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"[Embedded - Microcontrollers](#)" refer to small, integrated circuits designed to perform specific tasks within larger systems. These microcontrollers are essentially compact computers on a single chip, containing a processor core, memory, and programmable input/output peripherals. They are called "embedded" because they are embedded within electronic devices to control various functions, rather than serving as standalone computers. Microcontrollers are crucial in modern electronics, providing the intelligence and control needed for a wide range of applications.

Applications of "[Embedded - Microcontrollers](#)"

Details

Product Status	Discontinued at Digi-Key
Core Processor	RX
Core Size	32-Bit Single-Core
Speed	100MHz
Connectivity	CANbus, EBI/EMI, Ethernet, I ² C, LINbus, SCI, SPI, USB
Peripherals	DMA, LVD, POR, PWM, WDT
Number of I/O	111
Program Memory Size	1.5MB (1.5M x 8)
Program Memory Type	FLASH
EEPROM Size	32K x 8
RAM Size	128K x 8
Voltage - Supply (Vcc/Vdd)	2.7V ~ 3.6V
Data Converters	A/D 8x10b, 21x12b; D/A 2x10b
Oscillator Type	Internal
Operating Temperature	-40°C ~ 85°C (TA)
Mounting Type	Surface Mount
Package / Case	144-LQFP
Supplier Device Package	144-LFQFP (20x20)
Purchase URL	https://www.e-xfl.com/product-detail/renesas-electronics-america/r5f563ndddfb-v0

Table 1.3 List of Products (5/8)

Group	Part No.	Package	ROM Capacity	RAM Capacity	E2 Data Flash	Operating Frequency (Max.)	Operating Temp. Range
RX631 (D version)	R5F5631ADDFC	PLQP0176KB-A	768 Kbytes	128 Kbytes	32 Kbytes	100 MHz	-40 to +85°C
	R5F56318CDFC	PLQP0176KB-A	512 Kbytes	128 Kbytes	32 Kbytes	100 MHz	-40 to +85°C
	R5F56318DDFC	PLQP0176KB-A	512 Kbytes	128 Kbytes	32 Kbytes	100 MHz	-40 to +85°C
	R5F56317CDFC	PLQP0176KB-A	384 Kbytes	128 Kbytes	32 Kbytes	100 MHz	-40 to +85°C
	R5F56317DDFC	PLQP0176KB-A	384 Kbytes	128 Kbytes	32 Kbytes	100 MHz	-40 to +85°C
	R5F56316CDFC	PLQP0176KB-A	256 Kbytes	128 Kbytes	32 Kbytes	100 MHz	-40 to +85°C
	R5F56316DDFC	PLQP0176KB-A	256 Kbytes	128 Kbytes	32 Kbytes	100 MHz	-40 to +85°C
	R5F5631ECDLK	PTLG0145KA-A	2 Mbytes	128 Kbytes	32 Kbytes	100 MHz	-40 to +85°C
	R5F5631EDDLK	PTLG0145KA-A	2 Mbytes	128 Kbytes	32 Kbytes	100 MHz	-40 to +85°C
	R5F5631DCDLK	PTLG0145KA-A	1.5 Mbytes	128 Kbytes	32 Kbytes	100 MHz	-40 to +85°C
	R5F5631DDDLK	PTLG0145KA-A	1.5 Mbytes	128 Kbytes	32 Kbytes	100 MHz	-40 to +85°C
	R5F5631BCDLK	PTLG0145KA-A	1 Mbyte	128 Kbytes	32 Kbytes	100 MHz	-40 to +85°C
	R5F5631BDDLK	PTLG0145KA-A	1 Mbyte	128 Kbytes	32 Kbytes	100 MHz	-40 to +85°C
	R5F5631ACDLK	PTLG0145KA-A	768 Kbytes	128 Kbytes	32 Kbytes	100 MHz	-40 to +85°C
	R5F5631ADDLK	PTLG0145KA-A	768 Kbytes	128 Kbytes	32 Kbytes	100 MHz	-40 to +85°C
	R5F56318CDLK	PTLG0145KA-A	512 Kbytes	128 Kbytes	32 Kbytes	100 MHz	-40 to +85°C
	R5F56318DDLK	PTLG0145KA-A	512 Kbytes	128 Kbytes	32 Kbytes	100 MHz	-40 to +85°C
	R5F56317CDLK	PTLG0145KA-A	384 Kbytes	128 Kbytes	32 Kbytes	100 MHz	-40 to +85°C
	R5F56317DDLK	PTLG0145KA-A	384 Kbytes	128 Kbytes	32 Kbytes	100 MHz	-40 to +85°C
	R5F56316CDLK	PTLG0145KA-A	256 Kbytes	128 Kbytes	32 Kbytes	100 MHz	-40 to +85°C
	R5F56316DDLK	PTLG0145KA-A	256 Kbytes	128 Kbytes	32 Kbytes	100 MHz	-40 to +85°C
	R5F5631FHDFB	PLQP0144KA-A	2 Mbytes	256 Kbytes	32 Kbytes	100 MHz	-40 to +85°C
	R5F5631FDDFB	PLQP0144KA-A	2 Mbytes	256 Kbytes	32 Kbytes	100 MHz	-40 to +85°C
	R5F5631KHDFB	PLQP0144KA-A*1	2 Mbytes	192 Kbytes	32 Kbytes	100 MHz	-40 to +85°C
	R5F5631KDDFB	PLQP0144KA-A	2 Mbytes	192 Kbytes	32 Kbytes	100 MHz	-40 to +85°C
	R5F5631ECDFB	PLQP0144KA-A	2 Mbytes	128 Kbytes	32 Kbytes	100 MHz	-40 to +85°C
	R5F5631EDDFB	PLQP0144KA-A	2 Mbytes	128 Kbytes	32 Kbytes	100 MHz	-40 to +85°C
	R5F5631JHDFB	PLQP0144KA-A*1	1.5 Mbytes	256 Kbytes	32 Kbytes	100 MHz	-40 to +85°C
	R5F5631JDDFB	PLQP0144KA-A	1.5 Mbytes	256 Kbytes	32 Kbytes	100 MHz	-40 to +85°C
	R5F5631GHDFB	PLQP0144KA-A*1	1.5 Mbytes	192 Kbytes	32 Kbytes	100 MHz	-40 to +85°C
	R5F5631GDDFB	PLQP0144KA-A	1.5 Mbytes	192 Kbytes	32 Kbytes	100 MHz	-40 to +85°C
	R5F5631DCDFB	PLQP0144KA-A	1.5 Mbytes	128 Kbytes	32 Kbytes	100 MHz	-40 to +85°C
	R5F5631DDDFB	PLQP0144KA-A	1.5 Mbytes	128 Kbytes	32 Kbytes	100 MHz	-40 to +85°C
	R5F5631YHDFB	PLQP0144KA-A	1 Mbyte	256 Kbytes	32 Kbytes	100 MHz	-40 to +85°C
	R5F5631YDDFB	PLQP0144KA-A	1 Mbyte	256 Kbytes	32 Kbytes	100 MHz	-40 to +85°C
	R5F5631WHDFB	PLQP0144KA-A	1 Mbyte	192 Kbytes	32 Kbytes	100 MHz	-40 to +85°C
	R5F5631WDDFB	PLQP0144KA-A	1 Mbyte	192 Kbytes	32 Kbytes	100 MHz	-40 to +85°C
	R5F5631BCDFB	PLQP0144KA-A	1 Mbyte	128 Kbytes	32 Kbytes	100 MHz	-40 to +85°C
	R5F5631BDDFB	PLQP0144KA-A	1 Mbyte	128 Kbytes	32 Kbytes	100 MHz	-40 to +85°C
	R5F5631ACDFB	PLQP0144KA-A	768 Kbytes	128 Kbytes	32 Kbytes	100 MHz	-40 to +85°C
	R5F5631ADDFB	PLQP0144KA-A	768 Kbytes	128 Kbytes	32 Kbytes	100 MHz	-40 to +85°C
	R5F56318CDFB	PLQP0144KA-A	512 Kbytes	128 Kbytes	32 Kbytes	100 MHz	-40 to +85°C
	R5F56318DDFB	PLQP0144KA-A	512 Kbytes	128 Kbytes	32 Kbytes	100 MHz	-40 to +85°C
	R5F56316CDFB	PLQP0144KA-A	256 Kbytes	128 Kbytes	32 Kbytes	100 MHz	-40 to +85°C
	R5F56316DDFB	PLQP0144KA-A	256 Kbytes	128 Kbytes	32 Kbytes	100 MHz	-40 to +85°C

Table 1.3 List of Products (8/8)

