RX Family

Design Guide for Migration between RX Family Differences in Package External form

Summary

The RX family partly includes products with QFP package and the same pin count with the different external form, with a RENESAS Code attached to each product.

This application note compares and shows differences in external form between the products with QFP package and the same pin count for each RENESAS Code.

Please refer to this material when designing for migration between RX family.

Note that differences in external form for the same package and the same pin count exist in QFP package only, and not in BGA, LGA and QFN packages.

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1. Differences in package external form

Table1.1 shows the list of RENESAS Codes for different external form with QFP package and the same pin count.

Table1.1 RENESAS Code for different external form with QFP package pin count

No.	Pin count	Existing RENESAS Code	Additional RENESAS Code
1	144	PLQP0144KA-A	PLQP0144KA-B
2	112	PLQP0112JA-A	PLQP0112JA-B
3	100	PLQP0100KB-A	PLQP0100KB-B
4	80	PLQP0080KB-A	PLQP0080KB-B
5	64	PLQP0064KB-A	PLQP0064KB-C
6	48	PLQP0048KB-A	PLQP0048KB-B

※ The RENESAS Code is described in the external form dimension diagram in User's Manual: Hardware for the target product.

JEITA Package Code	RENESAS Code	Previous Code	MASS [Typ.]
P-LFQFP144-20×20-0.50	PLQP0144KA-B	—	1.2 g

2. Differences in external form in detail

2.1 QFP-144pin

Figure 2.1 shows differences in external form and Table 2.1 shows differences dimension for both QFP144pin. Left Fig and table: existing RENESAS Code. Right Fig and table: additional RENESAS Code.

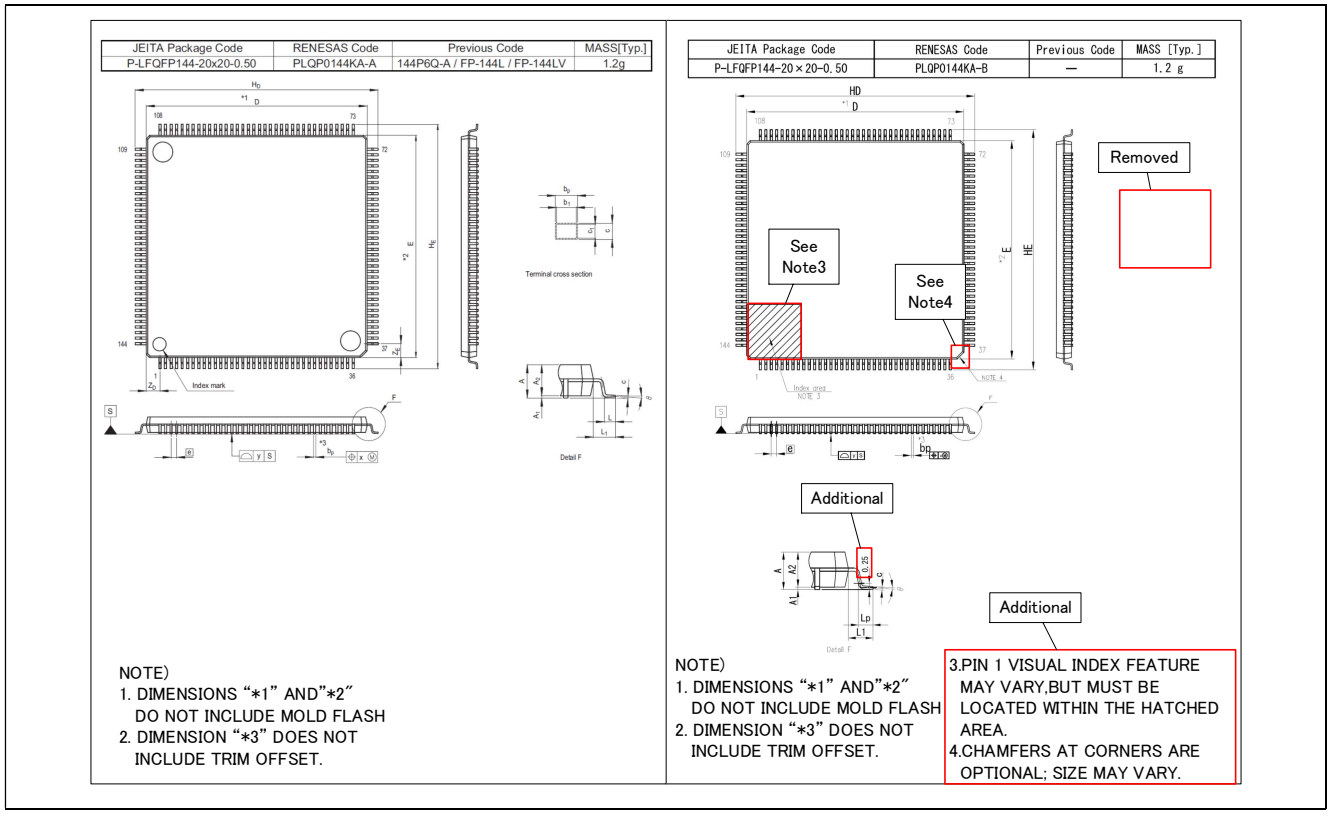

Figure 2.1 Differences in external form for QFP-144pin

Table 2.1 Differences in external form for QFP-144pin (Dimension)

