



Model 643H

Very Low Jitter HCSL Clock



Part Dimensions:
3.2 x 2.5 x 1.2mm • 24mg

Features

- High Speed Current Steering Logic [HCSL] Output
- Ceramic Surface Mount Package
- Low Phase Jitter Performance, 500fs Typical
- Fundamental or 3rd Overtone Crystal Design
- Frequency Range 13.5MHz – 156.25MHz *
- +2.5V or +3.3V Operation
- Output Enable Standard
- Tape and Reel Packaging, EIA-418

Applications

- PCI Express [PCIe]
- Data Storage Systems
- Ethernet Line Cards
- Serial ATA Express [SATAe]
- Intel Chipsets
- Network Servers
- Switches and Routers
- Set-Top Boxes/DVRs

Standard Frequencies

- 25MHz
- 27MHz
- 50MHz
- 100MHz
- 106.25MHz
- 125MHz
- 155.52MHz
- 156.25MHz

* Check with factory for availability of frequencies not listed.

Description

CTS Model 643H is a low cost, high performance clock oscillator supporting HCSL output. Employing the latest IC technology, M643H has excellent stability and low phase jitter performance.

Ordering Information

Model	Output Type	Frequency Code [MHz]	Frequency Stability	Temperature Range	Supply Voltage	Packaging
643	H	XXX or XXXX	3	I	3	R
	Code Output		Code Stability		Code Voltage	
	H HCSL - Pin 1 Enable		5 ±25ppm		2 +2.5Vdc	
			4 ±30ppm		3 +3.3Vdc	
			3 ±50ppm			
			2 ±100ppm			
		Code Frequency		Code Temp. Range		Code Packing
		Product Frequency Code ¹		C -20°C to +70°C		R 3k pcs./reel
				I -40°C to +85°C		
				G -40°C to +105°C ²		

Notes:

- 1) Refer to document 016-1454-0, Frequency Code Tables. 3-digits for frequencies <100MHz, 4-digits for frequencies 100MHz or greater.
- 2) Check factory for availability. Stability codes 2 and 3 only.

**Not all performance combinations and frequencies may be available.
Contact your local CTS Representative or CTS Customer Service for availability.**

This product is specified for use only in standard commercial applications. Supplier disclaims all express and implied warranties and liability in connection with any use of this product in any non-commercial applications or in any application that may expose the product to conditions that are outside of the tolerances provided in its specification.



Electrical Specifications

Operating Conditions

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
Maximum Supply Voltage	V_{CC}	-	-0.3	-	4.0	V
Supply Voltage	V_{CC}	$\pm 5\%$	2.375 3.135	2.5 3.3	2.625 3.465	V
Supply Current	I_{CC}	Maximum Load Maximum Current Value @ +3.3V	-	-	60	mA
Operating Temperature	T_A	-	-20 -40	+25	+70 +85	$^{\circ}\text{C}$
Storage Temperature	T_{STG}	-	-40 -50	-	+105 +125	$^{\circ}\text{C}$

Frequency Stability

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
Frequency Range	f_O	-		13.5 - 156.25		MHz
Frequency Stability [Note 1]	$\Delta f/f_O$	-		25, 30, 50 or 100		$\pm\text{ppm}$
Aging	$\Delta f/f_{25}$	First Year @ +25 $^{\circ}\text{C}$, nominal V_{CC}	-5	± 3	5	ppm

1.] Inclusive of initial tolerance at time of shipment, changes in supply voltage, load, temperature and 1st year aging.