Group	Part No.	Package	ROM Capacity	RAM Capacity	E2 Data Flash	Operating Frequency (Max.)	Operating Temp. Range
RX631 (G version) *2	R5F5631GDGFB	PLQP0144KA-A	1.5 Mbytes	192 Kbytes	32 Kbytes	100 MHz	-40 to +105°C
	R5F5631DDGFB	PLQP0144KA-A	1.5 Mbytes	128 Kbytes	32 Kbytes	100 MHz	-40 to +105°C
	R5F5631YDGFB	PLQP0144KA-A	1 Mbyte	256 Kbytes	32 Kbytes	100 MHz	-40 to +105°C
	R5F5631WDGFB	PLQP0144KA-A	1 Mbyte	192 Kbytes	32 Kbytes	100 MHz	-40 to +105°C
	R5F5631BDGFB	PLQP0144KA-A	1 Mbyte	128 Kbytes	32 Kbytes	100 MHz	-40 to +105°C
	R5F5631ADGFB	PLQP0144KA-A	768 Kbytes	128 Kbytes	32 Kbytes	100 MHz	-40 to +105°C
	R5F56318SGFB	PLQP0144KA-A	512 Kbytes	128 Kbytes	32 Kbytes	100 MHz	-40 to +105°C
	R5F56318DGFB	PLQP0144KA-A	512 Kbytes	128 Kbytes	32 Kbytes	100 MHz	-40 to +105°C
	R5F56317SGFB	PLQP0144KA-A	384 Kbytes	128 Kbytes	32 Kbytes	100 MHz	-40 to +105°C
	R5F56317DGFB	PLQP0144KA-A	384 Kbytes	128 Kbytes	32 Kbytes	100 MHz	-40 to +105°C
	R5F56316SGFB	PLQP0144KA-A	256 Kbytes	128 Kbytes	32 Kbytes	100 MHz	-40 to +105°C
	R5F56316DGFB	PLQP0144KA-A	256 Kbytes	128 Kbytes	32 Kbytes	100 MHz	-40 to +105°C
	R5F5631FDGFP	PLQP0100KB-A	2 Mbytes	256 Kbytes	32 Kbytes	100 MHz	-40 to +105°C
	R5F5631KDGFP	PLQP0100KB-A	2 Mbytes	192 Kbytes	32 Kbytes	100 MHz	-40 to +105°C
	R5F5631EDGFP	PLQP0100KB-A	2 Mbytes	128 Kbytes	32 Kbytes	100 MHz	-40 to +105°C
	R5F5631JDGFP	PLQP0100KB-A	1.5 Mbytes	256 Kbytes	32 Kbytes	100 MHz	-40 to +105°C
	R5F5631GDGFP	PLQP0100KB-A	1.5 Mbytes	192 Kbytes	32 Kbytes	100 MHz	-40 to +105°C
	R5F5631DDGFP	PLQP0100KB-A	1.5 Mbytes	128 Kbytes	32 Kbytes	100 MHz	-40 to +105°C
	R5F5631YDGFP	PLQP0100KB-A	1 Mbyte	256 Kbytes	32 Kbytes	100 MHz	-40 to +105°C
	R5F5631WDGFP	PLQP0100KB-A	1 Mbyte	192 Kbytes	32 Kbytes	100 MHz	-40 to +105°C
	R5F5631BDGFP	PLQP0100KB-A	1 Mbyte	128 Kbytes	32 Kbytes	100 MHz	-40 to +105°C
	R5F5631ADGFP	PLQP0100KB-A	768 Kbytes	128 Kbytes	32 Kbytes	100 MHz	-40 to +105°C
	R5F56318DGFP	PLQP0100KB-A	512 Kbytes	128 Kbytes	32 Kbytes	100 MHz	-40 to +105°C
	R5F56317DGFP	PLQP0100KB-A	384 Kbytes	128 Kbytes	32 Kbytes	100 MHz	-40 to +105°C
	R5F56316DGFP	PLQP0100KB-A	256 Kbytes	128 Kbytes	32 Kbytes	100 MHz	-40 to +105°C
	R5F5631PDGFM	PLQP0064KB-A	512 Kbytes	64 Kbytes	32 Kbytes	100 MHz	-40 to +105°C
	R5F5631NDGFM	PLQP0064KB-A	384 Kbytes	64 Kbytes	32 Kbytes	100 MHz	-40 to +105°C
	R5F5631MDGFM	PLQP0064KB-A	256 Kbytes	64 Kbytes	32 Kbytes	100 MHz	-40 to +105°C
	R5F5631PDGFL	PLQP0048KB-A	512 Kbytes	64 Kbytes	32 Kbytes	100 MHz	-40 to +105°C
	R5F5631NDGFL	PLQP0048KB-A	384 Kbytes	64 Kbytes	32 Kbytes	100 MHz	-40 to +105°C
	R5F5631MDGFL	PLQP0048KB-A	256 Kbytes	64 Kbytes	32 Kbytes	100 MHz	-40 to +105°C

Note 1. In the planning stage

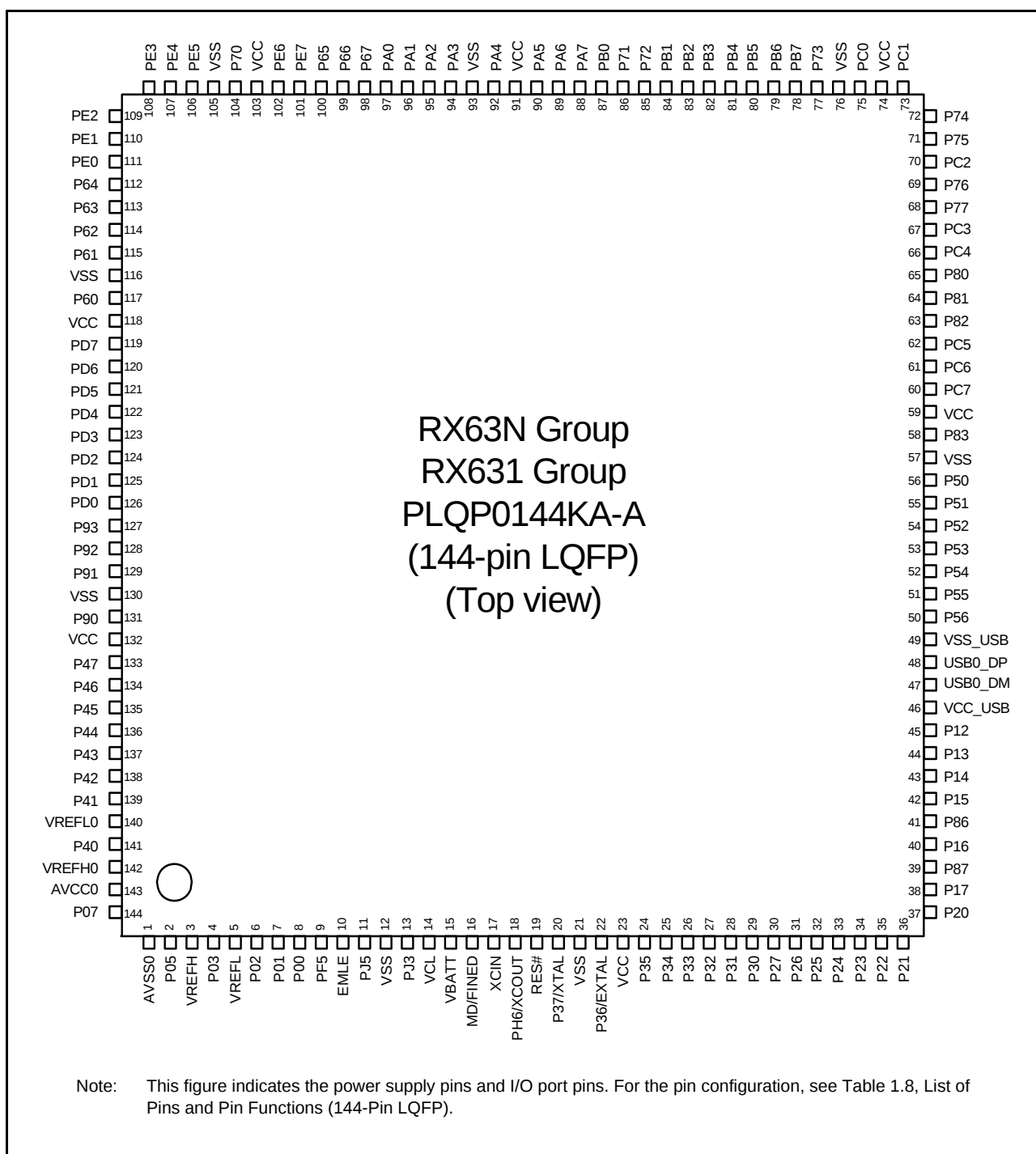
Note 2. The specifications of the temperature sensor calibration and unique ID for G-version products differ from those for other products. For details, see section 45.2.2, Temperature Sensor Calibration Data Registers (TSCDRH, TSCDRL), section 45.3, Using the Temperature Sensor, and section 47.2.22, Unique ID Registers n (UIDRn) (n = 0 to 15) in the User's manual: Hardware.

Table 1.4 Pin Functions (3/6)

Classifications	Pin Name	I/O	Description
16-bit timer pulse unit	TIOCA0, TIOCB0 TIOCC0, TIOCD0	I/O	The TGRA0 to TGRD0 input capture input/output compare output/PWM output pins.
	TIOCA1, TIOCB1	I/O	The TGRA1 and TGRB1 input capture input/output compare output/PWM output pins.
	TIOCA2, TIOCB2	I/O	The TGRA2 and TGRB2 input capture input/output compare output/PWM output pins.
	TIOCA3, TIOCB3 TIOCC3, TIOCD3	I/O	The TGRA3 to TGRD3 input capture input/output compare output/PWM output pins.
	TIOCA4, TIOCB4	I/O	The TGRA4 and TGRB4 input capture input/output compare output/PWM output pins.
	TIOCA5, TIOCB5	I/O	The TGRA5 and TGRB5 input capture input/output compare output/PWM output pins.
	TCLKA, TCLKB TCLKC, TCLKD	Input	Input pins for external clock signals.
	TIOCA6, TIOCB6 TIOCC6, TIOCD6	I/O	The TGRA6 to TGRD6 input capture input/output compare output/PWM output pins.
	TIOCA7, TIOCB7	I/O	The TGRA7 and TGRB7 input capture input/output compare output/PWM output pins.
	TIOCA8, TIOCB8	I/O	The TGRA8 and TGRB8 input capture input/output compare output/PWM output pins.
	TIOCA9, TIOCB9 TIOCC9, TIOCD9	I/O	The TGRA9 to TGRD9 input capture input/output compare output/PWM output pins.
	TIOCA10, TIOCB10	I/O	The TGRA10 and TGRB10 input capture input/output compare output/PWM output pins.
	TIOCA11, TIOCB11	I/O	The TGRA11 and TGRB11 input capture input/output compare output/PWM output pins.
	TCLKE, TCLKF TCLKG, TCLKH	Input	Input pins for external clock signals.
Programmable pulse generator	PO0 to PO31	Output	Output pins for the pulse signals.
8-bit timer	TMO0 to TMO3	Output	Output pins for the compare match signals.
	TMCI0 to TMCI3	Input	Input pins for the external clock signals that drive for the counters.
	TMRI0 to TMRI3	Input	Input pins for the counter-reset signals.
Serial communications interface (SC1c)	• Asynchronous mode/clock synchronous mode		
	SCK0 to SCK11	I/O	Input/output pins for clock signals.
	RXD0 to RXD11	Input	Input pins for data reception.
	TXD0 to TXD11	Output	Output pins for data transmission.
	CTS0# to CTS11#	Input	Transmit/receive start control input pins
	RTS0# to RTS11#	Output	Transmit/receive start control output pins
	• Simple I ² C mode		
	SSCL0 to SSCL11	I/O	Input/output pins for the I ² C clock
Serial communications interface (SC1c)	SSDA0 to SSDA11	I/O	Input/output pins for the I ² C data
	• Simple SPI mode		
	SCK0 to SCK11	I/O	Input/output pins for the clock
	SMISO0 to SMISO11	I/O	Input/output pins for slave transmit data.
	SMOSI0 to SMOSI11	I/O	Input/output pins for master transmit data.
	SS0# to SS11#	Input	Input pins for chip select signals

Table 1.4 Pin Functions (6/6)

