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# HAT2052T

Silicon N Channel Power MOS FET  
High Speed Power Switching

# HITACHI

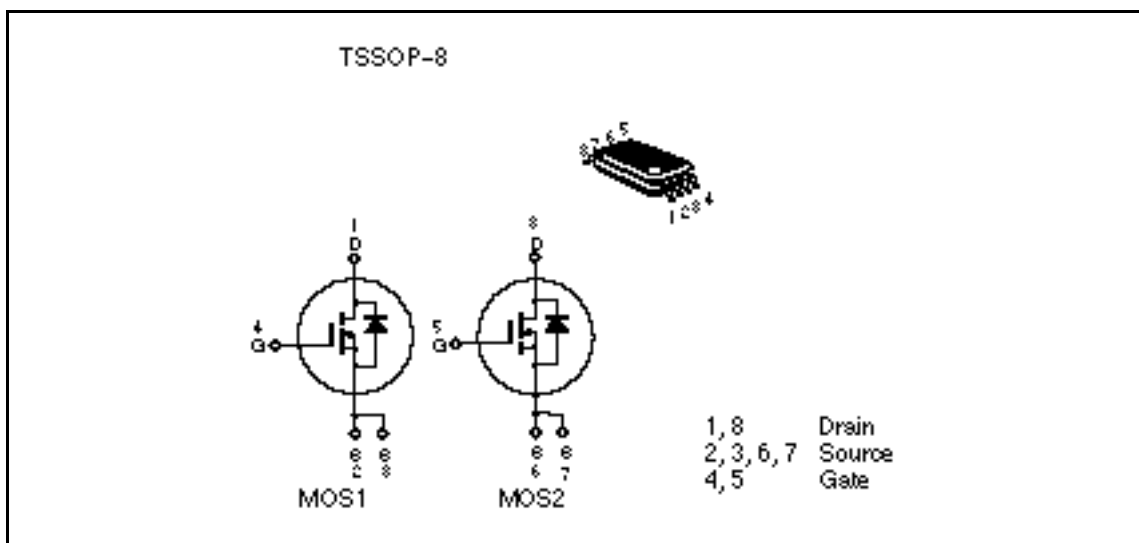
ADE-208-724C (Z)  
4th. Edition  
February 1999

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## Features

- Low on-resistance
- Capable of 2.5 V gate drive
- Low drive current
- High density mounting

## Outline



# HAT2052T

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

Item	Symbol	Ratings	Unit
Drain to source voltage	$V_{DSS}$	28	V
Gate to source voltage	$V_{GSS}$	±12	V
Drain current	$I_D$	5.0	A
Drain peak current	$I_{D(pulse)}$ <sup>Note1</sup>	40	A
Body-drain diode reverse drain current	$I_{DR}$	5.0	A
Channel dissipation	$P_{ch}$ <sup>Note2</sup>	1.0	W
Channel dissipation	$P_{ch}$ <sup>Note3</sup>	1.5	W
Channel temperature	$T_{ch}$	150	°C
Storage temperature	$T_{stg}$	-55 to +150	°C

