

RJK1003DPN-E0

N-Channel MOS FET
100 V, 50 A, 11 mΩ

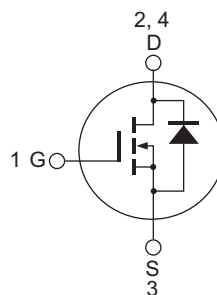
R07DS0621EJ0200
Rev.2.00
Aug 24, 2012

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-220AB

Outline

RENESAS Package code: PRSS0004AG-A
(Package name: TO-220AB)



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

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	50	A
Drain peak current	$I_{D(pulse)}$ ^{Note1}	150	A
Body-drain diode reverse drain current	I_{DR}	50	A
Avalanche current	I_{AP} ^{Note2}	25	A
Avalanche energy	E_{AS} ^{Note2}	63	mJ
Channel dissipation	P_{ch} ^{Note3}	125	W
Channel to case thermal impedance	θ_{ch-c}	1.0	$^\circ\text{C/W}$
Channel temperature	T_{ch}	150	$^\circ\text{C}$
Storage temperature	T_{stg}	-55 to +150	$^\circ\text{C}$

Notes: 1. $PW \leq 10 \mu\text{s}$, duty cycle $\leq 1\%$

2. Value at $L = 100 \mu\text{H}$, $T_{ch} = 25^\circ\text{C}$, $R_g \geq 50\Omega$,

3. $T_c = 25^\circ\text{C}$

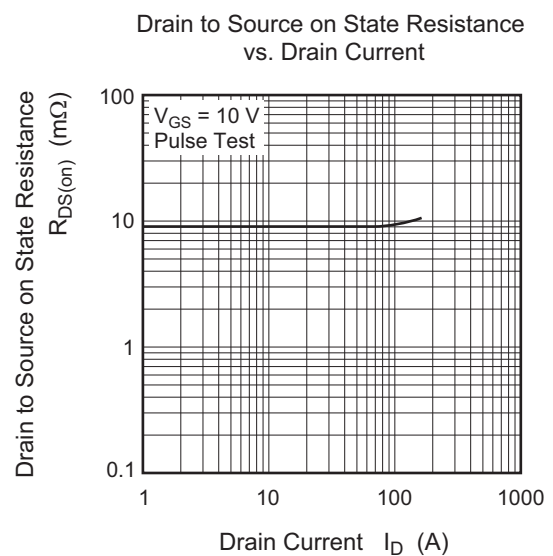
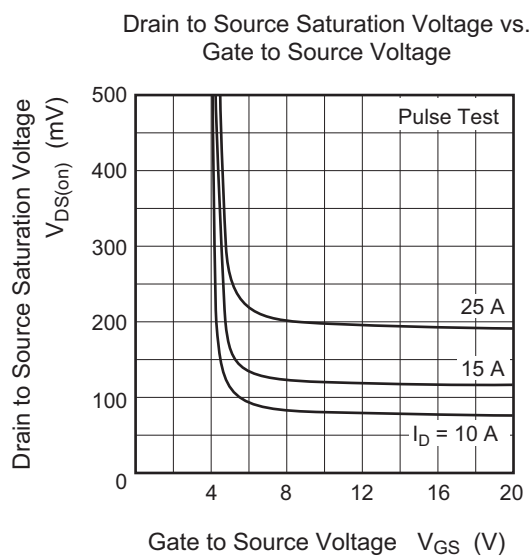
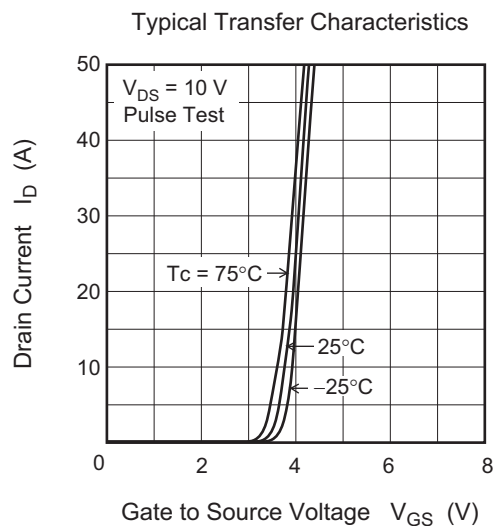
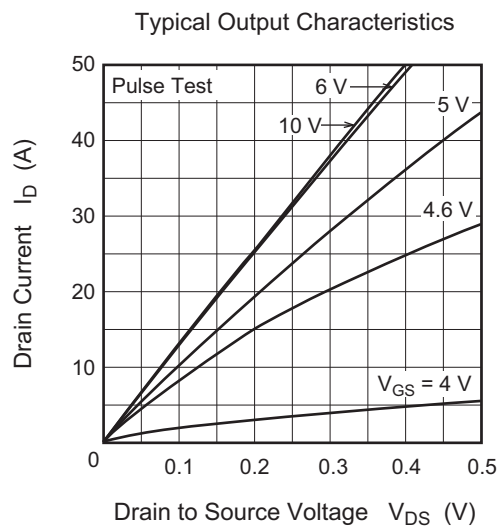
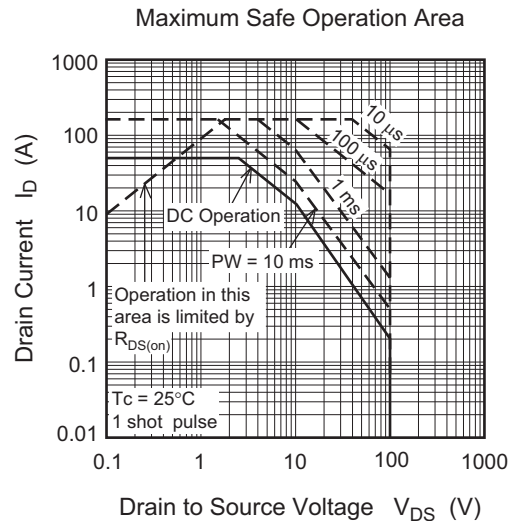
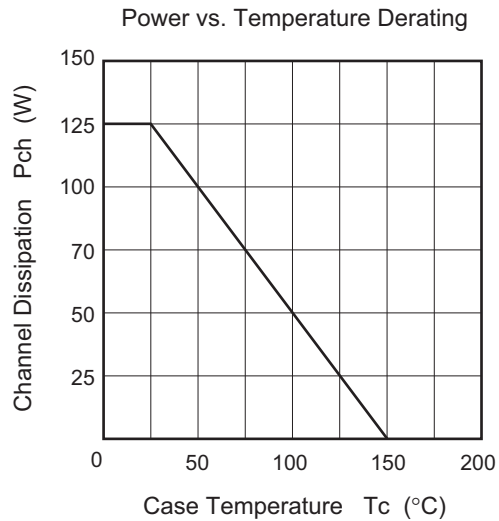
Electrical Characteristics

