

RJK5013DPP-E0

500V - 14A - MOS FET
High Speed Power Switching

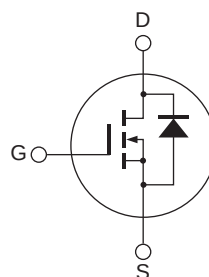
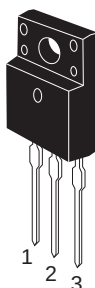
R07DS0606EJ0100
Rev.1.00
Feb 29, 2012

Features

- Low on-resistance
 $R_{DS(on)} = 0.385 \Omega$ typ. (at $I_D = 7 A$, $V_{GS} = 10 V$, $T_a = 25^\circ C$)
- Low leakage current
- High speed switching

Outline

RENESAS Package code: PRSS0003AG-A
(Package name: TO-220FP)



1. Gate
2. Drain
3. Source

Absolute Maximum Ratings

($T_a = 25^\circ C$)

Item	Symbol	Ratings	Unit
Drain to source voltage	V_{DS}	500	V
Gate to source voltage	V_{GS}	± 30	V
Drain current	I_D ^{Note4}	14	A
Drain peak current	$I_{D(pulse)}$ ^{Note1}	42	A
Body-drain diode reverse drain current	I_{DR}	14	A
Body-drain diode reverse drain peak current	$I_{DR(pulse)}$ ^{Note1}	42	A
Avalanche current	I_{AP} ^{Note3}	4	A
Avalanche energy	E_{AR} ^{Note3}	0.88	mJ
Channel dissipation	P_{ch} ^{Note2}	30	W
Channel to case thermal impedance	θ_{ch-c}	4.17	$^\circ C/W$
Channel temperature	T_{ch}	150	$^\circ C$
Storage temperature	T_{stg}	-55 to +150	$^\circ C$

- Notes: 1. $PW \leq 10 \mu s$, duty cycle $\leq 1\%$
2. Value at $T_c = 25^\circ C$
3. $STch = 25^\circ C$, $T_{ch} \leq 150^\circ C$
4. Limited by maximum safe operation area

