RJK1003DPN-A0

N-Channel MOS FET
100 V, 50 A, 11 mΩ

R07DS1450EJ0101
Rev.1.01
2020.1.9

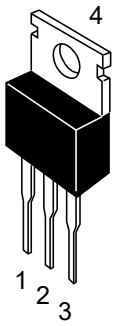
Features

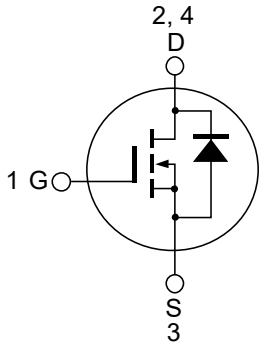
- High speed switching
- Low drive current
- Low on-resistance $R_{DS(on)}$ = 8.8 mΩ typ. (at V_{GS} = 10 V)
- Package TO-220ABA
- Quality Grade : Standard

Outline

RENESAS Package code: PRSS0004AT-A

(Package name: TO-220ABA)





1. Gate
2. Drain
3. Source
4. Drain

Absolute Maximum Ratings

(Ta = 25°C)

Item	Symbol	Ratings	Unit
Drain to source voltage	V_{DSS}	100	V
Gate to source voltage	V_{GSS}	±20	V
Drain current	I_D Note1	50	A
Drain peak current	$I_{D\ (pulse)}$ Note2	150	A
Body-drain diode reverse drain current	I_{DR}	50	A
Avalanche current	I_{AP} Note3	25	A
Avalanche energy	E_{AS} Note3	63	mJ
Channel dissipation	Pch Note1	125	W
Channel temperature	Tch	150	°C
Storage temperature	Tstg	–55 to +150	°C

Note: Continuous heavy condition (e.g. high temperature/voltage/current or high variation of temperature) may affect a reliability even if it is within the absolute maximum ratings. Please consider derating condition for appropriate reliability in reference Renesas Semiconductor Reliability Handbook (Recommendation for Handling and Usage of Semiconductor Devices) and individual reliability data.

Notes: 1. Tc = 25°C
2. PW ≤ 10 μs, duty cycle ≤ 1%
3. Value at L = 100 μH , Tch = 25°C, Rg ≥ 50Ω,

Thermal Impedance

Item	Symbol	Max. Value Note4	Unit
Channel to case thermal impedance	θch-c	1.0	°C/W

Notes: 4. This data is the designed target maximum value on Renesas's measurement condition. (Not tested)

Electrical Characteristics

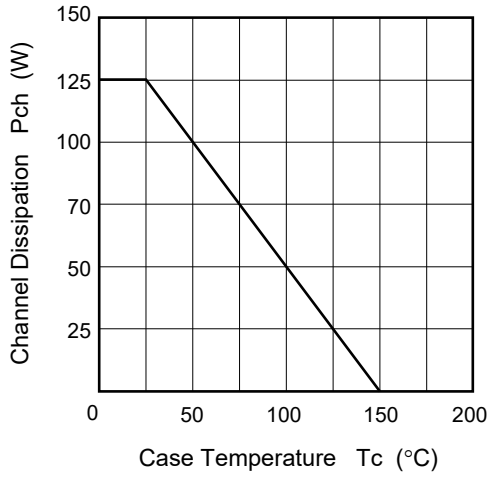
(Ta = 25°C)

Item	Symbol	Min	Typ	Max	Unit	Test conditions
Drain to source breakdown voltage	$V_{(BR)DSS}$	100	—	—	V	I_D = 10mA, 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} = 100 V, V_{GS} = 0
Gate to source cutoff voltage	$V_{GS(off)}$	2.0	—	4.0	V	V_{DS} = 10 V, I_D = 1 mA
Static drain to source on state resistance	$R_{DS(on)}$	—	8.8	11.0	mΩ	I_D = 25 A, V_{GS} = 10 V Note5
Forward transfer admittance	$\|y_{fs}\|$	—	100	—	S	I_D = 25 A, V_D = 10 V Note5
Input capacitance	Ciss	—	4150	—	pF	V_{DS} = 10 V V_{GS} = 0 f = 1 MHz
Output capacitance	Coss	—	660	—	pF	
Reverse transfer capacitance	Crss	—	160	—	pF	
Gate Resistance	Rg	—	1.6	—	Ω	
Total gate charge	Qg	—	59	—	nC	V_{DD}= 50 V V_{GS} = 10 V, I_D = 25 A
Gate to source charge	Qgs	—	20	—	nC	
Gate to drain charge	Qgd	—	12	—	nC	
Turn-on delay time	$t_{d(on)}$	—	30	—	ns	V_{GS} = 10 V I_D = 25 A V_{DD} ≅ 30 V Rg = 4.7 Ω
Rise time	t_r	—	9	—	ns	
Turn-off delay time	$t_{d(off)}$	—	60	—	ns	
Fall time	t_f	—	10	—	ns	
Body-drain diode forward voltage	V_{DF}	—	0.85	1.5	V	I_F = 50 A, V_{GS} = 0 Note5
Body-drain diode reverse recovery time	t_{rr}	—	55	—	ns	I_F = 50 A, V_{GS} = 0 di_F/dt = 100 A/μs

