RJK1002DPN-A0

N-Channel MOSFET
100 V, 70 A, 7.6 mΩ

R07DS1449EJ0101
Rev.1.01
2020.1.9

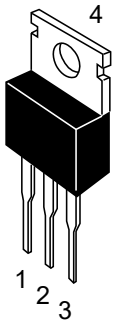
Features

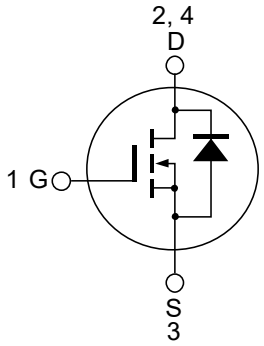
- High speed switching
- Low drive current
- Low on-resistance $R_{DS(on)}$ = 6.0 mΩ typ. (at V_{GS} = 10 V)
- Package TO-220ABA
- Quality Grade : Standard

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	70	A
Drain peak current	$I_{D\ (pulse)}$ Note2	210	A
Body-drain diode reverse drain current	I_{DR}	70	A
Avalanche current	I_{AP} Note3	35	A
Avalanche energy	E_{AS} Note3	123	mJ
Channel dissipation	Pch Note1	150	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 ≥ 50 Ω,

Thermal Impedance

Item	Symbol	Max. Value Note4	Unit
Channel to case thermal impedance	θch-c	0.83	°C/W

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

Electrical Characteristics

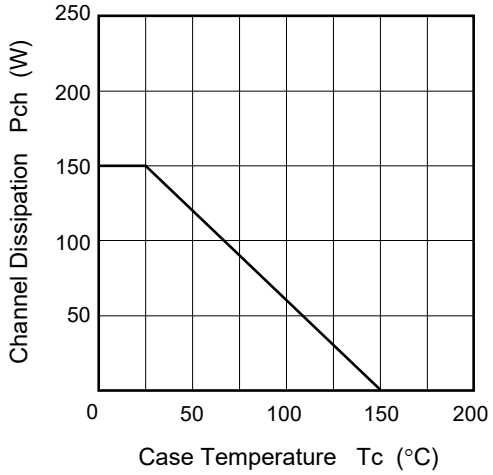
(Ta = 25°C)

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	$R_{DS(on)}$	—	6.0	7.6	mΩ	I_D = 35 A, V_{GS} = 10 V Note5
Forward transfer admittance	$\|y_{fs}\|$	—	135	—	S	I_D = 35 A, V_D = 10 V Note5
Input capacitance	Ciss	—	6450	—	pF	V_{DS} = 10 V V_{GS} = 0 f = 1 MHz
Output capacitance	Coss	—	1000	—	pF	
Reverse transfer capacitance	Crss	—	240	—	pF	
Gate Resistance	Rg	—	1.5	—	Ω	
Total gate charge	Qg	—	94	—	nC	V_{DD}= 50 V V_{GS} = 10 V, I_D = 35 A
Gate to source charge	Qgs	—	33	—	nC	
Gate to drain charge	Qgd	—	19	—	nC	
Turn-on delay time	$t_{d(on)}$	—	40	—	ns	V_{GS} = 10 V I_D = 35 A V_{DD} ≅ 30 V Rg = 4.7 Ω
Rise time	t_r	—	13	—	ns	
Turn-off delay time	$t_{d(off)}$	—	80	—	ns	
Fall time	t_f	—	13	—	ns	
Body-drain diode forward voltage	V_{DF}	—	0.85	1.5	V	I_F = 70 A, V_{GS} = 0 Note5
Body-drain diode reverse recovery time	t_{rr}	—	65	—	ns	I_F = 70 A, V_{GS} = 0 di_F/dt = 100 A/μs

