RJK60S5DPP-E0

600V - 20A - SJ MOS FET
High Speed Power Switching

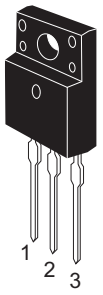
R07DS0641EJ0300
Rev.3.00
Jan 23, 2013

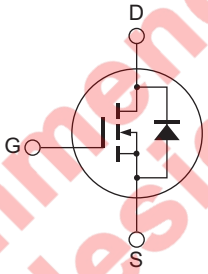
Features

- Superjunction MOSFET
- Low on-resistance
  $R_{DS(on)}$ = 0.150 Ω typ. (at I_D = 10 A, V_{GS} = 10 V, Ta = 25°C)
- High speed switching
  t_f = 23 ns typ. (at I_D = 10 A, V_{GS} = 10 V, R_L = 30 Ω, Rg = 10 Ω, Ta = 25°C)

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}	600	V
Gate to source voltage		V_{GSS}	+30, –20	V
Drain current	Tc = 25°C	I_D Note1	20	A
	Tc = 100°C	I_D Note1	12.6	A
Drain peak current		$I_{D\ (pulse)}$ Note1	40	A
Body-drain diode reverse drain current		I_{DR} Note1	20	A
Body-drain diode reverse drain peak current		$I_{DR\ (pulse)}$ Note1	40	A
Avalanche current		I_{AP} Note2	5	A
Avalanche energy		E_{AR} Note2	1.36	mJ
MOSFET dv/dt ruggedness		dv/dt Note3	150	V/ns
Channel dissipation		Pch Note4	33.7	W
Channel to case thermal impedance		θch-c	3.7	°C/W
Channel temperature		Tch	150	°C
Storage temperature		Tstg	–55 to +150	°C

Notes: 1. Limited by Tch max.
2. STch = 25°C, Tch ≤ 150°C
3. Value at Tj = 25°C, V_{DS} ≤ 480 V
4. Value at Tc = 25°C

Electrical Characteristics

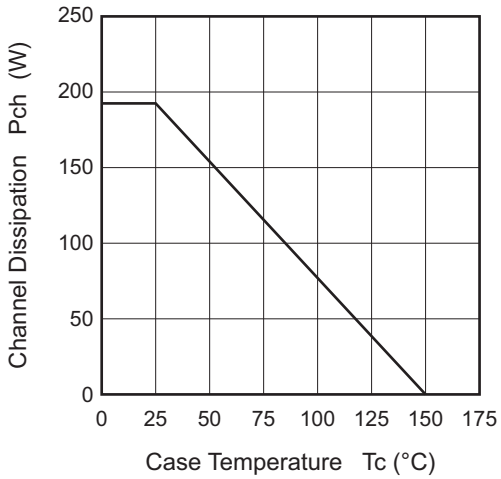
(Ta = 25°C)

