

# HAT1043M

Silicon P Channel Power MOS FET  
Power Switching

# HITACHI

ADE-208-754D (Z)

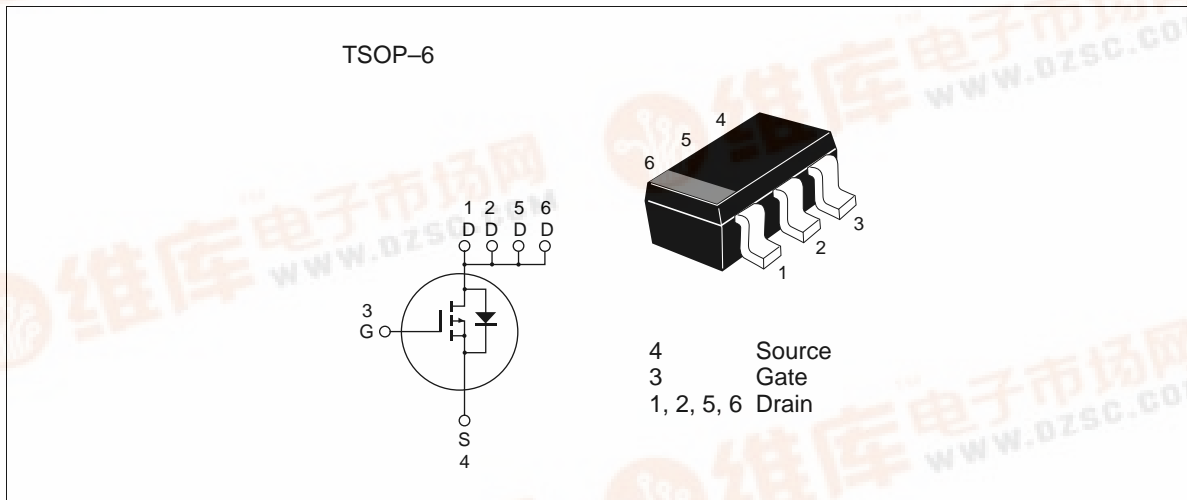
5th Edition

February 1999

## Features

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

## Outline



## HAT1043M

### 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	$I_D$	-4.4	A
Drain peak current	$I_{D(pulse)}$ <sup>Note 1</sup>	-17.6	A
Body-drain diode reverse drain current	$I_{DR}$ <sup>Note 2</sup>	-4.4	A
Channel dissipation	$Pch_{(pulse)}$ <sup>Note 2</sup>	2.0	W
	$Pch_{(continuous)}$ <sup>Note 3</sup>	1.05	W
Channel temperature	Tch	150	°C
Storage temperature	Tstg	-55 to +150	°C

