# 10.6 – 11.8 GHz InGaP/GaAs MMIC
# Dual Output VCO & Divide by 2 Prescaler

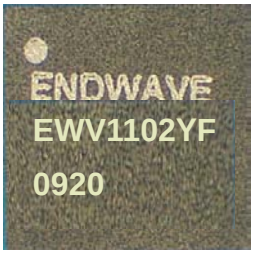
## EWV1102YF

September 2009 – Rev 7
*Production*

### Features

- Dual Output Frequencies
- Push-push Architecture
- Phase Noise: -110 dBc/Hz @ 100 kHz
- Output Power at $f_{out}$: +10 dBm, typical
- Output Power at $f_{out/2}$: +9 dBm, typical
- Integrated Divide by 2 Prescaler
- HBM Class 1A - ESD Protection Bias Circuitry
- Package: 5 x 5 mm, 32 Lead, plastic overmold QFN
- 100% RF and DC tested
- Also available in bare die format
- RoHS Compliant

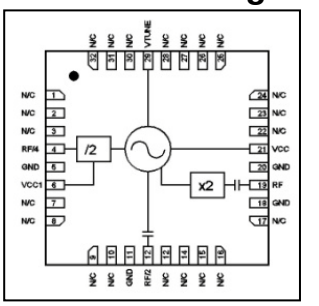
### Device Photo




### Description

The Endwave *EWV1102YF* is a high performance InGaP/GaAs HBT MMIC voltage controlled oscillator which provides a set of dual outputs ideal for applications which require 5.3 to 5.9 or 10.6 to 11.8GHz outputs. The device boasts state of the art phase noise at better than -110 dBc/Hz at a 100 kHz offset. This device has integrated ESD Protection Bias Circuitry and can be used for a wide range of applications from defense electronics to commercial communication systems. All parts are 100% DC and RF tested and visually inspected to IPC-A-610.

### Functional Diagram




### Electrical Characteristics (Temperature = +25 °C, $V_{cc}$ =+5V)

| Parameter | Min | Typ | Max | Units |
|---|---|---|---|---|
| Frequency Range ($f_{out}$) | 10.6 | | 11.8 | GHz |
| Frequency Range ($f_{out/2}$) | 5.3 | | 5.9 | GHz |
| Output Power ($f_{out}$) | +7 | +10 | +14 | dBm |
| Output Power ($f_{out/2}$) | +5 | +9 | +12 | dBm |
| Output Power ($f_{out/4}$) | -3 | 0 | +3 | dBm |
| Phase Noise @ $f_{out}$<br>100 kHz Offset, $V_t$ = +5V | | -110 | | dBc/Hz |
| Tune Voltage | 2 | | 13 | V |
| Supply Current<br>VCO<br>Prescaler (optional) | <br>150<br>35 | <br>220<br>45 | <br>245<br>55 | <br>mA<br>mA |
| Tune Port Leakage Current, $V_{tune}$ = 13V | | | 10 | uA |
| Output Return Loss | | 5 | | dB |
| Harmonic / Subharmonics<br>½<br>2nd | | <br>30<br>10 | | <br>dBc<br>dBc |
| Pulling (into a 2:1 VSWR) | | 8 | | MHz pp |
| Pushing @ $V_{tune}$ = 5V | | 3 | | MHz/V |
| Frequency Drift Rate | | | -1.0 | MHz/ C |

