

# RJL5014DPP-A0

500V - 19A - MOS FET  
High Speed Power Switching

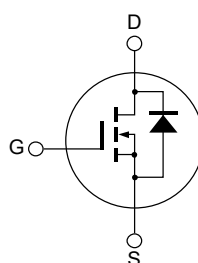
R07DS1436EJ0100  
Rev.1.00  
Mar.23.2021

## Features

- Built-in fast recovery diode
- Low on-resistance  
 $R_{DS(on)} = 0.32 \Omega$  typ. (at  $I_D = 9.5 A$ ,  $V_{GS} = 10 V$ ,  $T_a = 25 ^\circ C$ )
- Low leakage current
- High speed switching
- Quality grade: Standard

## Outline

RENESAS Package code: PRSS0003AP-A  
(Package name: TO-220FPA)



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	$V_{GS}$	$\pm 30$	V
Drain current	$I_D$ Notes4	19	A
Drain peak current	$I_{D(pulse)}$ Notes1	57	A
Body-drain diode reverse drain current	$I_{DR}$	19	A
Body-drain diode reverse drain peak current	$I_{DR(pulse)}$ Notes1	57	A
Avalanche current	$I_{AP}$ Notes3	4	A
Avalanche energy	$E_{AR}$ Notes3	0.88	mJ
Channel dissipation	$P_{ch}$ Notes2	35	W
Channel temperature	$T_{ch}$	150	$^\circ C$
Storage temperature	$T_{stg}$	-55 to +150	$^\circ C$

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.  $PW \leq 10 \mu s$ , 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

## Thermal Resistance Characteristics

(Ta = 25 °C)

Item	Symbol	Max. Value <sup>Notes5</sup>	Unit
Channel to case thermal impedance	$\theta_{ch-c}$	3.57	°C/W

Notes: 5. Designed target value on Renesas measurement condition. (Not tested)

