EPSON

E0C37120

Multifunction Buffer IC

■ DESCRIPTION

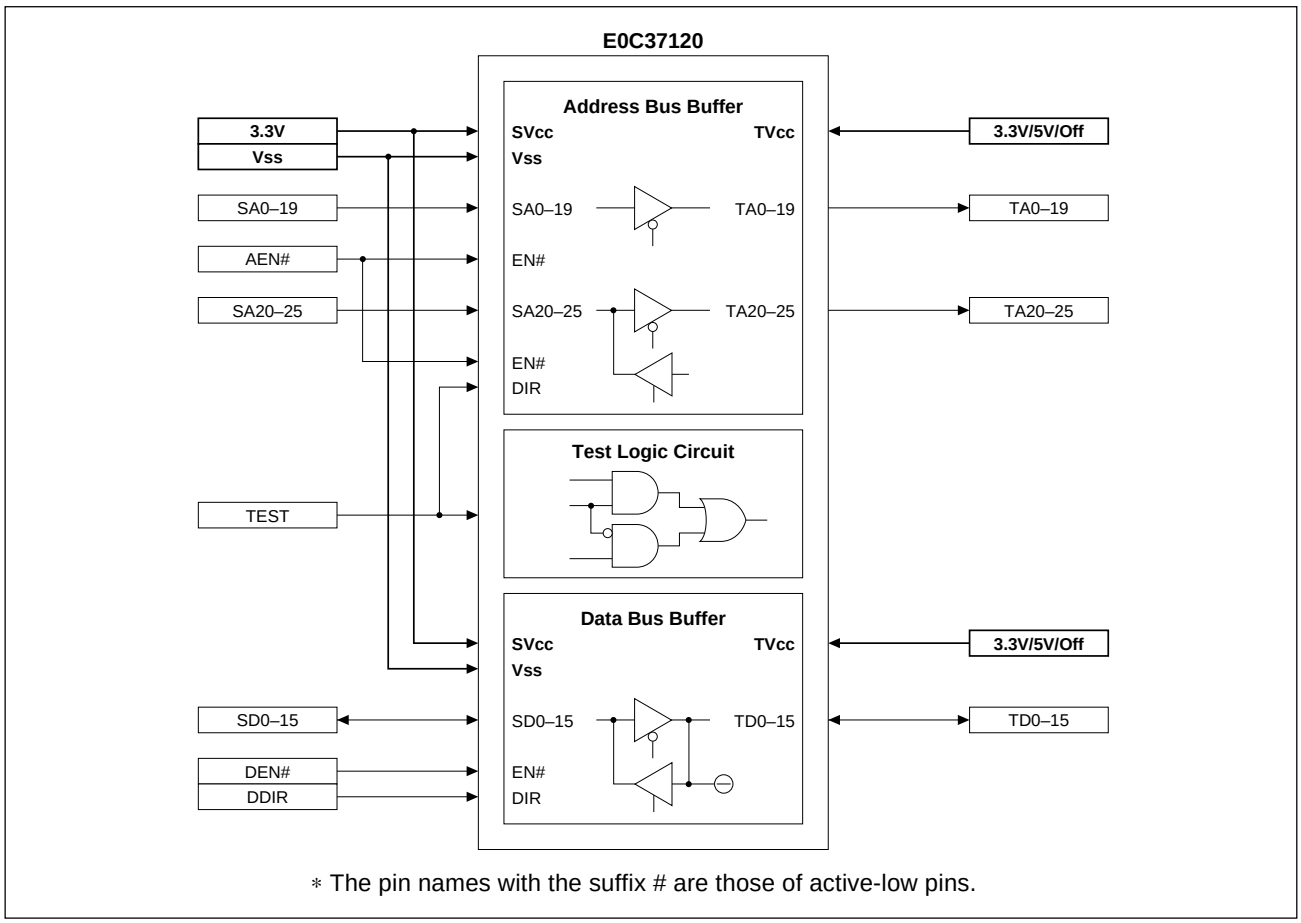
The E0C37120 is a multifunction buffer IC suitable for use as a PCMCIA interface buffer and 3.3V↔5V conversion level shifter. Because it enables a multi-chip buffer IC to be integrated into a single chip, this product helps you miniaturize your system.

