MITSUBISHI ELECTRIC

TECHNICAL BULLETIN

FA-A-0295-A

Production Discontinuation of CC-Link Remote Device Station Communication LSIs

■Date of Issue

March 2022

■Relevant Models

A6GA-CCMFP3NN60F and A6GA-CCMFP3NN300F

Thank you for your continued support of Mitsubishi Electric programmable controllers.
We are informing you that production of the CC-Link remote device station communication LSIs, A6GA-CCMFP3NN60F and A6GA-CCMFP3NN300F, will be discontinued.

1 RELEVANT MODELS

Product	Model	Packaging unit
CC-Link Remote Device Station Communication LSI (PC03003N)	A6GA-CCMFP3NN60F	60 pieces
	A6GA-CCMFP3NN300F	300 pieces

2 SCHEDULE

Order acceptance: Until December 22, 2023
Production discontinuation: March 29, 2024

3 REASON FOR DISCONTINUATION

We will close the production line of the product.

4 REPAIR SUPPORT

Repair support period: Until March 31, 2031 (for seven years after the discontinuation of production)
If you request repair of the discontinued model, it will be replaced with an alternative model. Thank you for your understanding.

5 ALTERNATIVE MODELS

Product	Model	Packaging unit
CC-Link Remote Device Station Communication LSI (PC15003E)	A6GA-CCMFP3NN60FN	60 pieces
	A6GA-CCMFP3NN300FN	300 pieces

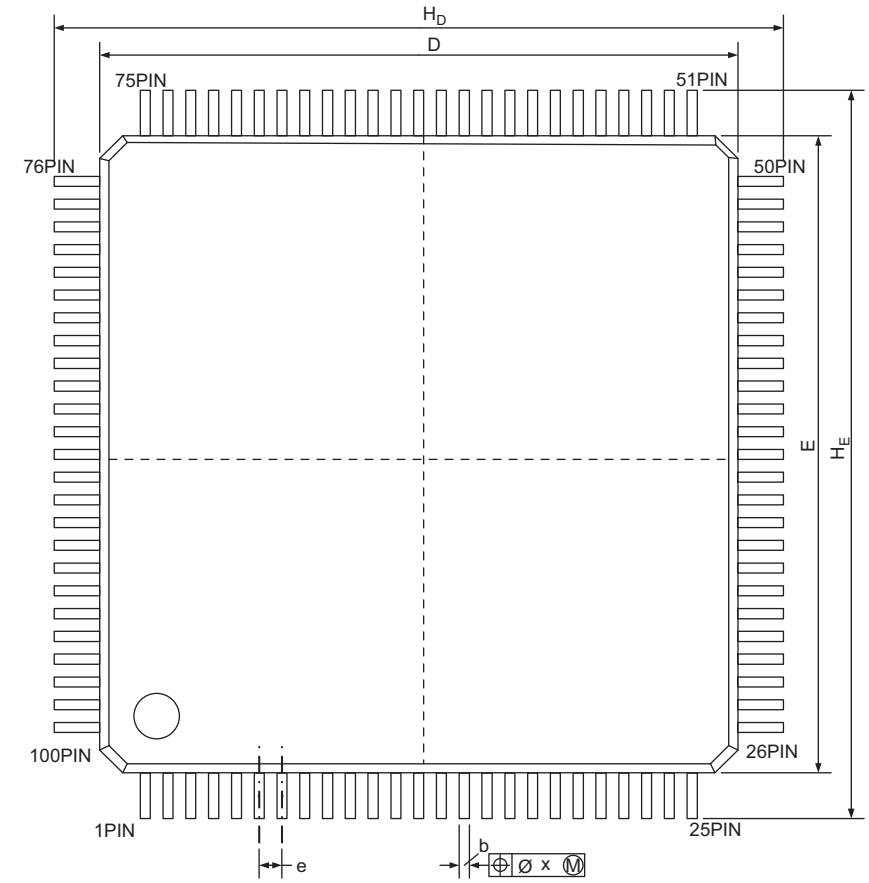
MITSUBISHI ELECTRIC CORPORATION
HEAD OFFICE : TOKYO BUILDING, 2-7-3 MARUNOUCHI, CHIYODA-KU, TOKYO 100-8310, JAPAN
NAGOYA WORKS : 1-14 , YADA-MINAMI 5-CHOME , HIGASHI-KU, NAGOYA , JAPAN

