RJF0604JPD

Silicon N Channel MOS FET Series
Power Switching

R07DS0583EJ0100
Rev.1.00
Nov 22, 2011

Description

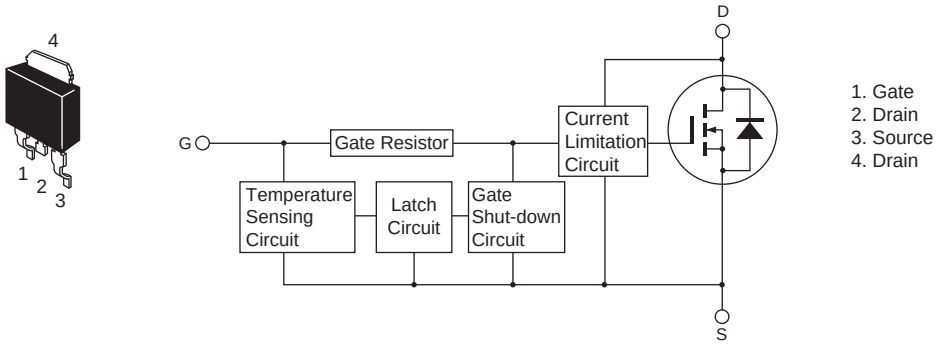
This FET has the over temperature shut-down capability sensing to the junction temperature. This FET has the built-in over temperature shut-down circuit in the gate area. And this circuit operation to shut-down the gate voltage in case of high junction temperature like applying over power consumption, over current etc..

Features

- Logic level operation (5 V Gate drive).
- Built-in the over temperature shut-down circuit.
- High endurance capability against to the short circuit.
- Latch type shut down operation (need 0 voltage recovery).
- Built-in the current limitation circuit.
- Power supply voltage applies 12 V and 24 V.
- AEC-Q101 Compliant

Outline

RENESAS Package code: PRSS0004ZD-C
(Package name: DPAK (S))



Absolute Maximum Ratings

(Ta = 25°C)

Item	Symbol	Ratings	Unit
Drain to source voltage	V_{DSS}	60	V
Gate to source voltage	V_{GSS}	16	V
Gate to source voltage	V_{GSS}	–2.5	V
Drain current	I_D Note3	5	A
Body-drain diode reverse drain current	I_{DR}	5	A
Avalanche current	I_{AP} Note 2	(4.7)	A
Avalanche energy	E_{AR} Note 2	(94.7)	mJ
Channel dissipation	Pch Note 1	30	W
Channel temperature	Tch	150	°C
Storage temperature	Tstg	–55 to +150	°C

Notes: 1. Value at Tc = 25°C
2. Tch = 25°C, Rg ≥ 50 Ω
3. It provides by the current limitation lower bound value.

Typical Operation Characteristics

(Ta = 25°C)

Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Input voltage	V_{IH}	3.5	—	—	V	
	V_{IL}	—	—	1.2	V	
Input current (Gate non shut down)	I_{IH1}	—	—	100	μA	Vi = 8 V, V_{DS} = 0
	I_{IH2}	—	—	50	μA	Vi = 3.5 V, V_{DS} = 0
	I_{IL}	—	—	1	μA	Vi = 1.2 V, V_{DS} = 0
Input current (Gate shut down)	$I_{IH(sd)1}$	—	0.8	—	mA	Vi = 8 V, V_{DS} = 0
	$I_{IH(sd)2}$	—	0.35	—	mA	Vi = 3.5 V, V_{DS} = 0
Shut down temperature	Tsd	—	175	—	°C	Channel temperature
Gate operation voltage	Vop	3.5	—	12	V	
Drain current (Current limitation value)	$I_{D\ limt}$	(5)	—	—	A	V_{GS} = 5 V, V_{DS} = 10 V Note 4

Note; 4. Pulse test

Electrical Characteristics

(Ta = 25°C)

Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Drain current	I_{D1}	—	—	(17)	A	V_{GS} = 3.5 V, V_{DS} = 10 V Note 5
	I_{D2}	—	—	(10)	mA	V_{GS} = 1.2 V, V_{DS} = 10 V
	I_{D3}	(5)	—	—	A	V_{GS} = 5 V, V_{DS} = 10 V Note 5
Drain to source breakdown voltage	$V_{(BR)DSS}$	60	—	—	V	I_D = 10 mA, V_{GS} = 0
Gate to source breakdown voltage	$V_{(BR)GSS}$	16	—	—	V	I_G = 800 μA, V_{DS} = 0
	$V_{(BR)GSS}$	–2.5	—	—	V	I_G = –100 μA, V_{DS} = 0
Gate to source leak current	I_{GSS1}	—	—	100	μA	V_{GS} = 8 V, V_{DS} = 0
	I_{GSS2}	—	—	50	μA	V_{GS} = 3.5 V, V_{DS} = 0
	I_{GSS3}	—	—	1	μA	V_{GS} = 1.2 V, V_{DS} = 0
	I_{GSS4}	—	—	–100	μA	V_{GS} = –2.4 V, V_{DS} = 0
Input current (shut down)	$I_{GS(OP)1}$	—	0.8	—	mA	V_{GS} = 8 V, V_{DS} = 0
	$I_{GS(OP)2}$	—	0.35	—	mA	V_{GS} = 3.5 V, V_{DS} = 0
Zero gate voltage drain current	I_{DSS1}	—	—	10	μA	V_{DS} = 32 V, V_{GS} = 0
	I_{DSS2}	—	—	(10)	μA	V_{DS} = 60 V, V_{GS} = 0, Ta = 110°C
Gate to source cutoff voltage	$V_{GS(off)}$	(1.2)	—	(2.4)	V	V_{DS} = 10 V, I_D = 1 mA
Forward transfer admittance	$\|y_{fs}\|$	(4)	(7.6)	—	S	I_D = 2.5 A, V_{DS} = 10 V Note 5
Static drain to source on state resistance	$R_{DS(on)}$	—	(76)	100	mΩ	I_D = 2.5 A, V_{GS} = 4 V Note 5
	$R_{DS(on)}$	—	(51)	(75)	mΩ	I_D = 2.5 A, V_{GS} = 10 V Note 5
Output capacitance	Coss	—	(280)	—	pF	V_{DS} = 10 V, V_{GS} = 0, f = 1MHz
Turn-on delay time	$t_{d(on)}$	—	(4.1)	—	μs	V_{GS} = 5 V, I_D= 2.5 A, R_L = 12 Ω
Rise time	t_r	—	(16)	—	μs	
Turn-off delay time	$t_{d(off)}$	—	(2.5)	—	μs	
Fall time	t_f	—	(3.1)	—	μs	
Body-drain diode forward voltage	V_{DF}	—	(0.84)	—	V	I_F = 5 A, V_{GS} = 0
Body-drain diode reverse recovery time	t_{rr}	—	(100)	—	ns	I_F = 5 A, V_{GS} = 0 di_F/dt = 50 A/μs
Over load shut down operation time Note 6	t_{os1}	—	(1.2)	—	ms	V_{GS} = 5 V, V_{DD} = 16 V
	t_{os2}	—	(0.7)	—	ms	V_{GS} = 5 V, V_{DD} = 24 V

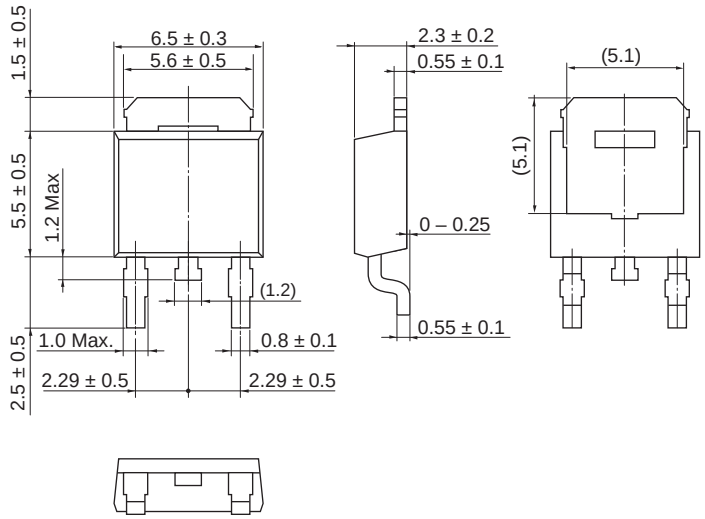
Notes: 5. Pulse test

6. Including the junction temperature rise of the over loaded condition.

Package Dimensions

Package Name	JEITA Package Code	RENESAS Code	Previous Code	MASS[Typ.]
DPAK(S)	SC-63	PRSS0004ZD-C	DPAK(S) / DPAK(S)V	0.28g

Unit: mm



Ordering Information

Orderable Part Number	Quantity	Shipping Container
RJF0604JPD-00#J3	3000 pcs	Taping

Note: The symbol of a "#" are occasionally presented as a "-".

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