PLQP0144KA-A Unit(mm)				PLQP0144KA-B Unit(mm)			
Symbol	MIN.	NOM.	MAX.	Symbol	MIN.	NOM.	MAX.
D	19.9	20.0	20.1	D	19.9	20.0	20.1
E	19.9	20.0	20.1	E	19.9	20.0	20.1
A2	-	1.40	-	A2	-	1.40	-
HD	21.8	22.0	22.2	HD	21.8	22.0	22.2
HE	21.8	22.0	22.2	HE	21.8	22.0	22.2
A	-	-	1.70	A	-	-	1.70
A1	0.05	0.10	0.15	A1	0.05	-	0.15
bp	0.17	0.22	0.27	bp	0.17	0.20	0.27
b1	-	0.20	-	Undefined			
C	0.09	0.145	0.20	C	0.09	-	0.20
c1	-	0.125	-	Undefined			
Θ	0°	-	8°	Θ	0°	3.5°	8°
e	-	0.50	-	e	-	0.50	-
x	-	-	0.08	x	-	-	0.08
y	-	-	0.10	y	-	-	0.10
ZD	-	1.25	-	Undefined			
ZE	-	1.25	-	Undefined			
L	0.35	0.50	0.65	Undefined			
Undefined				Lp	0.45	0.60	0.75
L1	-	1.00	-	L1	-	1.00	-

2.2 QFP-112pin

Figure 2.2 shows differences in external form and Table 2.2 shows differences dimension for both QFP-112pin Left Fig and table: existing RENESAS Code. Right Fig and table: additional RENESAS Code.

