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

April 1st, 2010
Renesas Electronics Corporation

Issued by: Renesas Electronics Corporation (<http://www.renesas.com>)

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HAT2050T

Silicon N Channel Power MOS FET
High Speed Power Switching

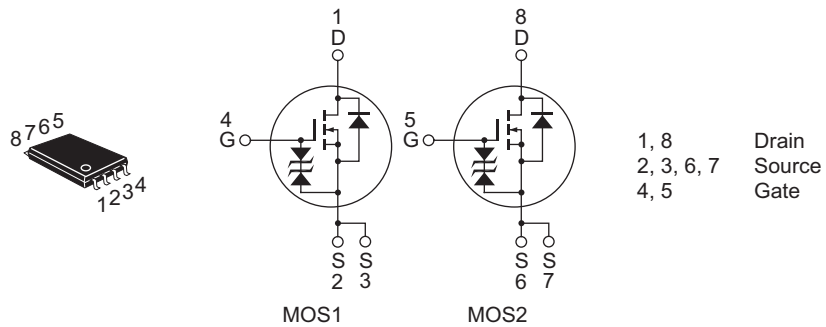
REJ03G1171-0300
(Previous: ADE-208-660A)
Rev.3.00
Sep 07, 2005

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_{DSS}	100	V
Gate to source voltage	V_{GSS}	±20	V
Drain current	I_D	1	A
Drain peak current	$I_{D(pulse)}$ ^{Note 1}	4	A
Body-drain diode reverse drain current	I_{DR}	1	A
Channel dissipation	P_{ch} ^{Note 2}	1.0	W
Channel dissipation	P_{ch} ^{Note 3}	1.5	W
Channel temperature	T_{ch}	150	°C
Storage temperature	T_{stg}	-55 to +150	°C

Notes: 1. $PW \leq 10 \mu s$, duty cycle $\leq 1\%$ 2. 1 Drive operation: When using the glass epoxy board (FR4 40 × 40 × 1.6 mm), $PW \leq 10 s$ 3. 2 Drive operation: When using the glass epoxy board (FR4 40 × 40 × 1.6 mm), $PW \leq 10 s$

Electrical Characteristics

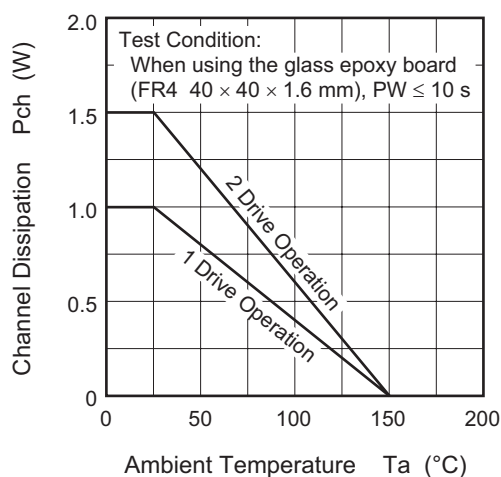
(Ta = 25°C)

Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Drain to source breakdown voltage	$V_{(BR)DSS}$	100	—	—	V	$I_D = 10 \text{ mA}$, $V_{GS} = 0$
Gate to source breakdown voltage	$V_{(BR)GSS}$	±20	—	—	V	$I_G = \pm 100 \mu A$, $V_{DS} = 0$
Gate to source leak current	I_{GSS}	—	—	±10	μA	$V_{GS} = \pm 16 \text{ V}$, $V_{DS} = 0$
Zero gate voltage drain current	I_{DSS}	—	—	1	μA	$V_{DS} = 100 \text{ V}$, $V_{GS} = 0$
Gate to source cutoff voltage	$V_{GS(off)}$	1.3	—	2.3	V	$V_{DS} = 10 \text{ V}$, $I_D = 1 \text{ mA}$
Static drain to source on state resistance	$R_{DS(on)}$	—	0.56	0.75	Ω	$I_D = 0.5 \text{ A}$, $V_{GS} = 10 \text{ V}$ ^{Note 4}
	$R_{DS(on)}$	—	0.72	1.0	Ω	$I_D = 0.5 \text{ A}$, $V_{GS} = 4 \text{ V}$ ^{Note 4}
Forward transfer admittance	$ y_{fs} $	0.7	1.1	—	S	$I_D = 0.5 \text{ A}$, $V_{DS} = 10 \text{ V}$ ^{Note 4}
Input capacitance	C_{iss}	—	90	—	pF	$V_{DS} = 10 \text{ V}$ $V_{GS} = 0$ $f = 1 \text{ MHz}$
Output capacitance	C_{oss}	—	42	—	pF	
Reverse transfer capacitance	C_{rss}	—	20	—	pF	
Turn-on delay time	$t_{d(on)}$	—	11	—	ns	$V_{GS} = 4 \text{ V}$, $I_D = 0.5 \text{ A}$, $V_{DD} \cong 10 \text{ V}$
Rise time	t_r	—	24	—	ns	
Turn-off delay time	$t_{d(off)}$	—	14	—	ns	
Fall time	t_f	—	11	—	ns	
Body-drain diode forward voltage	V_{DF}	—	0.84	1.1	V	$I_F = 1 \text{ A}$, $V_{GS} = 0$ ^{Note 4}
Body-drain diode reverse recovery time	t_{rr}	—	85	—	ns	$I_F = 1 \text{ A}$, $V_{GS} = 0$ $di_F/dt = 20 \text{ A}/\mu s$

