User's Manual

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RH850/F1K, RH850/F1KM, RH850/F1KH

User's Manual: Hardware

Renesas microcontroller
RH850 Family

Addendum for additional products

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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
   Unconnected CMOS device inputs can be cause of malfunction. If an input pin is unconnected, it is possible that an internal input level may be generated due to noise, etc., causing malfunction. CMOS devices behave differently than Bipolar or NMOS devices. Input levels of CMOS devices must be fixed high or low by using pull-up or pull-down circuitry. Each unused pin should be connected to power supply or GND via a resistor if there is a possibility that it will be an output pin. All handling related to unused pins must be judged separately for each device and according to related specifications governing the device.
5. 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.).
6. 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.
7. Power ON/OFF sequence
   In the case of a device that uses different power supplies for the internal operation and external interface, as a rule, switch on the external power supply after switching on the internal power supply. When switching the power supply off, as a rule, switch off the external power supply and then the internal power supply. Use of the reverse power on/off sequences may result in the application of an overvoltage to the internal elements of the device, causing malfunction and degradation of internal elements due to the passage of an abnormal current. The correct power on/off sequence must be judged separately for each device and according to related specifications governing the device.

How to Use This Manual

1. Purpose and Target Readers

This manual is designed to provide the user with an understanding of the hardware functions and electrical characteristics of the MCU. It is intended for users designing application systems incorporating the MCU. A basic knowledge of electric circuits, logical circuits, and MCUs is necessary in order to use this manual.

The manual comprises only Overview, Electrical Characteristics section and package Dimensions.

> Particular attention should be paid to the precautionary notes when using the manual. These notes occur within the body of the text, at the end of each section, and in the Usage Notes section.

The following documents apply to the RH850/F1K, RH850/F1KM ,RH850/F1KH Group. Make sure to refer to the latest versions of these documents. The newest versions of the documents listed may be obtained from the Renesas Electronics Web site.

To understand the overall functions of the RH850/F1K, RH850/F1KM, RH850/F1KH.

→ The part names of the additional products are shown in this document including the correspondence table between the general products and the additional products.
The specification of the additional products is the same as the general product except the specification items shown in this document.
Read the following manuals according to its content.

Document Type	Description	Document Title	Document No.
User's manual for Hardware	Hardware specifications (pin assignments, memory maps, peripheral function specification, electrical characteristics, timing charts) and operational description	RH850/F1K Group User's Manual: Hardware	R01UH0562EJxxxx
User's manual for Hardware	Hardware specifications (pin assignments, memory maps, peripheral function specifications, electrical characteristics, timing charts) and operation description	RH850/F1KH, RH850/F1KM User's Manual: Hardware	R01UH0684EJxxxx
User's manual for Hardware	Hardware function and electrical characteristics	RH850/F1KM-S4, RH850/F1KM-S2 User`s Manual: Hardware Addendum for the high temperature products (Ta = 125℃)	R01UH0957EJxxxx
User's manual for Hardware	Hardware function and electrical characteristics	RH850/F1KM-S1 User's Manual: Hardware Addendum for the high temperature products (Tj = 160℃)	R01UH0956EJxxxx

Conventions

Data significance: Higher digits on the left and lower digits on the right

Active low representation: xxx (overscore over pin or signal name)

Memory map address: Higher addresses on the top and lower addresses on the bottom

Note: Footnote for item marked with Note in the text

Caution: Information requiring particular attention Remark:

Supplementary information

Numeric representation: Binary ... xxxx or $xxxx_B$

Decimal ... xxxx

Hexadecimal ... $xxxx_H$

Prefix indicating power of 2 (address space, memory capacity):

K (kilo): $2^{10} = 1,024$

M (mega): $2^{20} = 1,024^2$

G (giga): $2^{30} = 1,024^3$

Section 1 Overview

The specification of the additional products is the same as the general product.

