

RJK60S3DPD

600V - 12A - SJ MOS FET
High Speed Power Switching

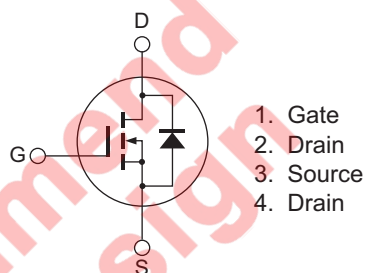
R07DS0731EJ0300
Rev.3.00
Oct 12, 2012

Features

- Superjunction MOSFET
- Low on-resistance
 $R_{DS(on)} = 0.35 \Omega$ typ. (at $I_D = 6 A$, $V_{GS} = 10 V$, $T_a = 25^\circ C$)
- High speed switching
 $t_f = 21 ns$ typ. (at $I_D = 6 A$, $V_{GS} = 10 V$, $R_L = 50 \Omega$, $R_g = 10 \Omega$, $T_a = 25^\circ C$)

Outline

RENESAS Package code: PRSS0004ZG-A
(Package name : MP-3A)



Absolute Maximum Ratings

($T_a = 25^\circ C$)

Item	Symbol	Ratings	Unit
Drain to source voltage	V_{DSS}	600	V
Gate to source voltage	V_{GSS}	+30, -20	V
Drain current	$T_c = 25^\circ C$ I_D ^{Note1,2}	12.0	A
	$T_c = 100^\circ C$ I_D ^{Note1,2}	7.6	A
Drain peak current	$I_{D(pulse)}$ ^{Note1}	24	A
Body-drain diode reverse drain current	I_{DR} ^{Note1}	12	A
Body-drain diode reverse drain peak current	$I_{DR(pulse)}$ ^{Note1}	24	A
Avalanche current	I_{AP} ^{Note3}	3	A
Avalanche energy	E_{AR} ^{Note3}	0.49	mJ
Channel dissipation	P_{ch} ^{Note4}	73.5	W
Channel to case thermal impedance	θ_{ch-c}	1.7	$^\circ C/W$
Channel temperature	T_{ch}	150	$^\circ C$
Storage temperature	T_{stg}	-55 to +150	$^\circ C$

- Notes: 1. Limited by T_{ch} max.
2. Maximum duty cycle $D = 0.75$.
3. $ST_{ch} = 25^\circ C$, $T_{ch} \leq 150^\circ C$
4. Value at $T_c = 25^\circ C$

