HAT2058R, HAT2058RJ

Silicon N Channel Power MOS FET
High Speed Power Switching

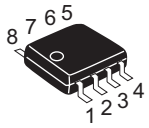
REJ03G1174-0200
(Previous: ADE-208-934)
Rev.2.00
Sep 07, 2005

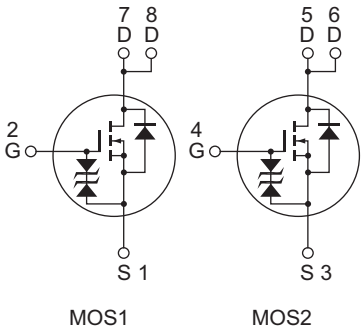
Features

- Low on-resistance
- Capable of 4 V gate drive
- Low drive current
- High density mounting
- "J" is for Automotive application
  High temperature D-S leakage guarantee
  Avalanche rating

Outline

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





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

Absolute Maximum Ratings

(Ta = 25°C)

Item	Symbol	Value		Unit
		HAT2058R	HAT2058RJ	
Drain to source voltage	V_{DSS}	100	100	V
Gate to source voltage	V_{GSS}	±20	±20	V
Drain current	I_D Note 2	4	4	A
Drain peak current	$I_{D\ (pulse)}$ Note 1	32	32	A
Body-drain diode reverse drain current	I_{DR}	4	4	A
Avalanche current	I_{AP} Note 4	—	4	A
Avalanche energy	E_{AR} Note 4	—	1.6	mJ
Channel dissipation	Pch Note 2	2	2	W
	Pch Note 3	3	3	W
Channel temperature	Tch	150	150	°C
Storage temperature	Tstg	–55 to +150	–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
4. Value at Tch = 25°C, Rg ≥ 50 Ω

Electrical Characteristics

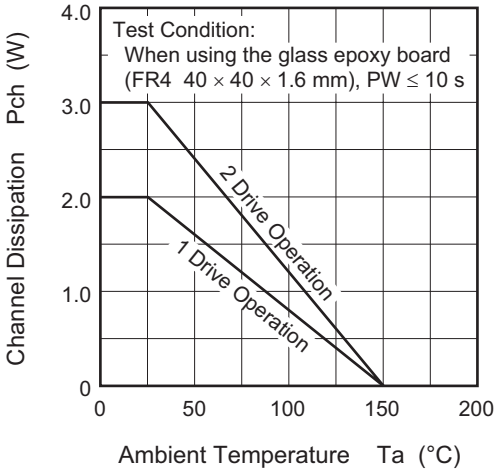
(Ta = 25°C)

Item		Symbol	Min	Typ	Max	Unit	Test Conditions
Drain to source breakdown voltage		$V_{(BR)\ DSS}$	100	—	—	V	I_D = 10 mA, V_{GS} = 0
Gate to source breakdown voltage		$V_{(BR)\ GSS}$	±20	—	—	V	I_G = ±100 µA, V_{DS} = 0
Zero gate voltage drain current	HAT2058R	I_{DSS}	—	—	1	µA	V_{DS} = 100 V, V_{GS} = 0
	HAT2058RJ	I_{DSS}	—	—	0.1	µA	
Zero gate voltage drain current	HAT2058R	I_{DSS}	—	—	—	µA	V_{DS} = 80 V, V_{GS} = 0
	HAT2058RJ	I_{DSS}	—	—	10	µA	Ta = 125°C
Gate to source leak current		I_{GSS}	—	—	±10	µA	V_{GS} = ±16 V, V_{DS} = 0
Gate to source cutoff voltage		$V_{GS\ (off)}$	1.0	—	2.5	V	V_{DS} = 10 V, I_D = 1 mA
Forward transfer admittance		$\|y_{fs}\|$	3	5	—	S	I_D = 2 A, V_{DS} = 10 V Note 5
Static drain to source on state resistance		$R_{DS\ (on)}$	—	120	145	mΩ	I_D = 2 A, V_{GS} = 10 V Note 5
		$R_{DS\ (on)}$	—	150	180	mΩ	I_D = 2 A, V_{GS} = 4 V Note 5
Input capacitance		Ciss	—	420	—	pF	V_{DS} = 10 V, V_{GS} = 0
Output capacitance		Coss	—	180	—	pF	f = 1 MHz
Reverse transfer capacitance		Crss	—	100	—	pF	
Turn-on delay time		$t_{d\ (on)}$	—	10	—	ns	V_{GS} = 10 V, I_D = 2 A,
Rise time		t_r	—	30	—	ns	V_{DD} ≅ 30 V
Turn-off delay time		$t_{d\ (off)}$	—	110	—	ns	
Fall time		t_f	—	60	—	ns	
Body-drain diode forward voltage		V_{DF}	—	0.85	1.1	V	I_F = 4 A, V_{GS} = 0 Note 5
Body-drain diode reverse recovery time		t_{rr}	—	75	—	ns	I_F = 4 A, V_{GS} = 0 di_F/dt = 50 A/µs

