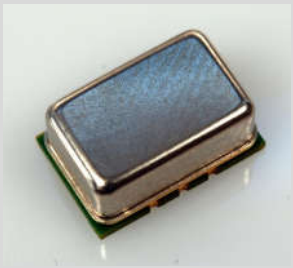
# Miniature
# SMD (VC)OCXO

## DESCRIPTION:

**O-9000-HS** is a very small sized SMD 'Oven Controlled Crystal Oscillator' **(VC)OCXO** offering exceptional tight frequency stability of ±0.01 ppm (±10 ppb) over a wide temperature range of up to -40/+85 °C.
The part comes in a **hermetically sealed 14 x 9 x 9 mm SMD** package taped on reel what makes it also suitable for automatic pick & place machine assembly.

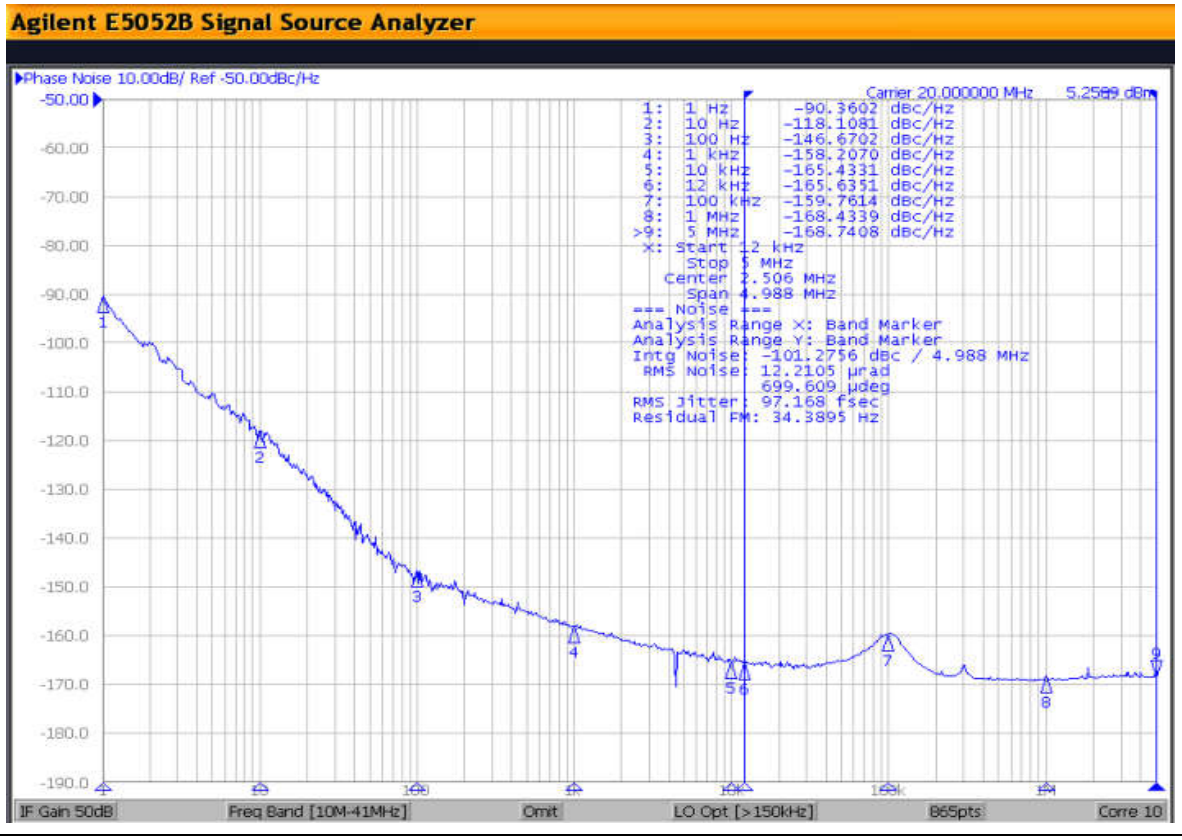


## FEATURES:

- Small HS SMD package
- Fast Warm-up Time
- Low Power Consumption
- Tight Frequency Stability
- Good Long-Term Stability
- Frequency Tuning Input option
- Output Enable/Disable option