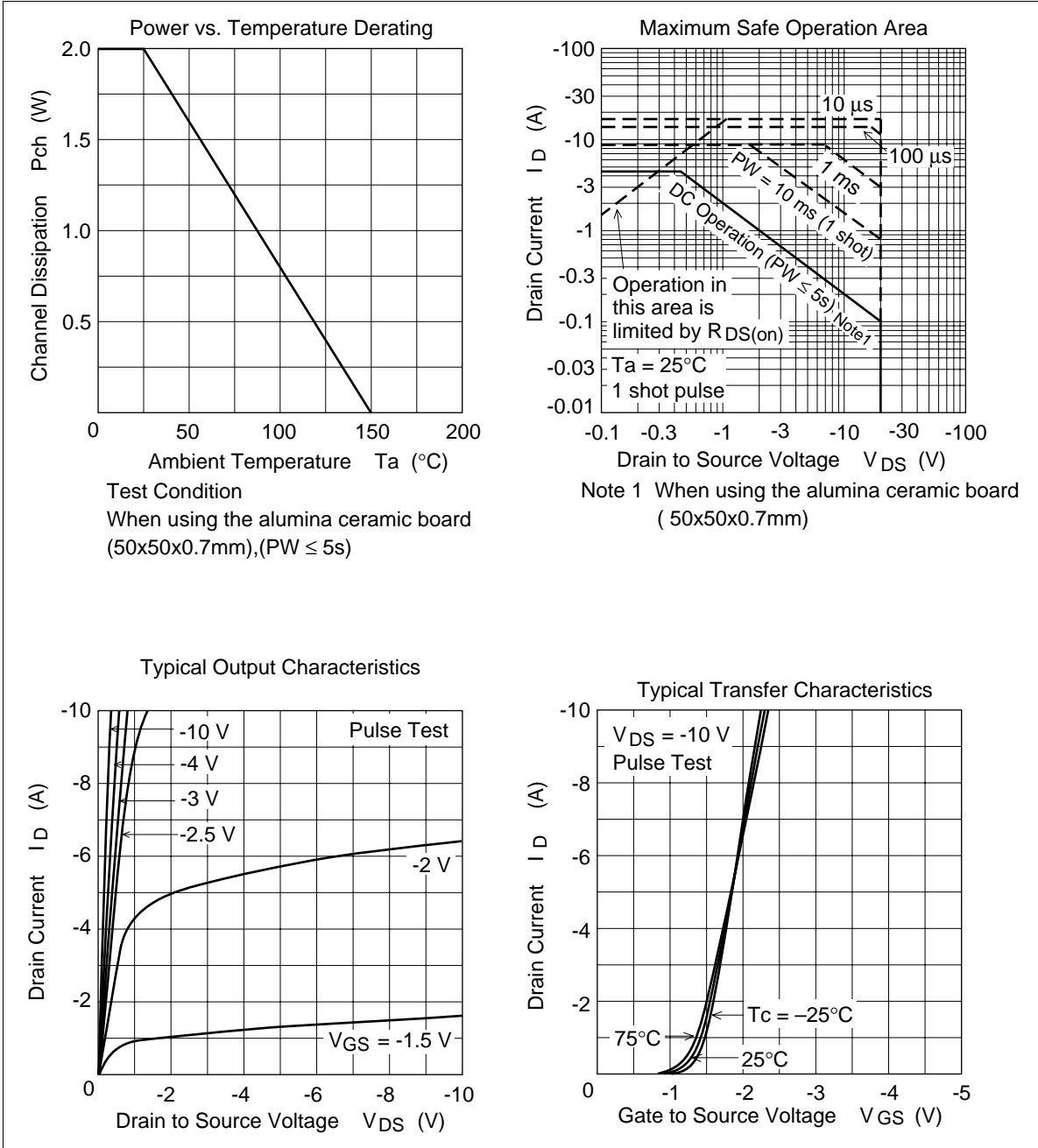
Note: 1.  $PW \leq 10 \mu s$ , duty cycle  $\leq 1\%$   
 2. When using the alumina ceramic board (50 x 50 x 0.7 mm),  $PW \leq 5 s$ , Ta = 25°C  
 3. When using the alumina ceramic board (50 x 50 x 0.7 mm), Ta = 25°C

