

RJK1003DPN-A0

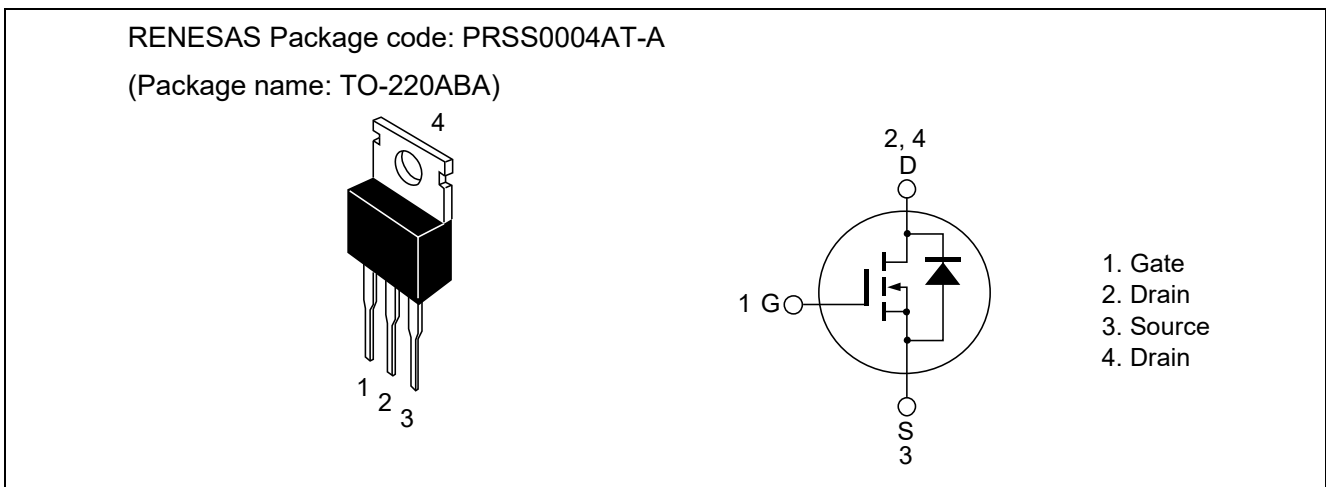
N-Channel MOS FET
100 V, 50 A, 11 mΩ

R07DS1450EJ0101
Rev.1.01
2020.1.9

Features

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

Outline



Absolute Maximum Ratings

($T_a = 25^\circ\text{C}$)

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	P_{ch} ^{Note1}	125	W
Channel temperature	T_{ch}	150	$^\circ\text{C}$
Storage temperature	T_{stg}	-55 to +150	$^\circ\text{C}$

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. $T_c = 25^\circ\text{C}$
 2. $PW \leq 10 \mu\text{s}$, duty cycle $\leq 1\%$
 3. Value at $L = 100 \mu\text{H}$, $T_{ch} = 25^\circ\text{C}$, $R_g \geq 50\Omega$,

Thermal Impedance

Item	Symbol	Max. Value ^{Note4}	Unit
Channel to case thermal impedance	θ_{ch-c}	1.0	°C/W