Item	Symbol	Min	Typ	Max	Unit	Test conditions
Drain to source breakdown voltage	$V_{(BR)DSS}$	600	—	—	V	I_D = 10 mA, V_{GS} = 0
Zero gate voltage drain current	I_{DSS}	—	—	1	mA	V_{DS} = 600 V, V_{GS} = 0
Gate to source leak current	I_{GSS}	—	—	±0.1	μA	V_{GS} = +30V, –20 V, V_{DS} = 0
Gate to source cutoff voltage	$V_{GS(off)}$	3	—	5	V	V_{DS} = 10 V, I_D = 1 mA
Static drain to source on state resistance	$R_{DS(on)}$	—	0.150	0.178	Ω	I_D = 10 A, V_{GS} = 10 V Note5
	$R_{DS(on}$	—	0.375	—	Ω	Ta = 150°C I_D = 10 A, V_{GS} = 10 V Note5
Gate resistance	Rg	—	2.5	—	Ω	f = 1 MHz V_{DS} = 25 V, V_{GS} = 0
Input capacitance	Ciss	—	1600	—	pF	V_{DS} = 25 V V_{GS} = 0 f = 100kHz
Output capacitance	Coss	—	2160	—	pF	
Reverse transfer capacitance	Crss	—	8.2	—	pF	
Turn-on delay time	$t_{d(on)}$	—	23	—	ns	I_D = 10 A V_{GS} = 10 V R_L = 30 Ω Rg = 10 Ω Note5
Rise time	t_r	—	25	—	ns	
Turn-off delay time	$t_{d(off)}$	—	49	—	ns	
Fall time	t_f	—	23	—	ns	
Total gate charge	Qg	—	27	—	nC	V_{DD} = 480 V V_{GS} = 10 V I_D = 20 A Note4
Gate to source charge	Qgs	—	10.5	—	nC	
Gate to drain charge	Qgd	—	8.5	—	nC	
Body-drain diode forward voltage	V_{DF}	—	0.96	1.60	V	I_F = 20 A, V_{GS} = 0 Note5
Body-drain diode reverse recovery time	t_{rr}	—	400	—	ns	I_F = 20 A V_{GS} = 0 di_F/dt = 100 A/μs Note5
Body-drain diode reverse recovery current	I_{rr}	—	25	—	A	
Body-drain diode reverse recovery charge	Q_{rr}	—	5.6	—	μC	

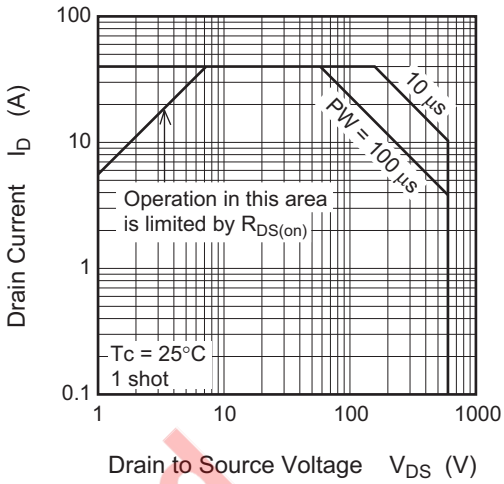
Notes: 5. Pulse test

Main Characteristics

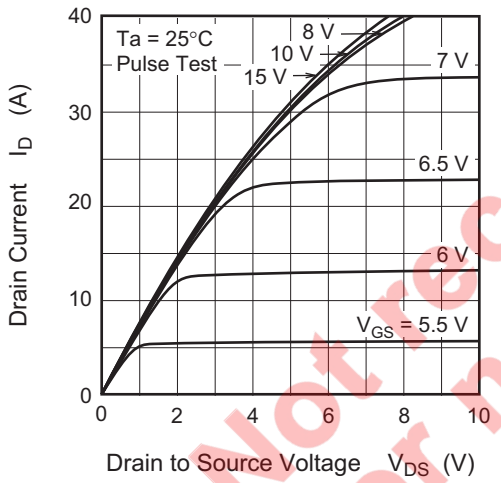
Channel Dissipation vs. Case Temperature



