

RJK0631JPD

Silicon N Channel Power MOS FET
High Speed Power Switching

R07DS0252EJ0300

Rev.3.00

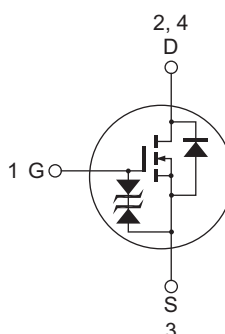
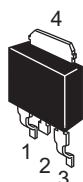
Jul 24, 2013

Features

- For Automotive application
- Low on-resistance : $R_{DS(on)} = 12 \text{ m}\Omega$ typ.
- Capable of 4.5 V gate drive
- Low input capacitance: $C_{iss} = 1350 \text{ pF}$ typ
- AEC-Q101 compliant

Outline

RENESAS Package code: PRSS0004ZD-C
(Package name: DPAK (S))



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

Absolute Maximum Ratings

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

Item	Symbol	Value	Unit
Drain to source voltage	V_{DSS}	60	V
Gate to source voltage	V_{GSS}	± 20	V
Drain current	I_D	30	A
Drain peak current	$I_{D(pulse)}$ ^{Note1}	120	A
Body-drain diode reverse drain current	I_{DR}	30	A
Body-drain diode reverse drain peak current	$I_{DR(pulse)}$ ^{Note1}	120	A
Avalanche current	I_{AP} ^{Note2}	27	A
Avalanche energy	E_{AR} ^{Note2}	62.5	mJ
Channel dissipation	P_{ch} ^{Note3}	45	W
Channel temperature	T_{ch} ^{Note4}	175	$^\circ\text{C}$
Storage temperature	T_{stg}	-55 to +150	$^\circ\text{C}$