1.1 Product Lineup

Table 1.1 Product Lineup of F1K

F1K		Memory				Line Name	Part Name (general product)		Part Name (additional product 1)		Part Name (additional product 2)	
Pin Count	CPU frequency	Code Flash	Local RAM	Data Flash	Retention RAM (RRAM)		Operating Temperature (Ta)		Operating Temperature (Ta)		Operating Temperature (Ta)	
							–40°C to +105°C	–40°C to +125°C	–40°C to +105°C	–40°C to +125°C	–40°C to +105°C	–40°C to +125°C
144 pins	80 MHz max.	768 KB	32 KB	64 KB	64 KB	ECO	R7F7016023AFP-C	R7F7016024AFP-C	R7F7016023AFE R7F7016023AFE-C	R7F7016024AFE R7F7016024AFE-C	R7F7016023AFD R7F7016023AFD-C	R7F7016024AFD R7F7016024AFD-C
		1024 KB	64 KB				R7F7016033AFP-C	R7F7016034AFP-C	R7F7016033AFE R7F7016033AFE-C	R7F7016034AFE R7F7016034AFE-C	R7F7016033AFD R7F7016033AFD-C	R7F7016034AFD R7F7016034AFD-C
		1536 KB	96 KB				R7F7015423AFP-C	R7F7015424AFP-C	R7F7015423AFE R7F7015423AFE-C	R7F7015424AFE R7F7015424AFE-C	R7F7015423AFD R7F7015423AFD-C	R7F7015424AFD R7F7015424AFD-C
		2048 KB	128 KB				R7F7015433AFP-C	R7F7015434AFP-C	R7F7015433AFE R7F7015433AFE-C	R7F7015434AFE R7F7015434AFE-C	R7F7015433AFD R7F7015433AFD-C	R7F7015434AFD R7F7015434AFD-C
176 pins	80 MHz max.	1024 KB	64 KB	64 KB	64 KB		R7F7015573AFP-C	R7F7015574AFP-C	R7F7015573AFE R7F7015573AFE-C	R7F7015574AFE R7F7015574AFE-C	R7F7015573AFD R7F7015573AFD-C	R7F7015574AFD R7F7015574AFD-C
		1536 KB	96 KB				R7F7015463AFP-C	R7F7015464AFP-C	R7F7015463AFE R7F7015463AFE-C	R7F7015464AFE R7F7015464AFE-C	R7F7015463AFD R7F7015463AFD-C	R7F7015464AFD R7F7015464AFD-C
		2048 KB	128 KB				R7F7015473AFP-C	R7F7015474AFP-C	R7F7015473AFE R7F7015473AFE-C	R7F7015474AFE R7F7015474AFE-C	R7F7015473AFD R7F7015473AFD-C	R7F7015474AFD R7F7015474AFD-C
100 pins	120 MHz max.	768 KB	32 KB	64 KB	64 KB	ADVANCED	R7F7016103AFP-C	R7F7016104AFP-C	R7F7016103AFE R7F7016103AFE-C	R7F7016104AFE R7F7016104AFE-C	R7F7016103AFD R7F7016103AFD-C	R7F7016104AFD R7F7016104AFD-C
		1024 KB	64 KB				R7F7016113AFP-C	R7F7016114AFP-C	R7F7016113AFE R7F7016113AFE-C	R7F7016114AFE R7F7016114AFE-C	R7F7016113AFD R7F7016113AFD-C	R7F7016114AFD R7F7016114AFD-C
		1536 KB	96 KB				R7F7015603AFP-C	R7F7015604AFP-C	R7F7015603AFE R7F7015603AFE-C	R7F7015604AFE R7F7015604AFE-C	R7F7015603AFD R7F7015603AFD-C	R7F7015604AFD R7F7015604AFD-C
		2048 KB	128 KB				R7F7015613AFP-C	R7F7015614AFP-C	R7F7015613AFE R7F7015613AFE-C	R7F7015614AFE R7F7015614AFE-C	R7F7015613AFD R7F7015613AFD-C	R7F7015614AFD R7F7015614AFD-C
144 pins	120 MHz max.	768 KB	32 KB	64 KB	64 KB		R7F7016123AFP-C	R7F7016124AFP-C	R7F7016123AFE R7F7016123AFE-C	R7F7016124AFE R7F7016124AFE-C	R7F7016123AFD R7F7016123AFD-C	R7F7016124AFD R7F7016124AFD-C
		1024 KB	64 KB				R7F7016133AFP-C	R7F7016134AFP-C	R7F7016133AFE R7F7016133AFE-C	R7F7016134AFE R7F7016134AFE-C	R7F7016123AFD R7F7016123AFD-C	R7F7016134AFD R7F7016134AFD-C
		1536 KB	96 KB				R7F7015623AFP-C	R7F7015624AFP-C	R7F7015623AFE R7F7015623AFE-C	R7F7015624AFE R7F7015624AFE-C	R7F7015623AFD R7F7015623AFD-C	R7F7015624AFD R7F7015624AFD-C
		2048 KB	128 KB				R7F7015633AFP-C	R7F7015634AFP-C	R7F7015633AFE R7F7015633AFE-C	R7F7015634AFE R7F7015634AFE-C	R7F7015633AFD R7F7015633AFD-C	R7F7015634AFD R7F7015634AFD-C
176 pins	120 MHz max.	1024 KB	64 KB	64 KB	64 KB	ADVANCED	R7F7015773AFP-C	R7F7015774AFP-C	R7F7015773AFE R7F7015773AFE-C	R7F7015774AFE R7F7015774AFE-C	R7F7015773AFD R7F7015773AFD-C	R7F7015774AFD R7F7015774AFD-C
		1536 KB	96 KB				R7F7015663AFP-C	R7F7015664AFP-C	R7F7015663AFE R7F7015663AFE-C	R7F7015664AFE R7F7015664AFE-C	R7F7015663AFD R7F7015663AFD-C	R7F7015664AFD R7F7015664AFD-C
		2048 KB	128 KB				R7F7015673AFP-C	R7F7015674AFP-C	R7F7015673AFE R7F7015673AFE-C	R7F7015674AFE R7F7015674AFE-C	R7F7015673AFD R7F7015673AFD-C	R7F7015674AFD R7F7015674AFD-C
100 pins	120 MHz max.	768 KB	32 KB	64 KB	64 KB	PREMIUM	R7F7016203AFP-C	R7F7016204AFP-C	R7F7016203AFE R7F7016203AFE-C	R7F7016204AFE R7F7016204AFE-C	R7F7016203AFD R7F7016203AFD-C	R7F7016204AFD R7F7016204AFD-C
		1024 KB	64 KB				R7F7016213AFP-C	R7F7016214AFP-C	R7F7016213AFE R7F7016213AFE-C	R7F7016214AFE R7F7016214AFE-C	R7F7016213AFD R7F7016213AFD-C	R7F7016214AFD R7F7016214AFD-C
		1536 KB	96 KB				R7F7015803AFP-C	R7F7015804AFP-C	R7F7015803AFE R7F7015803AFE-C	R7F7015804AFE R7F7015804AFE-C	R7F7015803AFD R7F7015803AFD-C	R7F7015804AFD R7F7015804AFD-C
		2048 KB	128 KB				R7F7015813AFP-C	R7F7015814AFP-C	R7F7015813AFE R7F7015813AFE-C	R7F7015814AFE R7F7015814AFE-C	R7F7015813AFD R7F7015813AFD-C	R7F7015814AFD R7F7015814AFD-C
144pins	120 MHz max.	768 KB	32 KB	64 KB	64 KB		R7F7016223AFP-C	R7F7016224AFP-C	R7F7016223AFE R7F7016223AFE-C	R7F7016224AFE R7F7016224AFE-C	R7F7016223AFD R7F7016223AFD-C	R7F7016224AFD R7F7016224AFD-C
		1024 KB	64 KB				R7F7016233AFP-C	R7F7016234AFP-C	R7F7016233AFE R7F7016233AFE-C	R7F7016234AFE R7F7016234AFE-C	R7F7016233AFD R7F7016233AFD-C	R7F7016234AFD R7F7016234AFD-C
		1536 KB	96 KB				R7F7015823AFP-C	R7F7015824AFP-C	R7F7015823AFE R7F7015823AFE-C	R7F7015824AFE R7F7015824AFE-C	R7F7015823AFD R7F7015823AFD-C	R7F7015824AFD R7F7015824AFD-C
		2048 KB	128 KB				R7F7015833AFP-C	R7F7015834AFP-C	R7F7015833AFE R7F7015833AFE-C	R7F7015834AFE R7F7015834AFE-C	R7F7015833AFD R7F7015833AFD-C	R7F7015834AFD R7F7015834AFD-C
176pins	120 MHz max.	1024 KB	64 KB	64 KB	64 KB		R7F7015973AFP-C	R7F7015974AFP-C	R7F7015973AFE R7F7015973AFE-C	R7F7015974AFE R7F7015974AFE-C	R7F7015973AFD R7F7015973AFD-C	R7F7015974AFD R7F7015974AFD-C
		1536 KB	96 KB				R7F7015863AFP-C	R7F7015864AFP-C	R7F7015863AFE R7F7015863AFE-C	R7F7015864AFE R7F7015864AFE-C	R7F7015863AFD R7F7015863AFD-C	R7F7015864AFD R7F7015864AFD-C
		2048 KB	128 KB				R7F7015873AFP-C	R7F7015874AFP-C	R7F7015873AFE R7F7015873AFE-C	R7F7015874AFE R7F7015874AFE-C	R7F7015873AFD R7F7015873AFD-C	R7F7015874AFD R7F7015874AFD-C

