HAT2254R

Silicon N Channel Power MOSFET
Power Switching

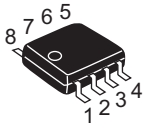
R07DS1367EJ0101
Rev.1.01
Jan 20, 2017

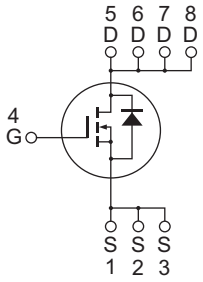
Features

- High speed switching
- Capable of 4.5 V gate drive
- Low drive current
- High density mounting
- Low on-resistance
  $R_{DS(on)}$ = 7.2 mΩ typ. (at V_{GS} = 10 V)

Outline

RENESAS Package code: PRSP0008DD-D
(Package name: SOP-8<FP-8DAV>)





1, 2, 3	Source
4	Gate
5, 6, 7, 8	Drain

Absolute Maximum Ratings

(Ta = 25°C)

Item	Symbol	Ratings	Unit
Drain to source voltage	V_{DSS}	30	V
Gate to source voltage	V_{GSS}	±20	V
Drain current	I_D	14	A
Drain peak current	$I_{D(pulse)}$ Note1	112	A
Body-drain diode reverse drain current	I_{DR}	14	A
Avalanche current	I_{AP} Note 2	14	A
Avalanche energy	E_{AR} Note 2	19.6	mJ
Channel dissipation	Pch Note3	2.5	W
Channel to ambient thermal impedance	θch-a Note3	50	°C/W
Channel temperature	Tch	150	°C
Storage temperature	Tstg	–55 to +150	°C

Notes: 1. PW ≤ 10 μs, duty cycle ≤ 1%
2. Value at Tch = 25°C, Rg ≥ 50 Ω
3. When using the glass epoxy board (FR4 40 x 40 x 1.6 mm), PW ≤ 10s

Electrical Characteristics

(Ta = 25°C)

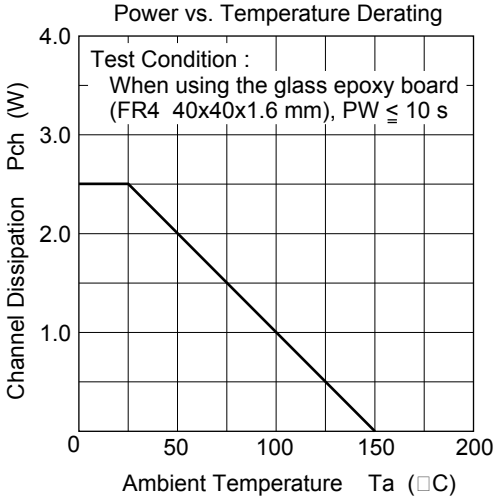
Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Drain to source breakdown voltage	$V_{(BR)DSS}$	30	—	—	V	I_D = 10 mA, V_{GS} = 0
Gate to source leak current	I_{GSS}	—	—	± 0.1	μA	V_{GS} = ±20 V, V_{DS} = 0
Zero gate voltage drain current	I_{DSS}	—	—	1	μA	V_{DS} = 30 V, V_{GS} = 0
Gate to source cutoff voltage	$V_{GS(off)}$	1.0	—	2.5	V	V_{DS} = 10 V, I_D = 1 mA
Static drain to source on state resistance	$R_{DS(on)}$	—	7.2	9.0	mΩ	I_D = 7 A, V_{GS} = 10 V Note4
	$R_{DS(on)}$	—	9.6	14.0	mΩ	I_D = 7 A, V_{GS} = 4.5 V Note4
Forward transfer admittance	$\|y_{fs}\|$	18	30	—	S	I_D = 7 A, V_{DS} = 10 V Note4
Input capacitance	Ciss	—	1700	3400	pF	V_{DS} = 10 V
Output capacitance	Coss	—	390	—	pF	V_{GS} = 0
Reverse transfer capacitance	Crss	—	135	—	pF	f = 1 MHz
Gate Resistance	Rg Note5	0.8	1.3	4.0	Ω	
Total gate charge	Qg	—	11	—	nc	V_{DD} = 10 V
Gate to source charge	Qgs	—	4.7	—	nc	V_{GS} = 4.5 V
Gate to drain charge	Qgd	—	2.5	—	nc	I_D = 14 A
Turn-on delay time	$t_{d(on)}$	—	8.5	—	ns	V_{GS} = 10 V, I_D = 7 A
Rise time	t_r	—	5	—	ns	V_{DD} ≅ 10 V
Turn-off delay time	$t_{d(off)}$	—	38	—	ns	R_L = 1.42 Ω
Fall time	t_f	—	3.8	—	ns	Rg = 4.7 Ω
Body–drain diode forward voltage	V_{DF}	—	0.80	1.04	V	IF = 14 A, V_{GS} = 0 Note4
Body–drain diode reverse recovery time	t_{rr}	—	28	56	ns	IF = 14 A, V_{GS} = 0 diF/ dt = 100 A/ μs
Body–drain diode reverse recovery charge	Q_{rr}	—	25	50	nC	

