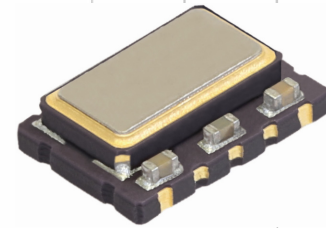


Model 586

HCMOS TCXO/VC-TCXO

Features

- Ceramic Surface Mount Package
- Fundamental Crystal Design
- Frequency Range 5 – 52MHz *
- Operating Voltage +2.5V, +3.0V and +3.3V
- Frequency Stability, Options from $\pm 0.5\text{ppm}$ to $\pm 2.5\text{ppm}$
- Operating Temperature Range to -40°C to $+85^{\circ}\text{C}$
- Voltage Control Option for Frequency Tuning [VCTCXO]
- Tape and Reel Packaging, EIA-481



Part Dimensions:
7.0 x 5.0 x 2.1mm • 177mg

Standard Frequencies

* See Page 8 for common frequencies.
Check with factory for frequency availability.

Applications

- Base Stations
- Synchronous Ethernet
- WLAN/WiMAX/WiFi
- Femtocells and Microcells
- Wireless Communication
- Test and Measurement

Description

CTS Model 586 is a high performance Temperature Compensated Crystal Oscillator [TCXO]. Employing analog IC technology that provides a HCMOS output, high-order temperature compensation engine; coupled with a fundamental quartz crystal M586 has excellent stability and low jitter/phase noise performance.

Ordering Information

Model	Supply Voltage	Frequency Code [MHz]	Frequency Stability ²	Temperature Range	Frequency Tuning	Packaging																																								
586	L	XXX	25	D	T	T																																								
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Notes:

- 1] Refer to document 016-1454-0, Frequency Code Tables. 3-digits for frequencies <100MHz, 4-digits for frequencies 100MHz or greater.
- 2] Frequency vs. Temperature only.
- 3] Check factory for availability with "I" temperature range.

**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}	-	-0.6	-	6.0	V
Maximum Control Voltage	V _C	-	-0.5	-	V _{CC}	V
Supply Voltage	V _{CC}	±5%	2.36	2.5	2.63	V
			2.85	3.0	3.15	
Supply Current	I _{CC}	-	-	-	6	mA
			3.14	3.3	3.47	
Output Load	C _L	-	-	-	15	pF
Operating Temperature	T _A	-	-20	+25	+70	°C
			-30		+85	
Storage Temperature	T _{STG}	-	-40	-	+85	°C
			-55	-	+125	

Frequency Stability

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
Frequency Range	f ₀	-		5 - 52		MHz
Frequency Stability						
Initial Calibration	Δf/f ₀	Calibration @ +25°C, After 2 Reflows	-2.0	-	2.0	ppm
Temperature Only		Referenced to +25°C Reading		0.5, 1.0, 1.5, 2.0, 2.5		±ppm
Voltage Coefficient	Δf/f ₂₅	Supply Voltage, ±5%	-0.2	-	0.2	ppm
Load Coefficient		Load, ±10%	-0.2	-	0.2	
Aging	Δf/f ₂₅	First Year @ +25°C, nominal V _{CC} and V _C	-1.0	-	1.0	ppm
		10 Years @ +25°C, nominal V _{CC} and V _C	-10	-	10	

Output Parameters

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
Output Type	-	-		HCMOS		-
Output Voltage Levels	V _{OH}	Logic '1' Level, CMOS Load	0.9*V _{CC}	-	-	V
	V _{OL}	Logic '0' Level, CMOS Load	-	-	0.1*V _{CC}	
Output Duty Cycle	SYM	@ 50% Level	45	-	55	%
Rise and Fall Time	T _R , T _F	@ 20%/80% Levels	-	3	6	ns
Start Up Time	T _S	-	-	-	5	ms
Phase Noise	-	See Typical Plots	-	-	-	-