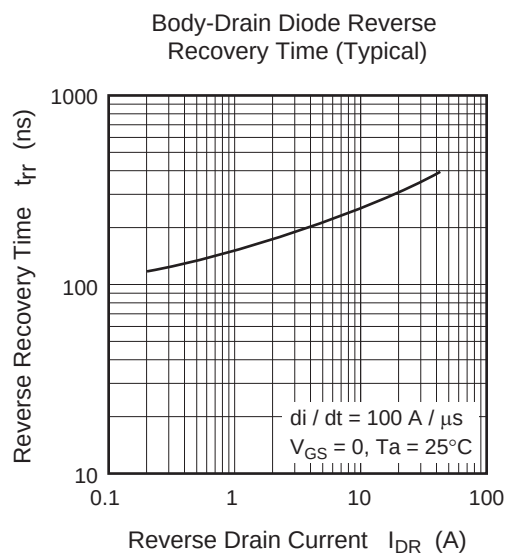
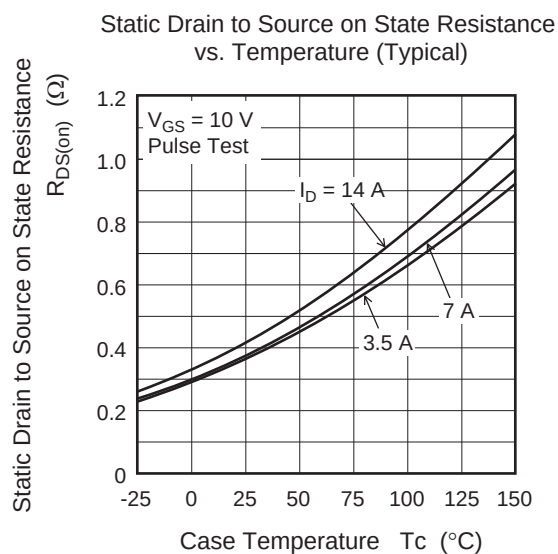
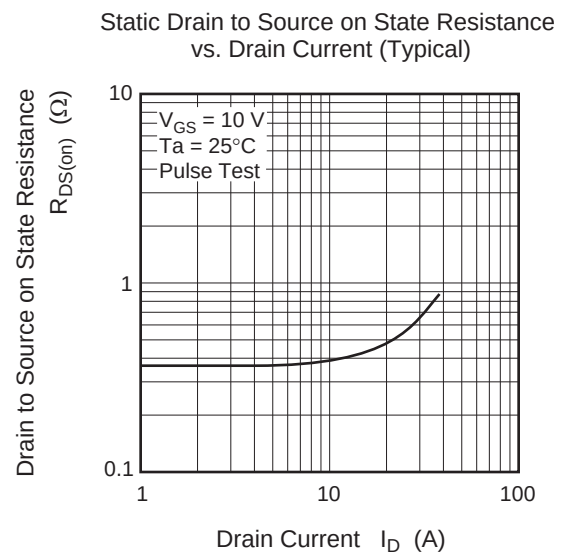
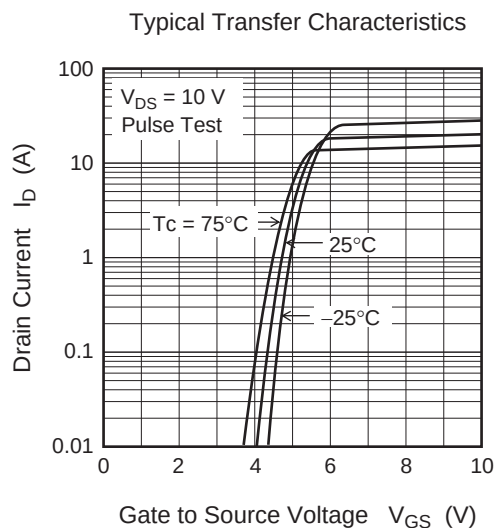
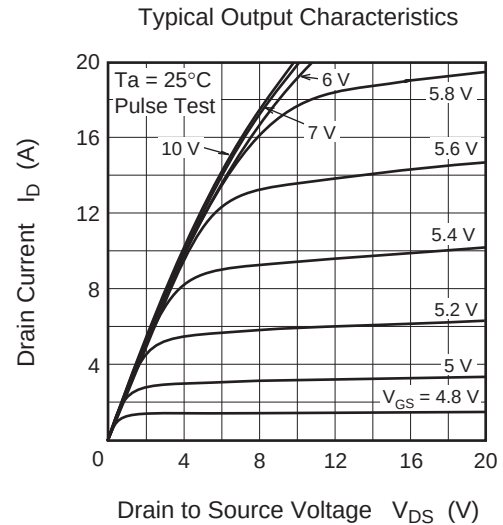
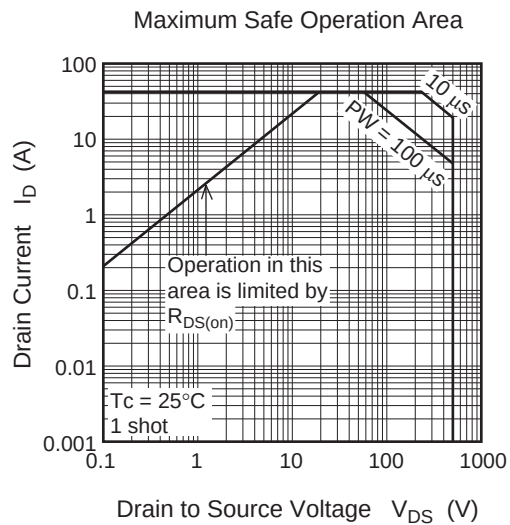
Electrical Characteristics

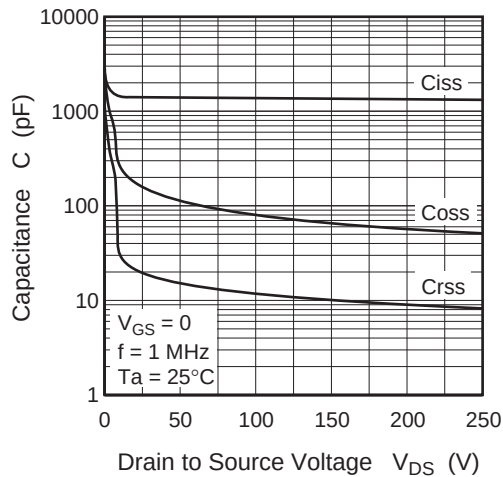
(Ta = 25°C)