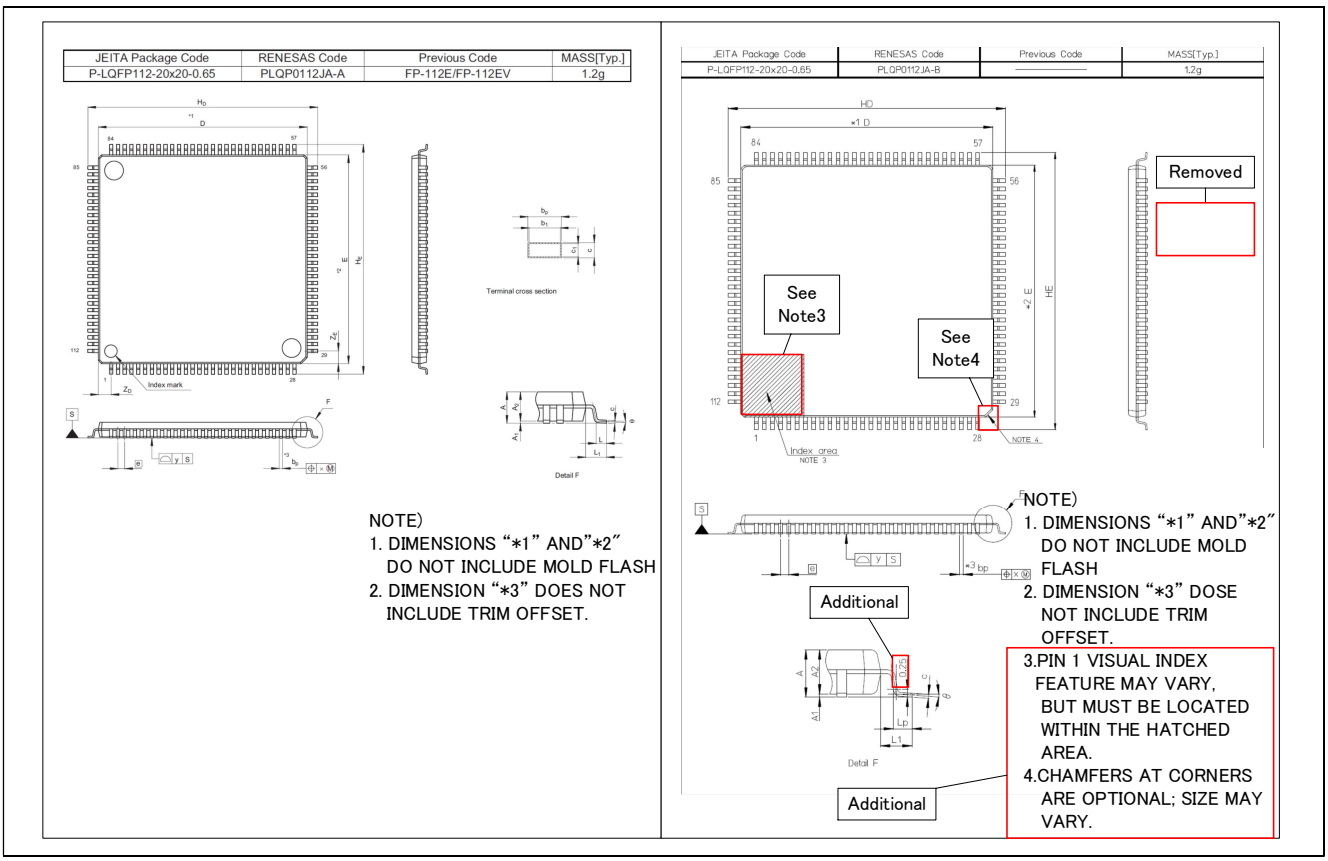

Figure 2.2 Differences in external form for QFP-112pin

Table 2.2 Differences in external form for QFP-112pin (Dimension)

PLQP0112JA-A Unit(mm)				PLQP0112JA-B Unit(mm)			
Symbol	MIN.	NOM.	MAX.	Symbol	MIN.	NOM.	MAX.
D	19.9	20.0	20.1	D	19.9	20.0	20.1
E	19.9	20.0	20.1	E	19.9	20.0	20.1
A2	-	1.40	-	A2	-	1.40	-
HD	21.8	22.0	22.2	HD	21.8	22.0	22.2
HE	21.8	22.0	22.2	HE	21.8	22.0	22.2
A	-	-	1.70	A	-	-	1.70
A1	0.05	0.10	0.15	A1	0.05	-	0.15
bp	0.27	0.32	0.37	bp	0.27	0.32	0.37
b1	-	0.30	-	Undefined			
C	0.09	0.145	0.20	C	0.09	-	0.20
c1	-	0.125	-	Undefined			
Θ	0°	-	8°	Θ	0°	3.5°	8°
e	-	0.65	-	e	-	0.65	-
x	-	-	0.13	x	-	-	0.13
y	-	-	0.10	y	-	-	0.10
ZD	-	1.225	-	Undefined			
ZE	-	1.225	-	Undefined			
L	0.35	0.50	0.65	Undefined			
Undefined				Lp	0.45	0.60	0.75
L1	-	1.00	-	L1	-	1.00	-

2.3 QFP-100pin

Figure 2.3 shows differences in external form and Table 2.3 shows differences dimension for both QFP-100pin.Left Fig and table: existing RENESAS Code. Right Fig and table: additional RENESAS Code.

