

RK105 5032

This radiation tolerant 5 x 3.2 mm hermetically sealed SMD XO is specifically designed for missions where resistance to demanding environment, short lead-time and radiation tolerance are required. It combines a very low RMS phase jitter, tight frequency stability and is available with different types of FM screening options.

Features

- Free from export restrictions
- TID limit of 72/100 kRad and latch-up free till 32.4/62 MeV
- Hermetically sealed package
- Frequency range: 8-1500 MHz
- Low consumption: 30 mA
- Supply voltage: 2.5 or 3.3 V
- AFD¹ ±50 ppm over -40°C to +85°C
- Different screening options

Applications

- Missions where TID limit of 72/100 kRad and latch-up free till 32.4/62 MeV are required
- Rugged environment

5.0 x 3.2 mm



1. Environmental Conditions

Parameter	Condition / Remarks	Min.	Typ.	Max.	Unit
Operating temperature	Option I: -40°C to 85°C Option M: -55°C to 125°C	-40 -55	25 25	85 125	°C
Switch-on temperature	TS ₀	-55		125	°C
Non-operating temperature	TNO _p	-55		125	°C
Mechanical shock	MIL-STD-883, Method 2002 (1500 g, 0.5 ms)				
Humidity	After 48 hours at 85°C ±2°, 85% relative humidity non-condensing				
Temperature cycling	MIL-STD-883, Method 1010.8 (-55°C, +125°C, 1000 cycles)				
Vibration	MIL-STD-883, Method 2007 (20 g, 3 different axis, 4 times)				
Gross and fine leak	MIL-STD-883, Method 1014				
RoHS compliant	Yes				
Radiation:					
Products have been tested up to the following levels without any events					
		TID (LDR as per ESICC22900)	SEL (MeV/mg/cm ²)	SET (MeV/mg/cm ²)	SEFI (MeV/mg/cm ²)
	CMOS	100 kRad	32.4	20	62.5
	LVDS	72 kRad	32.4	10	62.5
	LVPECL	72 kRad	62.5	10	62.5

2. Frequency Characteristics

Parameter	Condition / Remarks	Min.	Typ.	Max.	Unit
AFD ¹ option	Option I: -40°C to 85°C Option M: -55°C to 125°C			±50 ±75	ppm
Initial frequency accuracy (FVT ² option)				±15	ppm
Frequency stability over temperature (FVT)	Option I: -40°C to 85°C Option M: -55°C to 125°C			±30 ±50	ppm
Supply voltage stability (FVT)	Over operating temperature			±3	ppm
Load sensitivity (FVT)	Over operating temperature			±5	ppm
Ageing (FVT)	Over 10 years			±15	ppm
Start-up time				10	ms

¹ AFD: Absolute Frequency Drift. It includes initial accuracy + temperature range + supply variation + load variation + ageing over 10 years.

² FVT: Frequency Vs. Temperature.

3. Electrical Interface

Parameter	Condition / Remarks	Min.	Typ.	Max.	Unit
Power supply (V _{DD})	Option 2: 2.5 V Option 3: 3.3 V	2.375 2.97	2.5 3.3	2.625 3.63	V
Stead state input current power	CMOS output: LVDS output LVPECL output		20 23 54		mA

4. Output Characteristics – CMOS³

Parameter	Condition / Remarks	Min.	Typ.	Max.	Unit
Nominal frequency	CMOS output	8		200	MHz
Output voltage (V _{OL})	15pf load			10% V _{DD}	V
Output voltage (V _{OH})	15pf load	90% V _{DD}			V
Duty cycle	@50% V _{DD}	48		52	%
Rise time / Fall time	90% to 10% V _{CC}			3	ns
RMS Phase Jitter	Integrated 12 kHz to 20 MHz		0.9	2.5	ps

5. Output Characteristics – LVPECL

Parameter	Condition / Remarks	Min.	Typ.	Max.	Unit
Nominal frequency	LVPECL output	8		1500	MHz
Output voltage (V _{OL})	50Ω nominal load			V _{DD} – 1.6V	V
Output voltage (V _{OH})	50Ω nominal load	V _{DD} – 1.03V			V
Duty cycle	@ V _{DD} – 1.03V (45 to 55% over 600 MHz)	48		52	%
Rise time / Fall time	80% to 20% V _{CC}			0.6	ns
RMS Phase Jitter	Integrated 12 kHz to 20 MHz		0.9	2.5	ps

