

# HAT2040R

Silicon N Channel Power MOS FET  
Power Switching

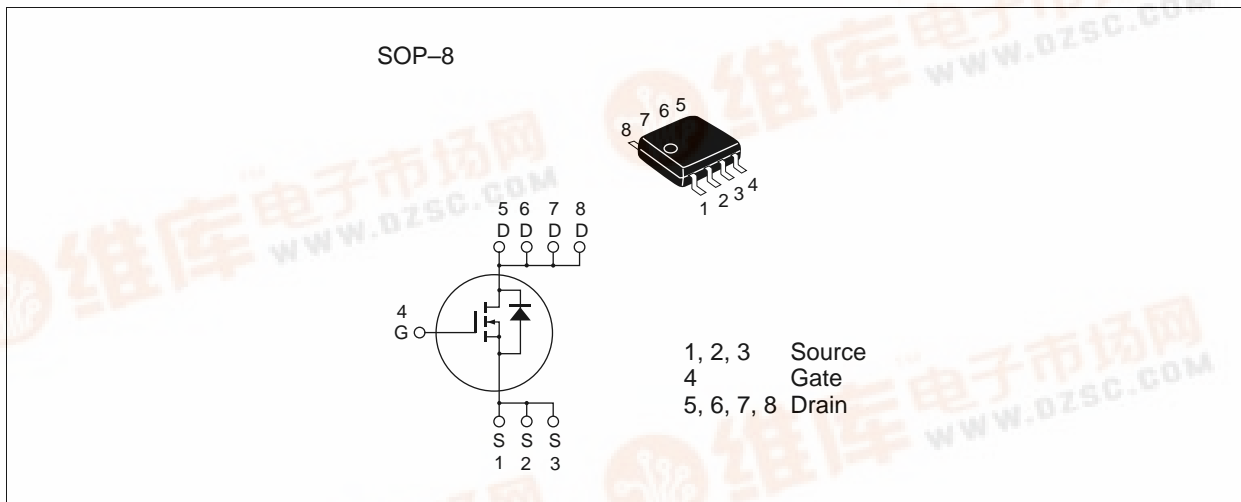
# HITACHI

ADE-208-565D (Z)  
5th. Edition  
February 1999

## Features

- Capable of 4 V gate drive
- Low drive current
- High density mounting
- Low on-resistance  
 $R_{DS(on)}=6.2m$  typ

## Outline



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## HAT2040R

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### 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>	15	A
Drain peak current	I <sub>D(pulse)</sub> <sup>Note1</sup>	120	A
Body-drain diode reverse drain current	I <sub>DR</sub>	15	A
Channel dissipation	Pch <sup>Note2</sup>	2.5	W
Channel temperature	Tch	150	°C
Storage temperature	Tstg	-55 to +150	°C

Note: 1. PW ≤ 10μs, duty cycle ≤ 1 %  
2. When using the glass epoxy board (FR4 40 x 40 x 1.6 mm), PW ≤ 10s

