



frequency control solutions

tcxo

T1276

RADIATION TOLERANT
ULTRA-LOW ACCELERATION SENSITIVITY

Product Description

Greenray Industries' T1276 TCXO offers excellent performance in high shock and vibration environments in a rugged, radiation tolerant package.



Features

- 200 krad (Si) total ionizing dose
- Rugged, hermetic, radiation tolerant 20.3 x 12.7mm 24-PIN DIP package
- Frequency: 2.5 to 120MHz
- Wide temperature range -55°C to +125°C
- SEL and SET free to 100 MeV cm²/mg
- Ultra-low acceleration sensitivity < 0.07 ppb/g
- 3.3 VDC and 5 VDC supply
- CMOS or Sinewave output
- MIL-PRF-55310 Level B or S Screening

Applications

- High orbit transponders
- Low orbit satellites (nano/micro satellites)
- RF telemetry systems
- Multiband terminal
- Upconverter

Rev. B



ISO 9001
Quality

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AS9100
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T1276 SERIES
2.5 MHz to 120 MHz



Electrical Characteristics

Electrical Characteristics						
Parameter	Conditions	Min	Typical	Max	Units	Ordering Code
Nominal Frequency	+25°C	2.5		120	MHz	
Frequency Stability	0°C to +50°C		± 0.3		ppm	B37
	-20°C to +70°C		± 1		ppm	N16
	-40°C to +85°C		± 3		ppm	T36
	-55°C to +95°C		± 5		ppm	V56
	-55°C to +125°C		± 7		ppm	X76
Aging	1 st year			± 1	ppm	
	10 years			± 3	ppm	
Acceleration Sensitivity	Acceleration Sensitivity is worst axis tested at 90 Hz, 10 g			0.7	ppb/g	SD
				0.07	ppb/g	ULG
Frequency vs Voltage	For a 2% change			0.1	ppm	
Electronic Frequency Control	EFC = V _{DD} to 0, Negative slope		± 10		ppm	
Short Term	For a 1 sec tau		0.08		ppb	
Phase Noise Performance						
Parameter	Frequency Offset (Hz)	Min	Typical	Max	Units	
Phase Noise (static) @ 20 MHz Nominal Frequency	10		-90		dBc/Hz	
	100		-120		dBc/Hz	
	1k		-140		dBc/Hz	
	10 k		-150		dBc/Hz	
	100 k		-155		dBc/Hz	
	1 M		-160		dBc/Hz	
DC Supply						
Parameter	Conditions	Min	Typical	Max	Units	Ordering Code
Supply Voltage (V _{DD})	± 5%	3.0	3.3	3.6	VDC	3.3
	± 5%	4.75	5.0	5.25	VDC	5.0
Supply Current	CMOS			35	mA	
RF Output: CMOS and Sinewave						
Parameter	Conditions	Min	Typical	Max	Units	Ordering Code
CMOS Output						C
Load	CMOS		15		pF	
Level	V _{DD} =3.3V	+2.8 "1" level		+0.2 "0" level	V	
	V _{DD} =5.0V	+4.5 "1" level		+0.2 "0" level	V	
Symmetry	CMOS	40	50	60	%	
Sinewave Output						S
Load	Sine		50		Ω	
Output Power	Sine	0	+3.0		dBm	
Harmonics	Sine		-30	-26	dBc	



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Environmental and Mechanical Specifications

Screenings			
Screening	Standard	Method, Condition	Description
Vibration	MIL-STD-883	2007, Cond A	50 g, 20 to 2,000 Hz, swept sine
Shock	MIL-STD-883	2002, Cond B	1,500 g, 0.5 ms half-sine
Radiation		TID	200 krad (Si)
		SEL, SET	100 MeV cm ² /mg

Recommendations and General Information

Information	
Parameter	Notes
Operating Temperature	-55°C to +125°C
Storage Temperature	-65°C to +130°C
Terminal Finish	Lead Free or SnPb
Package Finish	Stainless Steel and Nickel-plated Kovar
Package Weight	4 grams
Soldering Instruction	Hand solder
Shipping	Tray pack
Marking	Line 1: Greenray logo Line 2: Model Line 3: Frequency Line 4: Serial Number + Date Code (YYWW)

Ordering Example

T1276	-	T56	-	C	-	3.3	-	LG	-	B	-	10.0MHz	-	E
Model		Stability Code		Output Type		Supply Voltage		G-Sensitivity Code		Screening Level		Frequency in MHz		Termination finish
		Refer to Electrical Specs Table* B37 (0°C to +55°C) N16 (-20°C to +70°C) T36 (-40°C to +85°C) V56 (-55°C to +95°C) X76 (-55°C to +125°C)		C: CMOS S: Sinewave		3.3: 3.3V 5.0: 5.0V		SD: < 0.7 ppb/g ULG: < 0.07 ppb/g HG: Customer-specific		Refer to Screening Levels Table C: Level C B: Level B S: Level S		From 2.5 to 120 MHz		E: Gold plated (RoHS), Standard PB: SnPb 63/37 (non-RoHS) LF: SnAg 96.5/3.5 (Lead-free)

*other frequency stabilities available, please contact factory.



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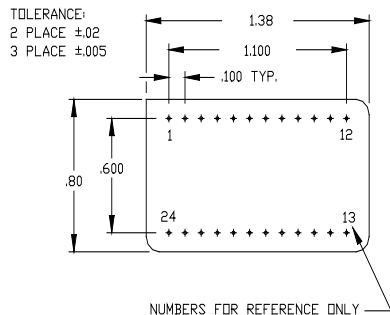
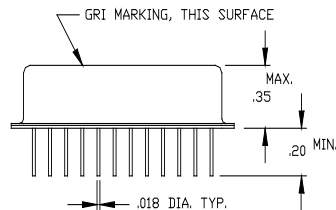
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Screening Information

Screening	Screening Levels		
	Level S	Level B	Level C
Random Vibration	MIL-STD-202, Method 214, Cond 1-B, 5 min. per axis	N/A	N/A
Thermal Shock	MIL-STD-202, Method 107, Cond. B-1	MIL-STD-202, Method 107, Cond. A	5 Cycles, min. to max. operating temperature
PIND	MIL-STD-202, Method 217	N/A	N/A
Electrical Test (+25°C Parameters)	per Specification	per Specification	per Specification
Burn-in (Load)	240 hrs min. at max. operating temperature	160 hrs min. at max. operating temperature	160 hrs min. at max. operating temperature
Electrical Test (+25°C Parameters)	per Specification	per Specification	per Specification
Seal Test	MIL-STD-202, Method 112, Cond. D	MIL-STD-202, Method 112, Cond. D	MIL-STD-202, Method 112, Cond. D
Radiographic (per Specification)	MIL-STD-209	N/A	N/A
Visual and Mechanical Inspection	MIL-STD-883, Method 2009	MIL-STD-883, Method 2009	IPC610, Class 3
Components	JAN-S, ER-Level S	JAN, ER-Level R	COTS

Package dimensions and Pin Connections



Pin Connections	
Pin 1	EFC
Pin 12	Ground
Pin 13	Output
Pin 24	V supply
All other pins are NC	



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