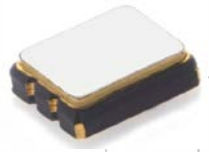
Model 643H

Very Low Jitter HCSL Clock



Part Dimensions:
3.2 × 2.5 × 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	**- 100MHz**	- 155.52MHz
- 27MHz	- 106.25MHz	- 156.25MHz
- 50MHz	- 125MHz	

* 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
H	HCSL - Pin 1 Enable

Code	Stability
5	±25ppm
4	±30ppm
3	±50ppm
2	±100ppm

Code	Voltage
2	+2.5Vdc
3	+3.3Vdc

Code	Frequency
Product Frequency Code [1]	

Code	Temp. Range
C	-20°C to +70°C
I	-40°C to +85°C
G	-40°C to +105°C [2]

Code	Packing
R	3k pcs./reel

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.

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}	±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 -40	 +25 	+70 +85 +105	℃
Storage Temperature	T_{STG}	-	-50	-	+125	℃

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		±ppm
Aging	$\Delta f/f_{25}$	First Year @ +25°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} - 1.3V	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	tjrms	Bandwidth 12 kHz - 20 MHz	-	500	-	fs

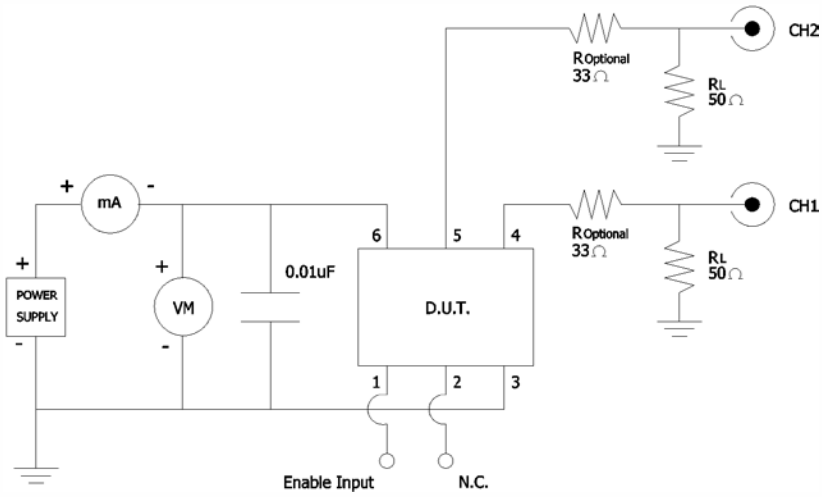
Electrical Specifications

Enable Truth Table

Pin 1	Pin 4 & Pin 5
Logic '1'	Output Enabled
Open	Output Enabled
Logic '0'	Output Disabled, High Impedance

