

# RJK1003DPN-E0

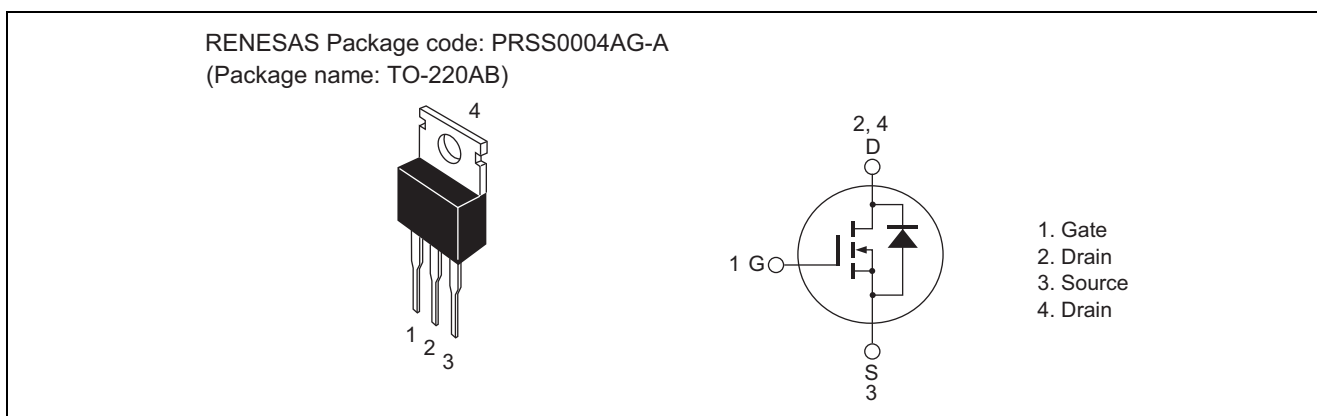
N-Channel MOS FET  
100 V, 50 A, 11 mΩ

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



## 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	$V_{GSS}$	$\pm 20$	V
Drain current	$I_D$	50	A
Drain peak current	$I_{D(pulse)}$ <sup>Note1</sup>	150	A
Body-drain diode reverse drain current	$I_{DR}$	50	A
Avalanche current	$I_{AP}$ <sup>Note2</sup>	25	A
Avalanche energy	$E_{AS}$ <sup>Note2</sup>	63	mJ
Channel dissipation	$P_{ch}$ <sup>Note3</sup>	125	W
Channel to case thermal impedance	$\theta_{ch-c}$	1.0	$^\circ\text{C}/\text{W}$
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.  $T_c = 25^\circ\text{C}$

