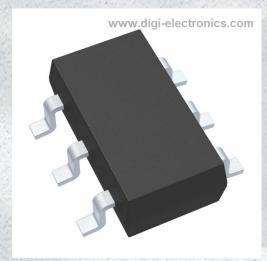


PL102-10TI-R Datasheet



https://www.DiGi-Electronics.com

DiGi Electronics Part Number PL102-10TI-R-DG

Manufacturer Microchip Technology

Manufacturer Product Number PL102-10TI-R

Description IC CLK BUFFER 1:3 170MHZ 6SOT23

Detailed Description IC 170MHz 1 SOT-23-6



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Purchase and inquiry

Manufacturer Product Number:	Manufacturer:
PL102-10TI-R	Microchip Technology
Series:	Product Status:
	Discontinued at Digi-Key
DiGi-Electronics Programmable:	PLL:
Not Verified	Yes with Bypass
Input:	Output:
Clock	Clock
Number of Circuits:	Ratio - Input:Output:
1	1:3
Differential - Input:Output:	Frequency - Max:
No/No	170MHz
Divider/Multiplier:	Voltage - Supply:
No/No	2.25V ~ 3.63V
Operating Temperature:	Mounting Type:
-40°C ~ 85°C	Surface Mount
Package / Case:	Supplier Device Package:
SOT-23-6	SOT-23-6
Base Product Number:	
PL102	

Environmental & Export classification

8542.39.0001

RoHS Status:	Moisture Sensitivity Level (MSL):
ROHS3 Compliant	1 (Unlimited)
REACH Status:	ECCN:
REACH Unaffected	EAR99
HTSUS:	



Low Skew Output Buffer

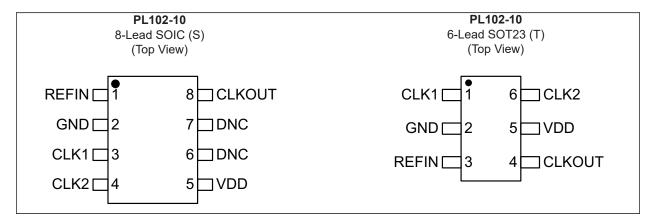
Features

- · Frequency Range:
 - 15 MHz to 170 MHz @ 3.3V
 - 15 MHz to 145 MHz @ 2.5V
- Internal Phase Locked Loop Allows Spread Spectrum Modulation on Reference Clock to Pass to Outputs
- Zero Input-to-Output Delay
- · Less than 700 ps Device-to-Device Skew
- · Less than 200 ps Skew between Outputs
- · Less than 100 ps Cycle-to-Cycle Jitter
- · 2.5V or 3.3V Power Supply
- Available in 8-Lead SOIC or 6-Lead SOT23 GREEN/RoHS-Compliant Packages

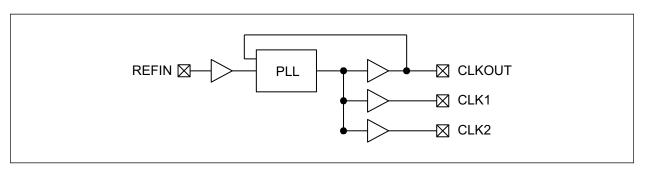
General Description

The PL102-10 is a high performance, low skew, low jitter zero delay buffer designed to distribute high speed clocks and is available in 8-lead SOIC or 6-lead SOT23 package. It has two outputs that are synchronized with the input. The synchronization is established via CLKOUT feed back to the input of the PLL. Because the skew between the input and output is less than ±350 ps, the device acts as a zero delay buffer.

Package Types



Block Diagram



1.0 ELECTRICAL CHARACTERISTICS

Absolute Maximum Ratings †

Supply Voltage (V _{DD})	+4.6V
DC Input Voltage (V _I)	
DC Output Voltage (V _O)	

† Notice: Stresses above those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. This is a stress rating only and functional operation of the device at those or any other conditions above those indicated in the operational sections of this specification is not intended. Exposure to maximum rating conditions for extended periods may affect device reliability.

ELECTRICAL CHARACTERISTICS

Parameter	Symbol	Min.	Тур.	Max.	Units	Conditions
Supply Voltage	V_{DD}	2.25	_	3.63	V	_
Input Low Voltage	V _{IL}	_	_	0.8	V	_
Input High Voltage	V _{IH}	2.0	_	_	V	_
Output Low Voltage	V _{OL}	_	_	0.4	V	I _{OL} = 24 mA
Output High Voltage	V _{OH}	2.4	_	_	V	I _{OH} = 24 mA
Supply Current	I _{DD}		22	30	mA	Unloaded outputs at 100 MHz, V _{DD} = 3.3V