Classifications	Pin Name	I/O	Description
Analog power supply	AVCC0	Input	Analog voltage supply pin for the 12-bit A/D converter. Connect this pin to VCC if the 12-bit A/D converter is not to be used.
	AVSS0	Input	Analog ground pin for the 12-bit A/D converter. Connect this pin to VSS if the 12-bit A/D converter is not to be used.
	VREFH0	Input	Analog reference voltage supply pin for the 12-bit A/D converter. Connect this pin to VCC if the 12-bit A/D converter is not to be used.
	VREFL0	Input	Analog reference ground pin for the 12-bit A/D converter. Connect this pin to VSS if the 12-bit A/D converter is not to be used.
	VREFH	Input	Reference voltage input pin for the 10-bit A/D converter and D/A converter. This is used as the analog power supply for the respective modules. Connect this pin to VCC if neither the 10-bit A/D converter nor the D/A converter is in use.
	VREFL	Input	Reference ground pin for the 10-bit A/D converter and D/A converter. This is used as the analog ground for the respective modules. Set this pin to the same potential as the VSS pin.
I/O ports	P00 to P03, P05, P07	I/O	6-bit input/output pins.
	P10 to P17	I/O	8-bit input/output pins.
	P20 to P27	I/O	8-bit input/output pins.
	P30 to P37	I/O	8-bit input/output pins. (P35 is an input pin)
	P40 to P47	I/O	8-bit input/output pins.
	P50 to P57	I/O	8-bit input/output pins.
	P60 to P67	I/O	8-bit input/output pins.
	P70 to P77	I/O	8-bit input/output pins.
	P80 to P87	I/O	8-bit input/output pins.
	P90 to P97	I/O	8-bit input/output pins.
	PA0 to PA7	I/O	8-bit input/output pins.
	PB0 to PB7	I/O	8-bit input/output pins.
	PC0 to PC7	I/O	8-bit input/output pins.
	PD0 to PD7	I/O	8-bit input/output pins.
	PE0 to PE7	I/O	8-bit input/output pins.
	PF0 to PF5	I/O	6-bit input/output pins.
	PG0 to PG7	I/O	8-bit input/output pins.
	PJ3, PJ5	I/O	2-bit input/output pins.

**Figure 1.7 Pin Assignment (144-Pin LQFP)**

RX63N Group, RX631 Group
PTLG0100JA-A (100-pin TFLGA)
(Top view)

	A	B	C	D	E	F	G	H	J	K	
10	PE2	PE3	PE4	PA0	PA3	VSS	VCC	PB7	PC1	PC2	10
9	PE1	PD7	PE5	PA1	PA5	PA7	PB1	PB6	PC0	PC3	9
8	PE0	PD6	PD5	PE7	PA4	PB0	PB4	PC6	PC4	PC5	8
7	PD4	PD3	PD2	PE6	PA6	PB2	PB5	PC7	P50	P51	7
6	PD0	PD1	P47	P46	PA2	PB3	P52	P54	VCC_ USB	USB0_ DP	6
5	P43	P44	P42	P45	P41	P12	P53	P55	VSS_ USB	USB0_ DM	5
4	VREFL0	P40	VREFH0	VBATT	P34	P32	P27	P15	P13	P14	4
3	P07	AVCC0	PJ3	MD/ FINED	RES#	P35	P30	P16	P17	P20	3
2	VREFH	AVSS0	VREFL	XCOUT	VSS	VCC	P31	P25	P21	P22	2
1	P05	EMLE	VCL	XCIN	XTAL	EXTAL	P33	P26	P24	P23	1
	A	B	C	D	E	F	G	H	J	K	

Note: This figure indicates the power supply pins and I/O port pins. For the pin configuration, see Table 1.10, List of Pins and Pin Functions (100-Pin LQFP).

Figure 1.8 Pin Assignment (100-Pin TFLGA)

Table 1.10 List of Pins and Pin Functions (100-Pin LQFP) (3/4)

Pin No.	Power Supply Clock System Control	I/O Port	Bus EXDMAC	Timers (MTU, TPU, TMR, PPG, RTC, POE)	Communications (ETHERC, SCIC, SCID, RSPI, RIIC, CAN, IEB, USB)	Interrupt	S12AD AD DA
59		PB1	A9	MTIOC0C/MTIOC4C/ TIOCB3/TMC10/PO25	TXD6/SMOSI6/SSDA6/ ET_ERXD0/ RMII_RXD0	IRQ4-DS	
60	VCC						
61		PB0	A8	MTIC5W/TIOCA3/PO24	RXD6/SMISO6/SSCL6/ RSPCKA/ET_ERXD1/ RMII_RXD1	IRQ12	
62	VSS						
63		PA7	A7	TIOCB2/PO23	MISOA/ET_WOL		
64		PA6	A6	MTIC5V/MTCLKB/ TIOCA2/TMC13/PO22/ POE2#	CTS5#/RTS5#/SS5#/ MOSIA/ET_EXOUT		
65		PA5	A5	TIOCB1/PO21	RSPCKA/ET_LINKSTA		
66		PA4	A4	MTIC5U/MTCLKA/ TIOCA1/TMRI0/PO20	TXD5/SMOSI5/SSDA5/ SSLA0/ET_MDC	IRQ5-DS	
67		PA3	A3	MTIOC0D/MTCLKD/ TIOC0D/TCLKB/PO19	RXD5/SMISO5/SSCL5/ ET_MDIO	IRQ6-DS	
68		PA2	A2	PO18	RXD5/SMISO5/SSCL5/ SSLA3		
69		PA1	A1	MTIOC0B/MTCLKC/ TIOCB0/PO17	SCK5/SSLA2/ET_WOL	IRQ11	
70		PA0	A0/BC0#	MTIOC4A/TIOCA0/ PO16	SSLA1/ET_TX_EN/ RMII_TXD_EN		
71		PE7	D15[A15/D15]		MISOB	IRQ7	AN5
72		PE6	D14[A14/D14]		MOSIB	IRQ6	AN4
73		PE5	D13[A13/D13]	MTIOC4C/MTIOC2B	RSPCKB/ET_RX_CLK/ REF50CK	IRQ5	AN3
74		PE4	D12[A12/D12]	MTIOC4D/MTIOC1A/ PO28	SSLB0/ET_ERXD2		AN2
75		PE3	D11[A11/D11]	MTIOC4B/PO26/POE8#	CTS12#/RTS12#/ SS12#/MISOB/ ET_ERXD3		AN1
76		PE2	D10[A10/D10]	MTIOC4A/PO23	RXD12/SMISO12/ SSCL12/RXD12/ SSLB3/MOSIB	IRQ7-DS	AN0
77		PE1	D9[A9/D9]	MTIOC4C/PO18	TXD12/SMOSI12/ SSDA12/TXD12/ SIOX12/SSLB2/ RSPCKB		ANEX1
78		PE0	D8[A8/D8]		SCK12/SSLB1		ANEX0
79		PD7	D7[A7/D7]	MTIC5U/POE0#		IRQ7	AN7
80		PD6	D6[A6/D6]	MTIC5V/POE1#		IRQ6	AN6
81		PD5	D5[A5/D5]	MTIC5W/POE2#		IRQ5	AN013
82		PD4	D4[A4/D4]	POE3#		IRQ4	AN012
83		PD3	D3[A3/D3]	POE8#		IRQ3	AN011
84		PD2	D2[A2/D2]	MTIOC4D	CRX0*1	IRQ2	AN010
85		PD1	D1[A1/D1]	MTIOC4B	CTX0*1	IRQ1	AN009
86		PD0	D0[A0/D0]			IRQ0	AN008
87		P47				IRQ15-DS	AN007
88		P46				IRQ14-DS	AN006
89		P45				IRQ13-DS	AN005
90		P44				IRQ12-DS	AN004
91		P43				IRQ11-DS	AN003
92		P42				IRQ10-DS	AN002
93		P41				IRQ9-DS	AN001

Table 1.12 List of Pins and Pin Functions (64-Pin LQFP) (2/3)

Pin Number 64-Pin LQFP	Power Supply Clock System Control	I/O Port	Timer (MTU2a, TPUa, TMR, PPG, RTCa, POE2a)	Timer Communications (SC1c, SC1d, RSPI, RIIC, CAN, IEB, USB)	Interrupt	S12ADa, DAa
32		PC2	MTIOC4B/TCLKA/ PO21	RXD5/SMISO5/SSCL5/ SSLA3/IERXD		
33		PB7/ PC1	MTIOC3B/TIOCB5/ PO31	TXD9/SMOSI9/SSDA9		
34		PB6/ PC0	MTIOC3D/TIOCA5/ PO30	RXD9/SMISO9/SSCL9		
35		PB5	MTIOC2A/MTIOC1B/ TIOCB4/TMRI1/PO29/ POE1#	SCK9		
36		PB3	MTIOC0A/MTIOC4A/ TIOCD3/TCLKD/TMO0/ PO27/POE3#	SCK6		
37		PB1	MTIOC0C/MTIOC4C/ TIOCB3/TMCI0/PO25	TXD6/SMOSI6/SSDA6	IRQ4-DS	
38	VCC					
39		PB0	MTIC5W/TIOCA3/PO24	RXD6/SMISO6/SSCL6/ RSPCKA	IRQ12	
40	VSS					
41		PA6	MTIC5V/MTCLKB/ TIOCA2/TMCI3/PO22/ POE2#	CTS5#/RTS5#/SS5#/ MOSIA		
42		PA4	MTIC5U/MTCLKA/ TIOCA1/TMRI0/PO20	TXD5/SMOSI5/SSDA5/ SSLA0	IRQ5-DS	
43		PA3	MTIOC0D/MTCLKD/ TIOCD0/TCLKB/PO19	RXD5/SMISO5/SSCL5	IRQ6-DS	
44		PA1	MTIOC0B/MTCLKC/ TIOCB0/PO17	SCK5/SSLA2/SCL2	IRQ11	
45		PA0	MTIOC4A/TIOCA0/ PO16	SSLA1		
46		PE5	MTIOC4C/MTIOC2B	RSPCKB	IRQ5	AN013
47		PE4	MTIOC4D/MTIOC1A/ PO28	SSLB0		AN012
48		PE3	MTIOC4B/PO26/POE8#	CTS12#/RTS12#/ SS12#/MISOB		AN011
49		PE2	MTIOC4A/PO23	RXD12/SMISO12/ SSCL12/RXDX12/ SSLB3/MOSIB	IRQ7-DS	AN010
50		PE1	MTIOC4C/PO18	TXD12/SMOSI12/SSDA12/ TXDX12/SIOX12/SSLB2/ RSPCKB		AN009
51		PE0		SCK12/SSLB1		AN008
52	VREFL					
53		P46			IRQ14-DS	AN006
54	VREFH					
55		P44			IRQ12-DS	AN004
56		P43			IRQ11-DS	AN003
57		P42			IRQ10-DS	AN002
58		P41			IRQ9-DS	AN001
59	VREFL0					
60		P40			IRQ8-DS	AN000

