

ANY-RATE PRECISION CLOCK MULTIPLIER/JITTER ATTENUATOR

Description

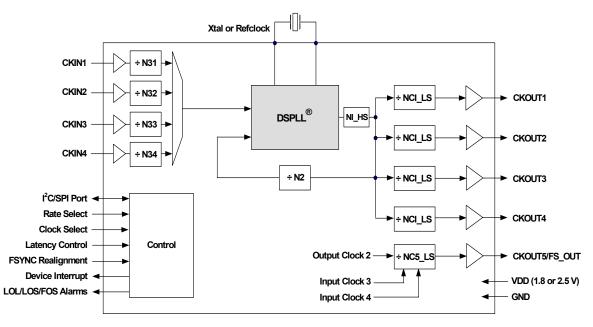
The Si5368 is a jitter-attenuating precision clock multiplier for applications requiring sub 1 ps rms jitter performance. The Si5368 accepts four clock inputs ranging from 2 kHz to 710 MHz and generates five clock outputs ranging from 2 kHz to 945 MHz and select frequencies to 1.4 GHz. The device provides virtually any frequency translation combination across this operating range. The outputs are divided down separately from a common source. The Si5368 input clock frequency and clock multiplication ratio are programmable through an I²C or SPI interface. The Si5368 is based on Silicon Laboratories' 3rd-generation DSPLL® technology, which provides any-rate frequency synthesis and jitter attenuation in a highly integrated PLL solution that eliminates the need for external VCXO and loop filter components. The DSPLL loop bandwidth is digitally programmable, providing jitter performance optimization at the application level. Operating from a single 1.8 or 2.5 V supply, the Si5368 is ideal for providing clock multiplication and jitter attenuation in high performance timing applications.

Applications

- SONET/SDH OC-48/STM-16/OC-192/STM-64 line cards
- GbE/10GbE, 1/2/4/8/10GFC line cards
- ITU G.709 and custom FEC line cards
- Wireless basestations
- Data converter clocking
- xDSL
- SONET/SDH + PDH clock synthesis
- Test and measurement
- Synchronous Ethernet
- Broadcast video

Features

- Generates any frequency from 2 kHz to 945 MHz and select frequencies to 1.4 GHz from an input frequency of 2 kHz to 710 MHz
- Ultra-low jitter clock outputs w/jitter generation as low as 0.3 ps rms (50 kHz–80 MHz)
- Integrated loop filter with selectable loop bandwidth (60 Hz to 8.4 kHz)
- Meets OC-192 GR-253-CORE jitter specifications
- Four clock inputs w/manual or automatically controlled hitless switching
- Five clock outputs with selectable signal format (LVPECL, LVDS, CML, CMOS)
- SONET frame sync switching and regeneration
- Support for ITU G.709 and custom FEC ratios (255/238, 255/237, 255/236)
- LOL, LOS, FOS alarm outputs
- Digitally-controlled output phase adjust
- I²C or SPI programmable settings
- On-chip voltage regulator for 1.8 V ±5% or 2.5 V ±10% operation
- Small size: 14 x 14 mm 100-pin TQFP
- Pb-free, RoHS compliant



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Si5368

This information applies to a product under development. Its characteristics and specifications are subject to change without notice.

Table 1. Performance Specifications

 $(V_{DD} = 1.8 \pm 5\% \text{ or } 2.5 \text{ V} \pm 10\%, T_A = -40 \text{ to } 85 \text{ °C})$

Parameter	Symbol	Test Condition	Min	Тур	Max	Unit
Temperature Range	T _A		-40	25	85	°C
Supply Voltage	V _{DD}		2.25	2.5	2.75	V
			1.71	1.8	1.89	V
Supply Current	I _{DD}	f _{OUT} = 622.08 MHz All CKOUTs enabled LVPECL format output	_	394	435	mA
		Only CKOUT1 enabled	_	253	284	mA
		f _{OUT} = 19.44 MHz All CKOUTs enabled CMOS format output	_	278	321	mA
		Only CKOUT1 enabled	_	229	261	mA
		Tristate/Sleep Mode	_	TBD	TBD	mA
Input Clock Frequency (CKIN1, CKIN2, CKIN3, CKIN4)	CK _F	Input frequency and clock multiplication ratio determined by programming device PLL divid-	0.002	_	710	MHz
Input Clock Frequency (CKIN3, CKIN4 used as FSYNC inputs)	CK _F	ers. Consult Silicon Laborato- ries configuration software DSPLL <i>sim</i> or Any-Rate Preci- sion Clock Family Reference	0.002	_	0.512	MHz
Output Clock Frequency (CKOUT1, CKOUT2, CKOUT3, CKOUT4, CKOUT5 used as fifth high-speed out- put)	CK _{OF}	Manual at www.silabs.com/tim- ing (click on Documentation) to determine PLL divider settings for a given input fre- quency/clock multiplication	0.002 970 1213	_ _ _	945 1134 1400	MHz
CKOUT5 used as frame sync output (FS_OUT)	CK _{OF}	ratio combination.	0.002	_	710	MHz
3-Level Input Pins				I		
Input Mid Current	I _{IMM}	See Note 2.	-2	_	2	μA
Input Clocks (CKIN1, CKIN2,	CKIN3, CI	KIN4)				
Differential Voltage Swing	CKN _{DPP}		0.25	_	1.9	V _{PP}
Common Mode Voltage	CKN _{VCM}	1.8 V ±5%	0.9	_	1.4	V
		2.5 V ±10%	1.0	_	1.7	V
Rise/Fall Time	CKN _{TRF}	20–80%		1	11	ns

- 1. For a more comprehensive listing of device specifications, please consult the Silicon Laboratories Any-Rate Precision Clock Family Reference Manual. This document can be downloaded from www.silabs.com/timing (click on Documentation).
- 2. This is the amount of leakage that the 3-level input can tolerate from an external driver. See the Family Reference Manual. In most designs, an external resistor voltage divider is recommended.



Table 1. Performance Specifications (Continued)

 $(V_{DD} = 1.8 \pm 5\% \text{ or } 2.5 \text{ V} \pm 10\%, T_A = -40 \text{ to } 85 \text{ °C})$

Parameter	Symbol	Test Condition	Min	Тур	Max	Unit
Duty Cycle	CKN _{DC}	Whichever is smaller	40	_	60	%
(Minimum Pulse Width)			2	_	_	ns
Output Clocks (CKOUT1, CK	OUT2, CK	OUT3, CKOUT4, CKOUT5/FS_	OUT)		1	
Common Mode	V _{OCM}	LVPECL	V _{DD} – 1.42	_	V _{DD} – 1.25	V
Differential Output Swing	V _{OD}	100 Ω load line-to-line	1.1	_	1.9	V_{DD}
Single Ended Output Swing	V _{SE}		0.5		0.93	Vpp
PLL Performance						
Jitter Generation	J _{GEN}	f _{IN} = f _{OUT} = 622.08 MHz, LVPECL output format 50 kHz–80 MHz	_	0.3	TBD	ps rms
		12 kHz–20 MHz		0.3	TBD	ps rms
Jitter Transfer	J _{PK}			0.05	0.1	dB
External Reference Jitter Transfer	J _{PKEXTN}		_	TBD	TBD	dB
Phase Noise	CKO _{PN}	f _{IN} = f _{OUT} = 622.08 MHz 100 Hz offset	_	TBD	TBD	dBc/Hz
		1 kHz offset	_	TBD	TBD	dBc/Hz
		10 kHz offset	_	TBD	TBD	dBc/Hz
		100 kHz offset	_	TBD	TBD	dBc/Hz
		1 MHz offset	_	TBD	TBD	dBc/Hz
Subharmonic Noise	SP _{SUBH}	Phase Noise @ 100 kHz Offset	_	TBD	TBD	dBc
Spurious Noise	SP _{SPUR}	Max spur @ n x F3 (n ≥ 1, n x F3 < 100 MHz)	_	TBD	TBD	dBc
Package						
Thermal Resistance Junction to Ambient	$\theta_{\sf JA}$	Still Air	_	40	_	°C/W

- 1. For a more comprehensive listing of device specifications, please consult the Silicon Laboratories Any-Rate Precision Clock Family Reference Manual. This document can be downloaded from www.silabs.com/timing (click on Documentation).
- 2. This is the amount of leakage that the 3-level input can tolerate from an external driver. See the Family Reference Manual. In most designs, an external resistor voltage divider is recommended.