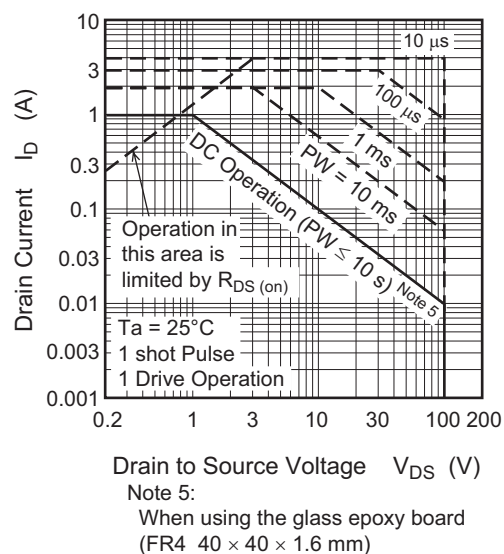
Note: 4. Pulse test

Main Characteristics

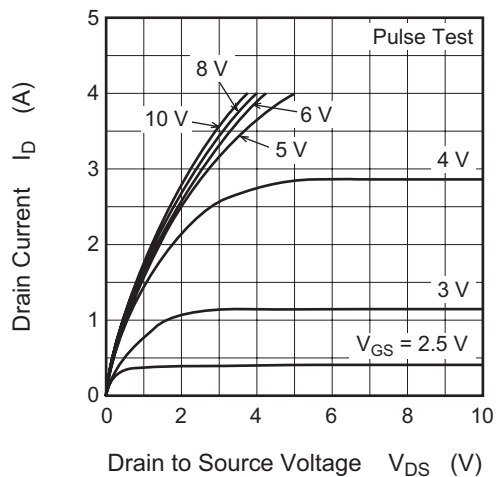
Power vs. Temperature Derating



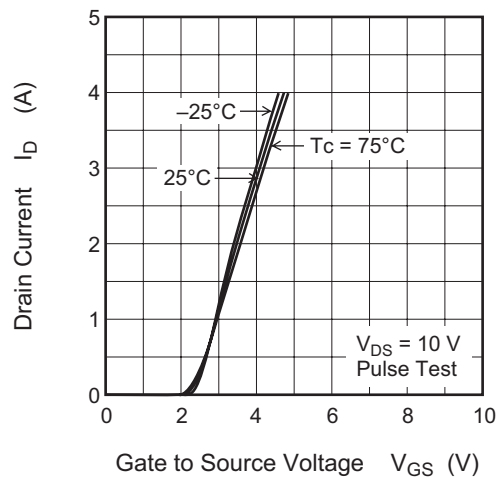
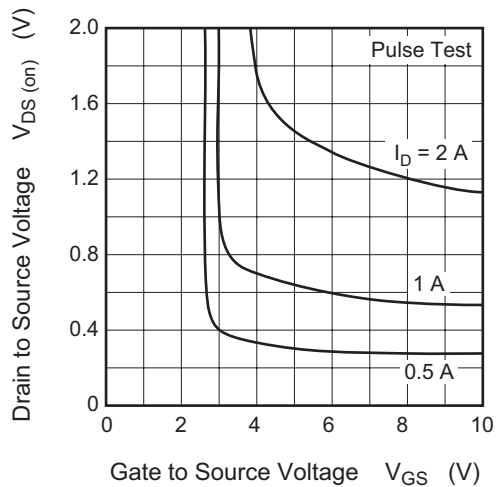
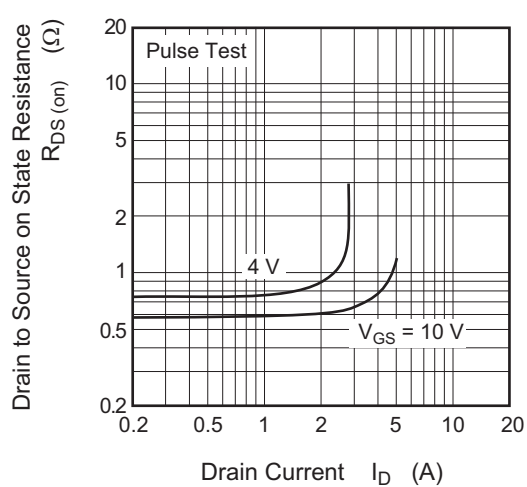
Maximum Safe Operation Area



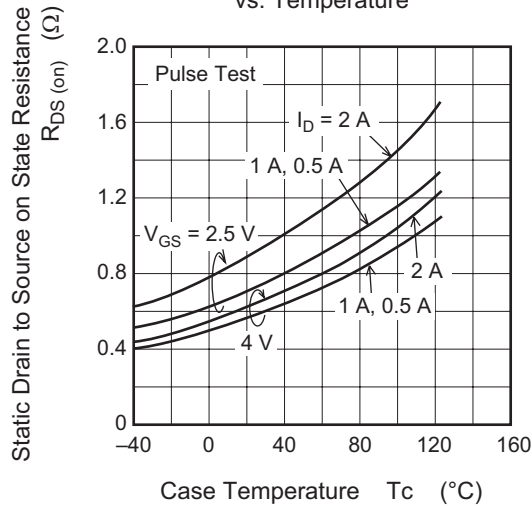
Typical Output Characteristics



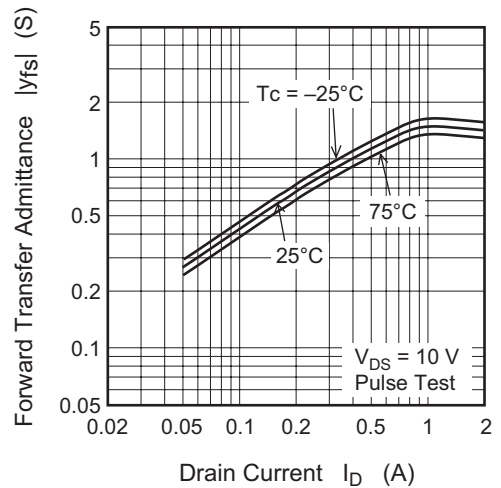
Typical Transfer Characteristics

Drain to Source Saturation Voltage vs.
Gate to Source VoltageStatic Drain to Source on State Resistance
vs. Drain Current

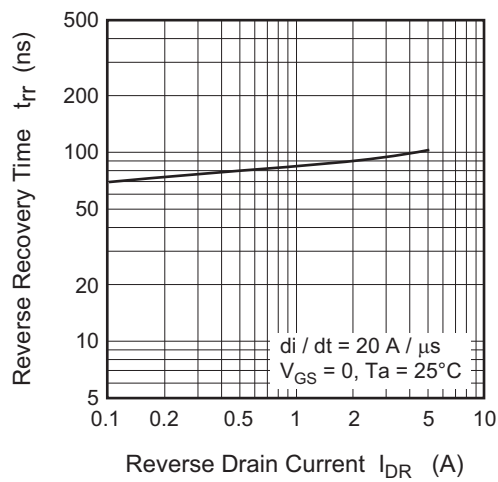
Static Drain to Source on State Resistance vs. Temperature