Notes: 4. Pulse test

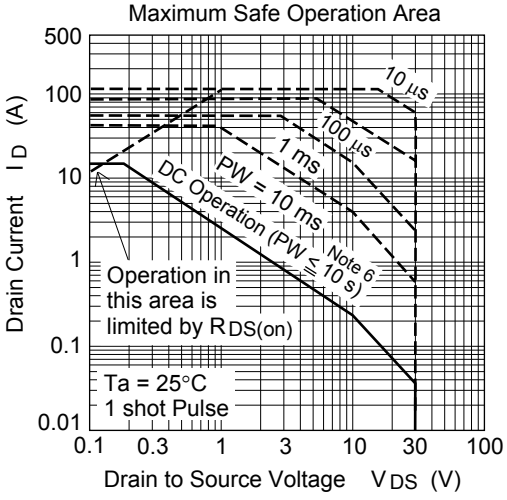
5. Screening test performed on wafer

Main Characteristics

Power vs. Temperature Derating

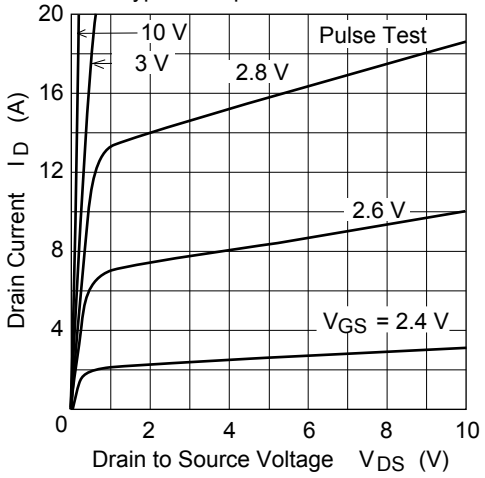


Maximum Safe Operation Area

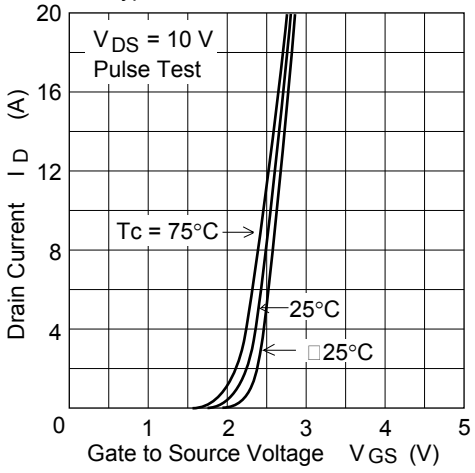


Note 6 :
When using the glass epoxy board
(FR4 40x40x1.6 mm)