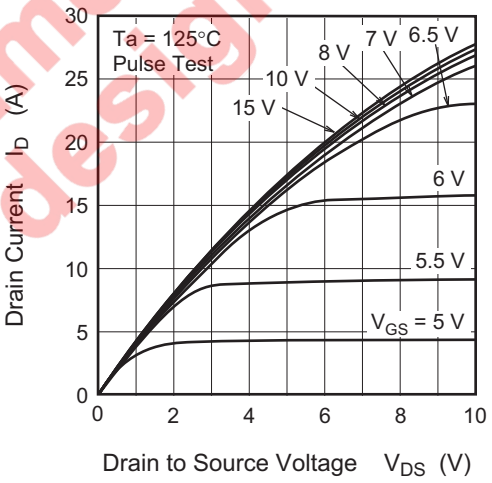
Maximum Safe Operation Area



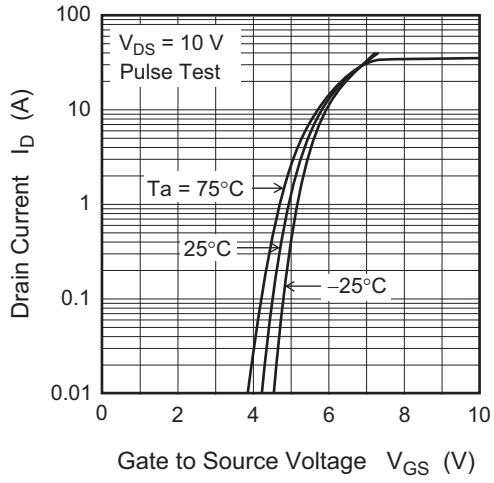
Typical Output Characteristics



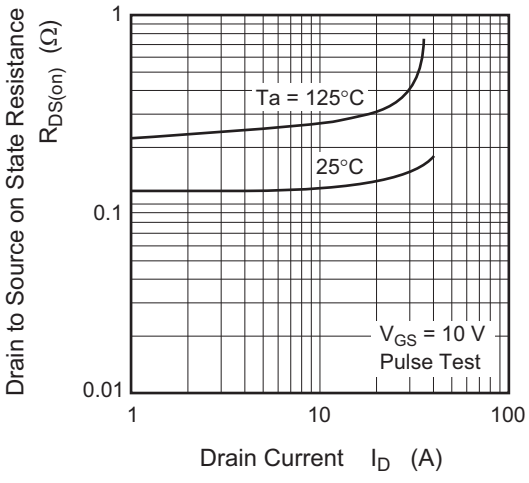
Typical Output Characteristics



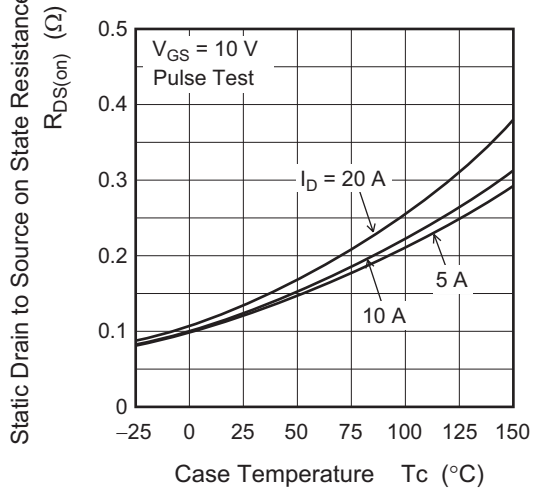
Typical Transfer Characteristics



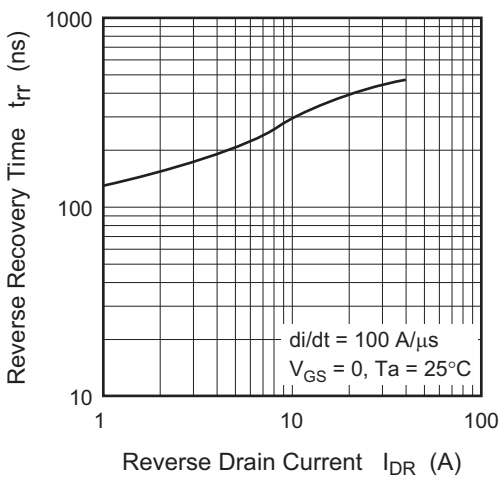
Static Drain to Source on State Resistance vs. Drain Current (Typical)



