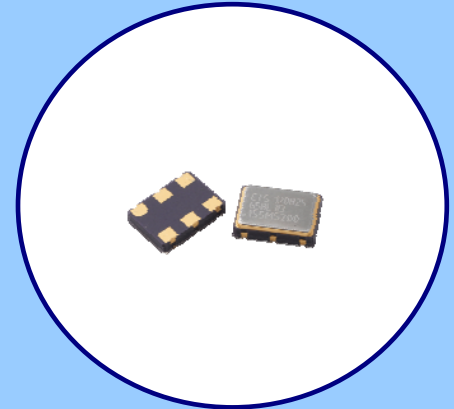


## FEATURES

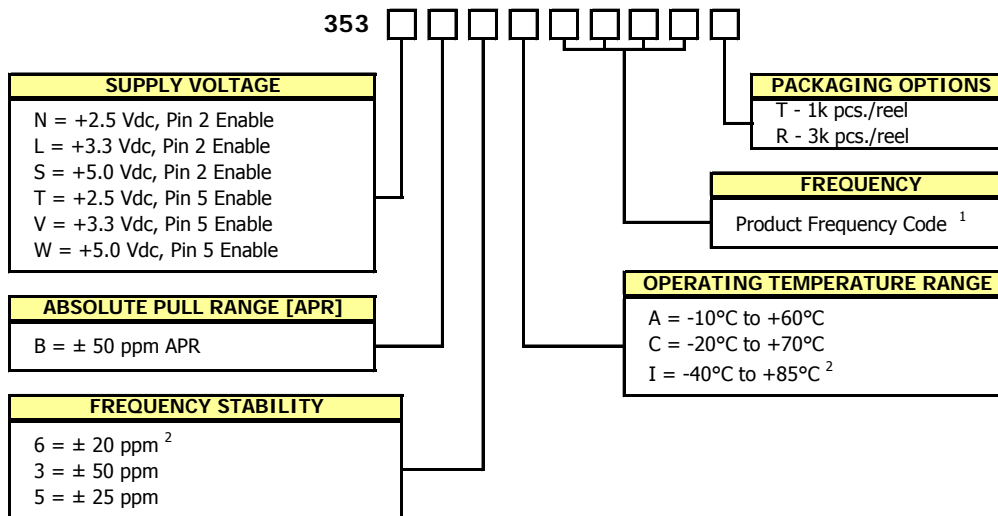
- Standard 5.0mm x 3.2mm 6-Pad Surface Mount Package
- HCMOS Output
- Low Jitter Performance
- Fundamental Crystal Designs
- Frequency Range 1 – 80 MHz
- Operating Voltages +2.5Vdc, +3.3Vdc or +5.0Vdc
- Operating Temperature to -40°C to +85°C
- Output Enable Standard
- Tape & Reel Packaging Standard, EIA-418
- **RoHS/Green Compliant [6/6]**



## APPLICATIONS

Model 353 is ideal for applications such as broadband access, Ethernet/Gigabit Ethernet, SONET/SDH, xDSL, PCMA, digital video, Picocells and base stations.

## ORDERING INFORMATION



1) Refer to document 016-1454-0, Frequency Code Tables.

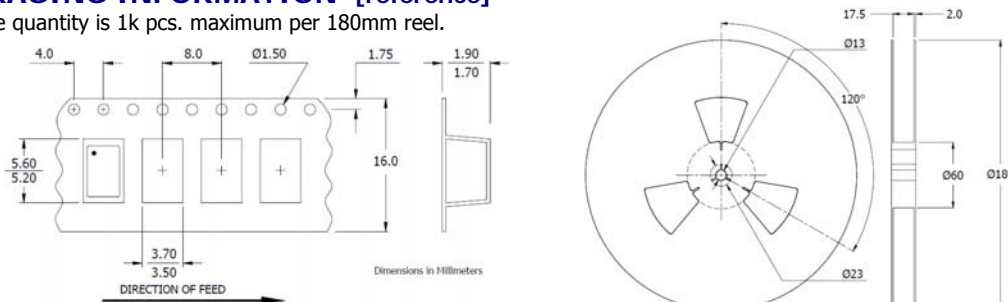
3-digits required for frequencies below 100MHz and 4-digits for frequencies 100MHz or greater.

2) Consult factory for availability of 6I Stability/Temperature combination.