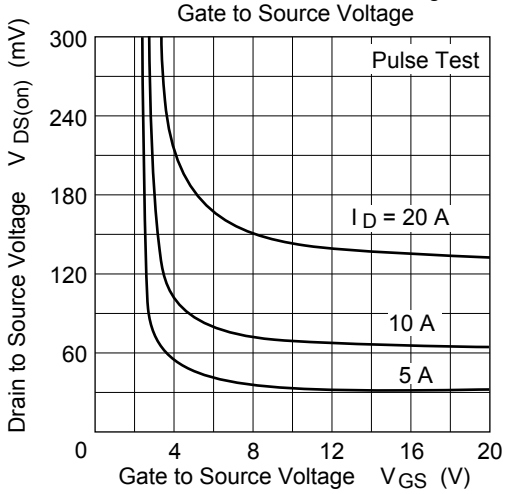
Typical Output Characteristics



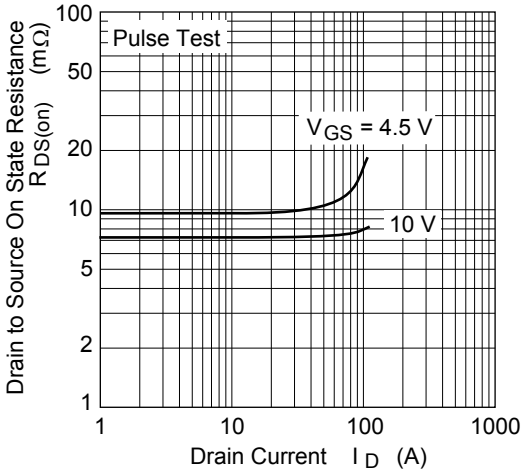
Typical Transfer Characteristics



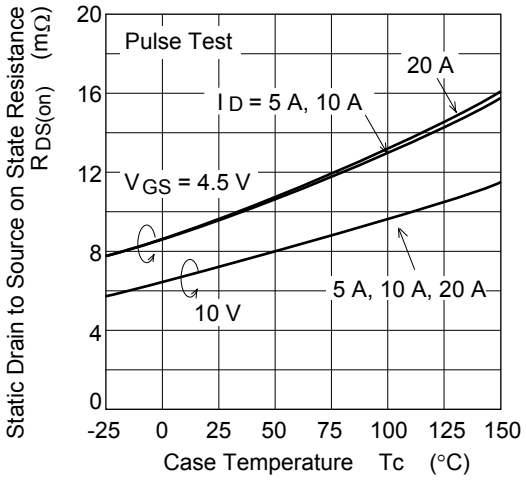
Drain to Source Saturation Voltage vs. Gate to Source Voltage



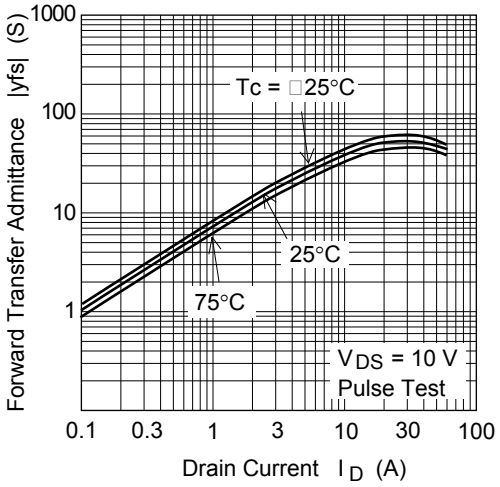
Static Drain to Source on State Resistance vs. Drain Current



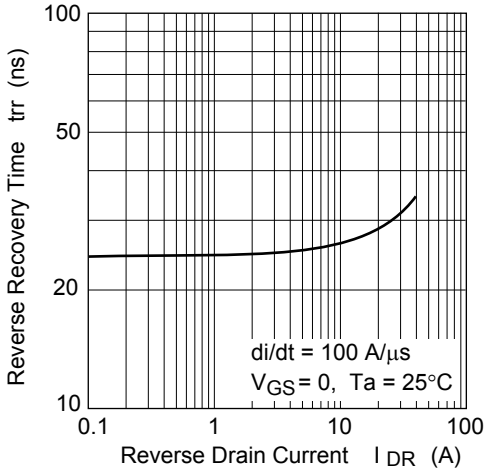
Static Drain to Source on State Resistance vs. Temperature



