

2.5/3.3V 220MHz Zero-Delay Clock Buffer with 5 Outputs

Features

- Phase-Lock Loop Clock Distribution (Zero Input-to-Output Delay)
- Internal feedback connection
- Distributes one to one bank of five outputs
- High-Performance
 - 30 MHz to 220 MHz operation frequency range
 - <100ps output-to-output skew
 - <100ps cycle-to-cycle jitter
 - Low Power Consumption - 25mA (outputs unloaded)
- Spread-spectrum capable
- Power supply
 - +2.5V $\pm 5\%$
 - +3.3V $\pm 10\%$
- Temperature range
 - -40°C to +85°C Industrial temp range
- Packaging (Pb-free & Green):
 - 8-pin TSSOP (L8)
 - 8-pin SOIC (W8)

Description

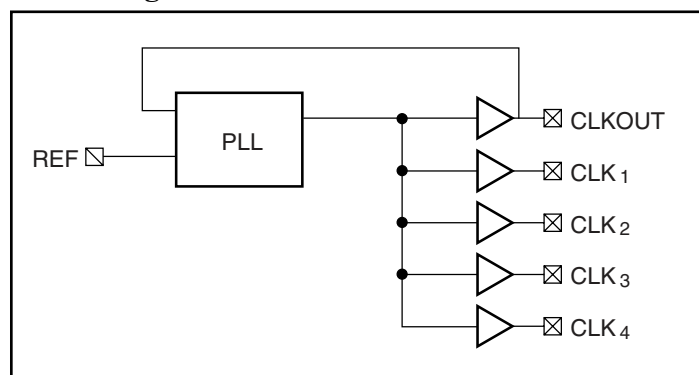
The PI6C22405 is a low-jitter, low-skew, high-speed Zero-Delay Buffer with five outputs designed to address high-speed clock distribution applications.

The PI6C22405 features an internal patented Phase Lock Loop (PLL) with high drive output capability and internal feedback.

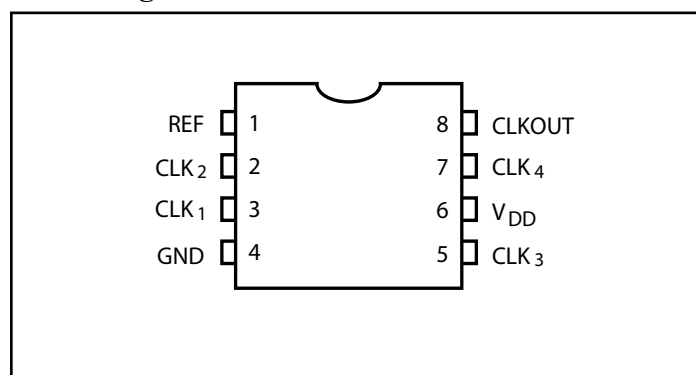
The PI6C22405 operates from a 2.5V $\pm 5\%$ or 3.3V $\pm 10\%$ supply, guaranteed over the full industrial temperature range of -40°C to +85°C. All support documentation can be found on Pericom's web site at: www.pericom.com.

Pericom can customize these devices for specific requirements.

Block Diagram



Pin Configuration



Pin Description

Pin	Signal	Description
1	REF	Reference clock input with weak pull down.
2, 3, 5, 7	CLK ₂ , CLK ₁ , CLK ₃ , CLK ₄	Clock output. Clock outputs contain a weak pull-down.
8	CLKOUT	Clock output. Internal feedback on this pin.
4	GND	Ground
6	V _{DD}	Power

Maximum Ratings⁽¹⁾

Supply Voltage	
V _{DD}	-0.5V to +4.6V
REF.....	-0.5V to +4.6V
Input Current	-50mA
Output Current	±50mA
Lead Temperature (soldering, 10 sec.).....	+260°C
Storage Temperature (Ts)	-65°C to +150°C
Junction Temperature.....	+150°C
Operating Temperature (industrial).....	-40°C to +85°C

Operation Ratings⁽²⁾

Supply Voltage	
V _{DD}	+3.0V to +3.6V
V _{DD}	+2.375V to +2.625V
Ambient Temperature (TA).....	0°C to +70°C
Package Thermal Resistance ⁽²⁾	
θJA	
Still-Air.....	157°C/W
θJB	
Junction-to-Board.....	42°C

Notes:

- Stresses greater than those listed under Maximum Ratings may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these or any other conditions above those indicated in the operational sections of the this specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect reliability.
- θJA and θJB values are determined for a 4-layer board in still-air, unless otherwise stated.

