RJK5012DPP-E0

500V - 12A - MOS FET
High Speed Power Switching

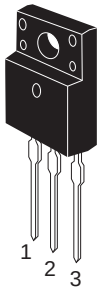
R07DS0561EJ0100
Rev.1.00
Jun 21, 2012

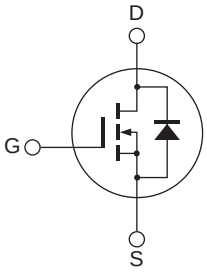
Features

- Low on-resistance
  $R_{DS(on)}$ = 0.515 Ω typ. (at I_D = 6 A, V_{GS} = 10 V, Ta = 25°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

(Ta = 25°C)

Item	Symbol	Ratings	Unit
Drain to source voltage	V_{DSS}	500	V
Gate to source voltage	V_{GSS}	±30	V
Drain current	I_D Note4	12	A
Drain peak current	$I_{D\ (pulse)}$ Note1	24	A
Body-drain diode reverse drain current	I_{DR}	12	A
Body-drain diode reverse drain peak current	$I_{DR\ (pulse)}$ Note1	24	A
Avalanche current	I_{AP} Note3	4	A
Avalanche energy	E_{AR} Note3	0.88	mJ
Channel dissipation	Pch Note2	30	W
Channel to case thermal impedance	θch-c	4.17	°C/W
Channel temperature	Tch	150	°C
Storage temperature	Tstg	–55 to +150	°C

Notes: 1. PW ≤ 10 μs, duty cycle ≤ 1%
2. Value at Tc = 25°C
3. STch = 25°C, Tch ≤ 150°C
4. Limited by maximum safe operation area

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Electrical Characteristics

(Ta = 25°C)

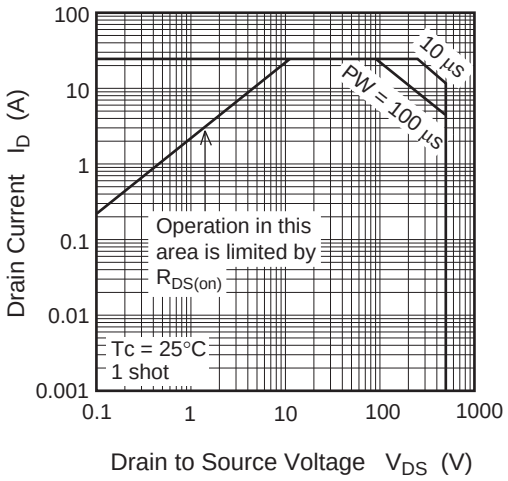
Item	Symbol	Min	Typ	Max	Unit	Test conditions
Drain to source breakdown voltage	$V_{(BR)DSS}$	500	—	—	V	I_D = 10 mA, V_{GS} = 0
Zero gate voltage drain current	I_{DSS}	—	—	1	μA	V_{DS} = 500 V, V_{GS} = 0
Gate to source leak current	I_{GSS}	—	—	±0.1	μA	V_{GS} = ±30 V, V_{DS} = 0
Gate to source cutoff voltage	$V_{GS(off)}$	3.0	—	4.5	V	V_{DS} = 10 V, I_D = 1 mA
Static drain to source on state resistance	$R_{DS(on)}$	—	0.515	0.620	Ω	I_D = 6 A, V_{GS} = 10 V Note5
Input capacitance	Ciss	—	1100	—	pF	V_{DS} = 25 V V_{GS} = 0 f = 1 MHz
Output capacitance	Coss	—	120	—	pF	
Reverse transfer capacitance	Crss	—	15	—	pF	
Turn-on delay time	$t_{d(on)}$	—	30	—	ns	I_D = 6 A V_{GS} = 10 V R_L = 41.6 Ω Rg = 10 Ω
Rise time	t_r	—	23	—	ns	
Turn-off delay time	$t_{d(off)}$	—	77	—	ns	
Fall time	t_f	—	16	—	ns	
Total gate charge	Qg	—	29	—	nC	V_{DD} = 400 V V_{GS} = 10 V I_D = 12 A
Gate to source charge	Qgs	—	5.5	—	nC	
Gate to drain charge	Qgd	—	13	—	nC	
Body-drain diode forward voltage	V_{DF}	—	0.89	1.50	V	I_F = 12 A, V_{GS} = 0 Note5
Body-drain diode reverse recovery time	t_{rr}	—	280	—	ns	I_F = 12 A, V_{GS} = 0 di_F/dt = 100 A/μs