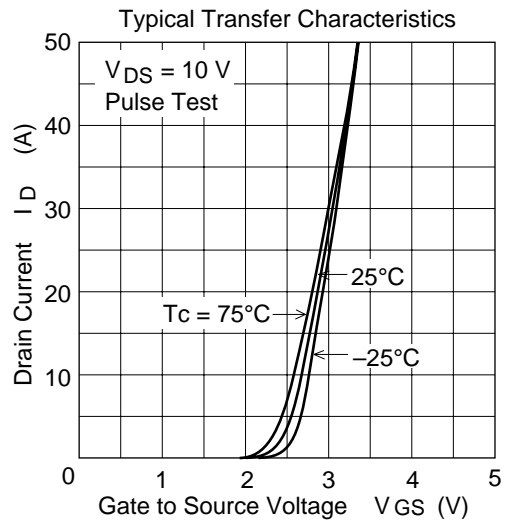
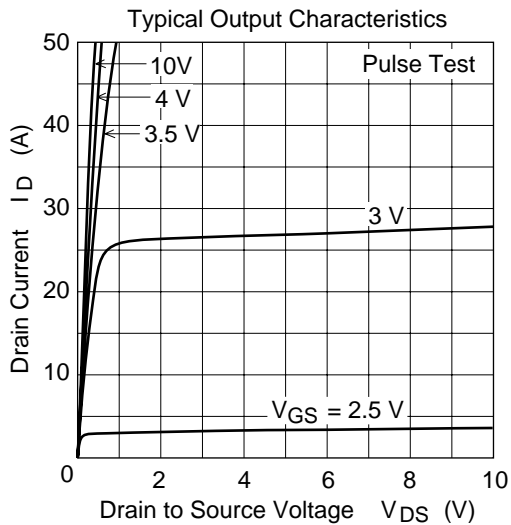
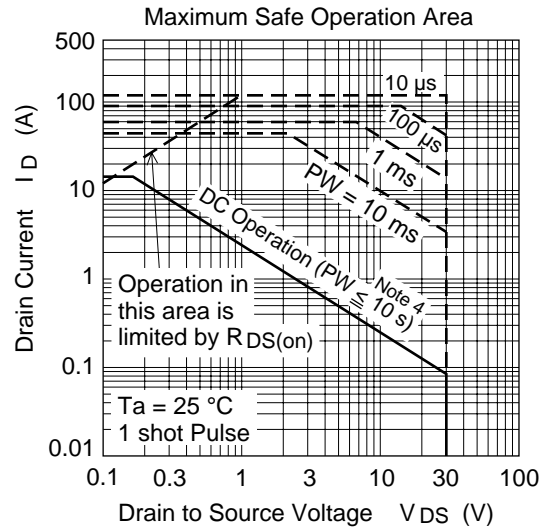
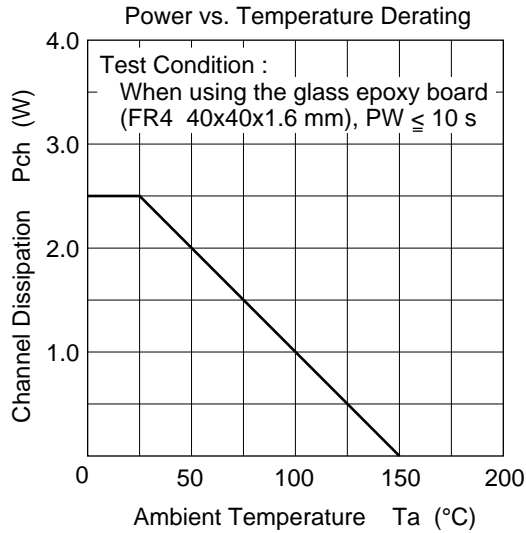
**Electrical Characteristics (Ta = 25°C)**