The E0C37120 is designed to be particularly effective when it is used with the E0C37109 (MPU), SEIKO EPSON 32-bit single-chip RISC microcomputer. When used in this way, it provides superior characteristics as an interface buffer for PCMCIA cards capable of hot insertion/removal.

■ FEATURES

- Incorporates 26-bit mono-directional buffer
- Incorporates 16-bit bi-directional buffer
- Power supply on target side: 3.3V, 5V, power-off
- Incorporates 3.3V/ 5V level shifter
- High-speed 0.35-µm CMOS process
- Compact package: QFP15-100pin

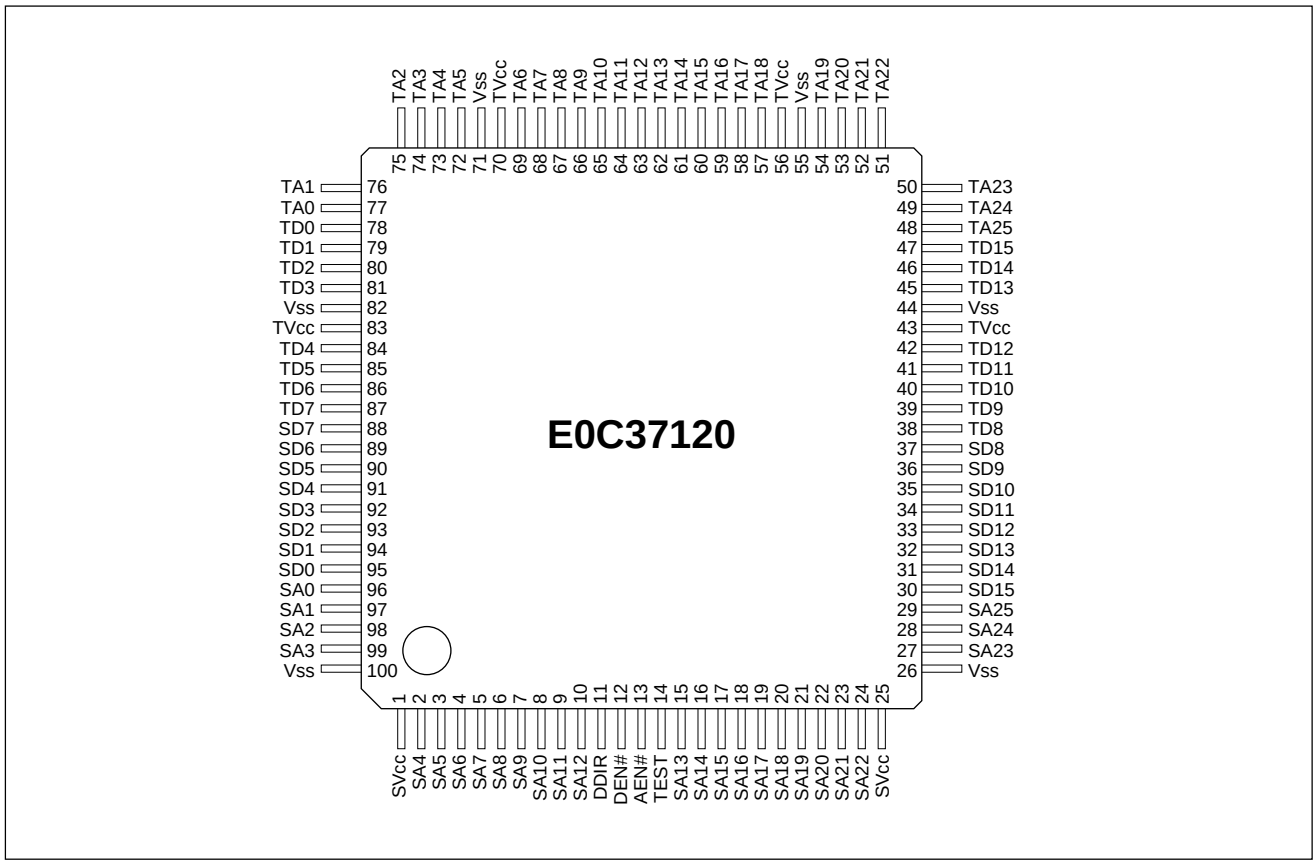
■ BLOCK DIAGRAM



∗ The pin names with the suffix # are those of active-low pins.

■ PIN DESCRIPTION

● Pin Assignment



● Pin Function

Pin name	Description	Type	No. of pins	Power
SA0–19	Address bus signal on system side	I	20	SVcc
SA20–25	Address bus signal on system side When TEST = high, the pins SA20–25 function as test-signal output pins. When these pins are not used, connect them to Vss via a resistor of 10 kΩ or more.	I/O	6	SVcc
SD0–15	Data bus signal on system side When these pins are not used, connect them to Vss via a resistor of 10 kΩ or more.	I/O	16	SVcc
TA0–25	Address bus signal on target side	O	26	TVcc
TD0–15	Data bus signal on target side When these pins are not used, leave them unconnected.	I/O PD	16	TVcc
AEN#	Address bus buffer-enable signal	I	1	SVcc
TEST	Test signal Always connect this pin to Vss.	I	1	SVcc