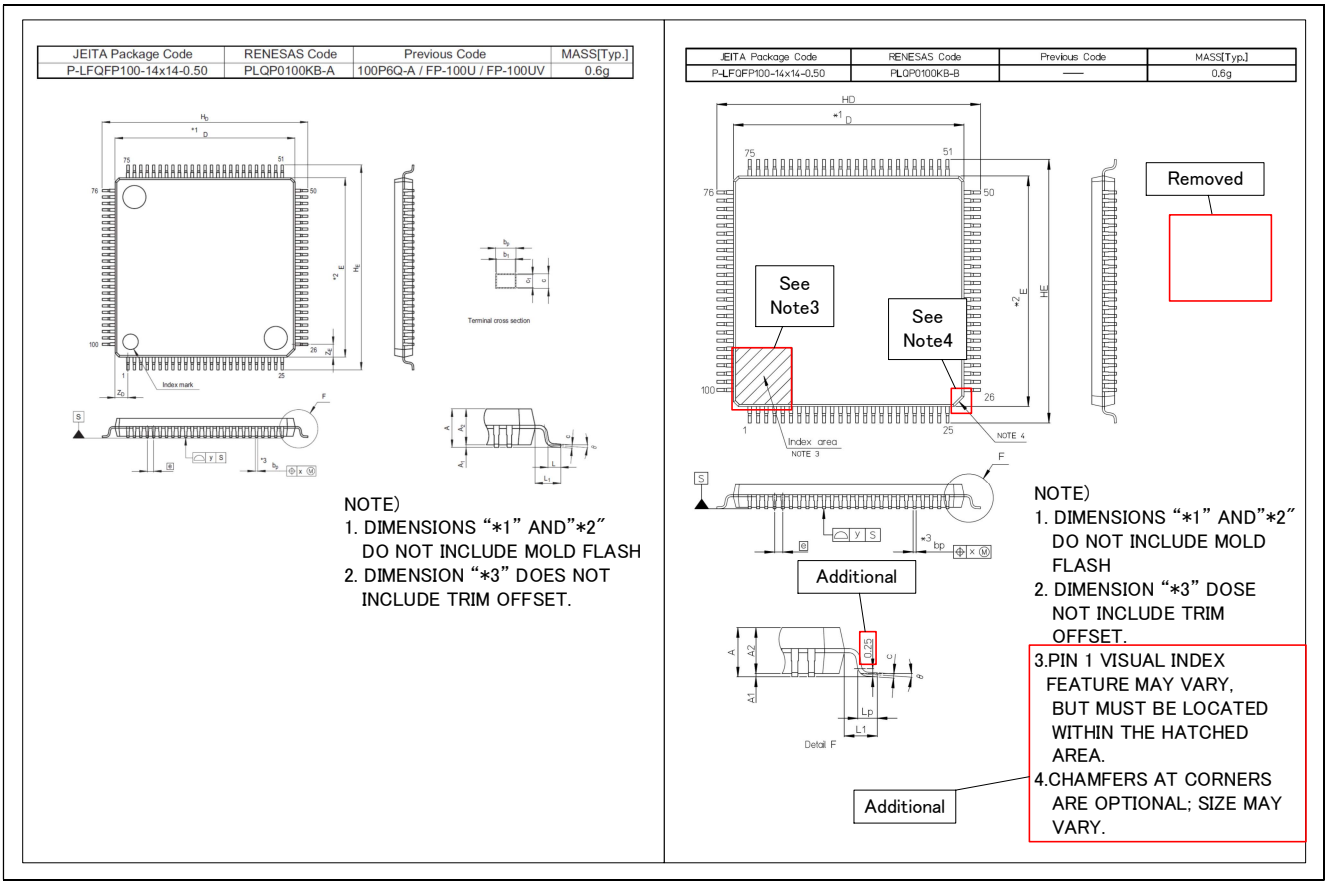

Figure 2.3 Differences in external form for QFP-100pin

Table 2.3 Differences in external form for QFP-100pin (Dimension)

PLQP0100KB-A Unit(mm)				PLQP0100KB-B Unit(mm)			
Symbol	MIN.	NOM.	MAX.	Symbol	MIN.	NOM.	MAX.
D	13.9	14.0	14.1	D	13.9	14.0	14.1
E	13.9	14.0	14.1	E	13.9	14.0	14.1
A2	-	1.40	-	A2	-	1.40	-
HD	15.8	16.0	16.2	HD	15.8	16.0	16.2
HE	15.8	16.0	16.2	HE	15.8	16.0	16.2
A	-	-	1.70	A	-	-	1.70
A1	0.05	0.10	0.15	A1	0.05	-	0.15
bp	0.15	0.20	0.25	bp	0.15	0.20	0.27
b1	-	0.18	-	Undefined			
C	0.09	0.145	0.20	C	0.09	-	0.20
c1	-	0.125	-	Undefined			
Θ	0°	-	8°	Θ	0°	3.5°	8°
e	-	0.50	-	e	-	0.50	-
x	-	-	0.08	x	-	-	0.08
y	-	-	0.08	y	-	-	0.08
ZD	-	1.00	-	Undefined			
ZE	-	1.00	-	Undefined			
L	0.35	0.50	0.65	Undefined			
Undefined				Lp	0.45	0.60	0.75
L1	-	1.00	-	L1	-	1.00	-

2.4 QFP-80pin

Figure 2.4 shows differences in external form and Table 2.4 shows differences dimension for both QFP-80pin Left Fig and table: existing RENESAS Code. Right Fig and table: additional RENESAS Code.