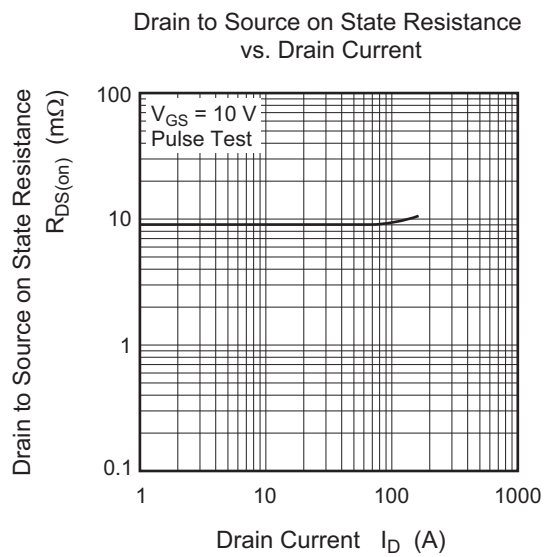
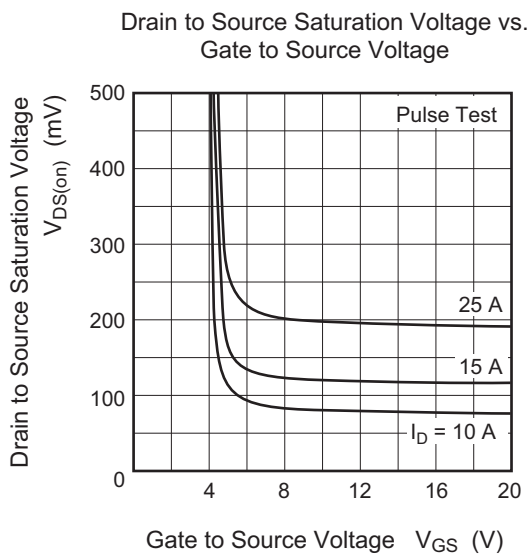
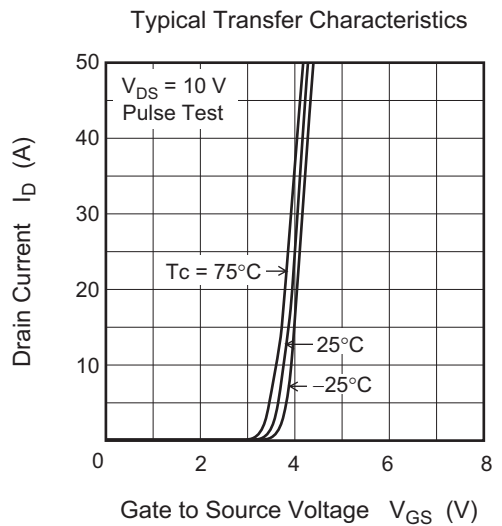
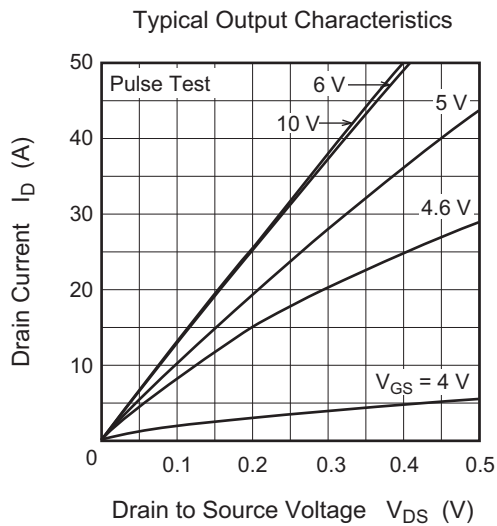
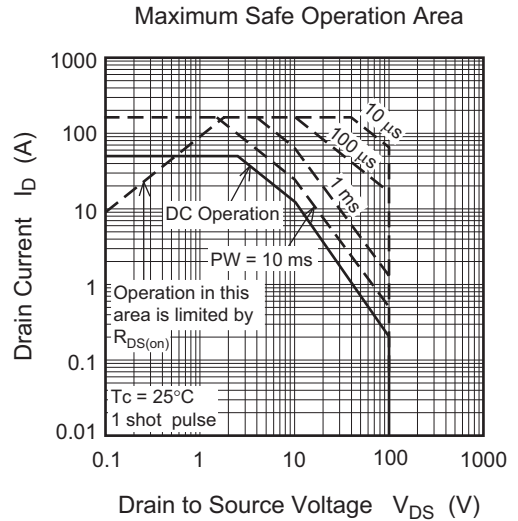
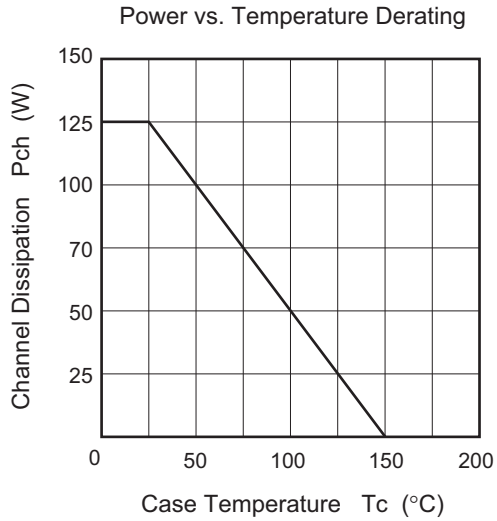
## Electrical Characteristics

(Ta = 25°C)