Table 2. Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
DC Supply Voltage	V_{DD}	-0.5 to 2.75	V
LVCMOS Input Voltage	V _{DIG}	-0.3 to (V _{DD} + 0.3)	V
Junction Temperature	T _{JCT}	-55 to 150	°C
Storage Temperature Range	T _{STG}	-55 to 150	°C
ESD HBM Tolerance (100 pF, 1.5 kΩ); All pins except CKIN+/CKIN–		2	kV
ESD MM Tolerance; All pins except CKIN+/CKIN-		200	V
ESD HBM Tolerance (100 pF, 1.5 kΩ); CKIN+/CKIN–		700	V
ESD MM Tolerance; CKIN+/CKIN-		150	V
Latch-Up Tolerance		JESD78 Comp	liant

Note: Permanent device damage may occur if the Absolute Maximum Ratings are exceeded. Functional operation should be restricted to the conditions as specified in the operation sections of this data sheet. Exposure to absolute maximum rating conditions for extended periods of time may affect device reliability.



155.52 MHz in, 622.08 MHz out

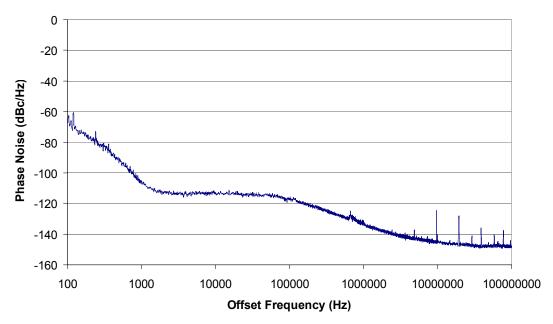


Figure 1. Typical Phase Noise Plot

Jitter Band	Jitter, RMS
Brick Wall, 100 Hz to 100 MHz	1,279 fs
SONET_OC48, 12 kHz to 20 MHz	315 fs
SONET_OC192_A, 20 kHz to 80 MHz	335 fs
SONET_OC192_B, 4 MHz to 80 MHz	194 fs
SONET_OC192_C, 50 kHz to 80 MHz	318 fs
Brick Wall, 800 Hz to 80 MHz	343 fs

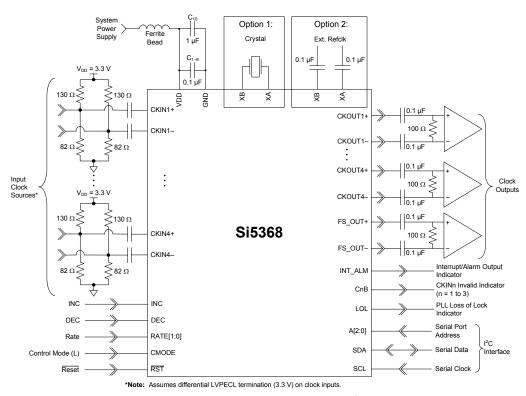


Figure 2. Si5368 Typical Application Circuit (I²C Control Mode)

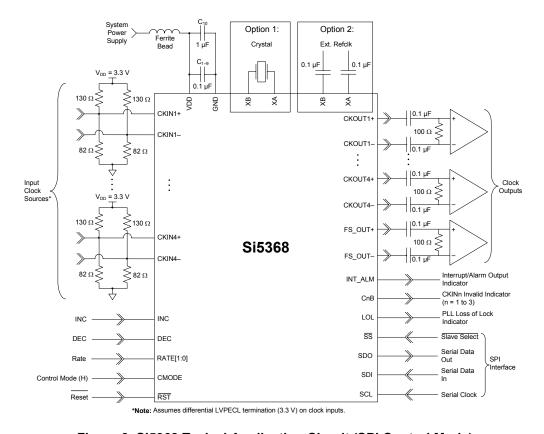


Figure 3. Si5368 Typical Application Circuit (SPI Control Mode)



1. Functional Description

The Si5368 is a jitter-attenuating precision clock multiplier for applications requiring sub 1 ps rms jitter performance. The Si5368 accepts four clock inputs ranging from 2 kHz to 710 MHz and generates five clock outputs ranging from 2 kHz to 945 MHz and select frequencies to 1.4 GHz. The device provides virtually any frequency translation combination across this operating range. Independent dividers are available for every input clock and output clock, so the Si5368 can accept input clocks at different frequencies and it can generate output clocks at different frequencies. The Si5368 input clock frequency and clock multiplication ratio are programmable through an I²C or SPI interface. Optionally, the fifth clock output can be configured as a 2 to 512 kHz SONET/SDH frame synchronization output that is phase aligned with one of the high-speed output clocks. Silicon Laboratories offers a PC-based software utility, DSPLLsim, that can be used to determine the optimum PLL divider settings for a given input frequency/clock multiplication ratio combination that minimizes phase noise and power consumption. This can utility be downloaded from http://www.silabs.com/timing (click on Documentation).

The Si5368 is based on Silicon Laboratories' 3rd-generation DSPLL® technology, which provides any-rate frequency synthesis and jitter attenuation in a highly integrated PLL solution that eliminates the need for external VCXO and loop filter components. The Si5368 PLL loop bandwidth is digitally programmable and supports a range from 60 Hz to 8.4 kHz. The DSPLLsim software utility can be used to calculate valid loop bandwidth settings for a given input clock frequency/clock multiplication ratio.

The Si5368 supports hitless switching between input clocks in compliance with GR-253-CORE and GR-1244-CORE that greatly minimizes the propagation of phase transients to the clock outputs during an input clock transition (<200 ps typ). Manual, automatic revertive and non-revertive input clock switching options are available. The Si5368 monitors the four input clocks for loss-ofsignal and provides a LOS alarm when it detects missing pulses on any of the four input clocks. The device monitors the lock status of the PLL. The lock detect algorithm works by continuously monitoring the phase of the input clock in relation to the phase of the feedback clock. The Si5368 monitors the frequency of CKIN1, CKIN3, and CKIN4 with respect to a reference frequency applied to CKIN2, and generates a frequency offset alarm (FOS) if the threshold is exceeded. This FOS feature is available for SONET applications in which both the monitored frequency on CKIN1, CKIN3, and CKIN4 and the reference frequency are integer multiples of 19.44 MHz. Both Stratum 3/3E and SONET Minimum Clock (SMC) FOS thresholds are supported.

The Si5368 provides a digital hold capability that allows the device to continue generation of a stable output clock when the selected input reference is lost. During digital hold, the DSPLL generates an output frequency based on a historical average that existed a fixed amount of time before the error event occurred, eliminating the effects of phase and frequency transients that may occur immediately preceding digital hold.

Fine phase adjustment is available and is set using the FLAT register bits. The nominal range and resolution of the FLAT[14:0] latency adjustment word are: ±110 ps and 3 ps, respectively.

The Si5368 has five differential clock outputs. The electrical format of the clock outputs is programmable to support LVPECL, LVDS, CML, or CMOS loads. If not required, unused clock outputs can be powered down to minimize power consumption. The phase difference between the selected input clock and the output clocks is adjustable in 200 ps increments for system skew control. In addition, the phase of one output clock may be adjusted in relation to the phase of the other output clock. The resolution varies from 800 ps to 2.2 ns depending on the PLL divider settings. Consult the DSPLLsim configuration software to determine the phase offset resolution for a given input clock/clock multiplication ratio combination. For system-level debugging, a bypass mode is available which drives the output clock directly from the input clock, bypassing the internal DSPLL. The device is powered by a single 1.8 or 2.5 V supply.

1.1. External Reference

An external, 38.88 MHz clock or a low-cost 114.285 MHz 3rd overtone crystal is used as part of a fixed-frequency oscillator within the DSPLL. This external reference is required for the device to perform jitter attenuation. Silicon Laboratories recommends using a high-quality crystal. Specific recommendations may be found in the Family Reference Manual. An external clock from a high-quality OCXO or TCXO can also be used as a reference for the device.

In digital hold, the DSPLL remains locked to this external reference. Any changes in the frequency of this reference when the DSPLL is in digital hold, will be tracked by the output of the device. Note that crystals can have temperature sensitivities.

1.2. Further Documentation

Consult the Silicon Laboratories Any-Rate Precision Clock Family Reference Manual (FRM) for detailed information about the Si5368. Additional design support is available from Silicon Laboratories through your distributor.

Silicon Laboratories has developed a PC-based software utility called DSPLLsim to simplify device configuration, including frequency planning and loop bandwidth selection. The FRM and this utility can be downloaded from http://www.silabs.com/timing; click on Documentation.