DC Electrical Characteristics

Parameter	Description	Test Conditions		Min.	Max.	Units
V _{IL}	Input LOW Voltage	V _{DD} = 3.3V			0.8	V
		V _{DD} = 2.5V			0.7	
V _{IH}	Input HIGH Voltage	V _{DD} = 3.3V		2.0		
		V _{DD} = 2.5V		1.7		
I _{IL}	Input LOW Current	V _{IN} = 0V			10	μA
I _{IH}	Input HIGH Current	V _{IN} = V _{DD}			100	
V _{OL}	Output LOW Voltage	I _{OL} = 12mA	V _{DD} = 3.3V		0.4	V
			V _{DD} = 2.5V		0.5	
V _{OH}	Output HIGH Voltage	V _{DD} = 2.5V, I _{OH} = -12mA		1.8		
		V _{DD} = 3.3V, I _{OH} = -12mA		2.4		
I _{DD}	Supply Current	Unloaded outputs 66 MHz			25	mA

AC Electrical Characteristics

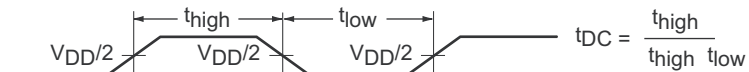
Parameter	Description	Test Conditions	Min.	Typ.	Max.	Units
F _O	Output Frequency	V _{DD} = 2.5V, C _L = 15pF	10		200	MHz
		V _{DD} = 3.3V, C _L = 15pF	10		220	MHz
BW	Bandwidth for PLL	V _{DD} = 2.5V		0.8		MHz
		V _{DD} = 3.3V		1.5		
t _{DC}	Duty Cycle ⁽¹⁾⁽⁴⁾	Measured at V _{DD} /2, 10pF load	45	50	55	%
t _R	Rise Time ⁽¹⁾⁽⁴⁾	For 3.3V: Measured between 0.8V and 2.0V @ 10pF			1	ns
		For 2.5V: Measured between 0.6V and 1.8V @ 10pF			1.8	
t _F	Fall Time ⁽¹⁾⁽⁴⁾	For 3.3V: Measured between 0.8V and 2.0V @ 10pF			1	
		For 2.5V: Measured between 0.6V and 1.8V @ 10pF			1.8	
t _{sk(o)}	Output to Output Skew ⁽²⁾	All outputs equally loaded	V _{DD} = 3.3V		90	ps
			V _{DD} = 2.5V		90	
t ₀	Delay, REF Rising Edge to CLKOUT Rising Edge ⁽²⁾	Measured at V _{DD} /2 @ 66MHz	V _{DD} = 3.3V	-100	100	
			V _{DD} = 2.5V	-200	200	
t _{SK(D)}	Device-to-device Skew ⁽³⁾	Measured at V _{DD} /2 on CLKx pins of device	-300		+300	
t _{JIT}	Cycle-to-Cycle Jitter	15pF load, >66MHz, standard drive	V _{DD} = 3.3V		47	ps
			V _{DD} = 2.5V		42	
		15pF load, >66MHz, high drive	V _{DD} = 3.3V		45	
			V _{DD} = 2.5V		40	
		30pF load, >66MHz, standard drive	V _{DD} = 3.3V		63	
			V _{DD} = 2.5V		83	
		30pF load, >66MHz, high drive	V _{DD} = 3.3V		51	
			V _{DD} = 2.5V		66	
t _{PJ}	Period Jitter (Peak)	15pF load, >66MHz, standard drive	V _{DD} = 3.3V		39	ps
			V _{DD} = 2.5V		28	
		15pF load, >66MHz, high drive	V _{DD} = 3.3V		39	
			V _{DD} = 2.5V		27	
		30pF load, >66MHz, standard drive	V _{DD} = 3.3V		48	
			V _{DD} = 2.5V		75	
		30pF load, >66MHz, high drive	V _{DD} = 3.3V		43	
			V _{DD} = 2.5V		60	
t _{LOCK}	PLL Lock Time ⁽¹⁾	Stable power supply, valid clocks presented on REF pin			1.0	ms