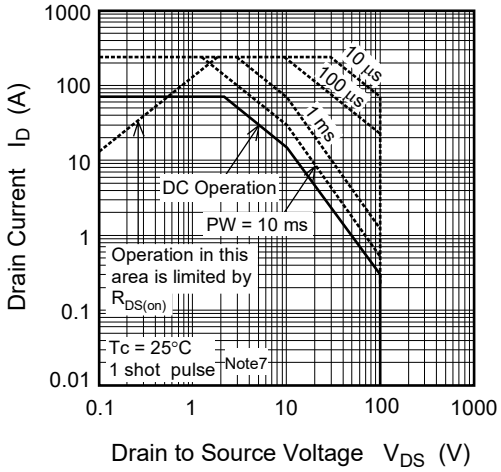
Notes: 5. Pulse test

Typical Characteristics Note6

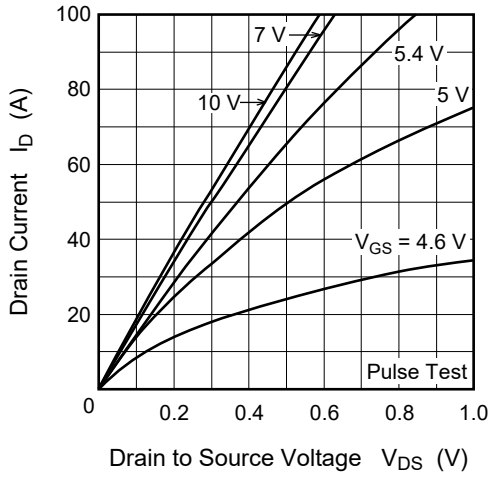
Power vs. Temperature Derating



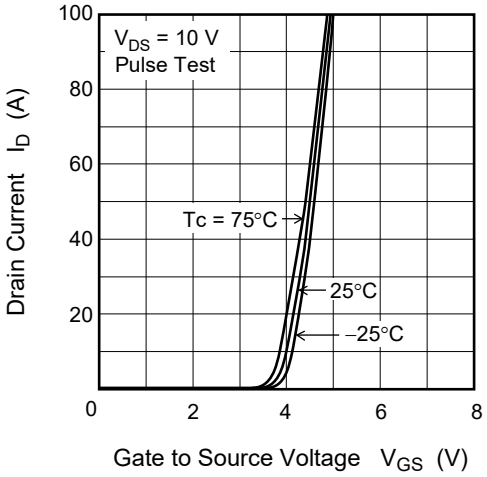
Maximum Safe Operation Area



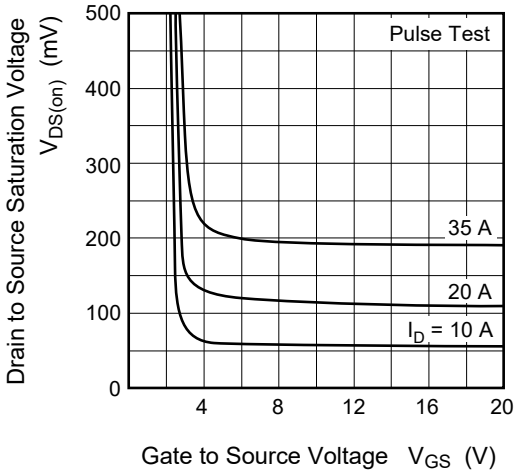
Typical Output Characteristics



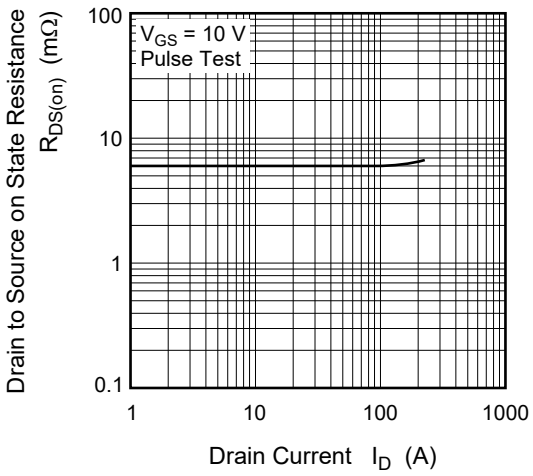
Typical Transfer Characteristics



Drain to Source Saturation Voltage vs. Gate to Source Voltage

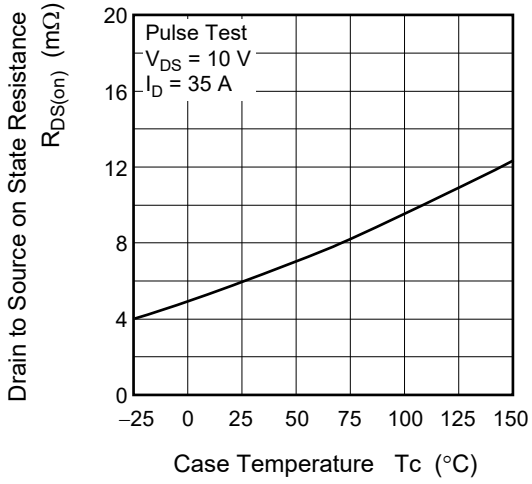


Drain to Source on State Resistance vs. Drain Current