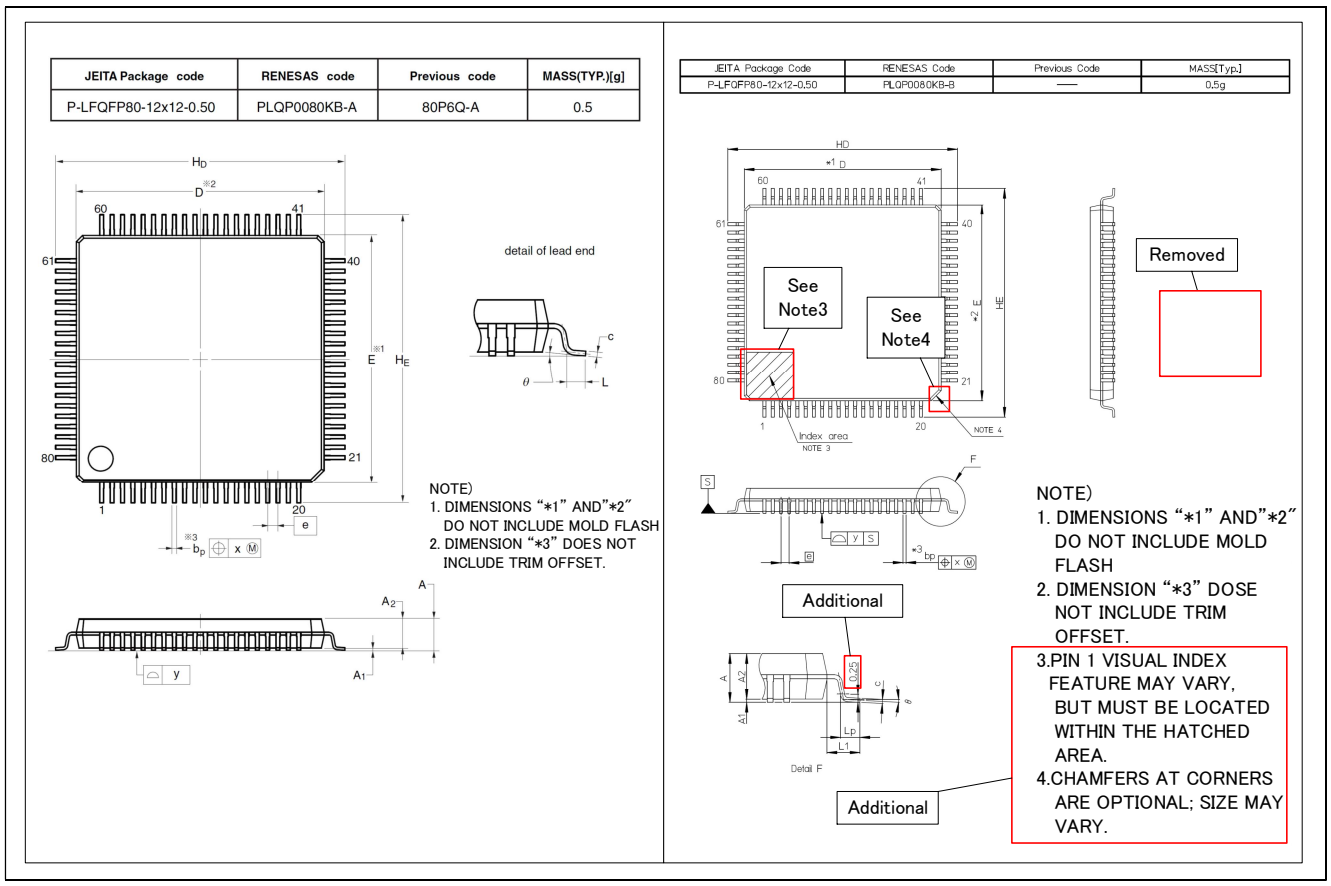

Figure 2.4 Differences in external form for QFP-80pin

Table 2.4 Differences in external form for QFP-80pin (Dimension)

PLQP0080KB-A Unit(mm)				PLQP0080KB-B Unit(mm)			
Symbol	MIN.	NOM.	MAX.	Symbol	MIN.	NOM.	MAX.
D	11.9	12.0	12.1	D	11.9	12.0	12.1
E	11.9	12.0	12.1	E	11.9	12.0	12.1
HD	13.8	14.0	14.2	HD	13.8	14.0	14.2
HE	13.8	14.0	14.2	HE	13.8	14.0	14.2
A	-	-	1.70	A	-	-	1.70
A1	0.00	0.10	0.20	A1	0.05	-	0.15
A2	-	1.40	-	A2	-	1.40	-
bp	0.15	0.20	0.25	bp	0.15	0.20	0.27
C	0.09	0.145	0.20	C	0.09	-	0.20
L	0.30	0.50	0.70	Undefined			
Θ	0°	-	10°	Θ	0°	3.5°	8°
e	-	0.50	-	e	-	0.50	-
x	-	-	0.08	x	-	-	0.08
y	-	-	0.08	y	-	-	0.08
Undefined				Lp	0.45	0.6	0.75
Undefined				L1	-	1.0	-

2.5 QFP-64pin

Figure 2.5 shows differences in external form and Table 2.5 shows differences dimension for both QFP-64pin. Left Fig and table: existing RENESAS Code. Right Fig and table: additional RENESAS Code.

