HAF1010RJ

Silicon P Channel MOS FET Series
Power Switching

R07DS1361EJ0200
Rev.2.00
Sep 06, 2016

Description

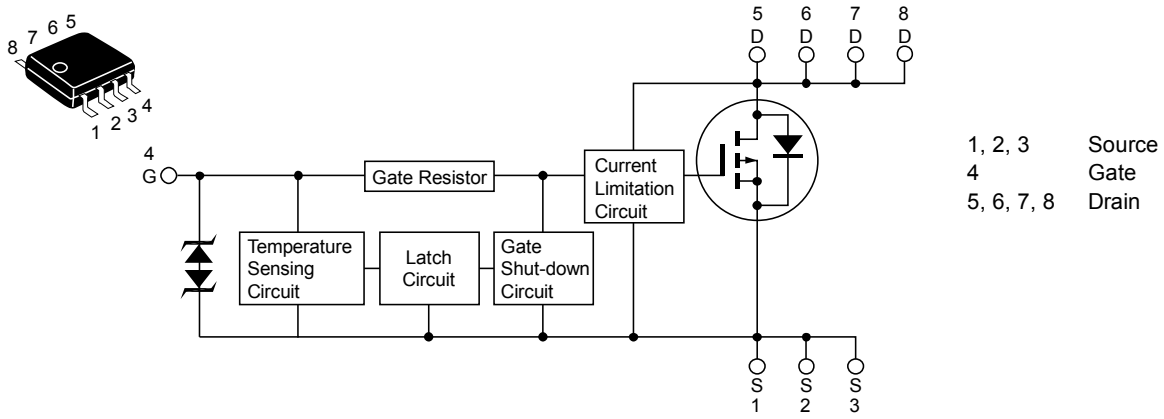
This FET has the over temperature shut-down capability sensing to the junction temperature. This FET has the built-in over temperature shut-down circuit in the gate area. And this circuit operation to shut-down the gate voltage in case of high junction temperature like applying over power consumption,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

RENESAS Package code: PRSP0008DD-D
(Package name: SOP-8<FP-8DA>))



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	–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 ≤ 10 μs, duty cycle ≤ 1%
2. When using the glass epoxy board (FR4 40 x 40 x 1.6 mm), PW ≤ 10s

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 = –8V, V_{DS} =0
	I_{IH2}	—	—	–50	μA	Vi = –3.5V, V_{DS} =0
	I_{IL}	—	—	–1	μA	Vi = –1.2V, V_{DS} =0
Input current (Gate shut down)	$I_{IH(sd)1}$	—	–0.8	—	mA	Vi = –8V, V_{DS} =0
	$I_{IH(sd)2}$	—	–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°C)