Table 1.2 Product Lineup of F1KM-S4

F1KM-S4		Memory					Part Name (general product)		Part Name (additional product 1)		Part Name (additional product 2)	
Pin Count	CPU Frequency	Code Flash	Data Flash	Local RAM (LRAM)	Global RAM (GRAM)	Retention RAM (RRAM)	Operating Temperature (Ta)		Operating Temperature (Ta)		Operating Temperature (Ta)	
							–40°C to +105°C	–40°C to +125°C	–40°C to +105°C	–40°C to +125°C	–40°C to +105°C	–40°C to +125°C
100 pin	240 MHz max.	3 MB	128 KB	192 KB	128 KB	64 KB	R7F7016443AFP-C	R7F701A554AFP-C	R7F7016443AFE-C	R7F701A554AFE-C	R7F7016443AFD-C	R7F701A554AFD-C
		4 MB		256 KB	192KB		R7F7016453AFP-C	R7F701A564AFP-C	R7F7016453AFE-C	R7F701A564AFE-C	R7F7016453AFD-C	R7F701A564AFD-C
144 pin	240 MHz max.	3 MB	128 KB	192 KB	128 KB	64 KB	R7F7016463AFP-C	R7F701A574AFP-C	R7F7016463AFE-C	R7F701A574AFE-C	R7F7016463AFD-C	R7F701A574AFD-C
		4 MB		256 KB	192KB		R7F7016473AFP-C	R7F701A584AFP-C	R7F7016473AFE-C	R7F701A584AFE-C	R7F7016473AFD-C	R7F701A584AFD-C
176 pin	240 MHz max.	3 MB	128 KB	192 KB	128 KB	64 KB	R7F7016483AFP-C	R7F701A594AFP-C	R7F7016483AFE-C	R7F701A594AFE-C	R7F7016483AFD-C	R7F701A594AFD-C
		4 MB		256 KB	192KB		R7F7016493AFP-C	R7F701A604AFP-C	R7F7016493AFE-C	R7F701A604AFE-C	R7F7016493AFD-C	R7F701A604AFD-C
233 pin	240 MHz max.	3 MB	128 KB	192 KB	128 KB	64 KB	R7F7016503ABG-C	R7F7016504ABG-C	R7F7016503ABE-C	R7F7016504ABE-C	—	—
		4 MB		256 KB	192KB		R7F7016513ABG-C	R7F7016514ABG-C	R7F7016513ABE-C	R7F7016514ABE-C	—	—

Table 1.3 Product Lineup of F1KM-S2

F1KM-S2		Memory					Part Name (general product)		Part Name (additional product 1)		Part Name (additional product 2)	
Pin Count	CPU Frequency	Code Flash	Data Flash	Local RAM (LRAM)	Global RAM (GRAM)	Retention RAM (RRAM)	Operating Temperature (Ta)		Operating Temperature (Ta)		Operating Temperature (Ta)	
							–40°C to +105°C	–40°C to +125°C	–40°C to +105°C	–40°C to +125°C	–40°C to +105°C	–40°C to +125°C
100 pin	240 MHz max.	2 MB	128 KB	128 KB	96 KB	32 KB	R7F7017603AFP-C	R7F701A614AFP-C	R7F7017603AFE-C	R7F701A614AFE-C	R7F7017603AFD-C	R7F701A614AFD-C
144 pin	240 MHz max	2 MB	128 KB	128 KB	96 KB	32 KB	R7F7017623AFP-C	R7F701A624AFP-C	R7F7017623AFE-C	R7F701A624AFE-C	R7F7017623AFD-C	R7F701A624AFD-C
176 pin	240 MHz max.	2 MB	128 KB	128 KB	96 KB	32 KB	R7F7017643AFP-C	R7F701A634AFP-C	R7F7017643AFE-C	R7F701A634AFE-C	R7F7017643AFD-C	R7F701A634AFD-C