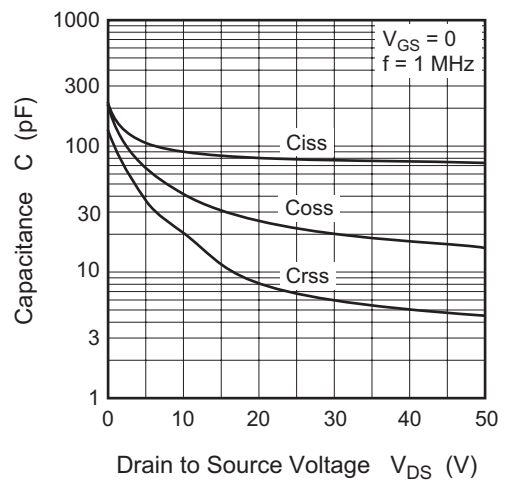
Forward Transfer Admittance vs. Drain Current



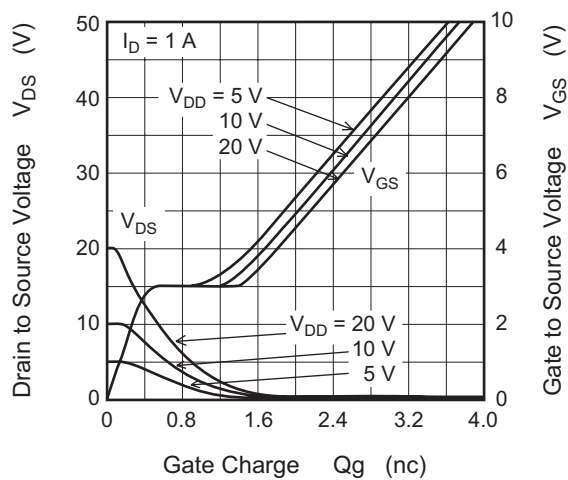
Body-Drain Diode Reverse Recovery Time



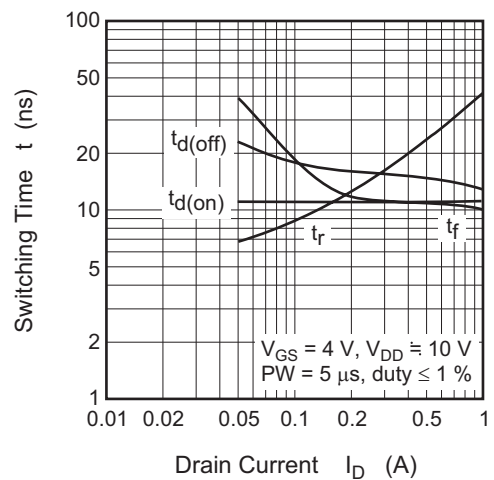
Typical Capacitance vs. Drain to Source Voltage