Item	Symbol	Min	Typ	Max	Unit	Test conditions
Drain to source breakdown voltage	$V_{(BR)DSS}$	500	—	—	V	$I_D = 10 \text{ mA}$, $V_{GS} = 0$
Zero gate voltage drain current	I_{DSS}	—	—	1	μA	$V_{DS} = 500 \text{ V}$, $V_{GS} = 0$
Gate to source leak current	I_{GSS}	—	—	± 0.1	μA	$V_{GS} = \pm 30 \text{ V}$, $V_{DS} = 0$
Gate to source cutoff voltage	$V_{GS(off)}$	3.0	—	4.5	V	$V_{DS} = 10 \text{ V}$, $I_D = 1 \text{ mA}$
Static drain to source on state resistance	$R_{DS(on)}$	—	0.385	0.465	Ω	$I_D = 7 \text{ A}$, $V_{GS} = 10 \text{ V}$ ^{Note5}
Input capacitance	C_{iss}	—	1450	—	pF	$V_{DS} = 25 \text{ V}$ $V_{GS} = 0$ $f = 1 \text{ MHz}$
Output capacitance	C_{oss}	—	155	—	pF	
Reverse transfer capacitance	C_{rss}	—	19	—	pF	
Turn-on delay time	$t_{d(on)}$	—	34	—	ns	$I_D = 7 \text{ A}$ $V_{GS} = 10 \text{ V}$ $R_L = 35.7 \Omega$ $R_g = 10 \Omega$
Rise time	t_r	—	24	—	ns	
Turn-off delay time	$t_{d(off)}$	—	86	—	ns	
Fall time	t_f	—	16	—	ns	
Total gate charge	Q_g	—	38	—	nC	$V_{DD} = 400 \text{ V}$ $V_{GS} = 10 \text{ V}$ $I_D = 14 \text{ A}$
Gate to source charge	Q_{gs}	—	8	—	nC	
Gate to drain charge	Q_{gd}	—	17	—	nC	
Body-drain diode forward voltage	V_{DF}	—	0.9	1.5	V	$I_F = 14 \text{ A}$, $V_{GS} = 0$ ^{Note5}
Body-drain diode reverse recovery time	t_{rr}	—	310	—	ns	$I_F = 14 \text{ A}$, $V_{GS} = 0$ $di_F/dt = 100 \text{ A}/\mu\text{s}$

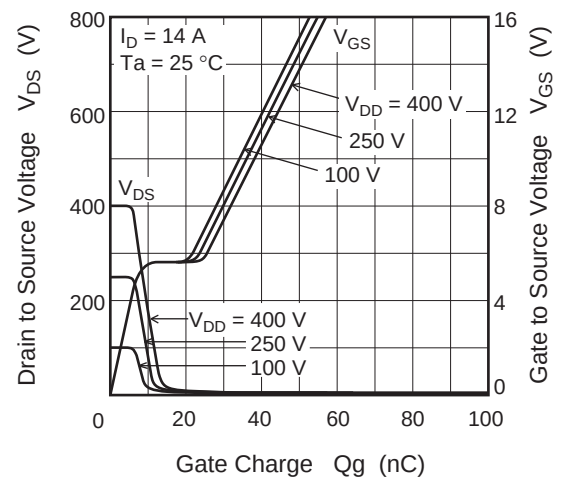
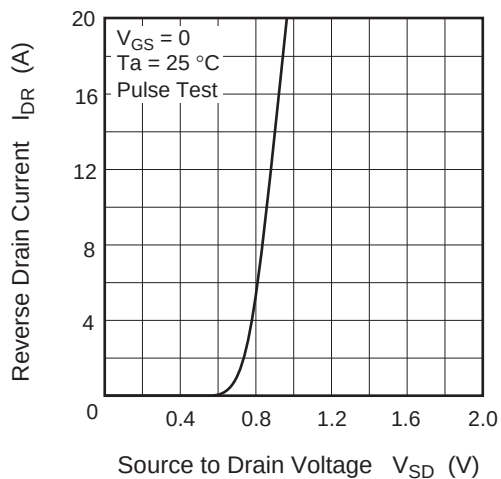
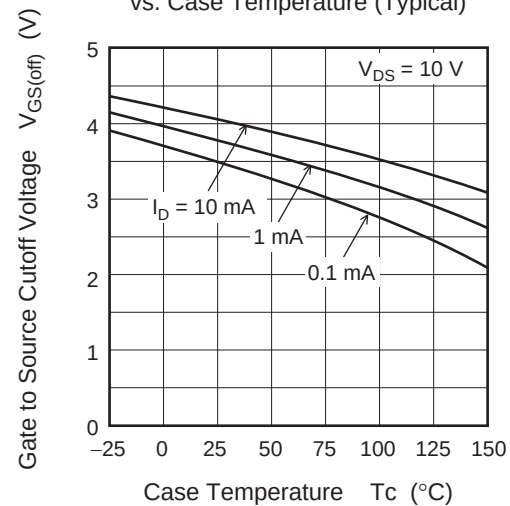
Notes: 5. Pulse test