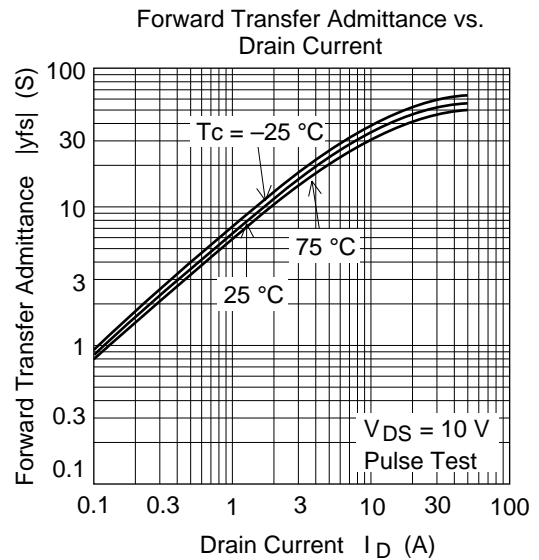
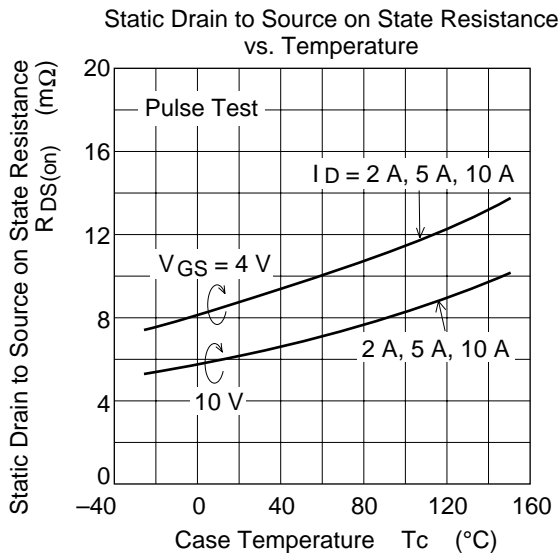
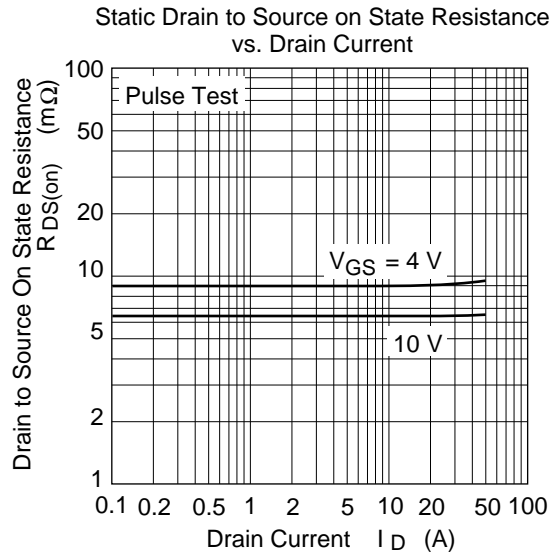
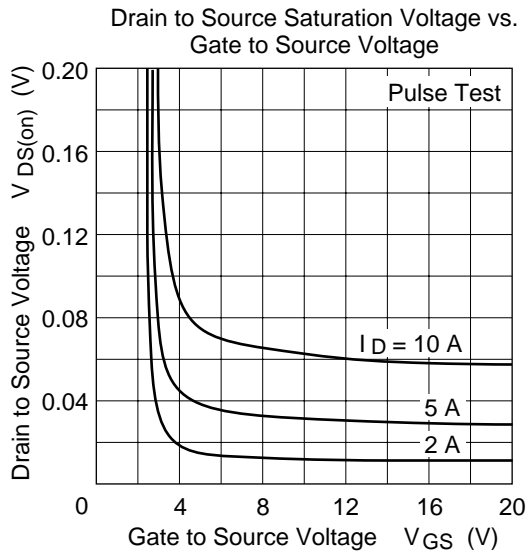
Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Drain to source breakdown voltage	$V_{(BR)DSS}$	30	—	—	V	$I_D = 10\text{mA}, V_{GS} = 0$
Gate to source leak current	$I_{GSS}$	—	—	$\pm 0.1$	$\mu\text{A}$	$V_{GS} = \pm 20\text{V}, V_{DS} = 0$
Zero gate voltage drain current	$I_{DSS}$	—	—	1	$\mu\text{A}$	$V_{DS} = 30\text{V}, V_{GS} = 0$
Gate to source cutoff voltage	$V_{GS(off)}$	1.0	—	2.5	V	$V_{DS} = 10\text{V}, I_D = 1\text{mA}$
Static drain to source on state resistance	$R_{DS(on)}$	—	6.2	8.0	$\text{m}\Omega$	$I_D = 8\text{A}, V_{GS} = 10\text{V}$ <sup>Note3</sup>
	$R_{DS(on)}$	—	9.0	13.0	$\text{m}\Omega$	$I_D = 8\text{A}, V_{GS} = 4\text{V}$ <sup>Note3</sup>
Forward transfer admittance	$ y_{fs} $	18	30	—	S	$I_D = 8\text{A}, V_{DS} = 10\text{V}$ <sup>Note3</sup>
Input capacitance	$C_{iss}$	—	4400	—	pF	$V_{DS} = 10\text{V}$
Output capacitance	$C_{oss}$	—	950	—	pF	$V_{GS} = 0$
Reverse transfer capacitance	$C_{rss}$	—	400	—	pF	$f = 1\text{MHz}$
Total gate charge	$Q_g$	—	90	—	nc	$V_{DD} = 10\text{V}$
Gate to source charge	$Q_{gs}$	—	15	—	nc	$V_{GS} = 10\text{V}$
Gate to drain charge	$Q_{gd}$	—	18	—	nc	$I_D = 15\text{A}$
Turn-on delay time	$t_{d(on)}$	—	110	—	ns	$V_{GS} = 4\text{V}, I_D = 8\text{A}$
Rise time	$t_r$	—	440	—	ns	$V_{DD} \cong 10\text{V}$
Turn-off delay time	$t_{d(off)}$	—	160	—	ns	
Fall time	$t_f$	—	170	—	ns	
Body-drain diode forward voltage	$V_{DF}$	—	0.9	1.17	V	$I_F = 15\text{A}, V_{GS} = 0$ <sup>Note3</sup>
Body-drain diode reverse recovery time	$t_{rr}$	—	55	—	ns	$I_F = 15\text{A}, V_{GS} = 0$ $diF/dt = 20\text{A}/\mu\text{s}$