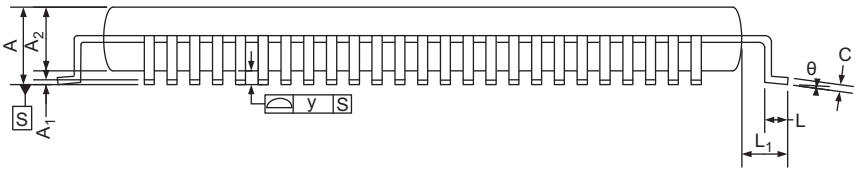
6 SPECIFICATIONS COMPARISON

The A6GA-CCMFP3NN□□FN differs from the A6GA-CCMFP3NN□□F on the specifications including electrical characteristics.
In addition, the crystal oscillator specified for the A6GA-CCMFP3NN□□FN differs from the crystal oscillator specified for the A6GA-CCMFP3NN□□F on the specifications. When replacing the product, refer to the specifications comparison in this chapter.

6.1 Appearance and Print on Package

External dimensions



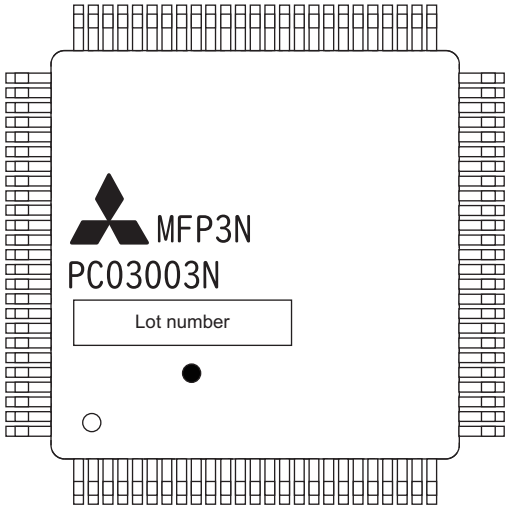


Symbol	PC03003N			PC15003E		
	Min.	Nom.	Max.	Min.	Nom.	Max.
A	—	—	1.6mm	—	—	1.7mm
A1	0.05mm	0.1mm	0.15mm	0mm	0.1mm	0.2mm
A2	1.35mm	1.4mm	1.45mm	1.3mm	1.4mm	1.5mm
C	0.1mm	0.17mm	0.2mm	0.09mm	0.15mm	0.2mm
D	13.8mm	14mm	14.2mm	13.9mm	14mm	14.1mm

Symbol	PC03003N			PC15003E		
	Min.	Nom.	Max.	Min.	Nom.	Max.
E	13.8mm	14mm	14.2mm	13.9mm	14mm	14.1mm
H_D	15.8mm	16mm	16.2mm	15.6mm	16mm	16.4mm
H_E	15.8mm	16mm	16.2mm	15.6mm	16mm	16.4mm
L	0.3mm	0.5mm	0.7mm	0.3mm	0.5mm	0.75mm
L1	0.8mm	1mm	1.2mm	0.8mm	1mm	1.2mm
b	0.18mm	0.22mm	0.27mm	0.17mm	0.22mm	0.27mm
e	—	0.5mm	—	—	0.5mm	—
x	—	—	0.08mm	—	—	0.08mm
y	—	—	0.08mm	—	—	0.08mm
θ	0°	3°	10°	0°	5°	10°

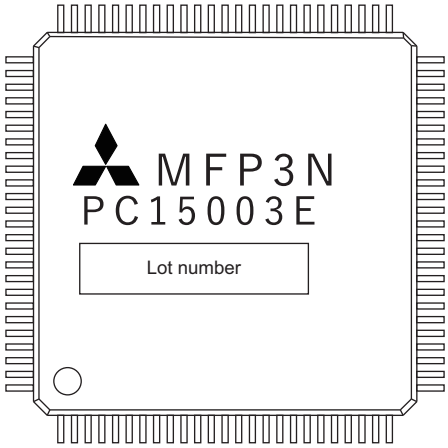
Print specifications

PC03003N



●: Lead-free/RoHS directive compliant identification dot mark

PC15003E



6.2 Electrical Characteristics

Buffer type list

I/O	Buffer type	PC03003N	PC15003E
I/O	I/O Buffer (TTL in: CMOS 3-state out: I_{OL} = 4mA)	BO04	BT1BT_CCL
I	Input Buffer (CMOS in) with Pull-Up Resistor 5kΩ	FIW1	IBCP1_CCL
I	Input Buffer (CMOS Schmitt in)	OFI7	IBH_CCL
I	Input Buffer (TTL level in)	FI02	IBT
I	Input Buffer (TTL Schmitt in)	FIS2	IBS_CCL
O	Output Buffer (CMOS level out: I_{OL} = 6mA)	FO01	OB1T_CCL
O	Output Buffer (CMOS level out: I_{OL} = 9mA)	FO02	OB2BT_CCL
O	Output Buffer (CMOS level out: I_{OL} = 12mA)	FO03	OB3T_CCL