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

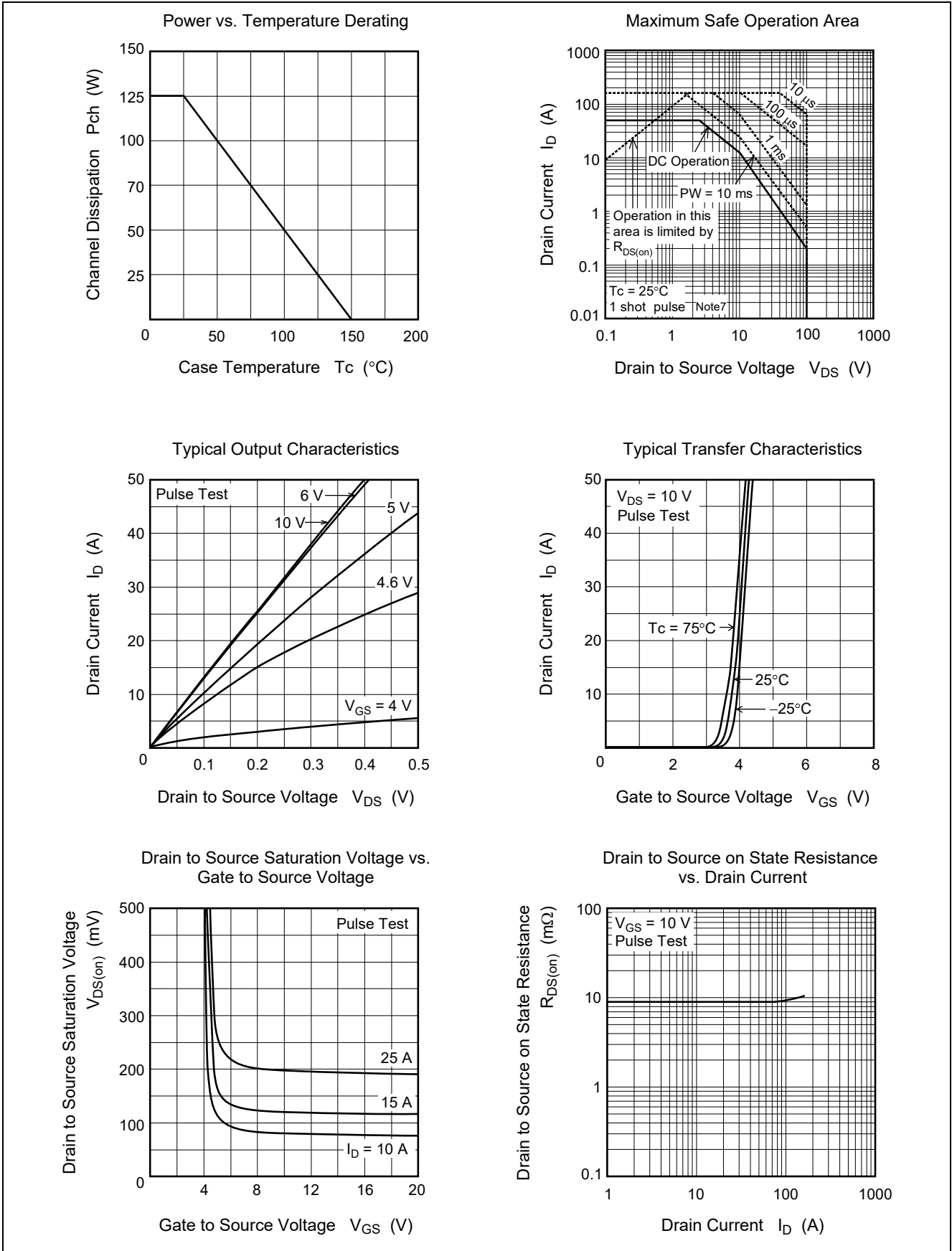
Electrical Characteristics

(Ta = 25°C)

