

HAF1010RJ

Silicon P Channel MOS FET Series Power Switching

R07DS1361EJ0200 Rev.2.00 Sep 06, 2016

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 to (-4 to -6 V Gate drive)

Built-in the over temperature shut-down circuit

High endurance capability against to the shut-down circuit

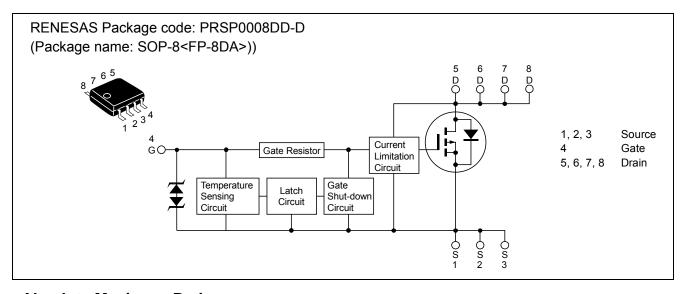
Latch type shut down operation (need 0 voltage recovery)

Built-in the current limitation circuit.

High density mounting

Power supply voltage applies 12 V and 24 V.

Outline



Absolute Maximum Ratings

 $(Ta = 25^{\circ}C)$

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	- 5	A
Drain peak current	I _{D (pulse)} Note1	-10	A
Body-drain diode reverse drain current	I _{DR}	- 5	A
Cannel dissipation	Pch Note2	2.5	W
Cannel temperature	Tch	150	°C
Storage temperature	Tstg	-55 to +150	°C

Notes: 1. PW \leq 10 μ s, duty cycle \leq 1%

2. When using the glass epoxy board (FR4 40 x 40 x 1.6 mm), PW \leq 10s

Typical Operation Characteristics

 $(Ta = 25^{\circ}C)$

Item	Symbol	Min	Тур	Max	Unit	Test Conditions
Input voltage	V _{IH}	-3.5	_	_	V	
	V _{IL}	_	_	-1.2	V	
Input current	I _{IH1}	_	_	-100	μΑ	Vi = -8V, V _{DS} =0
(Gate non shut down)	I _{IH2}	_	_	-50	μΑ	Vi = -3.5V, V _{DS} =0
	I _{IL}	_	_	-1	μΑ	Vi = -1.2V, V _{DS} =0
Input current	I _{IH(sd)1}	_	-0.8	_	mA	Vi = -8V, V _{DS} =0
(Gate shut down)	I _{IH(sd)2}	_	-0.35	_	mA	Vi = -3.5V, V _{DS} =0
Shut down temperature	Tsd	_	175	_	°C	Cannel temperature
Gate operation voltage	Vop	-3.5	_	-12	V	