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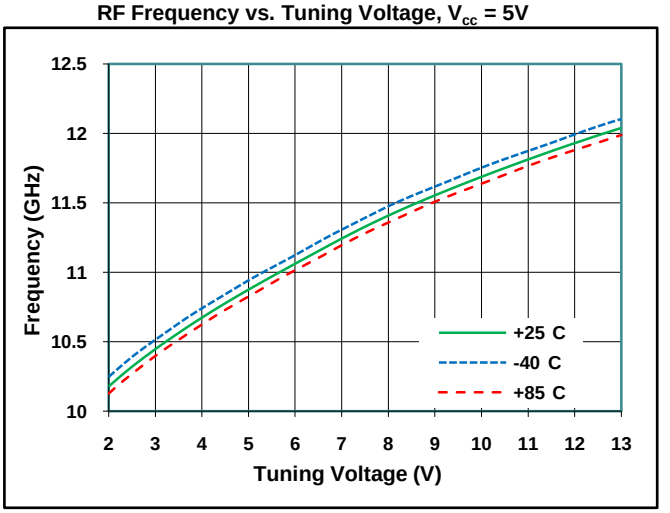
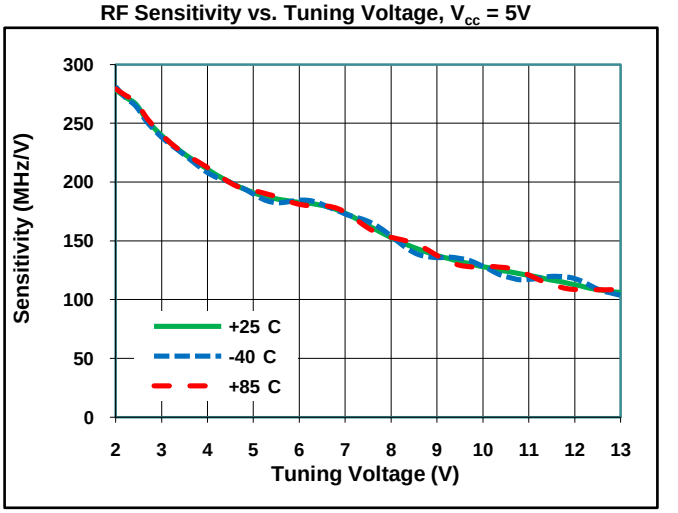
Voltage Controlled Oscillators - Packaged

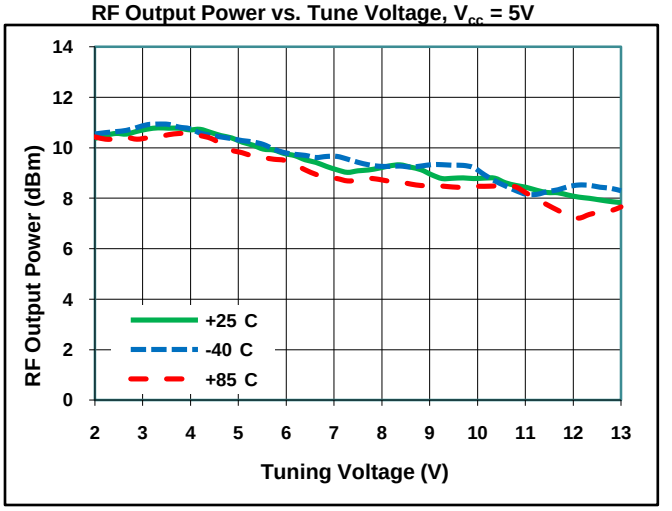
RF Frequency vs. Tuning Voltage, $V_{cc}$ = 5V