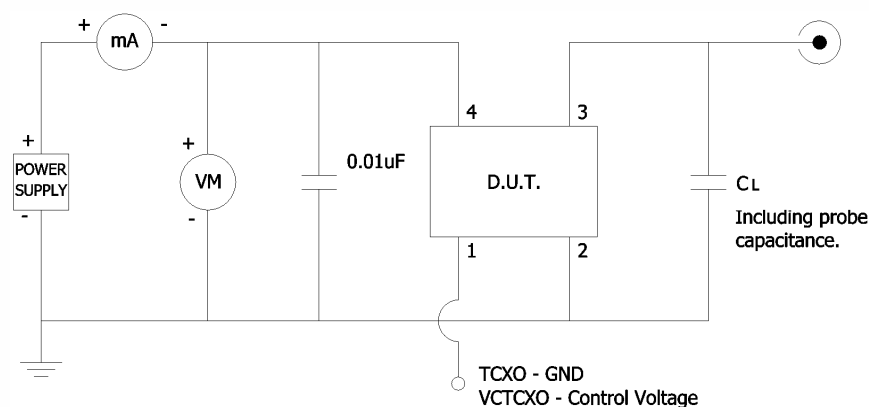
Electrical Specifications

Control Voltage

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
Control Voltage	V_C	2.5V	0.40	1.40	2.40	V
		3.0V, 3.3V	0.50	1.50	2.50	
Frequency Tuning [VCTCXO Only]	$\Delta f/f_0$	Specified V_C Range		$\pm 5 - \pm 12$		ppm
Linearity	L	Best Straight Line Fit	-	-	± 10	%
Input Impedance	Z_{V_C}	-	100	-	-	kOhms
Transfer Function	-	-		Positive		-