Output Parameters

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
Output Type	-	-		HCSL		-
Output Load	R_L	Terminated to ground	-	50	-	Ohms
Output Voltage Levels	V_{OH} V_{OL}	HCSL Load	-580 -150	-	850 150	mV
Output Duty Cycle	SYM	Differential Output, @ $V_{CC} - 1.3\text{V}$	45	-	55	%
Differential Output Voltage	V_{OD}	$R_L = 50$ Ohms to ground	0.4	-	-	Vp-p
Rise and Fall Time	T_R, T_F	@ 20%/80% Levels, $R_L = 50$ Ohms to ground	-	0.50	0.70	ns

Output Parameters

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
Start Up Time	T_S	Application of V_{CC}	-	5	10	ms
Enable Function [Standby]						
Enable Input Voltage	V_{IH}	Pin 1 Logic '1', Output Enabled	$0.7V_{CC}$	-	-	V
Disable Input Voltage	V_{IL}	Pin 1 Logic '0', Output Disabled	-	-	$0.3V_{CC}$	V
Disable Current	I_{IL}	Pin 1 Logic '0', Output Disabled	-	15	-	μA
Enable Time	T_{PLZ}	Pin 1 Logic '1', Output Enabled	-	-	2	ms
Phase Jitter, RMS	t_{jrms}	Bandwidth 12 kHz - 20 MHz	-	500	-	fs

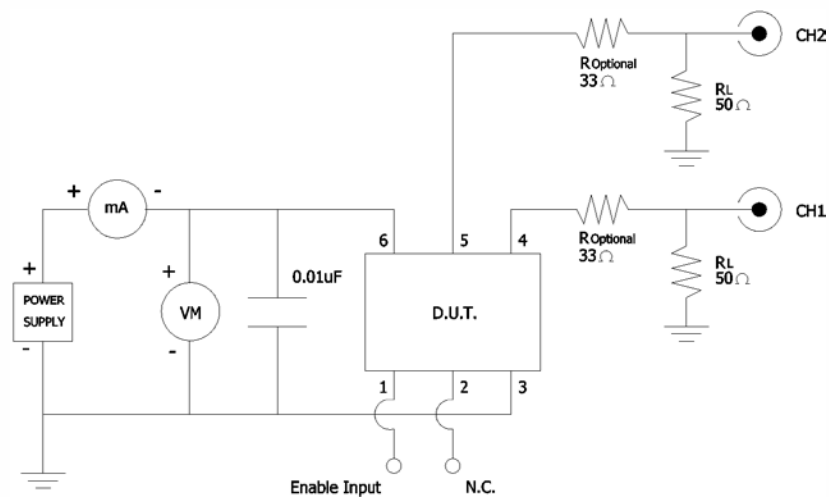
Electrical Specifications

Enable Truth Table

Pin 1	Pin 4 & Pin 5
Logic '1'	Output
Open	Output
Logic '0'	High Imp.