SWITCHING CHARACTERISTICS

Parameter	Symbol	Min.	Тур.	Max.	Units	Conditions
Input/Output Fraguency	t1	15	_	145	MHz	2.5V
Input/Output Frequency	(1	15	_	170	IVITIZ	3.3V
Duty Cycle	DC	45	50	55	%	Measured at $V_{DD}/2$, $C_L = 15$ pF, $f_{OUT} = 100$ MHz
Rise Time	t _r		1.2	1.5	ns	Measured between 10% and 90% of V _{DD} , C _L = 15 pF
Fall Time	t _f		1.2	1.5	ns	Measured between 90% and 10% of V_{DD} , $C_L = 15 \text{ pF}$
Output to Output Skew	t _{SKEW}		_	200	ps	All outputs equally loaded, C _L = 15 pF
Delay, REF Rising Edge to CLKOUT Rising Edge	t _{DELAY}	_	0	±350	ps	Measured at V _{DD} /2
Device to Device Skew	t _{DSK-DSK}	_	0	700	ps	Measured at V _{DD} /2 on the CLKOUT pins of devices
Cycle to Cycle Jitter	t _{CYC-CYC}	_	_	60	ps	Measured at 100 MHz
PLL Lock Time	t _{LOCK}		_	1.0	ms	Stable power supply, valid clock presented on REF pin
Jitter; Absolutle Jitter	t _{JABS}	_	20	50	ps	Measured 10,000 cycles, low jitter input signal
Jitter; 1-Sigma	t _{J1-S}	_	9	15	ps	Measured 10,000 cycles, low jitter input signal

TEMPERATURE SPECIFICATIONS

Parameters	Sym.	Min.	Тур.	Max.	Units	Conditions	
Temperature Ranges							
Ambient Operating Temperature	T _A	-40	_	+85	°C	_	
Junction Operating Temperature	TJ	_	_	+125	°C	_	
Storage Temperature Range	T _S	-65	_	+150	°C	_	
Lead Temperature	_	_	+260	_	°C	Soldering, 10s	

Switching Waveforms

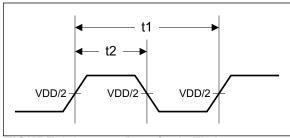


FIGURE 1-1: Duty Cycle Timing.

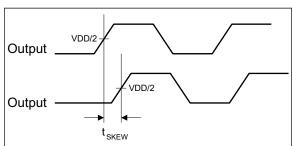


FIGURE 1-2: Output-to-Output Skew.

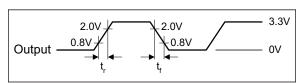


FIGURE 1-3: All Outputs Rise/Fall Time.

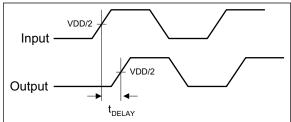


FIGURE 1-4: Input-to-Output Propagation Delay.

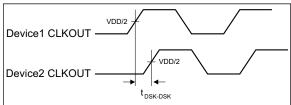


FIGURE 1-5: Device-to-Device Skew.

2.0 PIN DESCRIPTION

The descriptions of the pins are listed in Table 2-1.

TABLE 2-1: PIN FUNCTION TABLE

Pin Number SOIC-8	Pin Number SOT23-6	Pin Name	Pin Type	Description
1	3	REFIN	I	Input reference frequency. Spread spectrum modulation on this signal will be passed to the output (up to 100 kHz SST modulation).
2	2	GND	P Ground connection.	
3	1	CLK1	0	Buffered clock output.
4	6	CLK2	0	Buffered clock output. If CLK2 is pulled high during startup, the device will enter test mode.
5	5	VDD	Р	2.5V or 3.3V power supply connection.
6, 7	_	NC	_	Do not connect.
8	4	CLKOUT	0	Buffered clock output. Internal feedback on this pin.

3.0 OUTPUT-TO-OUTPUT SKEW

The skew between CLKOUT and the CLK(1-2) outputs is not dynamically adjusted by the PLL. Because CLKOUT is one of the inputs to the PLL, zero phase difference is maintained from REF to CLKOUT. If all outputs are equally loaded, zero phase difference will be maintained from REF to all outputs.

If applications requiring zero output-output skew, all the outputs must be equally loaded.

If the CLK(1-2) outputs are less loaded than CLKOUT, CLK(1-2) outputs will lead it; if the CLK(1-2) is more loaded than CLKOUT, CLK(1-2) will lag the CLKOUT.

Because the CLKOUT and the CLK(1-2) outputs are identical, they all start at the same time, but difference loads cause them to have different rise times and different times crossing the measurement thresholds.

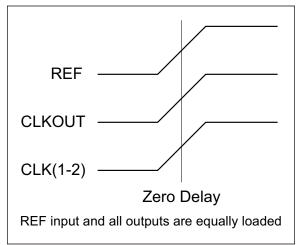


FIGURE 3-1: Zero Delay.