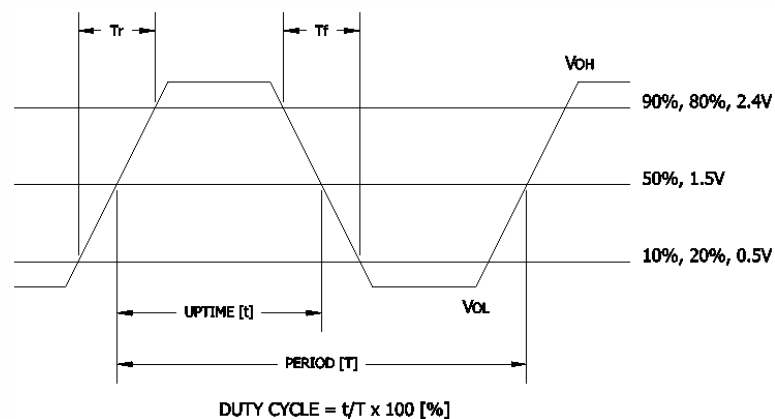
Test Circuit

HCMOS



Output Waveform

HCMOS

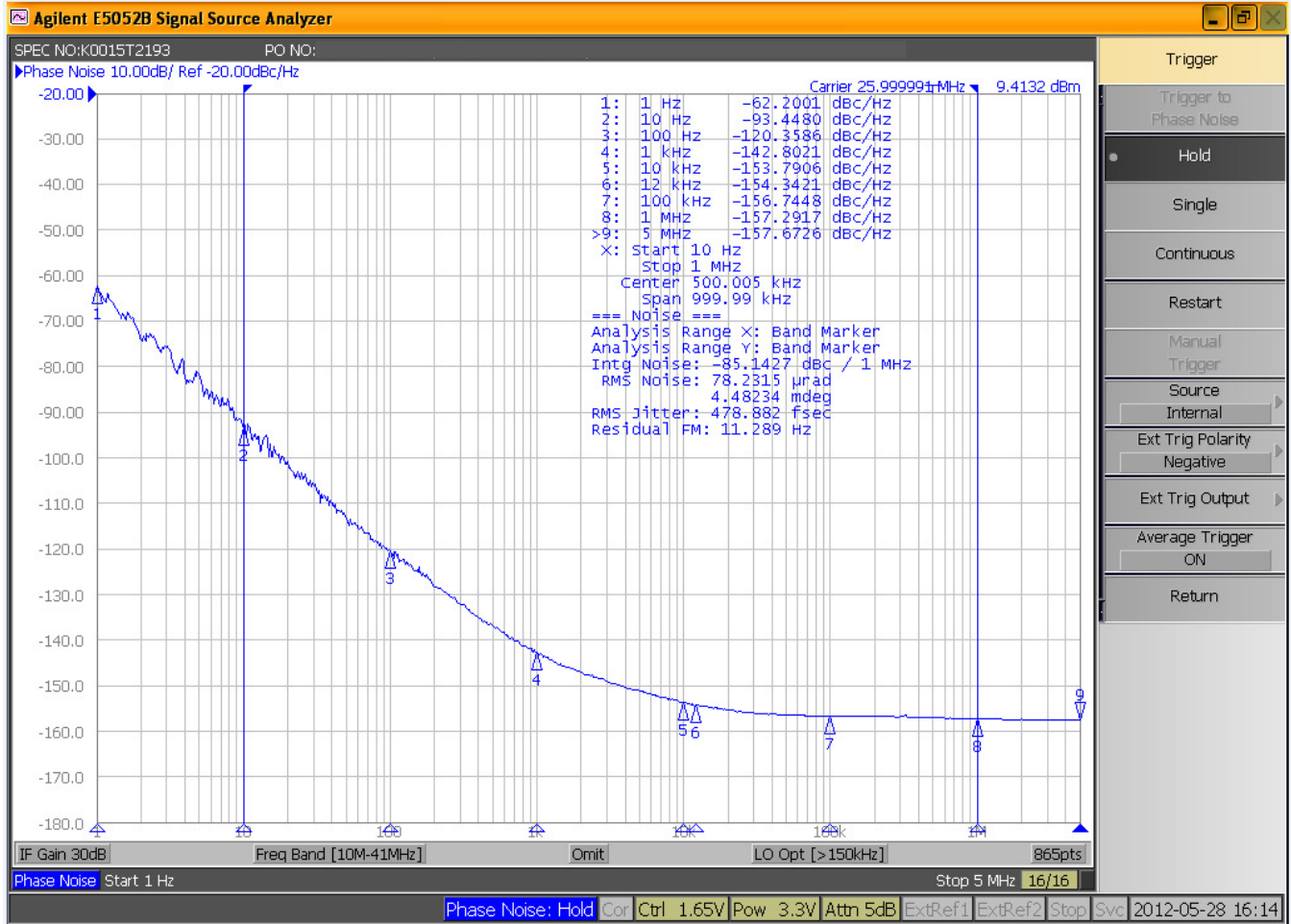


Electrical Specifications

Performance Data

Phase Noise [typical]