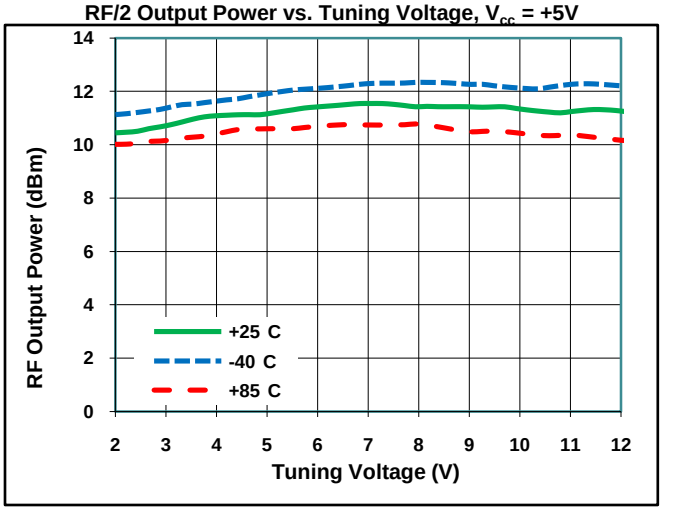

RF Sensitivity vs. Tuning Voltage, $V_{cc}$ = 5V



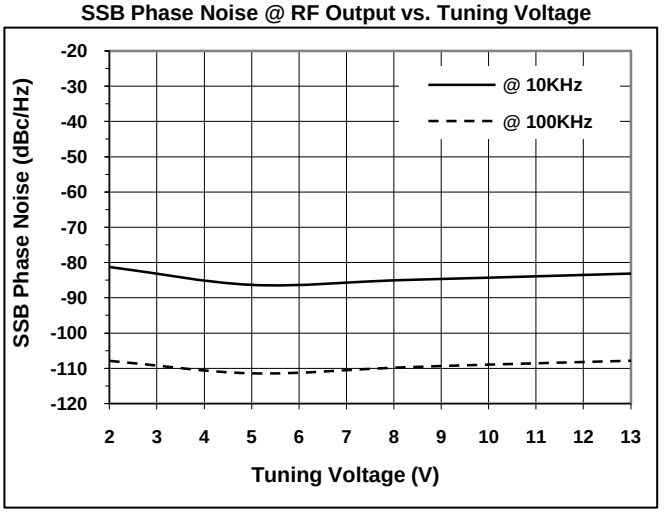

RF Output Power vs. Tune Voltage, $V_{cc}$ = 5V



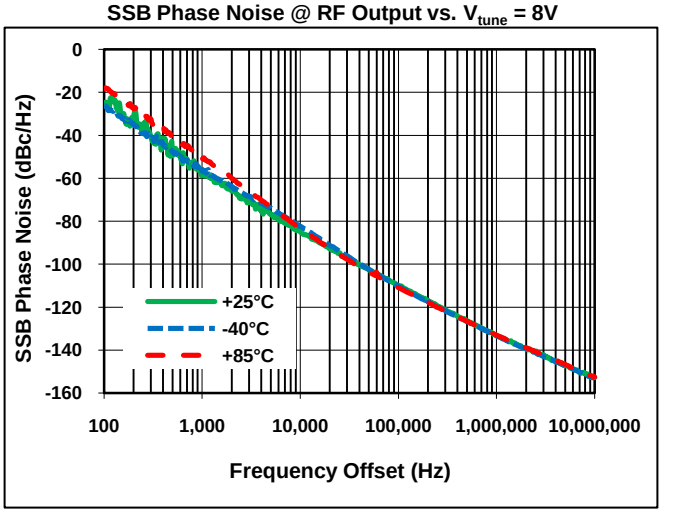

RF/2 Output Power vs. Tuning Voltage, $V_{cc}$ = +5V




SSB Phase Noise @ RF Output vs. Tuning Voltage




SSB Phase Noise @ RF Output vs. $V_{tune}$ = 8V



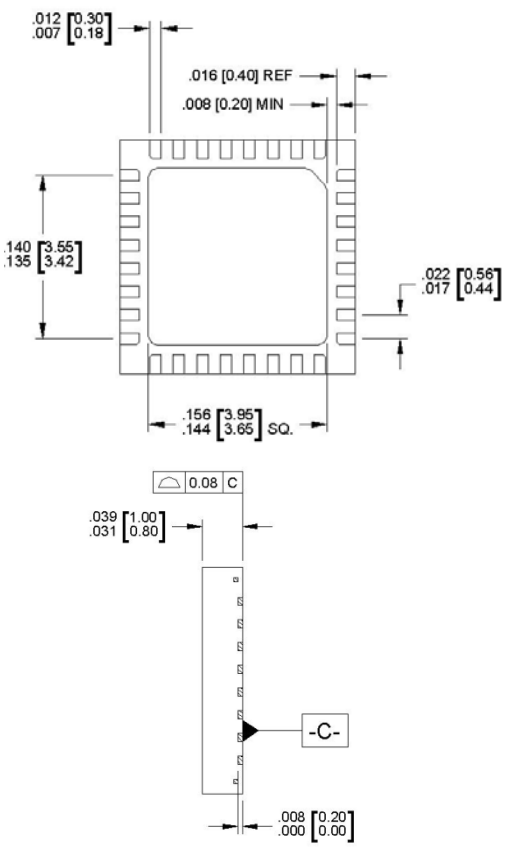
## DC & RF Pinout

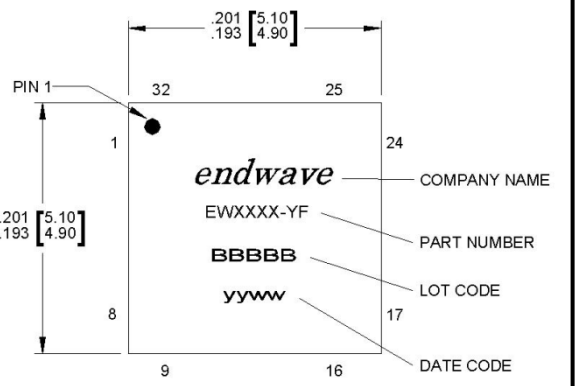
| Pin Number | Function |
|---|---|
| 1-3, 7-10, 13-17, 22-28, 30-32 | No Connection |
| 5, 11,18, 20 | Ground (or no connection) |
| 19 | RF Output ($f_{out}$) |
| 12 | RF/2 Output ($f_{out/2}$) Note 1 |
| 4 | RF/4 Output ($f_{out/4}$) Note 2 |
| 6 | $V_{cc1}$ for Prescaler |
| 21 | $V_{cc}$ for VCO |
| 29 | $V_{tune}$ |

Note 1 It is recommended that RF/2 Output be terminated with a 50 ohm load if not used.
Note 2 DC block must be used at RF/4 output port. 100pf 0402 capacitor is used on ENWV eval boards.

## Outline Drawings

"F" Package – 5 x 5mm, 32 lead




Electrostatic Sensitive Device
Observe Handling Precautions

Notes:
1. Lead frame material is a copper alloy.
2. Dimensions are in inches (mm).
3. Min and max dimensions indicated.