Table 1.4 Product Lineup of F1KM-S1

F1KM-S1		Memory				Part Name (general product)		Part Name (additional product 1)		Part Name (additional product 2)	
Pin Count	CPU Frequency	Code Flash	Data Flash	Local RAM (LRAM)	Retention RAM (RRAM)	Operating Temperature (Ta)		Operating Temperature (Ta)		Operating Temperature (Ta)	
						–40°C to +105°C	–40°C to +125°C	–40°C to +105°C	–40°C to +125°C	–40°C to +105°C	–40°C to +125°C
100 pin	120 MHz max.	1024 KB	64 KB	96 KB	32 KB	R7F7016843AFP-C	R7F7016844AFP-C	R7F7016843AFE-C	R7F7016844AFE-C	R7F7016843AFD-C	R7F7016844AFD-C
		768 KB		64 KB		R7F7016853AFP-C	R7F7016854AFP-C	R7F7016853AFE-C	R7F7016854AFE-C	R7F7016853AFD-C	R7F7016854AFD-C
		512 KB		32 KB		R7F7016863AFP-C	R7F7016864AFP-C	R7F7016863AFE-C	R7F7016864AFE-C	R7F7016863AFD-C	R7F7016864AFD-C

F1KM-S1		Memory				Part Name (general product)	Part Name (additional product 1)	Part Name (additional product 2)
Pin Count	CPU Frequency	Code Flash	Data Flash	Local RAM (LRAM)	Retention RAM (RRAM)	Operating Temperature (Tj)	Operating Temperature (Tj)	Operating Temperature (Tj)
						–40°C to +160°C	–40°C to +160°C	–40°C to +160°C
100 pin	80 MHz max.	1024 KB	64 KB	96 KB	32 KB	R7F701684FAFP-C	R7F701684FAFE-C	R7F701684FAFD-C
		768 KB		64 KB		R7F701685FAFP-C	R7F701685FAFE-C	R7F701685FAFD-C
		512 KB		32 KB		R7F701686FAFP-C	R7F701686FAFE-C	R7F701686FAFD-C

Table 1.5 Product Lineup of F1KH-D8

F1KH-D8		Memory						Part Name (general product)		Part Name (additional product)	
Pin Count	CPU Frequency	Code Flash	Data Flash	Local RAM (LRAM)		Global RAM (GRAM)	Retention RAM (RRAM)	Operating Temperature (Ta)		Operating Temperature (Ta)	
				CPU1	CPU2			–40°C to +105°C	–40°C to +125°C	–40°C to +105°C	–40°C to +125°C
176 pin	240 MHz max.	6 MB	256 KB	160 KB	160 KB	512 KB	64 KB	R7F7017083AFP-C	—	R7F7017083AFD-C	—
		8 MB		192 KB	192 KB	576 KB		R7F7017093AFP-C	—	R7F7017093AFD-C	—

Section 2 Electrical Characteristics

The specification of the additional products is the same as the general product.

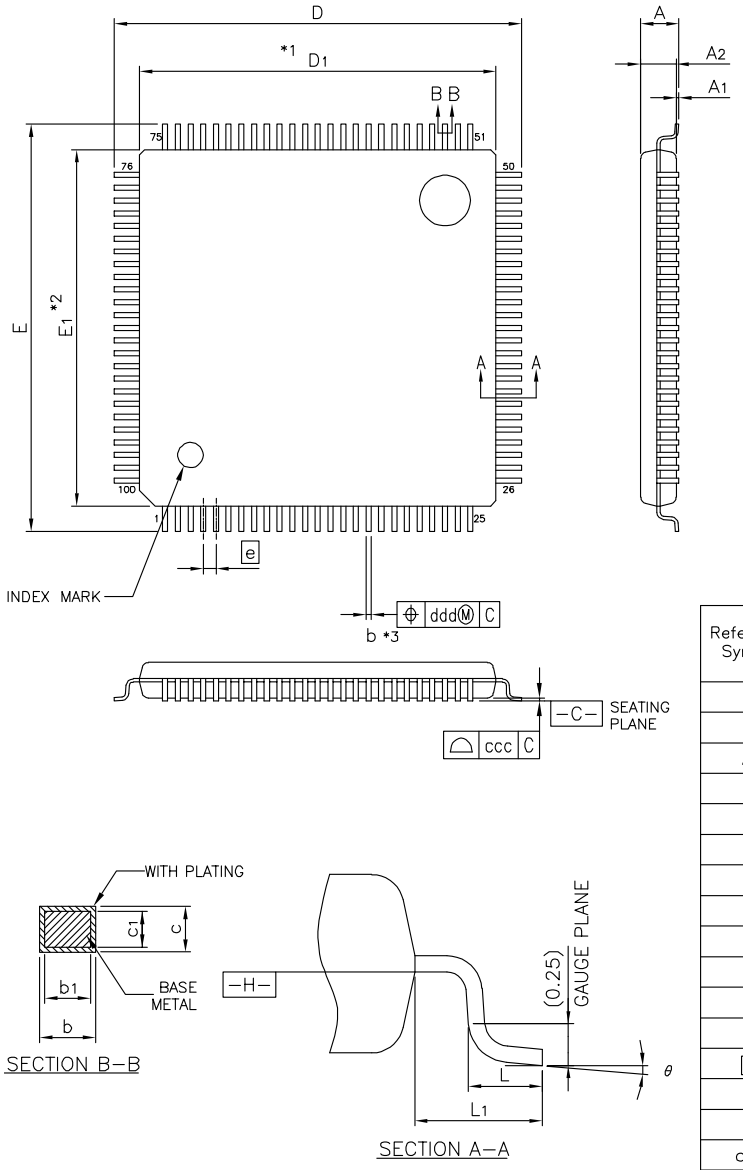
Appendix A Package

A.1 Package Dimensions

A.1.1 100 Pins (R7F701xxxxAFE)

JEITA Package code	RENESAS code	MASS(TYP.)[g]
P-LFQFP100-14x14-0.50	PLQP0100KL-A	0.7

