

Low-Power, 1.62V to 3.63V, 1MHz to 150MHz, 1:3 Fanout Buffer IC

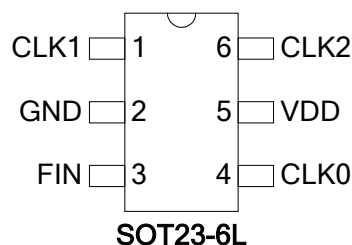
FEATURES

- 3 LVCMOS Outputs
- 12mA Output Drive Strength
- Input/Output Frequency:
 - Reference Clock: 1MHz to 150MHz
- Supports LVCMOS or Sine Wave Input Clock
- Very Low Jitter and Phase Noise
- Low Current Consumption
- Single 1.8V, 2.5V, or 3.3V, $\pm 10\%$ Power Supply
- Operating Temperature Range
 - 0°C to 70°C (Commercial)
 - -40°C to 85°C (Industrial)
- Available in SOT23-6L GREEN/RoHS Compliant Packages

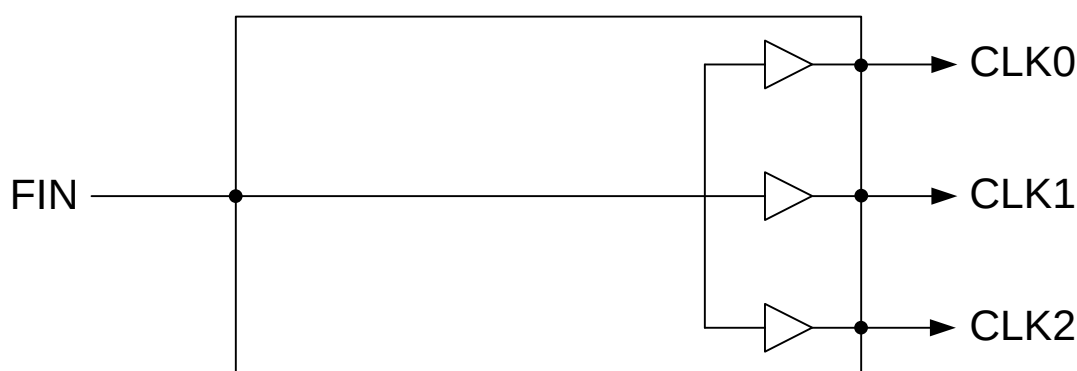
DESCRIPTION

The PL133-37 is an advanced fanout buffer design for high performance, low-power, small form-factor applications. The PL133-37 accepts a reference clock input of 1MHz to 150MHz and produces three outputs of the same frequency. Reference clock inputs may be LVCMOS or sine-wave signals (the inputs are internally AC-coupled). Offered in a small 3mm x 3mm SOT23, the PL133-37 offers the best phase noise and jitter performance and lowest power consumption of any comparable IC.

PACKAGE PIN CONFIGURATION



BLOCK DIAGRAM



Low-Power, 1.62V to 3.63V, 1MHz to 150MHz, 1:3 Fanout Buffer IC

PIN DESCRIPTION

Name	Package Pin #	Type	Description
	SOT23-6L		
CLK1	1	O	Output clock
GND	2	P	Ground connection
FIN	3	I	Reference clock input
CLK0	4	O	Output clock
VDD	5	P	Power supply
CLK2	6	O	Output clock

LAYOUT RECOMMENDATIONS

The following guidelines are to assist you with a performance optimized PCB design:

Signal Integrity and Termination Considerations

- Keep traces short!
- Trace = Inductor. With a capacitive load this equals ringing!
- Long trace = Transmission Line. Without proper termination this will cause reflections (looks like ringing).
- Design long traces as "striplines" or "microstrips" with defined impedance.
- Match trace at one side to avoid reflections bouncing back and forth.