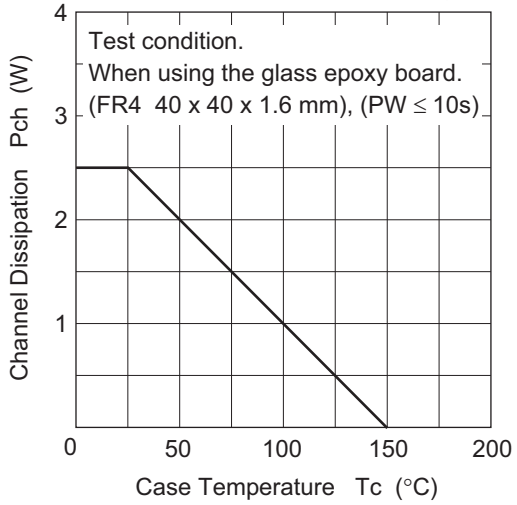
Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Drain current	I_{D1}	–1.5	—	—	A	V_{GS} = –3.5 V, V_{DS} = –2 V
Drain current	I_{D2}	—	—	–10	mA	V_{GS} = –1.2 V, V_{DS} = –2 V
Drain to source breakdown voltage	$V_{(BR)DSS}$	–60	—	—	V	I_D = –10 mA, V_{GS} = 0
Gate to source breakdown voltage	$V_{(BR)GSS}$	–16	—	—	V	I_G = –800 μA, V_{DS} = 0
Gate to source breakdown voltage	$V_{(BR)GSS}$	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_{DSS}	—	—	–10	μA	V_{DS} = –60 V, V_{GS} = 0
Gate to source cut off voltage	$V_{GS(off)}$	–1.1	—	–2.25	V	V_{DS} = –10 V, I_D = –1 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 resistance	$R_{DS(on)}$	—	200	340	mΩ	I_D = –2.5 A, V_{GS} = –4 V[note3]
	$R_{DS(on)}$	—	140	200	mΩ	I_D = –2.5 A, V_{GS} = –10 V[note3]
Output capacitance	Coss	—	326	—	pF	V_{DS} = –10 V, V_{GS} = 0, f = 1 MHz
Turn-on delay time	td(on)	—	2	—	μs	V_{GS} = –5 V, I_D= –2.5 A, R_L = 12 Ω
Rise time	tr	—	7.6	—	μs	
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 time	trr	—	77	—	ns	I_F = –5 A, V_{GS} = 0 diF/dt = 50 A/μs
Over lord shut down operation time [note4]	t_{os1}	—	4.4	—	ms	V_{GS} = –5 V, V_{DD} = –16 V
	t_{os2}	—	2	—	ms	V_{GS} = –5 V, V_{DD} = –24 V

Notes: 3. Pulse test

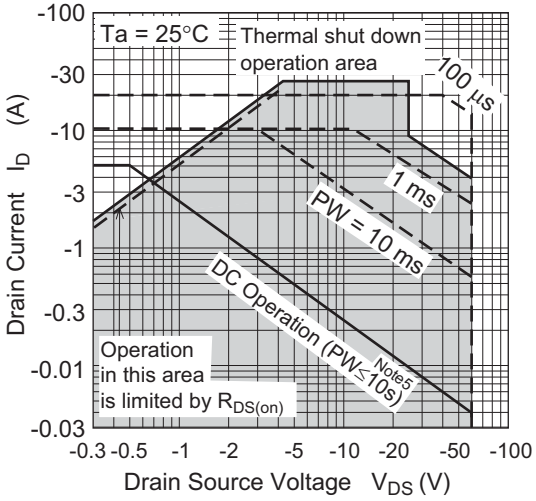
4. Including the junction temperature rise of the lorded condition