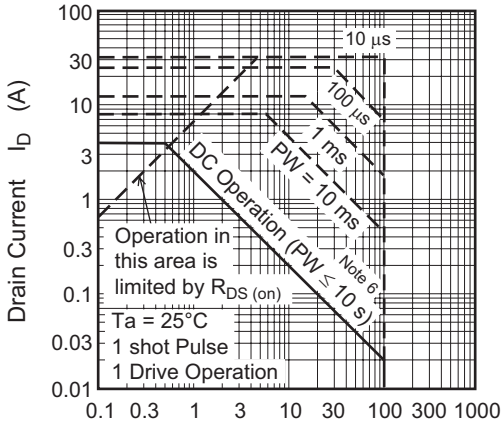
Note: 5. Pulse test

Main Characteristics

Power vs. Temperature Derating

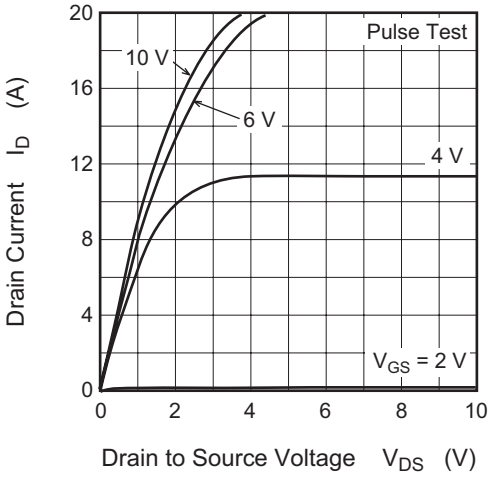


Maximum Safe Operation Area

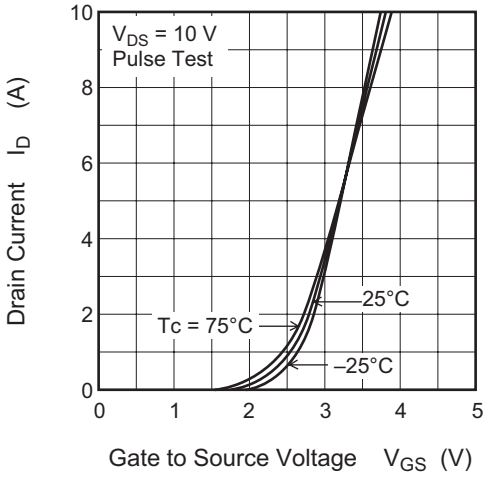


Note 6:
When using the glass epoxy board
(FR4 40 × 40 × 1.6 mm)