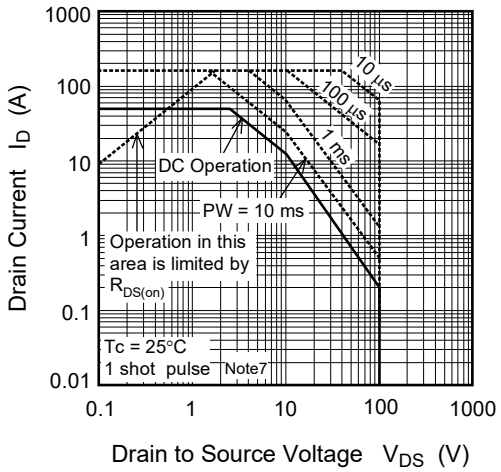
Notes: 5. Pulse test

Typical Characteristics Note6

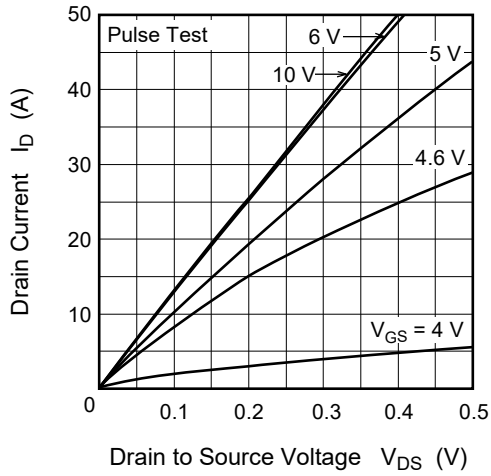
Power vs. Temperature Derating



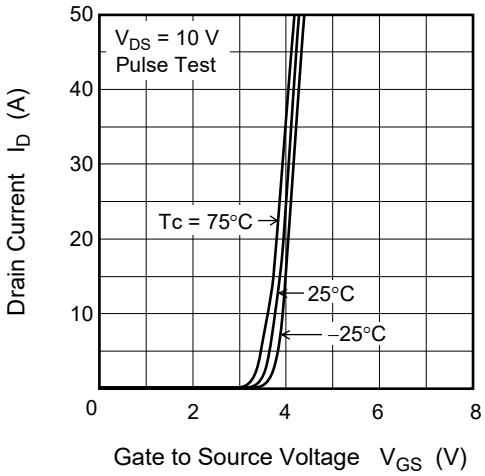
Maximum Safe Operation Area



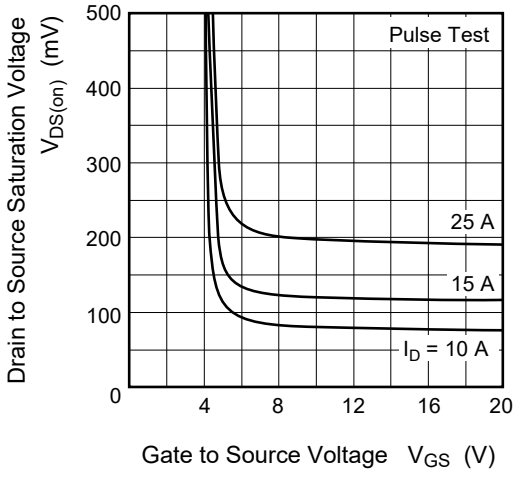
Typical Output Characteristics



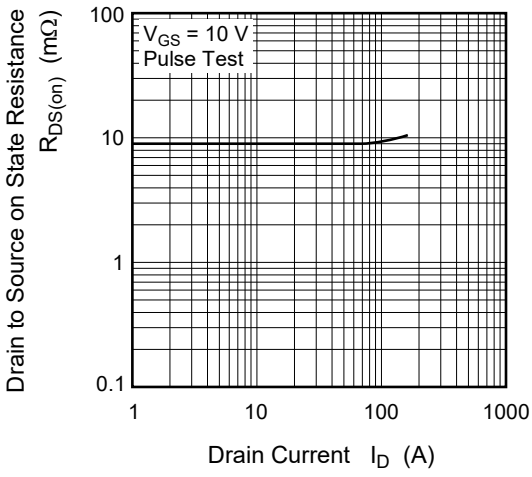
Typical Transfer Characteristics



Drain to Source Saturation Voltage vs. Gate to Source Voltage

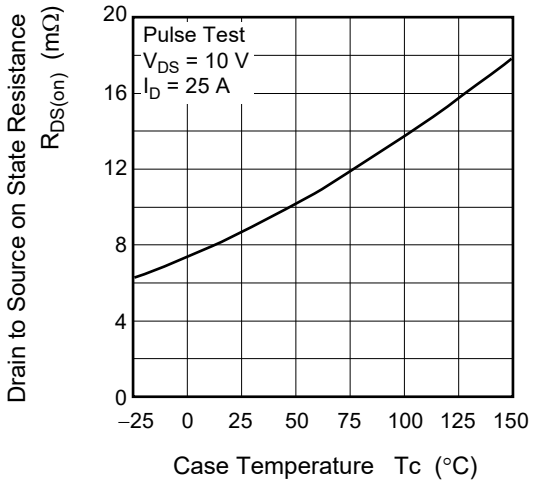


Drain to Source on State Resistance vs. Drain Current

