



FEATURES

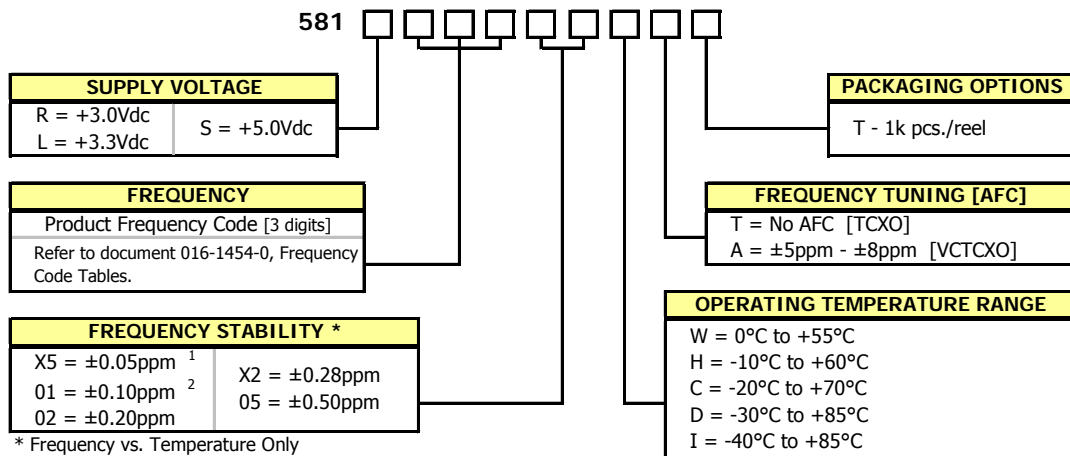
- HCMOS Output
- Optional Voltage Control for Frequency Tuning [VCTCXO]
- 5.0mm x 3.2mm Surface Mount Package
- Frequency Range 5 – 52 MHz
- Fundamental Crystal Design
- Operating Voltage, +3.3Vdc or +5.0Vdc
- Overall Frequency Stability ± 4.6 ppm
- Operating Temperature to -40°C to $+85^{\circ}\text{C}$
- Tape & Reel Packaging Standard, EIA-418
- **RoHS/Green Compliant [6/6]**



APPLICATIONS

The Model 581 is a quartz based analog TCXO with a HCMOS output and optional frequency tuning. M581 is suitable for applications requiring Stratum 3 performance such as base stations, small cells, 1588 and Synchronous Ethernet timing, wireless communications, test and measurement.

ORDERING INFORMATION

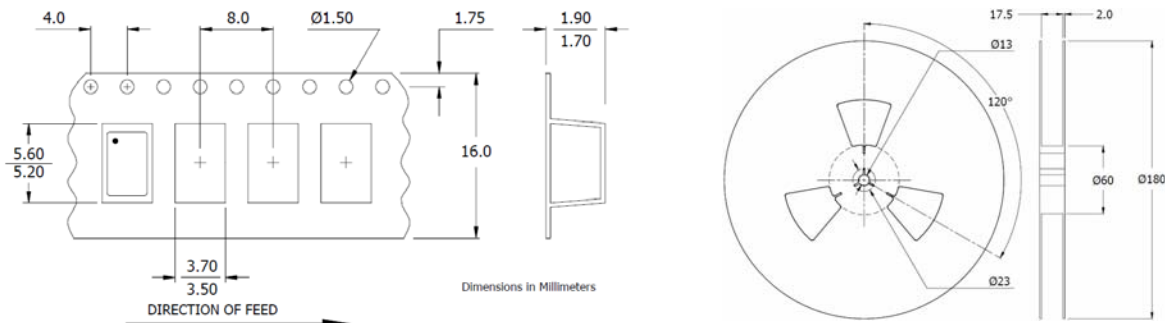


1] Only available with temperature range codes "W" and "H".
2] Only available with temperature range codes "W", "H" and "C".

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

PACKAGING INFORMATION [reference]

Device quantity is 1k pcs. maximum per 180mm reel.