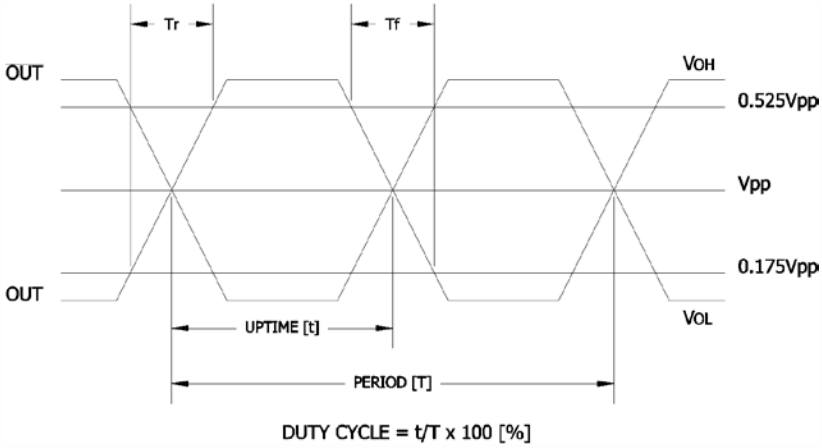
Test Circuit

HCSL



Output Waveform

HCSL

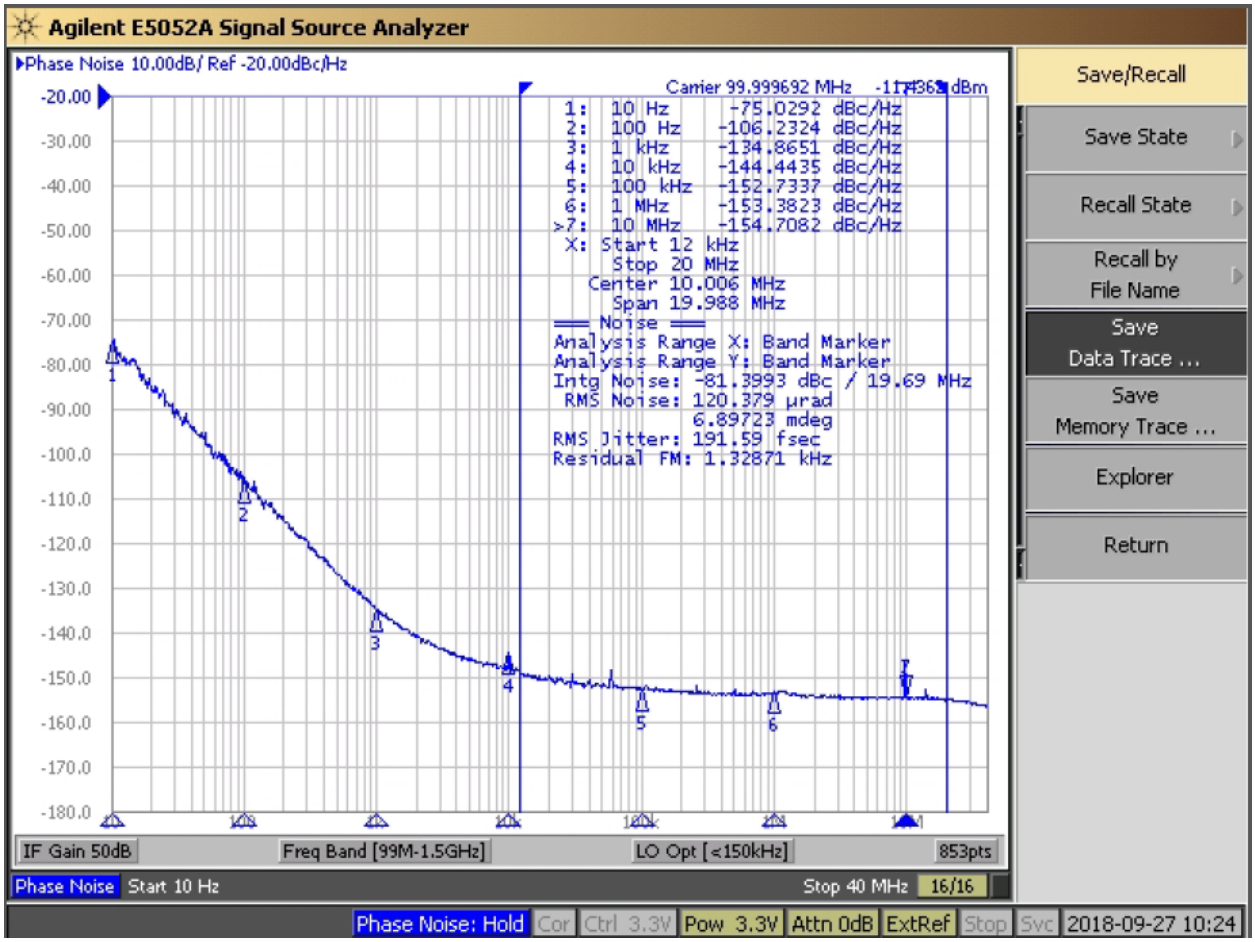


Electrical Specifications

Performance Data

Phase Noise [typical]