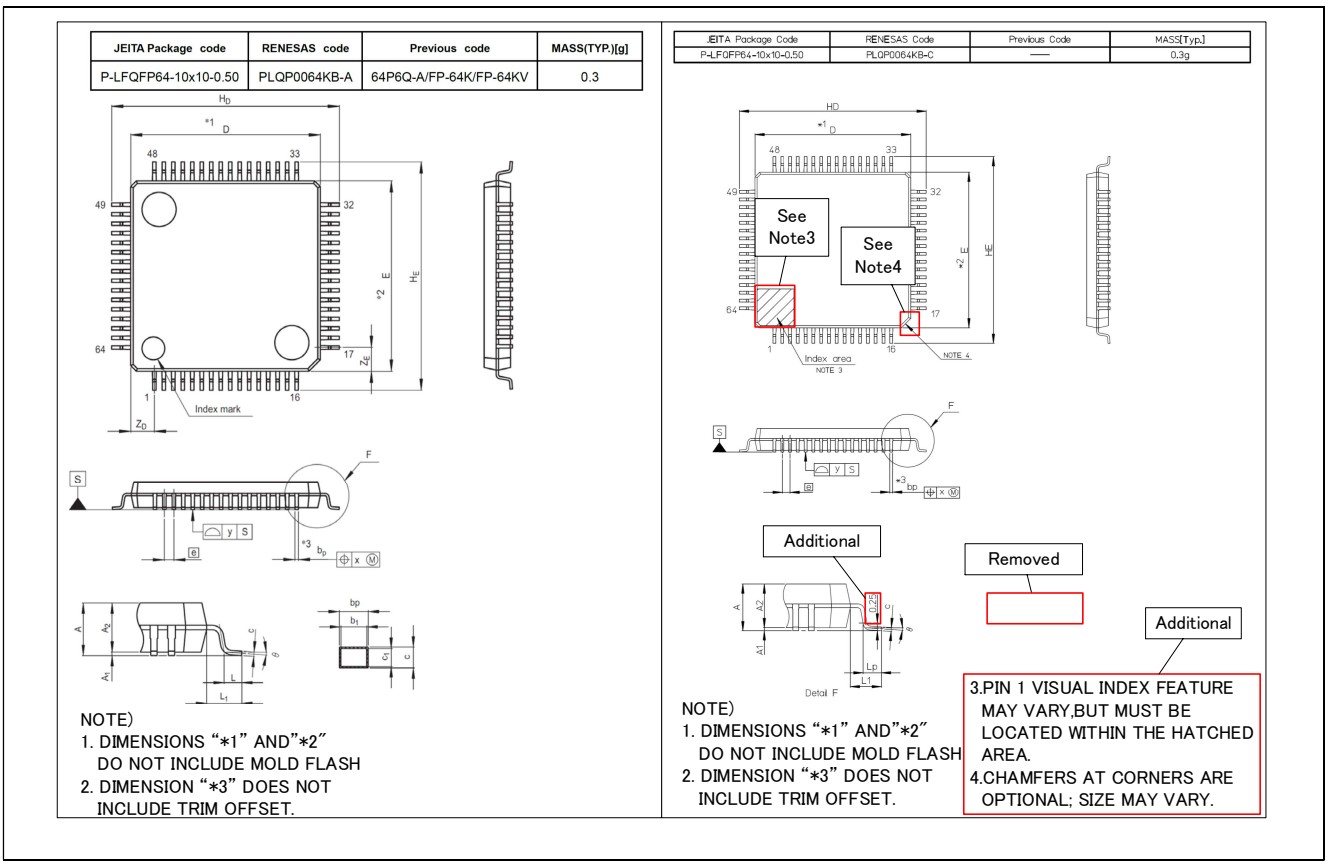

Figure 2.5 Differences in external form for QFP-64pin

Table 2.5 Differences in external form for QFP-64pin (Dimension)

PLQP0064KB-A Unit(mm)				PLQP0064KB-C Unit(mm)			
Symbol	MIN.	NOM.	MAX.	Symbol	MIN.	NOM.	MAX.
D	9.9	10.0	10.1	D	9.9	10.0	10.1
E	9.9	10.0	10.1	E	9.9	10.0	10.1
A2	-	1.40	-	A2	-	1.40	-
HD	11.8	12.0	12.2	HD	11.8	12.0	12.2
HE	11.8	12.0	12.2	HE	11.8	12.0	12.2
A	-	-	1.70	A	-	-	1.70
A1	0.05	0.10	0.15	A1	0.05	-	0.15
bp	0.15	0.20	0.25	bp	0.15	0.20	0.27
b1	-	0.18	-	Undefined			
C	0.09	0.145	0.20	C	0.09	-	0.20
c1	-	0.125	-	Undefined			
Θ	0°	-	8°	Θ	0°	3.5°	8°
e	-	0.50	-	e	-	0.50	-
x	-	-	0.08	x	-	-	0.08
y	-	-	0.08	y	-	-	0.08
ZD	-	1.25	-	Undefined			
ZE	-	1.25	-	Undefined			
L	0.35	0.50	0.65	Undefined			
Undefined				Lp	0.45	0.60	0.75
L1	-	1.00	-	L1	-	1.00	-

2.6 QFP-48pin

Figure 2.6 shows differences in external form and Table 2.6 shows differences dimension for both QFP-48pin Left Fig and table: existing RENESAS Code. Right Fig and table: additional RENESAS Code.