**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
<b>ELECTRICAL PARAMETERS</b>	Maximum Supply Voltage	$V_{CC}$	-	-0.5	-	5.0	V
	Maximum Control Voltage	$V_C$	-	-0.5	-	$V_{CC}$	V
	Storage Temperature	$T_{STG}$	-	-40	-	+100	°C
	Frequency Range	$f_o$	-	1 - 80			MHz
	Frequency Stability (See Note 1 and Ordering Information)	$\Delta f/f_o$	-	-	-	20, 25 or 50	± ppm
	Absolute Pull Range (See Note 2 and Ordering Information)	APR	-	±50	-	-	ppm
	Aging	$\Delta f/f_{25}$	First Year @ +25°C, nominal $V_{CC}$ and $V_C$	-3	-	3	ppm
	Operating Temperature	$T_A$	-	-10 -20 -40	+25	+60 +70 +86	°C
	Supply Voltage	$V_{CC}$	Model 353N, 353T, ±5% Model 353L, 353V, ±5% Model 353S, 353W, ±5%	2.38 3.14 4.75	2.5 3.3 5.0	2.63 3.47 5.25	V
	Supply Current	$I_{CC}$	$C_L = 15$ pF @ +2.5Vdc @ +3.3Vdc @ +5.0Vdc	- - -	- - -	25 25 30	mA
	Output Load	$C_L$	-	-	-	15	pF
	Control Voltage	$V_C$	Model 353N, 353T, $V_{CC} = 2.5V$ Model 353L, 353V, $V_{CC} = 3.3V$ Model 353S, 353W, $V_{CC} = 5.0V$	0.20 0.15 0.50	1.25 1.65 2.50	2.30 3.15 4.50	V
	Frequency Deviation	$\Delta f$	+25°C @ Time of Shipment, over $V_C$ range	±100	-	-	ppm
	Linearity	L	Best Straight Line Fit	-	-	10	%
	Input Impedance	$Z_{Vc}$	-	10	-	-	kOhms
	Transfer Function	-	-	Positive			-
	Output Duty Cycle	SYM	@ 50% Level	45	-	55	%
	Output Voltage Levels	$V_{OH}$ $V_{OL}$	Logic '1' Level, CMOS Load Logic '0' Level, CMOS Load	$0.9V_{CC}$ -	- -	- $0.1V_{CC}$	V
	Rise and Fall Time	$T_{Rr}$ , $T_{Ff}$	@ 20%/80% Levels	-	3	8.0	ns
	Start Up Time	$T_S$	Application of $V_{CC}$	-	5	10	ms
	Modulation Roll-off	-	@ -3dB	12	-	-	kHz
	Enable Function						
	Enable Input Voltage	$V_{IH}$	Pin 2 or Pin 5 Logic '1', Output Enabled	$0.7V_{CC}$	-	-	V
	Disable Input Voltage	$V_{IL}$	Pin 2 or Pin 5 Logic '0', Output Disabled	-	-	$0.3V_{CC}$	
	Enable Time	$T_{PLZ}$	Pin 2 or Pin 5 Logic '1'	-	-	100	ns
Phase Jitter, RMS	$t_{jrms}$	Bandwidth 12 kHz - 20 MHz	-	0.5	1	ps	

- Notes:
- Inclusive of initial tolerance at time of shipment, changes in supply voltage, load, temperature and 1year aging.  
Minimum guaranteed frequency shift from  $f_o$  over variations in temperature, aging, power supply and load.

**ENABLE TRUTH TABLE**

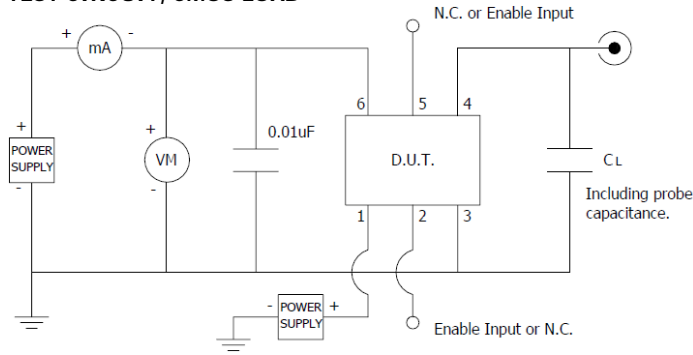
PIN 2 or Pin 5	PIN 4
Logic '1'	Output
Open	Output
Logic '0'	High Imp.