## APPLICATIONS:

- Instrument Reference
- Microwave Communication
- Clock Reference for Microwave Signal Source
- Test & Measurement
- Telecom Systems





**KVG Quartz Crystal Technology GmbH**
Waibstadter Strasse 2 – 4, 74924 Neckarbischofsheim, Germany
Tel.: +49 (0) 7263/648-0; Fax: +49 (0) 7263/6196
email: info@kvg-gmbh.de web: www.kvg-gmbh.de

ROHS-Compliant Product

# O-9000-HS Series

## 1. Specification (preliminary)

**Test conditions: $T_A$ = +25 °C; $V_C$ = 2.5 V resp. +1.65 V unless otherwise identified**

| | | |
|---|---|---|
| **Frequency Range:** | 10.000 to 40.000 MHz | |
| **Standard Frequencies:** | 10.0, 19.2, 20.0 MHz | |
| **Type:** | **O-9500-HS** | **O-9300-HS** |
| **Supply voltage $V_S$:** | **+5.0 V ± 5 %** | **+3.3 V ± 5 %** |
| **Frequency stability vs. temperature options:** | | |
| ≤ ± 2 x $10^{-8}$ vs. -20 °C to +70 °C: | **950x** | **930x** |
| ≤ ± 1 x $10^{-8}$ vs. -20 °C to +70 °C: | **951x** | **931x** |
| ≤ ± 5 x $10^{-9}$ vs. -20 °C to +70 °C: | **952x** | **932x** |
| ≤ ± 5 x $10^{-8}$ vs. -40 °C to +85 °C: | **953x** | **933x** |
| ≤ ± 2 x $10^{-8}$ vs. -40 °C to +85 °C: | **954x** | **934x** |
| ≤ ± 1 x $10^{-8}$ vs. -40 °C to +85 °C: | **955x** | **935x** |
| **Long term stability (aging)** options (after 30 days of continuous operation) | | |
| ≤ ± 5 x $10^{-7}$ / 1st year; ≤ ± 2 x $10^{-6}$ / 15 years: | **95x1** | **93x1** |
| ≤ ± 3 x $10^{-7}$ / 1st year; ≤ ± 1 x $10^{-6}$ / 15 years: | **95x2** | **93x2** |
| **Frequency stability** vs. supply voltage changes $V_S$ ± 5 %: | ≤ + 5.0 x $10^{-9}$ | |
| vs. load changes ± 10 %: | ≤ + 5.0 x $10^{-9}$ | |
| **Frequency control** by external tuning voltage : | ≥ ± 5 ppm | |
| **Tuning voltage range:** | +0.5 V to +4.5 V | +0.3 V to 3.0 V |
| **Transfer function** / Linearity: | Positive / ≤ 10 % | |
| **Supply current** steady state @ +25 °C: | ≤ 120 mA | ≤ 180 mA |
| during warm-up: | ≤ 400 mA | ≤ 600 mA |
| **Warm-up time:** (for a typical accuracy of < ± 1 x $10^{-7}$ @ +25 °C referred to final frequency after 1 hour) | ≤ 5 min | |
| **Output signal type:** | (LV)HCMOS | |
| Level: | $V_{OL}$ ≤ 0.1 x $V_S$; $V_{OH}$ ≥ +0.9 x $V_S$ | |
| Load: | 1 kOhm // 15 pF | |
| Duty cycle: | 45% to 55% | |
| Rise & fall time | ≤ 5 ns | |

| | | | | |
|---|---|---|---|---|
| 4 | | | | **KVG Quartz Crystal Technology GmbH** |
| 3 | | | | P.O. Box 61 |
| 2 | | | | D-74924 Neckarbischofsheim |
| 1 | | 30.06.2017 | Rudolph | Tel. +49 (0) 7263 / 648-0 |
| ED | Description | Date | Name | Fax. +49 (0) 7263 / 6196 |