6. Output Characteristics – LVDS

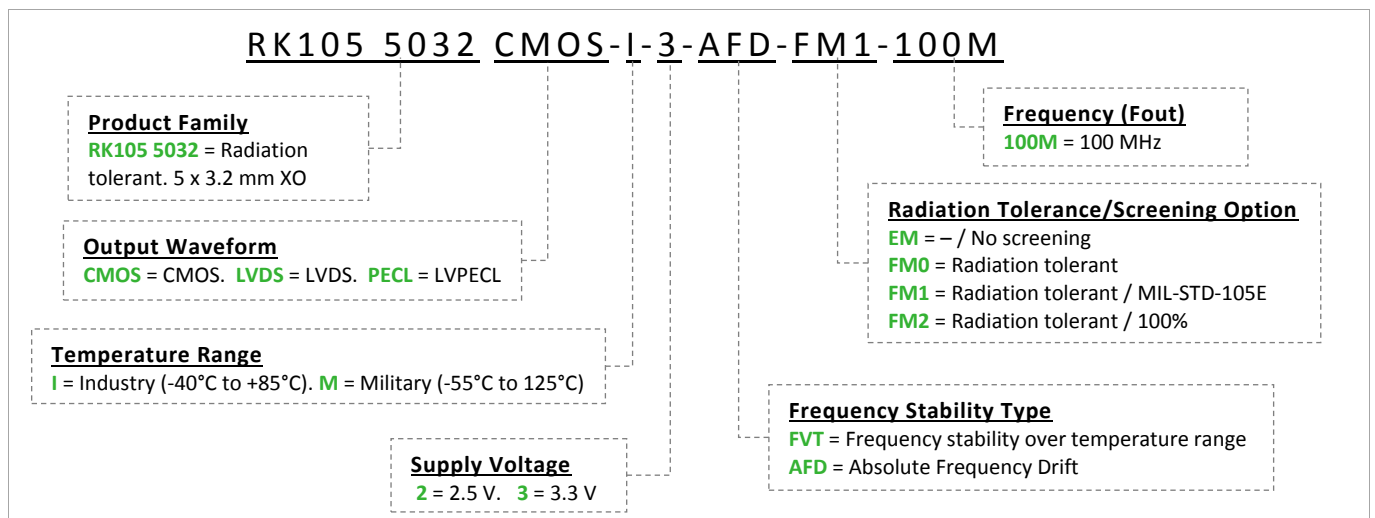
Parameter	Condition / Remarks	Min.	Typ.	Max.	Unit
Nominal frequency	LVDS output	8		1500	MHz
Output voltage	Voltage swing (V _{od})		350		mV
Duty cycle	Measured @ 1.25 V (45 to 55% over 150 MHz)	48		52	%
Rise time / Fall time	RL = 100 Ω / CL = 10 pF			0.6	ns
RMS Phase Jitter	Integrated 12 kHz to 20 MHz		0.9	2.5	ps

³ The CMOS output is TTL compatible with the 3.3 V supply voltage.

7. Screening Options

Screening Operation	Requirements and Condition	Options			
		EM	FM0	FM1	FM2
Stabilization bake (prior to seal)	MIL-STD-883 method 1008, conduction C	–	24h@150°C	24h@150°C	24h@150°C
Thermal shocks	MIL-STD-883, method 1011, condition A	–	✓	✓	✓
Temperature cycling	MIL-STD-883, method 1010, condition B	–	✓	✓	✓
Constant acceleration	MIL-STD-883, method 1010, condition A Acceleration: 5000g, curing 60s in direction Y1	–	✓	✓	✓
PIND test	MIL-STD-883, method 2020, condition B	✓	✓	✓	✓
Seal test	Fine leak: MIL-STD-883, method 1014, condition A2	✓	✓	✓	✓
	Gross leak: CEI 68-2-17 Test Qc, Method 1	✓	✓	✓	✓
Pre burn-in measurement	Following the guidelines of MIL-PRF-55310, §4.8.5, §4.8.6, §4.8.11, and §4.8.20	✓ ⁴	✓ ⁵	✓ ⁵	✓
Burn-in	Temperature: +125°C Pressure: Patm Supply Voltage: Vcc nom Load: Load nom	–	–	160h min.	160h min.
Post burn-in measurement	Following the guidelines of MIL-PRF-55310	–	–	✓	✓
PDA		–	–	20%	10%
External visual Inspection	MIL-STD-883, Method 2009	–	–	✓	✓