Table 4.1 List of I/O Registers (Address Order) (4/50)

Address	Module Symbol	Register Name	Register Symbol	Number of Bits	Access Size	Number of Access States		Related Function
						ICLK≥PCLK	ICLK<PCLK	
0008 3072h	BSC	CS7 mode register	CS7MOD	16	16	1, 2 BCLK		Buses
0008 3074h	BSC	CS7 wait control register 1	CS7WCR1	32	32	1, 2 BCLK		
0008 3078h	BSC	CS7 wait control register 2	CS7WCR2	32	32	1, 2 BCLK		
0008 3802h	BSC	CS0 control register	CS0CR	16	16	1, 2 BCLK		
0008 380Ah	BSC	CS0 recovery cycle register	CS0REC	16	16	1, 2 BCLK		
0008 3812h	BSC	CS1 control register	CS1CR	16	16	1, 2 BCLK		
0008 381Ah	BSC	CS1 recovery cycle register	CS1REC	16	16	1, 2 BCLK		
0008 3822h	BSC	CS2 control register	CS2CR	16	16	1, 2 BCLK		
0008 382Ah	BSC	CS2 recovery cycle register	CS2REC	16	16	1, 2 BCLK		
0008 3832h	BSC	CS3 control register	CS3CR	16	16	1, 2 BCLK		
0008 383Ah	BSC	CS3 recovery cycle register	CS3REC	16	16	1, 2 BCLK		
0008 3842h	BSC	CS4 control register	CS4CR	16	16	1, 2 BCLK		
0008 384Ah	BSC	CS4 recovery cycle register	CS4REC	16	16	1, 2 BCLK		
0008 3852h	BSC	CS5 control register	CS5CR	16	16	1, 2 BCLK		
0008 385Ah	BSC	CS5 recovery cycle register	CS5REC	16	16	1, 2 BCLK		
0008 3862h	BSC	CS6 control register	CS6CR	16	16	1, 2 BCLK		
0008 386Ah	BSC	CS6 recovery cycle register	CS6REC	16	16	1, 2 BCLK		
0008 3872h	BSC	CS7 control register	CS7CR	16	16	1, 2 BCLK		
0008 387Ah	BSC	CS7 recovery cycle register	CS7REC	16	16	1, 2 BCLK		
0008 3880h	BSC	CS recovery cycle insertion enable register	CSRECEN	16	16	1, 2 BCLK		
0008 3C00h	BSC	SDC control register	SDCCR	8	8	1, 2 BCLK		
0008 3C01h	BSC	SDC mode register	SDCMOD	8	8	1, 2 BCLK		
0008 3C02h	BSC	SDRAM access mode register	SDAMOD	8	8	1, 2 BCLK		
0008 3C10h	BSC	SDRAM self-refresh control register	SDSELF	8	8	1, 2 BCLK		
0008 3C14h	BSC	SDRAM refresh control register	SDRFCR	16	16	1, 2 BCLK		
0008 3C16h	BSC	SDRAM auto-refresh control register	SDRFEN	8	8	1, 2 BCLK		
0008 3C20h	BSC	SDRAM initialization sequence control register	SDICR	8	8	1, 2 BCLK		
0008 3C24h	BSC	SDRAM initialization register	SDIR	16	16	1, 2 BCLK		
0008 3C40h	BSC	SDRAM address register	SDADR	8	8	1, 2 BCLK		
0008 3C44h	BSC	SDRAM timing register	SDTR	32	32	1, 2 BCLK		
0008 3C48h	BSC	SDRAM mode register	SDMOD	16	16	1, 2 BCLK		
0008 3C50h	BSC	SDRAM status register	SDSR	8	8	1, 2 BCLK		
0008 6400h	MPU	Region-0 start page number register	RSPAGE0	32	32	1 ICLK		MPU
0008 6404h	MPU	Region-0 end page number register	REPAGE0	32	32	1 ICLK		
0008 6408h	MPU	Region-1 start page number register	RSPAGE1	32	32	1 ICLK		
0008 640Ch	MPU	Region-1 end page number register	REPAGE1	32	32	1 ICLK		
0008 6410h	MPU	Region-2 start page number register	RSPAGE2	32	32	1 ICLK		
0008 6414h	MPU	Region-2 end page number register	REPAGE2	32	32	1 ICLK		
0008 6418h	MPU	Region-3 start page number register	RSPAGE3	32	32	1 ICLK		
0008 641Ch	MPU	Region-3 end page number register	REPAGE3	32	32	1 ICLK		
0008 6420h	MPU	Region-4 start page number register	RSPAGE4	32	32	1 ICLK		
0008 6424h	MPU	Region-4 end page number register	REPAGE4	32	32	1 ICLK		
0008 6428h	MPU	Region-5 start page number register	RSPAGE5	32	32	1 ICLK		
0008 642Ch	MPU	Region-5 end page number register	REPAGE5	32	32	1 ICLK		
0008 6430h	MPU	Region-6 start page number register	RSPAGE6	32	32	1 ICLK		
0008 6434h	MPU	Region-6 end page number register	REPAGE6	32	32	1 ICLK		
0008 6438h	MPU	Region-7 start page number register	RSPAGE7	32	32	1 ICLK		
0008 643Ch	MPU	Region-7 end page number register	REPAGE7	32	32	1 ICLK		
0008 6500h	MPU	Memory-protection enable register	MPEN	32	32	1 ICLK		
0008 6504h	MPU	Background access control register	MPBAC	32	32	1 ICLK		
0008 6508h	MPU	Memory-protection error status-clearing register	MPECLR	32	32	1 ICLK		

Table 4.1 List of I/O Registers (Address Order) (13/50)

Address	Module Symbol	Register Name	Register Symbol	Number of Bits	Access Size	Number of Access States		Related Function
						ICLK≥PCLK	ICLK<PCLK	
0008 7394h	ICU	Interrupt source priority register 148	IPR148	8	8	2	ICLK	ICUb
0008 7396h	ICU	Interrupt source priority register 150	IPR150	8	8	2	ICLK	
0008 7398h	ICU	Interrupt source priority register 152	IPR152	8	8	2	ICLK	
0008 739Ch	ICU	Interrupt source priority register 156	IPR156	8	8	2	ICLK	
0008 73A0h	ICU	Interrupt source priority register 160	IPR160	8	8	2	ICLK	
0008 73A1h	ICU	Interrupt source priority register 161	IPR161	8	8	2	ICLK	
0008 73A4h	ICU	Interrupt source priority register 164	IPR164	8	8	2	ICLK	
0008 73A6h	ICU	Interrupt source priority register 166	IPR166	8	8	2	ICLK	
0008 73AAh	ICU	Interrupt source priority register 170	IPR170	8	8	2	ICLK	
0008 73ADh	ICU	Interrupt source priority register 173	IPR173	8	8	2	ICLK	
0008 73B0h	ICU	Interrupt source priority register 176	IPR176	8	8	2	ICLK	
0008 73B3h	ICU	Interrupt source priority register 179	IPR179	8	8	2	ICLK	
0008 73B6h	ICU	Interrupt source priority register 182	IPR182	8	8	2	ICLK	
0008 73B7h	ICU	Interrupt source priority register 183	IPR183	8	8	2	ICLK	
0008 73B8h	ICU	Interrupt source priority register 184	IPR184	8	8	2	ICLK	
0008 73B9h	ICU	Interrupt source priority register 185	IPR185	8	8	2	ICLK	
0008 73BAh	ICU	Interrupt source priority register 186	IPR186	8	8	2	ICLK	
0008 73BBh	ICU	Interrupt source priority register 187	IPR187	8	8	2	ICLK	
0008 73BCh	ICU	Interrupt source priority register 188	IPR188	8	8	2	ICLK	
0008 73BDh	ICU	Interrupt source priority register 189	IPR189	8	8	2	ICLK	
0008 73BEh	ICU	Interrupt source priority register 190	IPR190	8	8	2	ICLK	
0008 73BFh	ICU	Interrupt source priority register 191	IPR191	8	8	2	ICLK	
0008 73C0h	ICU	Interrupt source priority register 192	IPR192	8	8	2	ICLK	
0008 73C1h	ICU	Interrupt source priority register 193	IPR193	8	8	2	ICLK	
0008 73C2h	ICU	Interrupt source priority register 194	IPR194	8	8	2	ICLK	
0008 73C3h	ICU	Interrupt source priority register 195	IPR195	8	8	2	ICLK	
0008 73C4h	ICU	Interrupt source priority register 196	IPR196	8	8	2	ICLK	
0008 73C5h	ICU	Interrupt source priority register 197	IPR197	8	8	2	ICLK	
0008 73C6h	ICU	Interrupt source priority register 198	IPR198	8	8	2	ICLK	
0008 73C7h	ICU	Interrupt source priority register 199	IPR199	8	8	2	ICLK	
0008 73C8h	ICU	Interrupt source priority register 200	IPR200	8	8	2	ICLK	
0008 73C9h	ICU	Interrupt source priority register 201	IPR201	8	8	2	ICLK	
0008 73CAh	ICU	Interrupt source priority register 202	IPR202	8	8	2	ICLK	
0008 73CBh	ICU	Interrupt source priority register 203	IPR203	8	8	2	ICLK	
0008 73CEh	ICU	Interrupt source priority register 206	IPR206	8	8	2	ICLK	
0008 73CFh	ICU	Interrupt source priority register 207	IPR207	8	8	2	ICLK	
0008 73D0h	ICU	Interrupt source priority register 208	IPR208	8	8	2	ICLK	
0008 73D6h	ICU	Interrupt source priority register 214	IPR214	8	8	2	ICLK	
0008 73D9h	ICU	Interrupt source priority register 217	IPR217	8	8	2	ICLK	
0008 73DCh	ICU	Interrupt source priority register 220	IPR220	8	8	2	ICLK	
0008 73DFh	ICU	Interrupt source priority register 223	IPR223	8	8	2	ICLK	
0008 73E2h	ICU	Interrupt source priority register 226	IPR226	8	8	2	ICLK	
0008 73E5h	ICU	Interrupt source priority register 229	IPR229	8	8	2	ICLK	
0008 73E8h	ICU	Interrupt source priority register 232	IPR232	8	8	2	ICLK	
0008 73EBh	ICU	Interrupt source priority register 235	IPR235	8	8	2	ICLK	
0008 73EEh	ICU	Interrupt source priority register 238	IPR238	8	8	2	ICLK	
0008 73F1h	ICU	Interrupt source priority register 241	IPR241	8	8	2	ICLK	
0008 73F4h	ICU	Interrupt source priority register 244	IPR244	8	8	2	ICLK	
0008 73F7h	ICU	Interrupt source priority register 247	IPR247	8	8	2	ICLK	
0008 73FAh	ICU	Interrupt source priority register 250	IPR250	8	8	2	ICLK	
0008 73FDh	ICU	Interrupt source priority register 253	IPR253	8	8	2	ICLK	