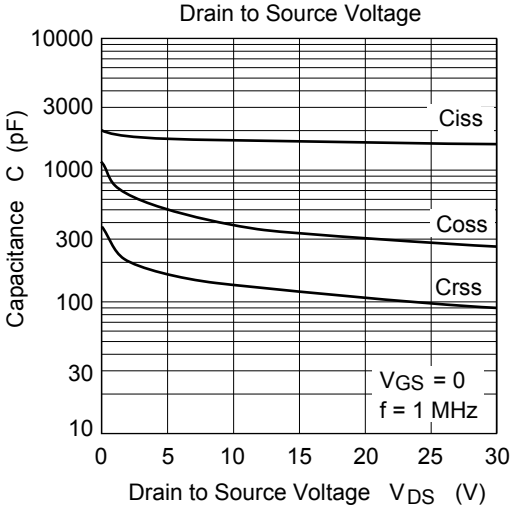
Forward Transfer Admittance vs. Drain Current



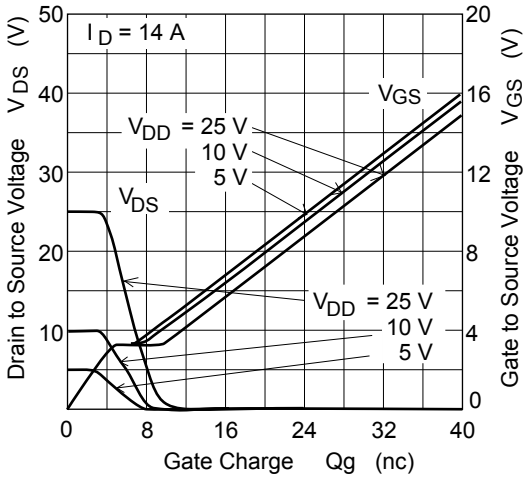
Body Drain Diode Reverse Recovery Time



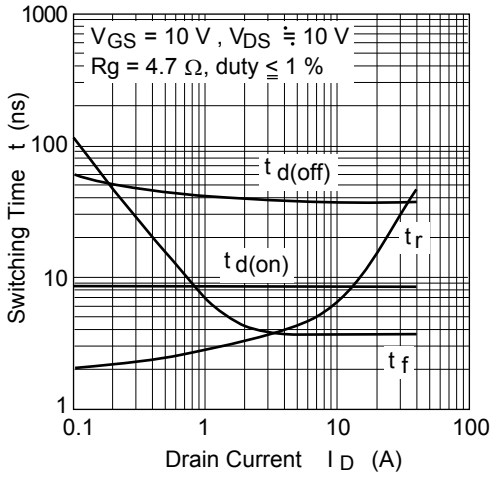
Typical Capacitance vs. Drain to Source Voltage