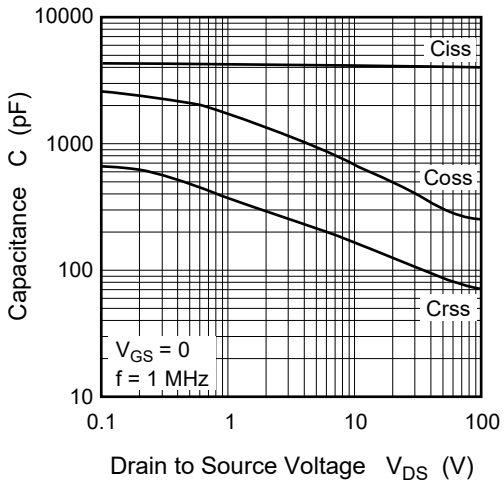


Notes: 6. Designed target value on Renesas measurement condition.
7. This data is the designed value on Renesas's measurement condition. Renesas recommends that operating conditions are designed according to a document "Power MOSFET/IGBT Attention of Handling Semiconductor Devices (R07ZZ0010)".

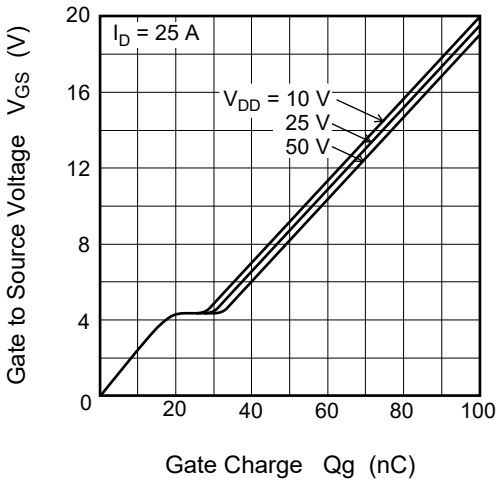
Drain to Source on State Resistance vs. Temperature



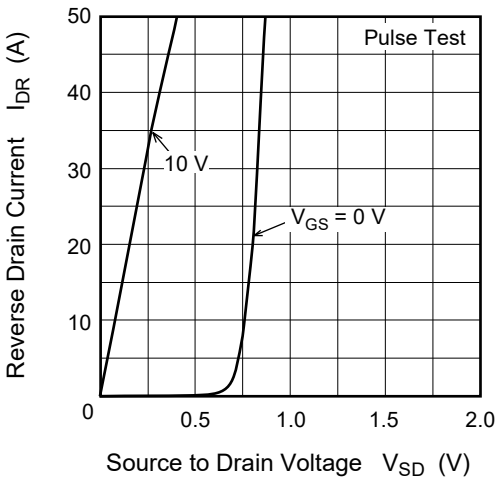
Typical Capacitance vs. Drain to Source Voltage