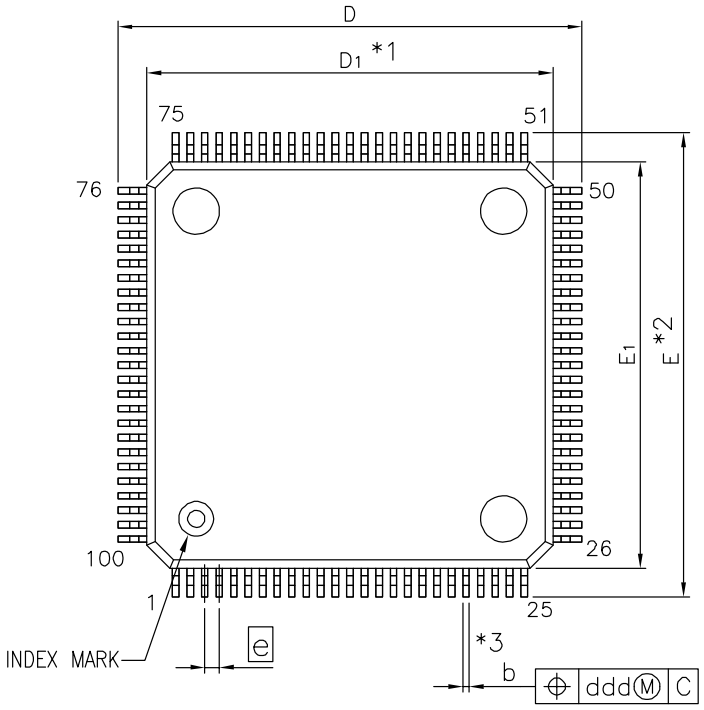
NOTE)
1.DIMENSIONS "*1 "AND "*2 "DO NOT INCLUDE MOLD FLASH.
2.DIMENSION"*3" DOES NOT INCLUDE TRIM OFFSET.



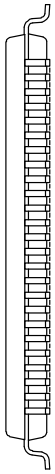
Reference Symbol	Dimension in Millimeters		
	Min.	Nom.	Max.
D_1	13.80	14.00	14.20
E_1	13.80	14.00	14.20
A_2	–	1.40	–
D	15.80	16.00	16.20
E	15.80	16.00	16.20
A	–	–	1.60
A_1	0.05	–	0.15
b	0.17	0.22	0.27
b_1	0.17	0.20	0.23
c	0.09	–	0.20
c_1	0.09	–	0.16
□	0°	–	7°
e	–	0.50	–
L	0.45	0.60	0.75
L_1	–	1.00	–
ccc	–	–	0.08
ddd	–	–	0.08

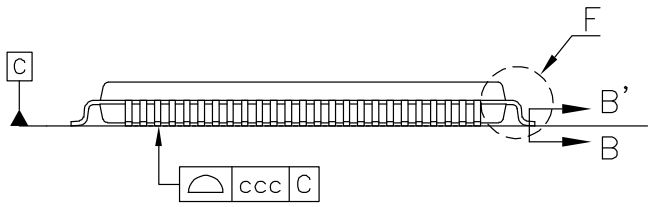
A.1.2 100 Pins (R7F701xxxxAFD)

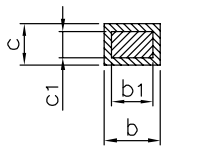
JEITA Package code	RENESAS code	MASS(TYP.)[g]
P-LFQFP100-14x14-0.50	PLQP0100KM-A	0.6



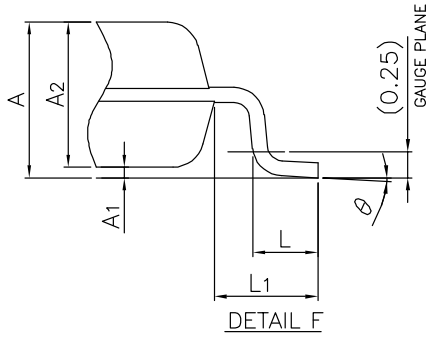
NOTE)
1. DIMENSIONS "*1"AND "*2" DO NOT INCLUDE MOLD FLASH.
2. DIMENSIONS "*3" DO NOT INCLUDE TRIM OFFSET.







SECTION B–B'