8. Ordering Part Example

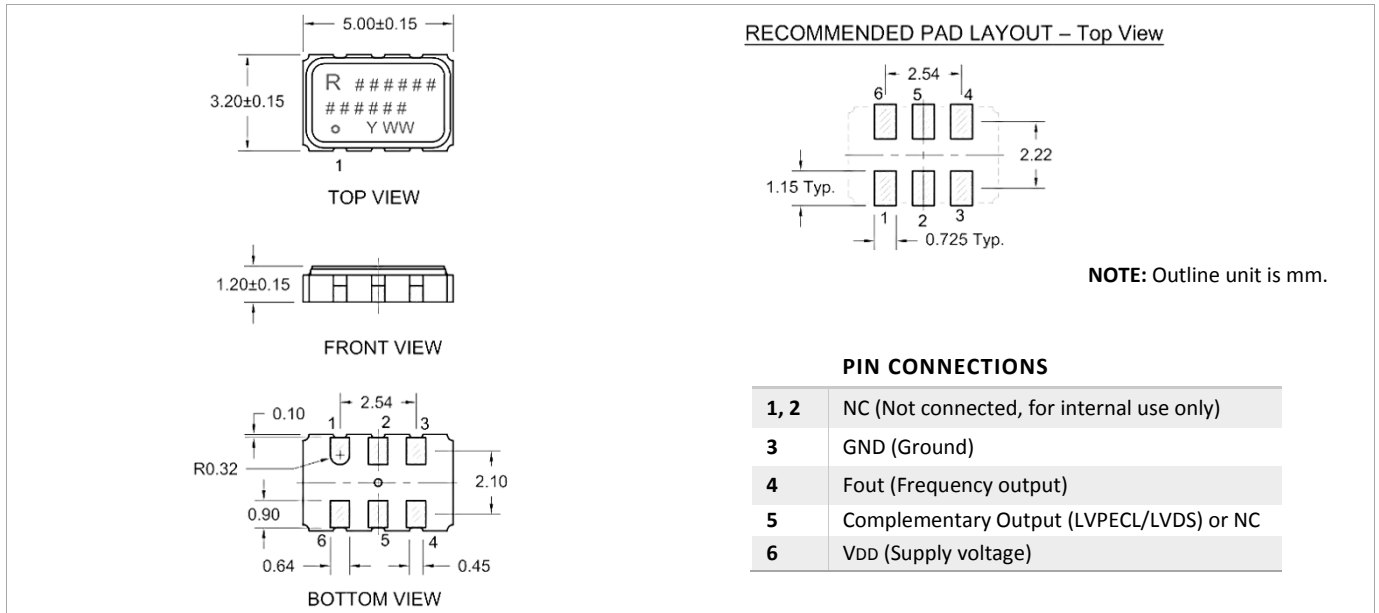


⁴ Electrical verification.

⁵ MIL-STD-105E general inspection level | AQL level 1.0.

▶ 100 pcs batch: test on 13 pcs / 0 rejected. ▶ 500 pcs batch: test on 20 pcs / 0 reject accepted. ▶ 1000 pcs batch: test on 50 pcs / 1 reject accepted.

9. Model Outline, Pin Connections and Recommended Pad Layout



10. Marking

Parameter	Test Condition / Description
Top line	[R #####] R and part identifier
Middle line	[#####] Part information
Bottom line	[o YWW] Pin 1, Year code* and Week code** Year code*: A = 2010, B = 2011, C = 2012, D = 2013, ... Z = 2035 Week code**: WW = 01 = Week of first Monday of the year

11. Manufacturing Information