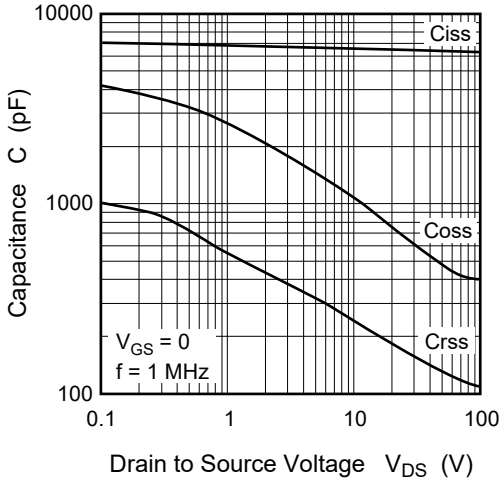


Notes: 6. Designed target value on Renesas measurement condition.
7. This data is the designed value on Renesas's measurement condition. Renesas recommends that operating conditions are designed according to a document "Power MOSFET/IGBT Attention of Handling Semiconductor Devices (R07ZZ0010)".

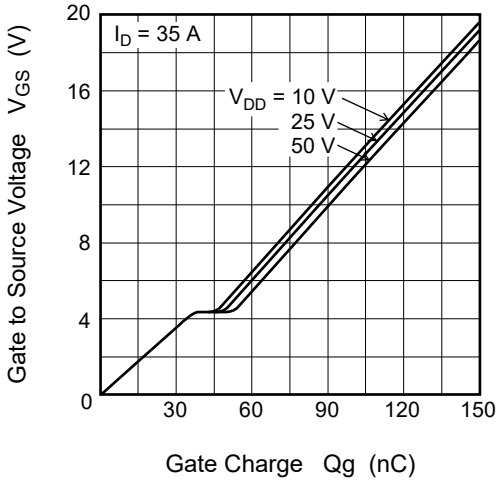
Drain to Source on State Resistance vs. Temperature



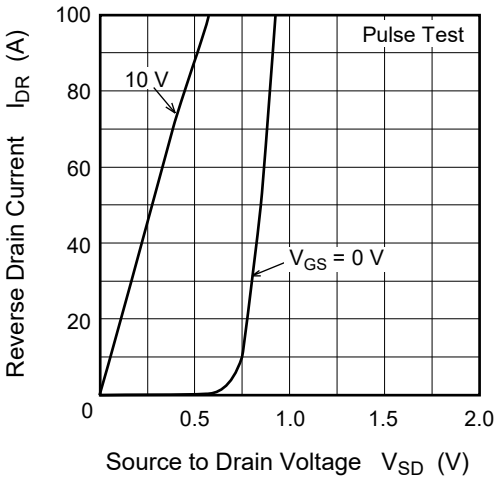
Typical Capacitance vs. Drain to Source Voltage