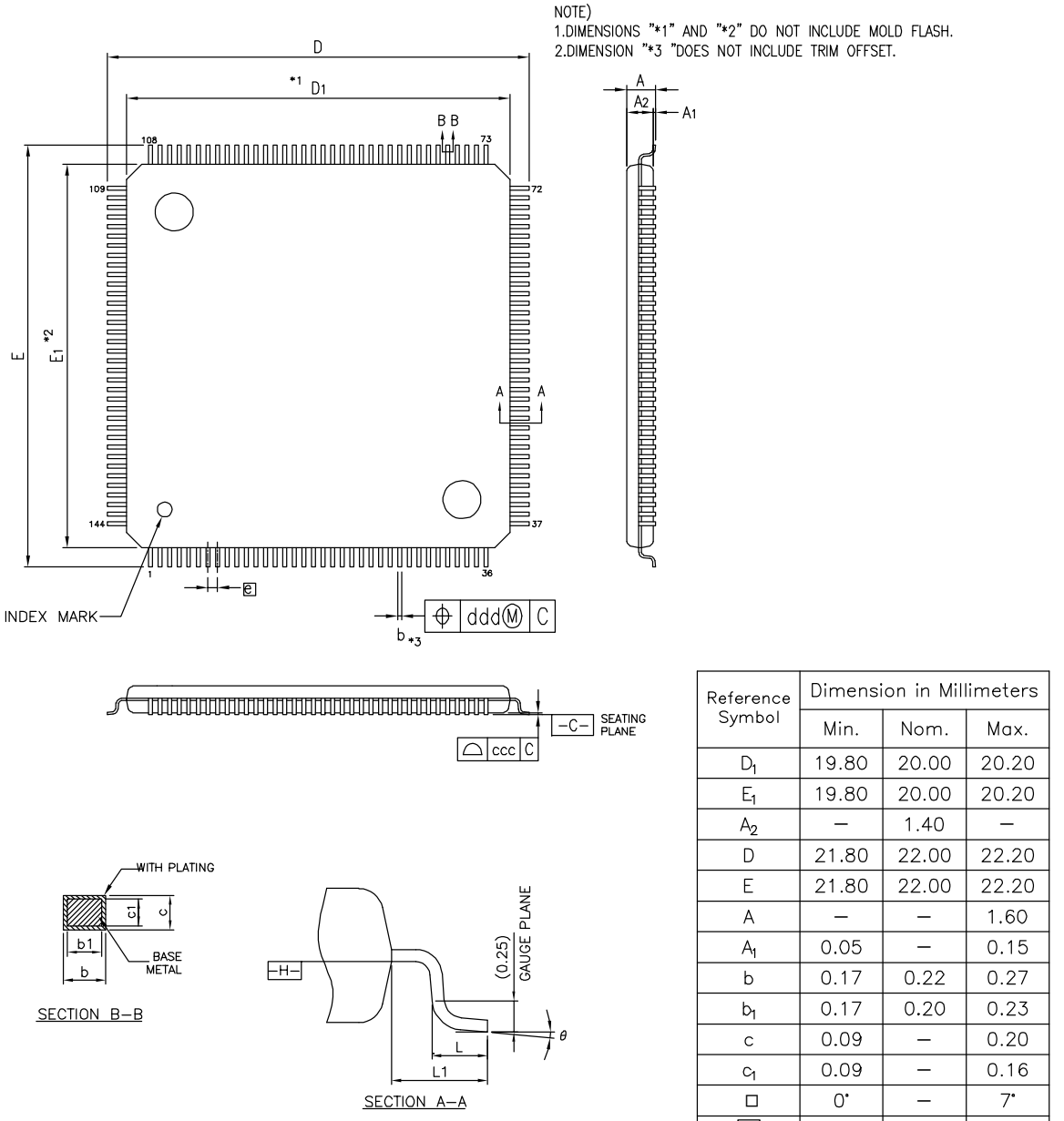


DETAIL F

Reference Symbol	Dimension in Millimeters		
	Min.	Nom.	Max.
D_1	13.80	14.00	14.20
E_1	13.80	14.00	14.20
A_2	–	1.40	–
D	15.80	16.00	16.20
E	15.80	16.00	16.20
A	–	–	1.60
A_1	0.05	–	0.15
b	0.17	0.22	0.27
b_1	0.17	0.20	0.23
c	0.09	–	0.20
c_1	0.09	–	0.16
θ	0°	–	7°
e	–	0.50	–
L	0.45	0.60	0.75
L_1	–	1.00	–
ccc	–	–	0.08
ddd	–	–	0.08

A.1.3 144 Pins (R7F701xxxxAFE)

JEITA Package code	RENESAS code	MASS(TYP.)[g]
P-LFQFP144-20x20-0.50	PLQP0144KF-A	1.4