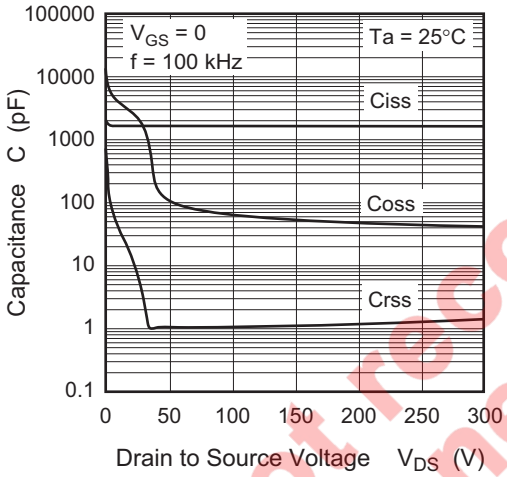
Static Drain to Source on State Resistance vs. Temperature (Typical)



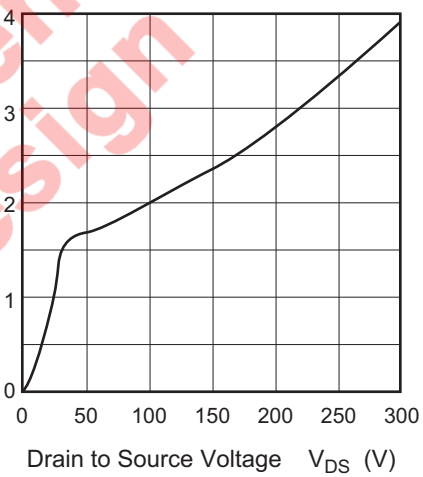
Body-Drain Diode Reverse Recovery Time (Typical)



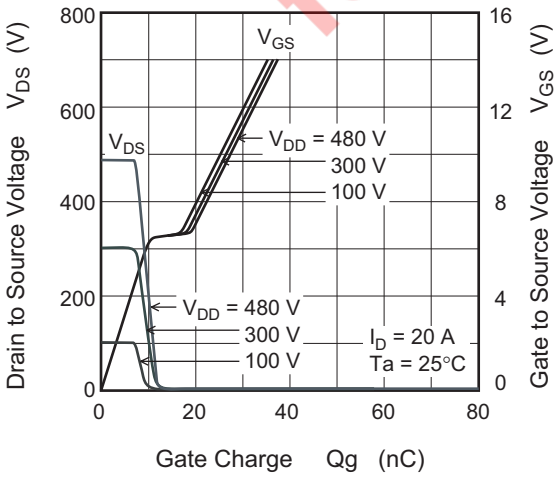
Typical Capacitance vs. Drain to Source Voltage



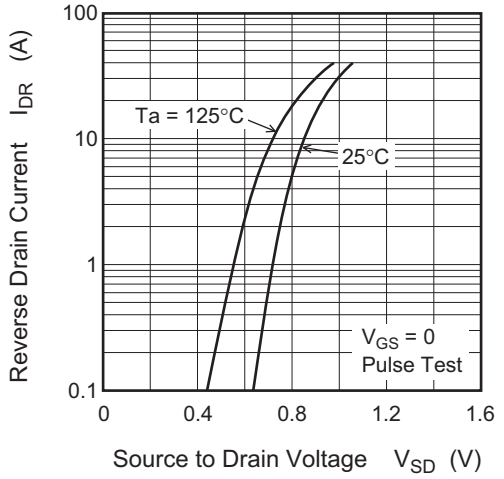
C_{OSS} Stored Energy (Typical)



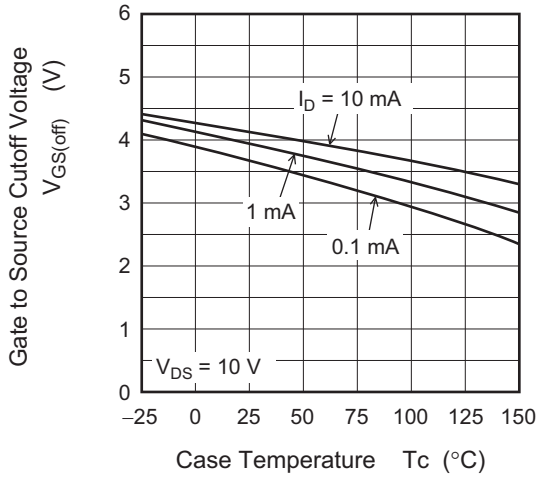
Dynamic Input Characteristics (Typical)