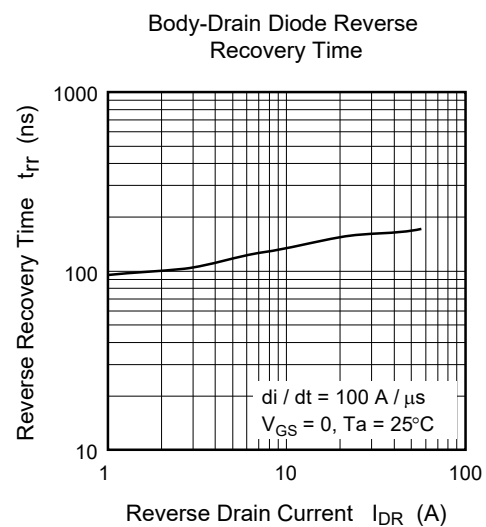
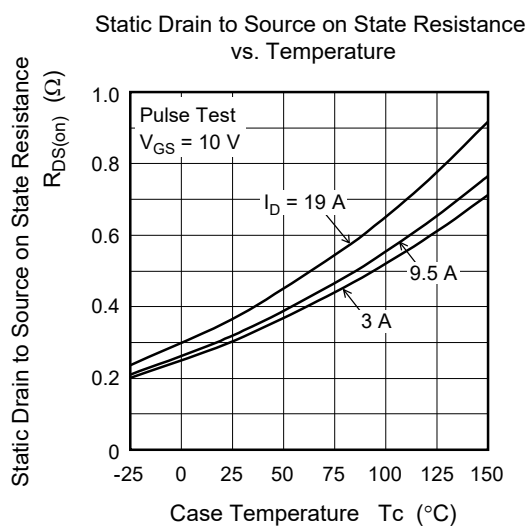
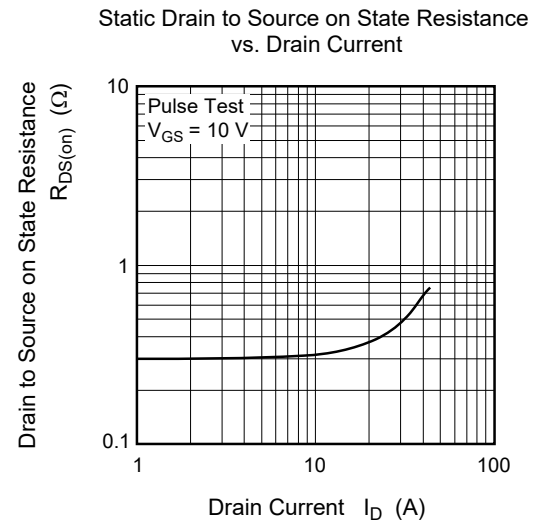
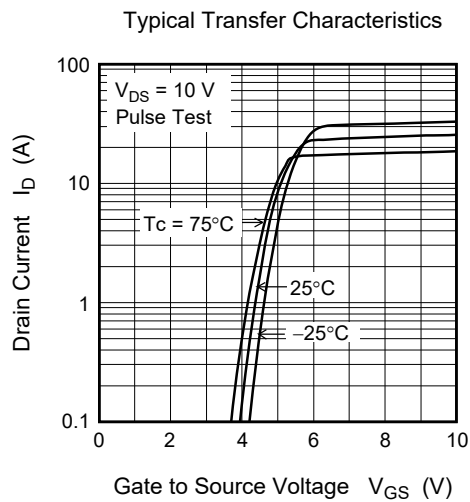
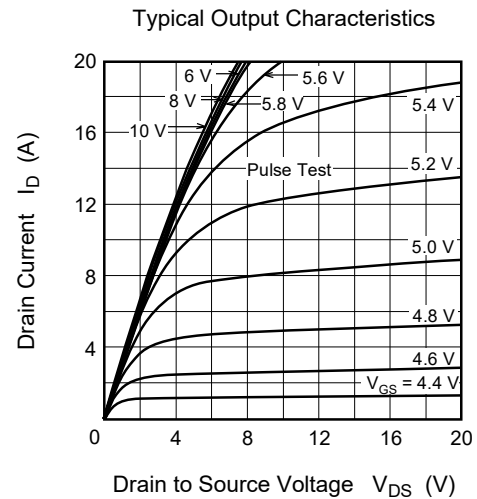
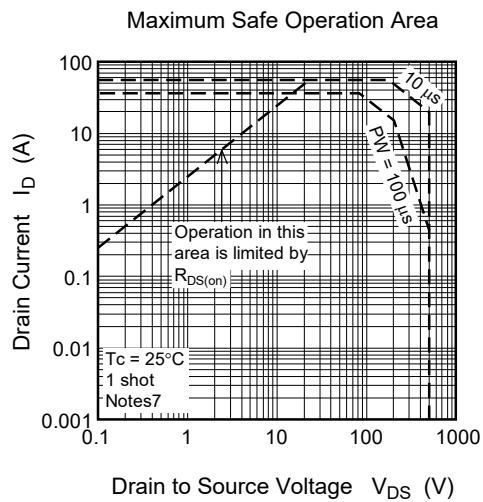
## Electrical Characteristics

(Ta = 25 °C)