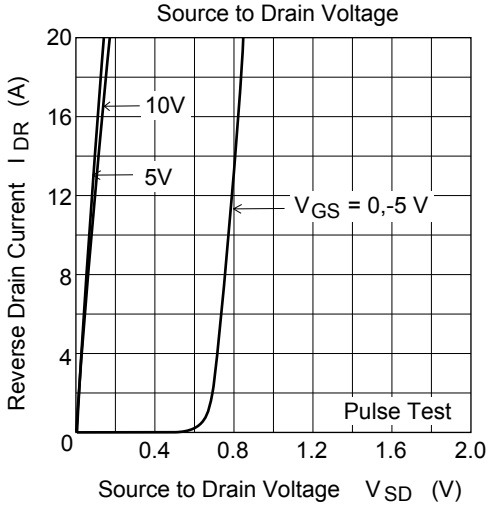
Dynamic Input Characteristics



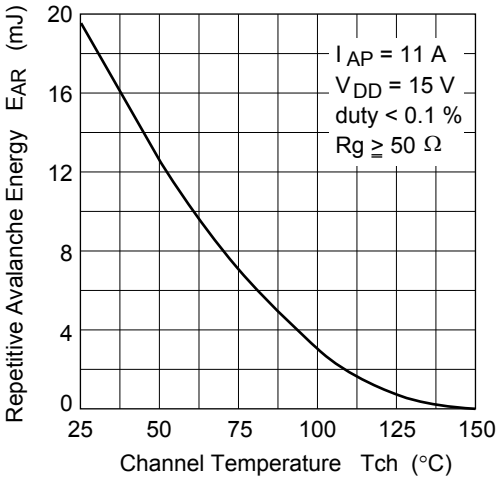
Switching Characteristics



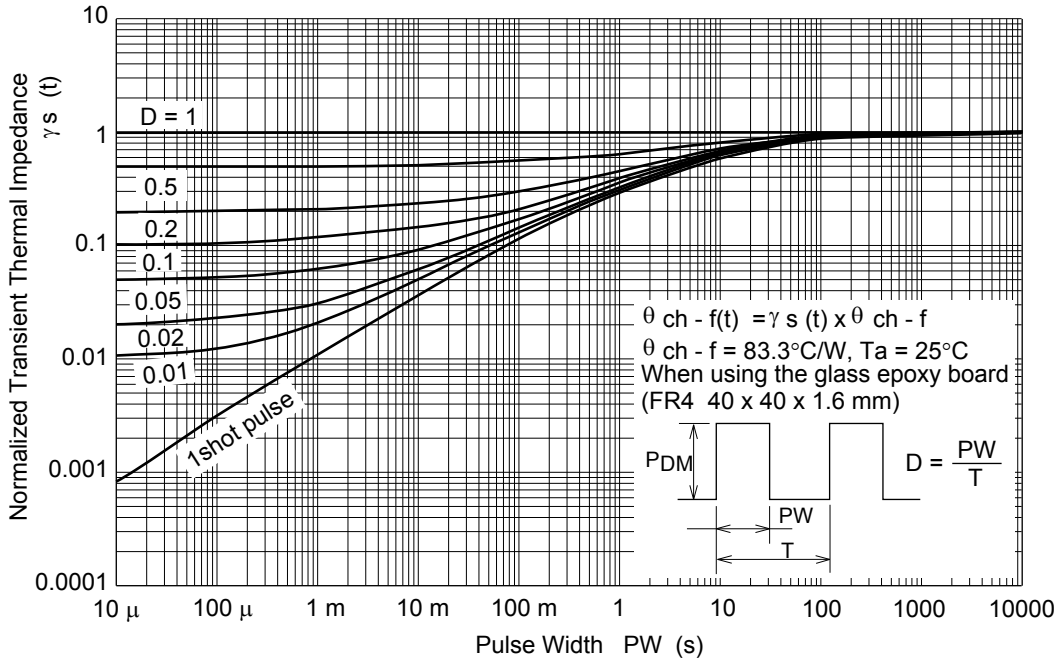
Reverse Drain Current vs.
Source to Drain Voltage



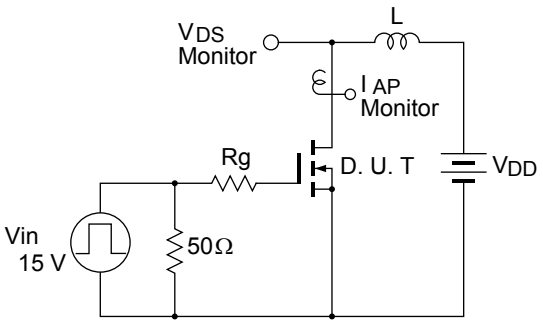
Maximum Avalanche Energy vs.
Channel Temperature Derating



Normalized Transient Thermal Impedance vs. Pulse Width

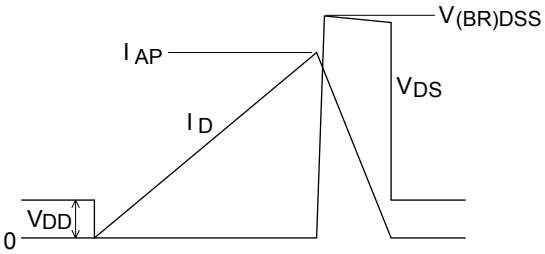


Avalanche Test Circuit

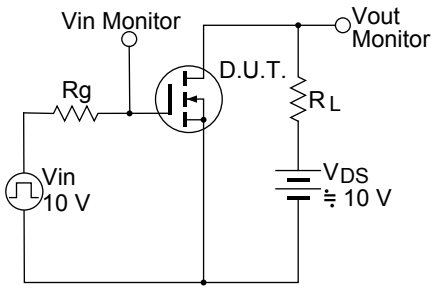


Avalanche Waveform

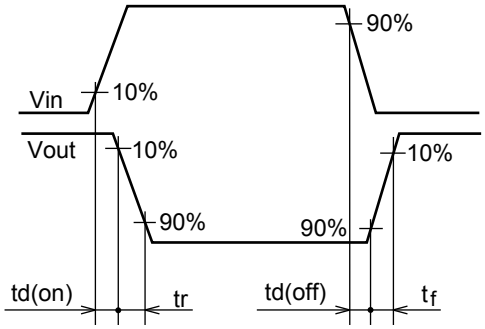
$$E_{AR} = \frac{1}{2} \cdot L \cdot I_{AP}^2 \cdot \frac{V_{DSS}}{V_{DSS} - V_{DD}}$$