Note: 3. Pulse test

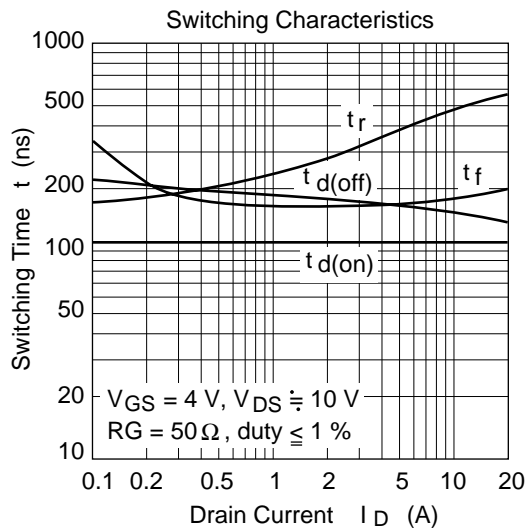
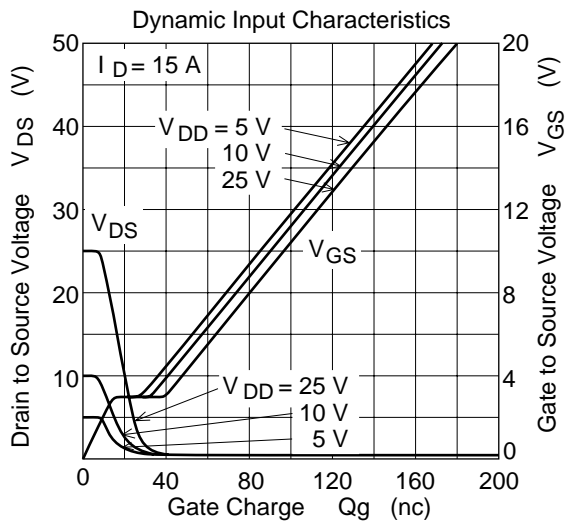
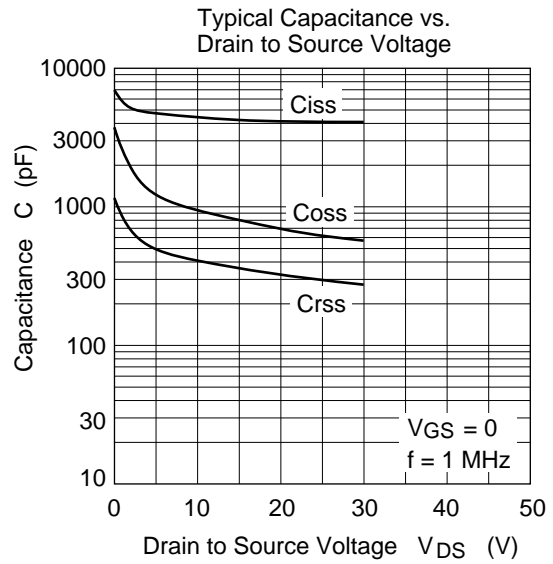
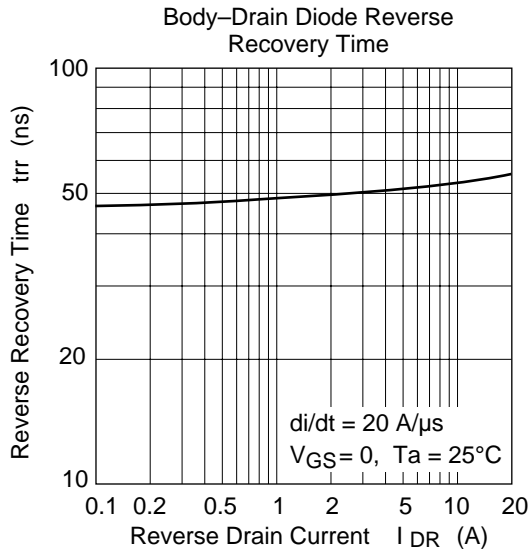