Item	Symbol	Min	Typ	Max	Unit	Test conditions
Drain to source breakdown voltage	$V_{(BR)DSS}$	500	—	—	V	$I_D = 10 \text{ mA}$ , $V_{GS} = 0$
Zero gate voltage drain current	$I_{DSS}$	—	—	10	$\mu\text{A}$	$V_{DS} = 500 \text{ V}$ , $V_{GS} = 0$
Gate to source leak current	$I_{GSS}$	—	—	$\pm 0.1$	$\mu\text{A}$	$V_{GS} = \pm 30 \text{ V}$ , $V_{DS} = 0$
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	$R_{DS(on)}$	—	0.32	0.40	$\Omega$	$I_D = 9.5 \text{ A}$ , $V_{GS} = 10 \text{ V}$ <sup>Notes6</sup>
Input capacitance	$C_{iss}$	—	1700	—	pF	$V_{DS} = 25 \text{ V}$ $V_{GS} = 0$ $f = 1 \text{ MHz}$
Output capacitance	$C_{oss}$	—	190	—	pF	
Reverse transfer capacitance	$C_{rss}$	—	23	—	pF	
Turn-on delay time	$t_{d(on)}$	—	32	—	ns	$I_D = 9.5 \text{ A}$ $V_{GS} = 10 \text{ V}$ $R_L = 26.3 \Omega$ $R_g = 10 \Omega$
Rise time	$t_r$	—	27	—	ns	
Turn-off delay time	$t_{d(off)}$	—	95	—	ns	
Fall time	$t_f$	—	20	—	ns	
Total gate charge	$Q_g$	—	43	—	nC	$V_{DD} = 400 \text{ V}$ $V_{GS} = 10 \text{ V}$ $I_D = 19 \text{ A}$
Gate to source charge	$Q_{gs}$	—	8.2	—	nC	
Gate to drain charge	$Q_{gd}$	—	21.8	—	nC	
Body-drain diode forward voltage	$V_{DF}$	—	1.00	1.65	V	$I_F = 19 \text{ A}$ , $V_{GS} = 0$ <sup>Notes6</sup>
Body-drain diode reverse recovery time	$t_{rr}$	—	160	—	ns	$I_F = 19 \text{ A}$ , $V_{GS} = 0$ $di_F/dt = 100 \text{ A}/\mu\text{s}$

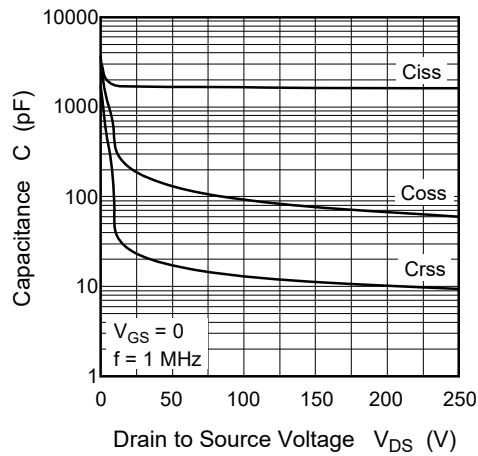
Notes: 6. Pulse test

## Main Characteristics

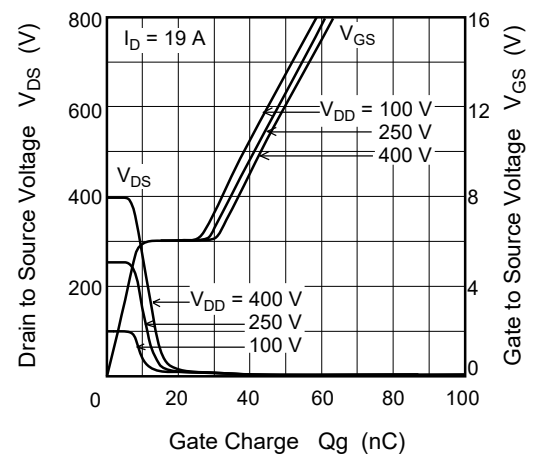


Notes: 7. Designed target value on Renesas measurement condition. (Not tested)  
 Renesas recommends that operating conditions are designed according to a document "Power MOS FET · IGBT Attention of Handling Semiconductor Devices".

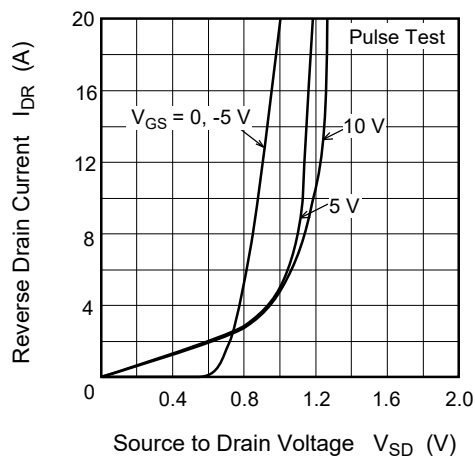
Typical Capacitance vs.  
Drain to Source Voltage