2. Pin Descriptions: Si5368

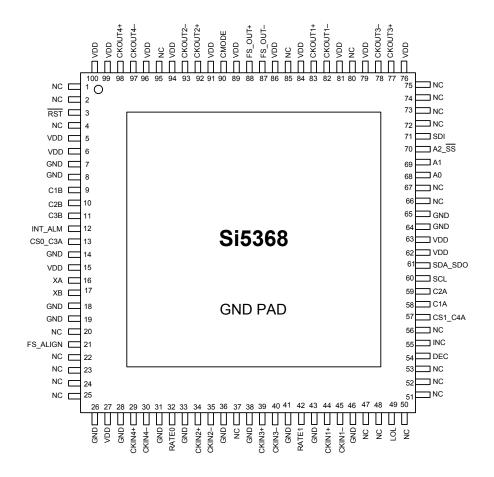


Table 3. Si5368 Pin Descriptions

Pin#	Pin Name	I/O	Signal Level	Description
1, 2, 4, 20,	NC			No Connect.
22, 23, 24,				These pins must be left unconnected for normal operation.
25, 37, 47,				
48, 50, 51,				
52, 53, 56,				
66, 67, 72,				
73, 74, 75,				
80, 85, 95				
3	RST	I	LVCMOS	External Reset.
				Active low input that performs external hardware reset of
				device. Resets all internal logic to a known state and forces the
				device registers to their default value. Clock outputs are dis-
				abled during reset. The part must be programmed after a reset
				or power-on to get a clock output. See Family Reference Man-
				ual for details.
				This pin has a weak pull-up.
Note: Interna	l register names	are indi	cated by underli	ned italics, e.g. <u>INT_PIN</u> . See Si5368 Register Map.



Table 3. Si5368 Pin Descriptions (Continued)

Pin#	Pin Name	I/O	Signal Level	
5, 6, 15, 27, 62, 63, 76, 79, 81, 84, 86, 89, 91, 94, 96, 99, 100	V _{DD}	Vdd	Supply	V_{DD} . The device operates from a 1.8 or 2.5 V supply. Bypass capacitors should be associated with the following V_{DD} pins: Pins Bypass Cap 5, 6 0.1 μF 15 0.1 μF 15 0.1 μF 162, 63 0.1 μF 162, 63 0.1 μF 164, 84 0.1 μF 165, 89 0.1 μF 166, 89 0.1 μF 166, 99, 100 0.1 μF 166, 99, 100 0.1 μF
7, 8, 14, 18, 19, 26, 28, 31, 33, 36, 38, 41, 43, 46, 64, 65	GND	GND	Supply	Ground. This pin must be connected to system ground. Minimize the ground path impedance for optimal performance.
9	C1B	0	LVCMOS	CKIN1 Invalid Indicator. This pin performs the <u>CK1_BAD</u> function if <u>CK1_BAD_PIN</u> = 1 and is tristated if <u>CK1_BAD_PIN</u> = 0. Active polarity is controlled by <u>CK_BAD_POL</u> . 0 = No alarm on CKIN1. 1 = Alarm on CKIN1.
10	C2B	0	LVCMOS	CKIN2 Invalid Indicator. This pin performs the <u>CK2_BAD</u> function if <u>CK2_BAD_PIN</u> = 1 and is tristated if <u>CK2_BAD_PIN</u> = 0. Active polarity is controlled by <u>CK_BAD_POL</u> . 0 = No alarm on CKIN2. 1 = Alarm on CKIN2.
11	СЗВ	0	LVCMOS	CKIN3 Invalid Indicator. This pin performs the <u>CK3_BAD</u> function if <u>CK3_BAD_PIN</u> = 1 and is tristated if <u>CK3_BAD_PIN</u> = 0. Active polarity is controlled by <u>CK_BAD_POL</u> . 0 = No alarm on CKIN3. 1 = Alarm on CKIN3.
12 Note: Interna	INT_ALM	O Sare indic	LVCMOS	Interrupt/Alarm Output Indicator. This pin functions as a maskable interrupt output with active polarity controlled by the INT_POL register bit. The INT output function can be turned off by setting INT_PIN = 0. If the ALR-MOUT function is desired instead on this pin, set ALRMOUT_PIN = 1 and INT_PIN = 0. 1 = ALRMOUT not active. 1 = ALRMOUT active. The active polarity is controlled by CK_BAD_POL . If no function is selected, the pin tristates. The italics, e.g. INT_PIN . See Si5368 Register Map.

Table 3. Si5368 Pin Descriptions (Continued)

Input Clock SelectifcKIN3 or CKIN4 Active Clock Indicator. Input Clock Selection is chosen, and if CKSEL_PIN = 1, the CKSEL pins control clock selection and the CKSEL_PIN = 1, the CKSEL pins control clock selection and the CKSEL_PIN = 1, the CKSEL pins control clock selection and the CKSEL_PIN = 0, the CKSEL_PIN = 0 CKIN1	Pin #	Pin Name	I/O	Signal Level		escription	
CKSEL_PIN = 1, the CKSEL pins control clock selection and the CKSEL_REG bits are ignored. CS[1:0]	13	CS0_C3A	I/O	LVCMOS	Input Clock Select/CKIN3	or CKIN4 Active Clock Indicate	or.
the <u>CKSEL_REG</u> bits are ignored. CS[1:0] Active Input Clock	57	CS1_C4A			Input: If manual clock selec	tion is chosen, and if	
CS[1:0] Active Input Clock 00 CKIN1 01 CKIN2 10 CKIN3 11 CKIN4 If CKSEL_PIN = 0, the CKSEL_REG register bits control this function and these inputs tristate. If configured as inputs, these pins must not float. Output: If auto clock selection is enabled, then they serve as the CKIN_n active clock indicator. 0 = CKIN3 (CKIN4) is not the active input clock 1 = CKIN3 (CKIN4) is currently the active input to the PLL. The CKN_ACTV_PIN = 0, this status will also be reflected on the CnA pin with active polarity controlled by the CK_ACTV_PIN = 1, this status will also be reflected on the CnA pin with active polarity controlled by the CK_ACTV_PIN = 0, this output tristates. 16 XA I ANALOG External crystal or Reference Clock. External crystal should be connected to these pins to use internal oscillator based reference. Refer to Family Reference Manual for interfacing to an external reference. External reference must be from a high-quality clock source (TCXO, OCXO). Frequency of crystal or external clock is set by the RATE pins. 21 FS_ALIGN I LVCMOS FSYNC Alignment Control. If FSYNC ALIGN_PIN = 1 and CK_CONFIG = 1, a logic high on this pin causes the FS_OUT phase to be realigned to the rising edge of the currently active input sync (CKIN_3 or CKIN_4). If FSYNC_ALIGN_PIN = 0, this pin is ignored and the FSYNC_ALIGN_PIN = 0, this pin is ignored and the FSYNC_ALIGN_PIN = 0, this pin is ignored and the FSYNC_ALIGN_PIN = 0, this pin is ignored and the FSYNC_ALIGN_PIN = 0, this pin is ignored and the FSYNC_ALIGN_PIN = 0, this pin is ignored and the FSYNC_ALIGN_PIN = 0, this pin is ignored and the FSYNC_ALIGN_PIN = 0, this pin is ignored and the FSYNC_ALIGN_PIN = 0, this pin is ignored and the FSYNC_ALIGN_PIN = 0, this pin is ignored and the FSYNC_ALIGN_PIN = 0, this pin is ignored and the FSYNC_ALIGN_PIN = 0, this pin is ignored and the FSYNC_ALIGN_PIN = 0, this pin is ignored and the FSYNC_ALIGN_PIN = 0, this pin is ignored and the FSYNC_ALIGN_PIN = 0, this pin is ignored and the FSYNC_ALIGN_PIN = 0, this pin is ignor					<u> </u>	•	t
10					the <u>CKSEL_REG</u> bits are ig	nored.	
10					CS[1:0]	Active Input Clock	
10					00	CKIN1	
If CKSEL_PIN = 0, the CKSEL_REG register bits control this function and these inputs tristate. If configured as inputs, these pins must not float. Output: If auto clock selection is enabled, then they serve as the CKIN_n active clock indicator. 0 = CKIN3 (CKIN4) is not the active input clock 1 = CKIN3 (CKIN4) is not the active input to the PLL The CKn_ACTV_REG bit always reflects the active clock status for CKIN_n. If CKn_ACTV_PIN = 1, this status will also be reflected on the CnA pin with active polarity controlled by the CK_ACTV_POL bit. If CKn_ACTV_PIN = 0, this output tristates. 16 XA I ANALOG External Crystal or Reference Clock. External crystal should be connected to these pins to use internal oscillator based reference. Refer to Family Reference Manual for interfacing to an external reference. External reference must be from a high-quality clock source (TCXO, OCXO). Frequency of crystal or external clock is set by the RATE pins. 21 FS_ALIGN I LVCMOS FSYNC Alignment Control. If FSYNC ALIGN_PIN = 1 and CK_CONFIG = 1, a logic high on this pin causes the FS_OUT phase to be realigned to the rising edge of the currently active input sync (CKIN_3) or CKIN_4). If FSYNC_ALIGN_PIN = 0, this pin is ignored and the FSYNC_ALIGN_PIN = 0, this pin is ignored and the FSYNC_ALIGN_PIN = 0, this pin is ignored and the FSYNC_ALIGN_PIN = 0, this pin is ignored and the FSYNC_ALIGN_PIN = 0. This pin that set is function. 29 CKIN4+ I MULTI Clock input 4. 29 CKIN4- I MULTI Clock input 4. 29 This pin has a weak pull-down. 29 CKIN4- I MULTI Clock input 4. 29 This pin has a weak pull-down. 29 This pin has a weak					01	CKIN2	
If <u>CKSEL_PIN</u> = 0, the <u>CKSEL_REG</u> register bits control this function and these inputs tristate. If configured as inputs, these pins must not float. Output: If auto clock selection is enabled, then they serve as the CKIN_n active clock indicator. 0 = CKIN3 (CKIN4) is not the active input clock 1 = CKIN3 (CKIN4) is currently the active input to the PLL The <u>CKn_ACTV_PIN</u> = 1, this status will also be reflected on the CnA pin with active polarity controlled by the <u>CK_ACTV_PIN</u> = 1, this status will also be reflected on the CnA pin with active polarity controlled by the <u>CK_ACTV_PIN</u> = 1, this output tristates. 16					10	CKIN3	
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Table 3. Si5368 Pin Descriptions (Continued)