Note:

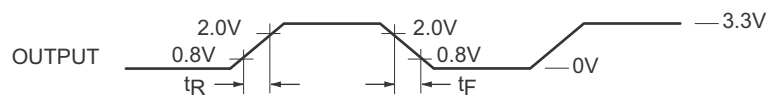
- See Switching Waveforms
- All clock output should have the same loading to achieve zero delay between the input and outputs and zero output-to-output skew. Since the CLKOUT pin is the internal feedback to the PLL, its relative loading can adjust the input-to-output delay. If input-to-output delay adjustments are needed, the CLKOUT load may be changed to vary the delay between the REF input to the clock outputs. Output-to-output skew includes CLK 1-4.
- Specifications are guaranteed by design and not production tested.
- Measured at 100MHz.

Switching Waveforms

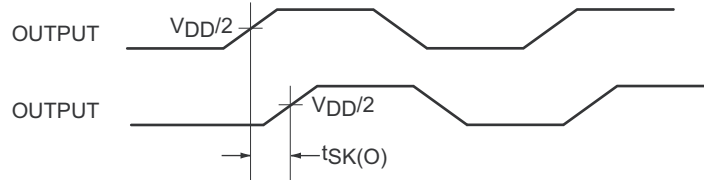
Duty Cycle Timing



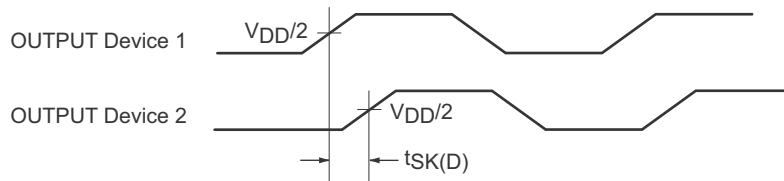
All Outputs Rise/Fall Time



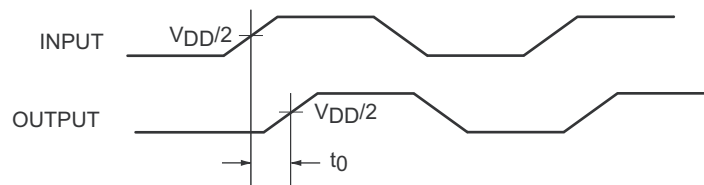
Output-Output Skew



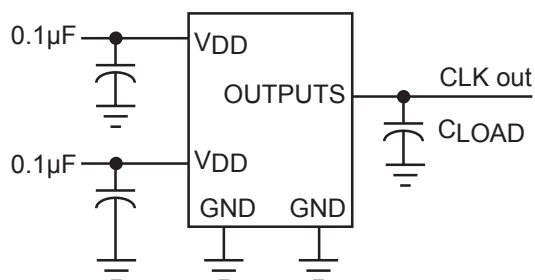
Device-Device Skew



Input-Output Propagation Delay

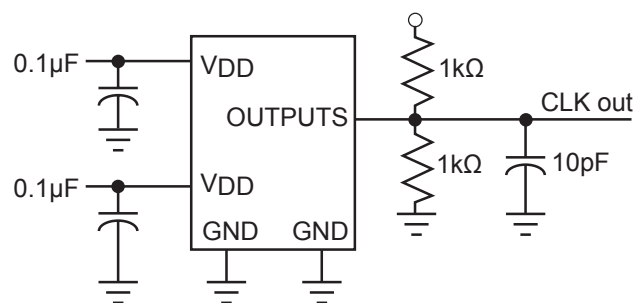


Test Circuit 1

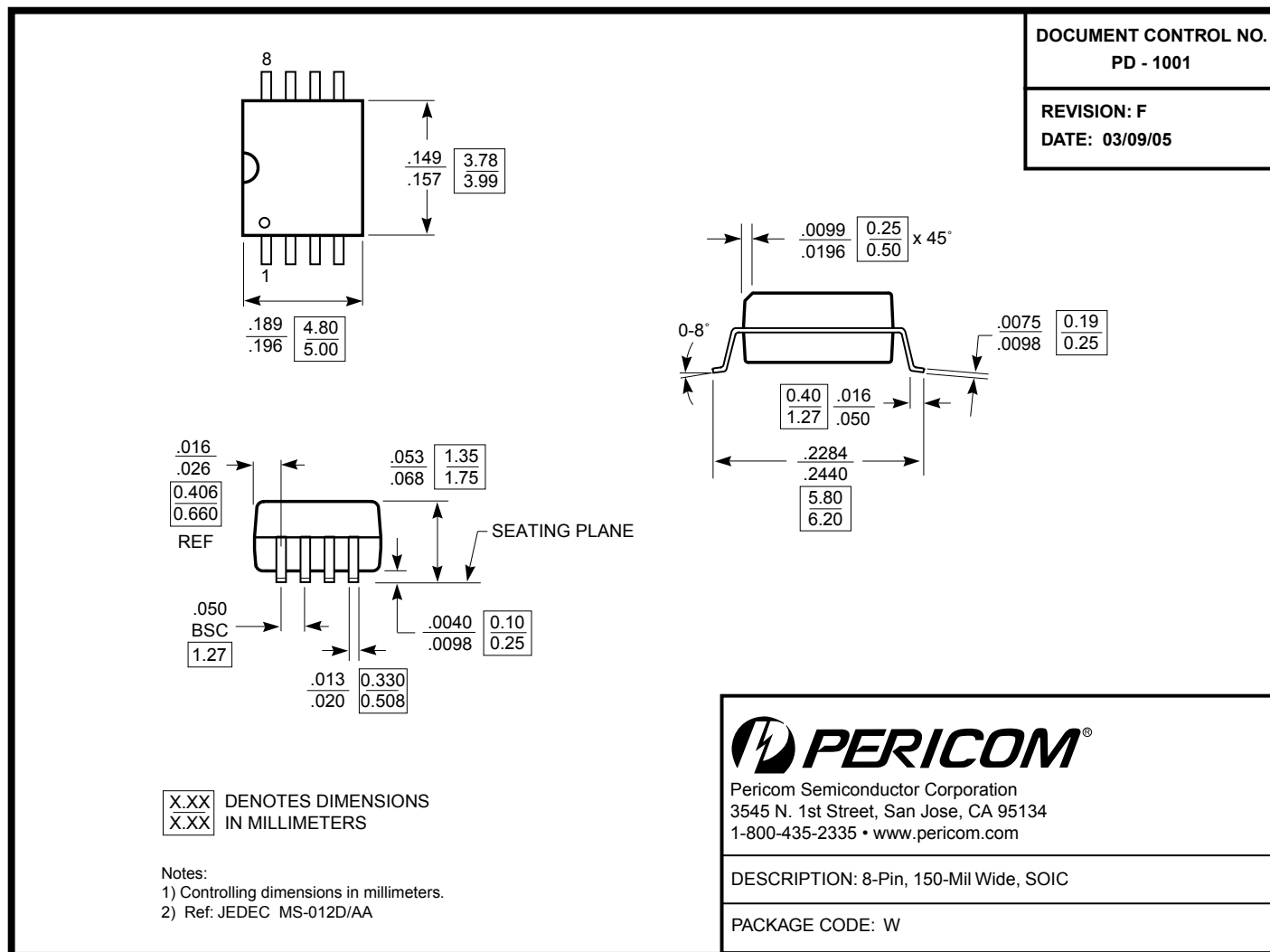


Test Circuit for all parameters except t_{SLEW}

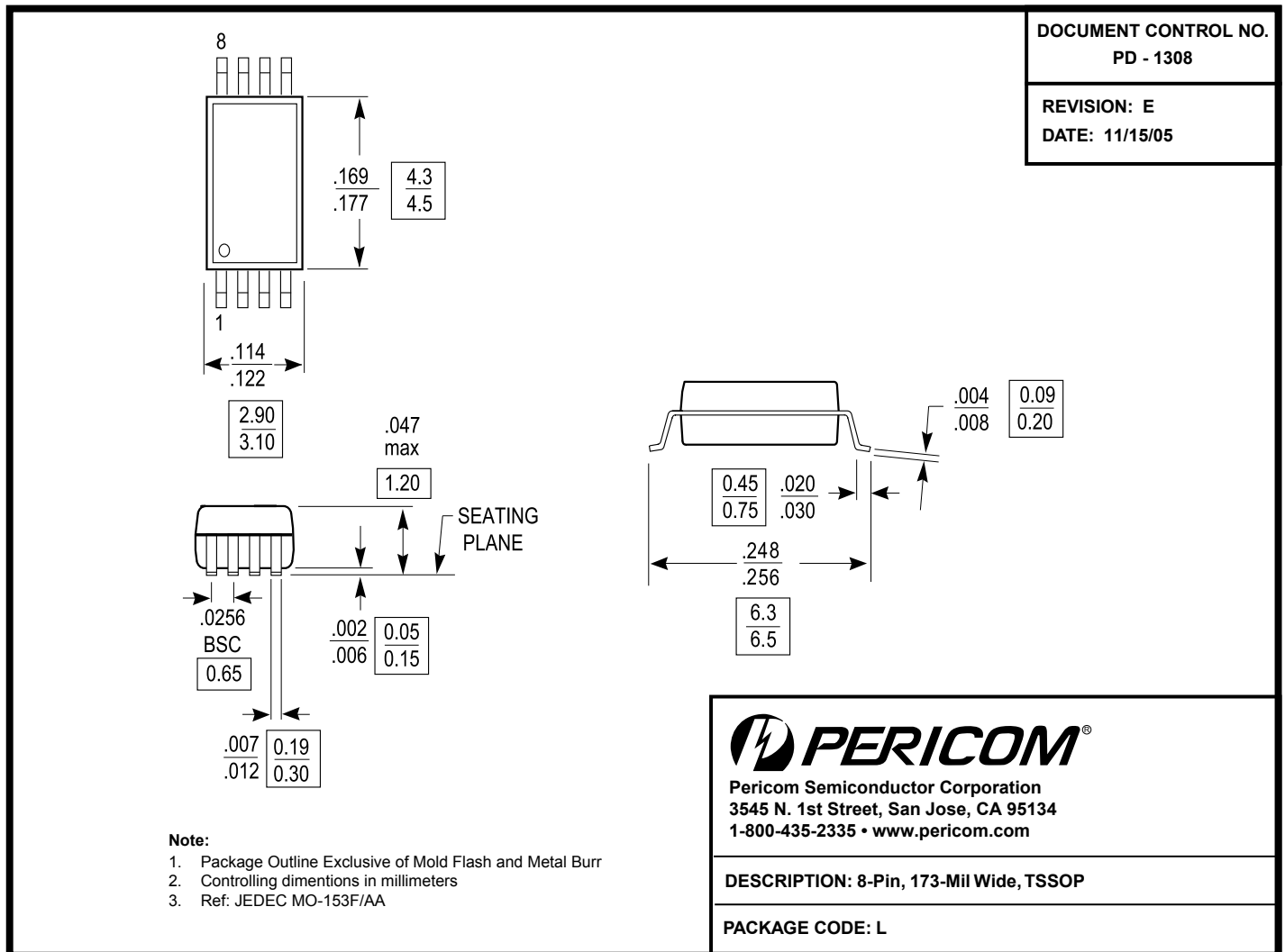
Test Circuit 2



Test Circuit for t_{SLEW} , Output slew

Packaging Mechanical: 8-Pin SOIC (W)

Note:

- For latest package info, please check: <http://www.pericom.com/products/packaging/mechanicals.php>

Packaging Mechanical: 8-Pin TSSOP (L)

Note:

- For latest package info, please check: <http://www.pericom.com/products/packaging/mechanicals.php>

Ordering Information(1,2,3)

Ordering Code	Package Code	Package Description
PI6C22405WE	W	Pb-free & Green, 8-pin SOIC
PI6C22405WIE	W	Pb-free & Green, 8-pin SOIC, Industrial temp range
PI6C22405LE	L	Pb-free & Green, 8-pin TSSOP
PI6C22405LIE	L	Pb-free & Green, 8-pin TSSOP, Industrial temp range

Notes:

- Thermal characteristics can be found on the company web site at www.pericom.com/packaging/
- E = Pb-free & Green
- Adding an X suffix = Tape/Reel

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[PI6C22405WEX](#)