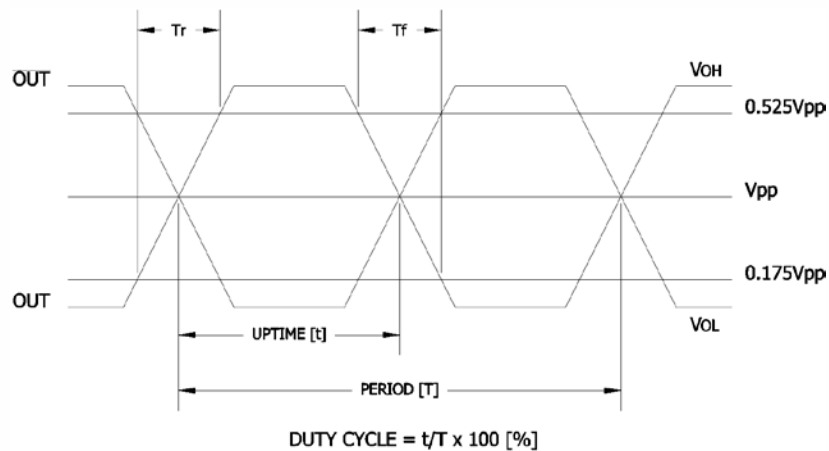
Test Circuit

HCSL



Output Waveform

HCSL

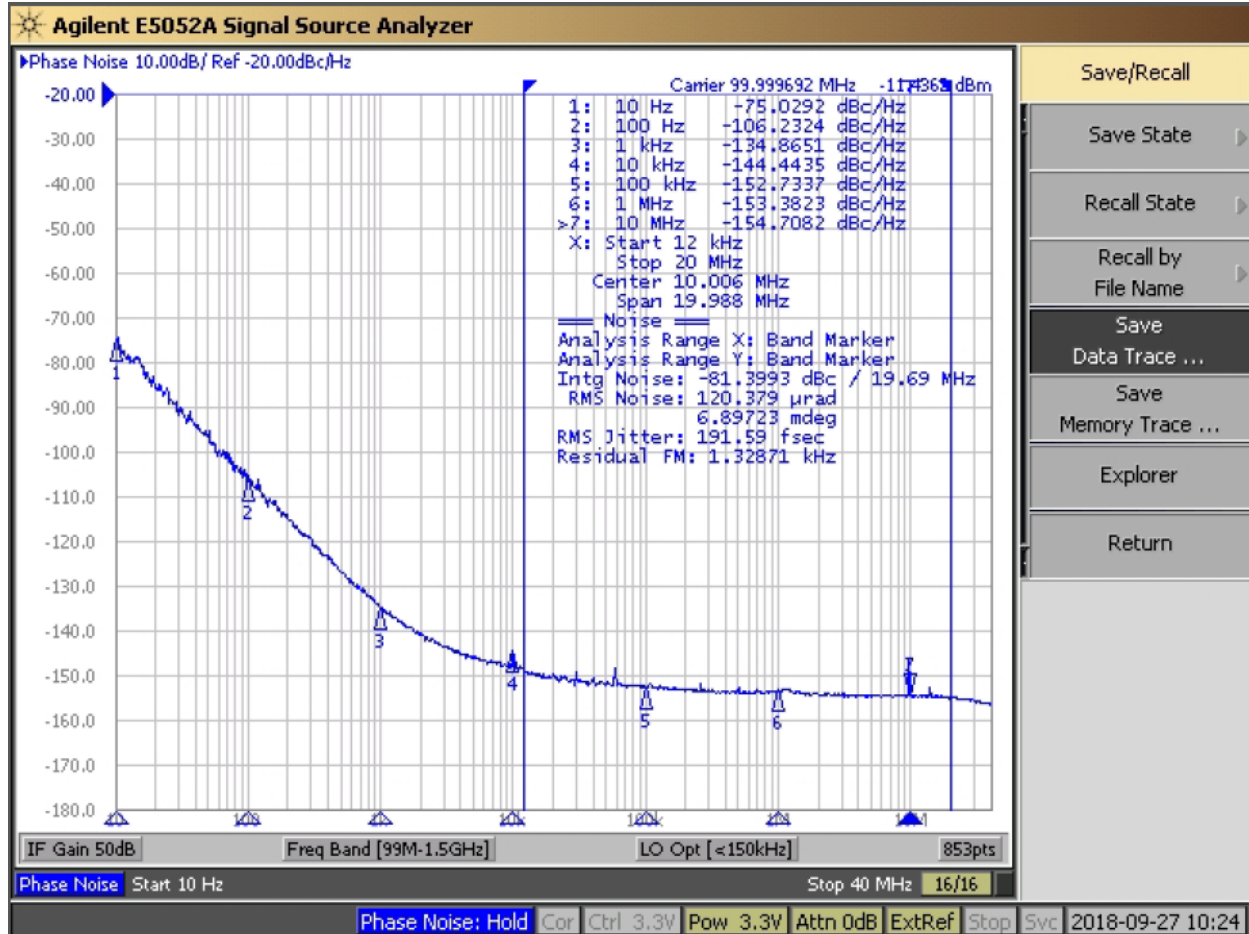


Electrical Specifications

Performance Data

Phase Noise [typical]