Decoupling and Power Supply Considerations

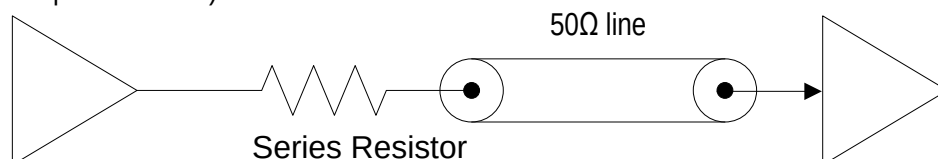
- Place decoupling capacitors as close as possible to the V_{DD} pin(s) to limit noise from the power supply
- Multiple V_{DD} pins should be decoupled separately for best performance.
- Addition of a ferrite bead in series with V_{DD} can help prevent noise from other board sources
- Value of decoupling capacitor is frequency dependant. Typical value to use is 0.1 μ F.

Typical CMOS termination

Place Series Resistor as close as possible to CMOS output

CMOS Output Buffer
(Typical buffer impedance 20 Ω)

To CMOS Input



Use value to match output buffer impedance to 50 Ω trace. Typical value 30 Ω

Low-Power, 1.62V to 3.63V, 1MHz to 150MHz, 1:3 Fanout Buffer IC

ELECTRICAL SPECIFICATIONS

ABSOLUTE MAXIMUM RATINGS

PARAMETERS	SYMBOL	MIN.	MAX.	UNITS
Supply Voltage Range	V_{DD}	-0.5	4.6	V
Input Voltage Range	V_I	-0.5	$V_{DD}+0.5$	V
Output Voltage Range	V_O	-0.5	$V_{DD}+0.5$	V
Storage Temperature	T_S	-65	150	°C
Ambient Operating Temperature*		-40	85	°C

Exposure of the device under conditions beyond the limits specified by Maximum Ratings for extended periods may cause permanent damage to the device and affect product reliability. These conditions represent a stress rating only, and functional operations of the device at these or any other conditions above the operational limits noted in this specification is not implied.

*Operating temperature is guaranteed by design. Parts are tested to commercial grade only.

AC SPECIFICATIONS

PARAMETERS	CONDITIONS	MIN.	TYP.	MAX.	UNITS
Input (FIN) Frequency	2.5V and 3.3V operation	1		150	MHz
	1.8V operation	1		100	MHz
Input (FIN) Signal Amplitude	Internally AC coupled, $\leq 150\text{MHz}$, $V_{DD}=2.5\text{V}$ and 3.3V .	0.8		V_{DD}	V_{PP}
	Internally AC coupled, $\leq 100\text{MHz}$, all VDDs	0.5		V_{DD}	V_{PP}
	Internally AC coupled, $3.3\text{V} \leq 50\text{MHz}$, $2.5\text{V} \leq 40\text{MHz}$, $1.8\text{V} \leq 15\text{MHz}$	0.1		V_{DD}	V_{PP}
Output Enable Time	OE Function; $T_a=25^\circ\text{C}$, 15pF Load			10	ns
Output Rise Time	15pF Load, 10/90% V_{DD} , 3.3V		2	3	ns
Output Fall Time	15pF Load, 90/10% V_{DD} , 3.3V		2	3	ns
Duty Cycle	Input Duty Cycle is 50%	45	50	55	%
Output to Output Skew	All outputs equally loaded			250	ps