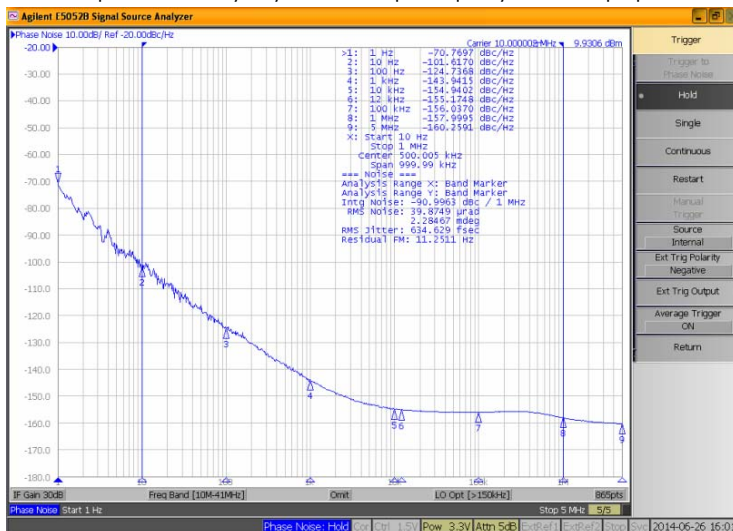


ELECTRICAL CHARACTERISTICS

PARAMETER		SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT		
ELECTRICAL PARAMETERS	Maximum Supply Voltage	V _{CC}	-	-0.6	-	6.0	V		
	Maximum Control Voltage	V _C	-	-0.5	-	V _{CC}	V		
	Storage Temperature	T _{STG}	-	-40	-	+100	°C		
	Operating Temperature	T _A	-	-20	+25	+70	°C		
	Order Code 'C'								
	Order Code 'I'			-40		+85			
	Frequency Range	f ₀	-	5	-	52	MHz		
	Supply Voltage	V _{CC}	±5%		2.85	3.0	3.15	V	
	Order Code 'R'								
	Order Code 'L'								
	Order Code 'S'								
	Supply Current	I _{CC}	-	-	-	-	6.0	mA	
	Frequency Stability	Δf/f ₀	Reference to f ₀ , Including 20 years aging @ +25°C, at time of shipment	-	-	-	4.60	± ppm	
	Overall Frequency Stability vs. Initial Calibration								
	vs. Operating Temperature ¹						[Fmax. - Fmin.]/2, over -40°C to +85°C		0.28
	vs. Supply Voltage						±5% change @ +25°C		0.20
	vs. Load						±5% change		0.20
	vs. Aging						20 years @ +40°C		3.00
	Holdover	Δf/f ₀	[Fmax. - Fmin.]/2, over 24 hours	-	-	-	0.40		
	Control Voltage	V _C	-	0.5	1.5	2.5	V		
	Frequency Tuning [VCTCXO Only]	-	V _C = 1.5V ±1.0V, monotonic positive	5 - 8			± ppm		
	V _C Input Impedance	ZV _C	-	100	-	-	kOhm		
	Output Waveform		HCMOS						
	Output Voltage Levels								
	Logic '1' Level	V _{OH}	HCMOS Load	0.9*V _{CC}	-	-	V		
Logic '0' Level	V _{OL}	HCMOS Load	-	-	0.1*V _{CC}				
Output Load	C _L	-	-	-	15	pF			
Rise and Fall Time	T _R , T _F	@ 20% - 80% Levels	-	3.0	6.0	ns			
Output Duty Cycle	SYM	@ 50% Level	45	-	55	%			
Start Up Time	T _S	-	-	-	2	ms			
Phase Noise ²	-	-	-	-	-	dBc/Hz			