**Subject to technical modification**

| | |
|---|---|
| **Phase noise** (typical for 20 MHz): | |
| 1 Hz: | ≤ -85 dBc / Hz |
| 10 Hz: | ≤ -115 dBc / Hz |
| 100 Hz: | ≤ -145 dBc / Hz |
| 1 kHz: | ≤ -155 dBc / Hz |
| 10 kHz: | ≤ -165 dBc / Hz |
| 100 kHz: | ≤ -165 dBc / Hz |
| 1 MHz: | ≤ -165 dBc / Hz |
| **Short term stability (Allan Deviation)** | Typ. |
| 1 sec: | 0.05 ppb |
| 10 sec: | 0.1 ppb |
| 100 sec: | 0.2 ppb |
| Storage temperature range: | -45 °C to +90 °C |

## 2. Environmental conditions

According to KVG Product Qualification Procedure AA-QM-200

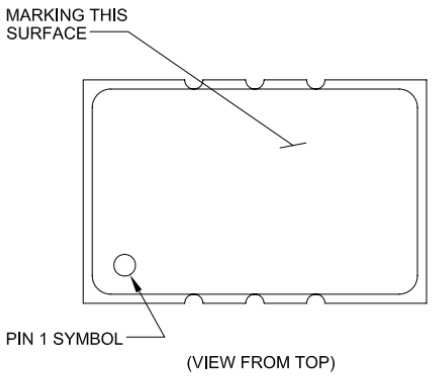
## 3. Marking

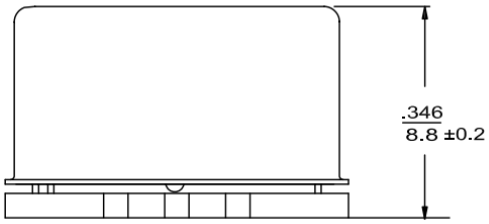
Manufacturer's name, date code (week/year), Specification; Center frequency

# O-9000-HS Series

## 4. Case

**BF157-9.0-HS/SMD**



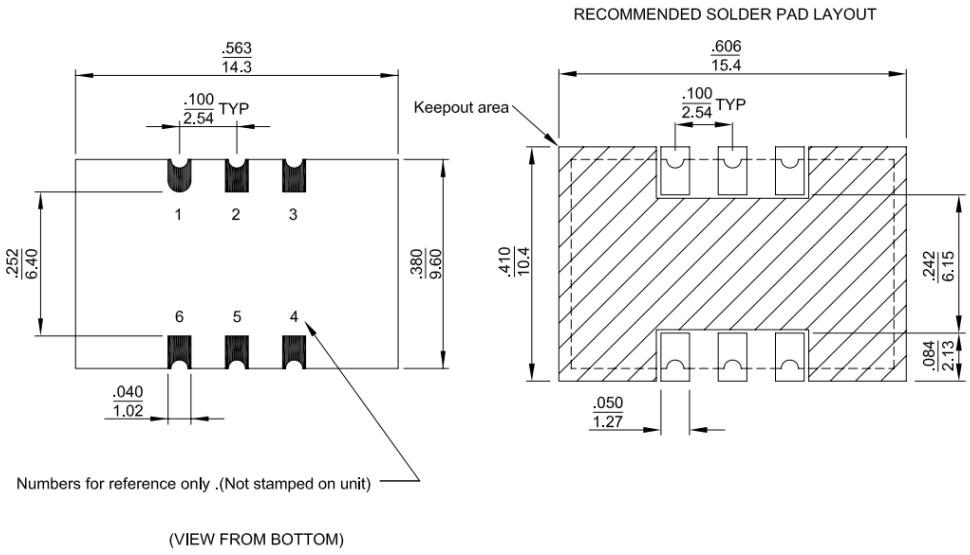

**H = 9.0 mm max.**

**Pin Configuration**

1. $V_C$ or N.C.
2. RF Enable or N.C.
3. GND and Case
4. RF Output
5. N.C.
6. Supply voltage $+V_S$

**Notes:**

1. Provided the data sheet does not specify any parameters for Pin 1 and/or Pin 2, then that respective Pin is not connected internally.