DC SPECIFICATIONS

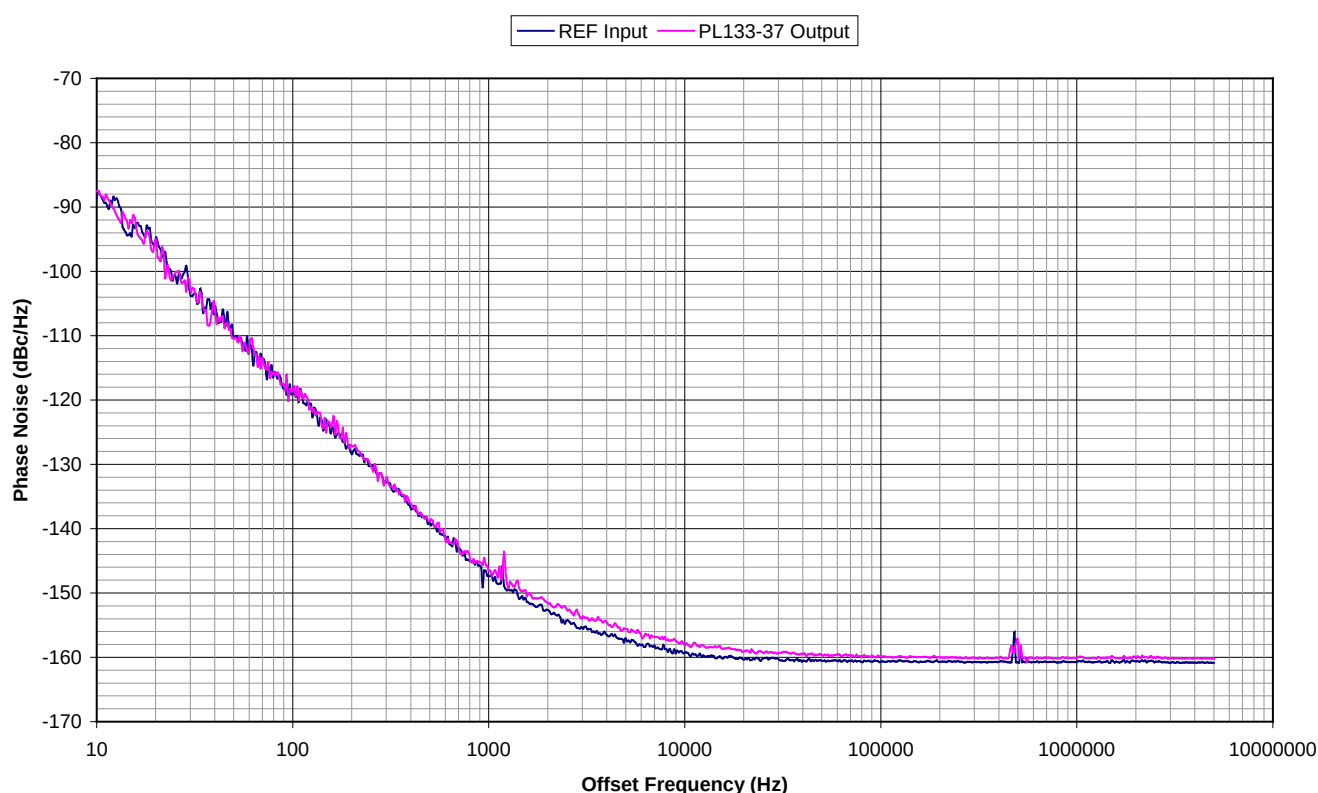
PARAMETERS	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
Supply Current, Dynamic	I_{DD}	$V_{DD} = 3.3\text{V}$, 25MHz, No Load		1.2		mA
		$V_{DD} = 2.5\text{V}$, 25MHz, No Load		0.9		mA
		$V_{DD} = 1.8\text{V}$, 25MHz, No Load		0.6		mA
Supply Current, Standby	I_{DD_SB}	OE Pin Pulled Low, $V_{DD} = 3.3\text{V}$		0.3		mA
Operating Voltage	V_{DD}		1.62		3.63	V
Output Low Voltage	V_{OL}	$I_{OL} = +12\text{mA}$, $V_{DD} = 3.3\text{V}$			0.4	V
Output High Voltage	V_{OH}	$I_{OH} = -12\text{mA}$, $V_{DD} = 3.3\text{V}$	2.4			V
Output Current	I_{OSD}	$V_{OL} = 0.4\text{V}$, $V_{OH} = 2.4\text{V}$, $V_{DD} = 3.3\text{V}$	12			mA

Low-Power, 1.62V to 3.63V, 1MHz to 150MHz, 1:3 Fanout Buffer IC

NOISE CHARACTERISTICS

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
Additive Phase Jitter		V _{DD} =3.3V, Frequency=26MHz Offset=12kHz ~ 5MHz		70		fs
		V _{DD} =3.3V, Frequency=100MHz Offset=12kHz ~ 20MHz		80		fs

PL133-37 Additive Phase Jitter:
V_{DD}=3.3V, CLK=26MHz, Integration Range 12KHz to 5MHz: 0.072ps typical.