Table 4.1 List of I/O Registers (Address Order) (19/50)

Address	Module Symbol	Register Name	Register Symbol	Number of Bits	Access Size	Number of Access States		Related Function
						ICLK≥PCLK	ICLK<PCLK	
0008 8313h	RIIC0	I ² C bus receive data register	ICDRR	8	8	2, 3 PCLKB	2 ICLK	RIIC
0008 8320h	RIIC1	I ² C bus control register 1	ICCR1	8	8	2, 3 PCLKB	2 ICLK	
0008 8321h	RIIC1	I ² C bus control register 2	ICCR2	8	8	2, 3 PCLKB	2 ICLK	
0008 8322h	RIIC1	I ² C bus mode register 1	ICMR1	8	8	2, 3 PCLKB	2 ICLK	
0008 8323h	RIIC1	I ² C bus mode register 2	ICMR2	8	8	2, 3 PCLKB	2 ICLK	
0008 8324h	RIIC1	I ² C bus mode register 3	ICMR3	8	8	2, 3 PCLKB	2 ICLK	
0008 8325h	RIIC1	I ² C bus function enable register	ICFER	8	8	2, 3 PCLKB	2 ICLK	
0008 8326h	RIIC1	I ² C bus status enable register	ICSER	8	8	2, 3 PCLKB	2 ICLK	
0008 8327h	RIIC1	I ² C bus interrupt enable register	ICIER	8	8	2, 3 PCLKB	2 ICLK	
0008 8328h	RIIC1	I ² C bus status register 1	ICSR1	8	8	2, 3 PCLKB	2 ICLK	
0008 8329h	RIIC1	I ² C bus status register 2	ICSR2	8	8	2, 3 PCLKB	2 ICLK	
0008 832Ah	RIIC1	Slave address register L0	SARL0	8	8	2, 3 PCLKB	2 ICLK	
0008 832Ah	RIIC1	Timeout Internal Counter L	TMOCNTL	8	8	2, 3 PCLKB	2 ICLK	
0008 832Bh	RIIC1	Slave address register U0	SARU0	8	8	2, 3 PCLKB	2 ICLK	
0008 832Bh	RIIC1	Timeout Internal Counter U	TMOCNTU	8	8	2, 3 PCLKB	2 ICLK	
0008 832Ch	RIIC1	Slave address register L1	SARL1	8	8	2, 3 PCLKB	2 ICLK	
0008 832Dh	RIIC1	Slave address register U1	SARU1	8	8	2, 3 PCLKB	2 ICLK	
0008 832Eh	RIIC1	Slave address register L2	SARL2	8	8	2, 3 PCLKB	2 ICLK	
0008 832Fh	RIIC1	Slave address register U2	SARU2	8	8	2, 3 PCLKB	2 ICLK	
0008 8330h	RIIC1	I ² C bus bit rate low-level register	ICBRL	8	8	2, 3 PCLKB	2 ICLK	
0008 8331h	RIIC1	I ² C bus bit rate high-level register	ICBRH	8	8	2, 3 PCLKB	2 ICLK	
0008 8332h	RIIC1	I ² C bus transmit data register	ICDRT	8	8	2, 3 PCLKB	2 ICLK	
0008 8333h	RIIC1	I ² C bus receive data register	ICDRR	8	8	2, 3 PCLKB	2 ICLK	
0008 8340h	RIIC2	I ² C bus control register 1	ICCR1	8	8	2, 3 PCLKB	2 ICLK	
0008 8341h	RIIC2	I ² C bus control register 2	ICCR2	8	8	2, 3 PCLKB	2 ICLK	
0008 8342h	RIIC2	I ² C bus mode register 1	ICMR1	8	8	2, 3 PCLKB	2 ICLK	
0008 8343h	RIIC2	I ² C bus mode register 2	ICMR2	8	8	2, 3 PCLKB	2 ICLK	
0008 8344h	RIIC2	I ² C bus mode register 3	ICMR3	8	8	2, 3 PCLKB	2 ICLK	
0008 8345h	RIIC2	I ² C bus function enable register	ICFER	8	8	2, 3 PCLKB	2 ICLK	
0008 8346h	RIIC2	I ² C bus status enable register	ICSER	8	8	2, 3 PCLKB	2 ICLK	
0008 8347h	RIIC2	I ² C bus interrupt enable register	ICIER	8	8	2, 3 PCLKB	2 ICLK	
0008 8348h	RIIC2	I ² C bus status register 1	ICSR1	8	8	2, 3 PCLKB	2 ICLK	
0008 8349h	RIIC2	I ² C bus status register 2	ICSR2	8	8	2, 3 PCLKB	2 ICLK	
0008 834Ah	RIIC2	Slave address register L0	SARL0	8	8	2, 3 PCLKB	2 ICLK	
0008 834Bh	RIIC2	Slave address register U0	SARU0	8	8	2, 3 PCLKB	2 ICLK	
0008 834Ch	RIIC2	Slave address register L1	SARL1	8	8	2, 3 PCLKB	2 ICLK	
0008 834Dh	RIIC2	Slave address register U1	SARU1	8	8	2, 3 PCLKB	2 ICLK	
0008 834Eh	RIIC2	Slave address register L2	SARL2	8	8	2, 3 PCLKB	2 ICLK	
0008 834Fh	RIIC2	Slave address register U2	SARU2	8	8	2, 3 PCLKB	2 ICLK	
0008 8350h	RIIC2	I ² C bus bit rate low-level register	ICBRL	8	8	2, 3 PCLKB	2 ICLK	
0008 8351h	RIIC2	I ² C bus bit rate high-level register	ICBRH	8	8	2, 3 PCLKB	2 ICLK	
0008 8352h	RIIC2	I ² C bus transmit data register	ICDRT	8	8	2, 3 PCLKB	2 ICLK	
0008 8353h	RIIC2	I ² C bus receive data register	ICDRR	8	8	2, 3 PCLKB	2 ICLK	
0008 8360h	RIIC3	I ² C bus control register 1	ICCR1	8	8	2, 3 PCLKB	2 ICLK	
0008 8361h	RIIC3	I ² C bus control register 2	ICCR2	8	8	2, 3 PCLKB	2 ICLK	
0008 8362h	RIIC3	I ² C bus mode register 1	ICMR1	8	8	2, 3 PCLKB	2 ICLK	
0008 8363h	RIIC3	I ² C bus mode register 2	ICMR2	8	8	2, 3 PCLKB	2 ICLK	
0008 8364h	RIIC3	I ² C bus mode register 3	ICMR3	8	8	2, 3 PCLKB	2 ICLK	
0008 8365h	RIIC3	I ² C bus function enable register	ICFER	8	8	2, 3 PCLKB	2 ICLK	
0008 8366h	RIIC3	I ² C bus status enable register	ICSER	8	8	2, 3 PCLKB	2 ICLK	
0008 8367h	RIIC3	I ² C bus interrupt enable register	ICIER	8	8	2, 3 PCLKB	2 ICLK	

Table 4.1 List of I/O Registers (Address Order) (34/50)