DEN#	Data bus buffer-enable signal	I	1	SVcc
DDIR	Data bus buffer-direction signal When DDIR = high, this signal is driven in the direction SDxx ← TDxx. When DDIR = low, this signal is driven in the direction SDxx → TDxx.	I	1	SVcc
SVcc	Power supply on system side and for internal logic (3.3 V) Make sure power is fed to all the SVcc pins.	P	2	–
TVcc	Power supply for address bus buffer and data bus buffer on system side (3.3 V/5 V/Off) When turning the power off, set AEN# high to prevent static current consumption from increasing. Make sure power is fed to all the TVcc pins.	P	4	–
Vss	Ground Be sure to connect all the Vss pins to ground.	P	6	–

Note: Symbols representing the type of pins mean the following.
I: Input port, O: Output port, I/O: Bi-directional port, P: Power port, PD: with pull-down resistance

■ ELECTRICAL CHARACTERISTICS

● Absolute Maximum Ratings

(Vss=0V)

Rating	Symbol	Value	Unit	Note
Supply voltage	SVcc	-0.3 to 4.6	V	
	TVcc	-0.3 to 6.0	V	
Input voltage	Vpin	-0.3 to SVcc + 0.5 -0.3 to TVcc + 0.5	V	
Output current/pin	Iout	±5	mA	
Total output current	ΣIout	±30	mA	
Storage temperature	Tstg	-65 to 150	°C	

● Recommended Operating Conditions

(Vss=0V)

Condition	Symbol	Min.	Typ.	Max.	Unit	Note
SVcc supply voltage	SVcc	3.0	3.3	3.6	V	
TVcc supply voltage	TVcc	3.0	–	5.5	V	∗1
SVcc pin voltage	Vpin	Vss	–	SVcc	V	
TVcc pin voltage	Vpin	Vss	–	TVcc	V	
Operating temperature	Ta	-40	–	85	°C	

∗1 Power Off (Hi-Z) input is allowed.