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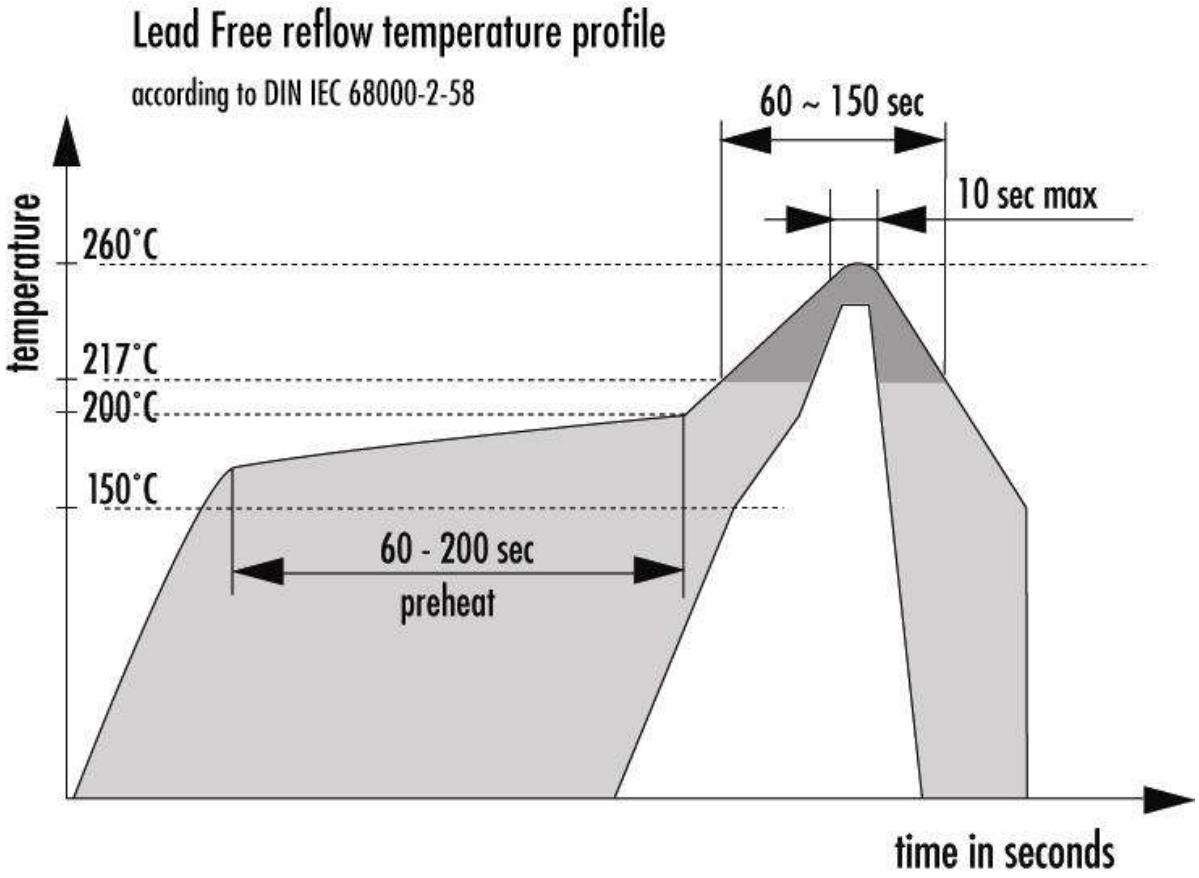
## 5.Recommended soldering profile




## 6. Ordering Information

| Type Code | Package Code | Supply Voltage | Temp. Range | Frequ. Stability | Aging | Hermetically Sealed | Nominal Frequency |
|---|---|---|---|---|---|---|---|
| OCXO | 14.4 x 9.5 mm | 3.3 V | -40/+85 °C | ±10 ppb | ±1 ppm | | 20.000 |
| **O-** | **9** | **3** | **5** | | **2** | **-HS** | **– XX.YYY MHz** |

**Example: O-9352-HS-20.000 MHz**