100.00MHz, HCSL, $V_{CC} = 3.3V$, $T_A = +25^\circ C$





Electrical Specifications

Performance Data

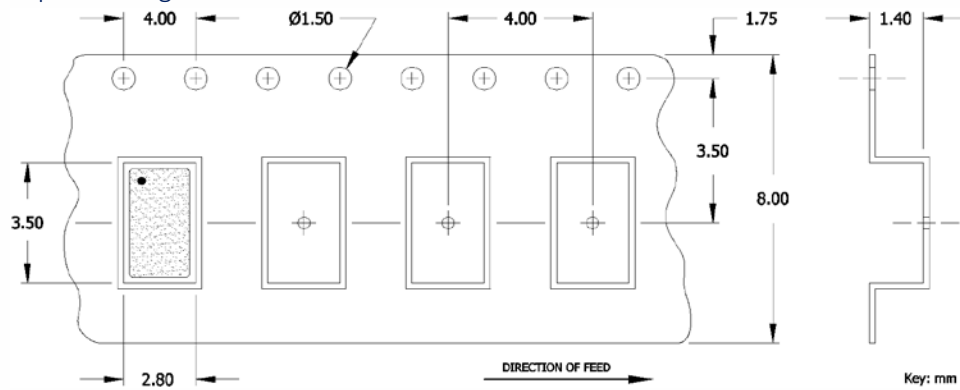
Phase Noise Tabulated

Typical, 100.00MHz, HCSL, $V_{CC} = 3.3V$, $T_A = +25^{\circ}C$

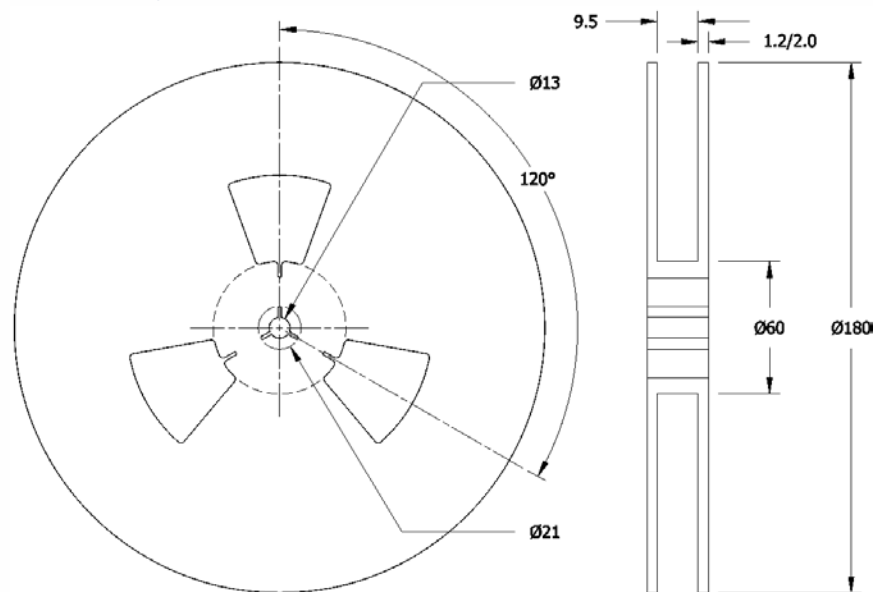
PARAMETER	SYMBOL	CONDITIONS	TYP	UNIT
HCSL @ 100.00MHz				
Phase Noise		Single Side Band		
		@ 10Hz	-75.9328	
		@ 100Hz	-106.9929	
		@ 1kHz	-135.1951	dBc/Hz
		@ 10kHz	-144.2209	
		@ 100kHz	-152.8159	
		@ 1MHz	-153.5793	
		@ 10MHz	-154.8219	
Phase Jitter, RMS	tjrms	Integration Bandwidth 12kHz - 20MHz	188.2315	

Packaging - Tape and Reel

Tape Drawing



Reel Drawing



Notes

1. Device quantity is 1k pieces minimum and 3k pieces maximum per 180mm reel.
2. Complete CTS part number, frequency value and date code information must appear on reel and carton labels.