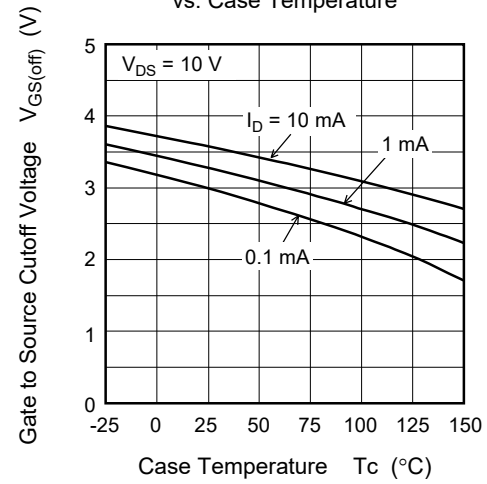
Dynamic Input Characteristics

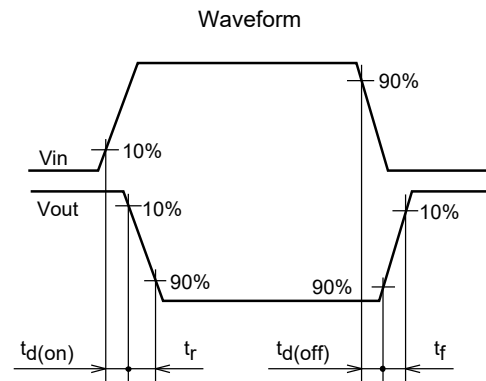
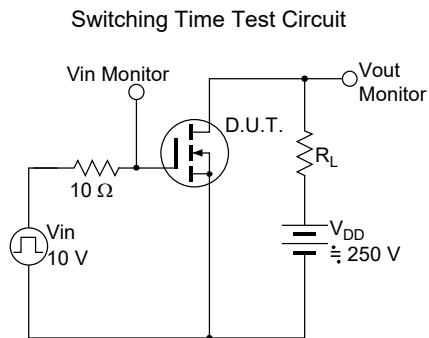
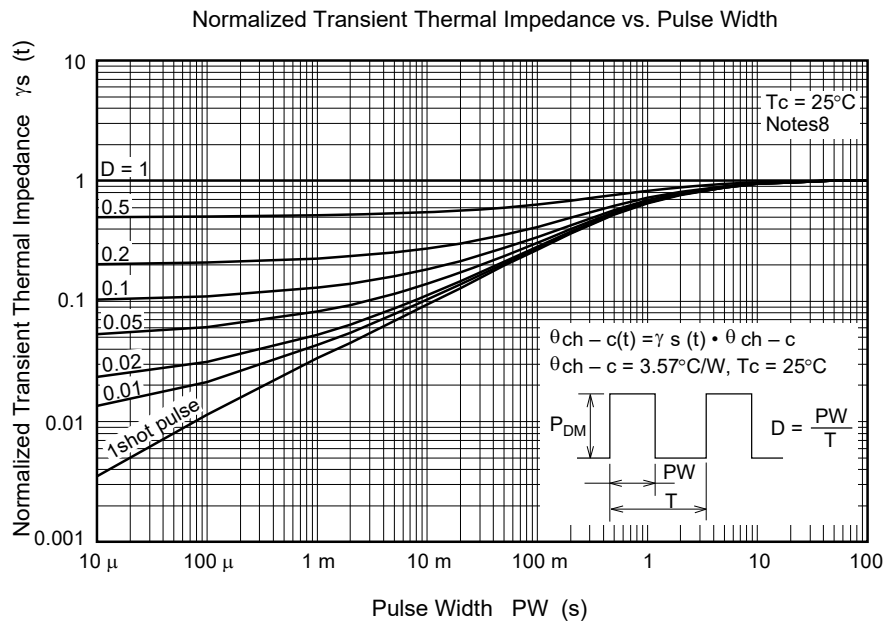