Electrical Characteristics

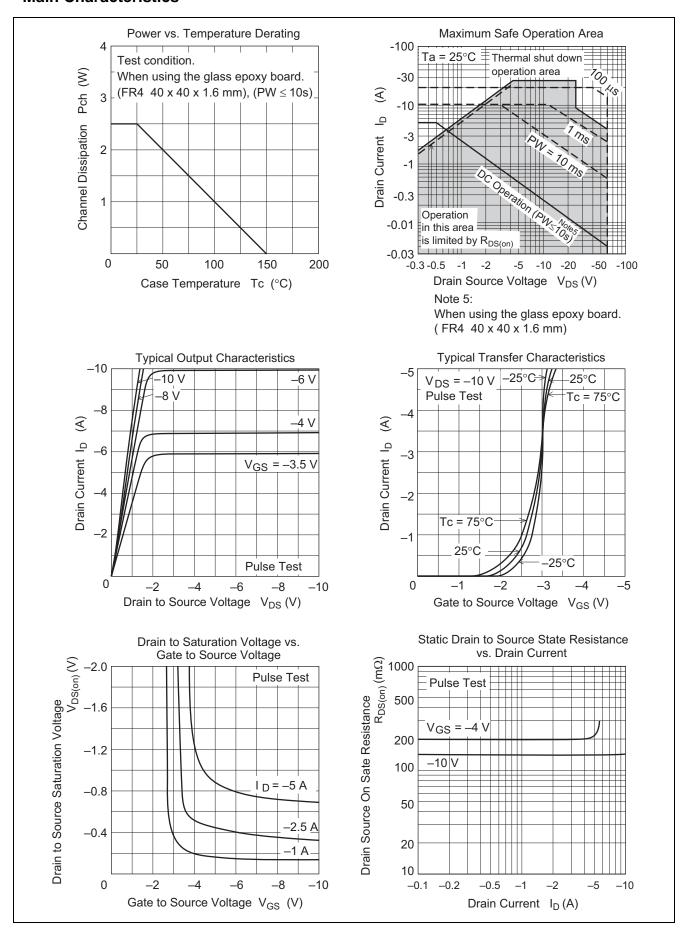
 $(Ta = 25^{\circ}C)$

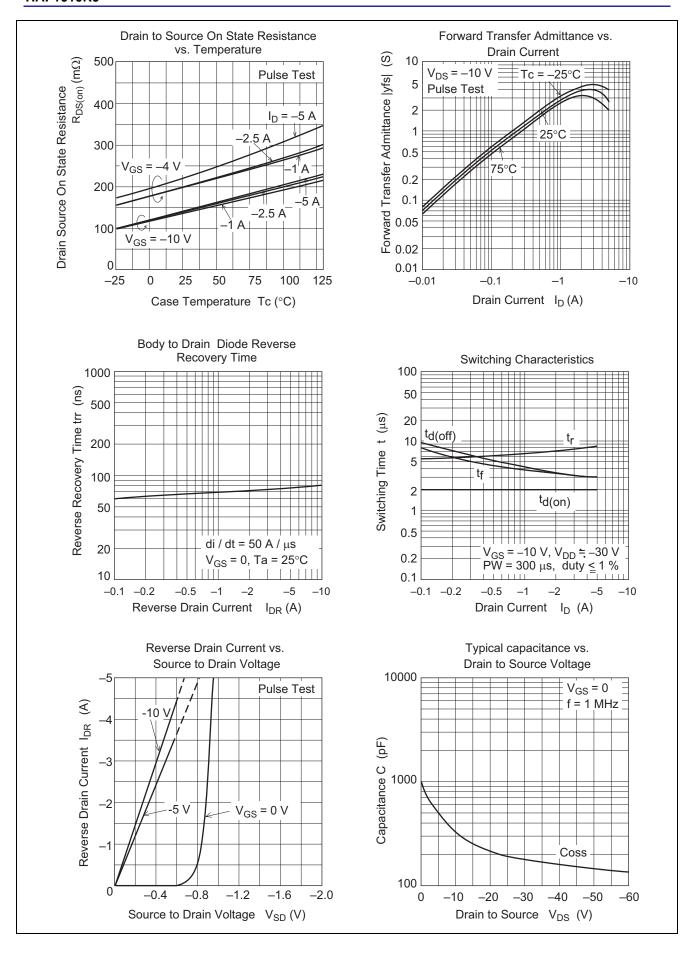
Item	Symbol	Min	Тур	Max	Unit	Test Conditions
Drain current	I _{D1}	-1.5	_		Α	$V_{GS} = -3.5 \text{ V}, V_{DS} = -2 \text{ V}$
Drain current	I _{D2}		_	-10	mA	V _{GS} = -1.2 V, V _{DS} = -2 V
Drain to source breakdown voltage	$V_{(BR)DSS}$	-60	_	_	V	$I_D = -10 \text{ mA}, V_{GS} = 0$
Gate to source breakdown voltage	$V_{(BR)GSS}$	-16	_	_	V	$I_G = -800 \mu A, V_{DS} = 0$
Gate to source breakdown voltage	$V_{(BR)GSS}$	2.5	_	_	V	$I_G = 100 \mu A, V_{DS} = 0$
Gate to source leak current	I _{GSS1}	_	_	-100	μΑ	$V_{GS} = -8 \text{ V}, V_{DS} = 0$
	I _{GSS2}	_	_	-50	μΑ	$V_{GS} = -3.5 \text{ V}, V_{DS} = 0$
	I _{GSS3}	_	_	- 1	μΑ	$V_{GS} = -1.2 \text{ V}, V_{DS} = 0$
	I _{GSS4}	_	_	100	μΑ	$V_{GS} = 2.4 \text{ V}, V_{DS} = 0$
Input current (shut down)	I _{GS(OP)1}	_	-0.8	_	mA	$V_{GS} = -8 \text{ V}, V_{DS} = 0$
	I _{GS(OP)2}	_	-0.35	_	mA	$V_{GS} = -3.5 \text{ V}, V_{DS} = 0$
Zero gate voltage drain current	I _{DSS}	_	_	-10	μΑ	$V_{DS} = -60 \text{ V}, V_{GS} = 0$
Gate to source cut off voltage	$V_{GS(off)}$	-1.1	_	-2.25	V	$V_{DS} = -10 \text{ V}, I_{D} = -1 \text{ mA}$
Forward transfer admittance	y _{fs}	2	4	_	S	I _D =–2.5 A, V _{DS} =–10 V ^{note3}
Static drain to source on state	R _{DS(on)}	_	200	340	mΩ	$I_D = -2.5 \text{ A}, V_{GS} = -4 \text{ V}^{\text{note3}}$
resistance	R _{DS(on)}	_	140	200	mΩ	$I_D = -2.5 \text{ A}, V_{GS} = -10 \text{ V}^{\text{note3}}$
Output capacitance	Coss	_	326	_	pF	$V_{DS} = -10 \text{ V}, V_{GS} = 0,$
						f = 1 MHz
Turn-on delay time	td(on)	_	2		μS	$V_{GS} = -5 \text{ V}, I_{D} = -2.5 \text{ A}, R_{L} =$
Rise time	tr	_	7.6	_	μS	12 Ω
Turn off delay time	td(off)	_	3.2	_	μS	
Fall time	tf		3.2	_	μS	
Body-drain diode forward voltage	V_{DF}		-0.9	_	V	$I_F = -5 A, V_{GS} = 0$
Body-drain diode reverse recovery	trr	_	77	_	ns	$I_F = -5 A$, $V_{GS} = 0$
time						diF/dt = 50 A/μs
Over lord shut down	t _{os1}	_	4.4	_	ms	$V_{GS} = -5 \text{ V}, V_{DD} = -16 \text{ V}$
operation time note4	t _{os2}	_	2	_	ms	$V_{GS} = -5 \text{ V}, V_{DD} = -24 \text{ V}$