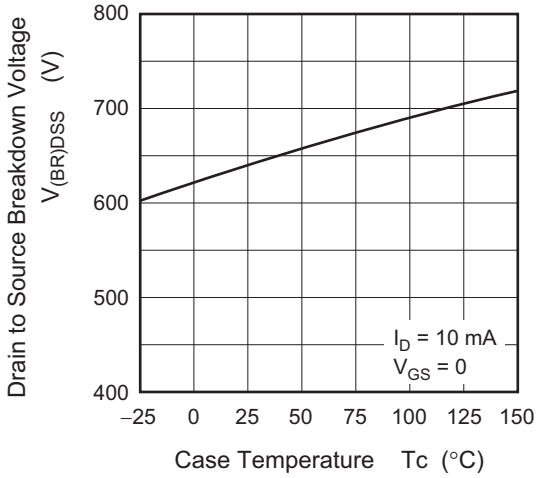
Reverse Drain Current vs. Source to Drain Voltage (Typical)



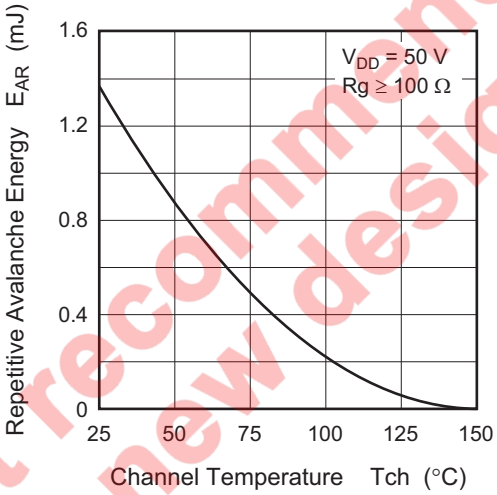
Gate to Source Cutoff Voltage vs. Case Temperature (Typical)



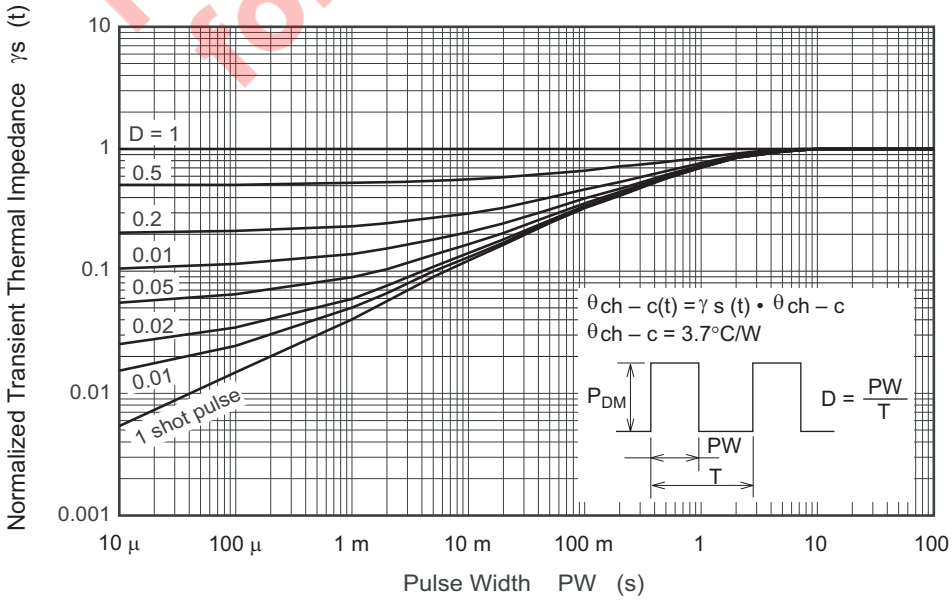
Drain to Source Breakdown Voltage vs. Case Temperature (Typical)