Notes: 5. Pulse test

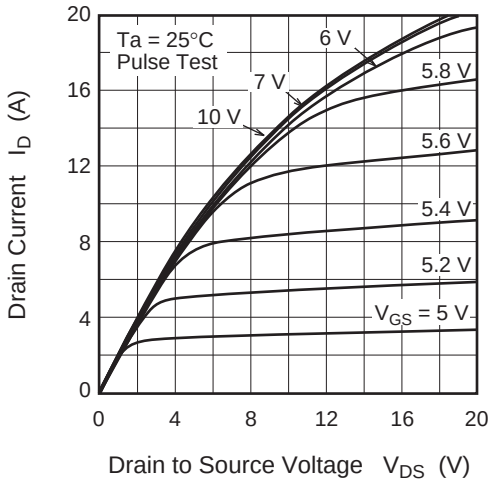
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Main Characteristics

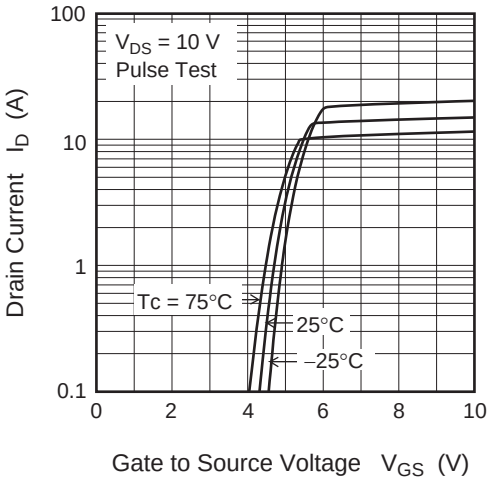
Maximum Safe Operation Area



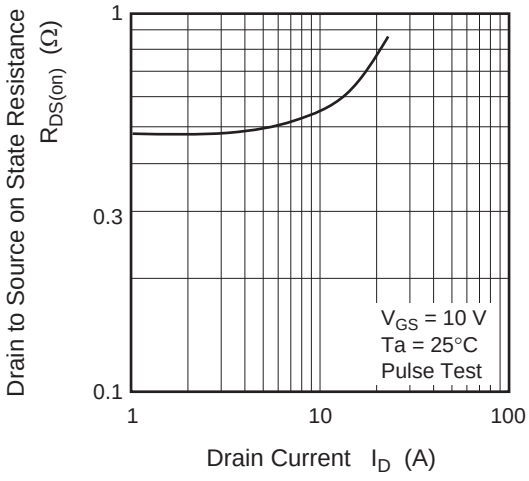
Typical Output Characteristics



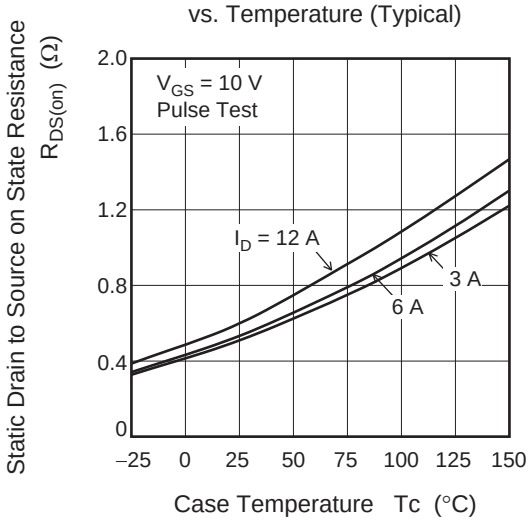
Typical Transfer Characteristics



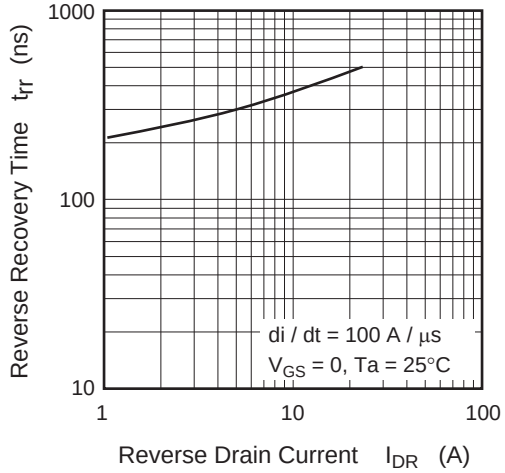
Static Drain to Source on State Resistance vs. Drain Current (Typical)