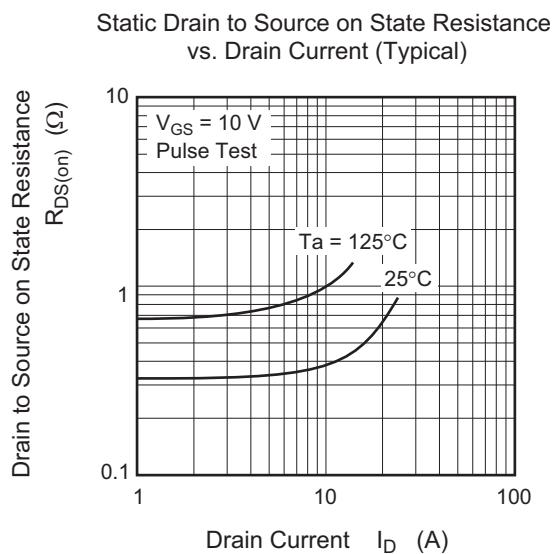
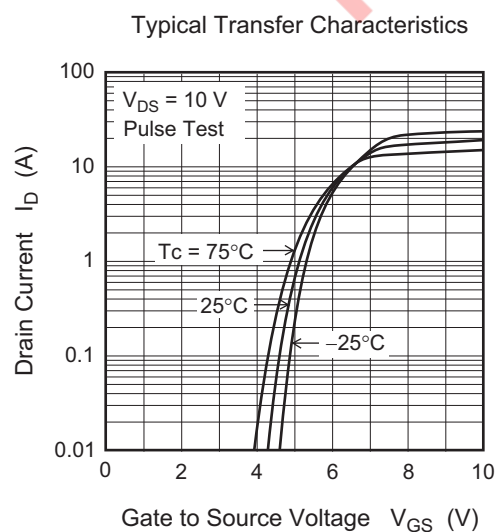
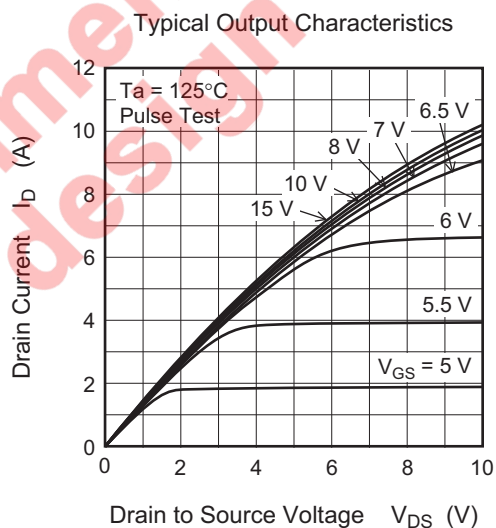
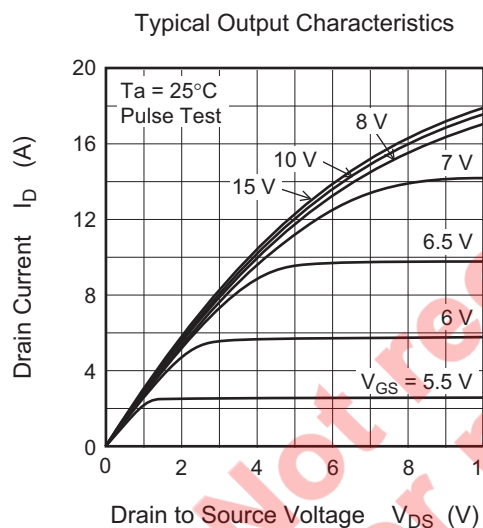
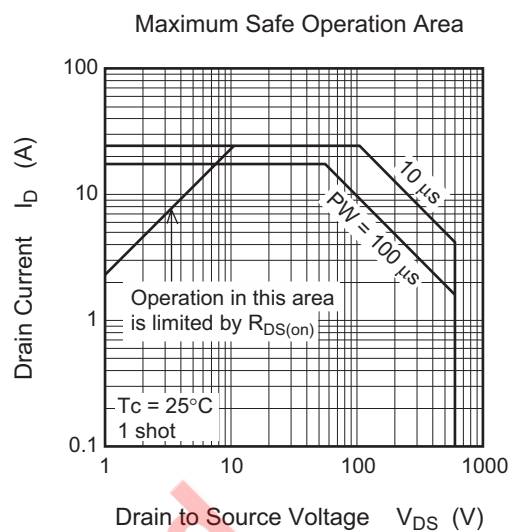
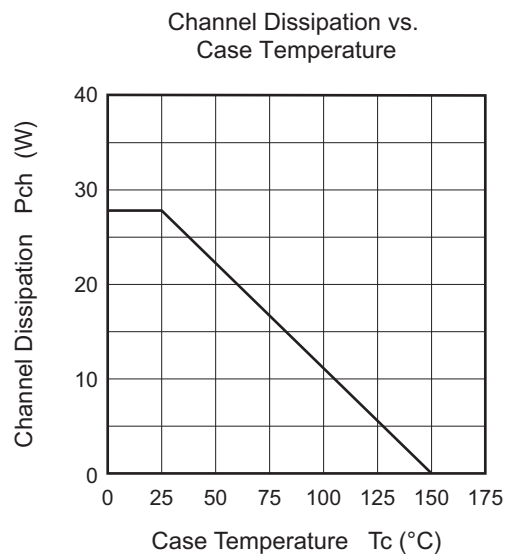
Electrical Characteristics