100.00MHz, HCSL, V_{CC} = 3.3V, T_A = +25°C



Electrical Specifications

Performance Data

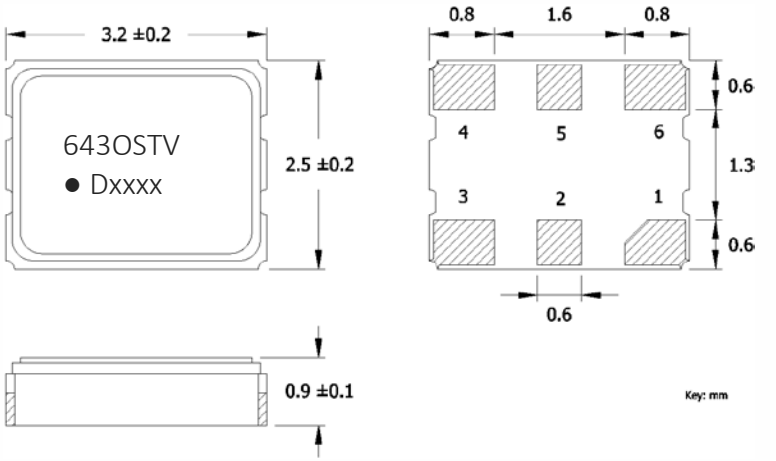
Phase Noise Tabulated

Typical, 100.00MHz, HCSL, V_{CC} = 3.3V, T_A = +25°C

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

Mechanical Specifications

Package Drawing

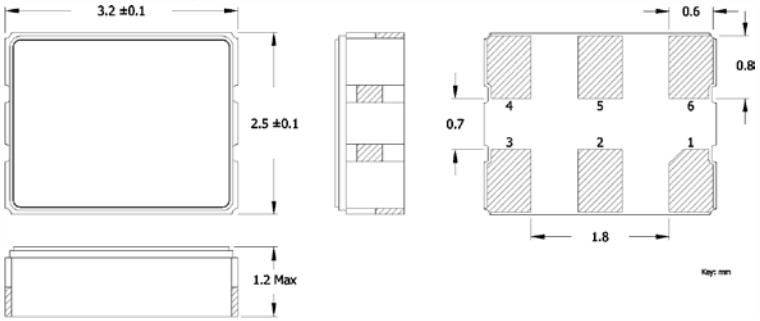


Marking Information

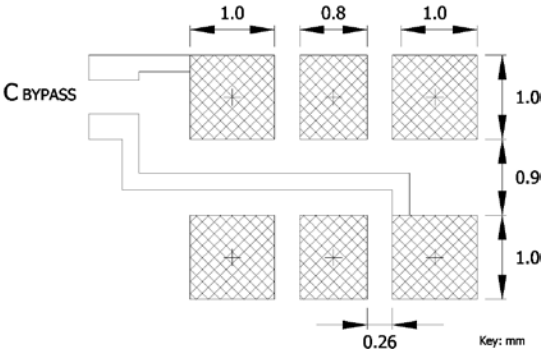
1. O – Output Type; H = HCSL.
2. ST – Frequency Stability/Temperature Code. [Refer to Ordering Information]
3. V – Voltage Code; 3 = 3.3V, 2 = 2.5V.
4. D – Date Code. See Table I for codes.
5. xxxx – Frequency Code.
   3-digits, frequencies below 100MHz
   4-digits, frequencies 100MHz or greater

[See document 016-1454-0, Frequency Code Tables.]

Alternate Package



Recommended Pad Layout



Pin Assignments

Pin	Symbol	Function
1	EOH	Enable
2	N.C.	No Connect
3	GND	Circuit & Package Ground
4	Output	RF Output
5	$\overline{\text{Output}}$	Complimentary RF Output
6	V_{CC}	Supply Voltage

Notes

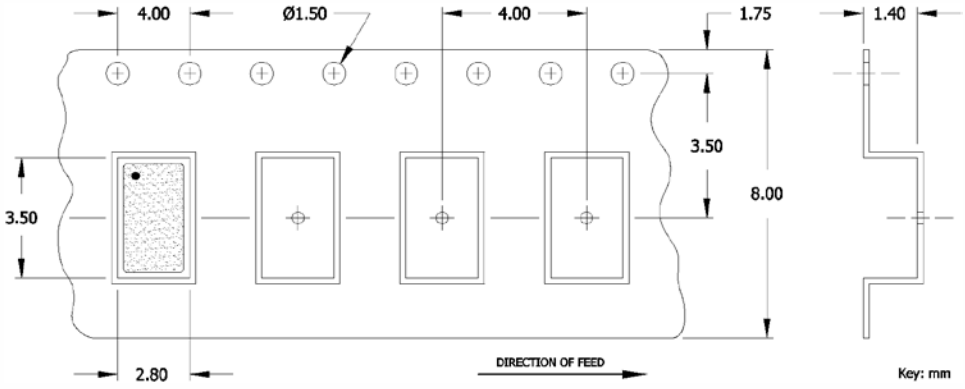
1. JEDEC termination code (e4). Barrier-plating is nickel [Ni] with gold [Au] flash plate.
2. Reflow conditions per JEDEC J-STD-020; +260°C maximum, 20 seconds.
3. MSL = 1.

