GREENRAY
frequency control solutions

T56

WIDE TEMPERATURE RANGE
LOW ACCELERATION SENSITIVITY

tcxo

Product Description

Greenray Industries' T56 Series TCXO has been developed as a reference oscillator for timing applications requiring low power draw, tight stability over military temperature range, and a compact footprint.

Features

- Military temperature range –55 °C to +125 °C
- Small and rugged 5.0 x 3.2 mm package
- Tight temperature stability of ± 1 ppm over −55 °C to +125°C
- Excellent long-term aging < 4 ppm over 10 years
- Low acceleration sensitivity < 0.2 ppb/g
- Low power consumption

Applications

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

Rev. B

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Electrical Characteristics

Frequency Characteristics						
Parameter	**Conditions**	**Min**	**Typical**	**Max**	**Units**	**Ordering Code**
Nominal Frequency	+25°C	10		52	MHz	
Frequency Stability (Other stabilities available)	-40°C to +95°C		± 0.3		ppm	E37
	-45°C to +105°C		± 0.5		ppm	J57
	-55°C to +125°C		± 1		ppm	X16
Aging	1st year			± 1	ppm	
	10 years			± 4	ppm	
Acceleration Sensitivity	(Note 1)			2	ppb/g	SD
			0.4	0.7	ppb/g	LG
				0.2	ppb/g	UL
Frequency vs Reflow	After 24hrs recovery			1	ppm	
Frequency vs Voltage	± 5%			0.2	ppm	
Frequency vs Load	± 10%			0.1	ppm	
Electronic Frequency Control	EFC = 0 to V_{DD} Positive slope	± 5			ppm	
Start-up time			10	16	ms	
Phase Noise Performance						
Parameter	**Frequency Offset (Hz)**	**Min**	**Typical**	**Max**	**Units**	
Phase Noise (static) @ 20 MHz nominal Frequency	10		-80		dBc/Hz	
	100		-112		dBc/Hz	
	1 k		-133		dBc/Hz	
	10 k		-145		dBc/Hz	
	100 k		-149		dBc/Hz	
	floor		-150		dBc/Hz	
DC Supply						
Parameter	**Conditions**	**Min**	**Typical**	**Max**	**Units**	**Ordering Code**
Supply Voltage (V_{DD})		3.0	3.3	3.6	VDC	3.3
Input Current	CMOS			6	mA	
	Clipped Sinewave			3	mA	
RF Outputs available: CMOS and Clipped Sine						
Parameter	**Conditions**	**Min**	**Typical**	**Max**	**Units**	**Ordering Code**
CMOS Output						C
Load			15		pF	
Level	V_{DD} = 3.3V	80% "1" Level		20% "0" level"	V_{DD}	
Symmetry		40	50	60	%	
Clipped Sine Output						S
Load			10 pF // 10k Ω			
Level		+0.8	+1.9	+3.0	V p-p	

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

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Environmental Screenings

Environmental				
Screening	**Conditions**	**Method**	**Notes**	**Ordering Code**
Vibration	MIL-STD-202G	204	Cond C. 20 g, 20 Hz to 2,000 Hz, swept sine	
Shock	MIL-STD-202G	213	Cond I. 100 g, 11 ms, half-sine	

Recommendation and General Information

Conditions	
Parameter	**Notes**
Operating Temperature	-55°C to +125°C
Storage Temperature	-60°C to +125°C
Terminal Finish	ENIG std. SnPb 63/37 (non-RoHS) available
Package Weight	3 grams
Soldering Instruction	Reflow
Shipping	Tray pack and Tape & Reel

Ordering Example

T56	-	X16	-	C	-	LG	-	20.0MHz	-	E
Model		Stability Code		Output Code		G-Sensitivity Code		Frequency in MHz		Termination finish
		Refer to Electrical Specs Table* E37 (-40°C to +95°C) J57 (-40°C to +105°C) X16 (-55°C to +125°C)		C: CMOS S: Clipped Sinewave		SD: < 2 ppb/g LG: < 0.7 ppb/g UL: <0.2 ppb/g HG: Customer-specific		From 10 to 52 MHz		E: Gold plated (RoHS), Standard