Switching Time Test Circuit

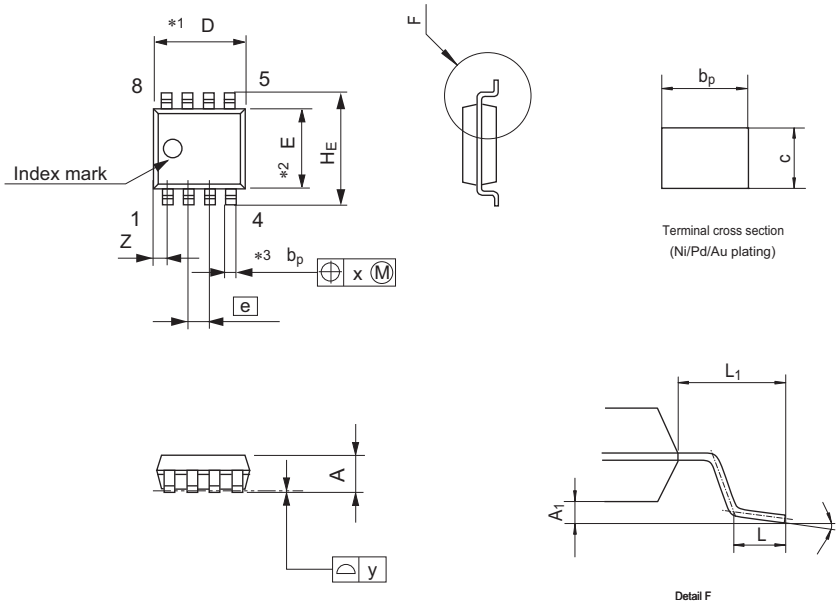


Switching Time Waveform



Package Dimensions

JEITA Package Code	RENESAS Code	Package Name	MASS[Typ.]
P-SOP8-3.95 × 4.9-1.27	PRSP0008DD-D	FP-8DAV	0.085g



NOTE)
1. DIMENSIONS "*1(Nom)" AND "*2" DO NOT INCLUDE MOLD FLASH.
2. DIMENSION "*3" DOES NOT INCLUDE TRIM OFFSET.

Reference Symbol	Dimension in Millimeters		
	Min	Nom	Max
D	——	4.90	5.3
E	——	3.95	——
A_2	——	——	——
A_1	0.10	0.14	0.25
A	——	——	1.75
b_p	0.34	0.40	0.46
b_1	——	——	——
c	0.15	0.20	0.25
c_1	——	——	——
θ	0°	——	8°
H_E	5.80	6.10	6.20
e	——	1.27	——
x	——	——	0.25
y	——	——	0.1
Z	——	——	0.75
L	0.40	0.60	1.27
L_1	——	1.08	——

Ordering Information

Orderable Part Number	Quantity	Shipping Container
HAT2254R-EL-E	2500 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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2. Quality grade
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9. 不可将瑞萨电子产品和技术用于或者嵌入日本国内或海外相应的法律法规所禁止生产、使用及销售的任何产品或系统中。也不可将本文档中记载的瑞萨电子产品或技术用于与军事应用或者军事用途有关的任何目的（如大规模杀伤性武器的开发等）。在将本文档中记载的瑞萨电子产品或技术进行出口时，应当遵守相应的出口管制法律法规，并按照上述法律法规所规定的程序进行。
10. 向第三方分销或处分产品或者以其他方式将产品置于第三方控制之下的瑞萨电子产品买方或分销商，有责任事先向上述第三方通知本文档规定的内容和条件；对于用户或第三方因非法使用瑞萨电子产品而遭受的任何损失，瑞萨电子不承担任何责任。
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(注1) 瑞萨电子：在本文档中指瑞萨电子株式会社及其控股子公司。
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