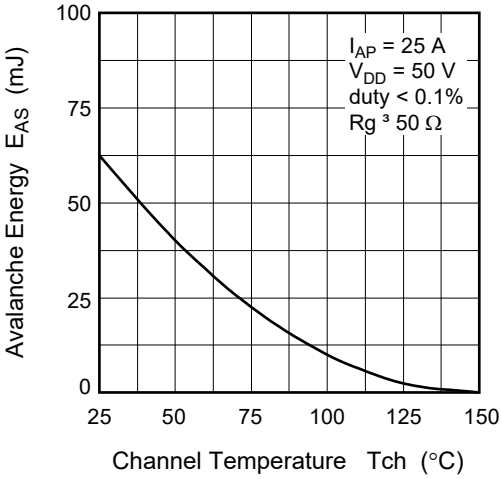
Dynamic Input Characteristics



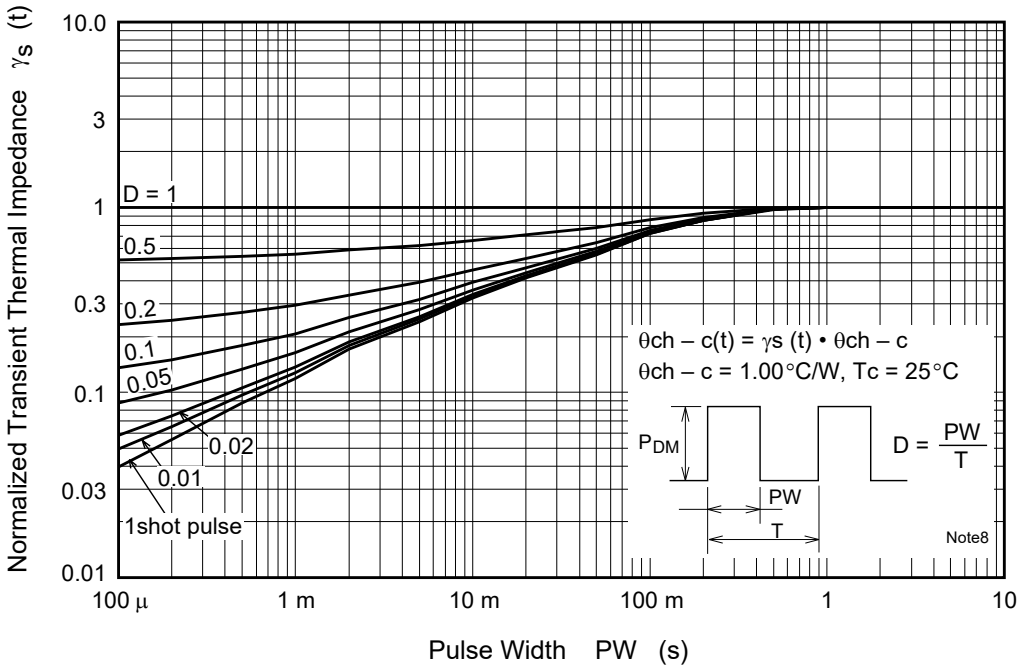
Reverse Drain Current vs. Source to Drain Voltage



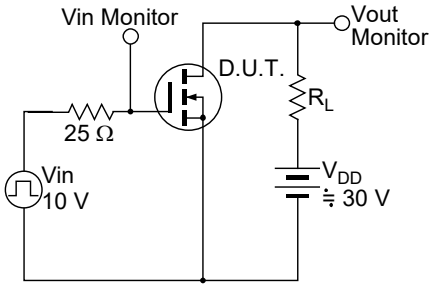
Maximum Avalanche Energy vs. Channel Temperature Derating



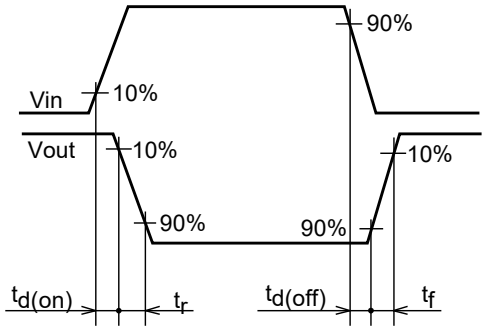
Normalized Transient Thermal Impedance vs. Pulse Width