Pin#	Pin Name	I/O	Signal Level	<u>-</u>
34 35	CKIN2+ CKIN2-	I	MULTI	Clock Input 2. Differential input clock. This input can also be driven with a sin-
				gle-ended signal.
39 40	CKIN3+ CKIN3-	I	MULTI	Clock Input 3. Differential clock input. This input can also be driven with a sin-
40	CKINO-			gle-ended signal. CKIN3 serves as the frame sync input associated with the CKIN1 clock when <u>CK_CONFIG_REG</u> = 1.
44	CKIN1+	I	MULTI	Clock Input 1.
45	CKIN1-			Differential clock input. This input can also be driven with a single-ended signal.
49	LOL	0	LVCMOS	PLL Loss of Lock Indicator. This pin functions as the active high PLL loss of lock indicator if the LOL_PIN register bit is set to one. 0 = PLL locked. 1 = PLL unlocked. If LOL_PIN = 0, this pin will tristate. Active polarity is controlled by the LOL_POL bit. The PLL lock status will always be reflected in the LOL_INT read only register bit.
54	DEC		LVCMOS	Coarse Latency Decrement. A pulse on this pin decreases the input to output device latency by 1/fOSC (approximately 200 ps). Detailed operations and timing characteristics for this pin may be found in the Any-Rate Precision Clock Family Reference Manual. There is no limit on the range of latency adjustment by this method. Pin control is enabled by setting INCDEC_PIN = 1 (default). If INCDEC_PIN = 0, this pin is ignored and coarse output latency is controlled via the CLAT register. If both INC and DEC are tied high, phase buildout is disabled and the device maintains a fixed-phase relationship between the selected input clock and the output clock during an input clock switch. Detailed operations and timing characteristics for these pins may be found in the Any-Rate Precision Clock Family Reference Manual. This pin has a weak pull-down. The indicate operation is input to output clock family Reference Manual. This pin has a weak pull-down.

Table 3. Si5368 Pin Descriptions (Continued)