Item	Symbol	Min	Typ	Max	Unit	Test conditions
Drain to source breakdown voltage	$V_{(BR)DSS}$	100	—	—	V	$I_D = 10\text{mA}$, $V_{GS} = 0$
Gate to source leak current	I_{GSS}	—	—	±0.1	μA	$V_{GS} = \pm 20\text{V}$, $V_{DS} = 0$
Zero gate voltage drain current	I_{DSS}	—	—	1	μA	$V_{DS} = 100\text{V}$, $V_{GS} = 0$
Gate to source cutoff voltage	$V_{GS(off)}$	2.0	—	4.0	V	$V_{DS} = 10\text{V}$, $I_D = 1\text{mA}$
Static drain to source on state resistance	$R_{DS(on)}$	—	8.8	11.0	mΩ	$I_D = 25\text{A}$, $V_{GS} = 10\text{V}$ ^{Note5}
Forward transfer admittance	$ y_{fs} $	—	100	—	S	$I_D = 25\text{A}$, $V_D = 10\text{V}$ ^{Note5}
Input capacitance	C_{iss}	—	4150	—	pF	$V_{DS} = 10\text{V}$ $V_{GS} = 0$ $f = 1\text{MHz}$
Output capacitance	C_{oss}	—	660	—	pF	
Reverse transfer capacitance	C_{rss}	—	160	—	pF	
Gate Resistance	R_g	—	1.6	—	Ω	
Total gate charge	Q_g	—	59	—	nC	$V_{DD} = 50\text{V}$ $V_{GS} = 10\text{V}$, $I_D = 25\text{A}$
Gate to source charge	Q_{gs}	—	20	—	nC	
Gate to drain charge	Q_{gd}	—	12	—	nC	
Turn-on delay time	$t_{d(on)}$	—	30	—	ns	$V_{GS} = 10\text{V}$ $I_D = 25\text{A}$ $V_{DD} \cong 30\text{V}$ $R_g = 4.7\ \Omega$
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	$I_F = 50\text{A}$, $V_{GS} = 0$ ^{Note5}
Body-drain diode reverse recovery time	t_{rr}	—	55	—	ns	$I_F = 50\text{A}$, $V_{GS} = 0$ $di_F/dt = 100\text{A}/\mu\text{s}$

Notes: 5. Pulse test

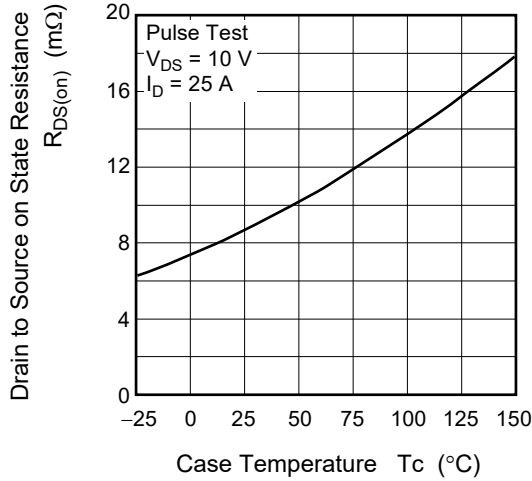
Typical Characteristics Note6



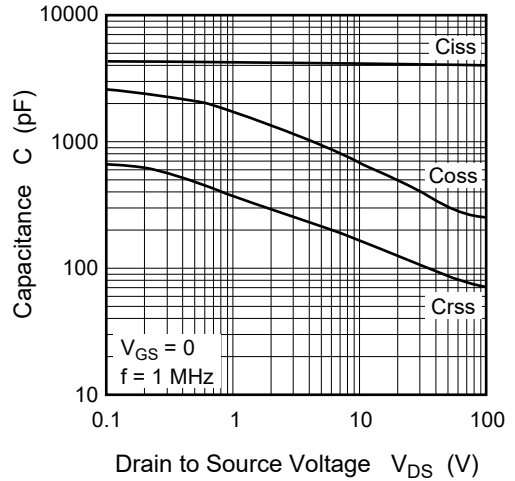
Notes: 6. Designed target value on Renesas measurement condition.

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)".