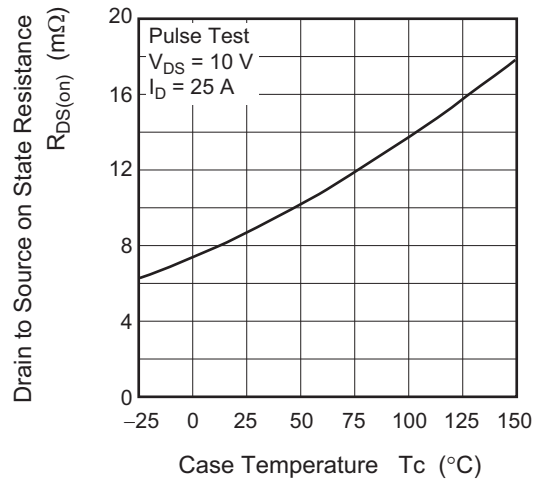
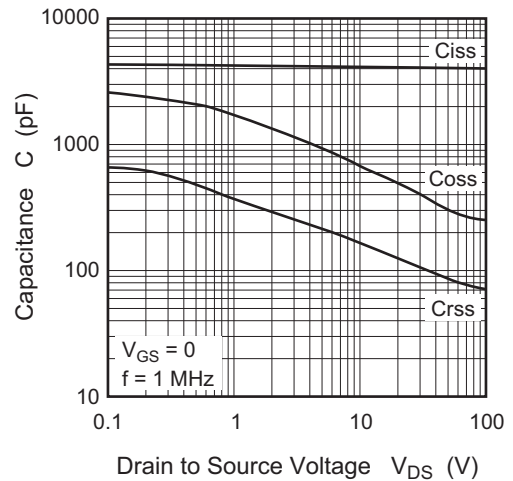
(Ta = 25°C)

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	$\text{m}\Omega$	$I_D = 25\text{ A}$, $V_{GS} = 10\text{ V}$ ^{Note4}
Forward transfer admittance	$ y_{fs} $	—	100	—	S	$I_D = 25\text{ A}$, $V_D = 10\text{ V}$ ^{Note4}
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	$V_{GS} = 10\text{ V}$ $I_D = 25\text{ A}$ $V_{DD} \cong 30\text{ V}$ $R_g = 4.7\text{ }\Omega$
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	$I_F = 50\text{ A}$, $V_{GS} = 0$ ^{Note4}
Body-drain diode reverse recovery time	t_{rr}	—	55	—	ns	$I_F = 50\text{ A}$, $V_{GS} = 0$ $di_F/dt = 100\text{ A}/\mu\text{s}$