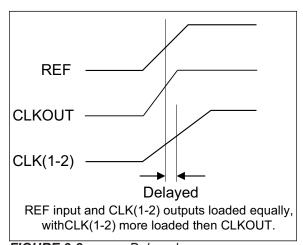


FIGURE 3-2: Delayed.

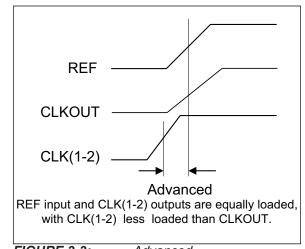
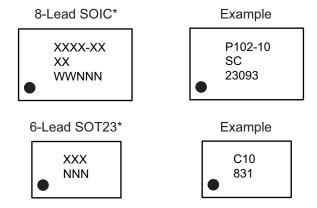


FIGURE 3-3: Advanced.

4.0 PACKAGING INFORMATION

4.1 Package Marking Information



Legend: XX...X Product code
Year code (last digit of calendar year)
YY Year code (last 2 digits of calendar ye

YY Year code (last 2 digits of calendar year)
WW Week code (week of January 1 is week '01')

NNN Alphanumeric traceability code

Pb-free JEDEC® designator for Matte Tin (Sn)

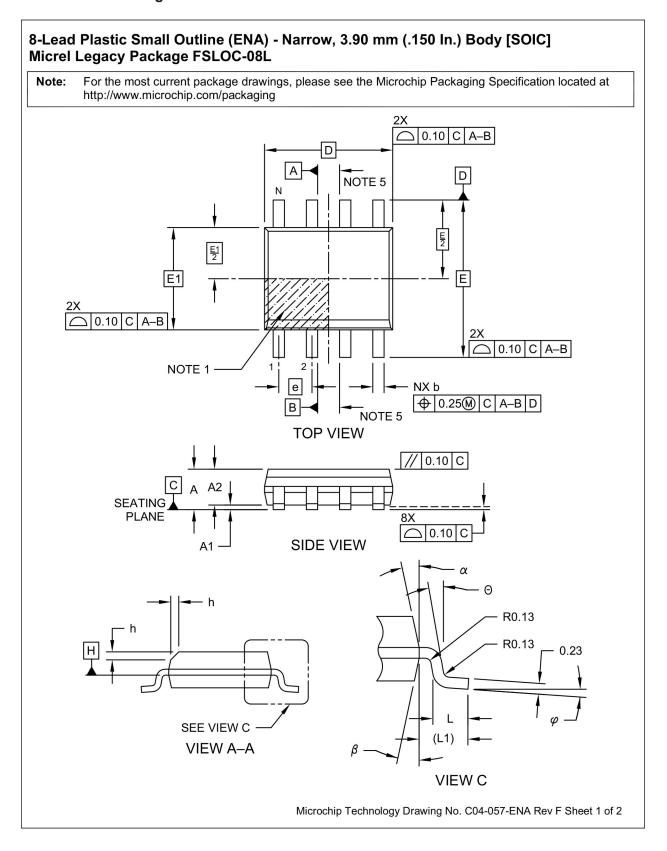
(e3) This package is Pb-free. The Pb-free JEDEC designator (can be found on the outer packaging for this package.

•, ▲, ▼ Pin one index is identified by a dot, delta up, or delta down (triangle mark).

Note: In the event the full Microchip part number cannot be marked on one line, it will be carried over to the next line, thus limiting the number of available characters for customer-specific information. Package may or may not include the corporate logo.

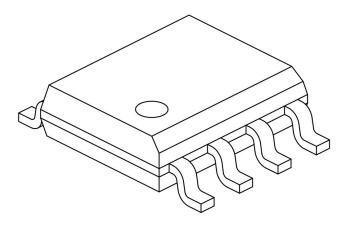
Underbar () and/or Overbar () symbol may not be to scale.

8-Lead SOIC Package Outline and Recommended Land Pattern



8-Lead Plastic Small Outline (ENA) - Narrow, 3.90 mm (.150 ln.) Body [SOIC] Micrel Legacy Package FSLOC-08L

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



	MILLIMETERS					
Dimension	MIN	NOM	MAX			
Number of Pins	N		8			
Pitch	е		1.27 BSC			
Overall Height	Α	ı	1	1.75		
Molded Package Thickness	A2	1.25	I	-		
Standoff §	A1	0.10	1	0.25		
Overall Width	Е	6.00 BSC				
Molded Package Width	E1	3.90 BSC				
Overall Length	D	4.90 BSC				
Chamfer (Optional)	h	0.25 - 0.50				
Foot Length	L	0.40	ı	1.27		
Footprint	L1	1.04 REF				
Foot Angle	φ	0° - 8°				
Lead Thickness	С	0.17 - 0.25				
Lead Width	b	0.31 - 0.51				
Mold Draft Angle Top	α	5° - 15°				
Mold Draft Angle Bottom	β	5°	-	15°		