Main Characteristics

Power vs. Temperature Derating

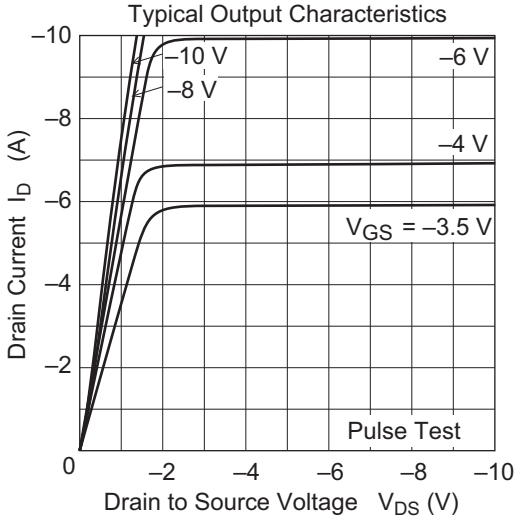


Maximum Safe Operation Area

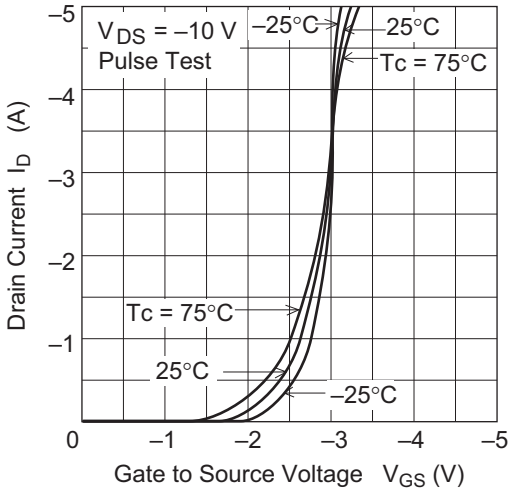


Note 5:
When using the glass epoxy board.
(FR4 40 x 40 x 1.6 mm)

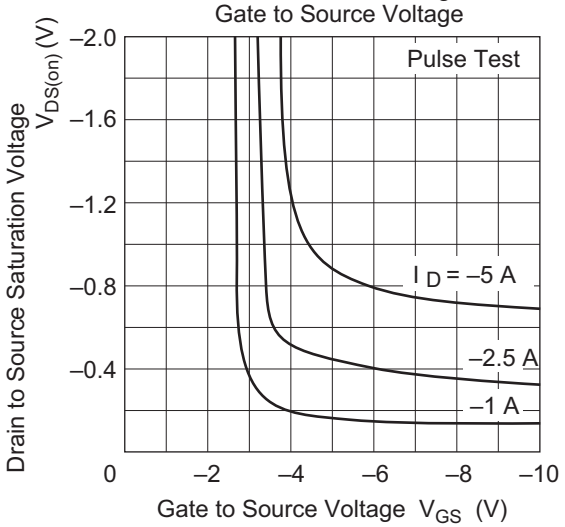
Typical Output Characteristics



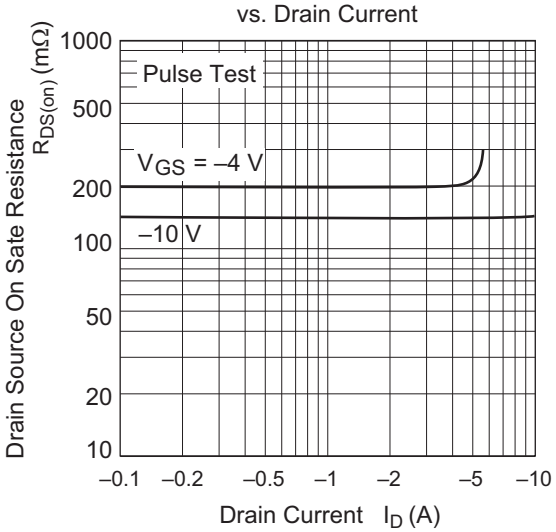
Typical Transfer Characteristics



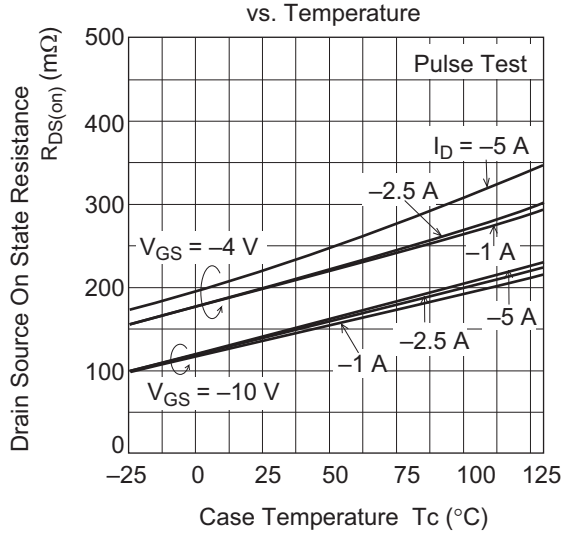
Drain to Saturation Voltage vs. Gate to Source Voltage



