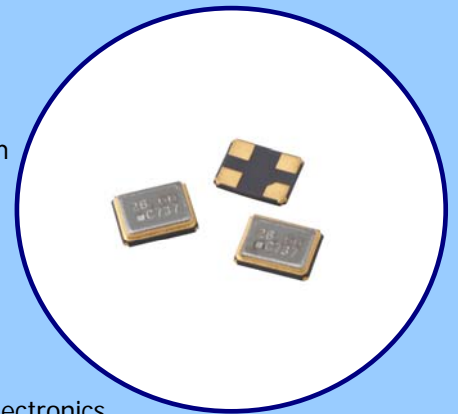




**FEATURES**

- **AEC-Q200 Compliant**
- **Standard 3.2mm x 2.5mm Seam Weld Package**
- **Fundamental Design**
- Frequency Range 12 – 40 MHz Fundamental, 36 – 120 MHz 3<sup>rd</sup> Overtone
- Frequency Tolerance;  $\pm 10$  ppm,  $\pm 15$  ppm,  $\pm 20$  ppm,  $\pm 30$  ppm and  $\pm 50$  ppm
- Frequency Stability, reference Ordering Information
- Operating Temperature, -40°C to +105°C standard
- Tape & Reel Packaging Standard, EIA-481



**APPLICATIONS**

Model SA324 is a low cost crystal specifically developed for use in automotive electronics.

**ORDERING INFORMATION**



FREQUENCY	
Product Frequency Code [Refer to document 016-1454-0.]	

MODE OF OSCILLATION	
F = Fundamental	
T = 3 <sup>rd</sup> Overtone	

FREQUENCY TOLERANCE @ 25°C	
1 = $\pm 10$ ppm	3 = $\pm 30$ ppm
X = $\pm 15$ ppm	5 = $\pm 50$ ppm
2 = $\pm 20$ ppm	

STABILITY TOLERANCE	
Over Operating Temperature Range (Referenced to 25°C Reading)	
X = $\pm 15$ ppm	5 = $\pm 50$ ppm
2 = $\pm 20$ ppm	6 = $\pm 100$ ppm
3 = $\pm 30$ ppm	

PACKAGING OPTIONS
T - 1k pcs./reel
R - 3k pcs./reel

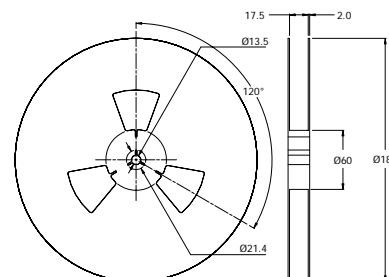
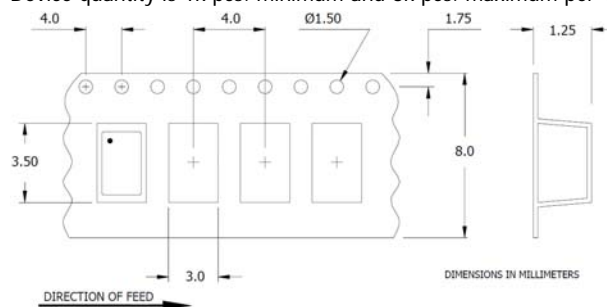
LOAD CAPACITANCE	
A = 10 pF	G = 30 pF
B = 13 pF	H = 32 pF
C = 16 pF	J = 9 pF
D = 18 pF	K = 8 pF
E = 20 pF	L = 12 pF
F = 24 pF	S = Series

TEMPERATURE RANGE OPTIONS
I = -40°C to +85°C
G = -40°C to +105°C [Stability Code 5 & 6]
H = -40°C to +125°C [Stability Code 6]

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. minimum and 3k pcs. maximum per 180mm reel.