Comparison of the absolute maximum rated values

Item		PC03003N			PC15003E		
		Symbol	Rated value		Symbol	Rated value	
			Min.	Max.		Min.	Max.
Power supply voltage		V_{DD}	-0.5V	6.0V	V_{DD}	V_{SS} - 0.5V	7.0V
Input voltage		V_I	-0.5V	6.0V	V_I	V_{SS} - 0.5V	V_{DD} + 0.5V
Output voltage		V_O	-0.5V	6.0V	V_O	V_{SS} - 0.5V	V_{DD} + 0.5V
Output current	I_{OL} = 4mA type → I_{OL} = 6mA type	I_{OUT}	—	12mA	I_{OUT}	±30mA	
	I_{OL} = 8mA type → I_{OL} = 9mA type		—	24mA			
	I_{OL} = 12mA type		—	30mA			
Storage temperature		T_{stg}	-65℃	150℃	T_{stg}	-65℃	150℃

Comparison of the recommended operating conditions

Item		PC03003N				PC15003E			
		Symbol	Rated value			Symbol	Rated value		
			Min.	TYP.	Max.		Min.	TYP.	Max.
Power supply voltage		V_{DD}	4.5V	—	5.5V	V_{DD}	4.5V	5.0V	5.5V
Operating temperature		T_A	-40℃	—	85℃	T_A	-40℃	25℃	110℃
Rise time of the input	Normal	t_{ri}	0ns	—	200ns	t_{ri}	—	—	200ns
	Schmitt	t_{fa}	0ms	—	10ms	t_{fa}	—	—	10ms
Fall time of the input	Normal	t_{ri}	0ns	—	200ns	t_{ri}	—	—	200ns
	Schmitt	t_{fa}	0ms	—	10ms	t_{fa}	—	—	10ms
External clock input frequency		F	—	80MHz	—	f	—	80MHz	—

Comparison of the electrical characteristics

Item		PC03003N				PC15003E			
		Symbol	Rated value			Symbol	Rated value		
			Min.	TYP.	Max.		Min.	TYP.	Max.
"H" input voltage	CMOS	V_{IH1}	0.7V_{DD}V	—	V_{DD}V	V_{IH1}	3.15V	—	V_{DD}V
	TTL	V_{IH2}	2.29V	—	V_{DD}V	V_{IH2}	2.29V	—	V_{DD}V
"L" input voltage	CMOS	V_{IL1}	0V	—	0.3V_{DD}V	V_{IL1}	0V	—	1.65V
	TTL	V_{IL2}	0V	—	0.77V	V_{IL2}	0V	—	0.77V
Positive trigger voltage	CMOS	V_{T1+}	2.85V	—	3.75V	V_{T1+}	2.55V	—	3.75V
	TTL	V_{T2+}	1.68V	—	2.55V	V_{T2+}	1.38V	—	2.55V
Negative trigger voltage	CMOS	V_{T1-}	1.15V	—	1.75V	V_{T1-}	1.15V	—	2.05V
	TTL	V_{T2-}	0.64V	—	1.33V	V_{T2-}	0.64V	—	1.33V
Hysteresis voltage	CMOS	ΔV	1.3V	—	2.07V	V_{H1}	1.1V	—	—
	TTL	V_{H2}	0.83V	—	1.44V	V_{H2}	0.64V	—	—
Leakage current of the output		I_{OZ}	—	—	10μA	I_{OZ}	-5μA	—	5μA
Clamp voltage of the input		V_{IC}	-1.2V	—	—	V_{IC}	-1.2V	—	—
Short-circuit current of the output		I_{OS}	—	—	-250mA	I_{OS}	—	—	-250mA
Leakage current of the input (V_I = V_{DD} or GND)		I_I	—	$\pm10^{-5}$μA	±10μA	I_I	-5μA	—	5μA
Pull-up resistor		R_{PU}	2.5kΩ	5.0kΩ	12.9kΩ	R_{PU}	2.5kΩ	5.0kΩ	12.9kΩ
"L" output current	I_{OL} = 4mA type → I_{OL} = 6mA type	I_{OL}	4.0mA	—	—	I_{OL}	6.0mA	—	—
	I_{OL} = 8mA type → I_{OL} = 9mA type		8.0mA	—	—		9.0mA	—	—
	I_{OL} = 12mA type		12.0mA	—	—		12.0mA	—	—
"H" output current	I_{OL} = 4mA type → I_{OL} = 6mA type	I_{OH}	-2.0mA	—	—	I_{OH}	-6.0mA	—	—
	I_{OL} = 8mA type → I_{OL} = 9mA type		-4.0mA	—	—		-9.0mA	—	—
	I_{OL} = 12mA type		-6.0mA	—	—		-12.0mA	—	—
"L" output voltage		V_{OL}	—	—	0.1V	V_{OL}	—	—	V_{SS} + 0.4V
"H" output voltage		V_{OH}	V_{DD} - 0.1V	—	—	V_{OH}	V_{DD} - 0.4V	—	—
Static current consumption		I_{DDS}	—	—	100μA	I_{DDS}	—	—	240μA