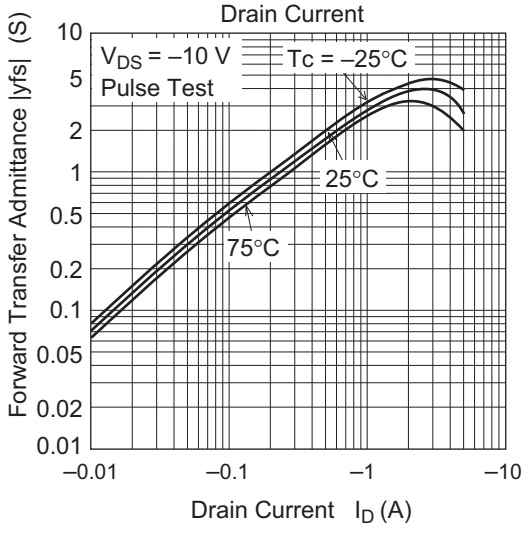
Static Drain to Source State Resistance vs. Drain Current



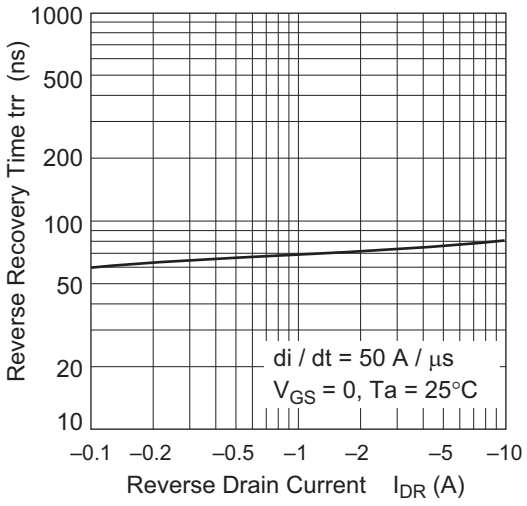
Drain to Source On State Resistance vs. Temperature



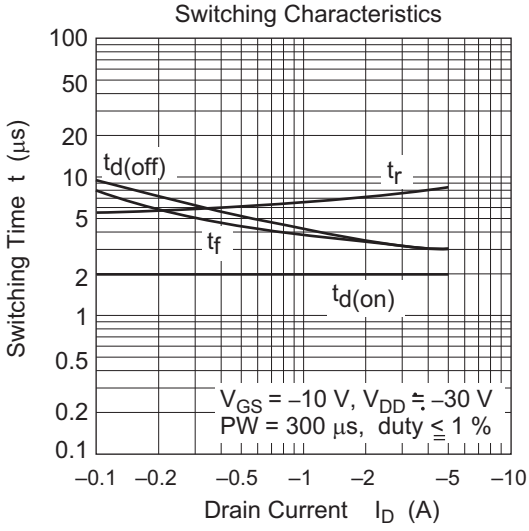
Forward Transfer Admittance vs. Drain Current



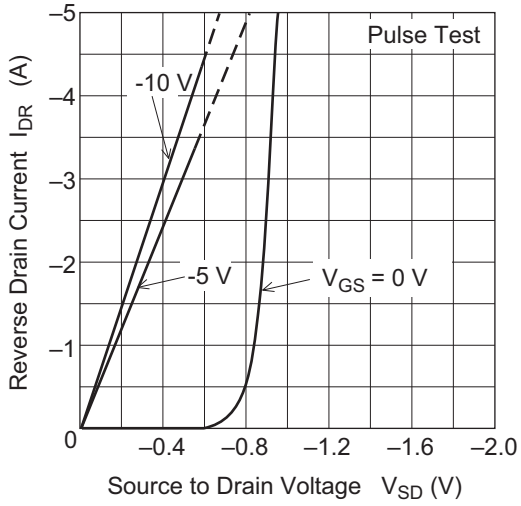
Body to Drain Diode Reverse Recovery Time



