



THIS SPEC IS OBSOLETE

Spec No: 38-07522

Spec Title: CY25023 SPREAD SPECTRUM CLOCK GENERATOR
7FOR EMI REDUCTION

Sunset Owner: Christopher Martin (CXQ)

Replaced by: None

Spread Spectrum Clock Generator for EMI Reduction

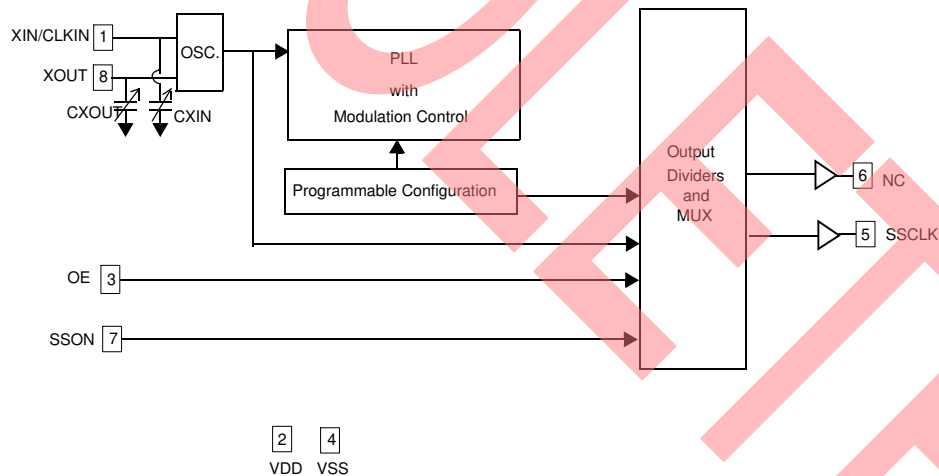
Features

- SSCLK frequency: 52.0 MHz
- Spread spectrum output with nominal 31.5 kHz modulation frequency
 - Center spread: $\pm 1.0\%$
- Input frequency
 - External clock or crystal: 16.384 MHz
- Integrated phase-locked loop (PLL)
- Low cycle to cycle jitter
- 3.3V operation
- Spread spectrum on and off function
- Output enable function

Benefits

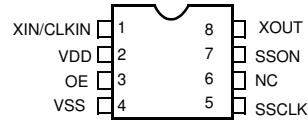
- Services most PC peripherals, networking, and consumer applications.
- Provides electromagnetic interference (EMI) reduction, to meet regulatory agency electromagnetic compliance (EMC) requirements.
- Eliminates the need for expensive and difficult to use overtone crystals.
- Internal PLL to generate up to 200 MHz output. Able to generate custom frequencies from an external crystal or a driven source.
- Suitable for most PC, consumer, and networking applications.
- Application compatibility in standard and low power systems.
- Provides ability to enable or disable spread spectrum with an external pin.
- Enables output clocks to High-Z state.

Logic Block Diagram



Pin Configurations

Figure 1. CY25023, 8-Pin SOIC



Pin Description

Pin	Name	Description
1	XIN/CLKIN	Reference Crystal or Clock Input (16.384 MHz)
2	VDD	3.3V Voltage Supply
3	OE	Output Enable Pin: Active High. If OE = 1, SSCLK is enabled.
4	VSS	GND
5	SSCLK	Spread Spectrum Clock Output (52.0 MHz, $\pm 1.0\%$ center spread)
6	NC	No Connect
7	SSON	Spread Spectrum Control. 1 = spread on, 0 = spread off.
8	XOUT	Crystal Output. Leave this pin floating if external clock is used.

Table 1. Spread Spectrum Table

Part Number	Spread Percentage
CY25023SC-1	$\pm 1.0\%$

Absolute Maximum Condition

Supply Voltage (VDD).....	-0.5 to +7.0V	Data Retention at Tj=125°C	>10 years
DC Input Voltage	-0.5V to V _{DD} +0.5	Package Power Dissipation.....	350 mW
Storage Temperature (Non-Condensing)....	-55°C to +125°C	Static Discharge Voltage.....	≥ 2000V
Junction Temperature	-40°C to +125°C	(per MIL-STD-883, Method 3015)	

Recommended Operating Conditions

Parameter	Description	Min	Typ	Max	Unit
V _{DD}	Supply Voltage	3.13	3.30	3.45	V
T _A	Ambient Temperature	0		70	° C
C _{LOAD}	Max. Load Capacitance at Pin 6			15	pF
XIN/CLKIN	External Reference, Crystal or Clock Input		16.384		MHz
F _{SSCLK}	SSCLK Output Frequency, C _{LOAD} = 15 pF		52.0		MHz
SS%	Spread Spectrum, CY25023SC-1		±1.0		%
T _{PU}	Power Up Time—for all VDDs to reach minimum specified voltage (power ramp must be monotonic)	0.05		500	ms