● DC Characteristics

(SVcc=3.3V±0.3V, Vss=0V, Ta=-40 to 85°C)

Characteristic	Symbol	Min.	Typ.	Max.	Unit	Note
High level output voltage (1) IOH =-2mA	VOH1	SVcc - 0.4	–	–	V	∗1
Low level output voltage (1) IOL=2mA	VOL1	–	–	0.4	V	∗1
High level input voltage (1)	VIH1	2.0	–	–	V	∗2
Low level input voltage (1)	VIL1	–	–	0.8	V	∗2

∗1 Pins SD0–SD15
∗2 Pins SA0–SA25, SD0–SD15, AEN#, DEN#, DDIR

(TVcc=3.3V±0.3V, Vss=0V, Ta=-40 to 85°C)

Characteristic	Symbol	Min.	Typ.	Max.	Unit	Note
High level output voltage (2) IOH =-2mA	VOH2	TVcc - 0.4	–	–	V	∗1
Low level output voltage (2) IOL=2mA	VOL2	–	–	0.4	V	∗1
High level input voltage (2)	VIH2	2.0	–	–	V	∗2
Low level input voltage (2)	VIL2	–	–	0.8	V	∗2
Pull-down resistance (1)	RPU1	40	100	240	kΩ	∗2

∗1 Pins TA0–TA25, TD0–TD15
∗2 Pins TD0–TD15

(TVcc=5.0V±0.5V, Vss=0V, Ta=-40 to 85°C)

Characteristic	Symbol	Min.	Typ.	Max.	Unit	Note
High level output voltage (3) IOH =-3mA	VOH3	TVcc - 0.4	–	–	V	∗1
Low level output voltage (3) IOL=3mA	VOL3	–	–	0.4	V	∗1
High level input voltage (3)	VIH3	3.5	–	–	V	∗2
Low level input voltage (3)	VIL3	–	–	1.0	V	∗2
Pull-down resistance (2)	RPU2	30	60	144	kΩ	∗2

∗1 Pins TA0–TA25, TD0–TD15
∗2 Pins TD0–TD15

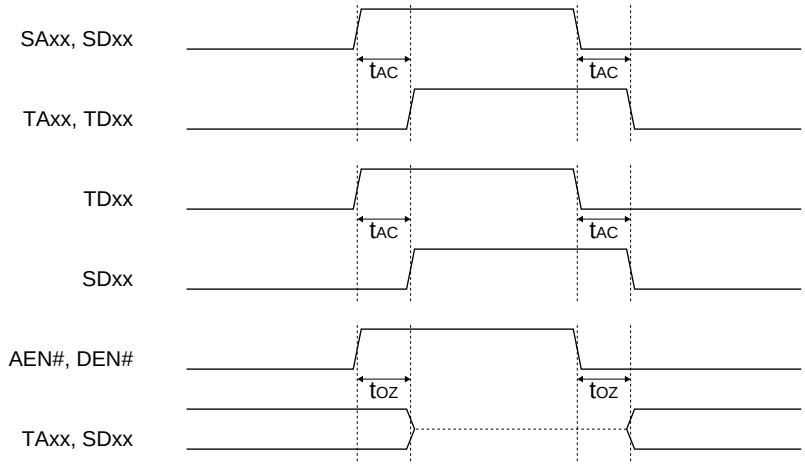
(SVcc=3.3V±0.3V, TVcc=5.0V±0.5V, Vss=0V, Ta=-40 to 85°C)

Characteristic	Symbol	Min.	Typ.	Max.	Unit	Note
Input leakage current	ILI	-1	–	1	µA	
Output leakage current	IOZ	-1	–	1	µA	
Pin capacitance f=1MHz, SVcc=0V, TVcc=0V	CIO	–	–	10	pF	
Static current consumption	ICCS	–	0.3	35	µA	

