RJK60S7DPK-M0

600V - 30A - SJ MOS FET
High Speed Power Switching

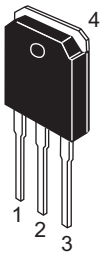
R07DS0642EJ0300
Rev.3.00
Dec 10, 2012

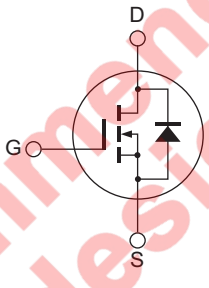
Features

- Superjunction MOSFET
- Low on-resistance
  $R_{DS(on)}$ = 0.1 Ω typ. (at I_D = 15 A, V_{GS} = 10 V, Ta = 25°C)
- High speed switching
  t_f = 9 ns typ. (at I_D = 15 A, V_{GS} = 10 V, R_L = 20 Ω, Rg = 10 Ω, Ta = 25°C)

Outline

RENESAS Package code: PRSS0004ZH-A
(Package name:TO-3PSG)





1. Gate
2. Drain
3. Source
4. Drain

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	30	A
	Tc = 100°C	I_D Note1	19	A
Drain peak current		$I_{D\ (pulse)}$ Note1	60	A
Body-drain diode reverse drain current		I_{DR} Note1	30	A
Body-drain diode reverse drain peak current		$I_{DR\ (pulse)}$ Note1	60	A
Avalanche current		I_{AP} Note2	7.5	A
Avalanche energy		E_{AR} Note2	3.06	mJ
Channel dissipation		Pch Note3	227.2	W
Channel to case thermal impedance		θch-c	0.55	°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 Tc = 25°C

Electrical Characteristics

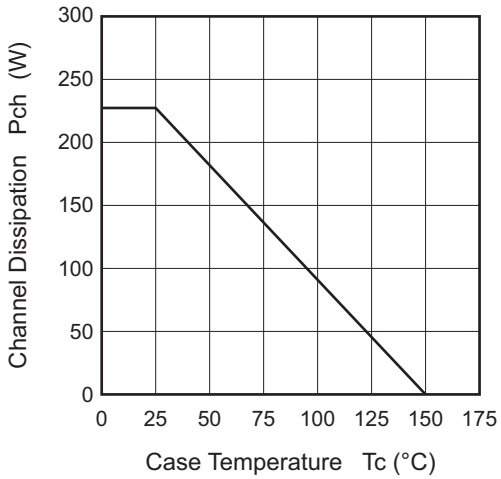
(Ta = 25°C)

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	$R_{DS(on)}$	—	0.100	0.125	Ω	I_D = 15 A, V_{GS} = 10 V Note4
	$R_{DS(on)}$	—	0.25	—	Ω	Ta = 150°C I_D = 15 A, V_{GS} = 10 V Note4
Gate resistance	Rg	—	2.0	—	Ω	f = 1 MHz V_{DS} = 25 V, V_{GS} = 0
Input capacitance	Ciss	—	2300	—	pF	V_{DS} = 25 V V_{GS} = 0 f = 100 kHz
Output capacitance	Coss	—	3000	—	pF	
Reverse transfer capacitance	Crss	—	10	—	pF	
Turn-on delay time	$t_{d(on)}$	—	27	—	ns	I_D = 15 A V_{GS} = 10 V R_L = 20 Ω Rg = 10 Ω Note4
Rise time	t_r	—	28	—	ns	
Turn-off delay time	$t_{d(off)}$	—	55	—	ns	
Fall time	t_f	—	9	—	ns	
Total gate charge	Qg	—	39	—	nC	V_{DD} = 480 V V_{GS} = 10 V I_D = 30 A Note4
Gate to source charge	Qgs	—	15	—	nC	
Gate to drain charge	Qgd	—	11	—	nC	
Body-drain diode forward voltage	V_{DF}	—	1.0	1.6	V	I_F = 30 A, V_{GS} = 0 Note4
Body-drain diode reverse recovery time	t_{rr}	—	490	—	ns	I_F = 30 A V_{GS} = 0 di_F/dt = 100 A/μs Note4
Body-drain diode reverse recovery current	I_{rr}	—	26	—	A	
Body-drain diode reverse recovery charge	Q_{rr}	—	7.1	—	μC	