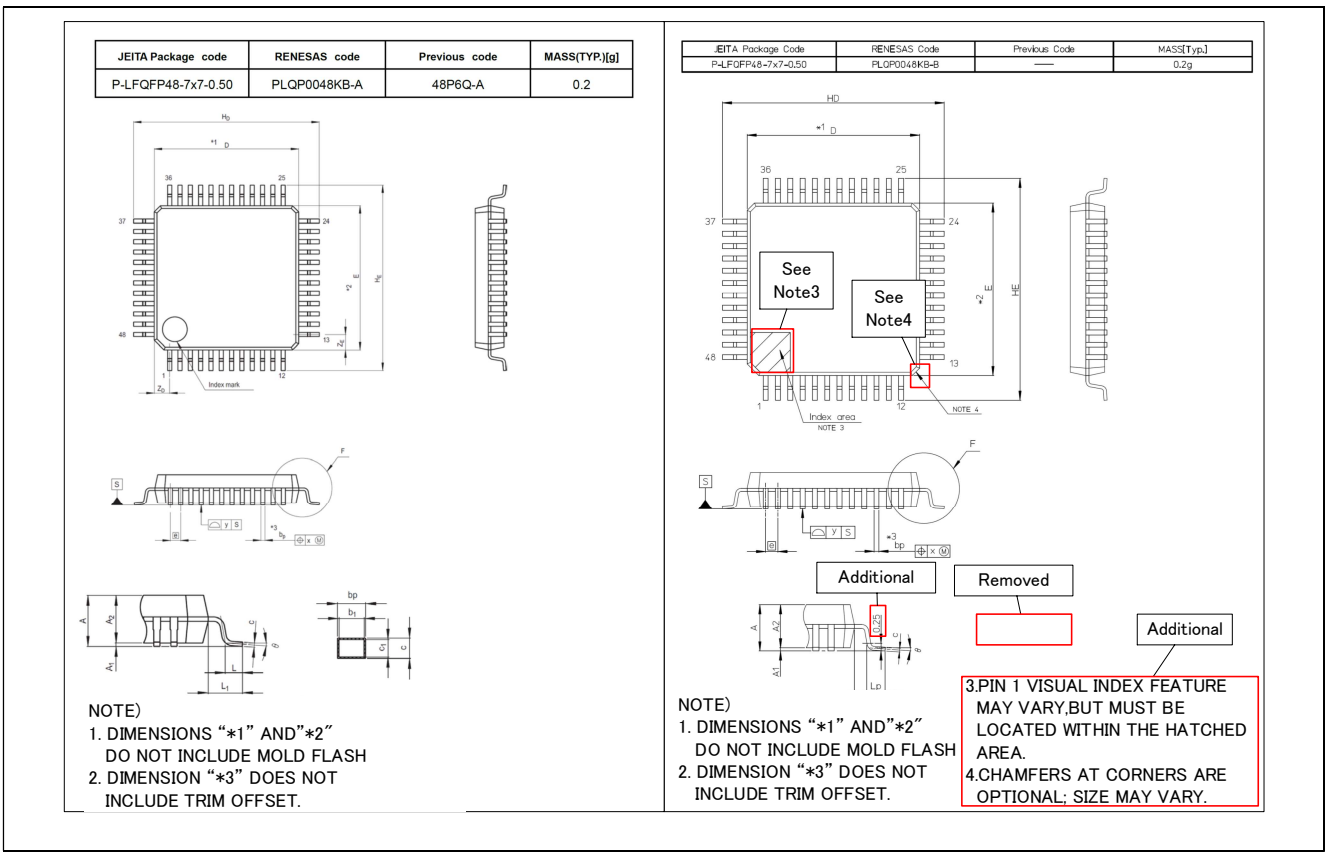

Figure2.6 Differences in external form for QFP-48pin

Table2.6 Differences in external form for QFP-48pin (Dimension)

PLQP0048KB-A Unit(mm)				PLQP0048KB-B Unit(mm)			
Symbol	MIN.	NOM.	MAX.	symbol	MIN.	NOM.	MAX.
D	6.9	7.0	7.1	D	6.9	7.0	7.1
E	6.9	7.0	7.1	E	6.9	7.0	7.1
A2	-	1.40	-	A2	-	1.40	-
HD	8.8	9.0	9.2	HD	8.8	9.0	9.2
HE	8.8	9.0	9.2	HE	8.8	9.0	9.2
A	-	-	1.70	A	-	-	1.70
A1	0.00	0.10	0.20	A1	0.05	-	0.15
bp	0.17	0.22	0.27	bp	0.17	0.20	0.27
b1	-	0.20	-	Undefined			
C	0.09	0.145	0.20	C	0.09	-	0.20
c1	-	0.125	-	Undefined			
Θ	0°	-	8°	Θ	0°	3.5°	8°
e	-	0.50	-	e	-	0.50	-
x	-	-	0.08	x	-	-	0.08
y	-	-	0.10	y	-	-	0.08
ZD	-	0.75	-	Undefined			
ZE	-	0.75	-	Undefined			
L	0.35	0.50	0.65	Undefined			
Undefined				Lp	0.45	0.60	0.75
L1	-	1.00	-	L1	-	1.00	-

3.Reference

User's manual hardware

See below each RX group User's manual: Hardware, each revision

(Download the latest User's manual: Hardware from Renesas Electronics web site)