Address	Module Symbol	Register Name	Register Symbol	Number of Bits	Access Size	Number of Access States		Related Function
						ICLK≥PCLK	ICLK<PCLK	
0008 C1B1h	MPC	PE1 pin function control register	PE1PFS	8	8	2, 3 PCLKB	2 ICLK	MPC
0008 C1B2h	MPC	PE2 pin function control register	PE2PFS	8	8	2, 3 PCLKB	2 ICLK	
0008 C1B3h	MPC	PE3 pin function control register	PE3PFS	8	8	2, 3 PCLKB	2 ICLK	
0008 C1B4h	MPC	PE4 pin function control register	PE4PFS	8	8	2, 3 PCLKB	2 ICLK	
0008 C1B5h	MPC	PE5 pin function control register	PE5PFS	8	8	2, 3 PCLKB	2 ICLK	
0008 C1B6h	MPC	PE6 pin function control register	PE6PFS	8	8	2, 3 PCLKB	2 ICLK	
0008 C1B7h	MPC	PE7 pin function control register	PE7PFS	8	8	2, 3 PCLKB	2 ICLK	
0008 C1B8h	MPC	PF0 pin function control register	PF0PFS	8	8	2, 3 PCLKB	2 ICLK	
0008 C1B9h	MPC	PF1 pin function control register	PF1PFS	8	8	2, 3 PCLKB	2 ICLK	
0008 C1BAh	MPC	PF2 pin function control register	PF2PFS	8	8	2, 3 PCLKB	2 ICLK	
0008 C1BDh	MPC	PF5 pin function control register	PF5PFS	8	8	2, 3 PCLKB	2 ICLK	
0008 C1D3h	MPC	PJ3 pin function control register	PJ3PFS	8	8	2, 3 PCLKB	2 ICLK	
0008 C280h	SYSTEM	Deep standby control register	DPSBYCR	8	8	4, 5 PCLKB	2, 3 ICLK	Low Power Consumption
0008 C282h	SYSTEM	Deep standby interrupt enable register 0	DPSIER0	8	8	4, 5 PCLKB	2, 3 ICLK	
0008 C283h	SYSTEM	Deep standby interrupt enable register 1	DPSIER1	8	8	4, 5 PCLKB	2, 3 ICLK	
0008 C284h	SYSTEM	Deep standby interrupt enable register 2	DPSIER2	8	8	4, 5 PCLKB	2, 3 ICLK	
0008 C285h	SYSTEM	Deep standby interrupt enable register 3	DPSIER3	8	8	4, 5 PCLKB	2, 3 ICLK	
0008 C286h	SYSTEM	Deep standby interrupt flag register 0	DPSIFR0	8	8	4, 5 PCLKB	2, 3 ICLK	
0008 C287h	SYSTEM	Deep standby interrupt flag register 1	DPSIFR1	8	8	4, 5 PCLKB	2, 3 ICLK	
0008 C288h	SYSTEM	Deep standby interrupt flag register 2	DPSIFR2	8	8	4, 5 PCLKB	2, 3 ICLK	
0008 C289h	SYSTEM	Deep standby interrupt flag register 3	DPSIFR3	8	8	4, 5 PCLKB	2, 3 ICLK	
0008 C28Ah	SYSTEM	Deep standby interrupt edge register 0	DPSIEGR0	8	8	4, 5 PCLKB	2, 3 ICLK	
0008 C28Bh	SYSTEM	Deep standby interrupt edge register 1	DPSIEGR1	8	8	4, 5 PCLKB	2, 3 ICLK	
0008 C28Ch	SYSTEM	Deep standby interrupt edge register 2	DPSIEGR2	8	8	4, 5 PCLKB	2, 3 ICLK	
0008 C28Dh	SYSTEM	Deep standby interrupt edge register 3	DPSIEGR3	8	8	4, 5 PCLKB	2, 3 ICLK	
0008 C290h	SYSTEM	Reset status register 0	RSTSR0	8	8	4, 5 PCLKB	2, 3 ICLK	Resets
0008 C291h	SYSTEM	Reset status register 1	RSTSR1	8	8	4, 5 PCLKB	2, 3 ICLK	
0008 C293h	SYSTEM	Main clock oscillator forced oscillation control register	MOFCR	8	8	4, 5 PCLKB	2, 3 ICLK	Clock Generation Circuit
0008 C294h	SYSTEM	High-speed on-chip oscillator power supply control register	HOCOPCR	8	8	4, 5 PCLKB	2, 3 ICLK	
0008 C296h	FLASH	Flash write erase protection register	FWEPROR	8	8	4, 5 PCLKB	2, 3 ICLK	ROM
0008 C297h	SYSTEM	Voltage monitoring circuit control register	LVCMPCR	8	8	4, 5 PCLKB	2, 3 ICLK	LVDA
0008 C298h	SYSTEM	Voltage detection level select register	LVDLVL	8	8	4, 5 PCLKB	2, 3 ICLK	
0008 C29Ah	SYSTEM	Voltage monitoring 1 circuit control register 0	LVD1CR0	8	8	4, 5 PCLKB	2, 3 ICLK	
0008 C29Bh	SYSTEM	Voltage monitoring 2 circuit control register 0	LVD2CR0	8	8	4, 5 PCLKB	2, 3 ICLK	
0008 C2A0h to 0008 C2BFh	SYSTEM	Deep standby backup register 0 to 31	DPSBKR0 to 31	8	8	4, 5 PCLKB	2, 3 ICLK	Low Power Consumption
0008 C300h	ICU	Group 0 interrupt source register	GRP00	32	32	1 to 2PCLKB	2 ICLK	ICUb
0008 C304h	ICU	Group 1 interrupt source register	GRP01	32	32	1 to 2PCLKB	2 ICLK	
0008 C308h	ICU	Group 2 interrupt source register	GRP02	32	32	1 to 2PCLKB	2 ICLK	
0008 C30Ch	ICU	Group 3 interrupt source register	GRP03	32	32	1 to 2PCLKB	2 ICLK	
0008 C310h	ICU	Group 4 interrupt source register	GRP04	32	32	1 to 2PCLKB	2 ICLK	
0008 C314h	ICU	Group 5 interrupt source register	GRP05	32	32	1 to 2PCLKB	2 ICLK	
0008 C318h	ICU	Group 6 interrupt source register	GRP06	32	32	1 to 2PCLKB	2 ICLK	
0008 C330h	ICU	Group 12 interrupt source register	GRP12	32	32	1 to 2PCLKB	2 ICLK	
0008 C340h	ICU	Group 0 interrupt enable register	GEN00	32	32	1 to 2PCLKB	2 ICLK	

Table 4.1 List of I/O Registers (Address Order) (44/50)

Address	Module Symbol	Register Name	Register Symbol	Number of Bits	Access Size	Number of Access States		Related Function
						ICLK $\geq$ PCLK	ICLK<PCLK	
000A 0230h	USB1	Interrupt enable register 0	INTENB0	16	16	9 PCLKB or more	Rounded up to the nearest integer greater than 1 + 9/ (frequency ratio of ICLK/ PCLKB) ^{*6}	
000A 0236h	USB1	BRDY interrupt enable register	BRDYENB	16	16	9 PCLKB or more	Rounded up to the nearest integer greater than 1 + 9/ (frequency ratio of ICLK/ PCLKB) ^{*6}	
000A 0238h	USB1	NRDY interrupt enable register	NRDYENB	16	16	9 PCLKB or more	Rounded up to the nearest integer greater than 1 + 9/ (frequency ratio of ICLK/ PCLKB) ^{*6}	
000A 023Ah	USB1	BEMP interrupt enable register	BEMPENB	16	16	9 PCLKB or more	Rounded up to the nearest integer greater than 1 + 9/ (frequency ratio of ICLK/ PCLKB) ^{*6}	
000A 023Ch	USB1	SOF output configuration register	SOFCFG	16	16	9 PCLKB or more	Rounded up to the nearest integer greater than 1 + 9/ (frequency ratio of ICLK/ PCLKB) ^{*6}	
000A 0240h	USB1	Interrupt status register 0	INTSTS0	16	16	9 PCLKB or more	Rounded up to the nearest integer greater than 1 + 9/ (frequency ratio of ICLK/ PCLKB) ^{*6}	
000A 0246h	USB1	BRDY interrupt status register	BRDYSTS	16	16	9 PCLKB or more	Rounded up to the nearest integer greater than 1 + 9/ (frequency ratio of ICLK/ PCLKB) ^{*6}	
000A 0248h	USB1	NRDY interrupt status register	NRDYSTS	16	16	9 PCLKB or more	Rounded up to the nearest integer greater than 1 + 9/ (frequency ratio of ICLK/ PCLKB) ^{*6}	USBa
000A 024Ah	USB1	BEMP interrupt status register	BEMPSTS	16	16	9 PCLKB or more	Rounded up to the nearest integer greater than 1 + 9/ (frequency ratio of ICLK/ PCLKB) ^{*6}	
000A 024Ch	USB1	Frame number register	FRMNUM	16	16	9 PCLKB or more	Rounded up to the nearest integer greater than 1 + 9/ (frequency ratio of ICLK/ PCLKB) ^{*6}	

Table 5.10 Operation Frequency Value (Low-Speed Operating Mode 2)

Conditions: $V_{CC} = AVCC0 = VREFH = VCC_USB = V_{BATT} = 2.7$ to 3.6 V, $VREFH0 = 2.7$ V to $AVCC0$,
 $VSS = AVSS0 = VREFL/VREFL0 = VSS_USB = 0$ V, $T_a = T_{opr}$

Item			Symbol	Min.	Typ.	Max.	Unit
Operation frequency	System clock (ICLK)		f	32	—	143.75	kHz
	Peripheral module clock (PCLKA)			—	—	143.75	
	Peripheral module clock (PCLKB)			—	—	143.75	
	FlashIF clock (FCLK)			32	—	143.75	
	External bus clock (BCLK)	Packages with 177 to 144 pins		—	—	143.75	
		Packages with 100 pins or less		—	—	143.75	
	BCLK pin output	Packages with 177 to 144 pins		—	—	143.75	
		Packages with 100 pins or less		—	—	143.75	
	SDRAM clock (SDCLK)	Packages with 177 to 144 pins only		—	—	143.75	
	SDCLK pin output	Packages with 177 to 144 pins only		—	—	143.75	
	USB clock (UCLK)			—	—	143.75	
IEBUS clock (IECLK)		—	—	143.75			

5.3.1 Reset Timing

Table 5.11 Reset Timing

Conditions: $V_{CC} = AVCC0 = VREFH = VCC_USB = V_{BATT} = 2.7$ to 3.6 V, $VREFH0 = 2.7$ V to $AVCC0$,
 $VSS = AVSS0 = VREFL/VREFL0 = VSS_USB = 0$ V, $T_a = T_{opr}$

Item		Symbol	Min.	Typ.	Max.	Unit	Test Conditions
RES# pulse width	Power-on	t_{RESWP}	2	—	—	ms	Figure 5.1
	Deep software standby mode	t_{RESWD}	1	—	—	ms	Figure 5.2
	Software standby mode, low-speed operating mode 2	t_{RESWS}	1	—	—	ms	
	Programming or erasure of the ROM or E2 data-flash memory or blank checking of the E2 DataFlash memory	t_{RESW}	200	—	—	μ s	
	Other than above	t_{RESW}	200	—	—	μ s	
Wait time after RES# cancellation		t_{RESWT}	59	—	60	t_{cyc}	Figure 5.1
Internal reset time (independent watchdog timer reset, watchdog timer reset, software reset)		t_{RESW2}	112	—	120	t_{cyc}	

