

To our customers,

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## Old Company Name in Catalogs and Other Documents

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Renesas Electronics website: <http://www.renesas.com>

April 1<sup>st</sup>, 2010  
Renesas Electronics Corporation

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## HAT2050T

Silicon N Channel Power MOS FET  
High Speed Power Switching

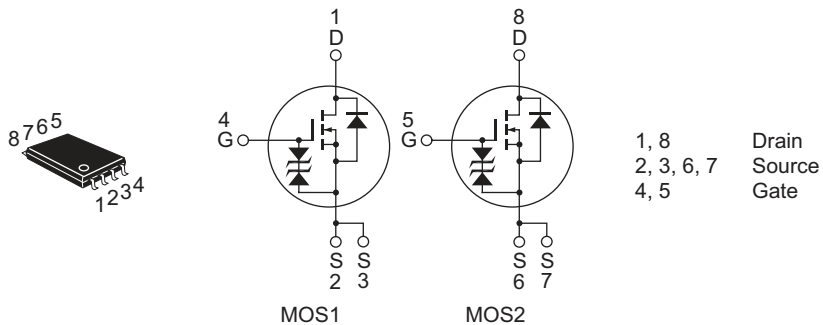
REJ03G1171-0300  
(Previous: ADE-208-660A)  
Rev.3.00  
Sep 07, 2005

### Features

- Low on-resistance
- Capable of 4 V gate drive
- Low drive current
- High density mounting

### Outline

RENESAS Package code: PTSP0008JB-A  
(Package name: TSSOP-8 <TTP-8D> )



## Absolute Maximum Ratings

(Ta = 25°C)

Item	Symbol	Value	Unit
Drain to source voltage	V <sub>DSS</sub>	100	V
Gate to source voltage	V <sub>GSS</sub>	±20	V
Drain current	I <sub>D</sub>	1	A
Drain peak current	I <sub>D (pulse)</sub> <sup>Note 1</sup>	4	A
Body-drain diode reverse drain current	I <sub>DR</sub>	1	A
Channel dissipation	P <sub>ch</sub> <sup>Note 2</sup>	1.0	W
Channel dissipation	P <sub>ch</sub> <sup>Note 3</sup>	1.5	W
Channel temperature	T <sub>ch</sub>	150	°C
Storage temperature	T <sub>stg</sub>	-55 to +150	°C

Notes: 1. PW ≤ 10 μs, duty cycle ≤ 1%

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

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

## Electrical Characteristics

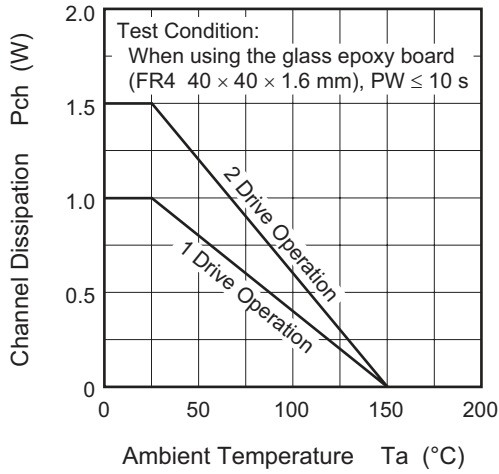
(Ta = 25°C)

Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Drain to source breakdown voltage	V <sub>(BR) DSS</sub>	100	—	—	V	I <sub>D</sub> = 10 mA, 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> = ±16 V, V <sub>DS</sub> = 0
Zero gate voltage drain current	I <sub>DSS</sub>	—	—	1	μA	V <sub>DS</sub> = 100 V, V <sub>GS</sub> = 0
Gate to source cutoff voltage	V <sub>GS (off)</sub>	1.3	—	2.3	V	V <sub>DS</sub> = 10 V, I <sub>D</sub> = 1 mA
Static drain to source on state resistance	R <sub>DS (on)</sub>	—	0.56	0.75	Ω	I <sub>D</sub> = 0.5 A, V <sub>GS</sub> = 10 V <sup>Note 4</sup>
	R <sub>DS (on)</sub>	—	0.72	1.0	Ω	I <sub>D</sub> = 0.5 A, V <sub>GS</sub> = 4 V <sup>Note 4</sup>
Forward transfer admittance	y <sub>fs</sub>	0.7	1.1	—	S	I <sub>D</sub> = 0.5 A, V <sub>DS</sub> = 10 V <sup>Note 4</sup>
Input capacitance	C <sub>iss</sub>	—	90	—	pF	V <sub>DS</sub> = 10 V V <sub>GS</sub> = 0 f = 1 MHz
Output capacitance	C <sub>oss</sub>	—	42	—	pF	
Reverse transfer capacitance	C <sub>rss</sub>	—	20	—	pF	
Turn-on delay time	t <sub>d (on)</sub>	—	11	—	ns	
Rise time	t <sub>r</sub>	—	24	—	ns	V <sub>GS</sub> = 4 V, I <sub>D</sub> = 0.5 A, V <sub>DD</sub> ≅ 10 V
Turn-off delay time	t <sub>d (off)</sub>	—	14	—	ns	
Fall time	t <sub>f</sub>	—	11	—	ns	
Body-drain diode forward voltage	V <sub>DF</sub>	—	0.84	1.1	V	I <sub>F</sub> = 1 A, V <sub>GS</sub> = 0 <sup>Note 4</sup>
Body-drain diode reverse recovery time	t <sub>rr</sub>	—	85	—	ns	I <sub>F</sub> = 1 A, V <sub>GS</sub> = 0 di <sub>F</sub> /dt = 20 A/μs

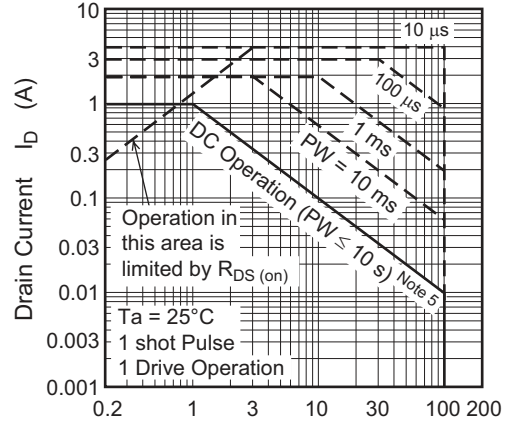
Note: 4. Pulse test

Main Characteristics

Power vs. Temperature Derating



Maximum Safe Operation Area

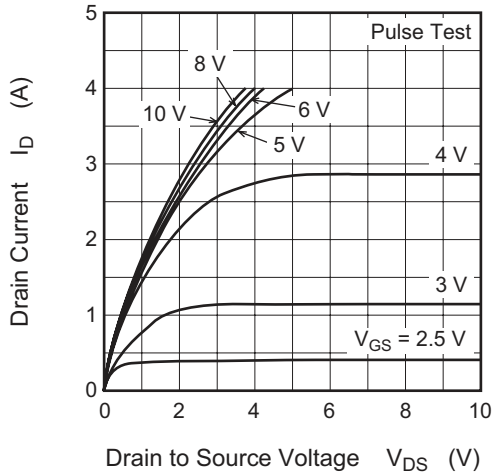


Drain to Source Voltage VDS (V)

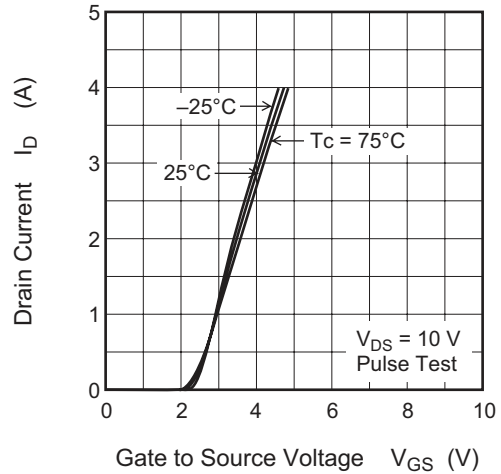
Note 5:

When using the glass epoxy board  
(FR4 40 × 40 × 1.6 mm)