Comparisons of the CMOS Schmitt buffer characteristics

Item		PC03003N				PC15003E			
		Symbol	Rated value			Symbol	Rated value		
			Min.	TYP.	Max.		Min.	TYP.	Max.
Positive trigger voltage	CMOS	V_{T1+}	2.85V	—	3.75V	V_{T1+}	2.55V	—	3.75V
Negative trigger voltage	CMOS	V_{T1-}	1.15V	—	1.75V	V_{T1-}	1.15V	—	2.05V
Hysteresis voltage	CMOS	ΔV	1.3V	—	2.07V	V_{H1}	1.1V	—	—

Comparison of the TTL Schmitt buffer characteristics

Item		PC03003N				PC15003E			
		Symbol	Rated value			Symbol	Rated value		
			Min.	TYP.	Max.		Min.	TYP.	Max.
Positive trigger voltage	TTL	V_{T2+}	1.68V	—	2.55V	V_{T2+}	1.38V	—	2.55V
Negative trigger voltage	TTL	V_{T2-}	0.64V	—	1.33V	V_{T2-}	0.64V	—	1.33V
Hysteresis voltage	TTL	V_{H2}	0.83V	—	1.44V	V_{H2}	0.64V	—	—

Comparison of the AC characteristics

Item	PC03003N				PC15003E			
	Symbol	Rated value			Symbol	Rated value		
		Min.	TYP.	Max.		Min.	TYP.	Max.
Rise time of the output	t_r	—	1.23ns	—	t_r	—	2.76ns	—
Fall time of the output	t_f	—	1.62ns	—	t_f	—	1.75ns	—

Comparison of the I/O capacity characteristics

Item		PC03003N				PC15003E			
		Symbol	Rated value			Symbol	Rated value		
			Min.	TYP.	Max.		Min.	TYP.	Max.
Input capacity	f = 1MHz, V_{DD} = 0V	C_I	—	10pF	20pF	C_I	—	—	10pF
Output capacity		C_o	—	10pF	20pF	C_o	—	—	10pF
I/O capacity		C_{IO}	—	10pF	20pF	C_{IO}	—	—	10pF

6.3 Operating Timing

Comparison of the read cycle

Item	Condition	PC03003N				PC15003E			
		Symbol	Rated value			Symbol	Rated value		
			Min.	TYP.	Max.		Min.	TYP.	Max.
Access time	CSL = MRDL = V_{IL}	t_{ACC}	—	—	24.19ns	t_{ACC}	—	—	24.19ns
CSL output delay time	MRDL = V_{IL}	t_{CE}	—	—	19.34ns	t_{CE}	—	—	19.34ns
MRDL output delay time	CSL = V_{IL}	t_{OE}	—	—	19.35ns	t_{OE}	—	—	19.35ns
Output disable delay time	CSL = V_{IL}	t_{DF}	2.25ns	—	12.56ns	t_{DF}	2.25ns	—	12.56ns
Time to hold the output data	CSL = MRDL = V_{IL}	t_{OH}	2.1ns	—	—	t_{OH}	2.25ns	—	—

Comparison of the write cycle

Item	PC03003N				PC15003E			
	Symbol	Rated value			Symbol	Rated value		
		Min.	TYP.	Max.		Min.	TYP.	Max.
Time to select a chip	t_{CW}	2.5ns	—	—	t_{CW}	6.3ns	—	—
Time to setup an address	t_{AS}	0ns	—	—	t_{AS}	0ns	—	—
Pulse width of the write	t_{WP}	2.5ns	—	—	t_{WP}	6.3ns	—	—
Time to hold an address	t_{WR}	0ns	—	—	t_{WR}	0ns	—	—
Time to setup an input data	t_{DW}	12.35ns	—	—	t_{DW}	12.35ns	—	—
Time to hold the input data	t_{DH}	-3.14ns	—	—	t_{DH}	-3.14ns	—	—

Specified parts (crystal oscillation)

For available crystal oscillations, refer to the following.