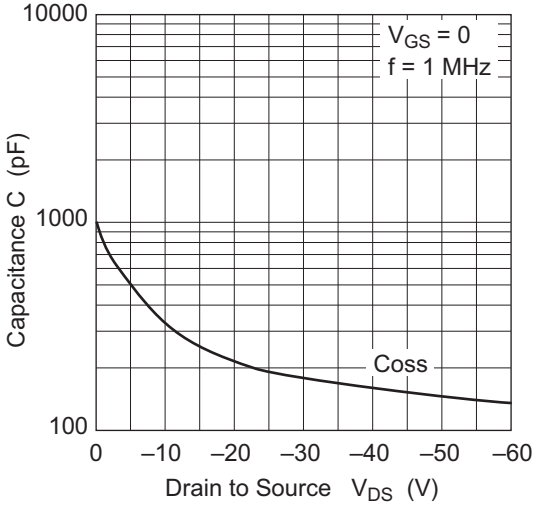
Switching Characteristics



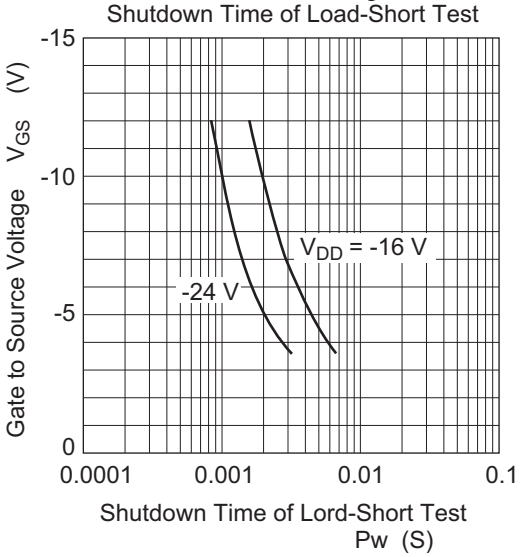
Reverse Drain Current vs. Source to Drain Voltage



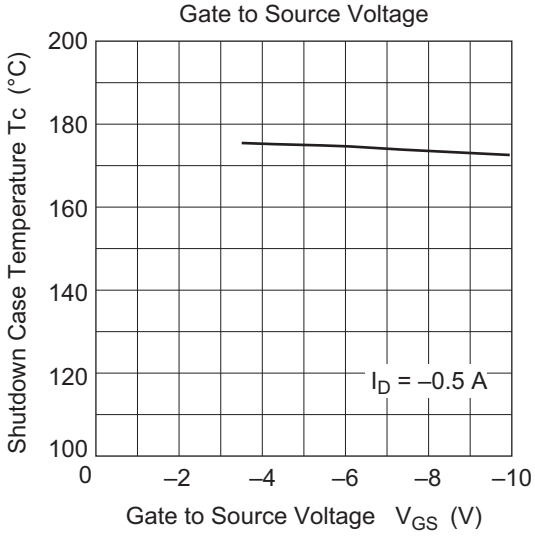
Typical capacitance vs. Drain to Source Voltage