### Electrical Characteristics (Ta = 25°C)

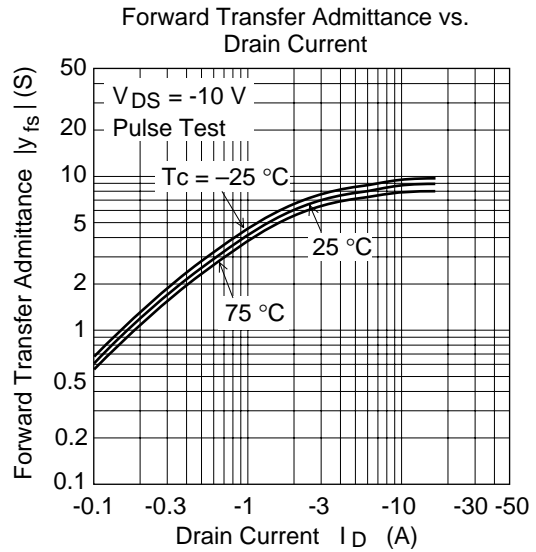
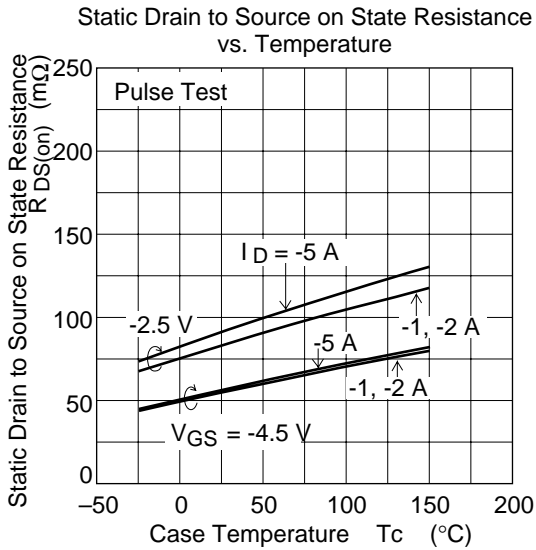
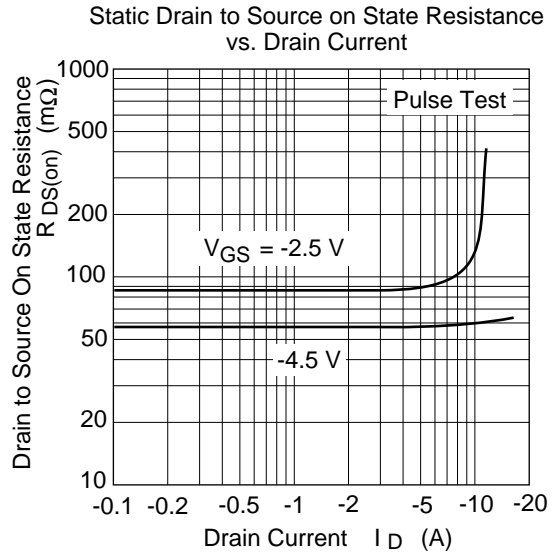
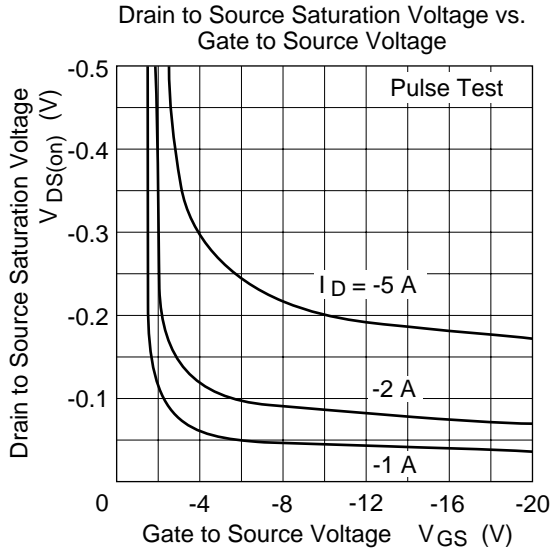
Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Drain to source breakdown voltage	$V_{(BR)DSS}$	-20	—	—	V	$I_D = -10 mA, V_{GS} = 0$
Gate to source leak current	$I_{GSS}$	—	—	±0.1	μA	$V_{GS} = \pm 12 V, V_{DS} = 0$
Zero gate voltage drain current	$I_{DSS}$	—	—	-1	μA	$V_{DS} = -20 V, V_{GS} = 0$
Gate to source cutoff voltage	$V_{GS(off)}$	-0.4	—	-1.4	V	$I_D = -1 mA, V_{DS} = -10 V$
Static drain to source on state resistance	$R_{DS(on)}$	—	55	65	mΩ	$I_D = -3 A, V_{GS} = -4.5 V$ <sup>Note 1</sup>
		—	85	110	mΩ	$I_D = -3 A, V_{GS} = -2.5 V$ <sup>Note 1</sup>
Forward transfer admittance	$ y_{fs} $	4	7	—	S	$I_D = -3 A, V_{DS} = -10 V$ <sup>Note 1</sup>
Input capacitance	Ciss	—	750	—	pF	$V_{DS} = -10 V$
Output capacitance	Coss	—	310	—	pF	$V_{GS} = 0$
Reverse transfer capacitance	Crss	—	220	—	pF	f = 1 MHz
Total Gate charge	Qg	—	11	—	nc	$V_{DD} = -10 V$
Gate to Source charge	Qgs	—	2	—	nc	$V_{GS} = -4.5 V$
Gate to Drain charge	Qgd	—	3.5	—	nc	$I_D = -4.4 A$
Turn-on delay time	$t_{d(on)}$	—	15	—	ns	$V_{GS} = -4.5 V, I_D = -3 A$
Rise time	$t_r$	—	100	—	ns	$R_L = 3.3 \Omega$
Turn-off delay time	$t_{d(off)}$	—	85	—	ns	
Fall time	$t_f$	—	100	—	ns	
Body-drain diode forward voltage	$V_{DF}$	—	-0.95	-1.23	V	$I_F = -4.4 A, V_{GS} = 0$
Body-drain diode reverse recovery time	$t_{rr}$	—	50	—	ns	$I_F = -4.4 A, V_{GS} = 0$ diF/ dt = -20 A/ μs