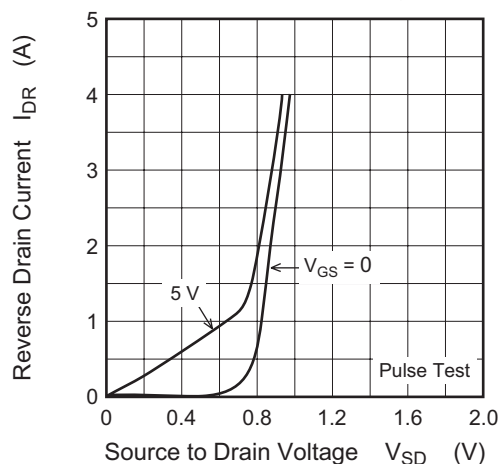


Dynamic Input Characteristics

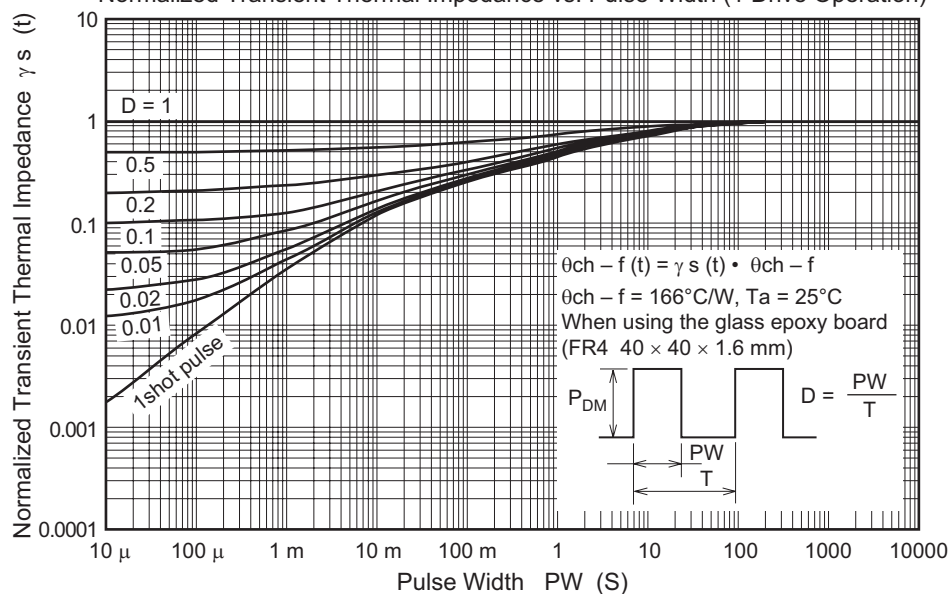


Switching Characteristics

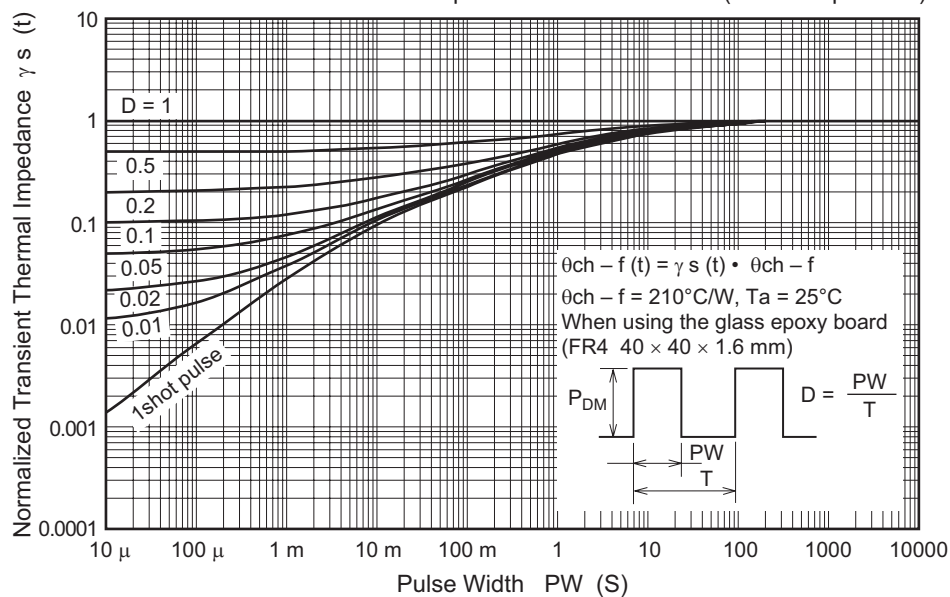


Reverse Drain Current vs.
Source to Drain Voltage

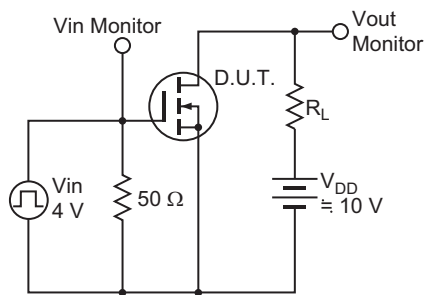
Normalized Transient Thermal Impedance vs. Pulse Width (1 Drive Operation)