📖 Addition of Specified Component(s) of Crystal Oscillator for the CC-Link Dedicated Communication LSI (FA-A-0351)

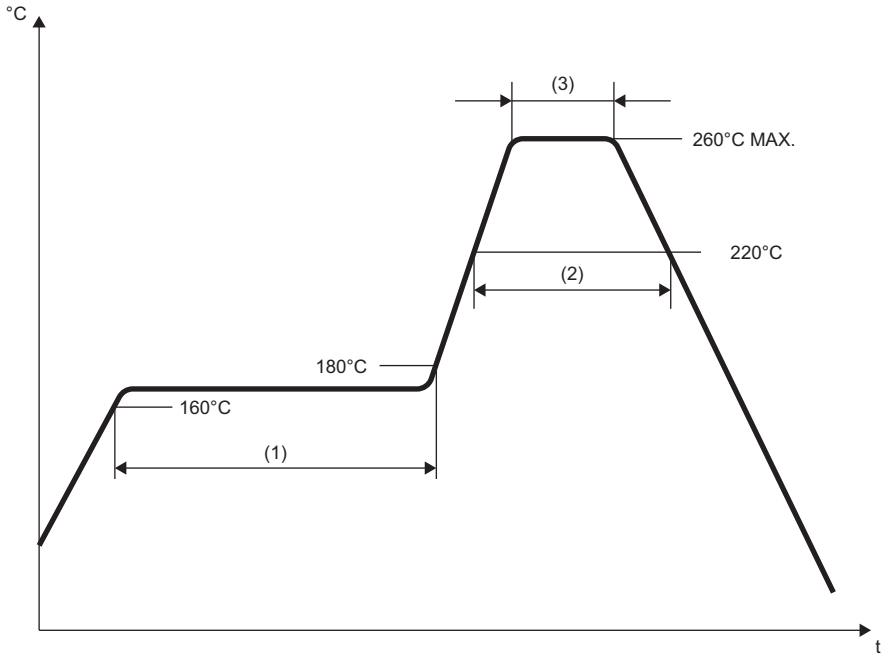
6.4 Precautions for Handling

Recommended conditions

Item	PC03003N	PC15003E
After unpacked	Within 7 days	Within 7 days
Baking	10 to 72h at 125℃	20 to 36h at 125℃
Maximum temperature (surface temperature of the product)	260℃ or lower	260℃ or lower
Preheating time	60 to 120s	60 to 120s
Main heating time	60s or shorter at 220℃	60s or shorter at 220℃
Maximum number of reflows	3 times or less	2 times or less

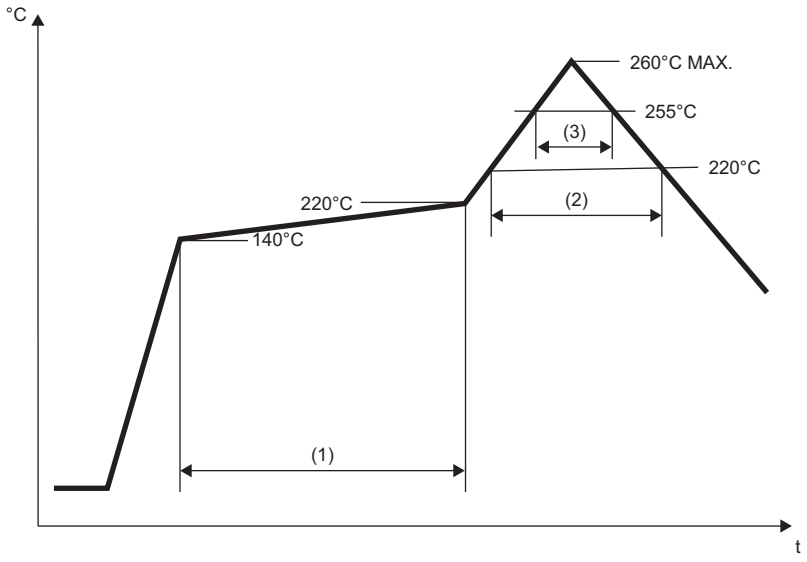
Allowable temperature profile conditions

PC03003N



℃: Surface temperature of the product
t: Time
(1) 60 to 120s (preheating)
(2) 60s or shorter
(3) 10s or shorter (main heating)

PC15003E



℃: Surface temperature of the product
t: Time
(1) 60 to 120s (preheating)
(2) 60s or shorter (main heating)
(3) 10s or shorter

REVISIONS

Version	Date of Issue	Revision
A	March 2022	First edition

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