● AC Characteristics

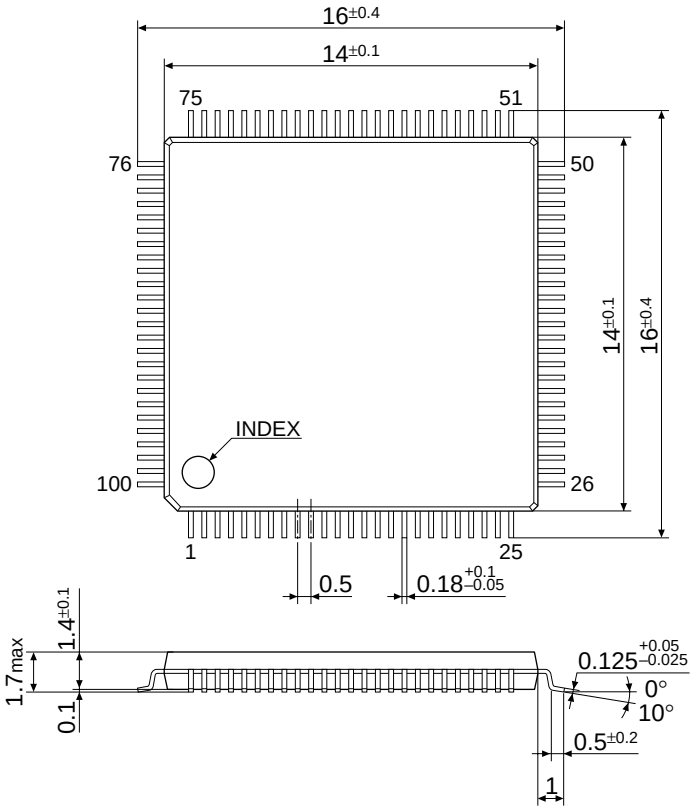
(SVcc=3.3V±0.3V, TVcc=5.0V±0.5V, Vss=0V, C_L=30pF, Ta=-40 to 85°C)

Characteristic	Symbol	Min.	Typ.	Max.	Unit	Note
Signal access time	t_{AC}	–	–	20	nS	
Output signal on/off time	t_{OZ}	–	–	20	nS	