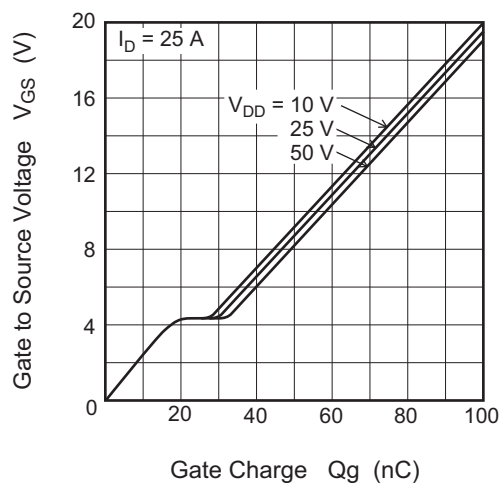
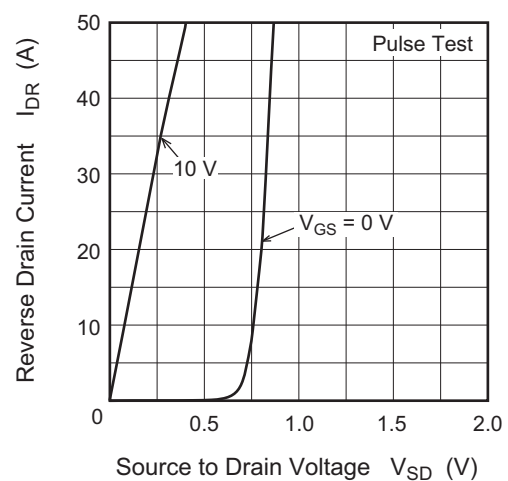
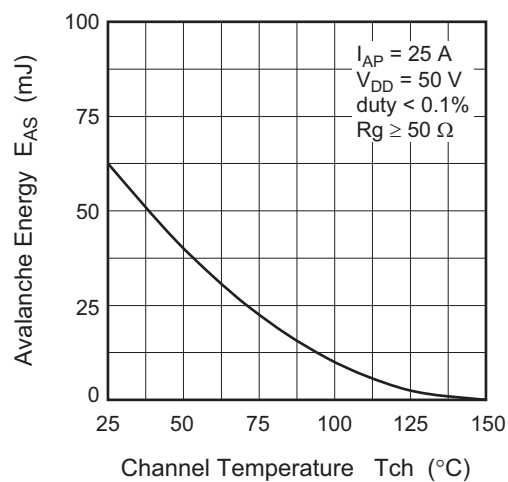
Notes: 4. Pulse test

Main Characteristics

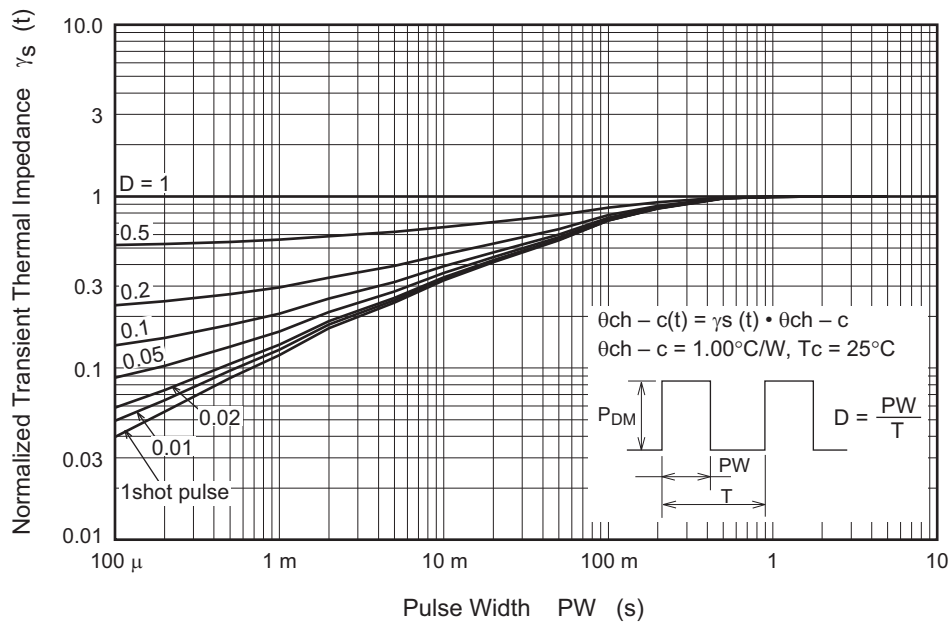


Drain to Source on State Resistance
vs. TemperatureTypical Capacitance vs.
Drain to Source Voltage