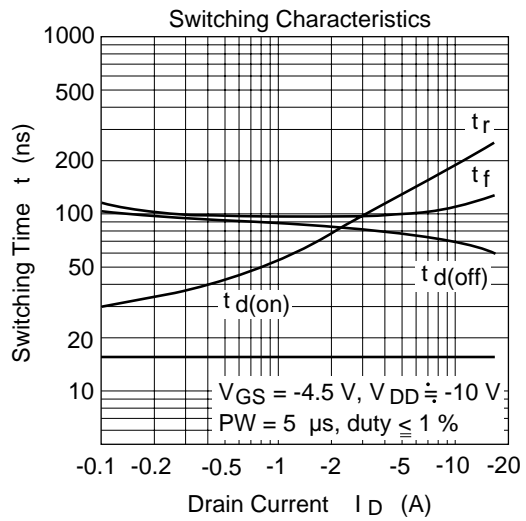
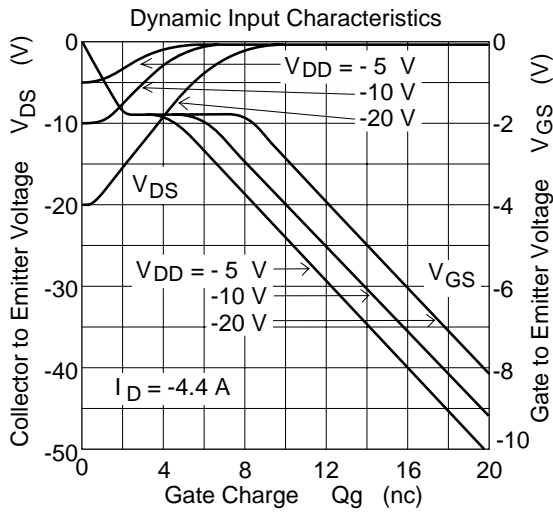
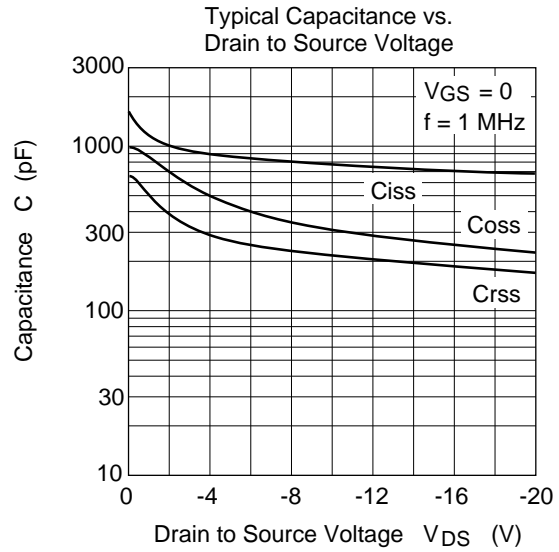
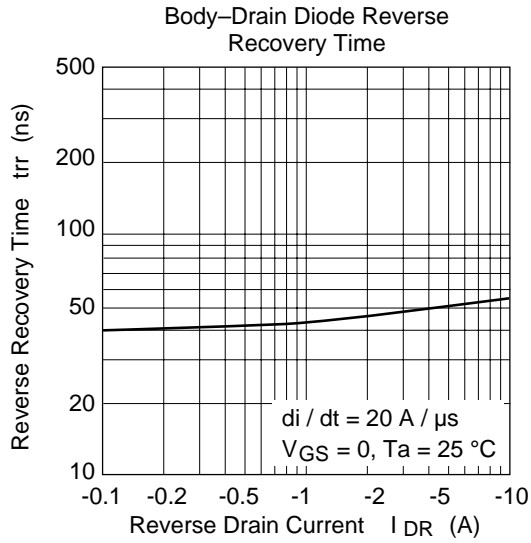
Note: 1. Pulse test