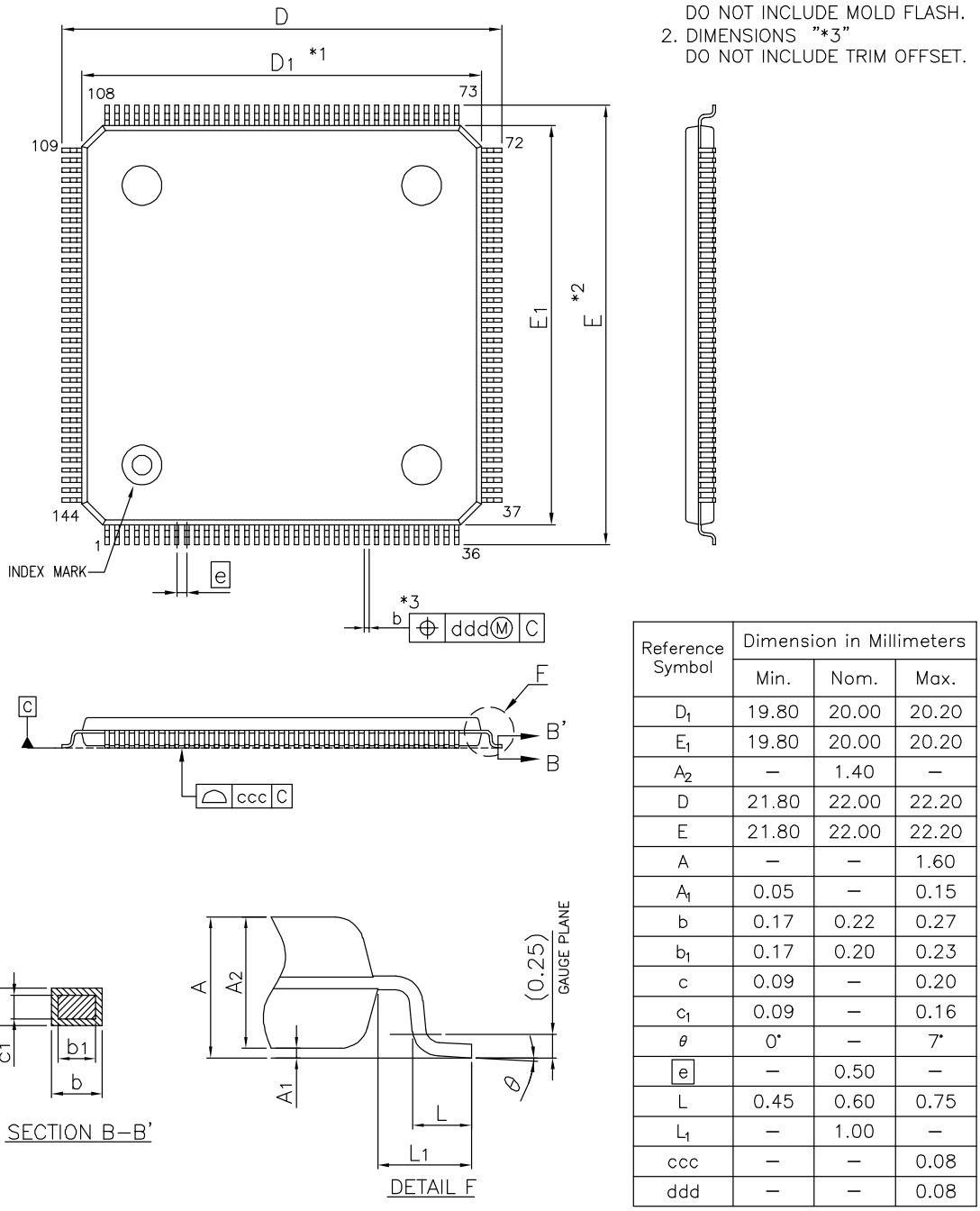


Reference Symbol	Dimension in Millimeters		
	Min.	Nom.	Max.
D_1	19.80	20.00	20.20
E_1	19.80	20.00	20.20
A_2	–	1.40	–
D	21.80	22.00	22.20
E	21.80	22.00	22.20
A	–	–	1.60
A_1	0.05	–	0.15
b	0.17	0.22	0.27
b_1	0.17	0.20	0.23
c	0.09	–	0.20
c_1	0.09	–	0.16
θ	0°	–	7°
e	–	0.50	–
L	0.45	0.60	0.75
L_1	–	1.00	–
ccc	–	–	0.08
ddd	–	–	0.08

A.1.4 144 Pins (R7F701xxxxAFD)

JEITA Package code	RENESAS code	MASS(TYP.)[g]
P-LFQFP144-20x20-0.50	PLQP0144KG-A	1.3

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

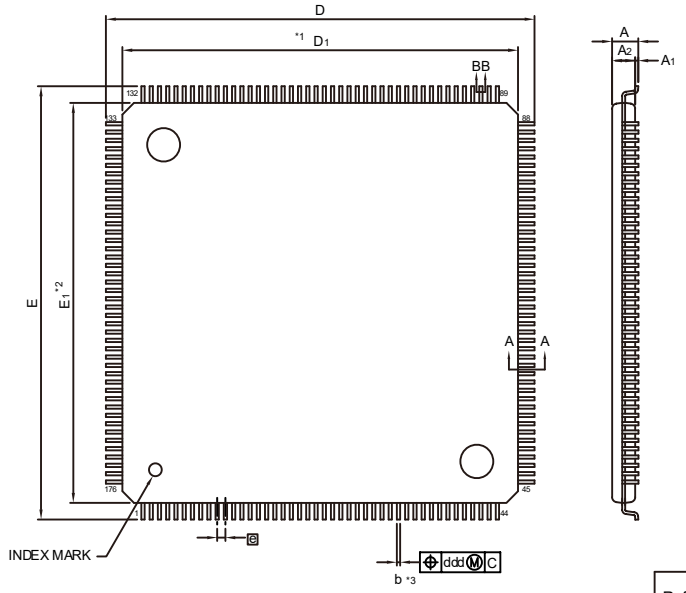


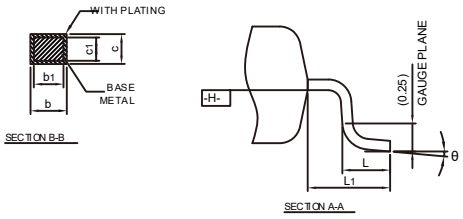
Reference Symbol	Dimension in Millimeters		
	Min.	Nom.	Max.
D_1	19.80	20.00	20.20
E_1	19.80	20.00	20.20
A_2	–	1.40	–
D	21.80	22.00	22.20
E	21.80	22.00	22.20
A	–	–	1.60
A_1	0.05	–	0.15
b	0.17	0.22	0.27
b_1	0.17	0.20	0.23
c	0.09	–	0.20
c_1	0.09	–	0.16
θ	0°	–	7°
e	–	0.50	–
L	0.45	0.60	0.75
L_1	–	1.00	–
ccc	–	–	0.08
ddd	–	–	0.08

A.1.5 176 Pins (R7F701xxxxAFE)

JEITA Package code	RENESAS code	MASS(TYP.)[g]
P-LFQFP176-24x24-0.50	PLQP0176KG-A	1.9