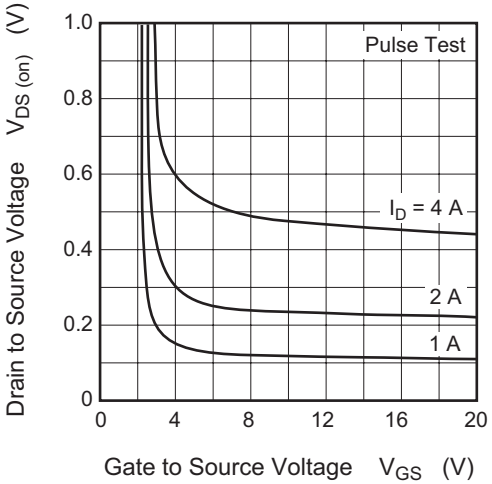
Typical Output Characteristics



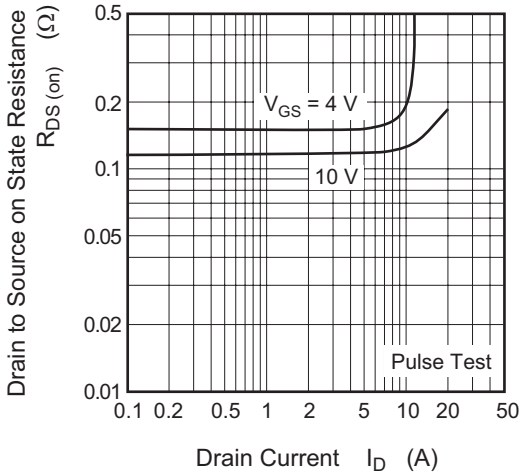
Typical Transfer Characteristics



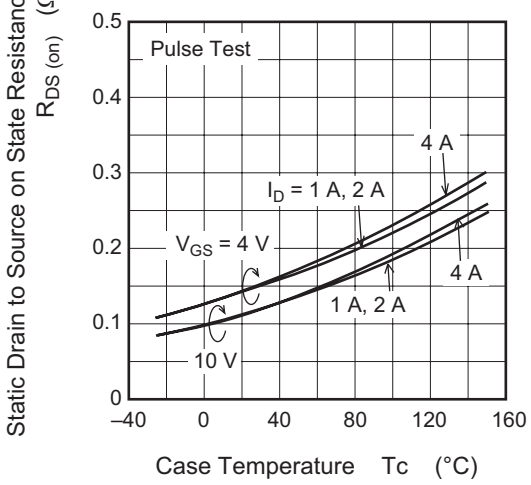
Drain to Source Saturation Voltage vs.
Gate to Source Voltage



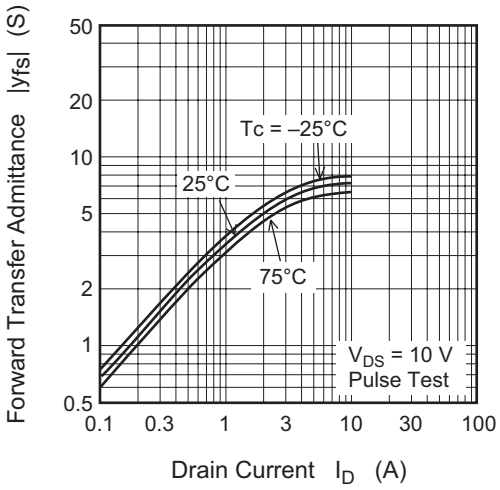
Static Drain to Source on State Resistance
vs. Drain Current



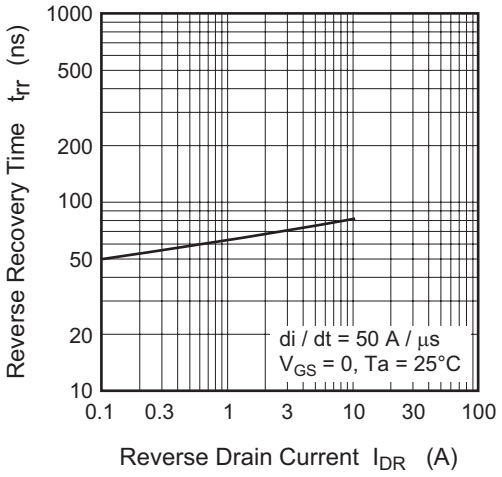
Static Drain to Source on State Resistance vs. Temperature