Switching Time Test Circuit



Waveform

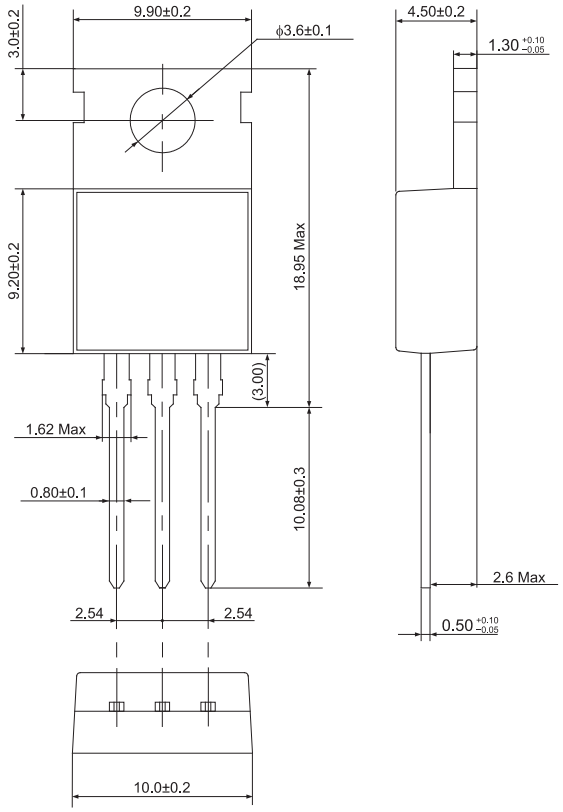


Notes: 8. This data is the designed target maximum value on Renesas's measurement condition.

Package Dimensions

Package Name	JEDEC Package Code	RENESAS Code	Previous Code	MASS (Typ) [g]
TO-220ABA	TO-220AB	PRSS0004AT-A	TO-220ABA	2.1

Unit: mm



Ordering Information

Orderable Part Number	Quantity	Shipping Container
RJK1003DPN-A0-T2	50 pcs	Magazine (Tube)

Note: The symbol of 2nd "-" is occasionally presented as "#".

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Renesas Electronics Corporation
TOYOSU FORESIA, 3-2-24 Toyosu, Koto-ku, Tokyo 135-0061, Japan

Renesas Electronics America Inc.
1001 Murphy Ranch Road, Milpitas, CA 95035, U.S.A.
Tel: +1-408-432-8888, Fax: +1-408-434-5351

Renesas Electronics Canada Limited
9251 Yonge Street, Suite 8309 Richmond Hill, Ontario Canada L4C 9T3
Tel: +1-905-237-2004

Renesas Electronics Europe GmbH
Arcadiastrasse 10, 40472 Düsseldorf, Germany
Tel: +49-211-6503-0, Fax: +49-211-6503-1327

Renesas Electronics (China) Co., Ltd.
Room 101-T01, Floor 1, Building 7, Yard No. 7, 8th Street, Shangdi, Haidian District, Beijing 100085, China
Tel: +86-10-8235-1155, Fax: +86-10-8235-7679

Renesas Electronics (Shanghai) Co., Ltd.
Unit 301, Tower A, Central Towers, 555 Langao Road, Putuo District, Shanghai 200333, China
Tel: +86-21-2226-0888, Fax: +86-21-2226-0999

Renesas Electronics Hong Kong Limited
Unit 1601-1611, 16/F., Tower 2, Grand Century Place, 193 Prince Edward Road West, Mongkok, Kowloon, Hong Kong
Tel: +852-2265-6688, Fax: +852 2886-9022

Renesas Electronics Taiwan Co., Ltd.
13F, No. 363, Fu Shing North Road, Taipei 10543, Taiwan
Tel: +886-2-8175-9600, Fax: +886 2-8175-9670

Renesas Electronics Singapore Pte. Ltd.
80 Bendemeer Road, Unit #06-02 Hyflux Innovation Centre, Singapore 339949
Tel: +65-6213-0200, Fax: +65-6213-0300

Renesas Electronics Malaysia Sdn.Bhd.
Unit No 3A-1 Level 3A Tower 8 UOA Business Park, No 1 Jalan Pengaturcara U1/51A, Seksyen U1, 40150 Shah Alam, Selangor, Malaysia
Tel: +60-3-5022-1288, Fax: +60-3-5022-1290

Renesas Electronics India Pvt. Ltd.
No.777C, 100 Feet Road, HAL 2nd Stage, Indiranagar, Bangalore 560 038, India
Tel: +91-80-67208700

Renesas Electronics Korea Co., Ltd.
17F, KAMCO Yangjae Tower, 262, Gangnam-daero, Gangnam-gu, Seoul, 06265 Korea
Tel: +82-2-558-3737, Fax: +82-2-558-5338

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