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

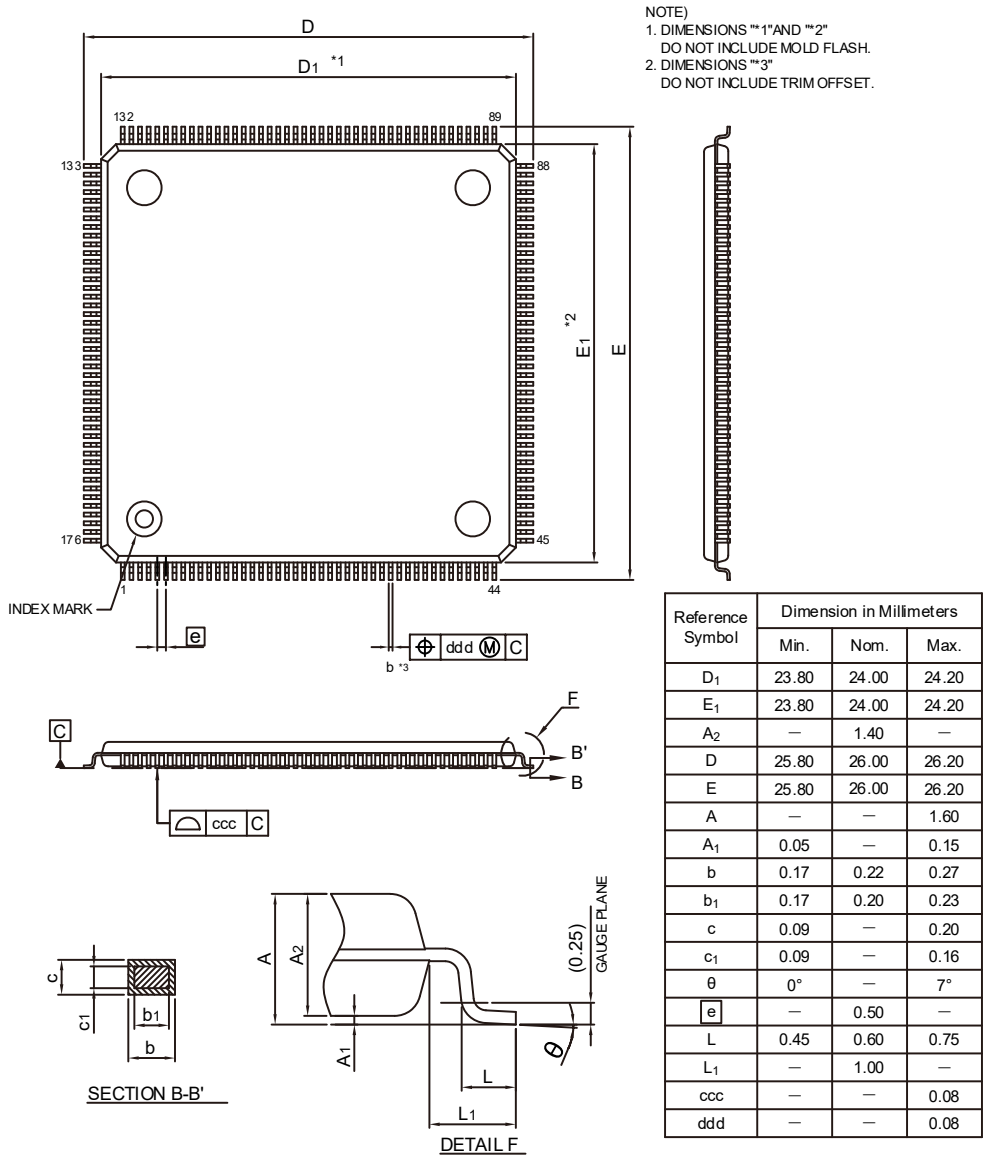




Reference Symbol	Dimension in Millimeters		
	Min.	Nom.	Max.
D_1	23.80	24.00	24.20
E_1	23.80	24.00	24.20
A_2	—	1.40	—
D	25.80	26.00	26.20
E	25.80	26.00	26.20
A	—	—	1.60
A_1	0.05	—	0.15
b	0.17	0.22	0.27
b_1	0.17	0.20	0.23
c	0.09	—	0.20
c_1	0.09	—	0.16
θ	0°	—	7°
e	—	0.50	—
L	0.45	0.60	0.75
L_1	—	1.00	—
ccc	—	—	0.08
ddd	—	—	0.08

A.1.6 176 Pins (R7F701xxxxAFD)

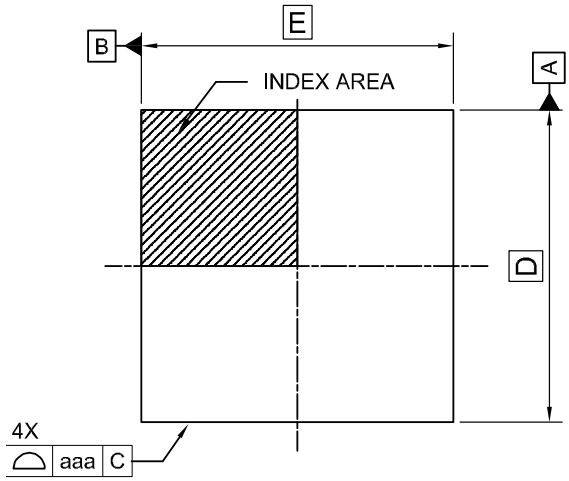
JEITA Package code	RENESAS code	MASS(TYP.)[g]
P-LFQFP176-24x24-0.50	PLQP0176KH-A	1.9

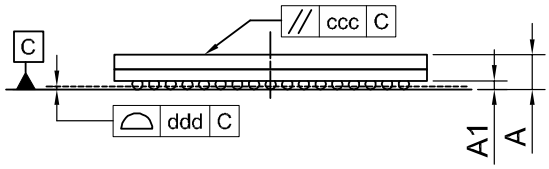


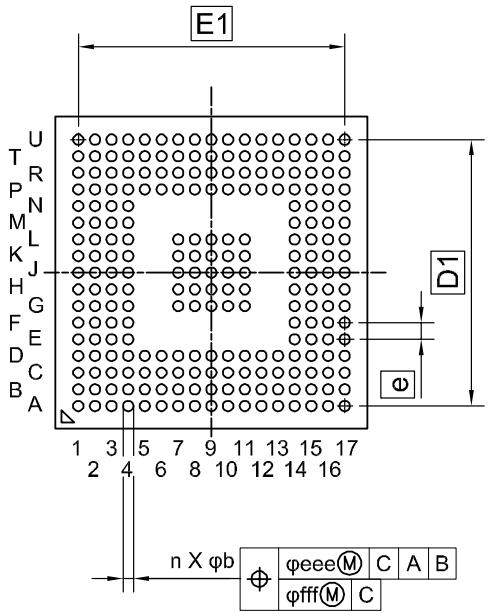
Reference Symbol	Dimension in Millimeters		
	Min.	Nom.	Max.
D_1	23.80	24.00	24.20
E_1	23.80	24.00	24.20
A_2	—	1.40	—
D	25.80	26.00	26.20
E	25.80	26.00	26.20
A	—	—	1.60
A_1	0.05	—	0.15
b	0.17	0.22	0.27
b_1	0.17	0.20	0.23
c	0.09	—	0.20
c_1	0.09	—	0.16
θ	0°	—	7°
e	—	0.50	—
L	0.45	0.60	0.75
L_1	—	1.00	—
ccc	—	—	0.08
ddd	—	—	0.08

A.1.7 233 Pins (R7F701xxxxABE-C)

JEITA Package code	RENESAS code	MASS(TYP.)[g]
P-FBGA233-15x15-0.80	PRBG0233GB-A	0.70







Reference Symbol	Dimension in Millimeters		
	Min.	Nom.	Max.
D	-	15.00	-
E	-	15.00	-
D1	-	12.80	-
E1	-	12.80	-
A	-	-	1.90
A1	0.36	0.41	0.46
b	0.49	0.54	0.59
e	-	0.80	-
aaa	-	-	0.15
ccc	-	-	0.20
ddd	-	-	0.10
eee	-	-	0.20
fff	-	-	0.08
n	-	233	-

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