drain to source voltage	V <sub>DSS</sub>	30	V
Gate to source voltage	V <sub>GSS</sub>	±20	V
Drain current	I <sub>D</sub>	9	A
Drain peak current	I <sub>D(pulse)</sub> <sup>Note1</sup>	72	A
Body-drain diode reverse drain current	I <sub>DR</sub>	9	A
Channel dissipation	Pch <sup>Note2</sup>	2	W
Channel dissipation	Pch <sup>Note3</sup>	3	W
Channel temperature	Tch	150	°C
Storage temperature	Tstg	–55 to +150	°C

Note: 1. PW ≤ 10μs, duty cycle ≤ 1 %

2. 1 Drive operation : When using the glass epoxy board (FR4 40 x 40 x 1.6 mm), PW≤ 10s

3. 2 Drive operation : When using the glass epoxy board (FR4 40 x 40 x 1.6 mm), PW≤ 10s

## Electrical Characteristics (Ta = 25°C)

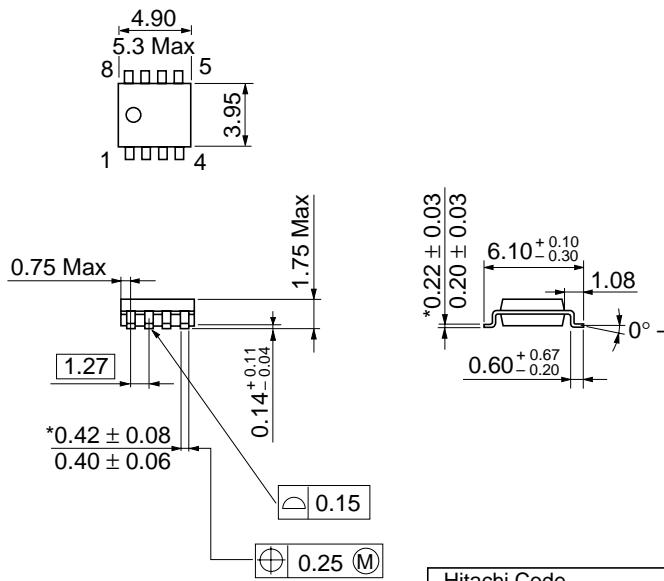
Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Drain to source breakdown voltage	V <sub>(BR)DSS</sub>	30	—	—	V	I <sub>D</sub> = 10mA, V <sub>GS</sub> = 0
Gate to source breakdown voltage	V <sub>(BR)GSS</sub>	± 20	—	—	V	I <sub>G</sub> = ±100 μA, V <sub>DS</sub> = 0
Gate to source leak current	I <sub>GSS</sub>	—	—	±10	μA	V <sub>GS</sub> = ±16V, V <sub>DS</sub> = 0
Zero gate voltage drain current	I <sub>DSS</sub>	—	—	1	μA	V <sub>DS</sub> = 30 V, V <sub>GS</sub> = 0
Gate to source cutoff voltage	V <sub>GS(off)</sub>	1.0	—	2.5	V	V <sub>DS</sub> = 10V, I <sub>D</sub> = 1mA
Static drain to source on state resistance	R <sub>DS(on)</sub>	—	18	23	mΩ	I <sub>D</sub> = 4.5A, V <sub>GS</sub> = 10V <sup>Note4</sup>
Forward transfer admittance	y <sub>fs</sub>	9	15	—	S	I <sub>D</sub> = 4.5A, V <sub>DS</sub> = 10V <sup>Note4</sup>
Input capacitance	C <sub>iss</sub>	—	750	—	pF	V <sub>DS</sub> = 10V
Output capacitance	C <sub>oss</sub>	—	200	—	pF	V <sub>GS</sub> = 0
Reverse transfer capacitance	C <sub>rss</sub>	—	110	—	pF	f = 1MHz
Total gate charge	Q <sub>g</sub>	—	12	—	nc	V <sub>DD</sub> = 10 V
Gate to source charge	Q <sub>gs</sub>	—	2.3	—	nc	V <sub>GS</sub> = 10 V
Gate to drain charge	Q <sub>gd</sub>	—	2.2	—	nc	I <sub>D</sub> = 9 A
Turn-on delay time	t <sub>d(on)</sub>	—	11	—	ns	V <sub>GS</sub> = 10A, I <sub>D</sub> = 4.5A
Rise time	t <sub>r</sub>	—	16	—	ns	V <sub>DD</sub> ≈ 10V
Turn-off delay time	t <sub>d(off)</sub>	—	40	—	ns	R <sub>L</sub> = 2.22Ω
Fall time	t <sub>f</sub>	—	7	—	ns	R <sub>g</sub> = 4.7Ω
Body-drain diode forward voltage	V <sub>DF</sub>	—	0.85	1.10	V	IF = 9A, V <sub>GS</sub> = 0 <sup>Note4</sup>
Body-drain diode reverse recovery time	t <sub>rr</sub>	—	50	—	ns	IF = 9A, V <sub>GS</sub> = 0 dI/dt = 50A/μs

Note: 4. Pulse test

## Package Dimensions

As of January, 2001

Unit: mm



\*Dimension including the plating thickness  
Base material dimension

Hitachi Code	FP-8DA
JEDEC	Conforms
EIAJ	—
Mass (reference value)	0.085 g

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