DC Electrical Specifications

Parameter	Description	Condition	Min	Typ	Max	Unit
I _{OH}	Output High Current	V _{OH} = V _{DD} - 0.5, V _{DD} =3.3V (source)	12	24		mA
I _{OL}	Output Low Current	V _{OL} = 0.5, V _{DD} = 3.3V (sink)	12	24		mA
V _{IH}	Input High Voltage	CMOS levels, 70% of V _{DD}	0.7V _{DD}			V
V _{IL}	Input Low Voltage	CMOS levels, 30% of V _{DD}			0.3V _{DD}	V
I _{IH}	Input High Current, OE and SSON pins	V _{in} =V _{DD}			10	μA
I _{IL}	Input Low Current, OE and SSON pins	V _{in} =V _{SS}			10	μA
I _{OZ}	Output Leakage Current	Three-state output, OE = 0	-10		10	μA
C _{XIN} /C _{XOUT} ^[1]	Capacitance at Pin 1 and Pin 8			22		pF
C _{IN} ^[1]	Input Capacitance at Pin 3 and Pin 7.	Input pins excluding XIN and XOUT		5	7	pF
I _{VDD}	Supply Current	V _{DD} = 3.45V, Fin = 16.384 MHz, SSCLK = 52.0 MHz, C _{LOAD} = 15 pF, OE = SSON = V _{DD}		30	40	mA

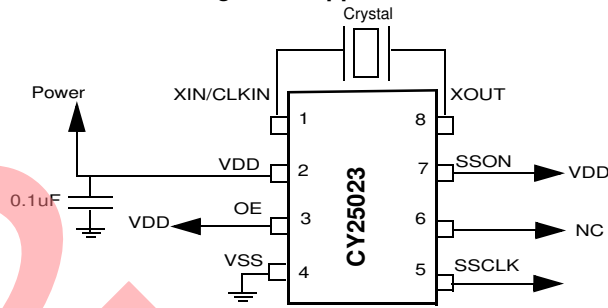
AC Electrical Specifications^[1]

Parameter	Description	Condition	Min	Typ	Max	Unit
DC	Output Duty Cycle	SSCLK, measured at VDD/2	45	50	55	%
SR1	Rising Edge Slew Rate	SSCLK from 20% to 80% of V _{DD}	0.7	1.1	1.5	V/ns
SR2	Falling Edge Slew Rate	SSCLK from 80% to 20% of V _{DD}	0.7	1.1	1.5	V/ns
F _{MOD}	Frequency Modulation	SSON = 1	30.0	31.5	33.0	kHz
tj1	Peak Cycle to Cycle Jitter. SSCLK pin.	SSCLK = 52.0 MHz. Spread on		100	200	ps
T ₁₀	PLL Lock Time	Time from VDD minimum voltage to valid output frequencies		3	5	ms
T _{OE1}	Output Disable time (pin3 = OE)	Time from falling edge on OE to stopped outputs, (Asynchronous)		150	300	ns
T _{OE2}	Output Enable Time (pin3 = OE)	Time from rising edge on OE to outputs at a valid frequency, (Asynchronous)		150	300	ns

Note

1. Guaranteed by Characterization, not 100% tested.

Figure 2. Application Circuit^[2,3]



Switching Waveforms

Figure 3. Duty Cycle Timing ($DC = t_{1A}/t_{1B}$)

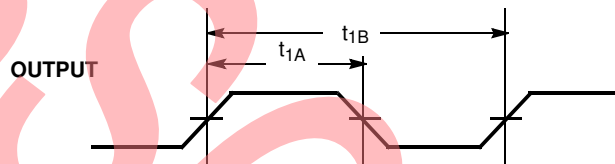


Figure 4. Output Rise/Fall Time (SSCLK and REFCLK)

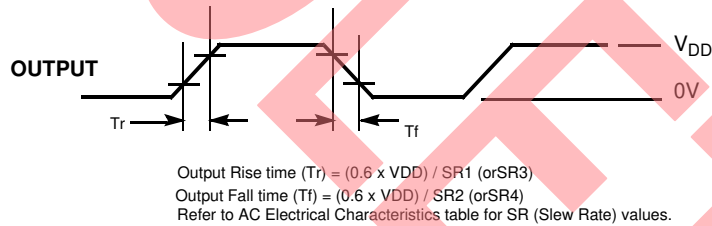
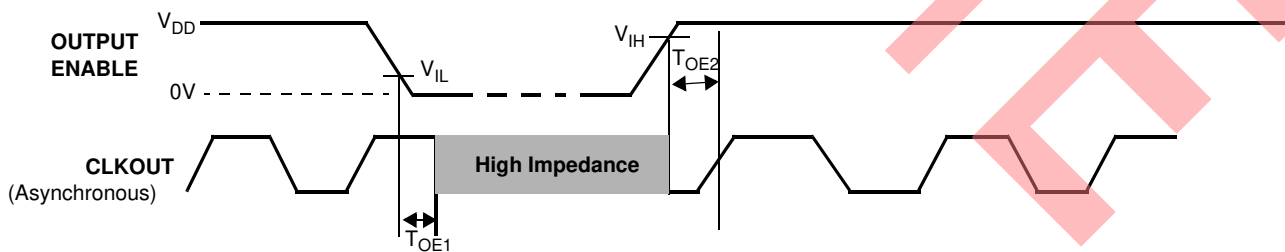