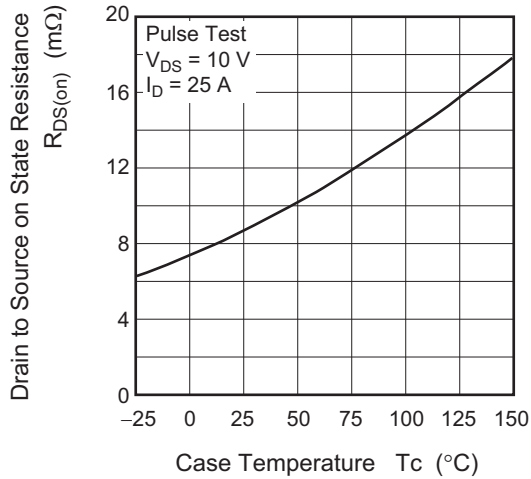
Item	Symbol	Min	Typ	Max	Unit	Test conditions
Drain to source breakdown voltage	$V_{(BR)DSS}$	100	—	—	V	$I_D = 10\text{mA}$ , $V_{GS} = 0$
Gate to source leak current	$I_{GSS}$	—	—	$\pm 0.1$	$\mu\text{A}$	$V_{GS} = \pm 20\text{V}$ , $V_{DS} = 0$
Zero gate voltage drain current	$I_{DSS}$	—	—	1	$\mu\text{A}$	$V_{DS} = 100\text{V}$ , $V_{GS} = 0$
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	$\text{m}\Omega$	$I_D = 25\text{A}$ , $V_{GS} = 10\text{V}$ <sup>Note4</sup>
Forward transfer admittance	$ y_{fs} $	—	100	—	S	$I_D = 25\text{A}$ , $V_D = 10\text{V}$ <sup>Note4</sup>
Input capacitance	$C_{iss}$	—	4150	—	pF	$V_{DS} = 10\text{V}$
Output capacitance	$C_{oss}$	—	660	—	pF	$V_{GS} = 0$
Reverse transfer capacitance	$C_{rss}$	—	160	—	pF	$f = 1\text{MHz}$
Gate Resistance	$R_g$	—	1.6	—	$\Omega$	
Total gate charge	$Q_g$	—	59	—	nC	$V_{DD} = 50\text{V}$
Gate to source charge	$Q_{gs}$	—	20	—	nC	$V_{GS} = 10\text{V}$ ,
Gate to drain charge	$Q_{gd}$	—	12	—	nC	$I_D = 25\text{A}$
Turn-on delay time	$t_{d(on)}$	—	30	—	ns	$V_{GS} = 10\text{V}$
Rise time	$t_r$	—	9	—	ns	$I_D = 25\text{A}$
Turn-off delay time	$t_{d(off)}$	—	60	—	ns	$V_{DD} \cong 30\text{V}$
Fall time	$t_f$	—	10	—	ns	$R_g = 4.7\ \Omega$
Body-drain diode forward voltage	$V_{DF}$	—	0.85	1.5	V	$I_F = 50\text{A}$ , $V_{GS} = 0$ <sup>Note4</sup>
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

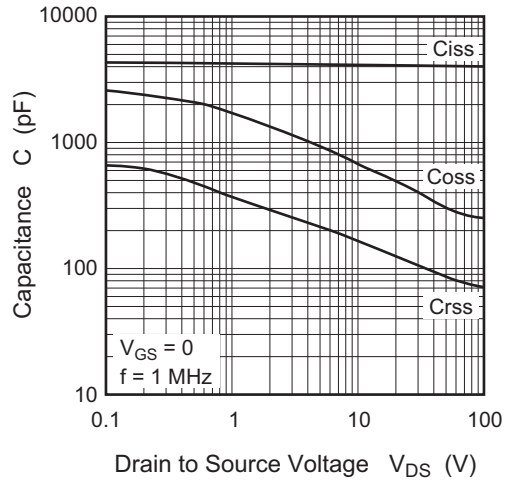
### Main Characteristics



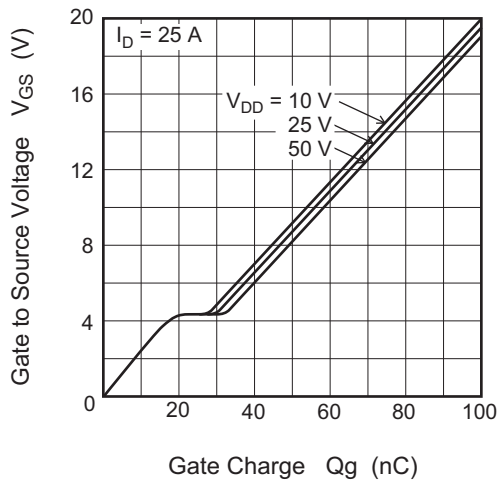
Drain to Source on State Resistance vs. Temperature