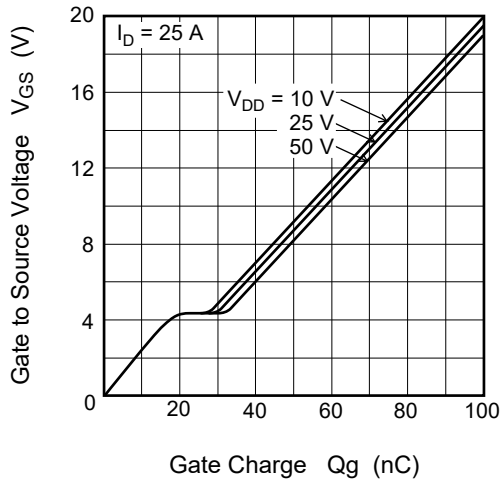
Drain to Source on State Resistance vs. Temperature



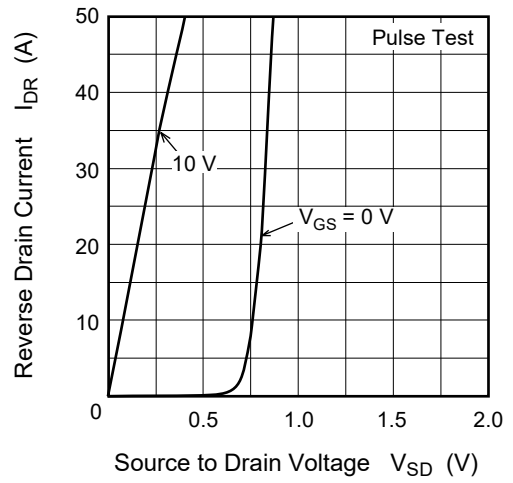
Typical Capacitance vs. Drain to Source Voltage