Solution	Pin#	Pin Name	I/O	Signal Level	<u>-</u>
by 1/fOSC (approximately 200 ps). Detailed operations, restrictions, and timing characteristics for this pin may be found in the Any-Rate Precision Clock Family Reference Manual. There is no limit on the range of latency adjustment by this method. Pin control is enabled by setting in/CDEC_PIN = 1 (default). Note: INC does not increase latency if INI_HS = 4. If in/CDEC_PIN = 0, this pin is ignored and coarse output latency is controlled via the CLAT register. If both INC and DEC care tied high, phase buildout is disabled and the device maintains a fixed-phase relationship between the selected input clock and the output clock during an input clock switch. Detailed operations and timing characteristics for these pins may be found in the Any-Rate Precision Clock Family Reference Manual. This pin has a weak pull-down. CKIN1 Active Clock Indicator. This pin serves as the CKIN1 active clock indicator. The CK1 ACTV REG bit always reflects the active clock status for CKIN1. If CK1 ACTV_PIN = 1, this status will also be reflected on the C1A pin with active polarity controlled by the CK ACTV_POL bit. If CK1 ACTV_PIN = 0, this output tristates. CKIN2 Active Clock Indicator. This pin serves as the CKIN2 active clock indicator. The CK2 ACTV_POL bit. If CK1 ACTV_PIN = 0, this output tristates. CKIN2 Active Clock Indicator. This pin serves as the CKIN2 active clock indicator. The CK2 ACTV_POL bit. If CK1 ACTV_PIN = 0, this output tristates. CK ACTV_POL bit. If CK1 ACTV_PIN = 0, this output tristates. CK ACTV_POL bit. If CK2 ACTV_PIN = 0, this output tristates. CK ACTV_POL bit. If CK2 ACTV_PIN = 0, this output tristates. CK ACTV_POL bit. If CK2 ACTV_PIN = 0, this output tristates. CK ACTV_POL bit. If CK2 ACTV_PIN = 0, this output tristates. CK ACTV_POL bit. If CK2 ACTV_PIN = 0, this output tristates. CK ACTV_POL bit. If CK2 ACTV_PIN = 0, this output tristates. CK ACTV_POL bit. If CK2 ACTV_PIN = 0, this output tristates. CK ACTV_POL bit. If CK2 ACTV_PIN = 0, this output tristates. CK ACTV_POL bit. If CK2 ACTV	55	INC	I	LVCMOS	Coarse Latency Increment.
Lions, and timing characteristics for this pin may be found in the Any-Rate Precision Clock Family Reference Manual. There is no limit on the range of latency adjustment by this method. Pin control is enabled by setting INCDEC PIN = 1 (default). Note: INC does not increase latency if IN IRS = 4.					
tions, and timing characteristics for this pin may be found in the Any-Rate Precision Clock Family Reference Manual. There is no limit on the range of latency adjustment by this method. Pin control is enabled by setting INCDEC PIN = 1 (default). Note: INC does not increase latency if N IHS = 4. If INCDEC PIN = 0, this pin is ignored and coarse output latency is controlled via the CLAT register. If both INC and DEC are tied high, phase buildout is disabled and the device maintains a fixed-phase relationship between the selected input clock and the output clock during an input clock switch. Detailed operations and timing characteristics for these pins may be found in the Any-Rate Precision Clock Family Reference Manual. This pin has a weak pull-down. CKIN Activ Refe bit always reflects the active clock status for CKIN1. If CK1_ACTV_REG bit always reflects the active clock status for CKIN1. If CK1_ACTV_PIN = 1, this status will also be reflected on the C1A pin with active polarity controlled by the CK_ACTV_PIO_b bit. If CK1_ACTV_PIN = 0, this output tristates. CKIN2_ACTV_REG bit always reflects the active clock status for CKIN2. If CK2_ACTV_PIN = 1, this status will also be reflected on the C2A pin with active polarity controlled by the CK_ACTV_PIO_b bit. If CK2_ACTV_PIN = 0, this output tristates. CKIN2_ACTV_PO_b bit. If CK2_ACTV_PIN = 0, this output tristates. CKIN2_ACTV_PO_b bit. If CK2_ACTV_PIN = 0, this output tristates. CKIN2_ACTV_PO_b bit. If CK2_ACTV_PIN = 0, this output tristates. CKIN2_ACTV_PO_b bit. If CK2_ACTV_PIN = 0, this output tristates. CKIN2_ACTV_PO_b bit. If CK2_ACTV_PIN = 0, this output tristates. CKIN2_ACTV_PO_b bit. If CK2_ACTV_PIN = 0, this pin functions as the bidirectional serial data port. In SPI microprocessor control mode (CMODE = 0), these pins function as a hardware controlled address bit LTQ. CKINDE = 1), these pins are ignored. This pin has a weak pull-down. CKINDE = 1), this pin functions as the slave select input. This pin has a weak pull-down.					by 1/fOSC (approximately 200 ps). Detailed operations, restric-
Any-Rate Precision Clock Family Reference Manual. There is no limit on the range of latency adjustment by this method. Pin control is enabled by setting \(\frac{IMCDEC PIN}{MCDEC PIN} = 1 \) (default). Note: INC does not increase latency if NI_HS = 4. If \(\frac{IMCDEC PIN}{MCDEC PIN} = 1 \) (default). Note: INC does not increase latency if NI_HS = 4. If \(\frac{IMCDEC PIN}{MCDEC PIN} = 1 \) (default). Note: INC does not increase latency if NI_HS = 4. If \(\frac{IMCDEC PIN}{MCDEC PIN} = 1 \) (pits) phase buildout is disabled and the device maintains a fixed-phase relationship between the selected input clock and the output clock during an input clock switch. Detailed operations and timing characteristics for these pins may be found in the Any-Rate Precision Clock Family Reference Manual. This pin has a weak pull-down. CKIM1 Active Clock Indicator. This pin serves as the CKIM1 active clock indicator. The CK1. ACTV. PIN = 1, this status will also be reflected on the C1A pin with active polarity controlled by the CK. ACTV. POL, bit. If CK1. ACTV. PIN = 0, this output tristates. DESTINATION OF CKIM2. If CK2. ACTV. PIN = 1, this status will also be reflected on the C2A pin with active polarity controlled by the CK. ACTV. PIN = 1, this status will also be reflected on the C2A pin with active polarity controlled by the CK. ACTV. PIN = 1, this status will also be reflected on the C2A pin with active polarity controlled by the CK. ACTV. PIN = 1, this status will also be reflected on the C2A pin with active polarity controlled by the CK. ACTV. PIN = 1, this status will also be reflected on the C2A pin with active polarity controlled by the CK. ACTV. PIN = 1, this status will also be reflected on the C2A pin with active polarity controlled by the CK. ACTV. PIN = 1, this status will also be reflected on the C2A pin with active polarity controlled by the CK. ACTV. PIN = 1, this status will also be reflected on the C2A pin with active polarity controlled by the CK. ACTV. PIN = 1, this status will also be reflec					
no limit on the range of latency adjustment by this method. Pin control is enabled by setting INCDEC_PIN = 1 (default). Note: INC does not increase latency if NI_HS = 4. If INCDEC_PIN = 0, this pin is ignored and coarse output latency is controlled via the CLAT register. If both INC and DEC are tied high, phase buildout is disabled and the device maintains a fixed-phase relationship between the selected input clock and the output clock during an input clock switch. Detailed operations and timing characteristics for these pins may be found in the Any-Rate Precision Clock Family Reference Manual. This pin has a weak pull-down. 58 C1A O LVCMOS CHIM Active Clock Indicator. This pin serves as the CKIM1 active clock indicator. The CKI_ACTV_PIN_PIN_1, this status will also be reflected on the C1A pin with active polarity controlled by the CK_ACTV_POL_BIN_1 if CKI_ACTV_PIN_PIN_2, this subjust tristates. 59 C2A O LVCMOS CKIN2 Active Clock Indicator. This pin serves as the CKIN2 active clock indicator. The CK2_ACTV_PIN_PIN_1 if CK1_ACTV_PIN_PIN_2, this output tristates. CKIN2_ACTV_PIN_BIN_2 if CK2_ACTV_PIN_1 = 0, this output tristates. CKIN2_ACTV_PIN_BIN_3 in this active clock indicator. The CK2_ACTV_PIN_PIN_1 = 1, this status will also be reflected on the C2Ap in with active polarity controlled by the CK_ACTV_POL_bit. If CK2_ACTV_PIN_PIN_1 = 0, this output tristates. 60 SCL I LVCMOS Serial Clock. This pin functions as the serial port clock input for both SPI and IPC modes. This pin has a weak pull-down. Serial Data. In IPC microprocessor control mode (CMODE = 0), this pin functions as the bidirectional serial data port. In SPI microprocessor control mode (CMODE = 1), this pin functions as the serial port controlled address bits. The IPC address is 1101 [A2] [A1] [A0]. In SPI microprocessor control mode (CMODE = 0), this pin functions as a hardware controlled address bits. The IPC address is 1101 [A2] [A1] [A0]. In SPI microprocessor control mode (CMODE = 1), this pin functions as a hardware controlled add					
Control is enabled by setting MCDEC_PIN = 1 (default). Note: INC does not increase latency if NI_HS = 4. If MCDEC_PIN = 0, this pin is ignored and coarse output latency is controlled via the CLAT_register. If both INC and DEC are tied high, phase buildout is disabled and the device maintains a fixed-phase relationship between the selected input clock and the output clock during an input clock switch. Detailed operations and timing characteristics for these pins may be found in the Any-Rate Precision Clock Family Reference Manual. This pin has a weak pull-down.					
Note: INIC does not increase latency if Ni_HS = 4. If INI_CDEC_IIN_ = 0, this pin is ignored and coarse output latency is controlled via the CLAT register. If both INIC and DEC are tied high, phase buildout is disabled and the device maintains a fixed-phase relationship between the selected input clock and the output clock during an input clock switch. Detailed operations and timing characteristics for these pins may be found in the Any-Rate Precision Clock Family Reference Manual. This pin has a weak pull-down. CKIN1 Active Clock Indicator. The CKIN1. If CKI_ACTV_REG bit always reflects the active clock status for CKIN1. If CKI_ACTV_PIN_ = 1, this status will also be reflected on the C1A pin with active polarity controlled by the CKA_CTV_POL_bit. If CKI_ACTV_PIN_ = 1, this status will also be reflected on the C1A pin with active polarity controlled by the CKA_CTV_POL_bit. If CKI_ACTV_PIN_ = 1, this status will also be reflected on the C2A pin with active polarity controlled by the CKA_CTV_POL_bit. If CKI_ACTV_PIN_ = 1, this status will also be reflected on the C2A pin with active polarity controlled by the CKA_CTV_POL_bit. If CKI_ACTV_PIN_ = 1, this status will also be reflected on the C2A pin with active polarity controlled by the CKA_CTV_POL_bit. If CKI_ACTV_PIN_ = 1, this status will also be reflected on the C2A pin with active polarity controlled by the CKA_CTV_POL_bit. If CKI_ACTV_PIN_ = 0, this output tristates. 8					
If INCDEC_PIN_= 0, this pin is ignored and coarse output latency is controlled via the CLAT register. If both INC and DEC are tied high, phase buildout is disabled and the device maintains a fixed-phase relationship between the selected input clock and the output clock during an input clock switch. Detailed operations and timing characteristics for these pins may be found in the Any-Rate Precision Clock Family Reference Manual. This pin has a weak pull-down. CKIN1 Active Clock Indicator. This pin serves as the CKIN1 active clock indicator. The CK1. ACTV_REG bit always reflects the active clock status for CKIN1. If CK1. ACTV_PIN = 1, this status will also be reflected on the C1A pin with active polarity controlled by the CK ACTV_POL bit. If CK1 ACTV_PIN = 0, this output tristates. CKIN2 Active Clock Indicator. This pin serves as the CKIN2 active clock indicator. The CK2. ACTV_PIN = 1, this status will also be reflected on the C2A pin with active polarity controlled by the CK. ACTV_PIN = 1, this status will also be reflected on the C2A pin with active polarity controlled by the CK. ACTV_PIN = 1, this status will also be reflected on the C2A pin with active polarity controlled by the CK. ACTV_PIN = 1, this status will also be reflected on the C2A pin with active polarity controlled by the CK ACTV_PIN = 0, this output tristates. Experimental provides the control of the control					_ , , ,
latency is controlled via the <u>CLAT</u> register. If both INC and DEC are tied high, phase buildout is disabled and the device maintains a fixed-phase relationship between the selected input clock and the output clock during an input clock switch. Detailed operations and timing characteristics for these pins may be found in the Any-Rate Precision Clock Family Reference Manual. This pin has a weak pull-down. CKIN1 Active Clock Indicator. This pin his pin serves as the CKIN1 active clock indicator. The <u>CK1 ACTV REG</u> bit always reflects the active clock status for CKIN1. If <u>CK1 ACTV PIN = 1</u> , this status will also be reflected on the C1A pin with active polarity controlled by the <u>CK ACTV POL</u> bit. If <u>CK1 ACTV PIN = 0</u> , this output tristates. Second Color CKIN2 Active Clock Indicator. This pin serves as the CKIN2 active clock indicator. The <u>CK2 ACTV PIN = 0</u> this status will also be reflected on the C2A pin with active polarity controlled by the <u>CK ACTV PIN = 1</u> , this status will also be reflected on the C2A pin with active polarity controlled by the <u>CK ACTV PIN = 1</u> , this status will also be reflected on the C2A pin with active polarity controlled by the <u>CK ACTV PIN = 0</u> , this output tristates. Serial Clock					
If both INC and DEC are tied high, phase buildout is disabled and the device maintains a fixed-phase relationship between the selected input clock and the output clock during an input clock switch. Detailed operations and timing characteristics for these pins may be found in the Any-Rate Precision Clock Family Reference Manual. This pin has a weak pull-down. CKIM1 Active Clock Indicator. This pin serves as the CKIN1 active clock indicator. The CK1 ACTV_REO bit always reflects the active clock status for CKIN1. If CK1 ACTV_PIN = 1, this status will also be reflected on the C1A pin with active polarity controlled by the CKACTV_PO_b bit. If CK1 ACTV_PIN = 0, this output tristates. Second CKIN2 Active Clock Indicator. The CK2 ACTV_REO bit always reflects the active clock status for CKIN2. If CK2 ACTV_PIN = 1, this status will also be reflected on the C2A pin with active polarity controlled by the CKACTV_PO_b bit. If CK2 ACTV_PIN = 1, this status will also be reflected on the C2A pin with active polarity controlled by the CKACTV_PO_b bit. If CK2 ACTV_PIN = 0, this output tristates. Serial Clock. This pin functions as the serial port clock input for both SPI and I ² C modes.					