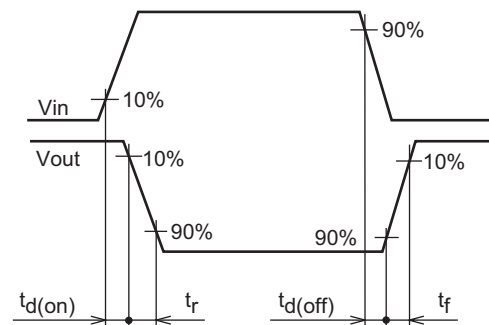
Normalized Transient Thermal Impedance vs. Pulse Width (2 Drive Operation)



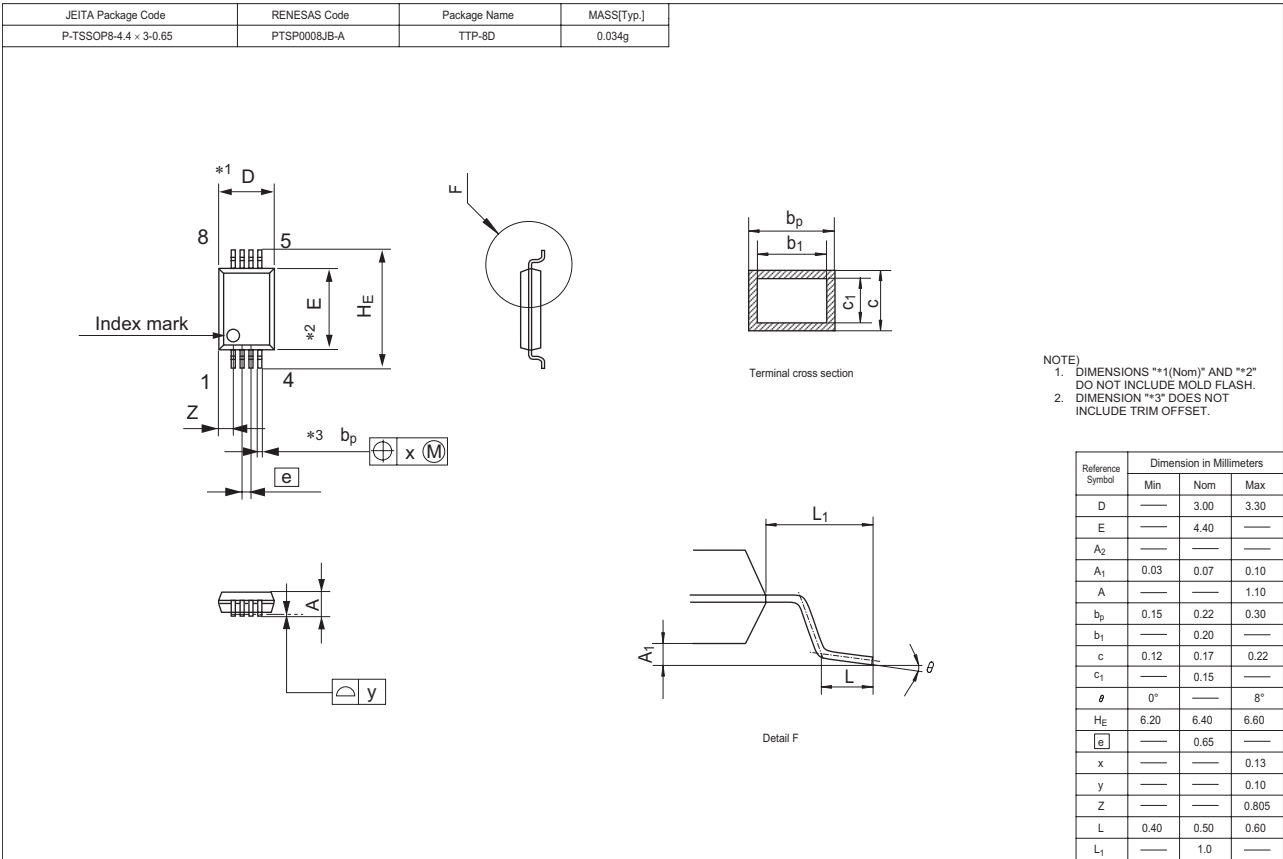
Switching Time Test Circuit



Switching Time Waveform



Package Dimensions



Ordering Information

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

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