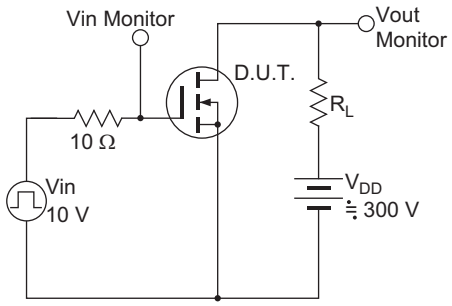
Maximum Avalanche Energy vs. Channel Temperature Derating



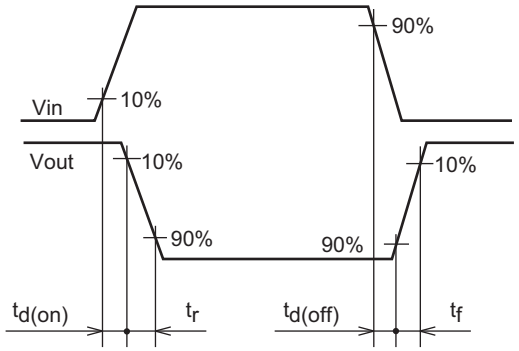
Normalized Transient Thermal Impedance vs. Pulse Width



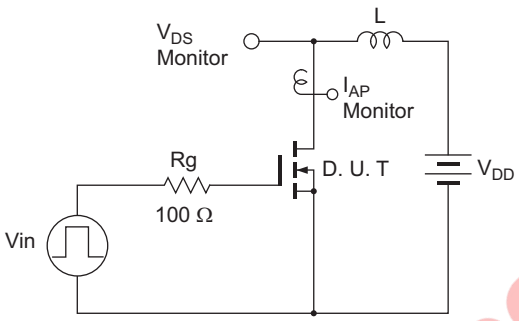
Switching Time Test Circuit



Waveform

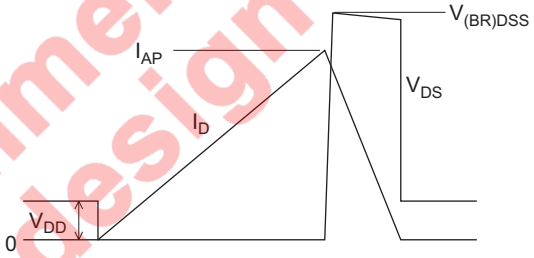


Avalanche Test Circuit



Avalanche Waveform

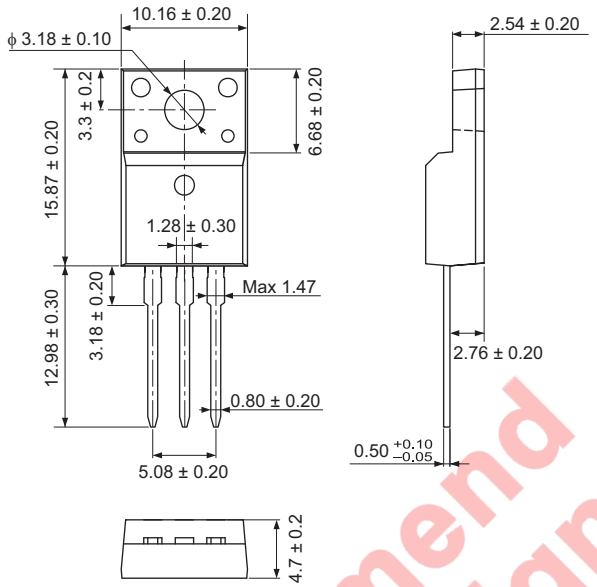
$$E_{AR} = \frac{1}{2} \cdot L \cdot I_{AP}^2 \cdot \frac{V_{DSS}}{V_{DSS} - V_{DD}}$$



Package Dimension

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
RJK60S5DPP-E0#T2	50 pcs	Tube

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