Figure 5. Output Enable/Disable Timing



Notes

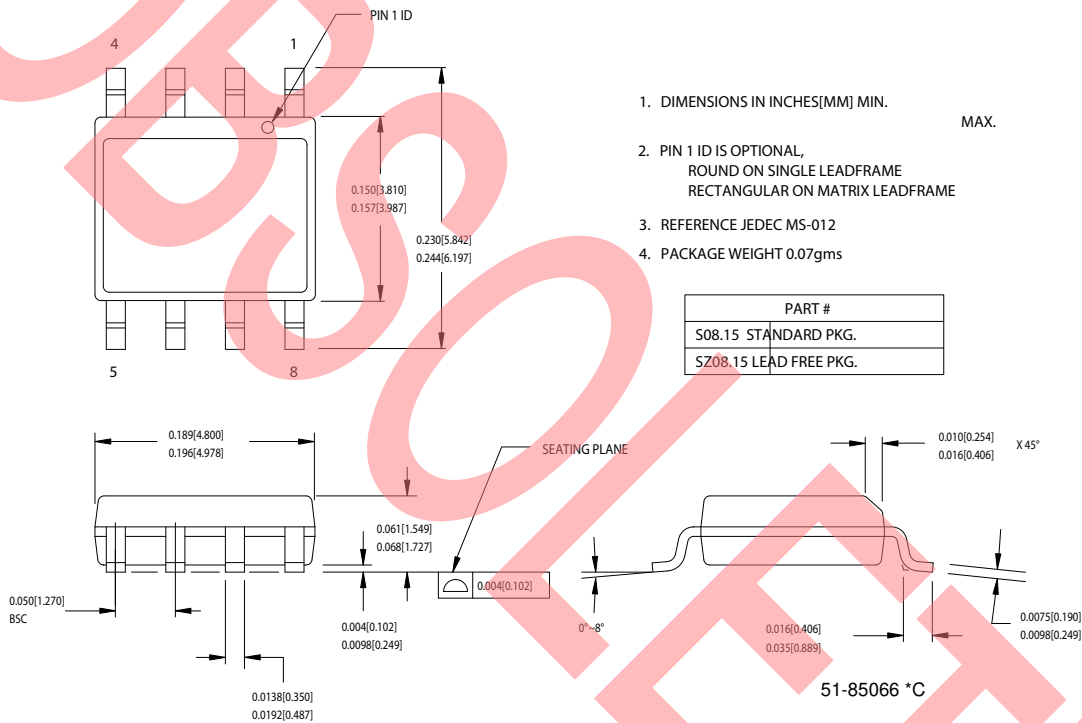
2. IF an external clock is used, apply the clock to CLKIN(pin1) and leave XOUT(pin8) floating (unconnected).
3. If SSON(pin7) is LOW(V_{SS}), the frequency modulation will be stopped on SSCLK pin(pin5)

Ordering Information

Part Number	Package Type	Product Flow
CY25023SXC-1 ^[4]	8-pin Small Outline Integrated Circuit (SOIC)	Commercial, 0 to 70°C
CY25023SXC-1T ^[4]	8-pin Small Outline Integrated Circuit (SOIC) – Tape and Reel	Commercial, 0 to 70°C
CY25023KSXC-1	8-pin Small Outline Integrated Circuit (SOIC)	Commercial, 0 to 70°C
CY25023KSXC-1T	8-pin Small Outline Integrated Circuit (SOIC) – Tape and Reel	Commercial, 0 to 70°C

Package Drawing and Dimensions

Figure 6. 8-lead (150-Mil) SOIC – S8



1. DIMENSIONS IN INCHES[MM] MIN. MAX.
2. PIN 1 ID IS OPTIONAL, ROUND ON SINGLE LEADFRAME RECTANGULAR ON MATRIX LEADFRAME
3. REFERENCE JEDEC MS-012
4. PACKAGE WEIGHT 0.07gms

Note
4. Not recommended for new designs.

Document History Page

Document Title: CY25023 Spread Spectrum Clock Generator for EMI Reduction Document Number: 38-07522				
REV.	ECN NO.	Orig. of Change	Submission Date	Description of Change
**	124268	KCN	See ECN	New Data Sheet
*A	2505007	AESA	See ECN	Updated template and package diagram. In ordering information table, replaced non-Pb-free part numbers CY25023SC-1 and CY25023SC-1T with Pb-free part numbers CY25023SXC-1 and CY25023SXC-1T. Added Note "Not recommended for new designs." Added part number CY25023KSXC-1, and CY25023KSXC-1T.
*B	2908854	CDQ	04/08/10	Inactive parts. Obsolete datasheet.

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