Static Drain to Source on State Resistance vs. Temperature (Typical)

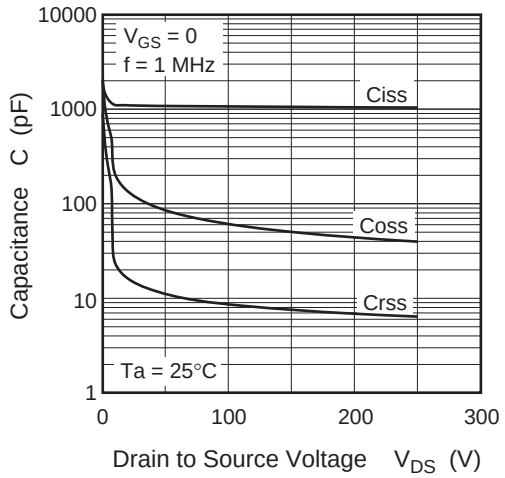


Body-Drain Diode Reverse Recovery Time (Typical)

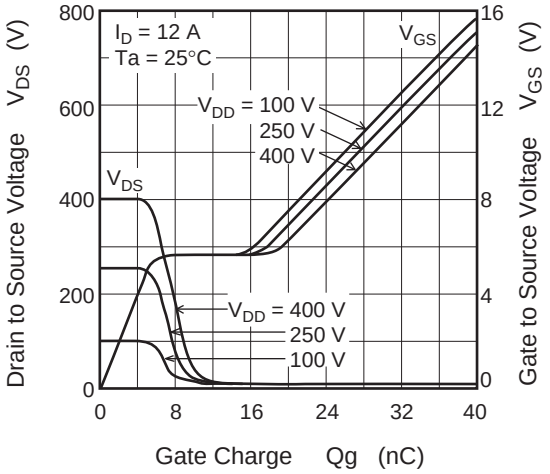


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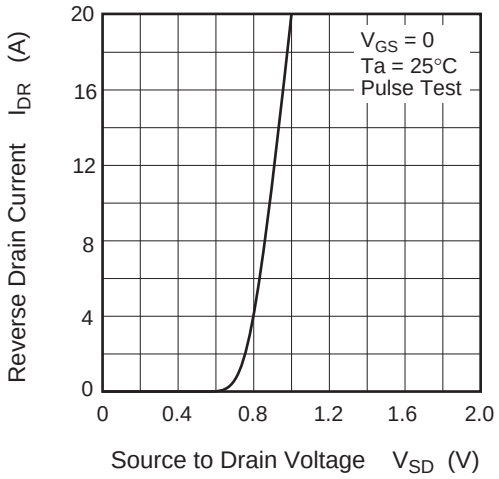
Typical Capacitance vs.
Drain to Source Voltage



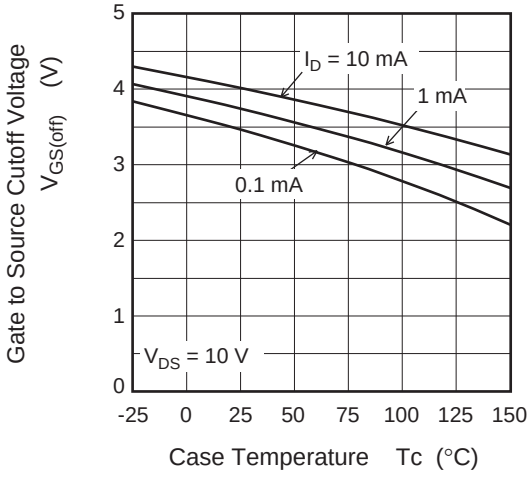
Dynamic Input Characteristics (Typical)



Reverse Drain Current vs.
Source to Drain Voltage (Typical)

