GREENRAY
frequency control solutions

T70

TIGHT TEMPERATURE STABILITY
RUGGED PACKAGE

tcxo

Product Description

Greenray Industries' T70 Series TCXOs offer reliable, precision performance for mobile, battery-powered apps. It has been developed as a reference oscillator for critical timing applications that require tight temperature stability, low supply current, a very rugged package, and a small footprint. The T70 Series is well-suited to use in exploration and tracking equipment applications.

Features

- Small and rugged 7.0 x 5.0 mm package
- Withstand vibration, and high shock up to 50,000 g
- Tight temperature stability as low as ±0.1ppm
- Excellent long-term aging < 5ppm over 10 years
- Low acceleration sensitivity: < 0.7 ppb/g
- Low power consumption, enable reliable, battery-operated performance gains
- Low phase noise

Applications

- Telecommunications
- High-shock electronics
- Mobile radio
- Mobile instrumentation
- Airborne communications
- Wireless communications
- Microwave receivers
- Smart munitions

Rev. E

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ISO 9001 Quality

AS9100 Aerospace

Electrical Characteristics

Frequency Characteristics						
Parameter	**Conditions**	**Min**	**Typical**	**Max**	**Units**	**Ordering Code**
Nominal Frequency	+25°C	10		50	MHz	
Frequency Stability (other stabilities available)	-10°C to +60°C		± 0.1		ppm	G17
	-20°C to +70°C		± 0.1		ppm	N17
	-40°C to +85°C		± 0.3		ppm	T37
	-55°C to +95°C		± 1.0		ppm	V16
Aging	1st year, for 10 MHz		± 0.5	± 1	ppm	
Acceleration Sensitivity	(Note 1)			2.5	ppb/g	SD
				0.7	ppb/g	LG
Frequency vs Reflow	After 24hrs recovery			1	ppm	
Electronic Frequency Control	EFC = 0 to V_{DD} Positive slope		± 7		ppm	
DC Supply						
Parameter	**Conditions**	**Min**	**Typical**	**Max**	**Units**	**Ordering Code**
Supply Voltage (V_{DD})		3.0	3.3	3.6	VDC	T70, T72
		4.75	5.0	5.25	VDC	T71, T73
Input Current	CMOS			6	mA	T70, T71
	Clipped Sinewave			3	mA	T72, T73
RF Outputs available: CMOS and Clipped Sinewave						
Parameter	**Conditions**	**Min**	**Typical**	**Max**	**Units**	**Ordering Code**
CMOS Output						T70, T71
Load			15		pF	
Level	V_{DD}=3.3V	+2.8 "1" Level		+0.2 "0" Level	V	T70
	V_{DD}=5.0V	+4.2 "1" Level		+0.2 "0" Level	V	T71
Symmetry		40	50	60	%	
Clipped Sine Output						T72, T73
Load			10 pF // 10k Ω			
Level		+0.8			V p-p	

(1) Acceleration Sensitivity is worst axis tested at 90 Hz, 10 g

Environmental Screenings

Environmentals				
Screening	**Conditions**	**Method, Condition**	**Notes**	**Ordering Code**
Vibration	MIL-STD-202G	214A, I-F	0.3 PSD, 20.71 g RMS	
Shock	MIL-STD-202G	213, I	100 g, 5 ms, Sawtooth Shock available up to 50,000 g	 HG

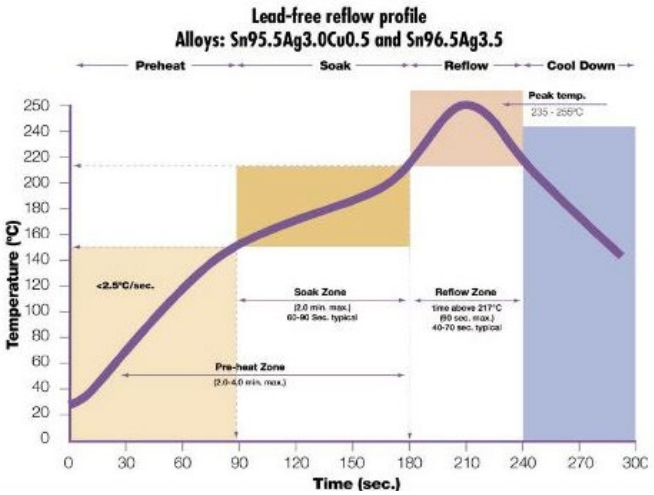
Ordering (Example)

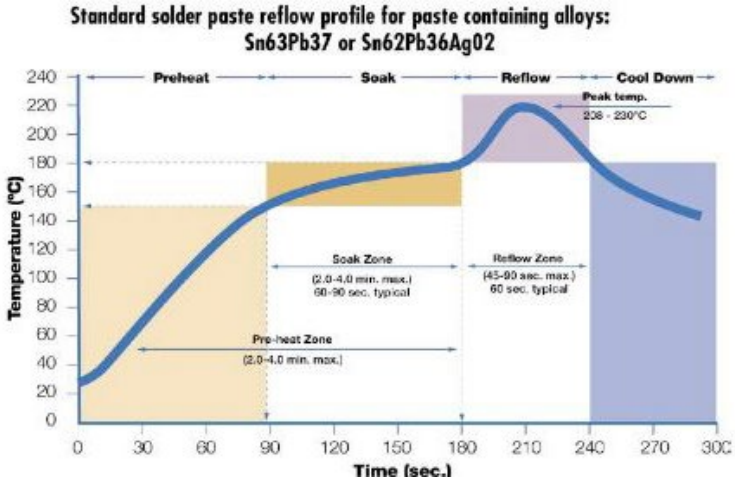
T70 - **N17** - **LG** - **20.0MHz** - **E**