Main Characteristics

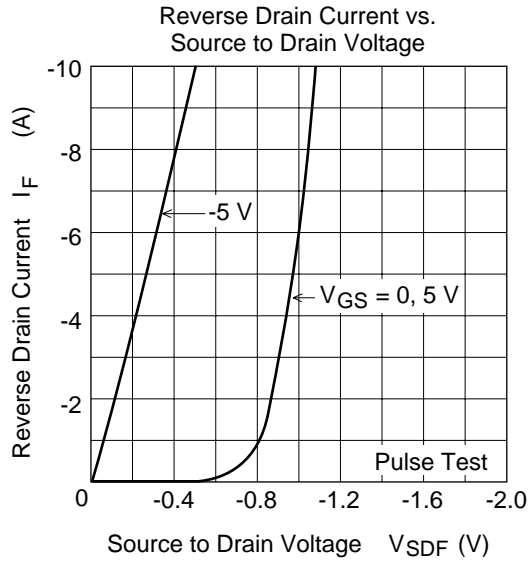


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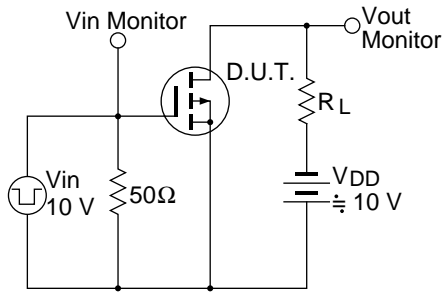




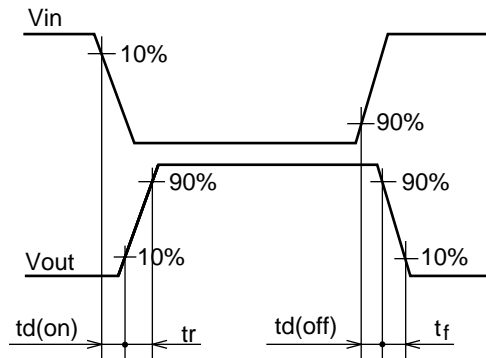
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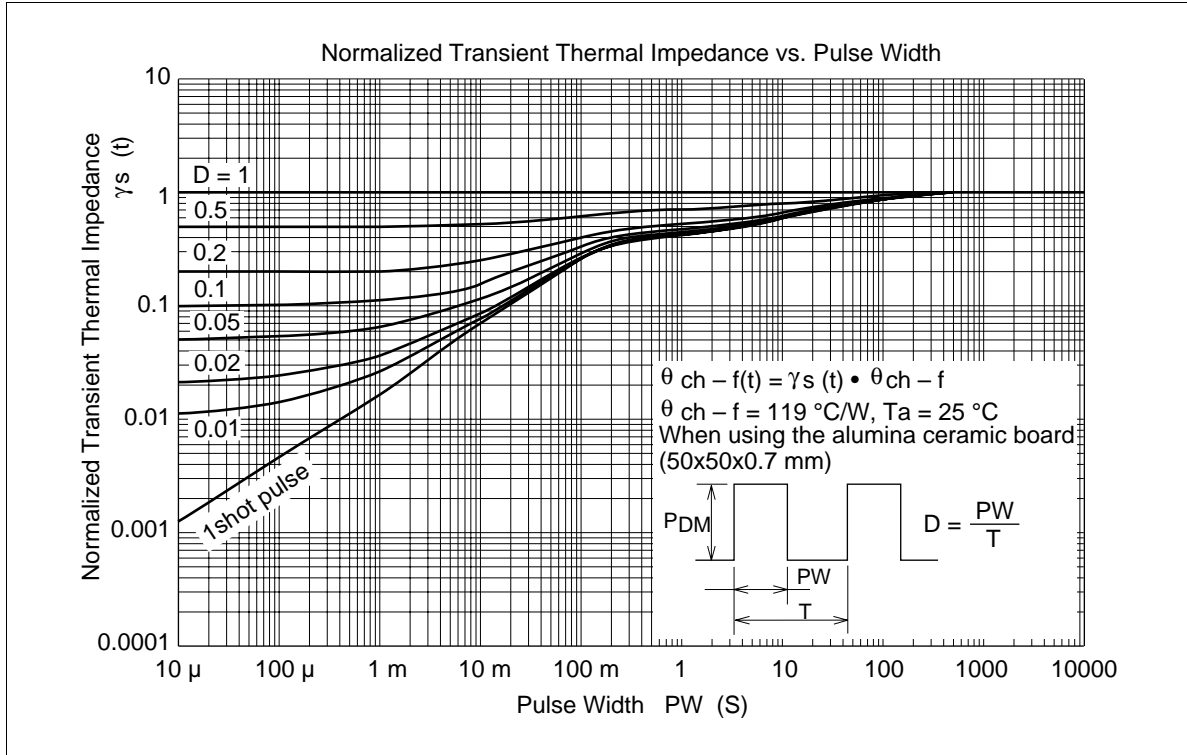