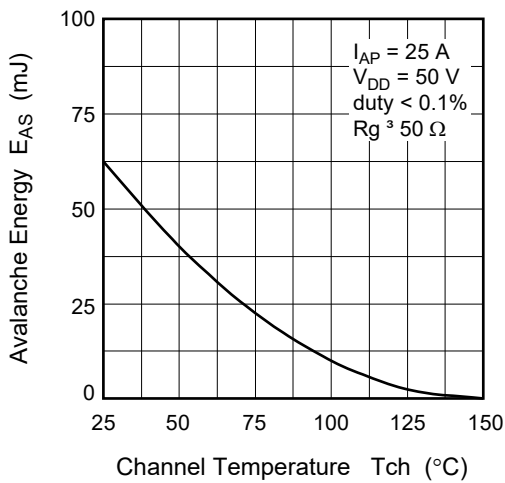
Dynamic Input Characteristics

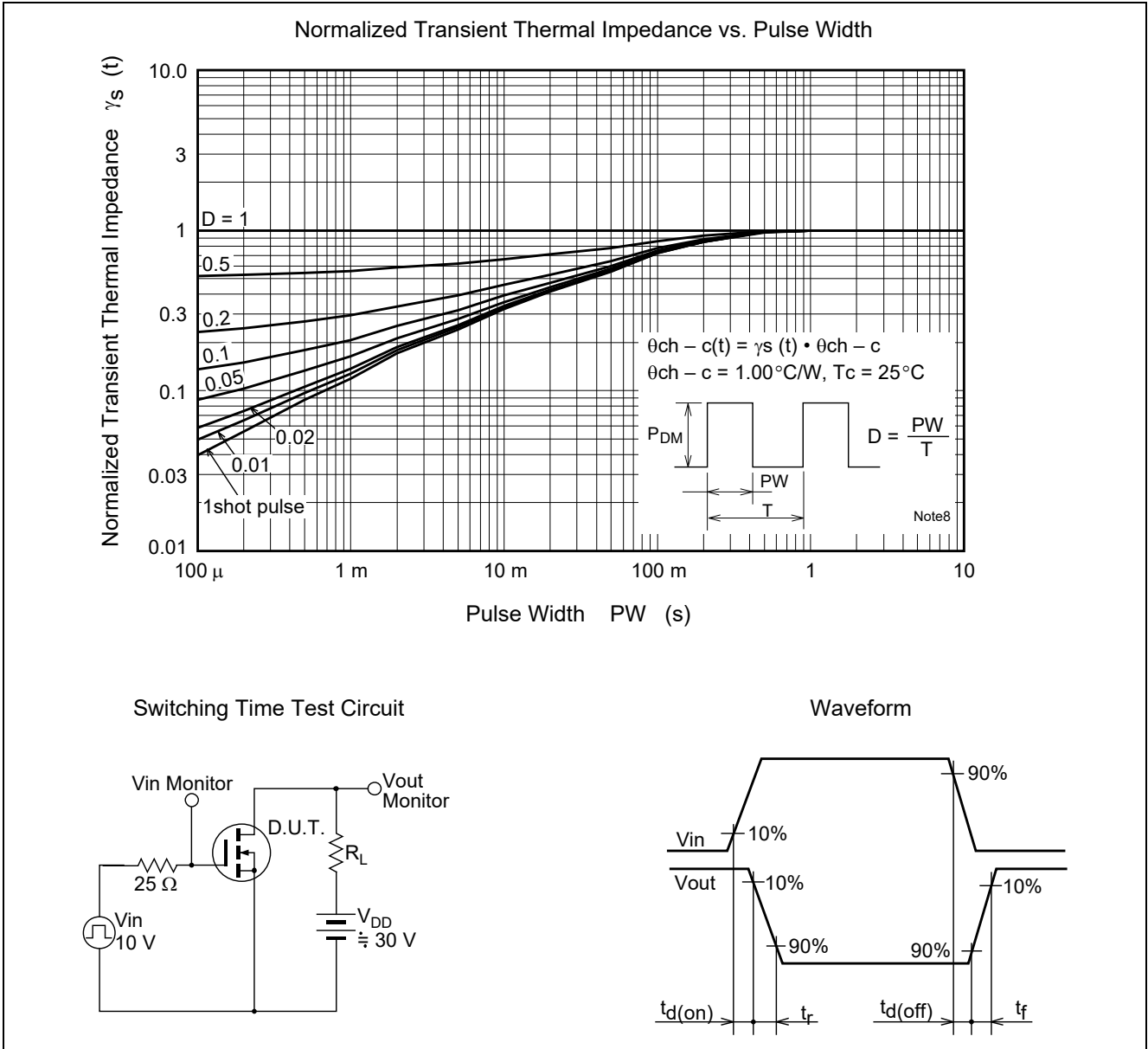


Reverse Drain Current vs. Source to Drain Voltage



Maximum Avalanche Energy vs. Channel Temperature Derating



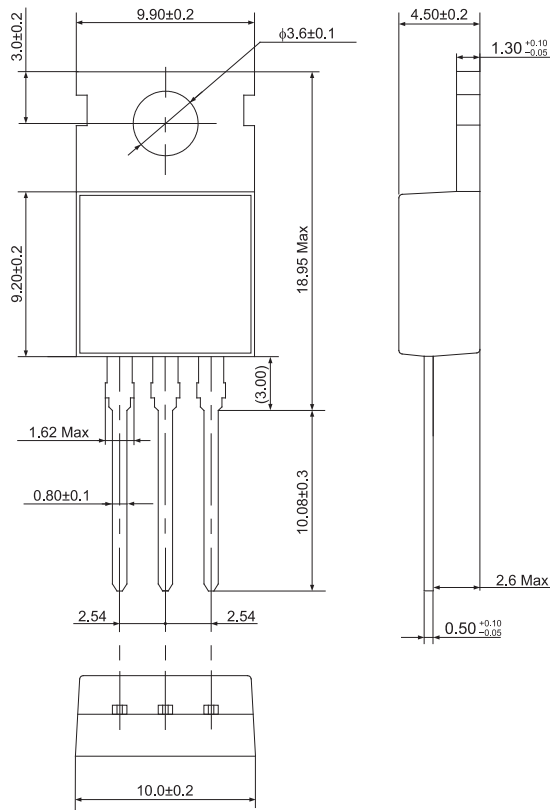


Notes: 8. This data is the designed target maximum value on Renesas's measurement condition.

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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