4. Ground paddle must be soldered to ground. Damage will result if not properly connected.

Voltage Controlled Oscillators - Packaged

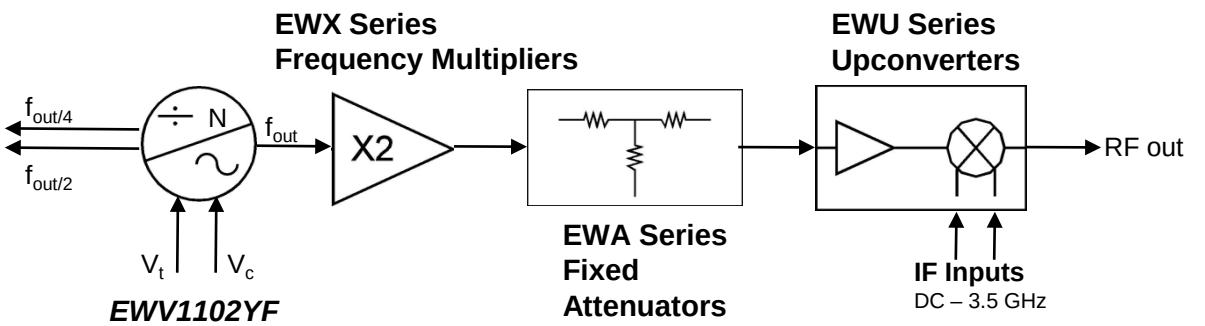
## Absolute Maximum Ratings

| | |
|---|---|
| Supply Voltage, $V_{cc}$ | +5.5V |
| Tune Voltage, $V_t$ | +0 to +15 V |
| Channel Temperature | 135°C |
| Continuous Power Dissipation at 25°C | 1.32 W |
| Supply Current, VCO | 330 mA |
| Supply Current, Prescaler | 60 mA |
| Storage Temperature | -65 to +150°C |
| Operating Temperature | -40 to +85°C |

## Typical Supply Current

| $V_{cc}$ | $I_{cc}$ |
|---|---|
| 4.8 V | 200 mA |
| 5.0 V | 220mA |
| 5.2 V | 240 mA |

## Typical Application




## Support Documentation

Support documentation including Assembly Notes, Application Notes and Qualification Procedures can be found on our website at www.endwave.com.

## Ordering Information

| Part Number | Description |
|---|---|
| *EWV1102YF* | RoHS compliant, 5 x 5mm, 32 lead, QFN “F” Package |
| *EWV1102YF-EV* | *EWV1102YF* on an Evaluation Board |
| *EWV1102ZZ* | RoHS compliant bare die in waffle or gel packs |
| *EWV1102ZZ-EV* | *EWV1102ZZ* in a connectorized test fixture |

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