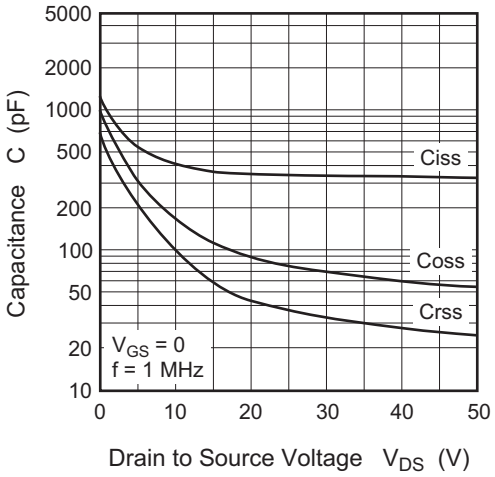
Forward Transfer Admittance vs. Drain Current



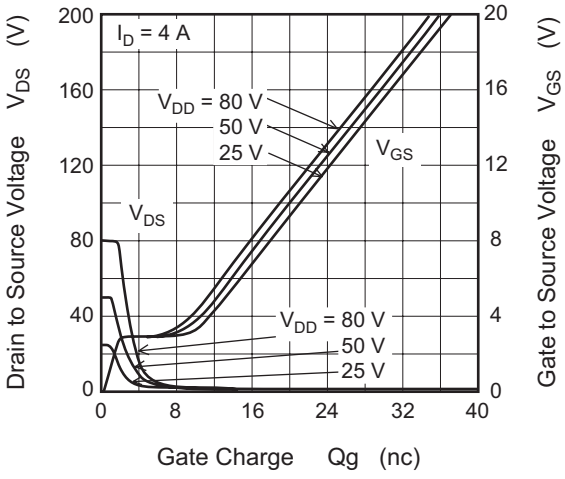
Body-Drain Diode Reverse Recovery Time



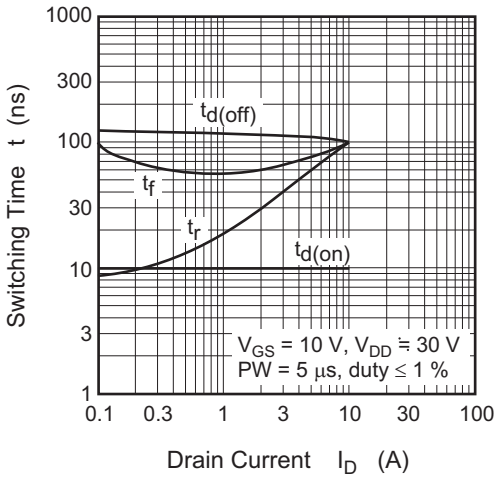
Typical Capacitance vs. Drain to Source Voltage