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

2. $T_{ch} = 25^\circ\text{C}$, $R_g \geq 50 \Omega$

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

4. AEC-Q101 compliant

Thermal Impedance Characteristics

- Channel to case thermal impedance θ_{ch-c} : 3.33°C/W

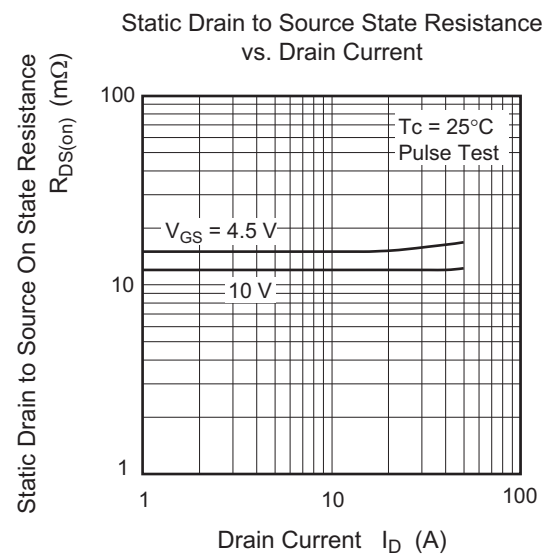
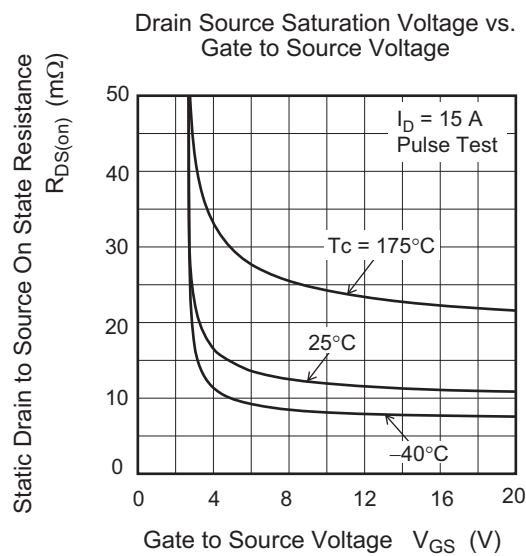
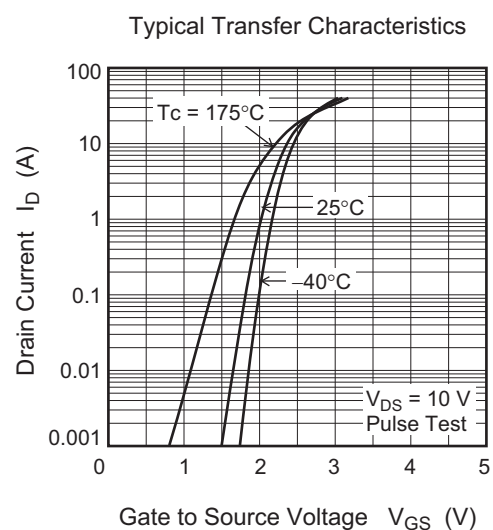
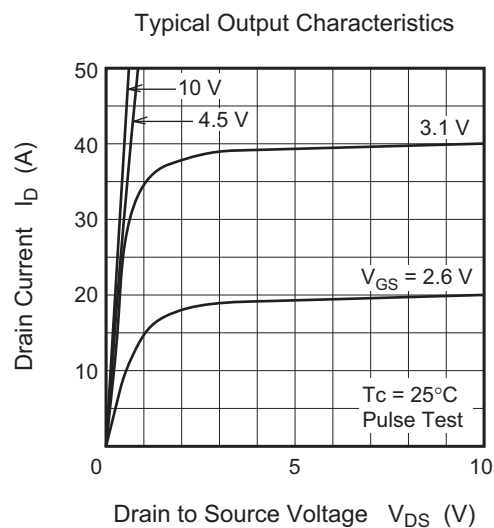
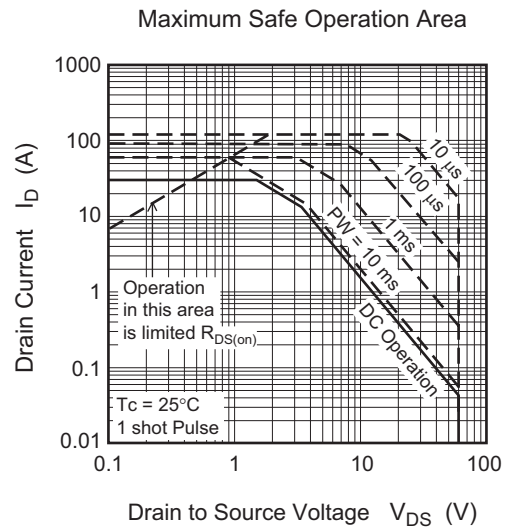
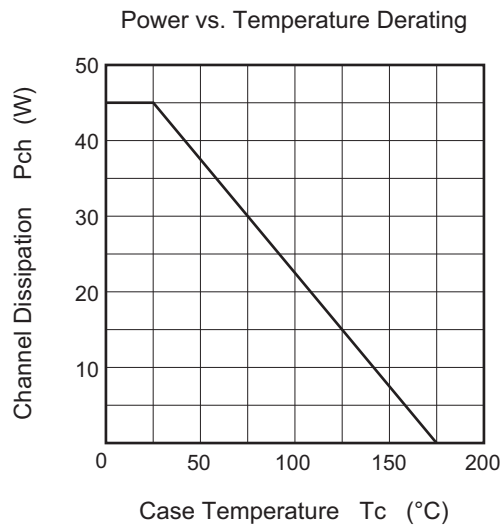
Electrical Characteristics

(Ta = 25°C)