and the device maintains a fixed-phase relationship between the selected input clock and the output clock during an input clock switch. Detailed operations and timing characteristics for these pins may be found in the Any-Rate Precision Clock Family Reference Manual. This pin has a weak pull-down. 58 C1A O LVCMOS CKIM1 Active Clock Indicator. This pin serves as the CKIN1 active clock indicator. The CK1A_ACTV_PEE bit always reflects the active clock status for CKIN1. If CK1_ACTV_PIN = 1, this status will also be reflected on the C1A pin with active polarity controlled by the CK_ACTV_POL_bit. If CK1_ACTV_PIN = 0, this output tristates. 59 C2A O LVCMOS CKIN2_Active Clock Indicator. This pin serves as the CKIN2 active clock indicator. The CK2_ACTV_REE_bit always reflects the active clock status for CKIN2_If CK2_ACTV_PIN = 1, this status will also be reflected on the C2A pin with active polarity controlled by the CK_ACTV_POL_bit. If CK2_ACTV_PIN = 0, this output tristates. 60 SCL I LVCMOS Serial Clock. This pin functions as the serial port clock input for both SPI and I ² C modes. This pin has a weak pull-down. 61 SDA_SDO I/O LVCMOS In I ² C microprocessor control mode (CMODE = 0), this pin functions as the bidirectional serial data port. In SPI microprocessor control mode (CMODE = 1), this pin functions as the serial data output. 68 A0 I LVCMOS Serial Data. In I ² C microprocessor control mode (CMODE = 0), these pins function as hardware controlled address bits. The I ² C address is 1101 [A2] [A11] [A0]. In SPI microprocessor control mode (CMODE = 0), this pin functions as hardware controlled address bits. The I ² C address is 1101 [A2] [A11] [A0]. In SPI microprocessor control mode (CMODE = 0), this pin functions as a hardware controlled address bit [A2]. In SPI microprocessor control mode (CMODE = 1), this pin functions as a hardware controlled address bit [A2]. In SPI microprocessor control mode (CMODE = 1), this pin functions as a hardware controlled address bit [A2].					
the selected input clock and the output clock during an input clock switch. Detailed operations and timing characteristics for these pins may be found in the Any-Rate Precision Clock Family Reference Manual. This pin has a weak pull-down. CKIM1 Active Clock Indicator. This pin serves as the CKIM1 active clock indicator. The CK1 ACTV_REG bit always reflects the active clock status for CKIM1. If CK1 ACTV_PIM = 1, this status will also be reflected on the C1A pin with active polarity controlled by the CK ACTV POL bit. If CK1 ACTV_PIM = 0, this output tristates. CKIM2 Active Clock Indicator. This pin serves as the CKIM2 active clock indicator. The CK2 ACTV_POL bit. If CK1 ACTV_PIM = 0, this output tristates. CKIM2.1 If CK2 ACTV_PIM = 1, this status will also be reflected on the C2A pin with active polarity controlled by the CK ACTV_POL bit. If CK2 ACTV_PIM = 0, this output tristates. Serial Clock. This pin functions as the serial port clock input for both SPI and I ² C modes. This pin functions as the serial port clock input for both SPI and I ² C modes. This pin has a weak pull-down. Serial Data. In I ² C microprocessor control mode (CMODE = 0), this pin functions as the bidirectional serial data port. In SPI microprocessor control mode (CMODE = 1), this pin functions as the serial data output. Serial Port Address. In I ² C microprocessor control mode (CMODE = 0), these pins function as hardware controlled address bits. The I ² C address is 1101 [A2] [A1] [A0]. In SPI microprocessor control mode (CMODE = 0), this pin functions as a hardware controlled address bits. The I ² C address is 1101 [A2] [A1] [A0]. In SPI microprocessor control mode (CMODE = 0), this pin functions as a hardware controlled address bit. The I ² C address is 1101 [A2] [A1] [A0]. In SPI microprocessor control mode (CMODE = 1), this pin functions as a hardware controlled address bit [A2]. In SPI microprocessor control mode (CMODE = 1), this pin functions as a hardware controlled address bit [A2]. In SPI microprocessor control mode (C					
Clock switch. Detailed operations and timing characteristics for these pins may be found in the Any-Rate Precision Clock Family Reference Manual. This pin has a weak pull-down. Stint Active Clock Indicator. The CKI ACTV REG bit always reflects the active clock status for CKIN1. If CK1 ACTV REG bit always reflects the active clock status for CKIN1. If CK1 ACTV PIN = 1, this status will also be reflected on the C1A pin with active polarity controlled by the CK ACTV POL bit. If CK1 ACTV PIN = 0, this output tristates. Stint Active Clock Indicator. The CK2 ACTV REG bit always reflects the active clock status for CKIN2. If CK2 ACTV REG bit always reflects the active clock status for CKIN2. If CK2 ACTV PIN = 1, this status will also be reflected on the C2A pin with active polarity controlled by the CK ACTV POL bit. If CK2 ACTV PIN = 0, this output tristates. Stint Clock Condition of the CX ACTV PIN = 0, this output tristates. This pin functions as the serial port clock input for both SPI and I ² C modes. This pin functions as the serial port clock input for both SPI and I ² C modes. This pin as a weak pull-down. Strial Data.					
these pins may be found in the Any-Rate Precision Clock Family Reference Manual. This pin has a weak pull-down. 58 C1A O LVCMOS CKIN1 Active Clock Indicator. This pin has a weak pull-down active clock indicator. The CK1 ACTV REG bit always reflects the active clock status for CKIN1. If CK1 ACTV PIN = 1, this status will also be reflected on the C1A pin with active polarity controlled by the CK ACTV POL bit. If CK1 ACTV PIN = 0, this output tristates. 59 C2A O LVCMOS CKIN2 Active Clock Indicator. This pin serves as the CKIN2 active clock indicator. The CK2 ACTV REG bit always reflects the active clock status for CKIN2 . If CK2 ACTV PIN = 1, this status will also be reflected on the C2A pin with active polarity controlled by the CK ACTV POL bit. If CK2 ACTV PIN = 0, this output tristates. 60 SCL I LVCMOS Serial Clock. This pin functions as the serial port clock input for both SPI and I ² C modes. This pin has a weak pull-down. 61 SDA_SDO I/O LVCMOS Serial Data. In I ² C microprocessor control mode (CMODE = 0), this pin functions as the bidirectional serial data port. In SPI microprocessor control mode (CMODE = 1), this pin functions as the serial data port. In SPI microprocessor control mode (CMODE = 1), this pin functions as the serial data port. In SPI microprocessor control mode (CMODE = 1), this pin functions as the serial data port. In SPI microprocessor control mode (CMODE = 1), this pin functions as the serial data port. In SPI microprocessor control mode (CMODE = 1), this pin functions as the serial data port. In SPI microprocessor control mode (CMODE = 0), this pin function as hardware controlled address bits. The I ² C address is 1101 [A2] [A1] [A0]. In SPI microprocessor control mode (CMODE = 0), this pin functions as a hardware controlled address bits. The I ² C address is 1101 [A2]. In SPI microprocessor control mode (CMODE = 1), this pin functions as a hardware controlled address bit [A2]. Figure 1					
ily Reference Manual. This pin has a weak pull-down. CKIM ACTV REG bit always reflects the active clock status for CKIN1. If CK1. ACTV REG bit always reflects the active clock status for CKIN1. If CK1. ACTV PIN = 1, this status will also be reflected on the C1A pin with active polarity controlled by the CK ACTV POL bit. If CK1. ACTV PIN = 0, this output tristates. Sequence of CKIN2. ACTV POL bit. If CK1. ACTV PIN = 0, this output tristates. CKIN2. ACTV REG bit always reflects the active clock status for CKIN2. If CK2 ACTV REG bit always reflects the active clock status for CKIN2. If CK2 ACTV PIN = 1, this status will also be reflected on the C2A pin with active polarity controlled by the CK ACTV POL bit. If CK2 ACTV PIN = 0, this output tristates. Serial Clock. This pin functions as the serial port clock input for both SPI and I ² C modes. This pin functions as the serial port clock input for both SPI and I ² C modes. In I ² C microprocessor control mode (CMODE = 0), this pin functions as the bidirectional serial data port. In SPI microprocessor control mode (CMODE = 1), this pin functions as the serial data output. Serial Port Address. In I ² C microprocessor control mode (CMODE = 0), these pins function as hardware controlled address bits. The I ² C address is 1101 [A2] [A1] [A0]. In SPI microprocessor control mode (CMODE = 1), these pins are ignored. This pin has a weak pull-down. Serial Port Address/Slave Select. In I ² C microprocessor control mode (CMODE = 0), this pin functions as a hardware controlled address bit [A2]. In SPI microprocessor control mode (CMODE = 1), this pin functions as a hardware controlled address bit [A2]. In SPI microprocessor control mode (CMODE = 1), this pin functions as a hardware controlled address bit [A2]. In SPI microprocessor control mode (CMODE = 1), this pin functions as the slave select input. This pin has a weak pull-down.					
This pin has a weak pull-down. CKIM Active Clock Indicator. This pin serves as the CKIN1 active clock indicator. The CK1 ACTV REG bit always reflects the active clock status for CKIN1. If CK1 ACTV PIN = 1, this status will also be reflected on the C1A pin with active polarity controlled by the CK ACTV POL bit. If CK1 ACTV PIN = 0, this output tristates. SP C2A O LVCMOS CKIN2 Active Clock Indicator. This pin serves as the CKIN2 active clock indicator. The CK2 ACTV REG bit always reflects the active clock status for CKIN_2. If CK2 ACTV PIN = 1, this status will also be reflected on the C2A pin with active polarity controlled by the CK ACTV POL bit. If CK2 ACTV PIN = 0, this output tristates. Serial Clock. This pin functions as the serial port clock input for both SPI and I²C modes. This pin functions as the serial port clock input for both SPI and I²C modes. This pin has a weak pull-down. Serial Data. In I²C microprocessor control mode (CMODE = 0), this pin functions as the bidirectional serial data port. In SPI microprocessor control mode (CMODE = 1), this pin functions as the serial part clock and the serial data output. Serial Port Address. In I²C microprocessor control mode (CMODE = 0), these pins function as hardware controlled address bits. The I²C address is 1101 [A2] [A1] [A0]. In SPI microprocessor control mode (CMODE = 1), this pin functions as a hardware controlled address bits. The I²C address is 1101 [A2] [A1] [A0]. In SPI microprocessor control mode (CMODE = 0), this pin functions as a hardware controlled address bit [A2]. In SPI microprocessor control mode (CMODE = 0), this pin functions as a hardware controlled address bit [A2]. In SPI microprocessor control mode (CMODE = 1), this pin functions as the slave select input. This pin has a weak pull-down.					
Serial Data					
This pin serves as the CKIN1 active clock indicator. The CK1 ACTV REG bit always reflects the active clock status for CKIN1. If CK1 ACTV PIN = 1, this status will also be reflected on the C1A pin with active polarity controlled by the CK ACTV POL bit. If CK1 ACTV PIN = 0, this output tristates. 59 C2A O LVCMOS CKIN2 Active Clock Indicator. This pin serves as the CKIN2 active clock indicator. The CK2 ACTV REG bit always reflects the active clock status for CKIN2. If CK2 ACTV PIN = 1, this status will also be reflected on the CA2 pin with active polarity controlled by the CK ACTV POL bit. If CK2 ACTV PIN = 0, this output tristates. 60 SCL I LVCMOS Serial Clock. This pin functions as the serial port clock input for both SPI and I ² C modes. This pin has a weak pull-down. Serial Data. In I ² C microprocessor control mode (CMODE = 0), this pin functions as the bidirectional serial data port. In SPI microprocessor control mode (CMODE = 1), this pin functions as the serial data output. Serial Port Address. In I ² C microprocessor control mode (CMODE = 0), these pins function as hardware controlled address bits. The I ² C address is 1101 [A2] [A1] [A0]. In SPI microprocessor control mode (CMODE = 0), this pin functions as a hardware controlled address bits. The I ² C address is 1101 [A2] [A1] [A0]. In SPI microprocessor control mode (CMODE = 0), this pin functions as a hardware controlled address bits. The I ² C address is 1101 [A2] [A1] [A0]. In SPI microprocessor control mode (CMODE = 0), this pin functions as a hardware controlled address bit [A2]. In SPI microprocessor control mode (CMODE = 0), this pin functions as a hardware controlled address bit [A2]. In SPI microprocessor control mode (CMODE = 1), this pin functions as he slave select input. This pin has a weak pull-down.	50	04.4		11/01/00	
CK1_ACTV_REG_ bit always reflects the active clock status for CKIN1. If CK1_ACTV_PIN = 1, this status will also be reflected on the C1A pin with active polarity controlled by the CK_ACTV_POL_ bit. If CK1_ACTV_PIN = 0, this output tristates. Section CKIN2_ACTV_POL_ bit. If CK1_ACTV_PIN = 0, this output tristates.	58	CIA	U	LVCMOS	
CKIN1. If CK1 ACTV PIN = 1, this status will also be reflected on the C1A pin with active polarity controlled by the CK ACTV POL bit. If CK1 ACTV PIN = 0, this output tristates. 59 C2A O LVCMOS CKIN2 Active Clock Indicator. This pin serves as the CKIN2 active clock indicator. This pin serves as the CKIN2 active clock indicator. This pin serves as the CKIN2 active clock status for CKIN2. If CK2 ACTV PIN = 1, this status will also be reflected on the C2A pin with active polarity controlled by the CK ACTV POL bit. If CK2 ACTV PIN = 0, this output tristates. 60 SCL I LVCMOS Serial Clock. This pin functions as the serial port clock input for both SPI and I²C modes. This pin has a weak pull-down. Serial Data. In I²C microprocessor control mode (CMODE = 0), this pin functions as the bidirectional serial data port. In SPI microprocessor control mode (CMODE = 1), this pin functions as the serial data output. Serial Port Address. In I²C microprocessor control mode (CMODE = 0), these pins function as hardware controlled address bits. The I²C address is 1101 [A2] [A1] [A0]. In SPI microprocessor control mode (CMODE = 1), these pins are ignored. This pin has a weak pull-down. 70 A2_SS I LVCMOS Serial Port Address/Slave Select. In I²C microprocessor control mode (CMODE = 0), this pin functions as a hardware controlled address bit [A2]. In SPI microprocessor control mode (CMODE = 1), this pin functions as a hardware controlled address bit [A2]. In SPI microprocessor control mode (CMODE = 1), this pin functions as the slave select input. This pin has a weak pull-down.					
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CZA					
This pin serves as the CKIN2 active clock indicator. The CK2 ACTV REG bit always reflects the active clock status for CKIN_2. If CK2 ACTV PIN = 1, this status will also be reflected on the C2A pin with active polarity controlled by the CK ACTV POL bit. If CK2 ACTV PIN = 0, this output tristates. Serial Clock. This pin functions as the serial port clock input for both SPI and I ² C modes. This pin has a weak pull-down. Serial Data. In I ² C microprocessor control mode (CMODE = 0), this pin functions as the bidirectional serial data port. In SPI microprocessor control mode (CMODE = 1), this pin functions as the serial data output. Serial Port Address. In I ² C microprocessor control mode (CMODE = 0), these pins function as hardware controlled address bits. The I ² C address is 1101 [A2] [A1] [A0]. In SPI microprocessor control mode (CMODE = 1), these pins are ignored. This pin has a weak pull-down. 70 A2_SS I LVCMOS Serial Port Address/Slave Select. In I ² C microprocessor control mode (CMODE = 0), this pin functions as a hardware controlled address bit [A2]. In SPI microprocessor control mode (CMODE = 1), this pin functions as a hardware controlled address bit [A2]. In SPI microprocessor control mode (CMODE = 1), this pin functions as the slave select input. This pin has a weak pull-down.					. – – – – – – – – – – – – – – – – – – –
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This pin has a weak pull-down.					
					·
	NI-4:				