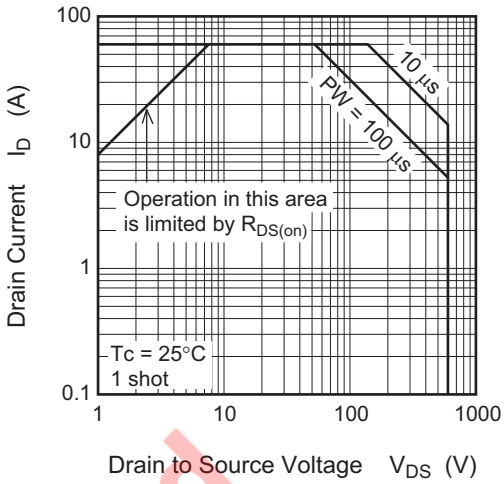
Notes: 4 Pulse test

Main Characteristics

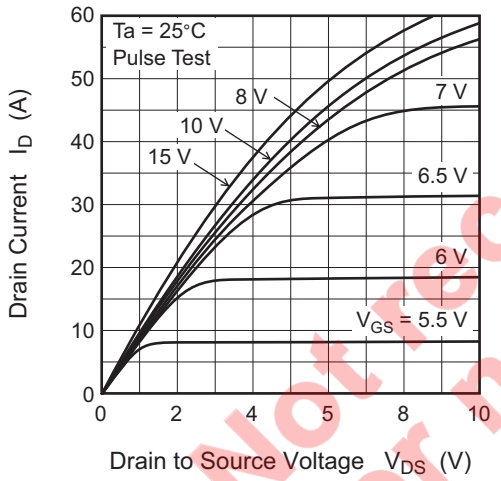
Channel Dissipation vs. Case Temperature