Note: 1.  $PW = 10\mu s$ , duty cycle = 1 %

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

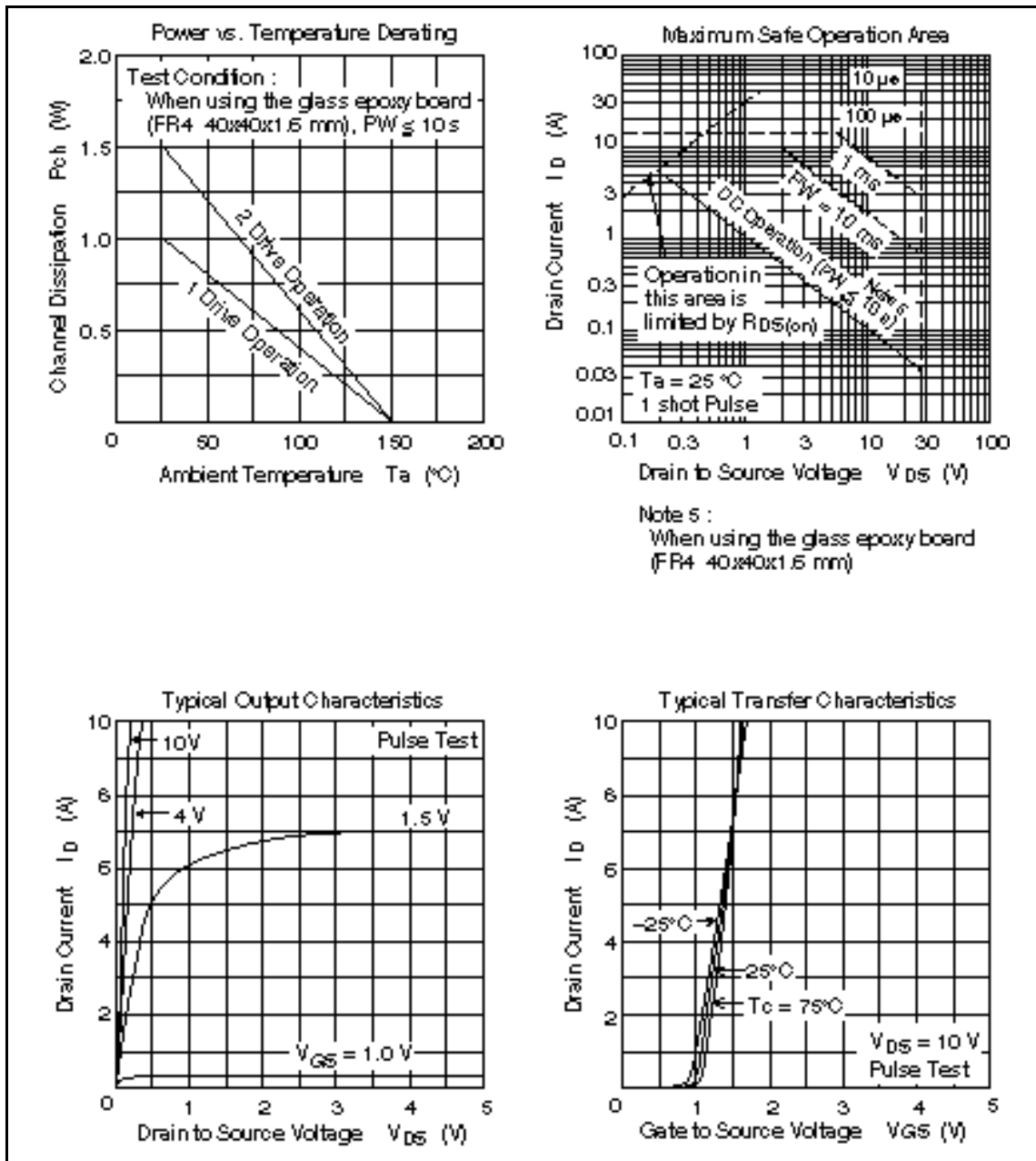
3. 2 Drive operation ; When using the glass epoxy board (FR4 40 x 40 x 1.6 mm),  $PW = 10s$