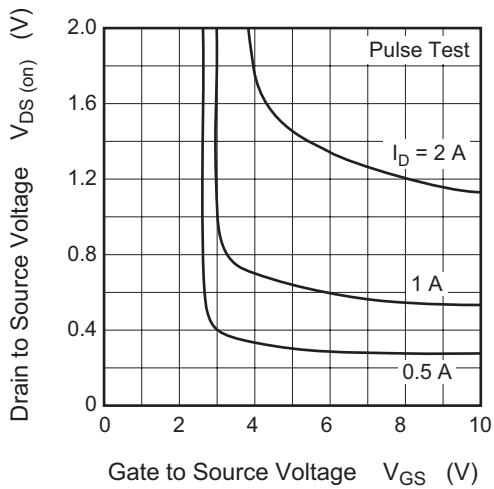
Typical Output Characteristics



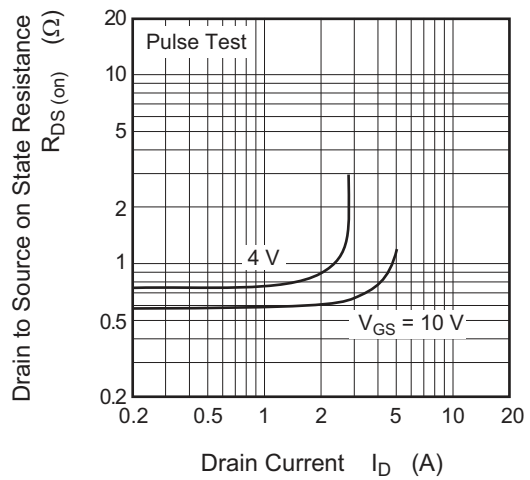
Typical Transfer Characteristics

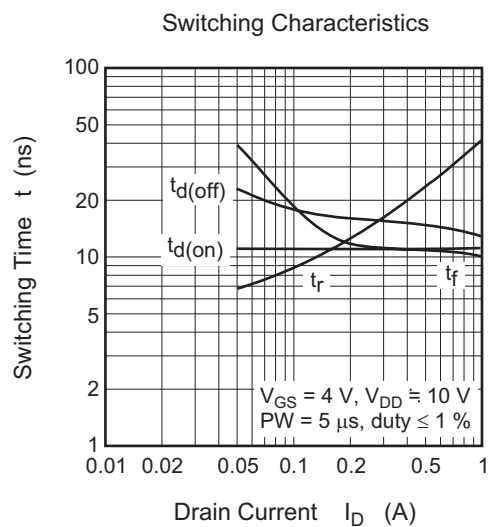