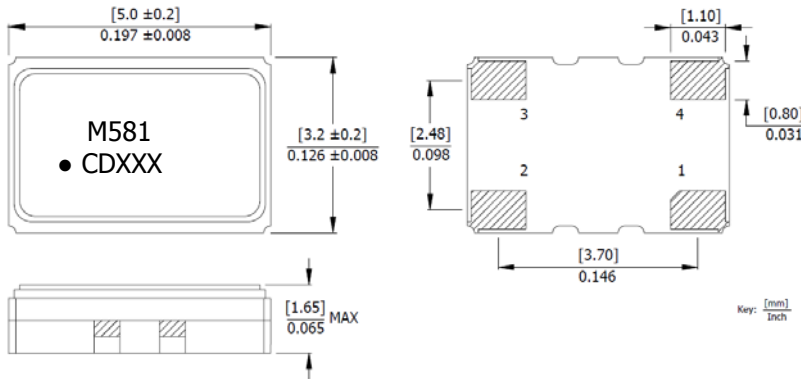
Notes:

- See Ordering Information for stability options.
- Phase Noise performance may vary based on output frequency. See example plot at 10MHz below.



MECHANICAL SPECIFICATIONS

PACKAGE DRAWING



MARKING INFORMATION

1. M581 – CTS Model Series.
 2. ● – Pin 1 identifier.
 3. C – CTS identifier.
 4. D – Date code. See Table II for codes.
 5. xxx – Frequency Code.
- Refer to document 016-1454-0, Frequency Code Tables.

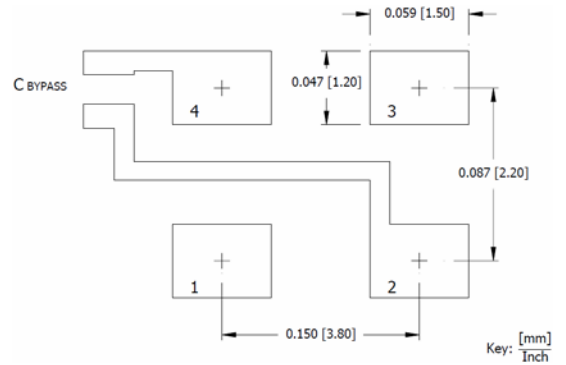
NOTES

1. DO NOT make connections to non-labeled pins. Castellation pins may have internal connections used in the manufacturing process.
2. Termination pads (e4); barrier plating is nickel [Ni] with gold [Au] flash plate.
3. Reflow conditions per JEDEC J-STD-020, 260°C maximum.
4. MSL = 1.

D.U.T. PIN ASSIGNMENTS

PIN	SYMBOL	DESCRIPTION
1	V _C	Control Voltage – VCTCXO NC - TCXO
2	GND	Circuit & Package Ground
3	Output	HCMOS Output
4	V _{CC}	Supply Voltage

SUGGESTED SOLDER PAD GEOMETRY



TEST CIRCUIT – HCMOS LOAD

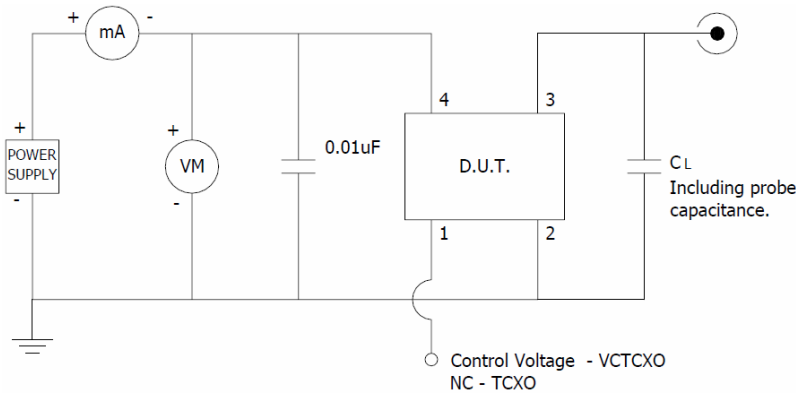


TABLE II – DATE CODE

YEAR		MONTH				JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
		YEAR	YEAR	YEAR	YEAR												
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	