26MHz, $V_{CC} = 3.3V$, $T_A = +25^\circ C$

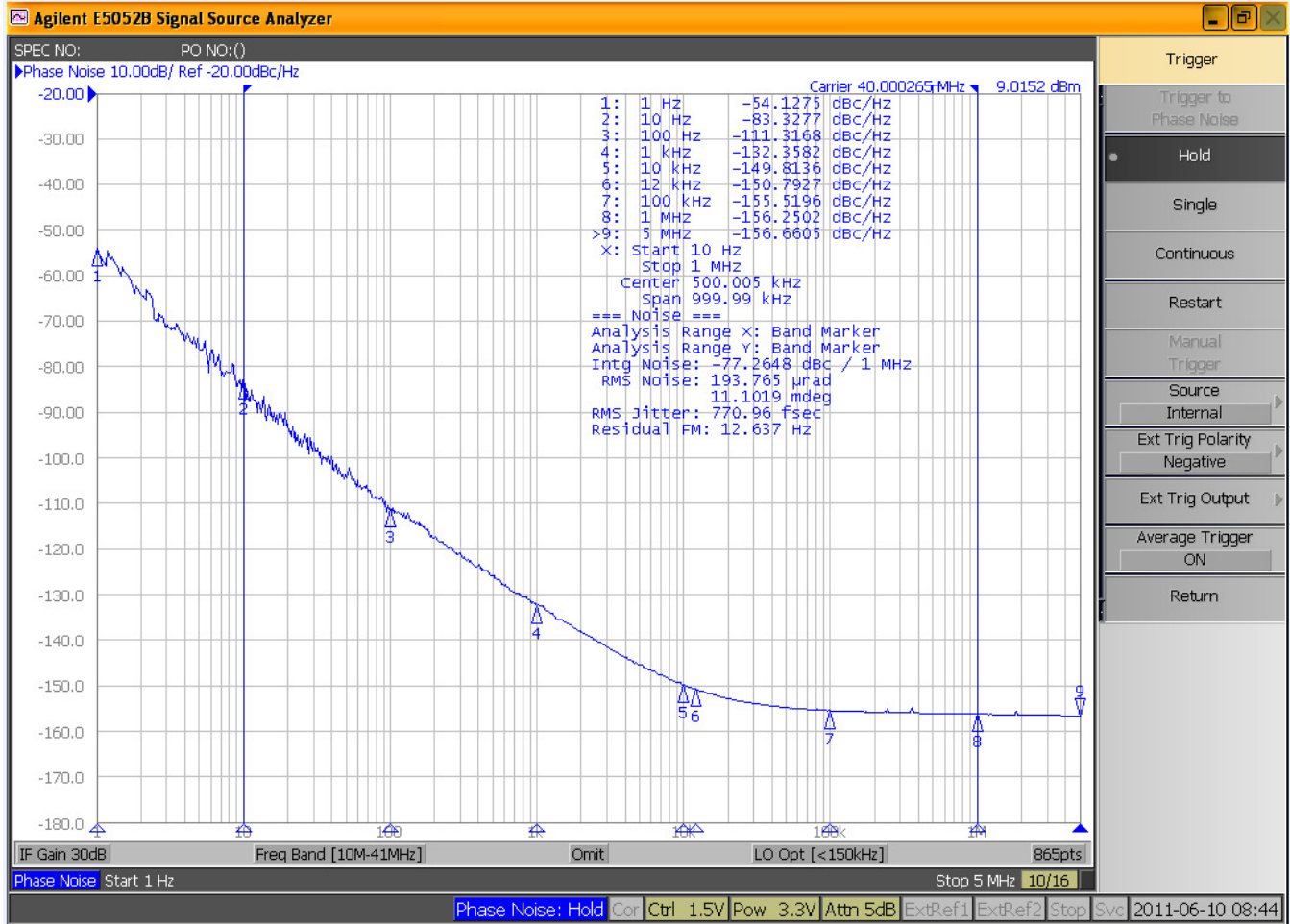


Electrical Specifications

Performance Data

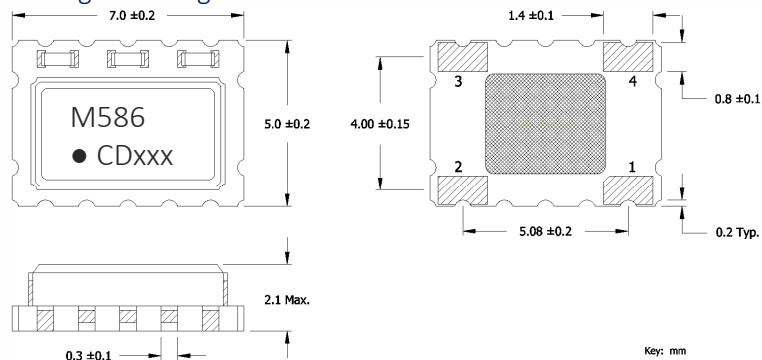
Phase Noise [typical]

40MHz, $V_{CC} = +3.3V$, $T_A = +25^\circ C$



Mechanical Specifications

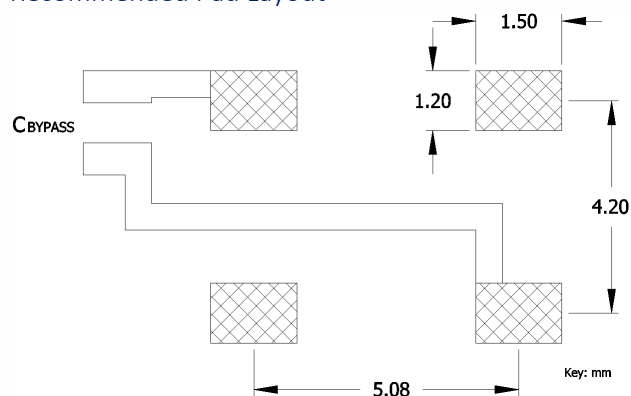
Package Drawing



Marking Information

1. M586 – CTS Model Series.
2. ● – Pin 1 Identifier.
3. C – CTS
4. D – Date Code. See Table I for codes.
5. xxx – Frequency Code, 3-digits.
[See document 016-1454-0, Frequency Code Tables.]

Recommended Pad Layout



Notes

1. DO NOT make connections to non-labeled pins or castellations as they may have internal connections used in the manufacturing process.
2. JEDEC termination code (e4). Barrier-plating is nickel [Ni] with gold [Au] flash plate.
3. Reflow conditions per JEDEC J-STD-020; +260°C maximum, 20 seconds.
4. MSL = 1.