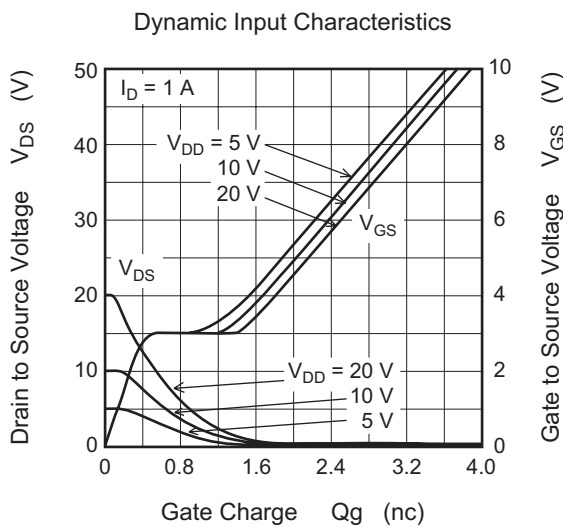
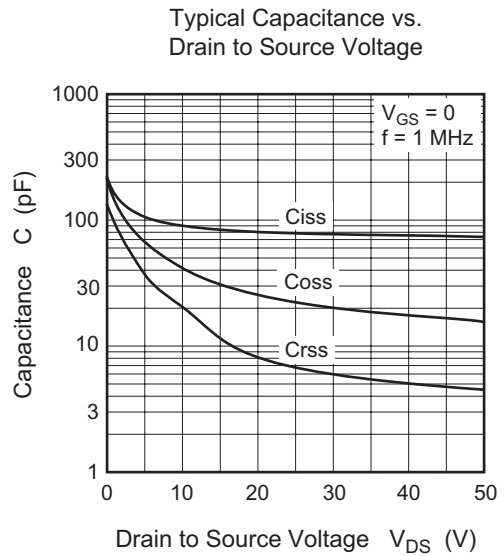
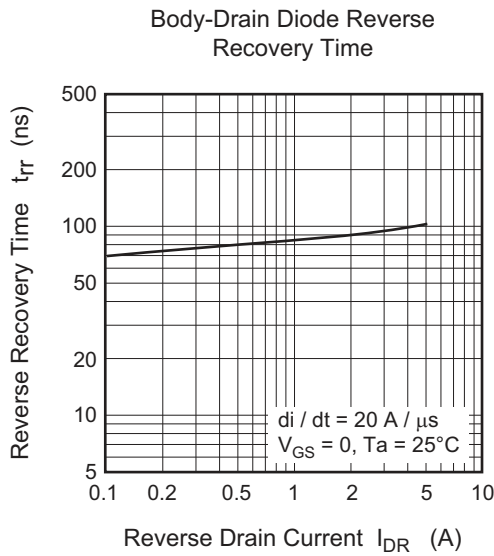
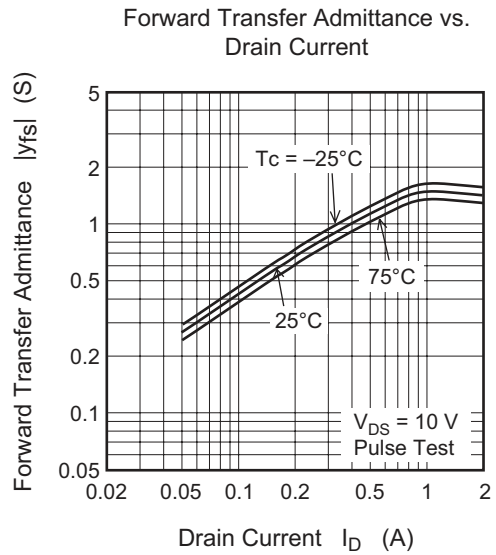
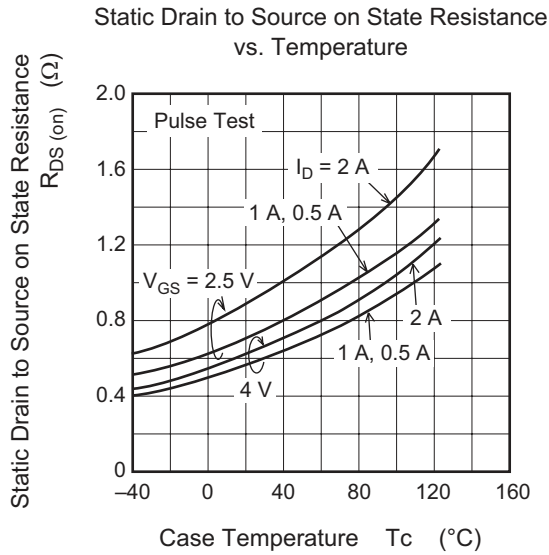