Notes:

- 1. Pin 1 visual index feature may vary, but must be located within the hatched area.
- 2. § Significant Characteristic
- Dimensions D and E1 do not include mold flash or protrusions. Mold flash or protrusions shall not exceed 0.15mm per side.
- 4. Dimensioning and tolerancing per ASME Y14.5M

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

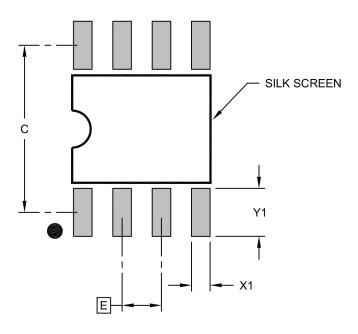
REF: Reference Dimension, usually without tolerance, for information purposes only.

5. Datums A & B to be determined at Datum H.

Microchip Technology Drawing No. C04-057-ENA Rev F Sheet 1 of 2

8-Lead Plastic Small Outline (ENA) - Narrow, 3.90 mm (.150 ln.) Body [SOIC] Micrel Legacy Package FSLOC-08L

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging



RECOMMENDED LAND PATTERN

	MILLIMETERS				
Dimension	MIN NOM MAX				
Contact Pitch	E	1.27 BSC			
Contact Pad Spacing	С	5.40			
Contact Pad Width (X8)	X1	0.60		0.60	
Contact Pad Length (X8)	Y1			1.55	

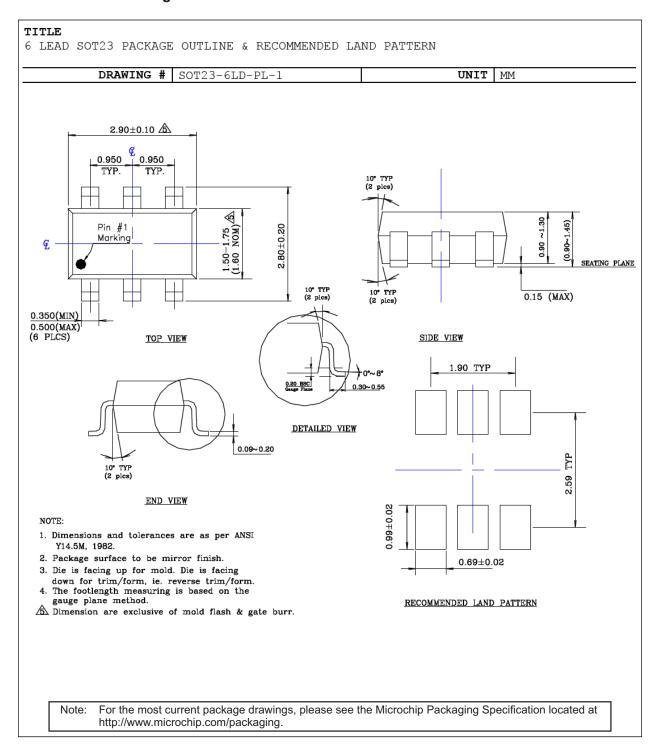
Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

BSC: Basic Dimension. Theoretically exact value shown without tolerances.

Microchip Technology Drawing C04-2057-ENA Rev F

6-Lead SOT23 Package Outline and Recommended Land Pattern



APPENDIX A: REVISION HISTORY

Revision A (April 2020)

- Converted Micrel document PL102-10 to Microchip data sheet template DS20006345A.
- Minor text changes throughout.

NOTES:

PRODUCT IDENTIFICATION SYSTEM

To order or obtain information, e.g., on pricing or delivery, contact your local Microchip representative or sales office.

PART No.	X	X	- <u>X</u>	Example	es:	
Device	Package	Temperature Range	Media Type	a) PL102	-10SC-R:	Low Skew Output Buffer, 8-Lead SOIC, 0°C to +70°C Temperature Range, 2,500/Reel
Device:	PL102-10: Low S	kew Output Buffer		b) PL102	-10TC:	Low Skew Output Buffer, 6-Lead SOT23, 0°C to +70°C Temperature Range, 20/Bag
Package:	S = 8-Lead : T = 6-Lead :			c) PL102	-10TC-R:	Low Skew Output Buffer, 6-Lead SOT23, 0°C to +70°C Temperature Range, 3,000/Reel
Temperature Range:	C = 0°C to	-70°C (Commercial)		Note 1:	catalog part used for ord	eel identifier only appears in the number description. This identifier is lering purposes and is not printed on
Media Type:	R = 3,000/R	(SOT23 Option Only) eel (SOT23 Option On eel (SO?? Option Only				package. Check with your Microchip for package availability with the Tape stion.

NOTES:

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