Model	Stability Code	G-Sensitivity Code	Frequency in MHz	Termination finish
Model: Input V Output T70 +3.3V CMOS T71 +5.0V CMOS T72 +3.3V Clipped Sine T73 +5.0V Clipped Sine	Refer to Electrical Specs Table* G17 (-10°C to +60°C) N17 (-20°C to +70°C) T37 (-40°C to +85°C) V16 (-55°C to +95°C)	SD: < 2.5 ppb/g LG: < 0.7 ppb/g HG: Customer-specific	From 10 to 50 MHz	E: Gold plated (RoHS), Standard PB: SnPb 63/37 (non-RoHS) LF: SnAg 96.5/3.5 (Lead-free)

*other frequency stabilities available, for further information please contact factory

Recommended Solder Reflow Profiles





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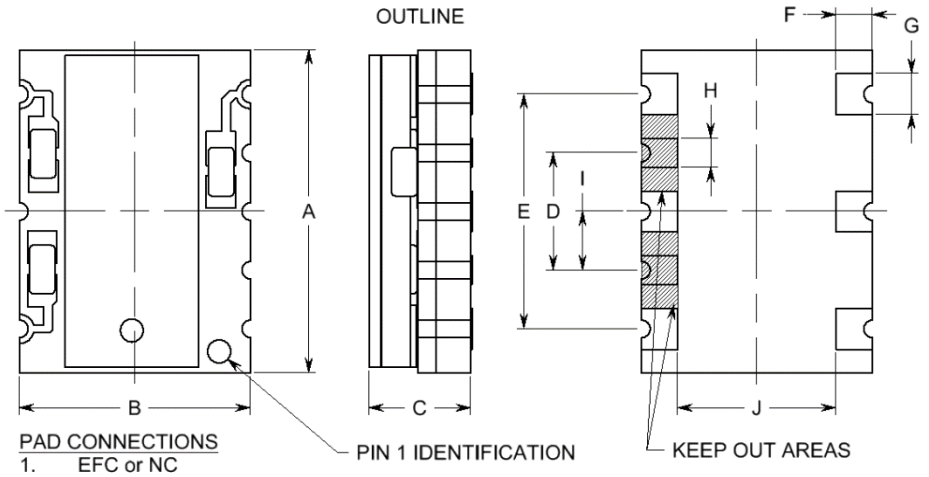
Package information



PART DIMENSIONS

DIM	TYP. inches	TYP. mm	MAX. inches	MAX. mm
A	0.275	7.00	0.280	7.11
B	0.197	5.00	0.202	5.13
C	NA	NA	0.100	2.54
D	0.100	2.54	0.105	2.67
E	0.200	5.08	0.205	5.21
F	0.031	0.79	NA	NA
G	0.035	0.89	NA	NA
H	0.025	0.64	NA	NA
I	0.050	1.27	0.055	1.40
J	0.135	3.43	0.140	3.56

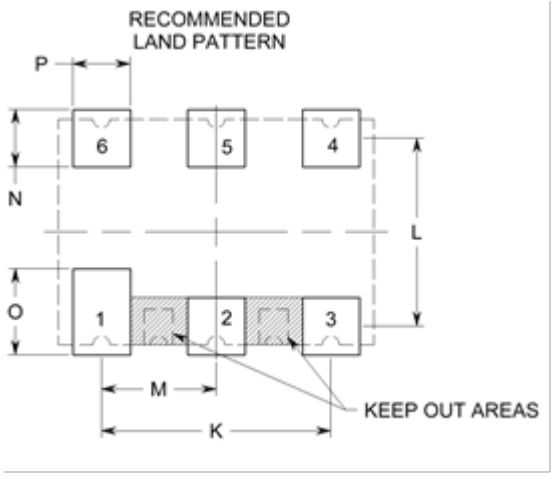
PAD CONNECTIONS

1. EFC or NC
2. SCLK (INTERNAL USE ONLY)
3. 0V & CASE GND
4. OUTPUT
5. TRI-STATE/VREF/UTIL (SEE TABLE 1 FOR TRI-STATE FUNCTION)
6. SUPPLY

A. DIA (INTERNAL USE ONLY)
B. CS (INTERNAL USE ONLY)

TABLE 1: TRI-STATE FUNCTION

PAD 5	ENABLE/DISABLE FUNCTION
HIGH (SUPPLY)	OUTPUT ENABLED
OPEN (NC)	OUTPUT ENABLED
LOW (GND	HIGH IMPEDANCE DISABLED



LAND PATTERN DIMENSIONS

DIM	TYP. inches	TYP. mm	MAX. inches	MAX. mm
K	0.200	5.08	0.205	5.21
L	0.164	4.17	0.169	4.29
M	0.100	2.54	0.105	2.68
N	0.050	1.27	NA	NA
O	0.050	1.27	NA	NA
P	0.075	1.91	NA	NA

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