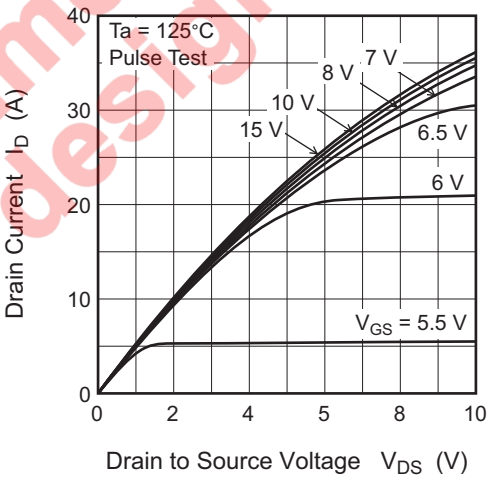
Maximum Safe Operation Area



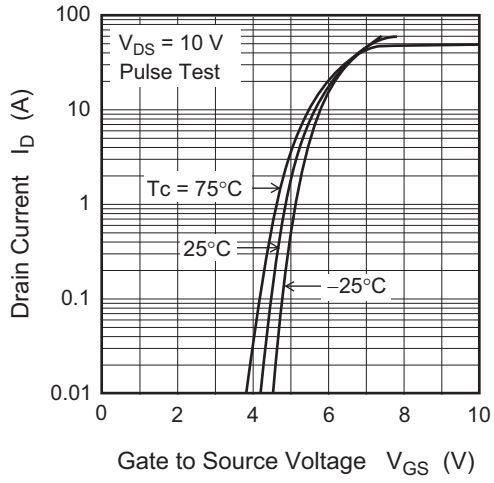
Typical Output Characteristics

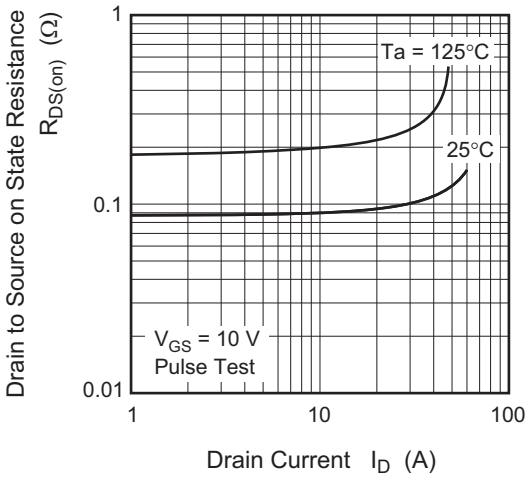


Typical Output Characteristics

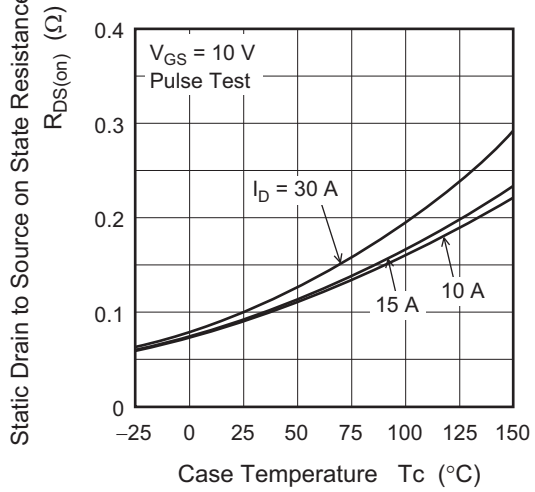


Static Drain to Source on State Resistance vs. Drain Current (Typical)

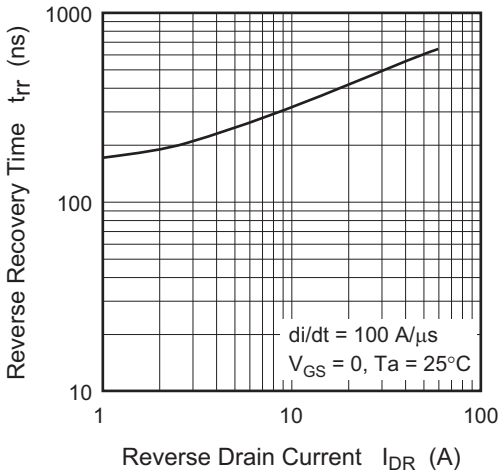




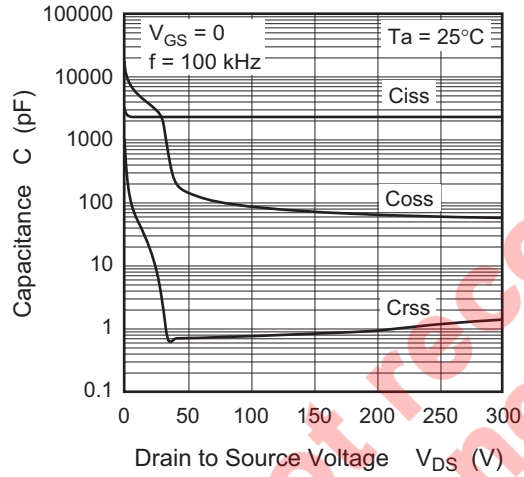
Static Drain to Source on State Resistance vs. Temperature (Typical)