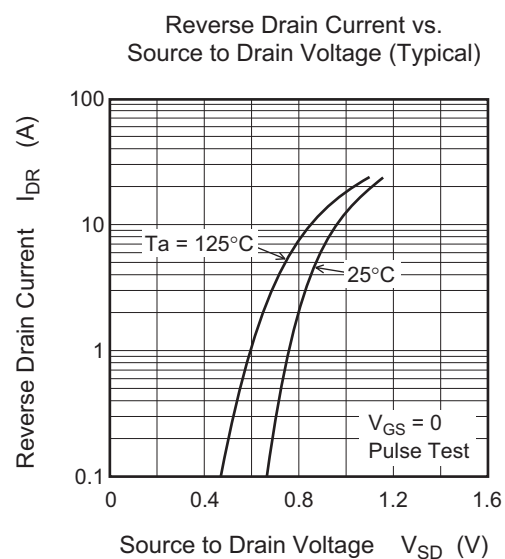
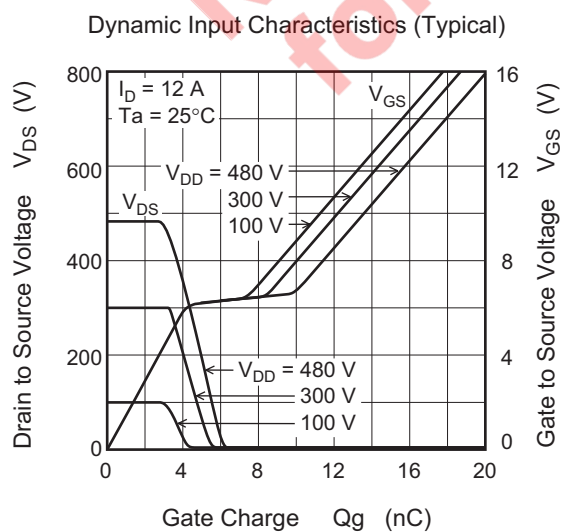
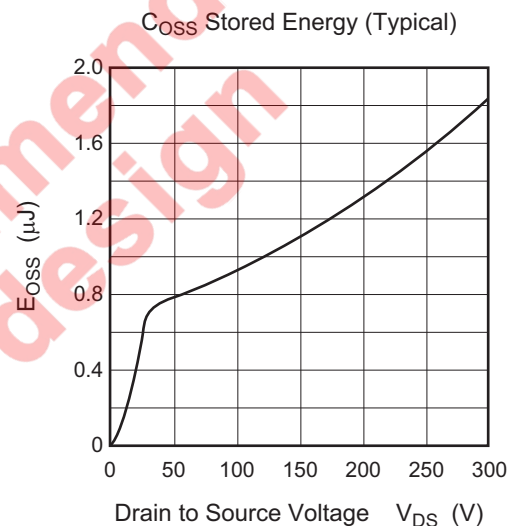
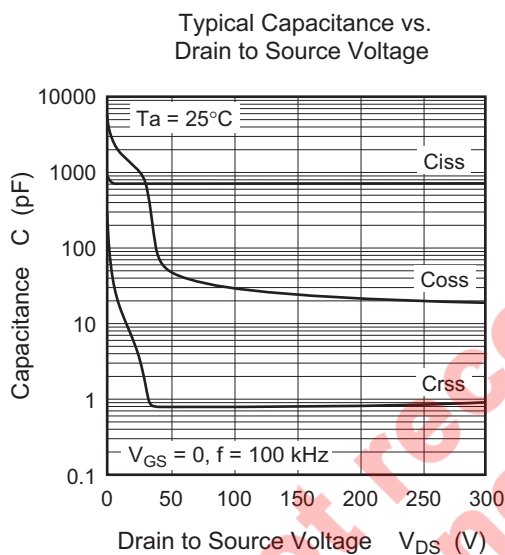
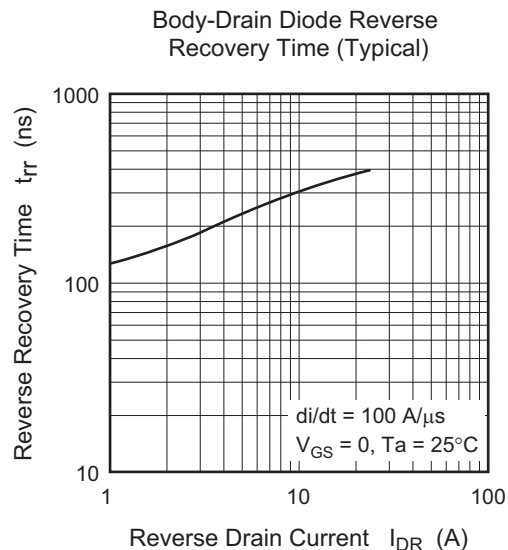
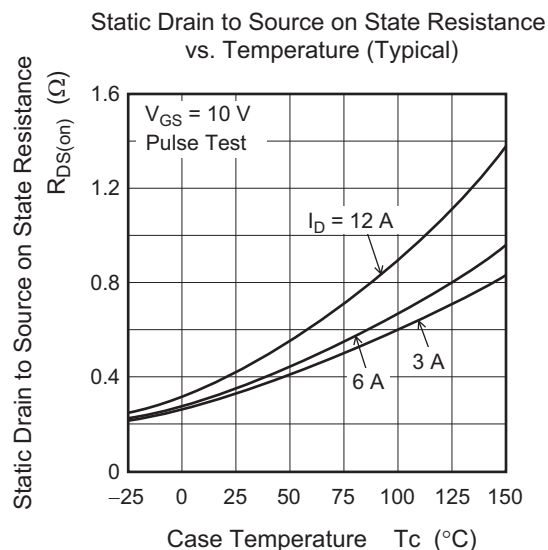
(Ta = 25°C)