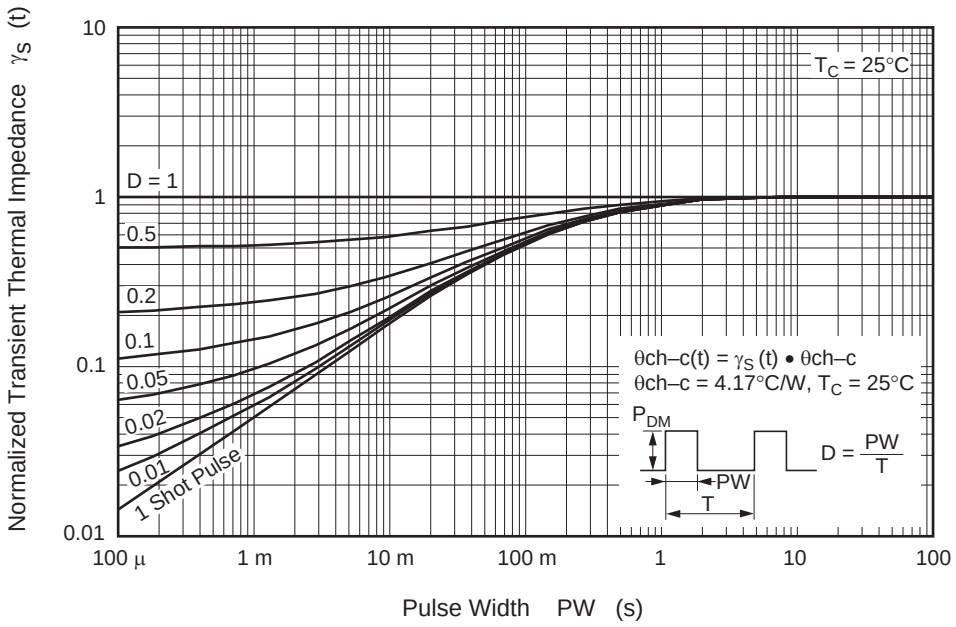


Gate to Source Cutoff Voltage
vs. Case Temperature (Typical)

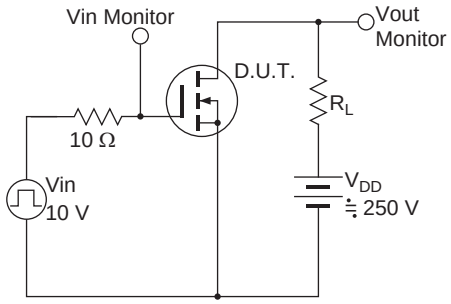


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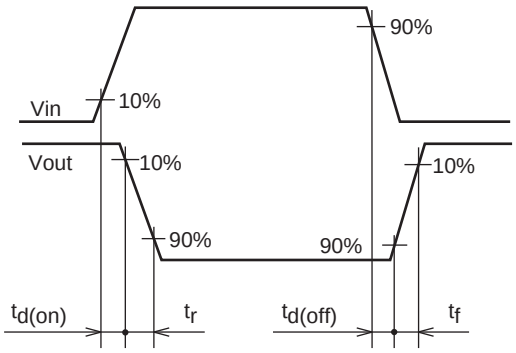
Normalized Transient Thermal Impedance vs. Pulse Width



Switching Time Test Circuit



Waveform

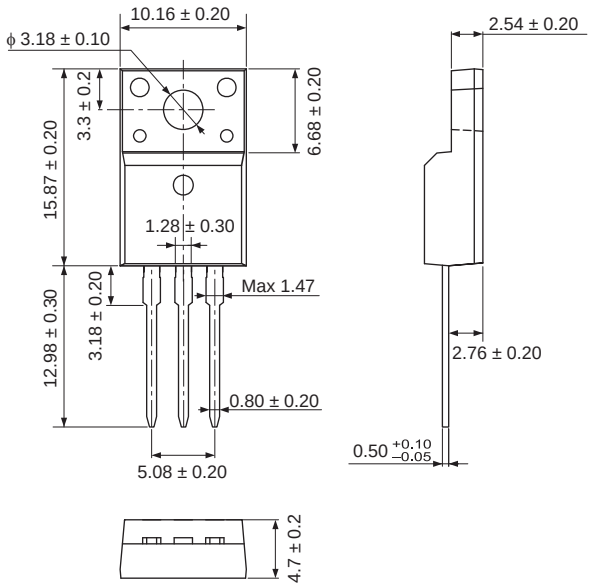


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Package Dimensions

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

Unit: mm



Ordering Information

Orderable Part Number	Quantity	Shipping Container
RJK5012DPP-E0#T2	1000 pcs	Box (Tube)

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