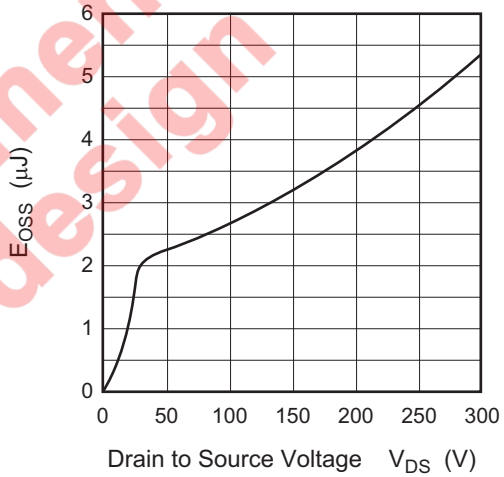
Body-Drain Diode Reverse Recovery Time (Typical)



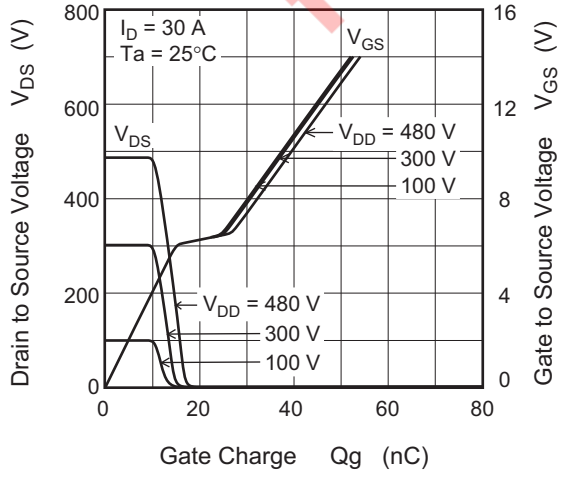
Typical Capacitance vs. Drain to Source Voltage



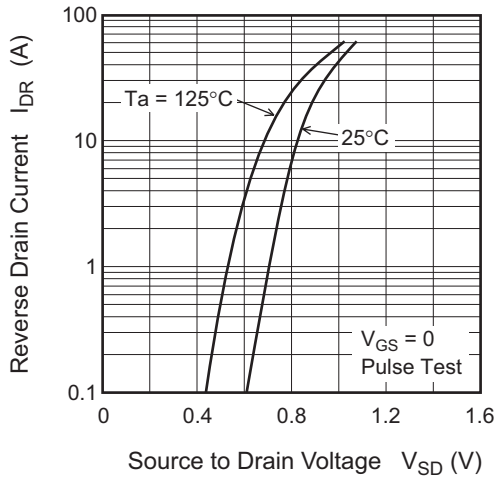
C_{OSS} Stored Energy (Typical)



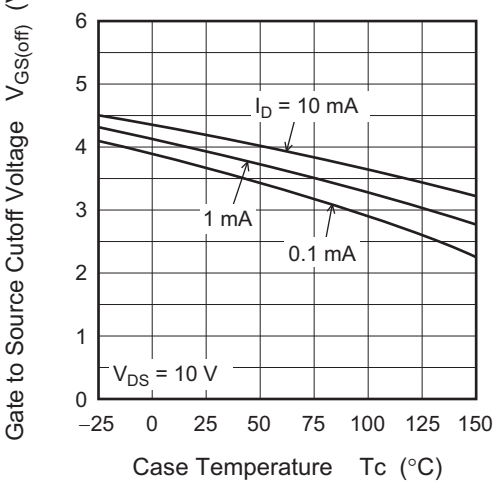
Dynamic Input Characteristics (Typical)



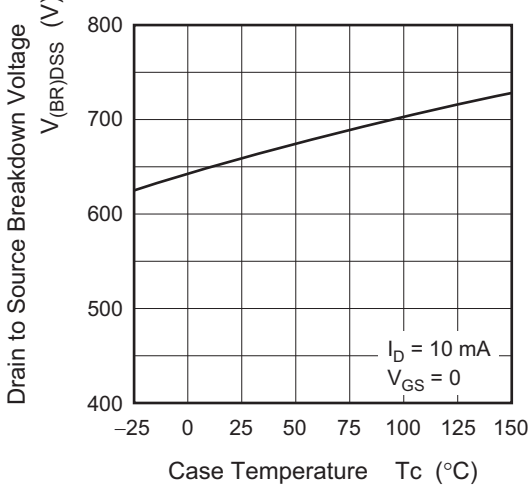
Reverse Drain Current vs. Source to Drain Voltage (Typical)