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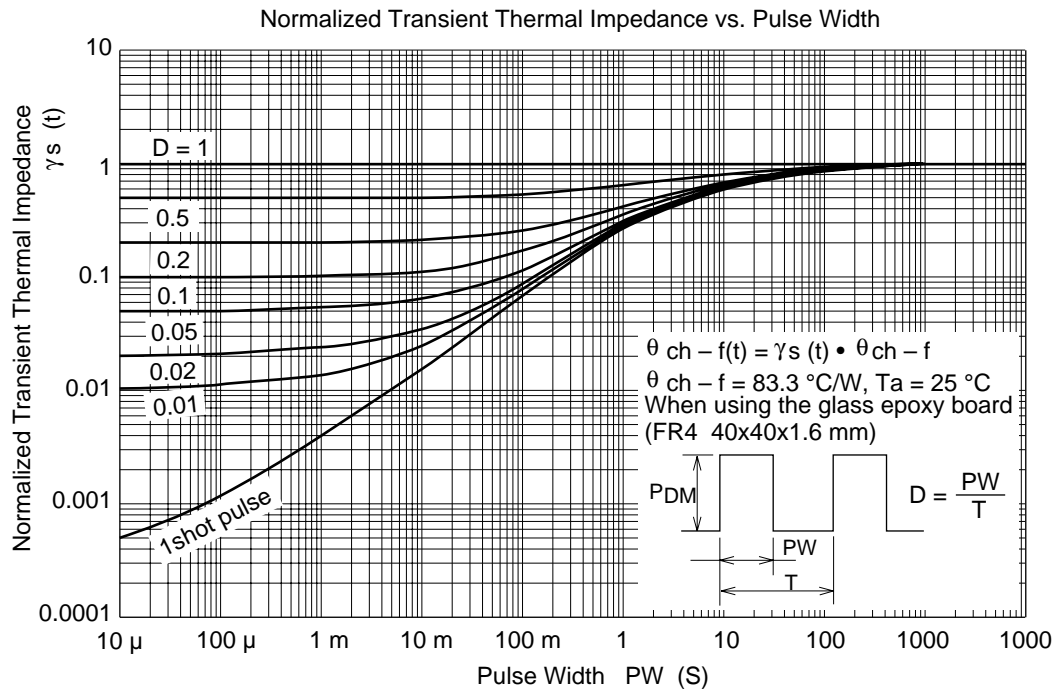
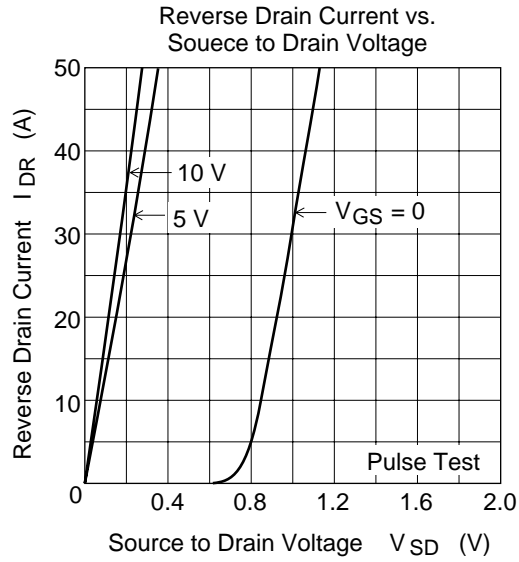
## Main Characteristics