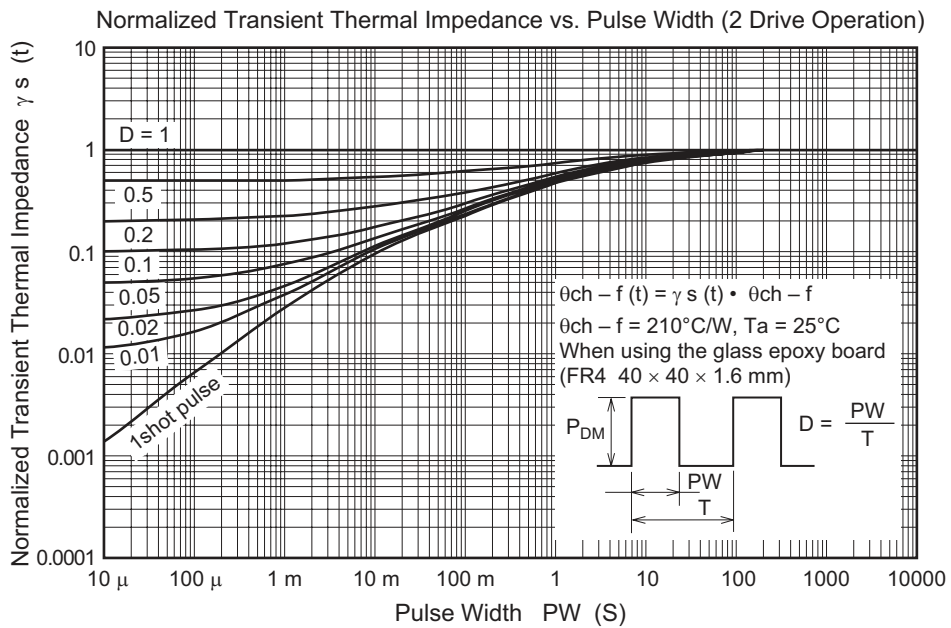
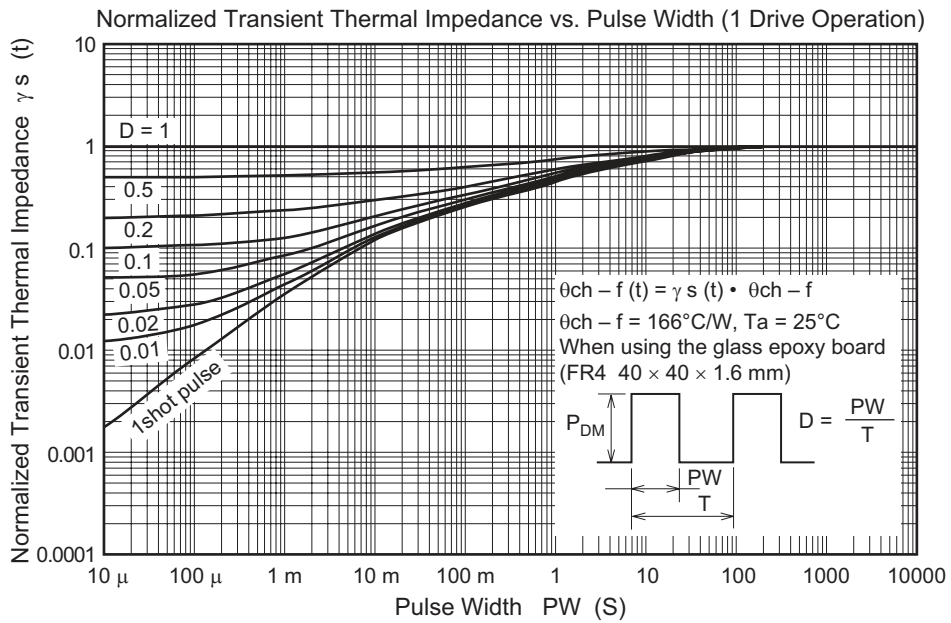
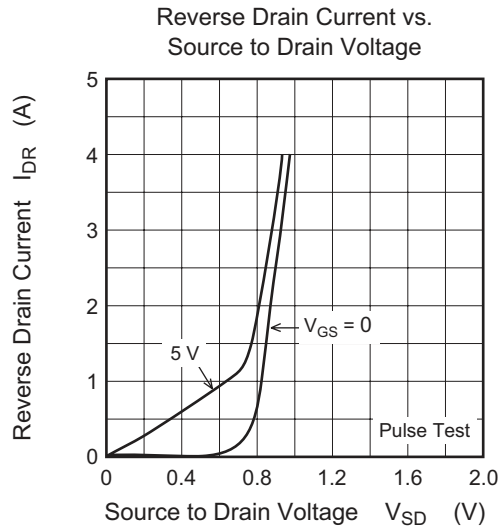
Drain to Source Saturation Voltage vs. Gate to Source Voltage