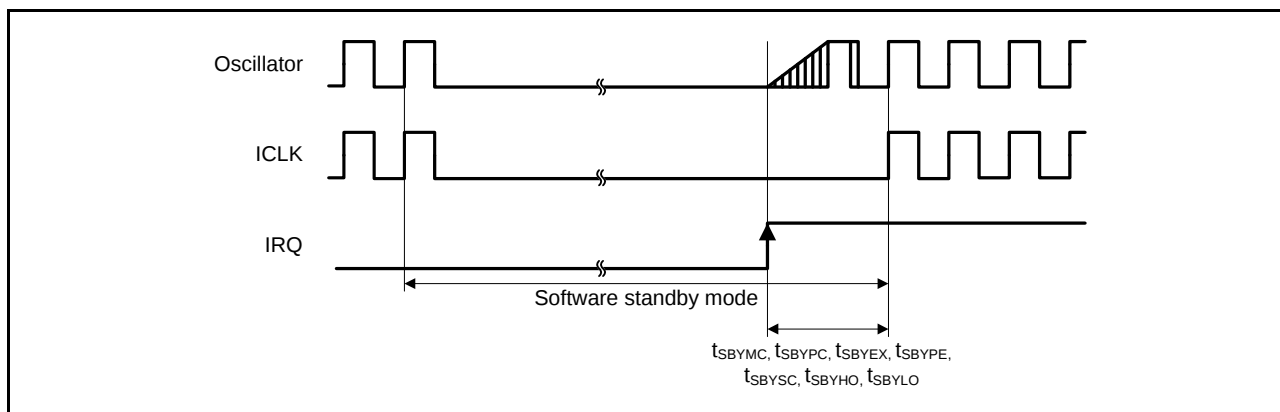


Figure 5.13 Software Standby Mode Cancellation Timing

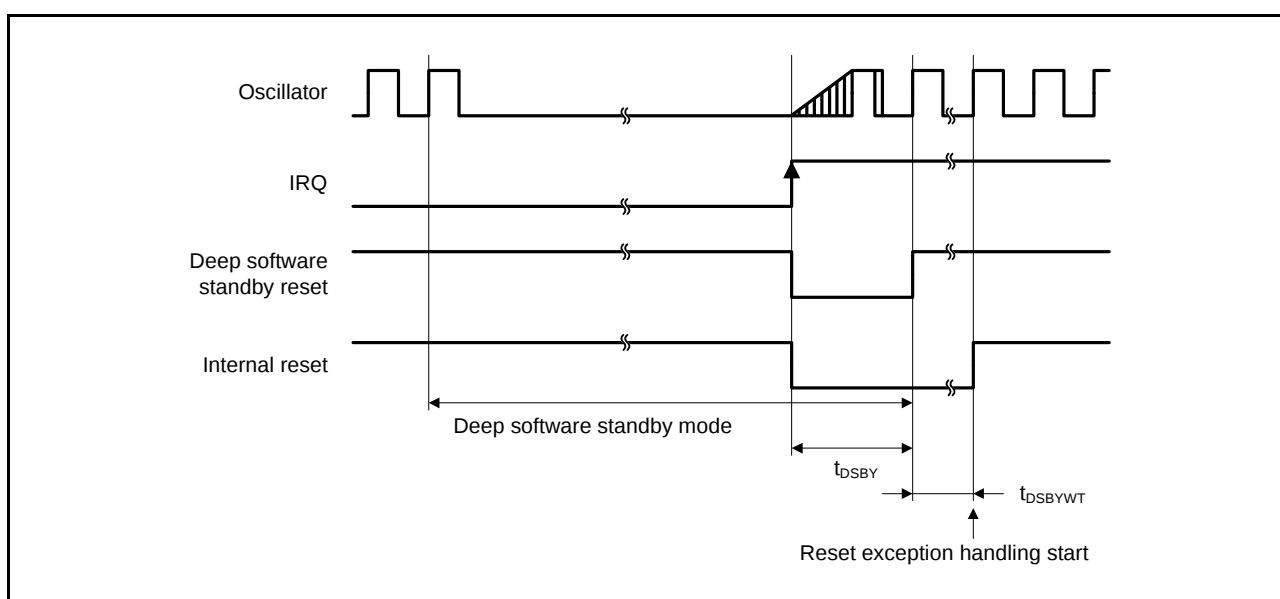


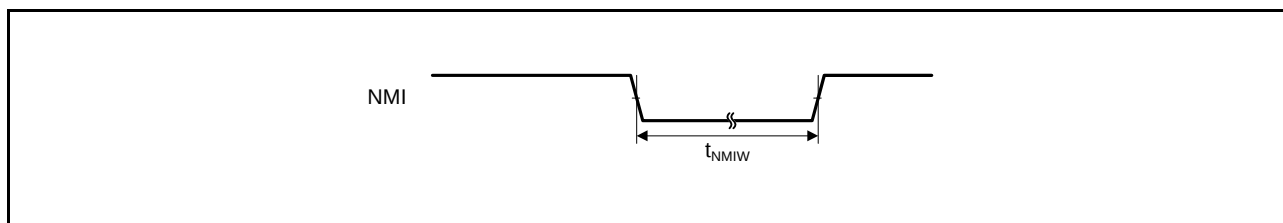
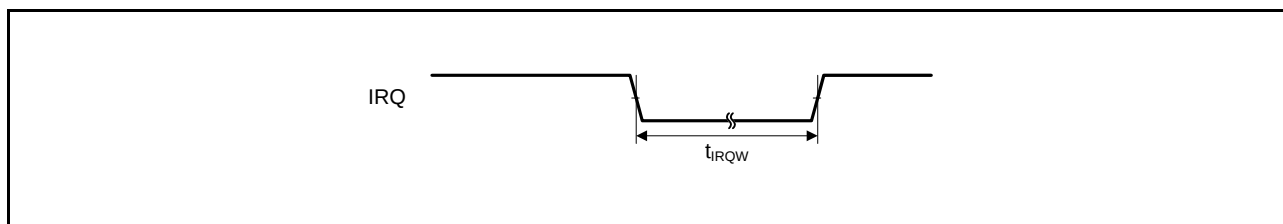
Figure 5.14 Deep Software Standby Mode Cancellation Timing

5.3.4 Control Signal Timing

Table 5.15 Control Signal Timing

Conditions: $V_{CC} = AVCC0 = VREFH = V_{CC_USB} = V_{BATT} = 2.7$ to 3.6 V, $VREFH0 = 2.7$ V to $AVCC0$,
 $VSS = AVSS0 = VREFL/VREFL0 = VSS_USB = 0$ V, $T_a = T_{opr}$

Item	Symbol	Min.	Typ.	Max.	Unit	Test Conditions
NMI pulse width	t_{NMIW}	200	—	—	ns	$t_c (PCLK) \times 2 \leq 200$ ns Figure 5.15
		$t_c (PCLK) \times 2$				$t_c (PCLK) \times 2 > 200$ ns Figure 5.15
IRQ pulse width	t_{IRQW}	200	—	—	ns	$t_c (PCLK) \times 2 \leq 200$ ns Figure 5.16
		$t_c (PCLK) \times 2$				$t_c (PCLK) \times 2 > 200$ ns Figure 5.16

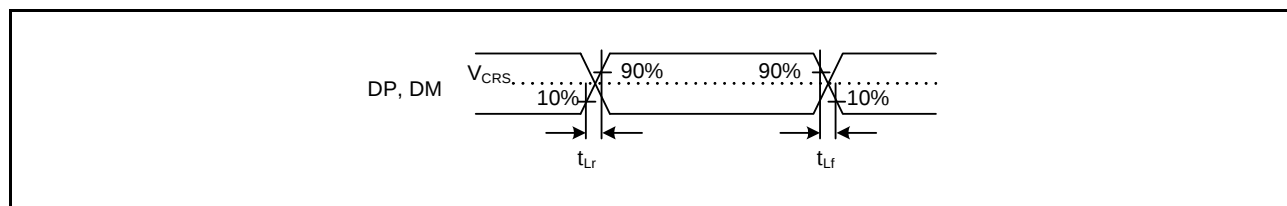
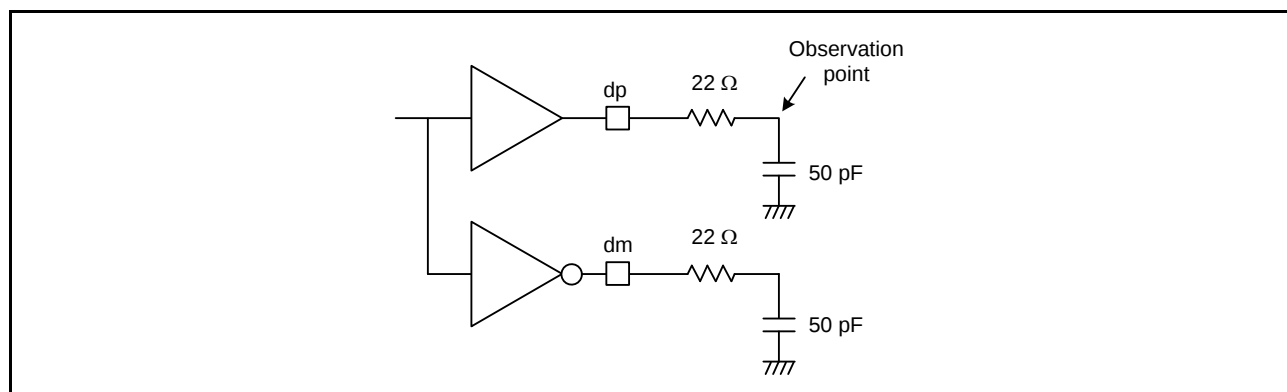
**Figure 5.15 NMI Interrupt Input Timing****Figure 5.16 IRQ Interrupt Input Timing**

5.4 USB Characteristics

Table 5.27 On-Chip USB Full-Speed Characteristics (DP and DM Pin Characteristics)Conditions: $V_{CC} = AV_{CC0} = V_{REFH} = V_{CC_USB} = 3.0$ to 3.6 V, $V_{REFH0} = 3.0$ V to AV_{CC0} $V_{SS} = AV_{SS0} = V_{REFL}/V_{REFL0} = V_{SS_USB} = 0$ V $PCLK = 24$ to 50 MHz $T_a = T_{opr}$

High drive output is selected by the drive capacity control register.

Item		Symbol	Min.	Max.	Unit	Test Conditions	
Input characteristics	Input high level voltage	V_{IH}	2.0	—	V		
	Input low level voltage	V_{IL}	—	0.8	V		
	Differential input sensitivity	V_{DI}	0.2	—	V	DP – DM	
	Differential common mode range	V_{CM}	0.8	2.5	V		
Output characteristics	Output high level voltage	V_{OH}	2.8	3.6	V	$I_{OH} = -200 \mu A$	
	Output low level voltage	V_{OL}	0.0	0.3	V	$I_{OL} = 2$ mA	
	Cross-over voltage	V_{CRS}	1.3	2.0	V		Figure 5.61
	Rise time	t_{Lr}	4	20	ns		
	Fall time	t_{Lf}	4	20	ns		
	Rise/fall time ratio	t_{Lr} / t_{Lf}	90	111.11	%	t_{Lr} / t_{Lf}	
	Output resistance	Z_{DRV}	28	44	Ω	$R_s = 22 \Omega$ included	