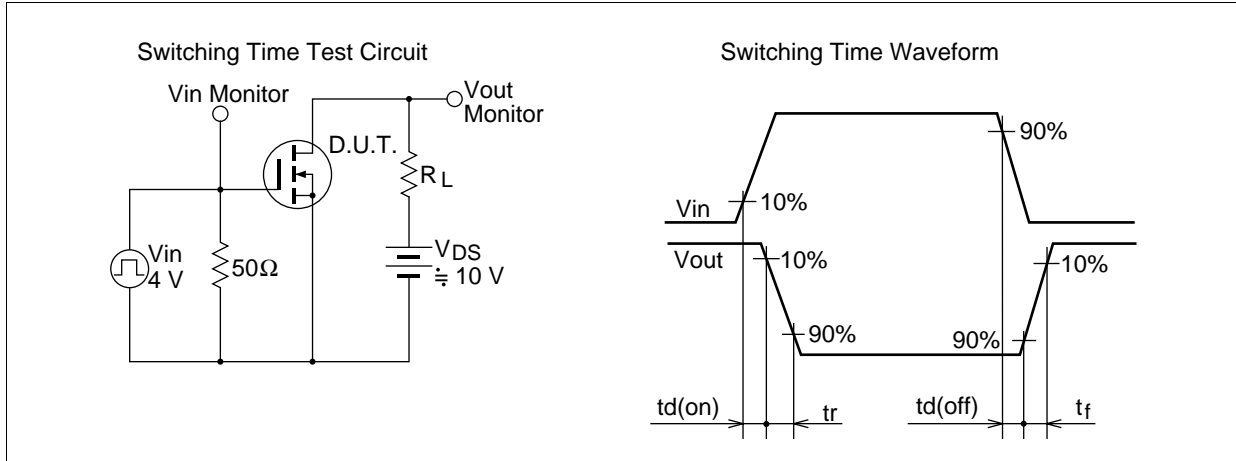


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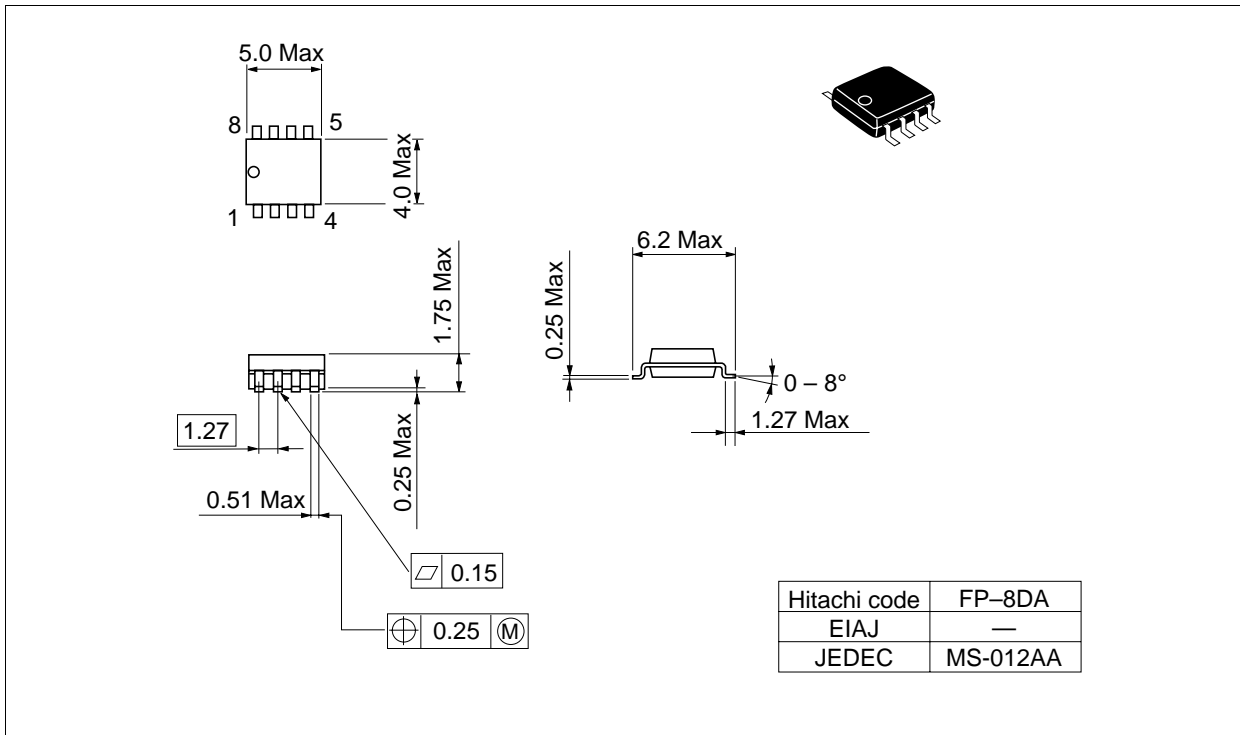
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Package Dimensions

Unit: mm



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