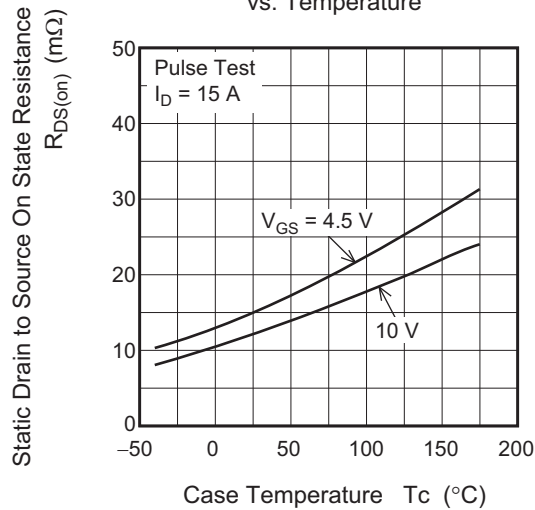
Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Gate to source leak current	I_{GSS}	—	—	± 10	μA	$V_{GS} = \pm 20 V, V_{DS} = 0$
Zero gate voltage drain current	I_{DSS}	—	—	1	μA	$V_{DS} = 60 V, V_{GS} = 0$
Gate to source cutoff voltage	$V_{GS(off)}$	1.0	—	2.0	V	$I_D = 1 mA, V_{DS} = 10 V$
Static drain to source on state resistance	$R_{DS(on)}$	—	12	15	$m\Omega$	$I_D = 15 A, V_{GS} = 10 V$ ^{Note5}
		—	15	20	$m\Omega$	$I_D = 15 A, V_{GS} = 4.5 V$ ^{Note5}
Input capacitance	C_{iss}	—	1350	—	pF	$V_{DS} = 10V, V_{GS} = 0,$ $f = 1 MHz$
Output capacitance	C_{oss}	—	360	—	pF	
Reverse transfer capacitance	C_{rss}	—	270	—	pF	
Total gate charge	Q_g	—	32	—	nC	$V_{DD} = 25 V, V_{GS} = 10 V,$ $I_D = 30 A$
Gate to source charge	Q_{gs}	—	3.6	—	nC	
Gate to drain charge	Q_{gd}	—	10	—	nC	
Turn-on delay time	$t_{d(on)}$	—	13	—	ns	$I_D = 15 A, R_L = 2 \Omega,$ $V_{GS} = 10 V, R_G = 4.7 \Omega$
Rise time	t_r	—	15	—	ns	
Turn-off delay time	$t_{d(off)}$	—	60	—	ns	
Fall time	t_f	—	15	—	ns	
Body-drain diode forward voltage	V_{DF}	—	0.94	1.17	V	$I_F = 30 A, V_{GS} = 0$ ^{Note5}
Body-drain diode reverse recovery time	t_{rr}	—	40	—	ns	$I_F = 30 A, V_{GS} = 0$ $di_F/dt = 100 A/\mu s$