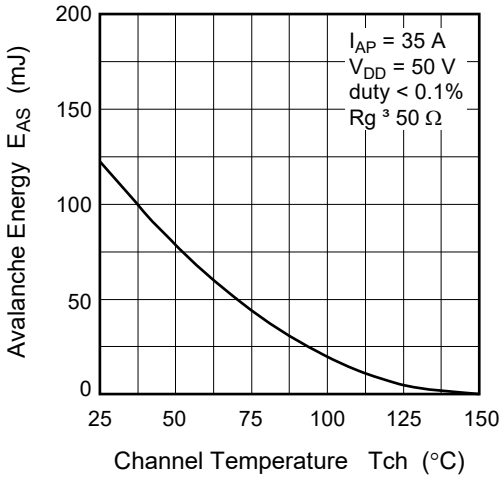
Dynamic Input Characteristics



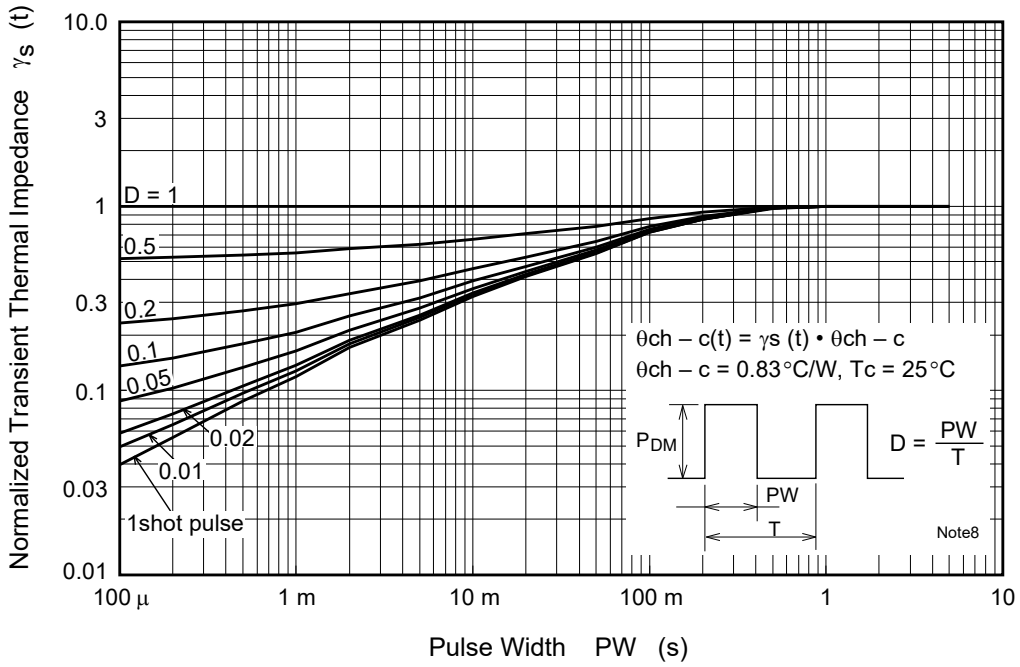
Reverse Drain Current vs. Source to Drain Voltage



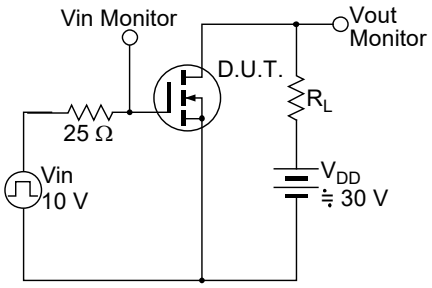
Maximum Avalanche Energy vs. Channel Temperature Derating



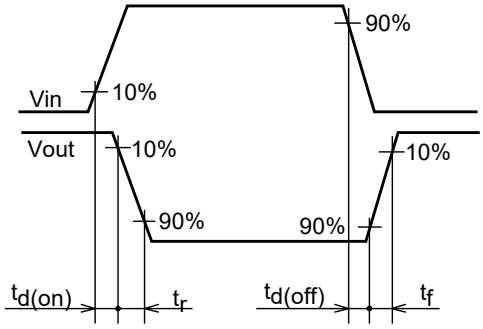
Normalized Transient Thermal Impedance vs. Pulse Width



Switching Time Test Circuit



Waveform

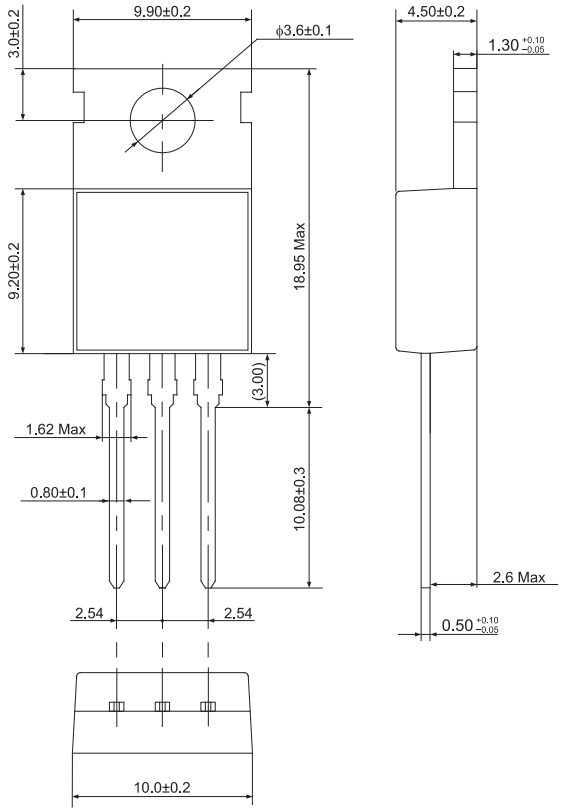


Notes: 8. This data is the designed target maximum value on Renesas's measurement condition.

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
RJK1002DPN-A0-T2	50 pcs	Magazine (Tube)

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

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