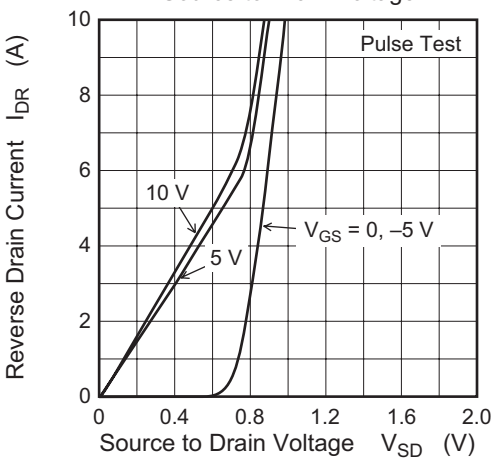
Dynamic Input Characteristics



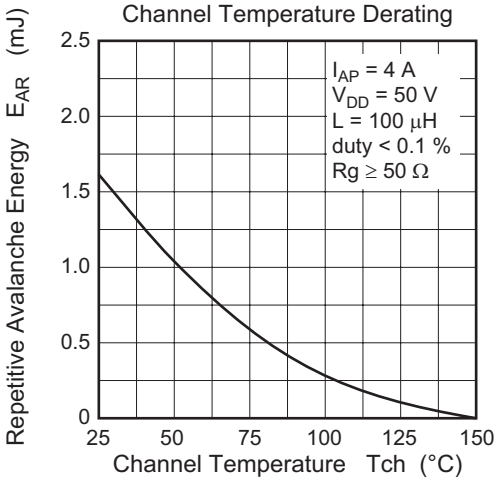
Switching Characteristics



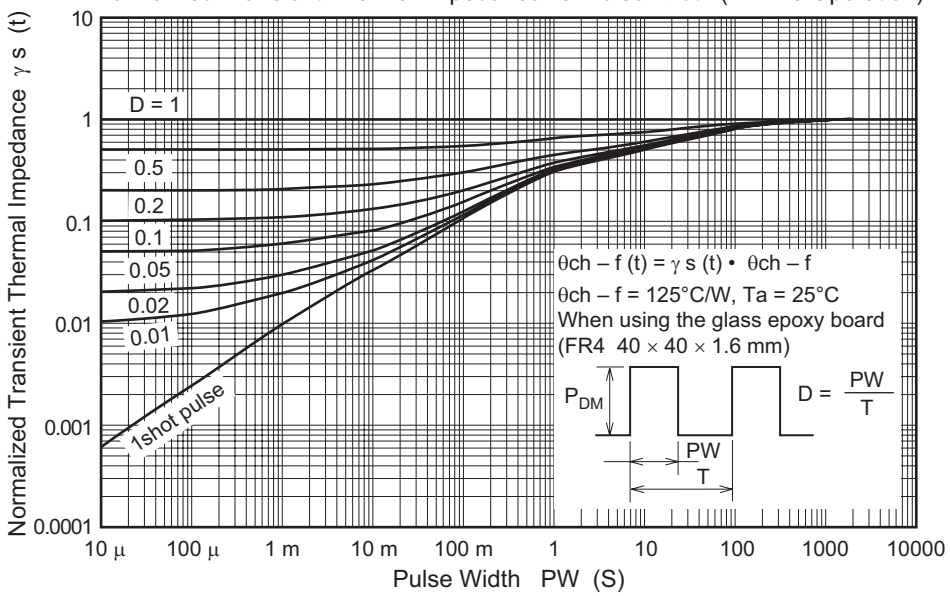
Reverse Drain Current vs. Source to Drain Voltage



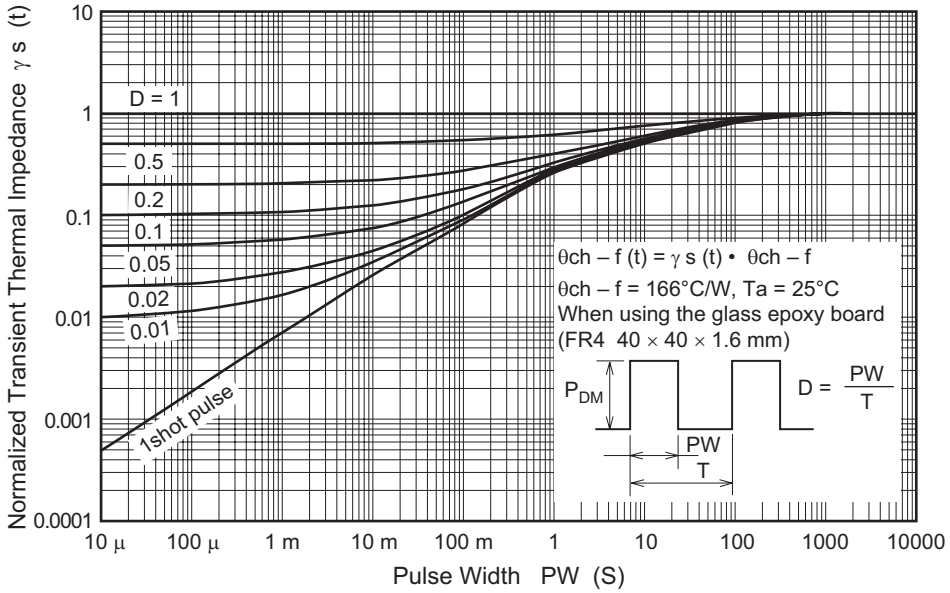
Maximum Avalanche Energy vs. Channel Temperature Derating