Table 3. Si5368 Pin Descriptions (Continued)

Pin#	Pin Name	I/O	Signal Level	Description			
71	SDI	1	LVCMOS	Serial Data In.			
				In SPI microprocessor control mode (CMODE = 1), this pin			
				functions as the serial data input.			
				In I^2 C microprocessor control mode (CMODE = 0), this pin is			
				ignored.			
				This pin has a weak pull-down.			
77	CKOUT3+	0	MULTI	Clock Output 3.			
78	CKOUT3-			Differential clock output. Output signal format is selected by			
				<u>SFOUT3_REG</u> register bits. Output is differential for LVPECL,			
				LVDS, and CML compatible modes. For CMOS format, both			
				output pins drive identical single-ended clock outputs.			
82	CKOUT1-	0	MULTI	Clock Output 1.			
83	CKOUT1+			Differential clock output. Output signal format is selected by			
				<u>SFOUT1_REG</u> register bits. Output is differential for LVPECL,			
				LVDS, and CML compatible modes. For CMOS format, both			
				output pins drive identical single-ended clock outputs.			
87	FS_OUT-	0	MULTI	Frame Sync Output.			
88	FS_OUT+			Differential frame sync output or fifth high-speed clock output.			
	_			Output signal format is selected by <u>SFOUT_FSYNC_REG</u> reg-			
				ister bits. Output is differential for LVPECL, LVDS, and CML			
				compatible modes. For CMOS format, both output pins drive			
				identical single-ended clock outputs. Duty cycle and active			
				polarity are controlled by <u>FSYNC PW</u> and <u>FSYNC POL</u> bits,			
				respectively. Detailed operations and timing characteristics for			
				these pins may be found in the Any-Rate Precision Clock Fam-			
				ily Reference Manual.			
90	CMODE	I	LVCMOS	Control Mode.			
				Selects I ² C or SPI control mode for the device.			
				0 = I ² C Control Mode.			
				1 = SPI Control Mode.			
				This pin must be tied high or low.			
92	CKOUT2+	0	MULTI	Clock Output 2.			
93	CKOUT2-			Differential clock output. Output signal format is selected by			
				SFOUT2 REG register bits. Output is differential for LVPECL,			
				LVDS, and CML compatible modes. For CMOS format, both			
				output pins drive identical single-ended clock outputs.			
97	CKOUT4-	0	MULTI	Clock Output 4.			
98	CKOUT4+			Differential clock output. Output signal format is selected by			
				SFOUT4 REG register bits. Output is differential for LVPECL,			
				LVDS, and CML compatible modes. For CMOS format, both			
				output pins drive identical single-ended clock outputs.			
GND PAD	GND PAD	GND	Supply	Ground Pad.			
				The ground pad must provide a low thermal and electrical			
				impedance to a ground plane.			
Note: Internal register names are indicated by underlined italics, e.g. <u>INT_PIN</u> . See Si5368 Register Map.							

