

RJF0604JPD

Silicon N Channel MOS FET Series Power Switching

R07DS0583EJ0100
Rev.1.00
Nov 22, 2011

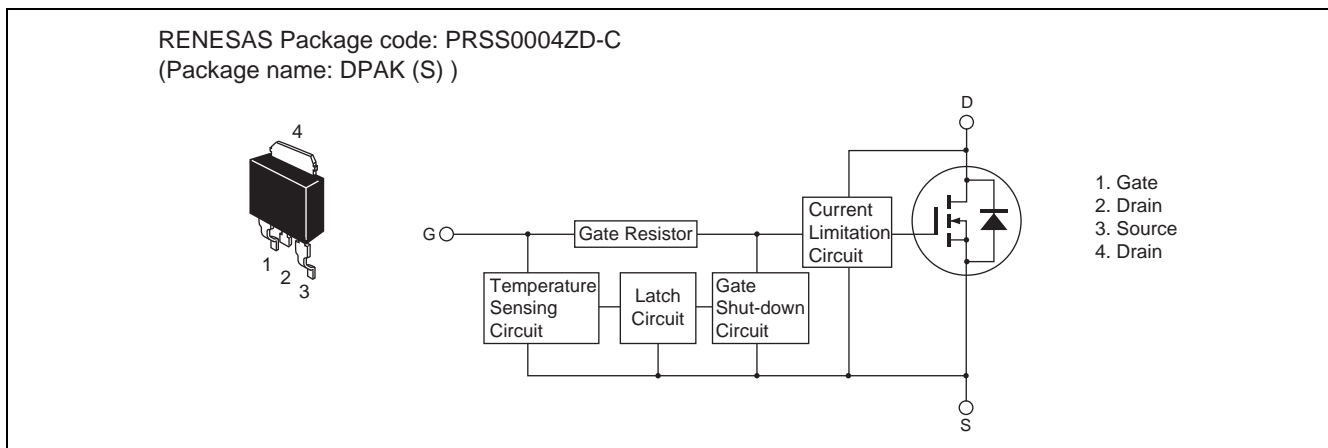
Description

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



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 ^{Note 3}	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	P_{ch} ^{Note 1}	30	W
Channel temperature	T_{ch}	150	°C
Storage temperature	T_{stg}	-55 to +150	°C

- Notes: 1. Value at $T_c = 25^\circ\text{C}$
 2. $T_{ch} = 25^\circ\text{C}$, $R_g \geq 50 \Omega$
 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	μ A	$V_i = 8$ V, $V_{DS} = 0$
	I_{IH2}	—	—	50	μ A	$V_i = 3.5$ V, $V_{DS} = 0$
	I_{IL}	—	—	1	μ A	$V_i = 1.2$ V, $V_{DS} = 0$
Input current (Gate shut down)	$I_{IH(sd)1}$	—	0.8	—	mA	$V_i = 8$ V, $V_{DS} = 0$
	$I_{IH(sd)2}$	—	0.35	—	mA	$V_i = 3.5$ V, $V_{DS} = 0$
Shut down temperature	T_{sd}	—	175	—	°C	Channel temperature
Gate operation voltage	V_{op}	3.5	—	12	V	
Drain current (Current limitation value)	$I_{D\ limit}$	(5)	—	—	A	$V_{GS} = 5$ V, $V_{DS} = 10$ V ^{Note 4}