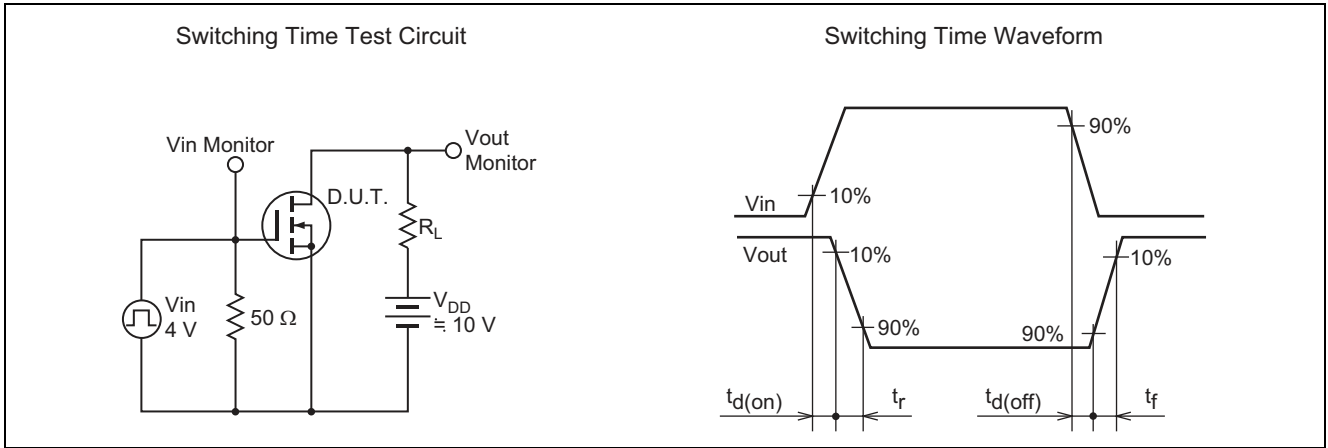


Static Drain to Source on State Resistance vs. Drain Current



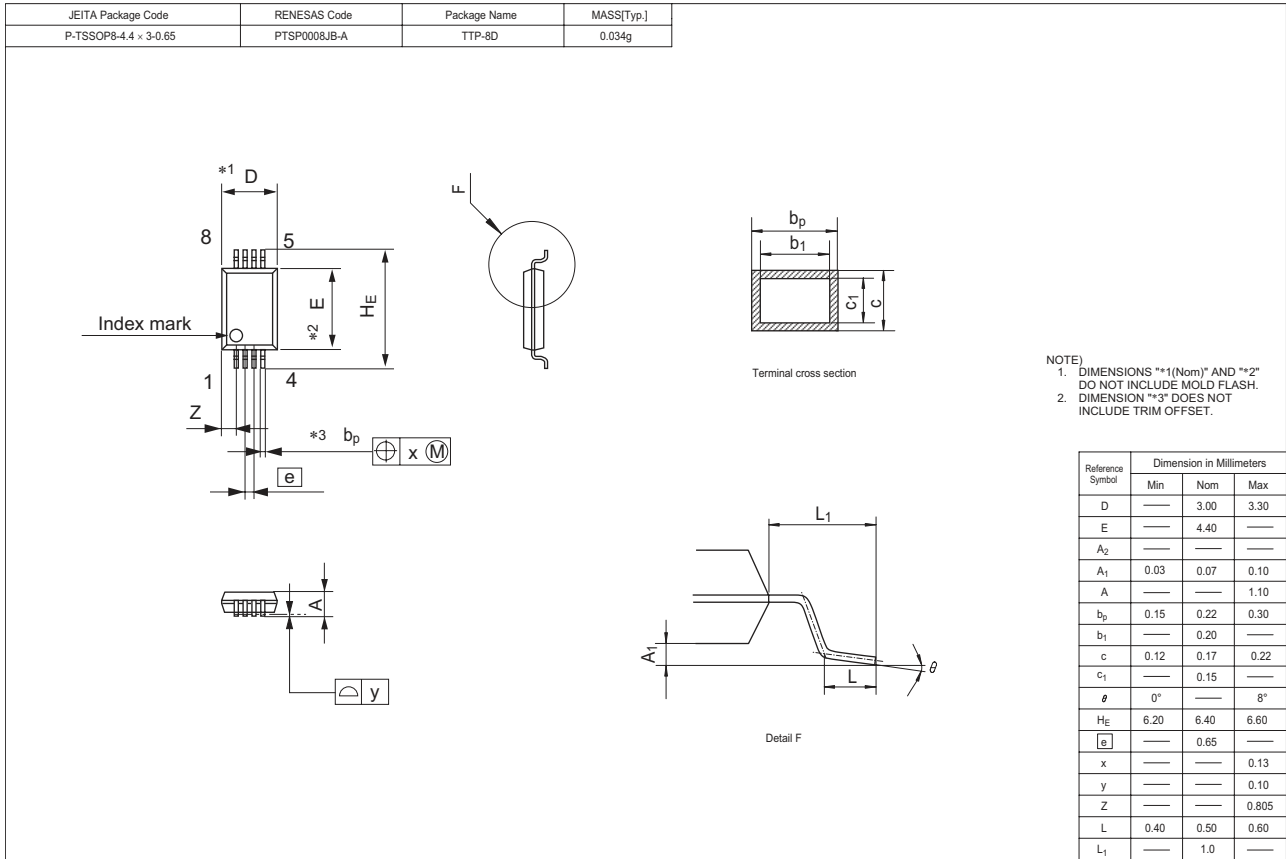








### Package Dimensions



### Ordering Information

Part Name	Quantity	Shipping Container
HAT2050T-EL-E	3000 pcs	Taping

Note: For some grades, production may be terminated. Please contact the Renesas sales office to check the state of production before ordering the product.

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