Note: 5. Pulse test

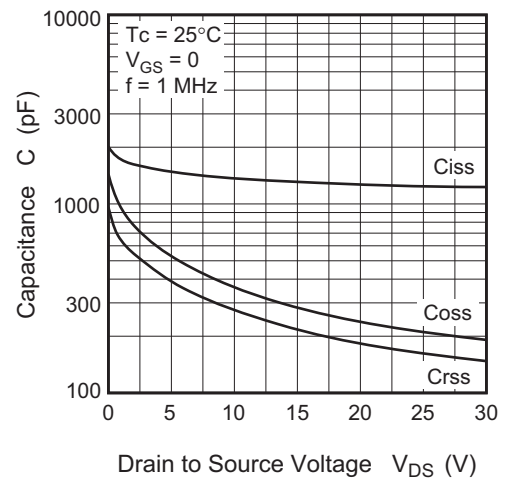
Main Characteristics



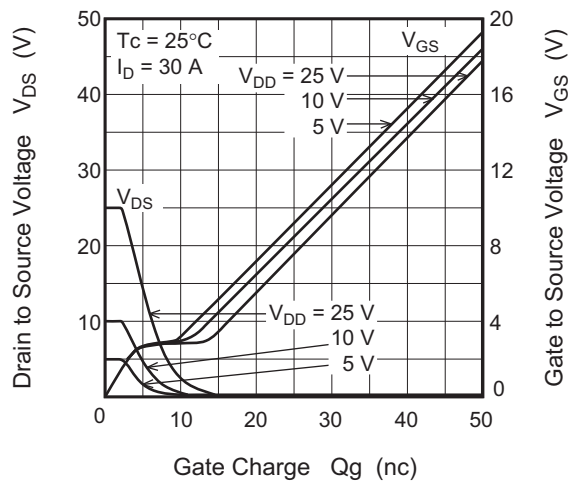
Static Drain to Source On State Resistance vs. Temperature



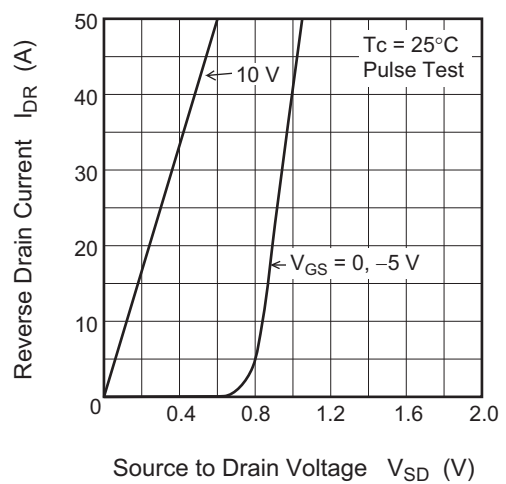
Typical Capacitance vs. Drain to Source Voltage