When a buffer is used to pass a signal then the buffer will add a little bit of its own noise. The phase noise on the output of the buffer will be a little bit more than the phase noise in the input signal. To quantify the noise addition in the buffer we compare the Phase Jitter numbers from the input and the output. The difference is called "Additive Phase Jitter". The formula for the Additive Phase Jitter is as follows:

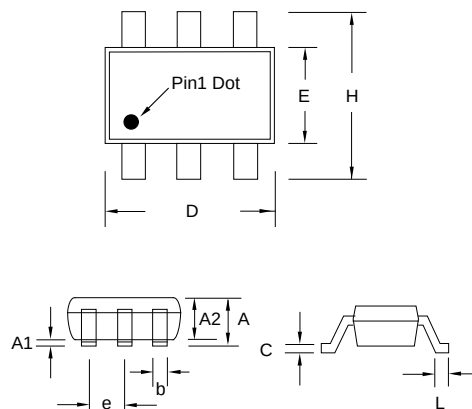
$$\text{Additive Phase Jitter} = \sqrt{(\text{Output Phase Jitter})^2 - (\text{Input Phase Jitter})^2}$$

Low-Power, 1.62V to 3.63V, 1MHz to 150MHz, 1:3 Fanout Buffer IC

PACKAGE DRAWINGS (GREEN PACKAGE COMPLIANT)

SOT23-6L

Symbol	Dimension in MM	
	Min.	Max.
A	1.05	1.35
A1	0.05	0.15
A2	1.00	1.20
b	0.30	0.50
c	0.08	0.20
D	2.80	3.00
E	1.50	1.70
H	2.60	3.00
L	0.35	0.55
e	0.95 BSC	



ORDERING INFORMATION (GREEN PACKAGE COMPLIANT)

For part ordering, please contact our Sales Department:

2180 Fortune Drive, San Jose, CA 95131, USA

Tel: (408) 944-0800 Fax: (408) 474-1000

PART NUMBER

The order number for this device is a combination of the following:

Part number, Package type and Operating temperature range

Part Number PL133-37 X X - X

None=Tubes
R=Tape and Reel

Package Type
T = SOT23-6L

Temperature Range
C=Commercial (0°C to 70°C)

Part/Order Number	Marking	Package Option
PL133-37TC-R	H37 LLL	6-Pin SOT23 (Tape and Reel)
PL133-37TI-R		

*Note: LLL designates lot number

Micrel Inc., reserves the right to make changes in its products or specifications, or both at any time without notice. The information furnished by Micrel is believed to be accurate and reliable. However, Micrel makes no guarantee or warranty concerning the accuracy of said information and shall not be responsible for any loss or damage of whatever nature resulting from the use of, or reliance upon this product.

LIFE SUPPORT POLICY: Micrel's products are not authorized for use as critical components in life support devices or systems without the express written approval of the President of Micrel Inc.

Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

[Microchip:](#)

[PL133-37TC](#) [PL133-37TC-R](#) [PL133-37TI](#) [PL133-37TI-R](#)



**Стандарт
Электрон
Связь**

Мы молодая и активно развивающаяся компания в области поставок электронных компонентов. Мы поставляем электронные компоненты отечественного и импортного производства напрямую от производителей и с крупнейших складов мира.

Благодаря сотрудничеству с мировыми поставщиками мы осуществляем комплексные и плановые поставки широчайшего спектра электронных компонентов.

Собственная эффективная логистика и склад в обеспечивает надежную поставку продукции в точно указанные сроки по всей России.

Мы осуществляем техническую поддержку нашим клиентам и предпродажную проверку качества продукции. На все поставляемые продукты мы предоставляем гарантию .

Осуществляем поставки продукции под контролем ВП МО РФ на предприятия военно-промышленного комплекса России , а также работаем в рамках 275 ФЗ с открытием отдельных счетов в уполномоченном банке. Система менеджмента качества компании соответствует требованиям ГОСТ ISO 9001.

Минимальные сроки поставки, гибкие цены, неограниченный ассортимент и индивидуальный подход к клиентам являются основой для выстраивания долгосрочного и эффективного сотрудничества с предприятиями радиоэлектронной промышленности, предприятиями ВПК и научно-исследовательскими институтами России.

С нами вы становитесь еще успешнее!

Наши контакты:

Телефон: +7 812 627 14 35

Электронная почта: sales@st-electron.ru

Адрес: 198099, Санкт-Петербург,
Промышленная ул, дом № 19, литера Н,
помещение 100-Н Офис 331