Note; 4. Pulse test

Electrical Characteristics

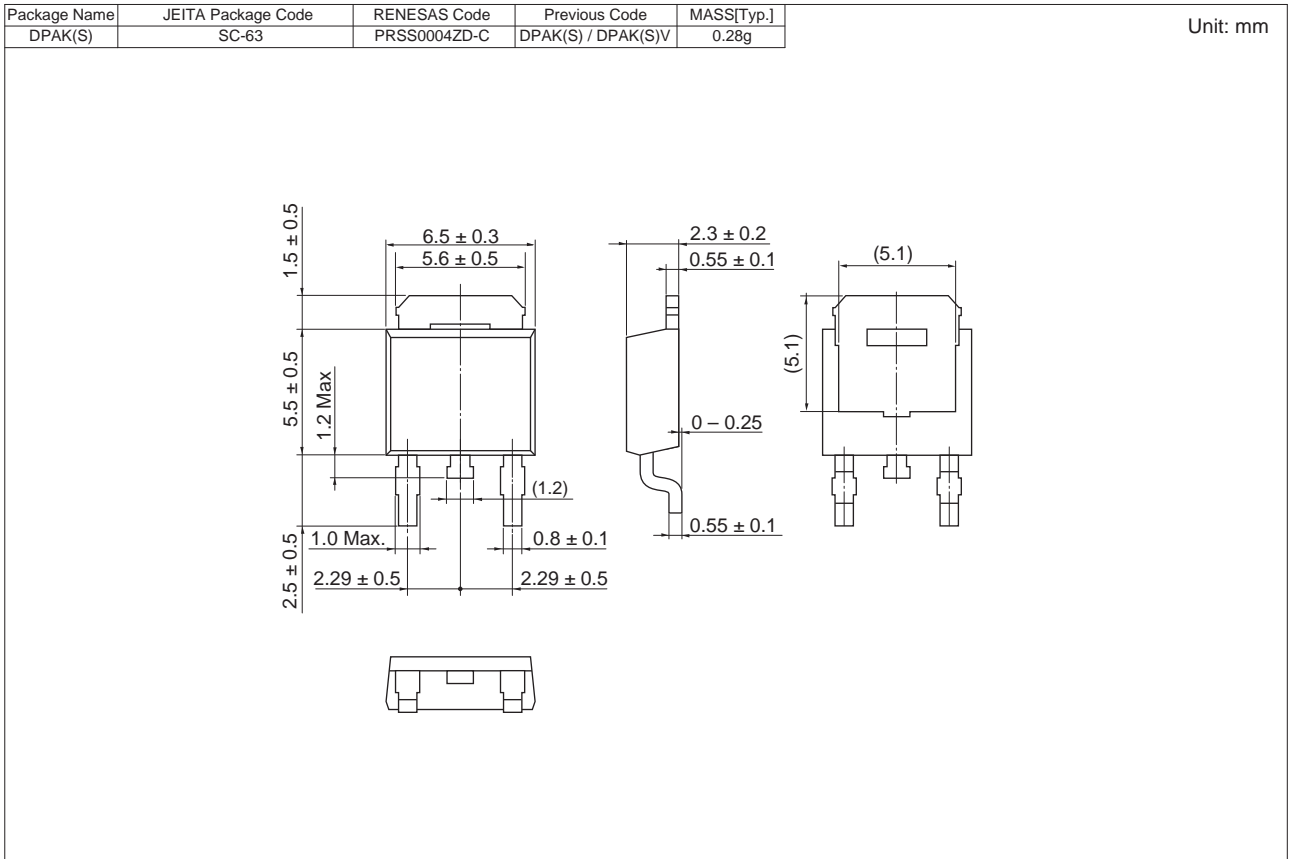
(Ta = 25°C)

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	$I_G = 800$ μ A, $V_{DS} = 0$
	$V_{(BR)GSS}$	-2.5	—	—	V	$I_G = -100$ μ A, $V_{DS} = 0$
Gate to source leak current	I_{GSS1}	—	—	100	μ A	$V_{GS} = 8$ V, $V_{DS} = 0$
	I_{GSS2}	—	—	50	μ A	$V_{GS} = 3.5$ V, $V_{DS} = 0$
	I_{GSS3}	—	—	1	μ A	$V_{GS} = 1.2$ V, $V_{DS} = 0$
	I_{GSS4}	—	—	-100	μ A	$V_{GS} = -2.4$ 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	μ A	$V_{DS} = 32$ V, $V_{GS} = 0$
	I_{DSS2}	—	—	(10)	μ A	$V_{DS} = 60$ V, $V_{GS} = 0$, $T_a = 110^\circ$ 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	m Ω	$I_D = 2.5$ A, $V_{GS} = 4$ V ^{Note 5}
	$R_{DS(on)}$	—	(51)	(75)	m Ω	$I_D = 2.5$ A, $V_{GS} = 10$ V ^{Note 5}
Output capacitance	C_{oss}	—	(280)	—	pF	$V_{DS} = 10$ V, $V_{GS} = 0$, $f = 1$ MHz
Turn-on delay time	$t_{d(on)}$	—	(4.1)	—	μ s	$V_{GS} = 5$ V, $I_D = 2.5$ A, $R_L = 12$ Ω
Rise time	t_r	—	(16)	—	μ s	
Turn-off delay time	$t_{d(off)}$	—	(2.5)	—	μ s	
Fall time	t_f	—	(3.1)	—	μ s	
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/ μ s
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



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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