■ PACKAGE DIMENSIONS

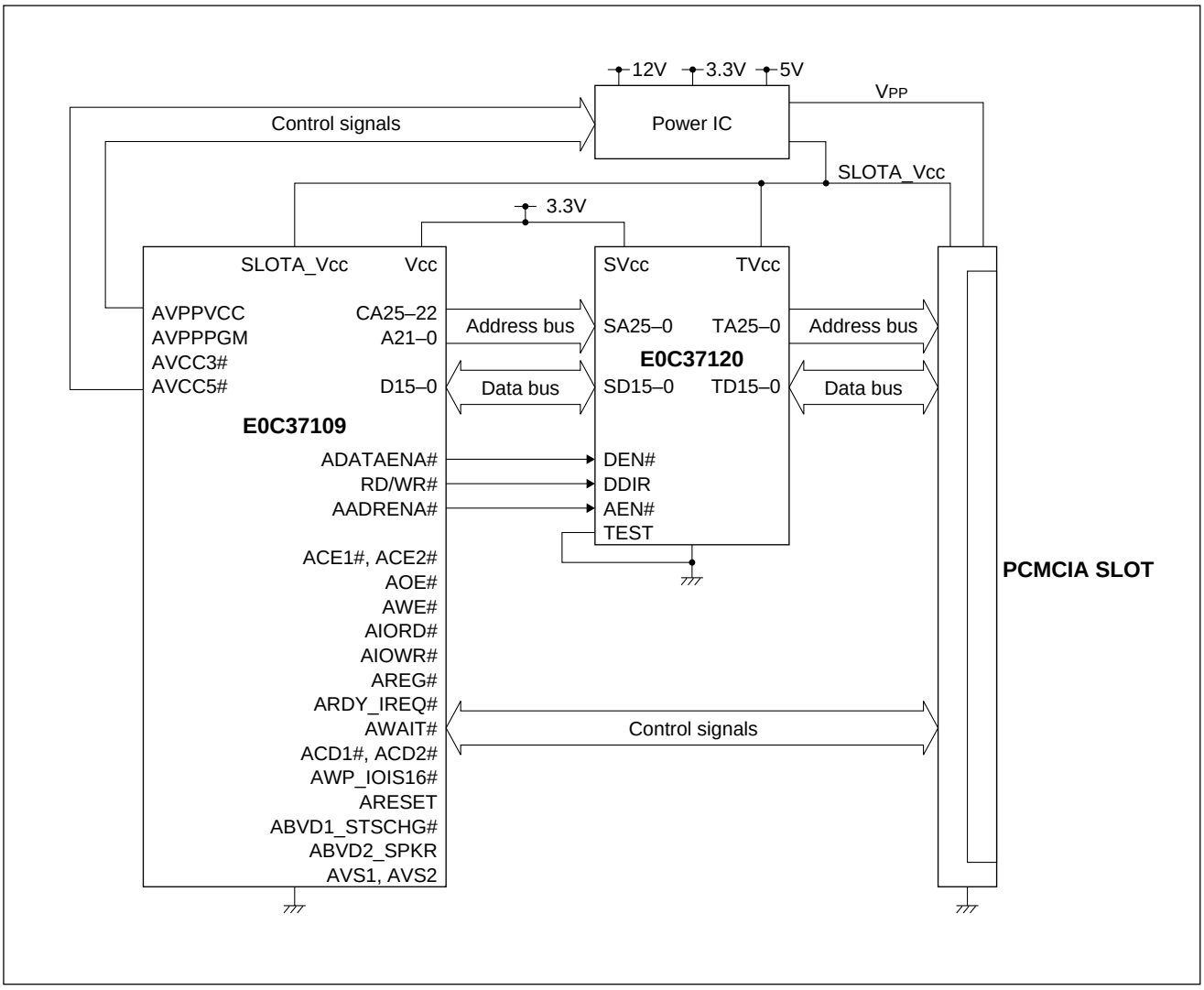
QFP15-100pin



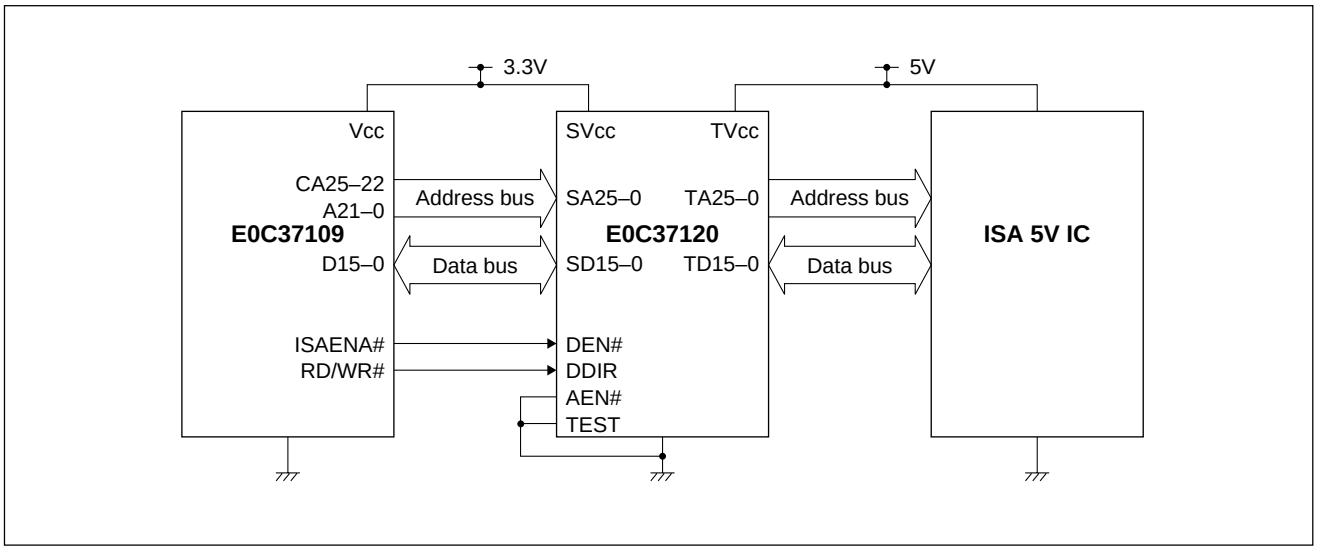
(Unit: mm)

■ APPLICATION EXAMPLE

● PCMCIA Buffer



● Level Shifter Buffer



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