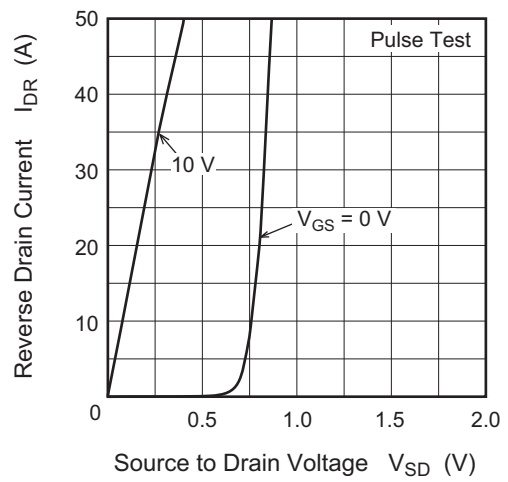
Typical Capacitance vs. Drain to Source Voltage



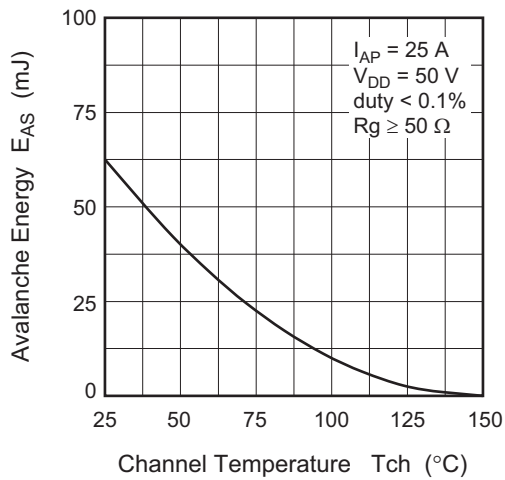
Dynamic Input Characteristics



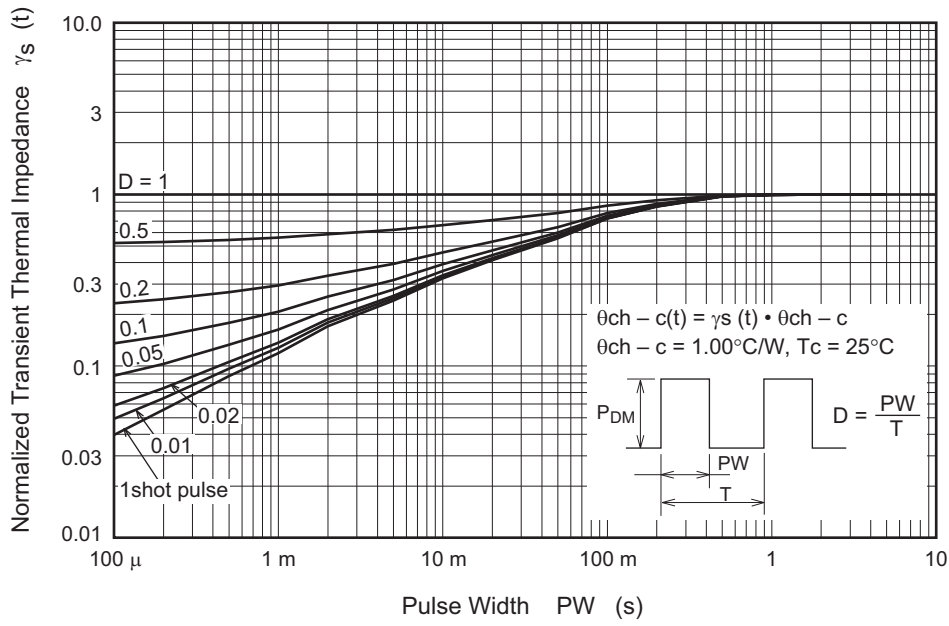
Reverse Drain Current vs. Source to Drain Voltage



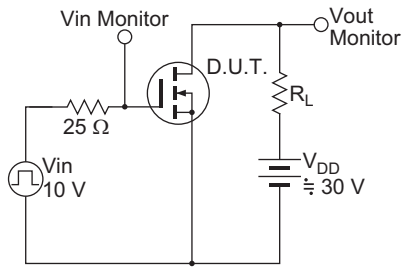
Maximum Avalanche Energy vs. Channel Temperature Derating