Main Characteristics

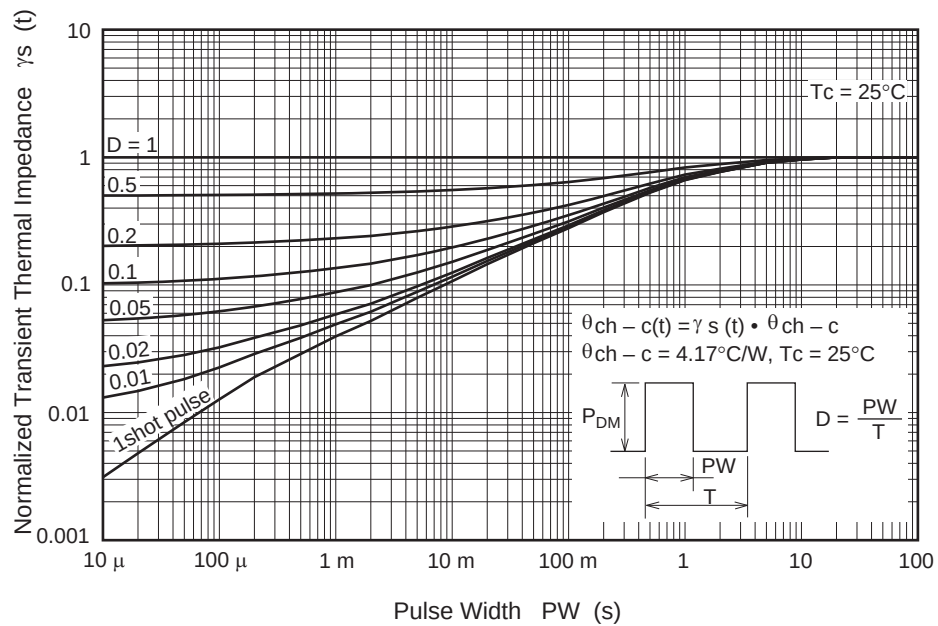


Typical Capacitance vs.
Drain to Source Voltage

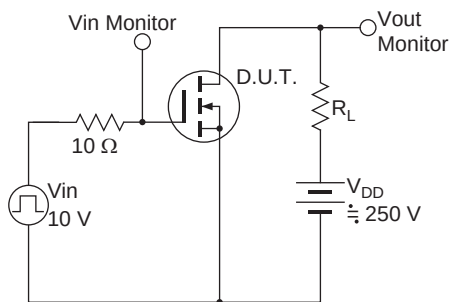
Dynamic Input Characteristics (Typical)

Reverse Drain Current vs.
Source to Drain Voltage (Typical)Gate to Source Cutoff Voltage
vs. Case Temperature (Typical)

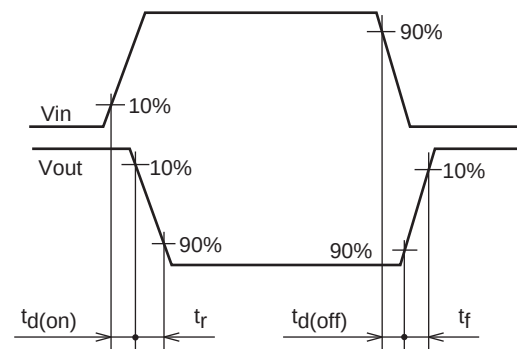
Normalized Transient Thermal Impedance vs. Pulse Width



Switching Time Test Circuit



Waveform



Package Dimensions

Package Name	JEITA Package Code	RENESAS Code	Previous Code	MASS[Typ.]	Unit: mm
TO-220FP	—	PRSS0003AG-A	—	1.9g	

The drawing shows the mechanical dimensions of the RJK5013DPP-E0 TO-220FP package. The top view shows a rectangular body with a width of 10.16 ± 0.20 mm and a height of 6.68 ± 0.20 mm. The top surface has a central circular feature with a diameter of $\phi 3.18 \pm 0.10$ mm. The side view shows a total height of 15.87 ± 0.20 mm, with a base thickness of 3.3 ± 0.2 mm. The bottom view shows a width of 5.08 ± 0.20 mm and a height of 4.7 ± 0.2 mm. The package has three leads with a maximum length of 1.47 mm. The lead spacing is 1.28 ± 0.30 mm. The lead width is 0.80 ± 0.20 mm. The lead thickness is $0.50^{+0.10}_{-0.05}$ mm. The lead pitch is 2.76 ± 0.20 mm. The lead length is 2.54 ± 0.20 mm.

Ordering Information

Orderable Part Number	Quantity	Shipping Container
RJK5013DPP-E0#T2	1000 pcs	Box (Tube)

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