**Figure 5.61 DP and DM Output Timing (Full-Speed)****Figure 5.62 Test Circuit (Full-Speed)**

5.10 Battery Backup Function Characteristics

Table 5.35 Battery Backup Function Characteristics

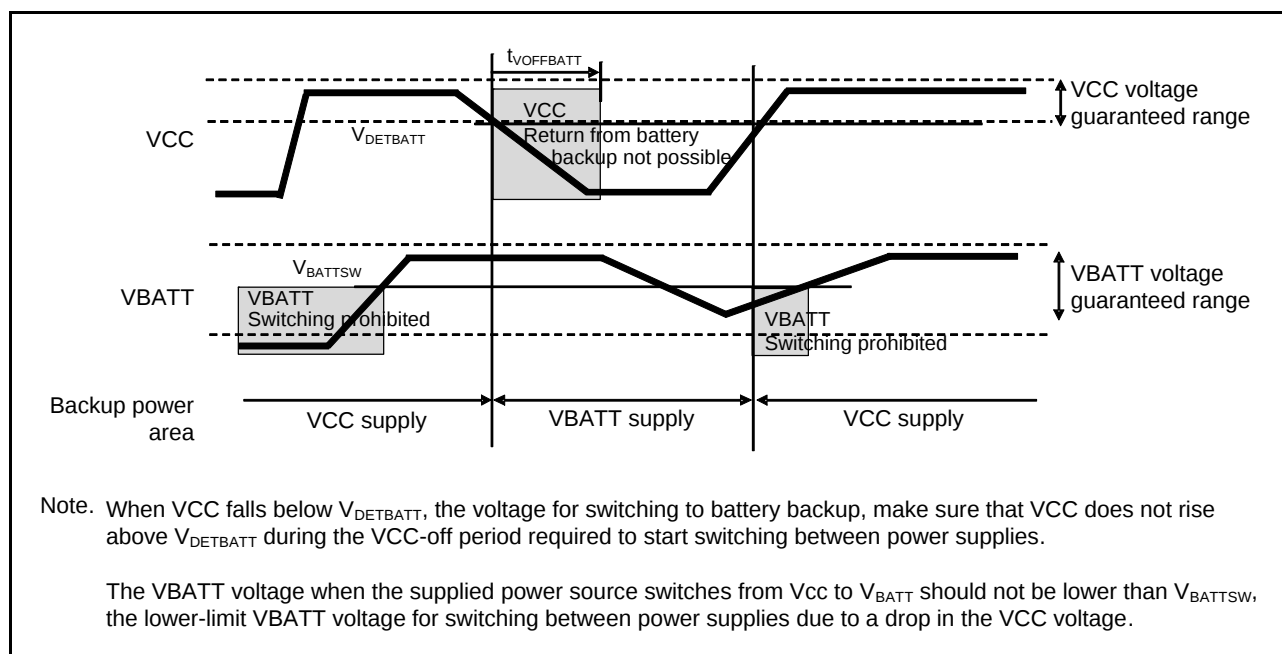
Conditions: $V_{CC} = AVCC0 = VREFH = VCC_USB = 2.7$ to 3.6 V, $VREFH0 = 2.7$ V to $AVCC0$, $V_{BATT} = 2.0$ to 3.6 V (for products with 100 pins or more), $V_{BATT} = 2.3$ to 3.6 V (for the 64-pin product)

$VSS = AVSS0 = VREFL/VREFL0 = VSS_USB = 0$ V

$T_a = T_{opr}$

Item	Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Voltage level for switching to battery backup	$V_{DETBATT}$	2.50	2.60	2.70	V	Figure 5.68
Lower-limit V_{BATT} voltage for power supply switching due to VCC voltage drop	V_{BATTSW}	2.70	—	—		
VCC-off period for starting power supply switching	$t_{VOFFBATT}$	200	—	—	μs	

Note: The VCC-off period for starting power supply switching indicates the period in which VCC is below the minimum value of the voltage level for switching to battery backup ($V_{DETBATT}$).

**Figure 5.68 Battery Backup Function Characteristics**

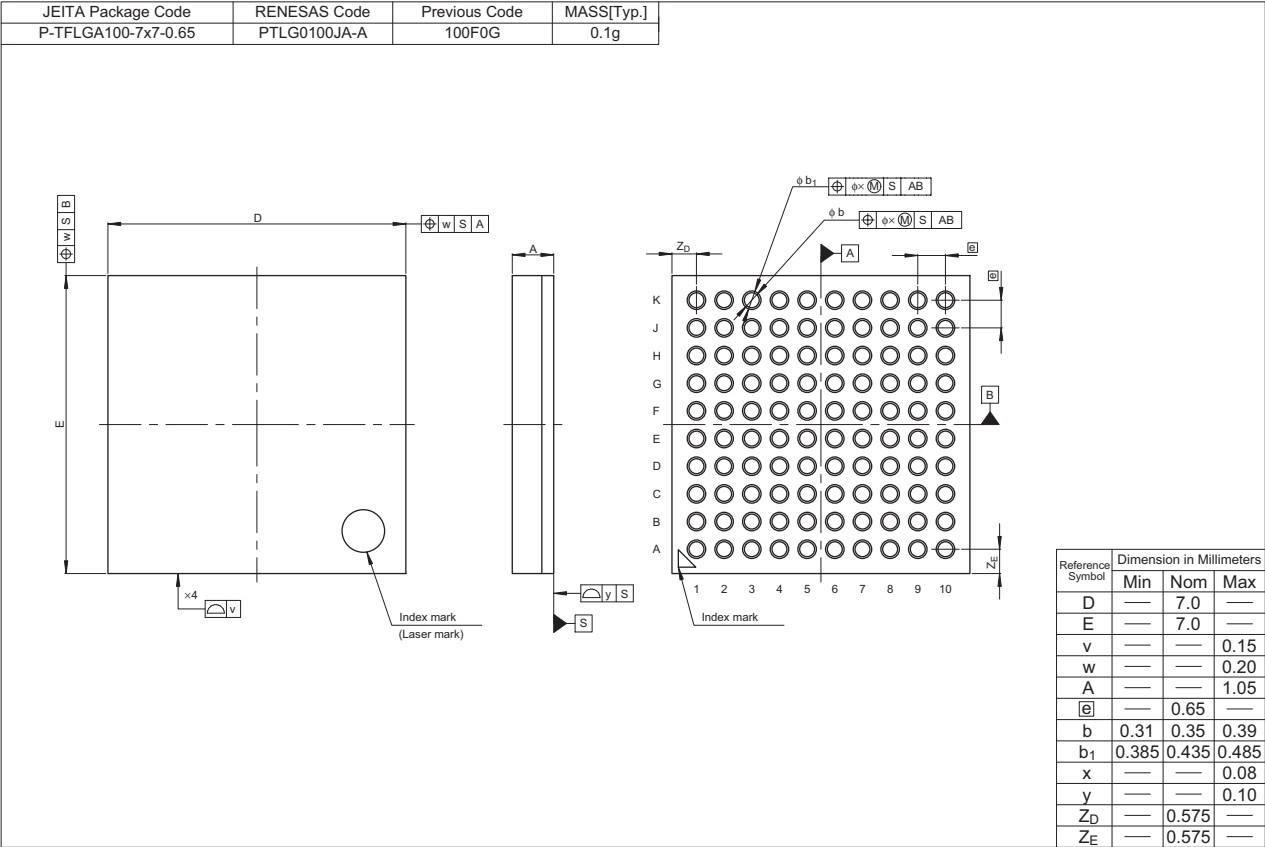


Figure F 100-pin TFLGA (PTLG0100JA-A)

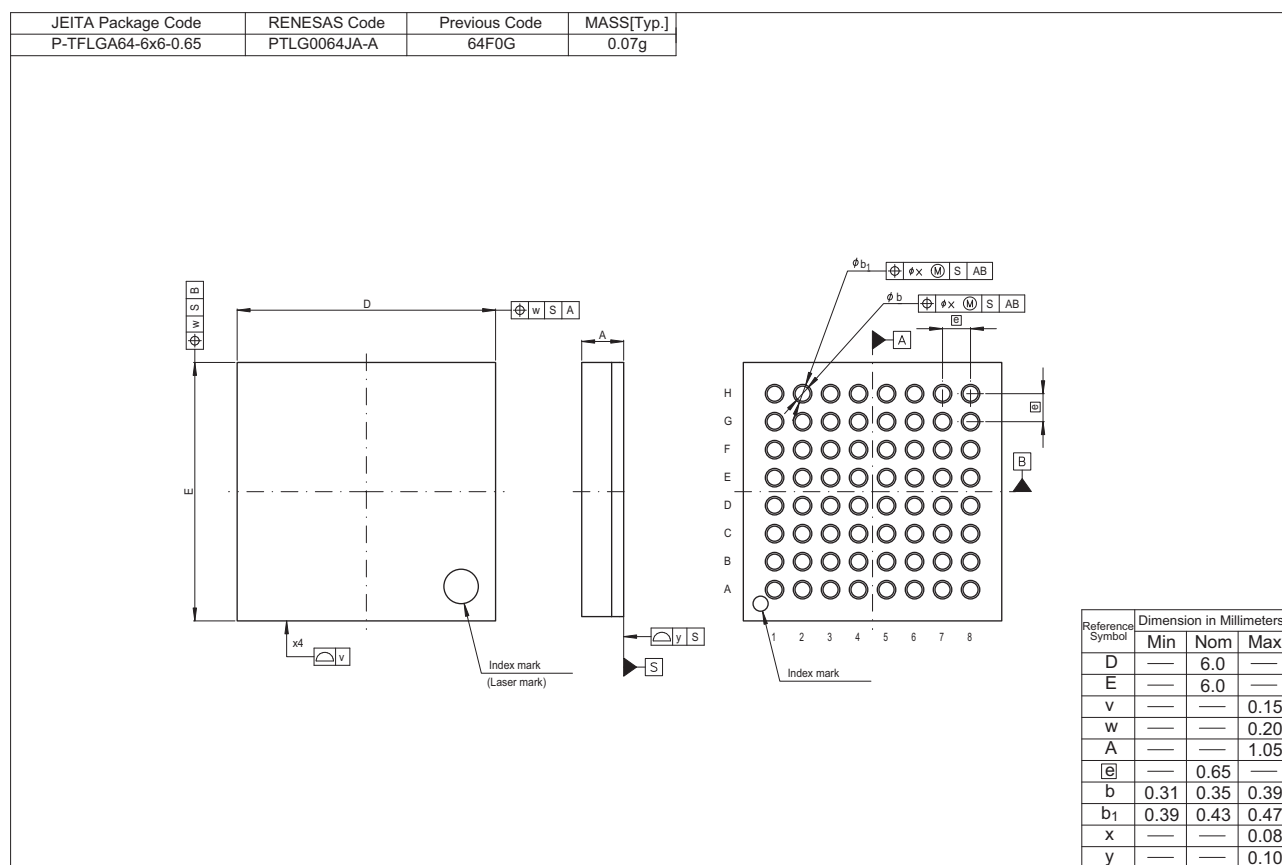


Figure H 64-pin TFLGA (PTLG0064JA-A)