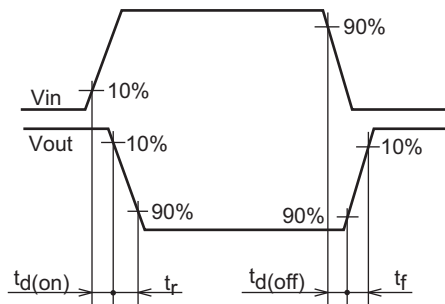
Normalized Transient Thermal Impedance vs. Pulse Width



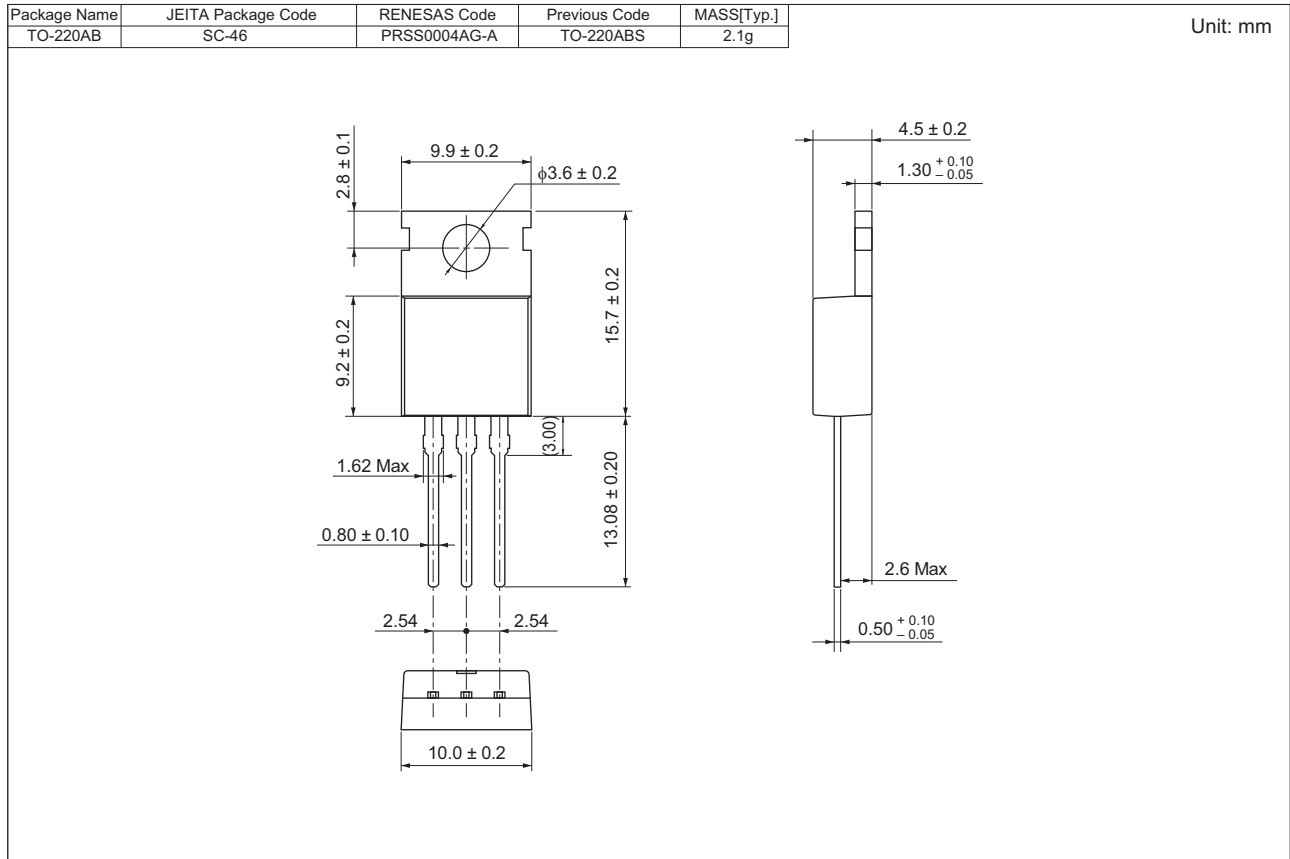
Switching Time Test Circuit



Waveform



### 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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