Item	Symbol	Min	Typ	Max	Unit	Test conditions
Drain to source breakdown voltage	$V_{(BR)DSS}$	600	—	—	V	$I_D = 10 \text{ mA}$, $V_{GS} = 0$
Zero gate voltage drain current	I_{DSS}	—	—	1	mA	$V_{DS} = 600 \text{ V}$, $V_{GS} = 0$
Gate to source leak current	I_{GSS}	—	—	± 0.1	μA	$V_{GS} = +30\text{V}$, -20 V , $V_{DS} = 0$
Gate to source cutoff voltage	$V_{GS(off)}$	3	—	5	V	$V_{DS} = 10 \text{ V}$, $I_D = 1 \text{ mA}$
Static drain to source on state resistance	$R_{DS(on)}$	—	0.35	0.44	Ω	$I_D = 6 \text{ A}$, $V_{GS} = 10 \text{ V}$ ^{Note5}
	$R_{DS(on)}$	—	0.87	—	Ω	Ta = 150°C $I_D = 6 \text{ A}$, $V_{GS} = 10 \text{ V}$ ^{Note5}
Gate resistance	Rg	—	2.5	—	Ω	f = 1 MHz $V_{DS} = 25 \text{ V}$, $V_{GS} = 0$
Input capacitance	Ciss	—	720	—	pF	$V_{DS} = 25 \text{ V}$
Output capacitance	Coss	—	980	—	pF	$V_{GS} = 0$
Reverse transfer capacitance	Crss	—	3.7	—	pF	f = 100 kHz
Turn-on delay time	$t_{d(on)}$	—	13	—	ns	$I_D = 6 \text{ A}$
Rise time	t_r	—	18	—	ns	$V_{GS} = 10 \text{ V}$
Turn-off delay time	$t_{d(off)}$	—	25	—	ns	$R_L = 50 \Omega$
Fall time	t_f	—	18	—	ns	Rg = 10 Ω ^{Note5}
Total gate charge	Qg	—	13.6	—	nC	$V_{DD} = 480 \text{ V}$
Gate to source charge	Qgs	—	4.8	—	nC	$V_{GS} = 10 \text{ V}$
Gate to drain charge	Qgd	—	3.9	—	nC	$I_D = 12 \text{ A}$ ^{Note5}
Body-drain diode forward voltage	V_{DF}	—	1.0	1.6	V	$I_F = 12 \text{ A}$, $V_{GS} = 0$ ^{Note5}
Body-drain diode reverse recovery time	t_{rr}	—	320	—	ns	$I_F = 12 \text{ A}$
Body-drain diode reverse recovery current	I_{rr}	—	20	—	A	$V_{GS} = 0$
Body-drain diode reverse recovery charge	Qrr	—	3.7	—	μC	$di_F/dt = 100 \text{ A}/\mu\text{s}$ ^{Note5}