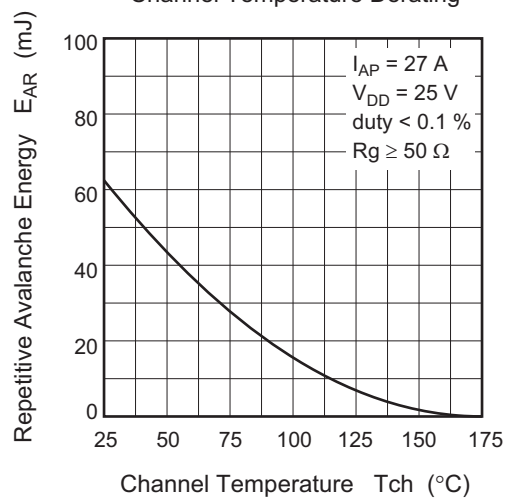
Dynamic Input Characteristics

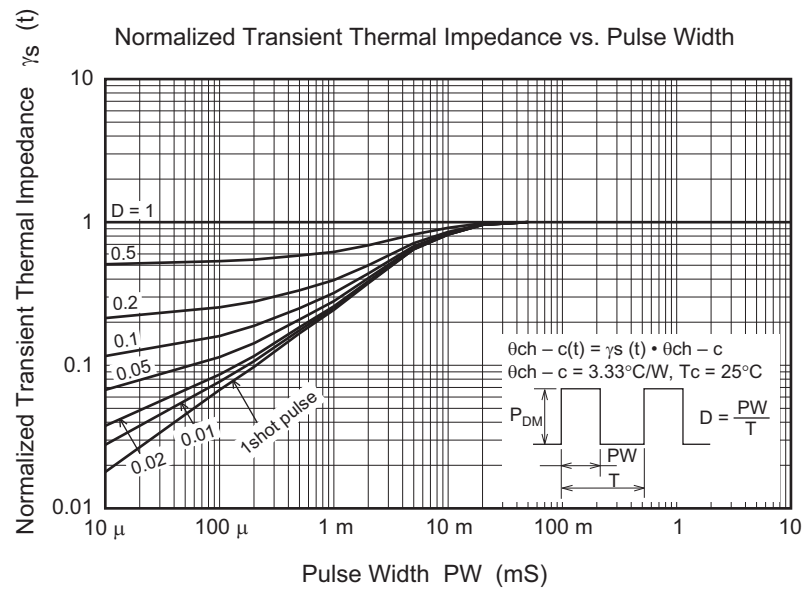


Reverse Drain Current vs. Source to Drain Voltage

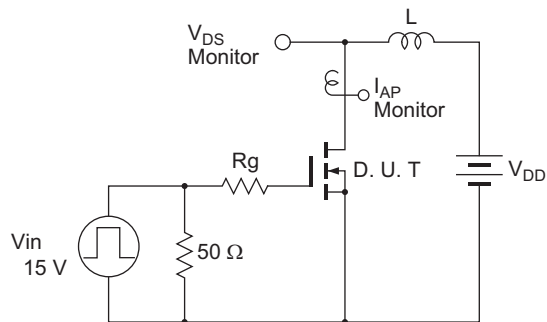


Avalanche Energy vs. Channel Temperature Derating



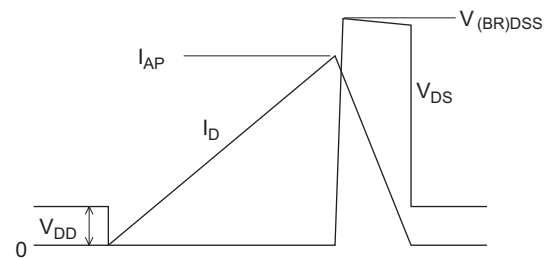


Avalanche Test Circuit

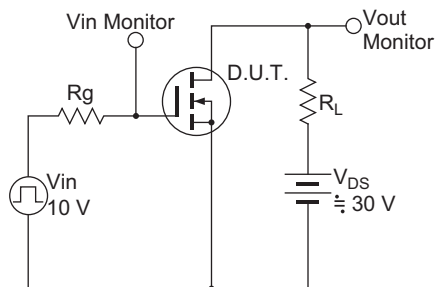


Avalanche Waveform

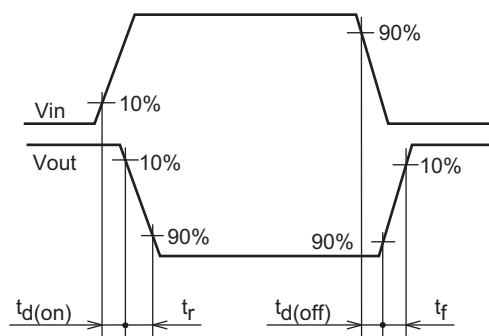
$$E_{AR} = \frac{1}{2} L \cdot I_{AP}^2 \cdot \frac{V_{DSS}}{V_{DSS} - V_{DD}}$$



Switching Time Test Circuit



Switching Time Waveform



Package Dimensions

Package Name	JEITA Package Code	RENESAS Code	Previous Code	MASS[Typ.]	Unit: mm
DPAK(S)	SC-63	PRSS0004ZD-C	DPAK(S) / DPAK(S)V	0.28g	

The drawing shows the mechanical dimensions of the RJK0631JPD package in millimeters. The top view shows a rectangular package with a width of 6.5 ± 0.3 mm and a body width of 5.6 ± 0.5 mm. The height is 1.5 ± 0.5 mm. The side view shows a maximum height of 5.5 ± 0.5 mm, a maximum width of 1.2 mm, and a base width of 1.0 Max. mm. The bottom view shows a width of 2.29 ± 0.5 mm and a distance of 0.8 ± 0.1 mm between the mounting tabs. The side view also shows a width of 2.3 ± 0.2 mm, a height of 0.55 ± 0.1 mm, and a base width of 0.55 ± 0.1 mm. The bottom view shows a width of 5.1 mm and a height of 0.55 ± 0.1 mm.

Ordering Information

Orderable Part Number	Quantity	Shipping Container
RJK0631JPD-00-J0	3000 pcs	Taping (Left-winded)

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

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