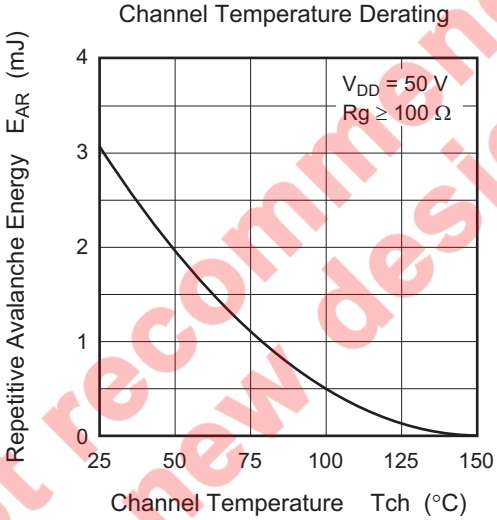
Gate to Source Cutoff Voltage vs. Case Temperature (Typical)



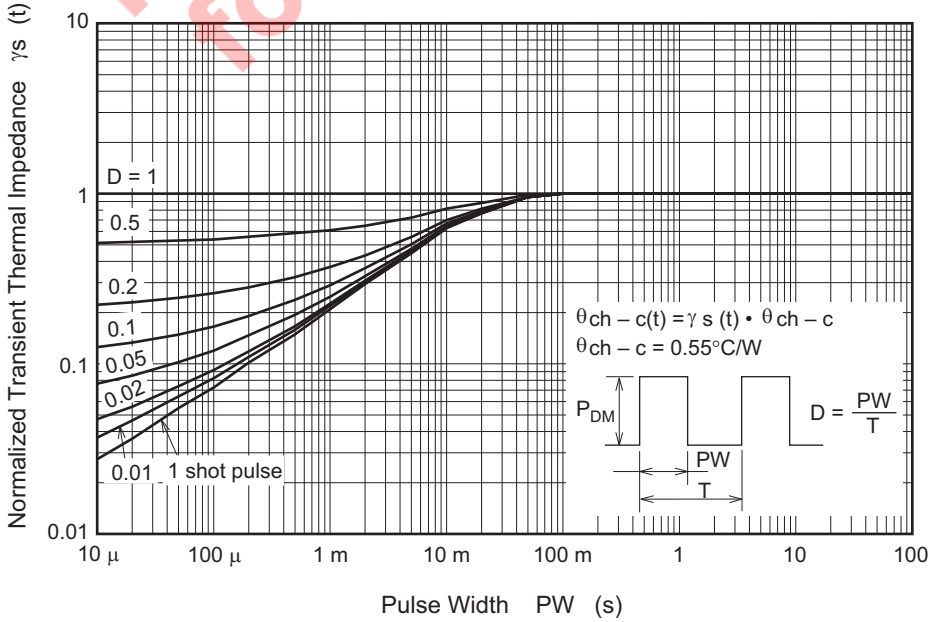
Drain to Source Breakdown Voltage vs. Case Temperature (Typical)



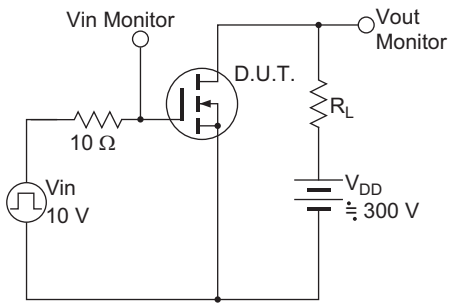
Maximum Avalanche Energy vs. Channel Temperature Derating