Switching Time Test Circuit



Switching Time Waveform





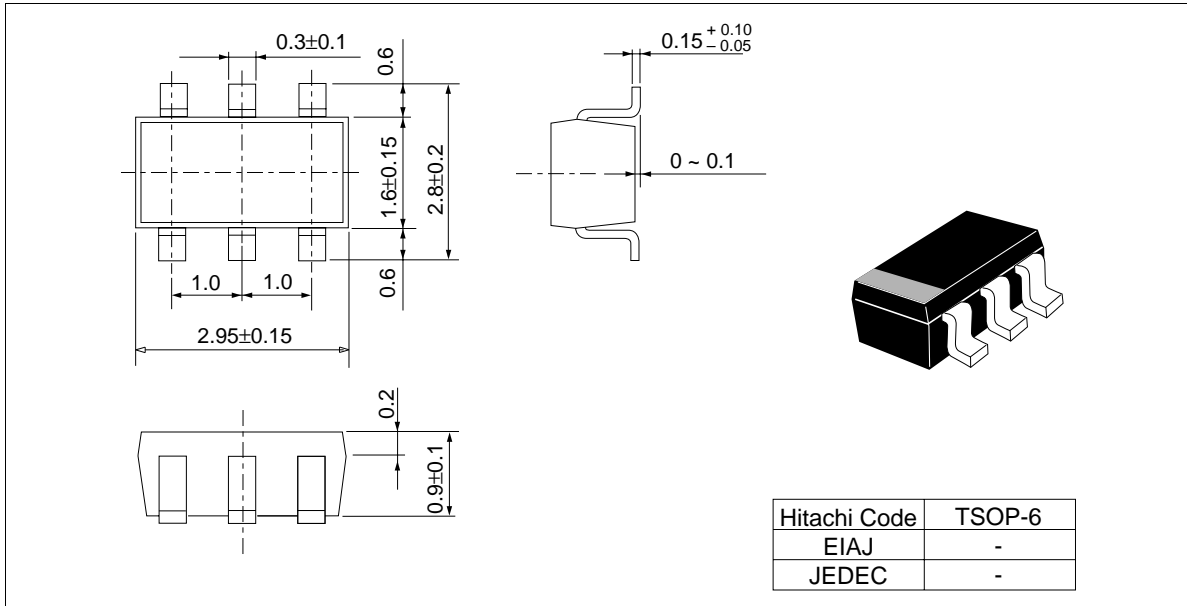
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## Package Dimensions

Unit: mm





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