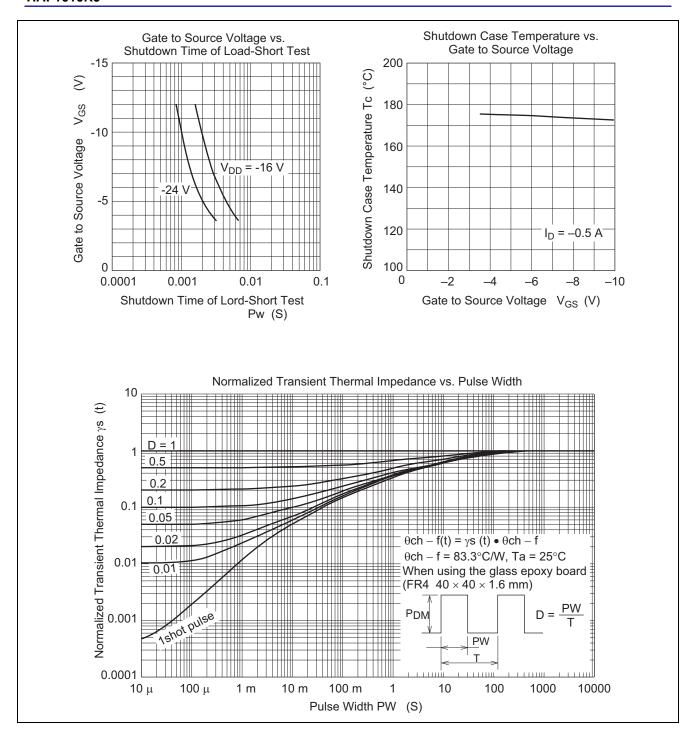
Notes: 3. Pulse test

4. Including the junction temperature rise of the lorded condition

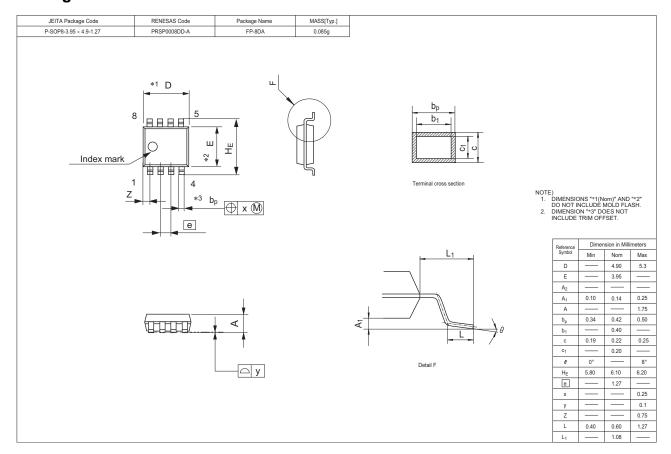
Main Characteristics







Package Dimensions



Ordering Information

Part Name	Quantity	Shipping Container
HAF1010RJ	2500 pcs/ Reel	Embossed tape (Reel)

Note: For some grades, production may be terminated.

Please contact the Renesas sales office to check the state of production before ordering the product.

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