Series	Group	Revision	Document No.
RX100	RX110	1.20	R01UH0421EJ0120
	RX111	1.30	R01UH0365EJ0130
	RX113	1.10	R01UH0448EJ0110
	RX130	3.00	R01UH0560EJ0300
RX200	RX210	1.50	R01UH0037EJ0150
	RX21A	1.10	R01UH0251EJ0110
	RX220	1.10	R01UH0292EJ0110
	RX230, RX231	1.20	R01UH0496EJ0120
	RX23T	1.10	R01UH0520EJ0110
	RX24T	2.00	R01UH0576EJ0200
	RX24U	1.00	R01UH0658EJ0100
RX600	RX610	1.20	R01UH0032EJ0120
	RX62N, RX621	1.40	R01UH0033EJ0140
	RX630	1.60	R01UH0040EJ0160
	RX63N, RX631	1.80	R01UH0041EJ0180
	RX634	1.00	R01UH0495EJ0100
	RX64M	1.10	R01UH0377EJ0110
	RX65N, RX651	2.10	R01UH0602EJ0210
	RX62T, RX62G	2.00	R01UH0034EJ0200
	RX63T	2.20	R01UH0238EJ0220
	RX66T	1.00	R01UH0749EJ0100
RX700	RX71M	1.10	R01UH0493EJ0110

Application note

No

Technical Update

No

Revision History

Rev.	Date	Revision	
		Page	Summary
1.00	22th Mar 2019	—	Issued

G General Precautions in the Handling of Microprocessing Unit and Microcontroller Unit Products

The following usage notes are applicable to all Microprocessing unit and Microcontroller unit products from Renesas. For detailed usage notes on the products covered by this document, refer to the relevant sections of the document as well as any technical updates that have been issued for the products.

1. Precaution against Electrostatic Discharge (ESD)
   A strong electrical field, when exposed to a CMOS device, can cause destruction of the gate oxide and ultimately degrade the device operation. Steps must be taken to stop the generation of static electricity as much as possible, and quickly dissipate it when it occurs. Environmental control must be adequate. When it is dry, a humidifier should be used. This is recommended to avoid using insulators that can easily build up static electricity. Semiconductor devices must be stored and transported in an anti-static container, static shielding bag or conductive material. All test and measurement tools including work benches and floors must be grounded. The operator must also be grounded using a wrist strap. Semiconductor devices must not be touched with bare hands. Similar precautions must be taken for printed circuit boards with mounted semiconductor devices.
2. Processing at power-on
   The state of the product is undefined at the time when power is supplied. The states of internal circuits in the LSI are indeterminate and the states of register settings and pins are undefined at the time when power is supplied. In a finished product where the reset signal is applied to the external reset pin, the states of pins are not guaranteed from the time when power is supplied until the reset process is completed. In a similar way, the states of pins in a product that is reset by an on-chip power-on reset function are not guaranteed from the time when power is supplied until the power reaches the level at which resetting is specified.
3. Input of signal during power-off state
   Do not input signals or an I/O pull-up power supply while the device is powered off. The current injection that results from input of such a signal or I/O pull-up power supply may cause malfunction and the abnormal current that passes in the device at this time may cause degradation of internal elements. Follow the guideline for input signal during power-off state as described in your product documentation.
4. Handling of unused pins
   Handle unused pins in accordance with the directions given under handling of unused pins in the manual. The input pins of CMOS products are generally in the high-impedance state. In operation with an unused pin in the open-circuit state, extra electromagnetic noise is induced in the vicinity of the LSI, an associated shoot-through current flows internally, and malfunctions occur due to the false recognition of the pin state as an input signal become possible.
5. Clock signals
   After applying a reset, only release the reset line after the operating clock signal becomes stable. When switching the clock signal during program execution, wait until the target clock signal is stabilized. When the clock signal is generated with an external resonator or from an external oscillator during a reset, ensure that the reset line is only released after full stabilization of the clock signal. Additionally, when switching to a clock signal produced with an external resonator or by an external oscillator while program execution is in progress, wait until the target clock signal is stable.
6. Voltage application waveform at input pin
   Waveform distortion due to input noise or a reflected wave may cause malfunction. If the input of the CMOS device stays in the area between V_{IL} (Max.) and V_{IH} (Min.) due to noise, for example, the device may malfunction. Take care to prevent chattering noise from entering the device when the input level is fixed, and also in the transition period when the input level passes through the area between V_{IL} (Max.) and V_{IH} (Min.).
7. Prohibition of access to reserved addresses
   Access to reserved addresses is prohibited. The reserved addresses are provided for possible future expansion of functions. Do not access these addresses as the correct operation of the LSI is not guaranteed.
8. Differences between products
   Before changing from one product to another, for example to a product with a different part number, confirm that the change will not lead to problems. The characteristics of a microprocessing unit or microcontroller unit products in the same group but having a different part number might differ in terms of internal memory capacity, layout pattern, and other factors, which can affect the ranges of electrical characteristics, such as characteristic values, operating margins, immunity to noise, and amount of radiated noise. When changing to a product with a different part number, implement a system-evaluation test for the given product.

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