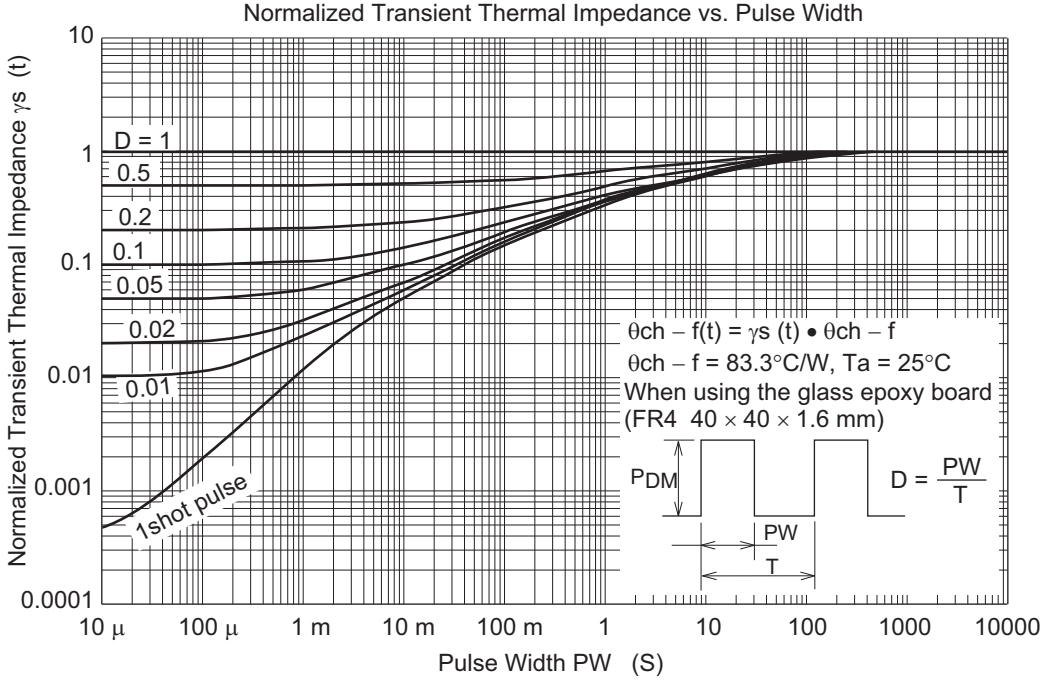
Gate to Source Voltage vs.
Shutdown Time of Load-Short Test



Shutdown Case Temperature vs.
Gate to Source Voltage

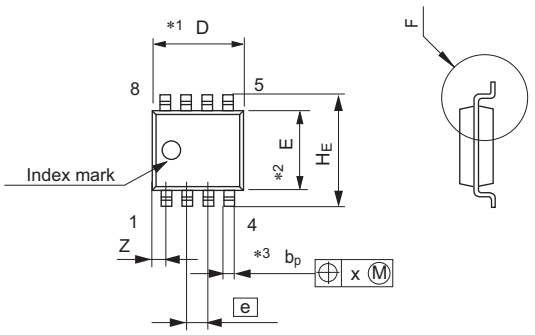


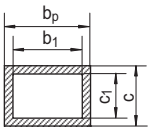
Normalized Transient Thermal Impedance vs. Pulse Width



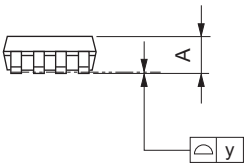
Package Dimensions

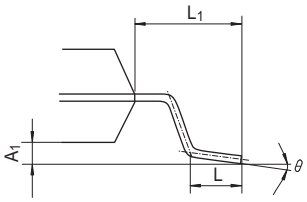
JEITA Package Code	RENESAS Code	Package Name	MASS[Typ.]
P-SOP8-3.95 × 4.9-1.27	PRSP0008DD-A	FP-8DA	0.085g





Terminal cross section





Detail F

NOTE)
1. DIMENSIONS "*1(Nom)" AND "*2" DO NOT INCLUDE MOLD FLASH.
2. DIMENSION "*3" DOES NOT INCLUDE TRIM OFFSET.

Reference Symbol	Dimension in Millimeters		
	Min	Nom	Max
D	—	4.90	5.3
E	—	3.95	—
A_2	—	—	—
A_1	0.10	0.14	0.25
A	—	—	1.75
b_p	0.34	0.42	0.50
b_1	—	0.40	—
c	0.19	0.22	0.25
c_1	—	0.20	—
θ	0°	—	8°
H_E	5.80	6.10	6.20
e	—	1.27	—
x	—	—	0.25
y	—	—	0.1
Z	—	—	0.75
L	0.40	0.60	1.27
L_1	—	1.08	—

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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