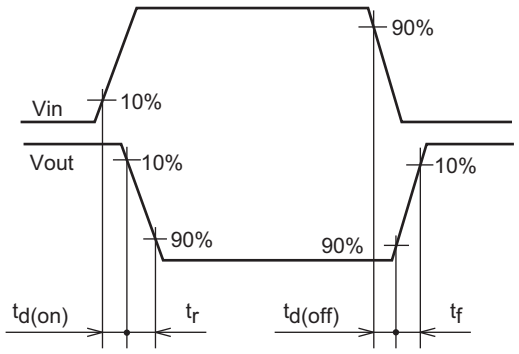
Normalized Transient Thermal Impedance vs. Pulse Width



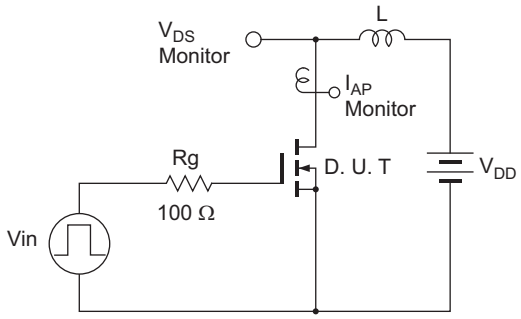
Switching Time Test Circuit



Waveform

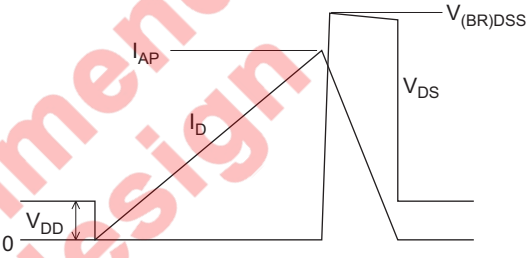


Avalanche Test Circuit



Avalanche Waveform

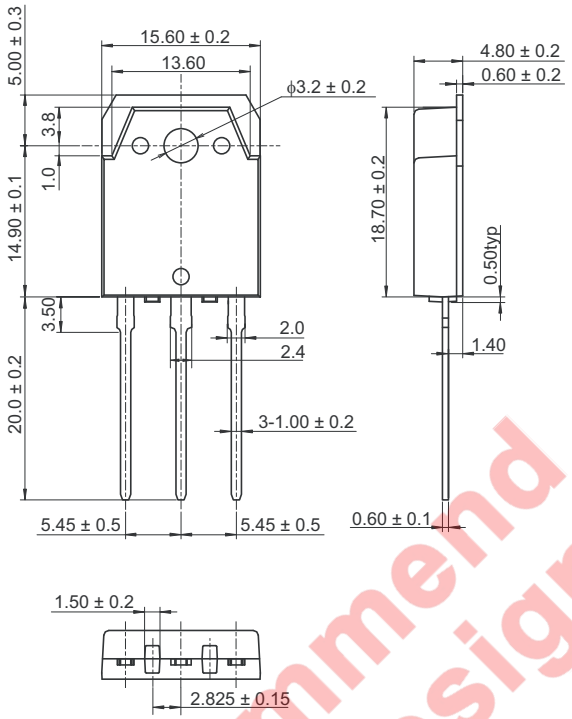
$$E_{AR} = \frac{1}{2} L \bullet I_{AP}^2 \bullet \frac{V_{DSS}}{V_{DSS} - V_{DD}}$$



Package Dimension

Package Name	JEITA Package Code	RENESAS Code	Previous Code	MASS[Typ.]
TO-3PSG	—	PRSS0004ZH-A	TO-3PSG/TO-3PSGV	3.7g

Unit: mm



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Orderable Part Number	Quantity	Shipping Container
RJK60S7DPK-M0#T0	360 pcs	Box (Tube)

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