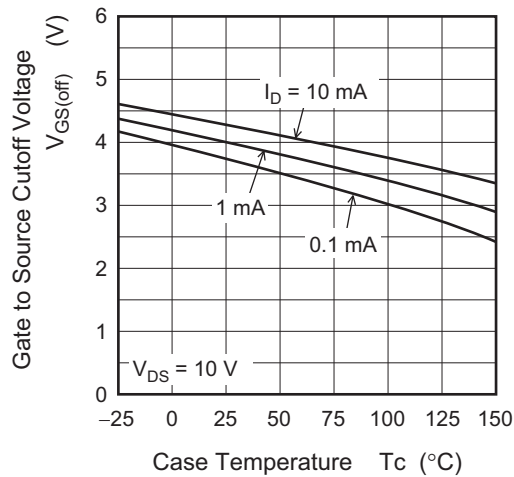
Notes: 5. Pulse test

Main Characteristics

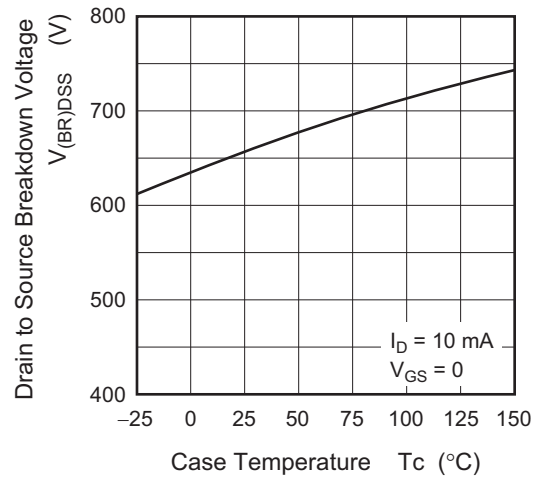




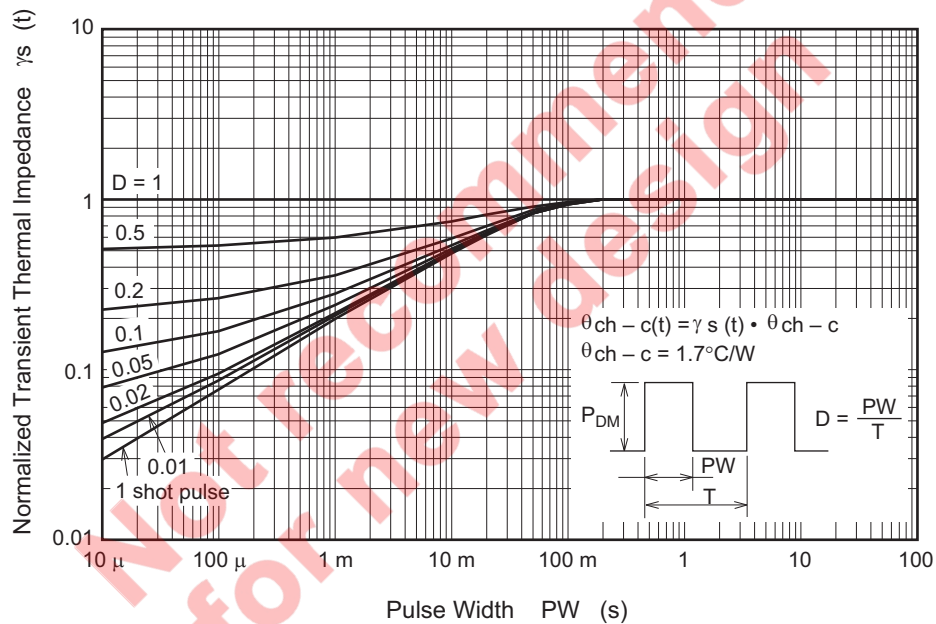
Gate to Source Cutoff Voltage
vs. Case Temperature (Typical)