## Electrical Characteristics (Ta = 25°C)

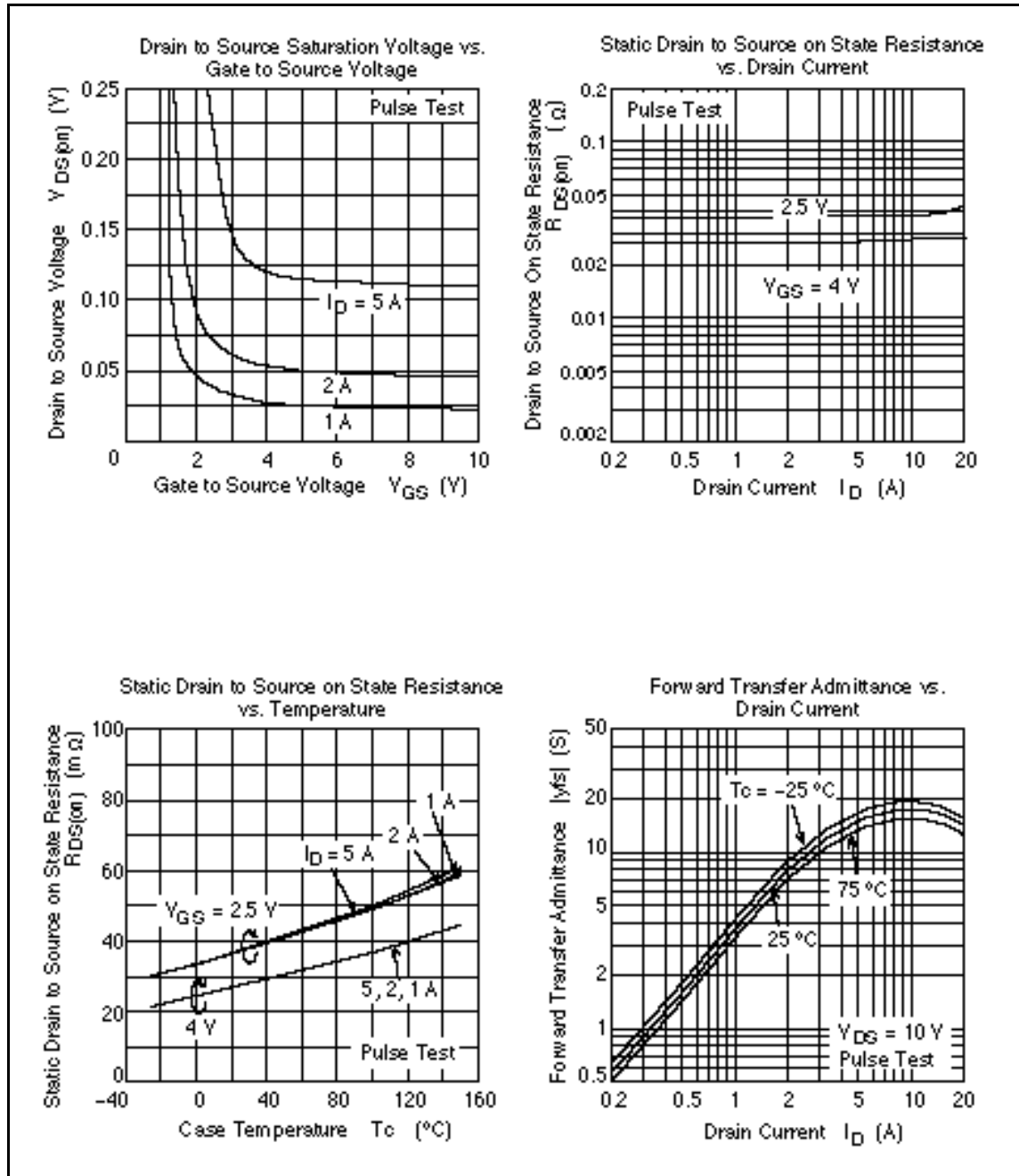
Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Drain to source breakdown voltage	$V_{(BR)DSS}$	28	—	—	V	$I_D = 10mA, V_{GS} = 0$
Gate to source leak current	$I_{GSS}$	—	—	±0.1	μA	$V_{GS} = \pm 12V, V_{DS} = 0$
Zero gate voltage drain current	$I_{DSS}$	—	—	1	μA	$V_{DS} = 28V, V_{GS} = 0$
Gate to source cutoff voltage	$V_{GS(off)}$	0.4	—	1.4	V	$V_{DS} = 10V, I_D = 1mA$
Static drain to source on state resistance	$R_{DS(on)}$	—	0.027	0.034		$I_D = 3A, V_{GS} = 4V$ <sup>Note4</sup>
	$R_{DS(on)}$	—	0.037	0.044		$I_D = 3A, V_{GS} = 2.5V$ <sup>Note4</sup>
Forward transfer admittance	$ y_{fs} $	7	11	—	S	$I_D = 3A, V_{DS} = 10V$ <sup>Note4</sup>
Input capacitance	$C_{iss}$	—	510	—	pF	$V_{DS} = 10V$
Output capacitance	$C_{oss}$	—	190	—	pF	$V_{GS} = 0$
Reverse transfer capacitance	$C_{rss}$	—	140	—	pF	$f = 1MHz$
Total gate charge	$Q_g$	—	8.5	—	nc	$V_{DD} = 10V$
Gate to source charge	$Q_{gs}$	—	4.5	—	nc	$V_{GS} = 4V$
Gate to drain charge	$Q_{gd}$	—	4	—	nc	$I_D = 5A$
Turn-on delay time	$t_{d(on)}$	—	14	—	ns	$V_{GS} = 4V, I_D = 3A$
Rise time	$t_r$	—	120	—	ns	$V_{DD} = 10V$
Turn-off delay time	$t_{d(off)}$	—	85	—	ns	
Fall time	$t_f$	—	120	—	ns	
Body-drain diode forward voltage	$V_{DF}$	—	0.85	1.1	V	$I_F = 5.0A, V_{GS} = 0$ <sup>Note4</sup>
Body-drain diode reverse recovery time	$t_{rr}$	—	40	—	ns	$I_F = 5.0A, V_{GS} = 0$ $di_F/dt = 20A/\mu s$