Reverse Drain Current vs.  
Source to Drain Voltage



Gate to Source Cutoff Voltage  
vs. Case Temperature



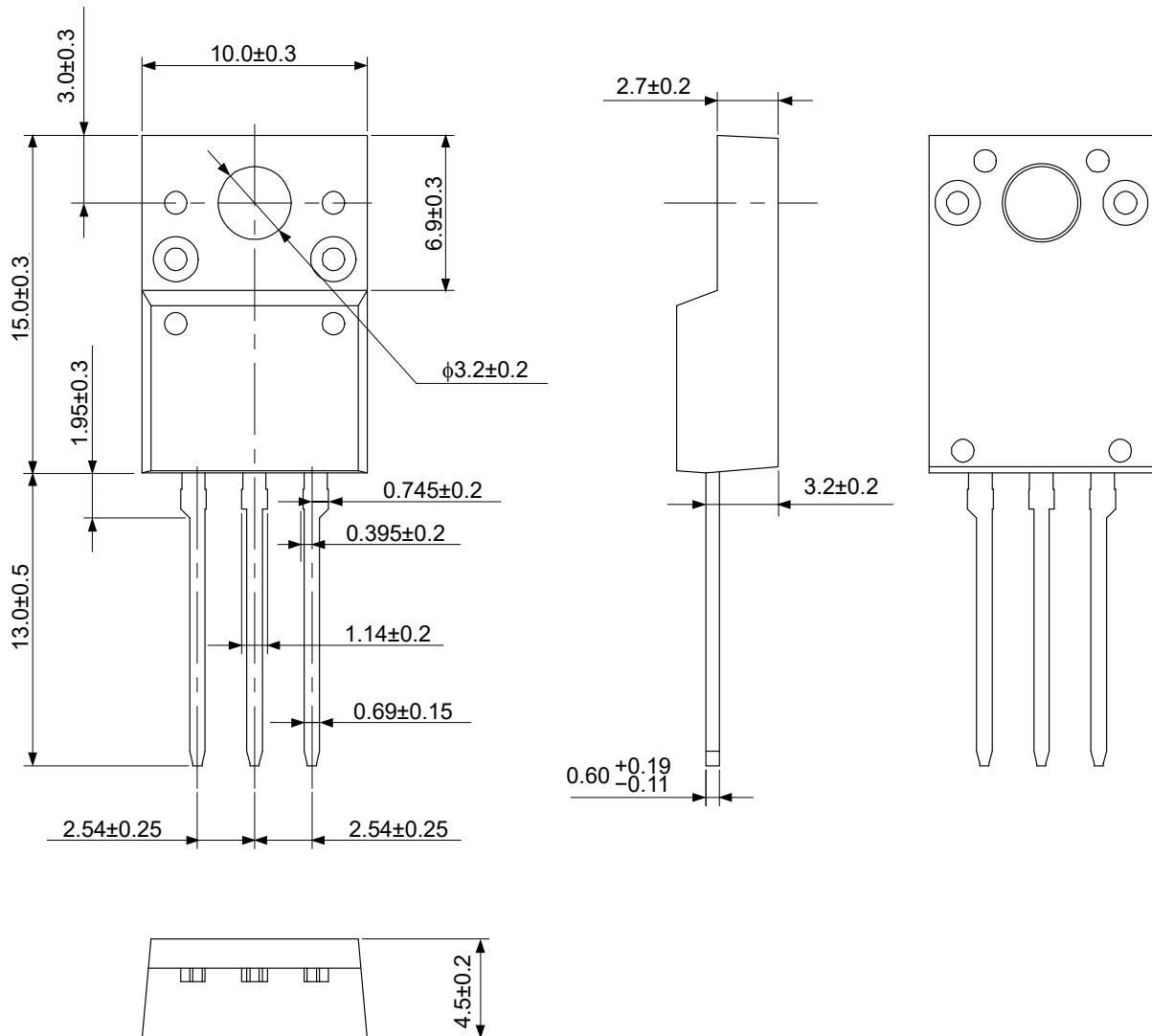


Notes: 8. Designed target value on Renesas measurement condition. (Not tested)

## Package Dimensions

Package Name	JEITA Package Code	RENESAS Code	Previous Code	MASS (Typ) [g]
TO-220FPA	—	PRSS0003AP-A	TO-220FPA	1.65

Unit: mm



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## Ordering Information

Orderable Part No.	Quantity	Shipping Container
RJL5014DPP-A0#T2	2500 pcs	Box (Tube)

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