3. Ordering Guide

Ordering Part Number	Output Clock Frequency Range	Package	ROHS6, Pb-Free	Temperature Range
Si5368A-C-GQ	2 kHz–945 MHz 970–1134 MHz 1.213–1.417 GHz	100-Pin 14 x 14 mm TQFP	Yes	–40 to 85 °C
Si5368B-C-GQ	2 kHz-808 MHz	100-Pin 14 x 14 mm TQFP	Yes	–40 to 85 °C
Si5368C-C-GQ	2 kHz-346 MHz	100-Pin 14 x 14 mm TQFP	Yes	–40 to 85 °C



4. Package Outline: 100-Pin TQFP

Figure 4 illustrates the package details for the Si5368. Table 4 lists the values for the dimensions shown in the illustration.

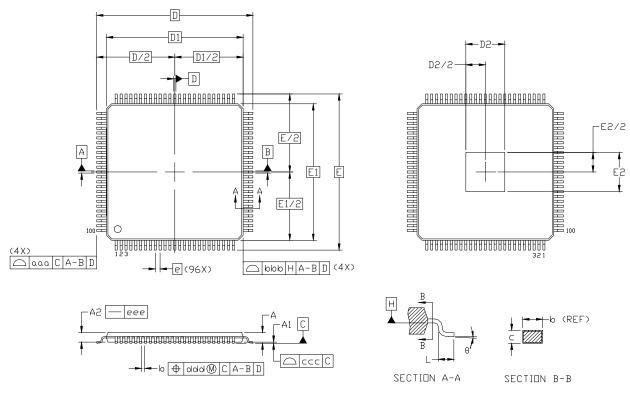


Figure 4. 100-Pin Thin Quad Flat Package (TQFP)

Table 4. 100-Pin Package Diagram Dimensions

Dimension	Min	Nom	Max		
Α	_	_	1.20		
A1	0.05	_	0.15		
A2	0.95	1.00	1.05		
b	0.17	0.22	0.27		
С	0.09	_	0.20		
D	16.00 BSC.				
D1	14.00 BSC.				
D2	3.85	4.00	4.15		
е	0.50 BSC.				

Dimension	Min	Nom	Max
E	16.00 BSC.		
E1	14.00 BSC.		
E2	3.85	4.00	4.15
L	0.45	0.60	0.75
aaa	_	_	0.20
bbb	1	_	0.20
ccc	_	_	0.08
ddd	_	_	0.08
θ	0°	3.5°	7°

- 1. All dimensions shown are in millimeters (mm) unless otherwise noted.
- 2. Dimensioning and Tolerancing per ANSI Y14.5M-1994.
- 3. This package outline conforms to JEDEC MS-026, variant AED-HD.
- **4.** Recommended card reflow profile is per the JEDEC/IPC J-STD-020C specification for Small Body Components.

5. Recommended PCB Layout

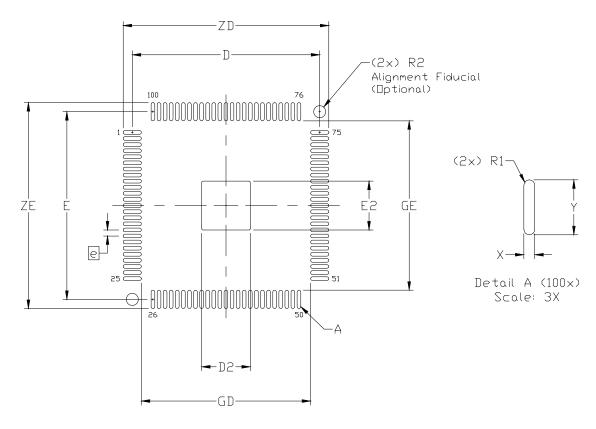


Figure 5. PCB Land Pattern Diagram



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Table 5. PCB Land Pattern Dimensions

Dimension	MIN	MAX	
е	0.50 BSC.		
E	15.40 REF.		
D	15.40 REF.		
E2	3.90	4.10	
D2	3.90	4.10	
GE	13.90	_	
GD	13.90	_	
X	_	0.30	
Y	1.50 REF.		
ZE	_	16.90	
ZD	_	16.90	
R1	0.15 REF		
R2	_	1.00	

Notes (General):

- 1. All dimensions shown are in millimeters (mm) unless otherwise noted.
- 2. Dimensioning and Tolerancing is per the ANSI Y14.5M-1994 specification.
- 3. This Land Pattern Design is based on IPC-7351 guidelines.
- **4.** All dimensions shown are at Maximum Material Condition (MMC). Least Material Condition (LMC) is calculated based on a Fabrication Allowance of 0.05 mm.

Notes (Solder Mask Design):

1. All metal pads are to be non-solder mask defined (NSMD). Clearance between the solder mask and the metal pad is to be 60 µm minimum, all the way around the pad.

Notes (Stencil Design):

- **1.** A stainless steel, laser-cut and electro-polished stencil with trapezoidal walls should be used to assure good solder paste release.
- 2. The stencil thickness should be 0.125 mm (5 mils).
- 3. The ratio of stencil aperture to land pad size should be 1:1 for the perimeter pads.
- **4.** A 4 x 4 array of 0.80 mm square openings on 1.05 mm pitch should be used for the center ground pad.

Notes (Card Assembly):

- 1. A No-Clean, Type-3 solder paste is recommended.
- 2. The recommended card reflow profile is per the JEDEC/IPC J-STD-020C specification for Small Body Components.



DOCUMENT CHANGE LIST

Revision 0.1 to Revision 0.2

- Changed LVTTL to LVCMOS in Table 2, "Absolute Maximum Ratings," on page 4.
- Updated Figure 2 and Figure 3 on page 6.
- Updated "2. Pin Descriptions: Si5368".
 - Added RATE0 to pin description. By changing RATE[1:0] the part can emulate a Si5367.
 - Changed XA/XB pin description to support both differential and single ended external REFCLK.

Revision 0.2 to Revision 0.3

- Added Figure 1, "Typical Phase Noise Plot," on page 5.
- Updated Figure 2, "Si5368 Typical Application Circuit (I²C Control Mode)," and Figure 3, "Si5368 Typical Application Circuit (SPI Control Mode)," on page 6 to show INC and DEC.
- Updated "2. Pin Descriptions: Si5368".
 - Changed font of register names to underlined italics.
- Updated "3. Ordering Guide" on page 14.
- Added "5. Recommended PCB Layout".

Revision 0.3 to Revision 0.4

- Changed V_{DD} specification for 1.8 V.
- Updated Table 1 on page 2.
- Updated Table 2 on page 4.
- Added table under Figure 1 on page 5.
- Updated "1. Functional Description" on page 7.
- Clarified "2. Pin Descriptions: Si5368" on page 8 including correcting pin assignments for RATE0 and RATE1.





Si5368

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