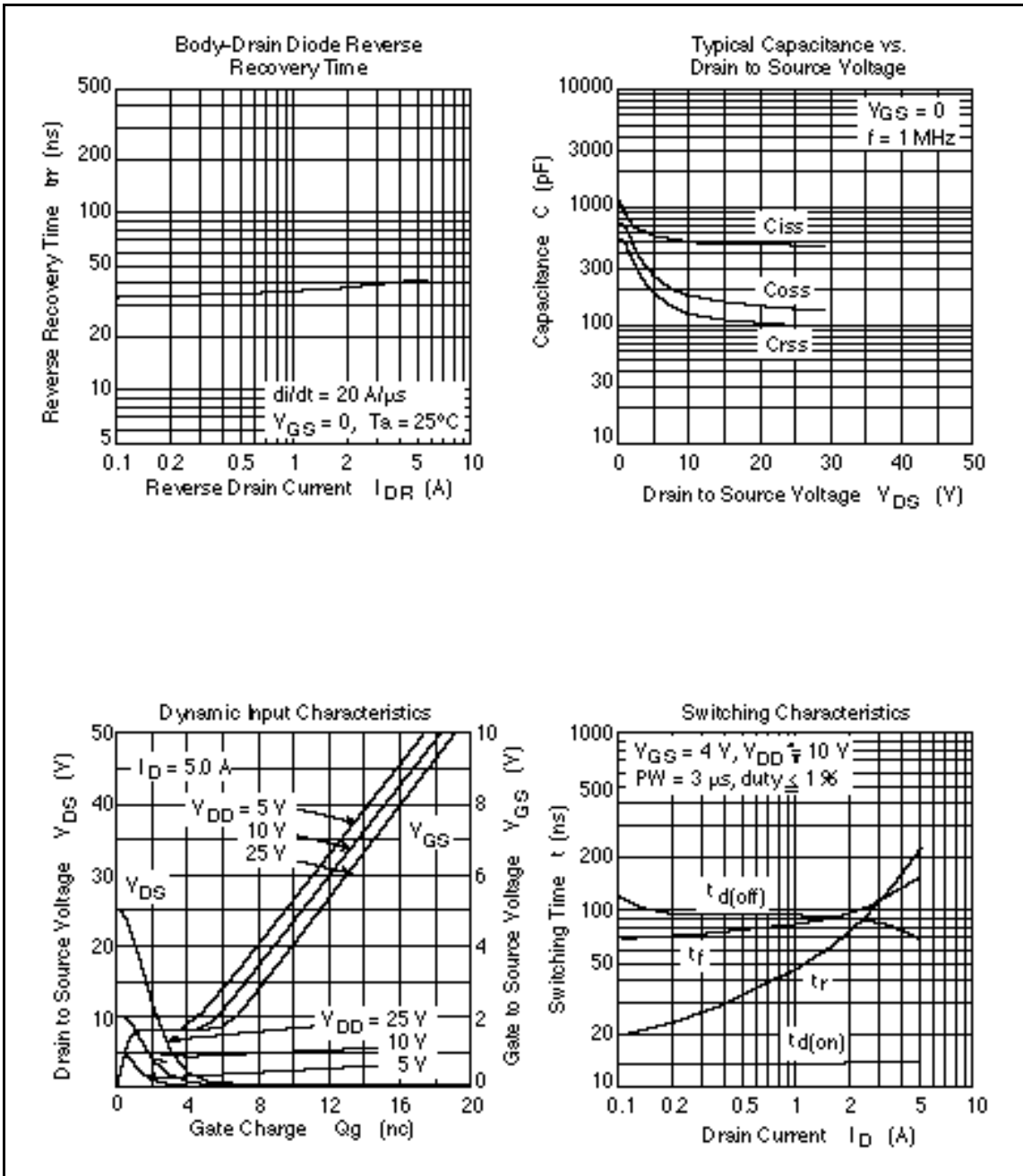
Note: 4. Pulse test

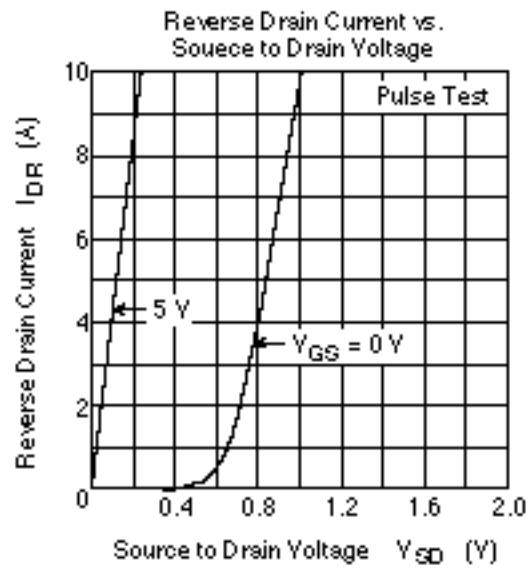
Main Characteristics



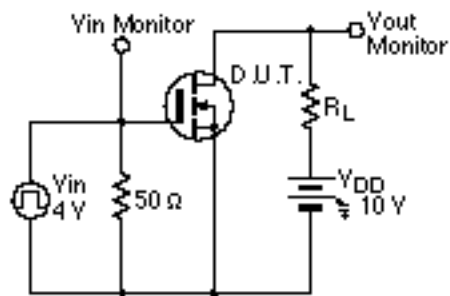
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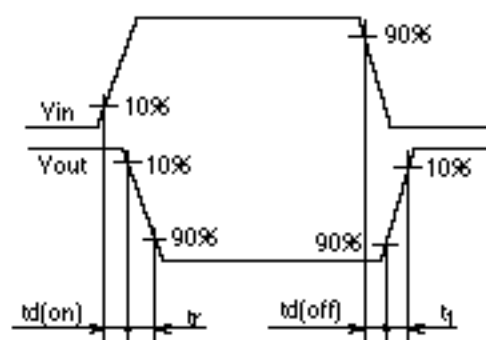