**SINGLE SIDE BAND PHASE NOISE**  
(typical maximum)

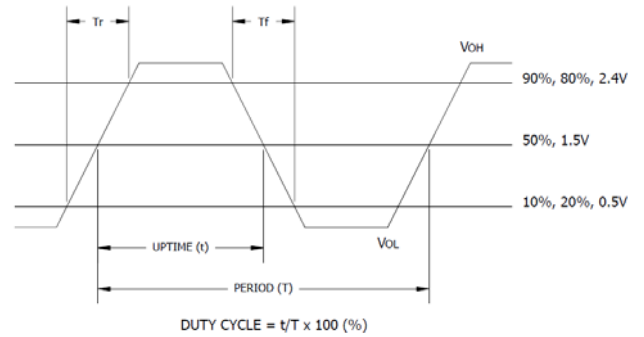
Frequency Offset	Phase Noise (dBc/Hz) *	Frequency Offset	Phase Noise (dBc/Hz) *
10 Hz	-60	10k Hz	-135
100 Hz	-90	100k Hz	-150
1k Hz	-120	>100k Hz	-150

\* Results may vary depending on frequency.

**TEST CIRCUIT, CMOS LOAD**

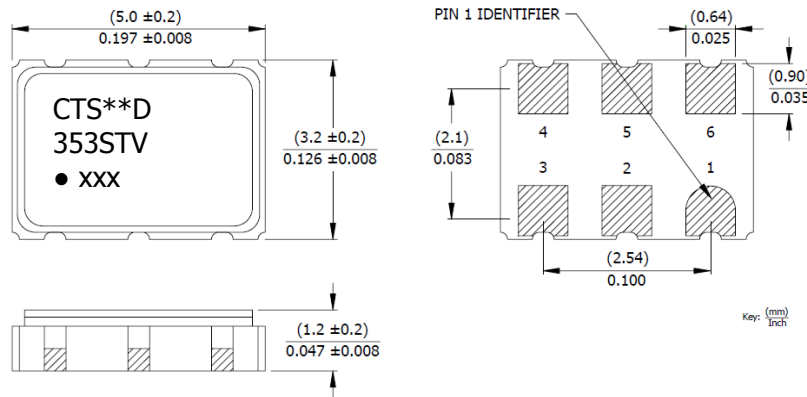


**OUTPUT WAVEFORM, CMOS**



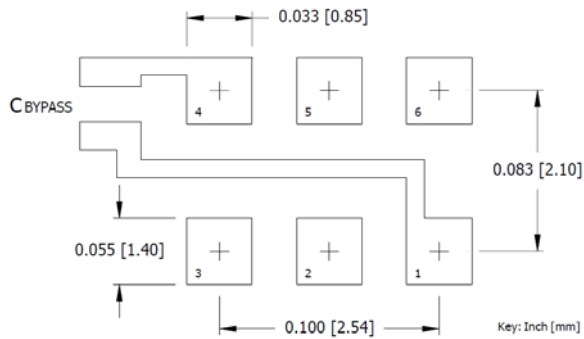
**MECHANICAL SPECIFICATIONS**

**PACKAGE DRAWING**



**SUGGESTED SOLDER PAD GEOMETRY**

C<sub>BYPASS</sub> should be ≥ 0.01 uF.



**MARKING INFORMATION**

- \*\* - Manufacturing Site Code.
  - D - Date Code. See Table I for codes.
  - ST - Frequency stability/temperature code. [Refer to Ordering Information.]
  - V - Voltage code. N or T = 2.5V, L or V = 3.3V, S or W = 5.0V
  - xxx - Frequency Code. 3-digits, frequencies below 100MHz
- Refer to document 016-1454-0, Frequency Code Tables.

**NOTES**

- Complete CTS part number, frequency value and date code information must appear on reel and carton labels.
- Termination pads [e4]. Barrier-plating is nickel [Ni] with gold [Au] flash plate.
- Reflow conditions per JEDEC J-STD-020; 260°C maximum, 20 seconds.
- MSL = 1.

**D.U.T. PIN ASSIGNMENTS**

PIN	SYMBOL	DESCRIPTION
1	V <sub>C</sub>	Control Voltage
2	EOH or N.C.	Enable [std] or No Connect
3	GND	Circuit & Package Ground
4	Output	RF Output
5	N.C. or EOH	No Connect or Enable [opt]
6	V <sub>CC</sub>	Supply Voltage

**TABLE I - DATE CODE**

YEAR		MONTH														
		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