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

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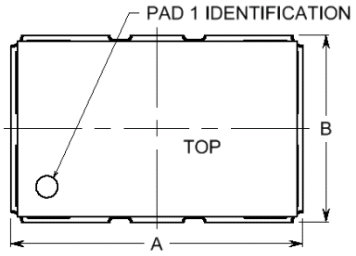
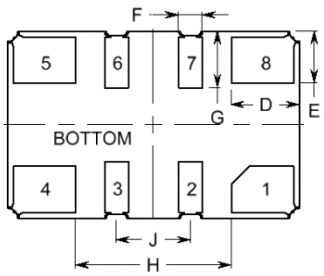
Package information



OUTLINE

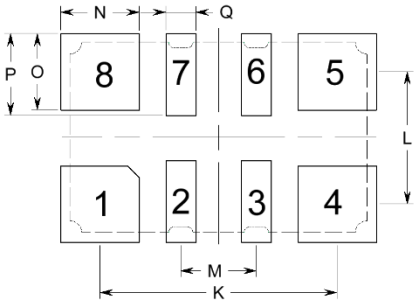


PART DIMENSIONS

DIM	TYP. inches	TYP. mm	MAX. inches	MAX. mm
A	0.197	5.00	0.207	5.25
B	0.126	3.20	0.136	3.45
C	NA	NA	0.079	2.00
D	0.046	1.17	NA	NA
E	0.035	0.89	NA	NA
F	0.016	0.41	NA	NA
G	0.038	0.97	NA	NA
H	0.105	2.67	0.115	2.92
I	0.056	1.42	0.066	1.68
J	0.050	1.27	0.060	1.52

PAD CONNECTIONS
1. EFC
2. INTERNAL USE ONLY
3. INTERNAL USE ONLY
4. GND
5. OUTPUT
6. INTERNAL USE ONLY
7. INTERNAL USE ONLY
8. SUPPLY

RECOMMENDED
LAND PATTERN

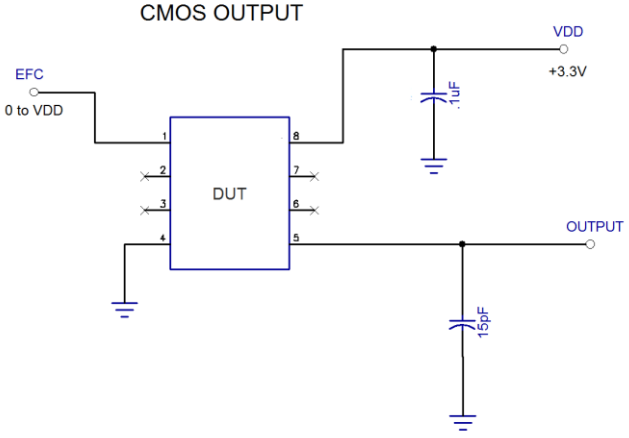


LAND PATTERN DIMENSIONS

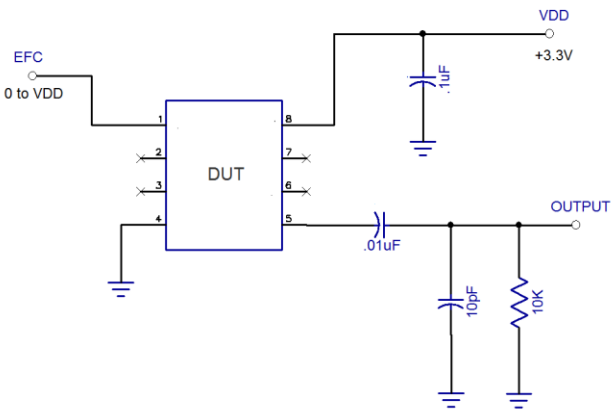
DIM	TYP. inches	TYP. mm	MAX. inches	MAX. mm
K	0.147	3.73	0.157	3.99
L	0.126	3.20	0.136	3.45
M	0.047	1.19	NA	NA
N	0.049	1.25	NA	NA
O	0.047	1.19	NA	NA
P	0.051	1.30	NA	NA
Q	0.019	0.48	NA	NA

Recommended Configuration

CMOS OUTPUT



CLIPPED SINE OUTPUT



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