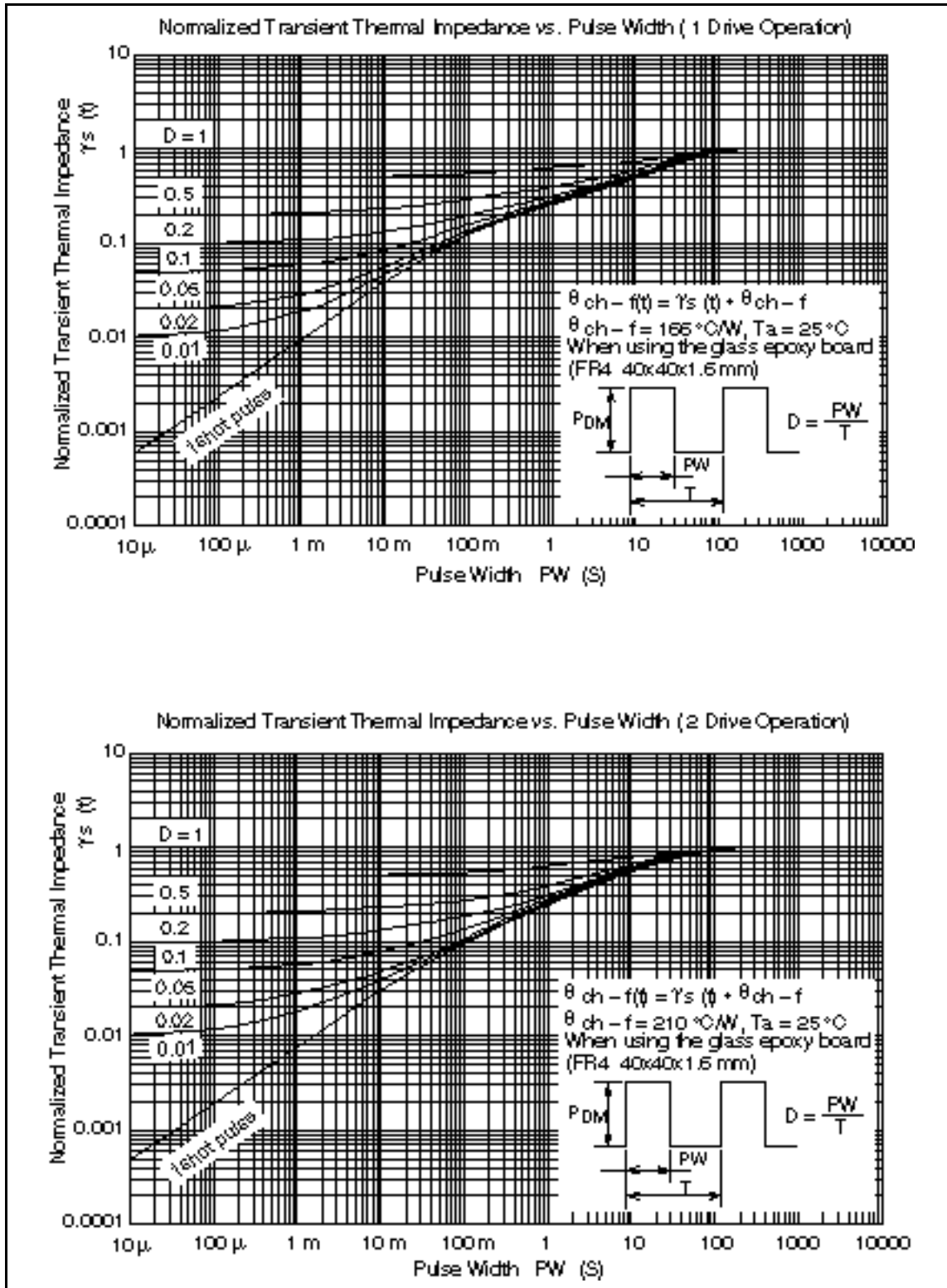


Switching Time Test Circuit



Switching Time Waveform

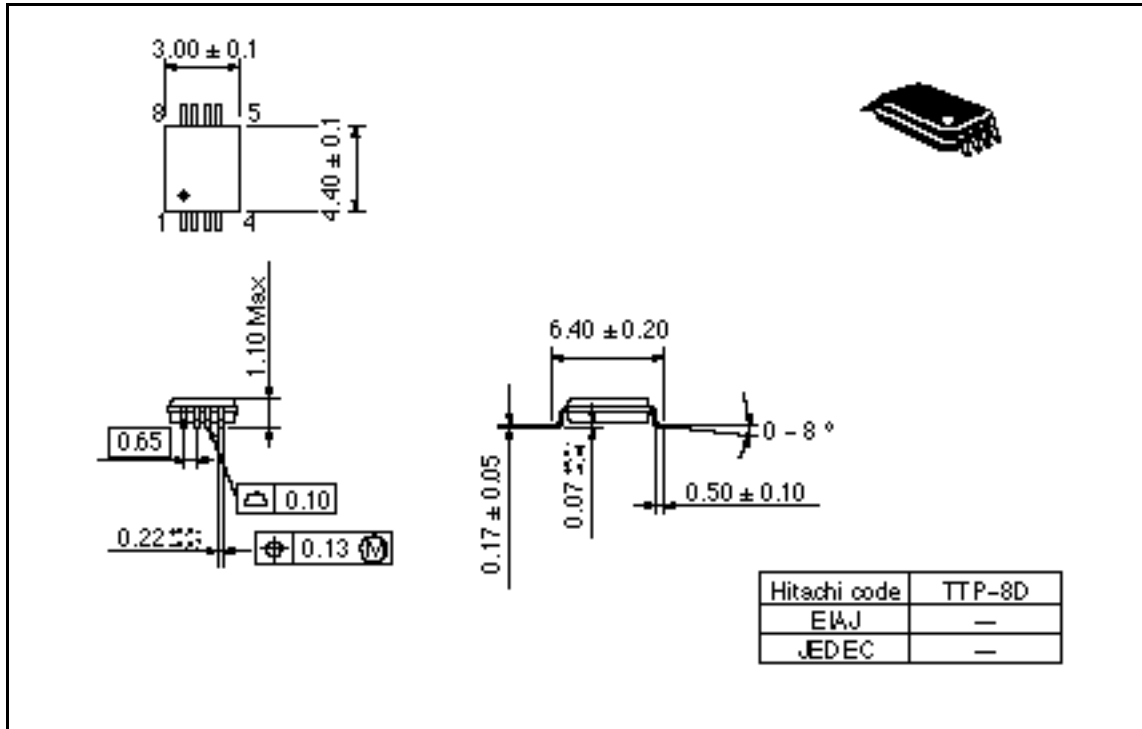




# HAT2052T

## Package Dimensions

Unit: mm





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