Table I - Date Code

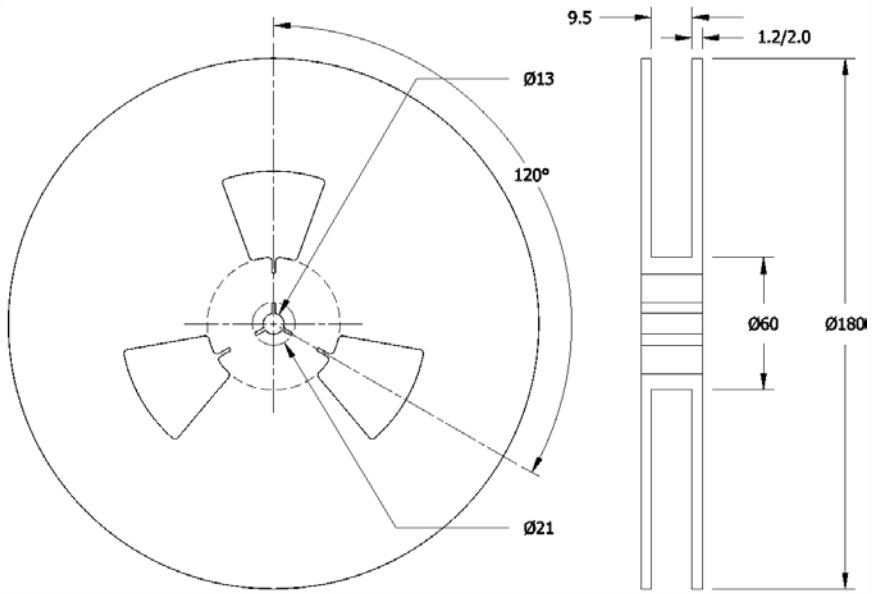
MONTH / YEAR					JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
2001	2005	2009	2013	2017	A	B	C	D	E	F	G	H	J	K	L	M
2002	2006	2010	2014	2018	N	P	Q	R	S	T	U	V	W	X	Y	Z
2003	2007	2011	2015	2019	a	b	c	d	e	f	g	h	j	k	l	m
2004	2008	2012	2016	2020	n	p	q	r	s	t	u	v	w	x	y	z

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.

Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

CTS:

643H10003C3R 643H10003G2R 643H10003G3R 643H10003I2R 643H10003I3R 643H10004C2R 643H10002G2R 643H10002G3R 643H10003C2R 643H5004I3R 643H5005C2R 643H5005C3R 643H5005I2R 643H5005I3R 643H5003G3R 643H5003I2R 643H5003I3R 643H5004C2R 643H5004C3R 643H5004I2R 643H2705I3R 643H5002G2R 643H5002G3R 643H5003C2R 643H5003C3R 643H5003G2R 643H2704C3R 643H2704I2R 643H2704I3R 643H2705C2R 643H2705C3R 643H2705I2R 643H2703C3R 643H2703G2R 643H2703G3R 643H2703I2R 643H2703I3R 643H2704C2R 643H2505C3R 643H2505I2R 643H2505I3R 643H2702G2R 643H2702G3R 643H2703C2R 643H2503I3R 643H2504C2R 643H2504C3R 643H2504I2R 643H2504I3R 643H2505C2R 643H2502G3R 643H2503C2R 643H2503C3R 643H2503G2R 643H2503G3R 643H2503I2R 643H15624I3R 643H15625C2R 643H15625C3R 643H15625I2R 643H15625I3R 643H2502G2R 643H15623G3R 643H15623I2R 643H15623I3R 643H15624C2R 643H15624C3R 643H15624I2R 643H15555I3R 643H15622G2R 643H15622G3R 643H15623C2R 643H15623C3R 643H15623G2R 643H15554C3R 643H15554I2R 643H15554I3R 643H15555C2R 643H15555C3R 643H15555I2R 643H15553C3R 643H15553G2R 643H15553G3R 643H15553I2R 643H15553I3R 643H15554C2R 643H12505C3R 643H12505I2R 643H12505I3R 643H15552G2R 643H15552G3R 643H15553C2R 643H12503I3R 643H12504C2R 643H12504C3R 643H12504I2R 643H12504I3R 643H12505C2R 643H12502G3R 643H12503C2R