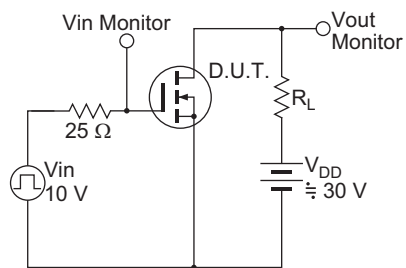
Dynamic Input Characteristics

Reverse Drain Current vs.
Source to Drain VoltageMaximum Avalanche Energy vs.
Channel Temperature Derating

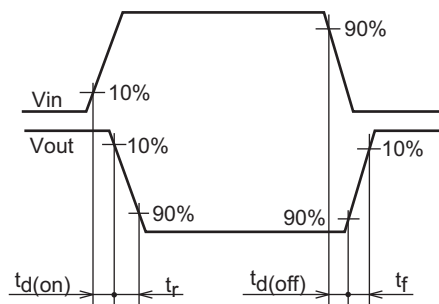
Normalized Transient Thermal Impedance vs. Pulse Width



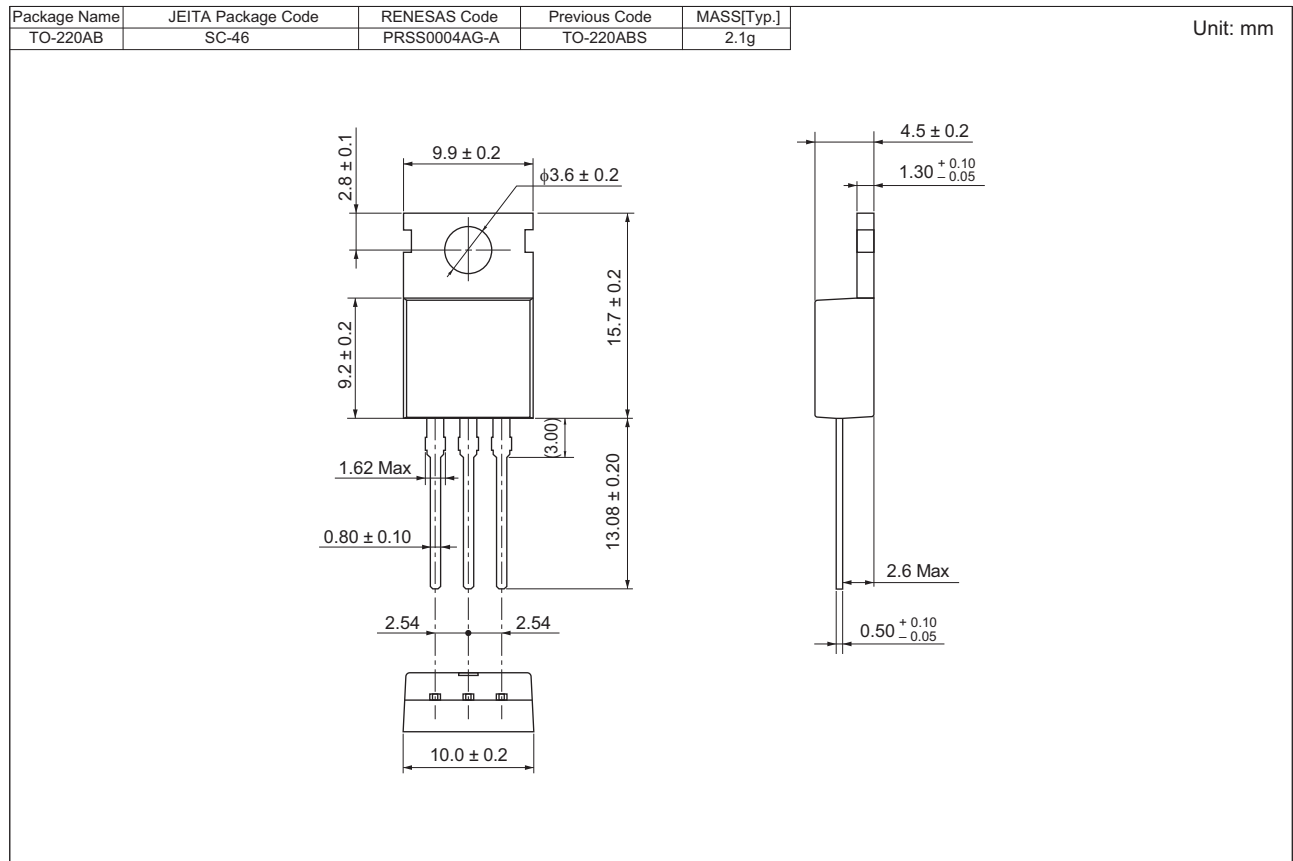
Switching Time Test Circuit



Waveform



Package Dimensions



Ordering Information

Orderable Part Number	Quantity	Shipping Container
RJK1003DPN-E0-T2	50 pcs	Magazine (Tube)

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

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