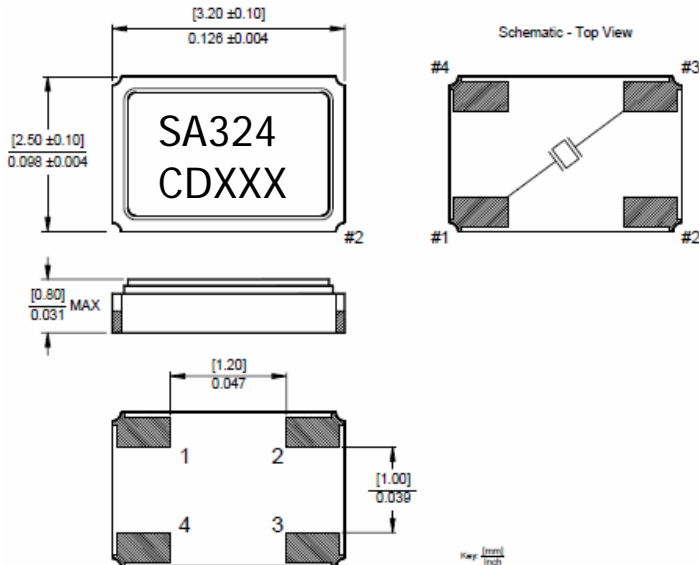
**ELECTRICAL CHARACTERISTICS**

PARAMETER		VALUE			
ELECTRICAL PARAMETERS	Operating Mode	Fundamental		3 <sup>rd</sup> Overtone	
	Frequency Range	12.0 MHz to 40.0 MHz		36.0 MHz to 120.0 MHz	
	Crystal Cut	AT-Cut			
	Frequency Tolerance @ 25°C	±10ppm, ±15ppm, ±20ppm, ±30ppm, ±50ppm			
	Frequency Stability Tolerance <sup>1</sup> [Operating Temperature Range, Referenced to 25°C Reading]	±15 ppm, ±20 ppm, ±30 ppm, ±50 ppm, ±100 ppm			
	Operating Temperature Range <sup>1</sup>	-40°C to +85°C [All Stability Codes] -40°C to +105°C [Stability Code 3, 5, 6] -40°C to +125°C [Stability Code 5, 6]			
	Equivalent Series Resistance	12.000 MHz - 15.999 MHz	100 Ohms maximum	36.000 MHz - 53.999 MHz	150 Ohms maximum
		16.000 MHz - 18.999 MHz	80 Ohms maximum	54.000 MHz - 120.000 MHz	100 Ohms maximum
		19.000 MHz - 29.999 MHz	60 Ohms maximum		
		30.000 MHz - 40.000 MHz	40 Ohms maximum		
	Load Capacitance or Resonance Mode [See Ordering Information for More Options]	10pF, 12pF, 16pF, Series standard			
	Shunt Capacitance (C <sub>0</sub> )	3.0 pF typical, 5.0 pF maximum			
	Drive Level	10 µW typical, 100 µW maximum			
	Aging @ +25°C	±5 ppm/yr maximum			
Insulation Resistance [ @ DC 100V]	500M Ohms minimum				
Storage Temperature Range	-40°C to +125°C				
Reflow Condition, per JEDEC J-STD-020	+260°C maximum, 10 Seconds maximum				

<sup>1</sup> See Ordering Information.

**MECHANICAL SPECIFICATIONS**

**PACKAGE DRAWING**



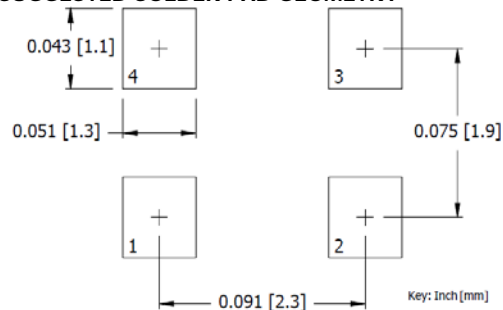
**MARKING INFORMATION**

- SA324 - CTS Model Series.
- C - CTS.
- D - Date code. See Table I for codes.
- XXX - Frequency code.  
[Reference CTS document 016-1450-0, Frequency Code Tables.]

**NOTES**

- Complete CTS part number, frequency value, date code and manufacturing site 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, 10 seconds.

**SUGGESTED SOLDER PAD GEOMETRY**



**TABLE I - DATE CODE**

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