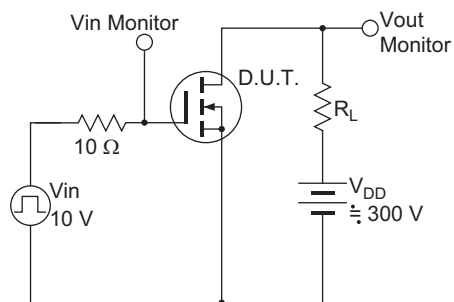
Drain to Source Breakdown Voltage
vs. Case Temperature (Typical)



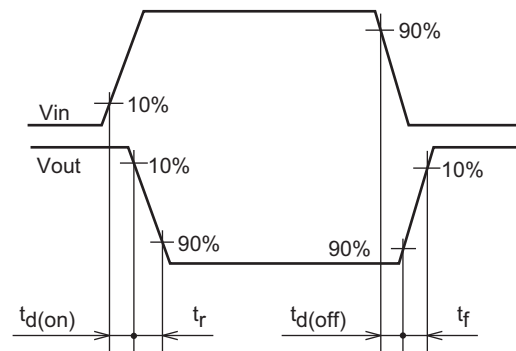
Normalized Transient Thermal Impedance vs. Pulse Width



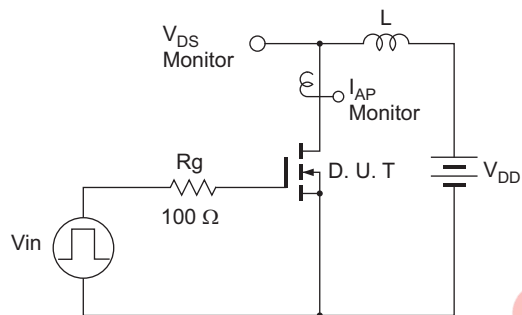
Switching Time Test Circuit



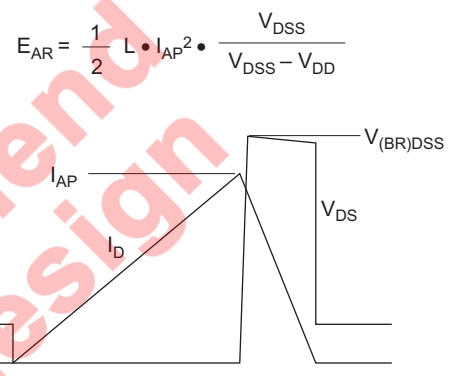
Waveform



Avalanche Test Circuit



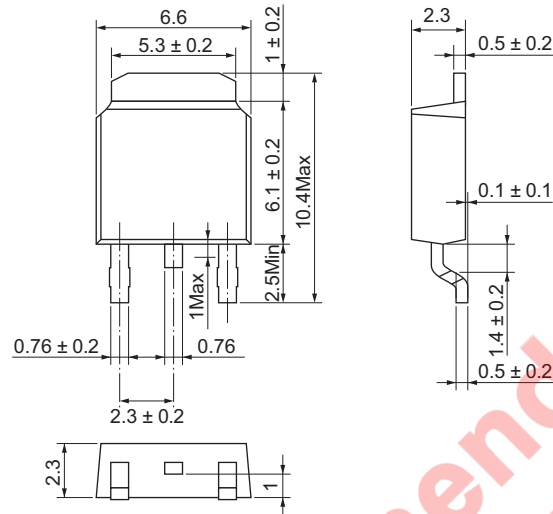
Avalanche Waveform



Package Dimension

Package Name	JEITA Package Code	RENESAS Code	Previous Code	MASS[Typ.]
MP-3A	SC-63	PRSS0004ZG-A	TMP3	0.32g

Unit: mm



Ordering Information

Orderable Part No.	Quantity	Shipping Container
RJK60S3DPD-00#J2	3000 pcs	Taping

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