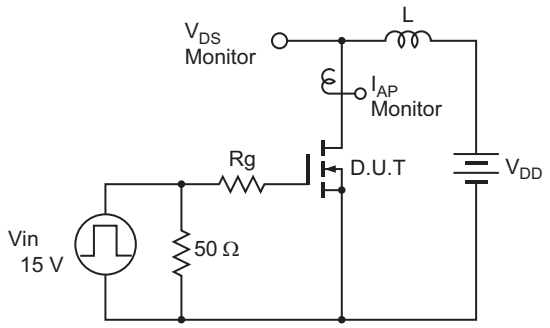
Normalized Transient Thermal Impedance vs. Pulse Width (1 Drive Operation)



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

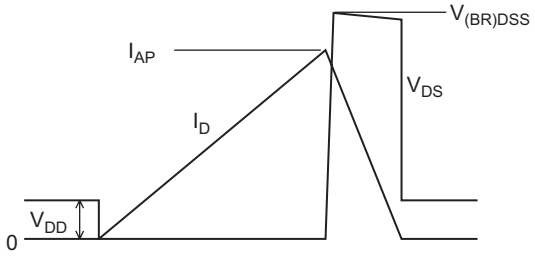


Avalanche Test Circuit

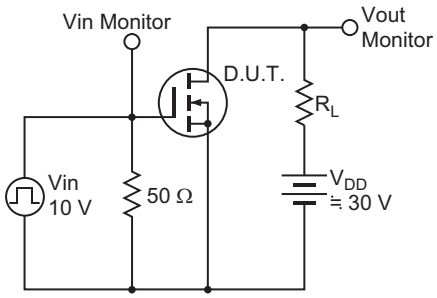


Avalanche Waveform

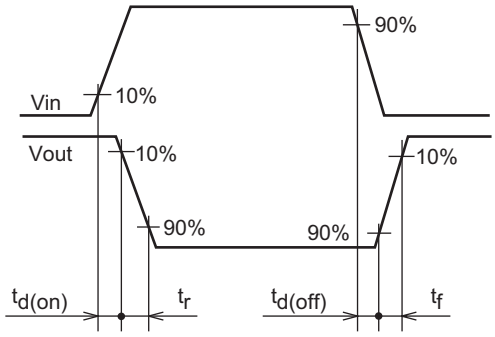
$$E_{AR} = \frac{1}{2} \cdot L \cdot I_{AP}^2 \cdot \frac{V_{DSS}}{V_{DSS} - V_{DD}}$$



Switching Time Test Circuit

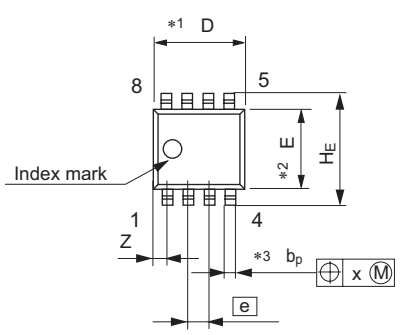


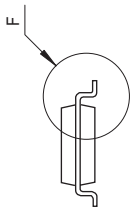
Switching Time Waveform

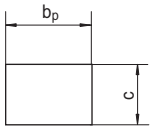


Package Dimensions

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

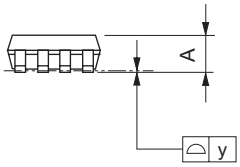


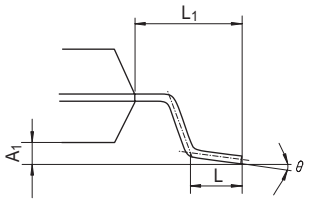




Terminal cross section
(Ni/Pd/Au plating)

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





Detail F

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

Part Name	Quantity	Shipping Container
HAT2058R-EL-E	2500 pcs	Taping
HAT2058RJ-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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RENESAS SALES OFFICES

http://www.renesas.com

Refer to "**http://www.renesas.com/en/network**" for the latest and detailed information.

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Colophon .3.0