Pin Assignments

Pin	Symbol	Function
1	GND	Ground [Note 1]
	V _C	Voltage Control [VC-TCXO]
2	GND	Circuit & Package
3	Output	RF Output [Note 2]
4	V _{CC}	Supply Voltage

Notes

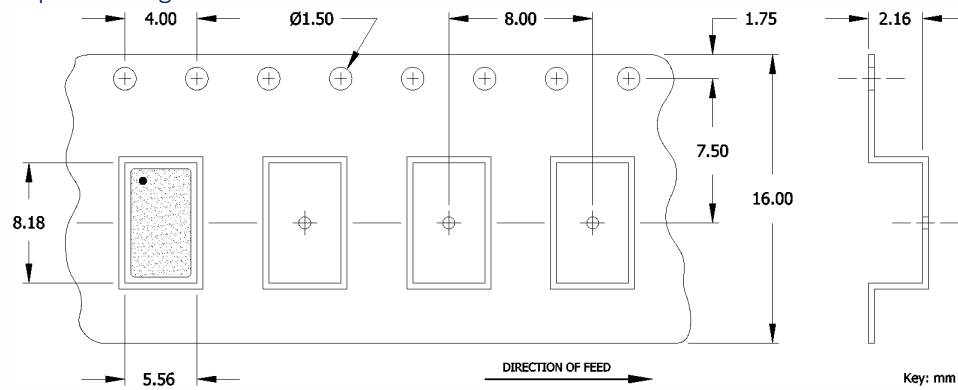
1. Connect to ground for TCXO, no frequency tuning.

Table I - Date Code, Beginning year 2021

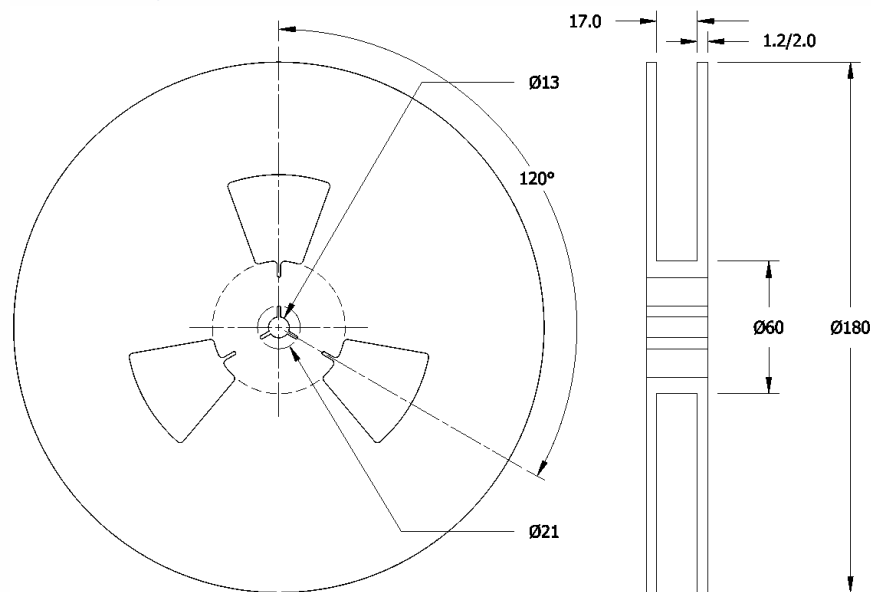
YEAR					MONTH											
					JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
2021	2025	2029	2033	2037	A	B	C	D	E	F	G	H	J	K	L	M
2022	2026	2030	2034	2038	N	P	Q	R	S	T	U	V	W	X	Y	Z
2023	2027	2031	2035	2039	a	b	c	d	e	f	g	h	j	k	l	m
2024	2028	2032	2036	2040	n	p	q	r	s	t	u	v	w	x	y	z

Packaging - Tape and Reel

Tape Drawing



Reel Drawing



Notes

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



Addendum

Common Frequencies – MHz

FREQUENCY	ORDERING CODE	FREQUENCY	ORDERING CODE	FREQUENCY	ORDERING CODE	FREQUENCY	ORDERING CODE
8.000000	080	27.000000	270				
8.192000	81	30.720000	307				
10.000000	100	40.000000	400				
12.288000	122	50.000000	500				
12.800000	128						
16.000000	160						
16.384000	163						
19.200000	192						
19.440000	194						
20.000000	200						
25.000000	250						
26.000000	260						