

**CS9L/CSPL SERIES: ULTRA HF CLOCK OSCILLATOR, PECL, +3.3 VDC or +2.5VDC**

**DESCRIPTION:** A crystal controlled, high frequency, highly stable oscillator, adhering to Positive Emitter Coupled Logic (PECL) Standards and fundamental crystal or analog multiplication technologies. The output can be Tri-stated to facilitate testing or combined multiple clocks. The device is contained in a sub-miniature, very low profile, leadless ceramic SMD package with 6 gold contact pads. This miniature oscillator is ideal for today's automated assembly environments.

**APPLICATIONS AND FEATURES:**

- Infiniband; Fiber Channel; SATA; 10GbE; Network Processors; SOHO Routing; Switches;
- Common Frequencies: 150 MHz; 156.25 MHz; 155.52 MHz; 161.1328 MHz; 212.5MHz; 312.5MHz
- +3.3 VDC or +2.5VDC PECL
- Frequency Range from 150.000 to 700 MHz
- Analog multiplication
- Miniature Ceramic SMD Package Available on Tape and Reel
- Lead Free and ROHS Compliant

**■ ABSOLUTE MAXIMUM RATINGS:**

PARAMETER	SYMBOL	VALUE	UNIT
Operating temperature range	Ta	-40...+85	°C
Storage temperature range	T(stg)	-55...+90	°C
Supply voltage	Vcc	+4.6	VDC
Maximum Input Voltage	Vi	Vss-0.5...Vcc+0.5	VDC
Maximum Output Voltage	Vo	Vss-0.5...Vcc+0.5	VDC

**■ ELECTRICAL PARAMETERS:**

PARAMETER	SYMBOL	TEST CONDITIONS <sup>1</sup>	VALUE	UNIT	
Nominal Frequency	fo		150.000 ~ 700.00**	MHz	
Supply Voltage	Vcc		+3.3 or +2.5 ±5%	VDC	
Supply Current	Is		80.0 MAX	mA	
Output Logic Type			PECL		
Load		Connected between each output and Vcc – 2.0 VDC	50	Ω	
Output Voltage Levels	Voh Vol	min max	Vcc-1.025 Vcc-1.620	VDC VDC	
Duty Cycle	DC	Measured at 50% of Vcc	40/60 to 60/40 or 45/55 to 55/45	%	
Rise / Fall Time	tr / tf	Measured at 20/80% and 80/20% Vcc Levels	0.7 TYP 1.0 MAX <sup>2</sup>	ns	
Jitter	J	Integrated Phase tji RMS, Fj = 12 kHz...20 MHz <sup>5</sup>	0.3 TYP**	ps	
		Integrated Phase RMS tii offset frequency 50KHz to 80MHz <sup>5</sup>	0.5 TYP**	ps	
		Deterministic period Jitter Dj using wavecrest analyzer <sup>4</sup>	Fo<320MHz.	1 TYP **	ps
			Fo>320MHz.	8 TYP **	
		Random period Jitter Rj using wavecrest analyzer <sup>4</sup>	Fo<320MHz.	2.5 TYP **	ps
Fo>320MHz.	2.5 TYP**				
Acumm. Peak to Peak Jitter Tp-p using wavecrest analyzer <sup>4</sup>	Fo<320MHz.	25 TYP**	ps		
	Fo>320MHz.	27 TYP**			
Phase Noise	£(Δf)	typ. @212.5MHz <sup>6</sup>	Δf=10 Hz	-65	dBc/Hz
			Δf=100 Hz	-95	dBc/Hz
			Δf=1 KHz	-125	dBc/Hz
			Δf=10 KHz	-140	dBc/Hz
			Δf=100 KHz	-145	dBc/Hz
Δf≥1M Hz	-148	dBc/Hz			
Sub Harmonics	f_sub	Load, nom, Supply nom	Fo<320MHz.	-50	dBc
			Fo>320MHz.	-35	
Overall Frequency Stability	Δf/fc	Op. Temp., Aging, Load, Supply and Cal. Variations	±20, ±25, ±50, or ±100 MAX <sup>3</sup>	ppm	
Pin 1	Output Enabled	En	High Voltage or No Connect	0.7•Vcc MIN	VDC
	Output Disabled	Dis	Ground	0.3•Vcc MAX	VDC

- \*1 Test Conditions Unless Stated Otherwise: Nominal Vcc, Nominal Load, +25 ±3°C
- \*2 Frequency Dependent
- \*3 Not All Stabilities Available With All Temperature Ranges—Please Consult Factory For Availability
- \*4 Measured with Wavcrest SIA-3000A 1,000,000 Hits no filtering
- \*5 Calculated from Agilent 5500 phase noise measurements
- \*6 Measured with Agilent 5500

## ■ PART NUMBERING SYSTEM:

SERIES	SYMMETRY	TEMPERATURE RANGE (°C)	FREQUENCY STABILITY (Overall)	FREQUENCY (MHz)
CS9L: UHF +3.3Vdc Clock with PECL Comp. Output CSPL: UHF +2.5Vdc Clock with PECL Comp. Output	A: 40/60 to 60/40% T: 45/55 to 55/45%	R: 0...+50 S: 0...+70 U: -20...+70 V: -40...+85**	K: ±20 ppm** L: ±25 ppm** H: ±50 ppm J: ±100 ppm	150.000...700.000

## EXAMPLE: CS9LASH-155.520

Clock Oscillator, 7x5mm Package, +3.3 VDC Supply Voltage, PECL Output, Standard Symmetry, 0...+70°C Operating Temperature Range, ±50 ppm Total Frequency Stability, 155.520 MHz

\*\*Above 300MHz extended temp range and ±25ppm stability may not be available, jitter may vary upon spec requirements. Please consult the factory for any custom requirements.

## ■ MECHANICAL PARAMETERS:

**OUTLINE TOLERANCE:**  
±0.006" / 0.15mm  
(Unless otherwise specified)

**PIN FUNCTIONS:**  
[1] ENABLE/ DISABLE  
[2] NO CONNECT  
[3] CASE GROUND  
[4] OUTPUT  
[5] COMP. OUTPUT  
[6] SUPPLY VOLTAGE

**MARKING:**  
CS9LASH  
155.52  
RAL D/C

**\*0.01µF external by-pass filter is recommended as seen on solder pattern.**

**SOLDER PATTERN**

■ **REFLOW PROFILE:**