



NXP LO generators TFF11xxxHN, TFF1003HN & TFF1007HN

Low-noise LO generators for microwave radios

Manufactured in NXP's breakthrough QUBiC4X SiGe:C process technology, these highly integrated, alignment-free LO generators are low-power, low-spurious solutions that simplify design-in and lower the total cost of ownership.

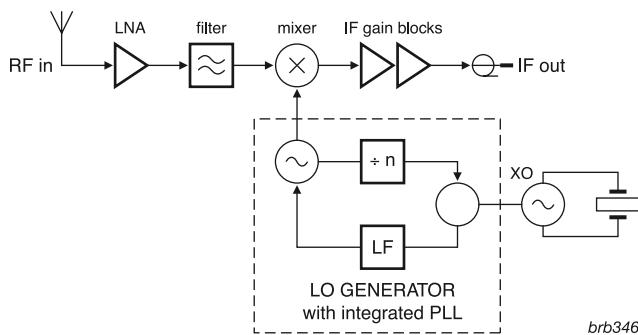
Features

- ▶ TFF11xxxHN family: Lowest noise LO generators for 7 to 15 GHz range
- ▶ Integrated VCO and divider PLL for Ku-band
 - TFF1003HN: 12.80 to 13.05 GHz VCO range
 - TFF1007HN: 14.75 to 15.00 GHz VCO range
- ▶ Maximum power consumption for all types, typical 330 mW
- ▶ Phase-noise compliant with IESS-308 (Intelsat)
- ▶ Proven QUBiC4X SiGe:C technology (120 GHz fT process)
- ▶ External loop filter
- ▶ Differential input and output
- ▶ Lock-detect output
- ▶ Internally stabilized voltage reference for loop filter
- ▶ 24-pin HVQFN (SOT616-1) package

Applications

- ▶ Industrial/Medical Test and Measurement Equipment
- ▶ Electronic Warfare (EW)
- ▶ Electronic Countermeasures (ECM)
- ▶ Point to Point
- ▶ Point to Multi-Point
- ▶ Satellite Communication
- ▶ VSAT

These low-noise local-oscillator (LO) generators, optimized for use in many different microwave applications between 7 and 15 GHz, deliver highly accurate performance in a small footprint. They require no alignment or frequency modification on the production line, so they simplify manufacturing. High integration saves board space and makes design-in easier, for lower overall cost, faster development, and quick time-to-market.



Since these ICs are manufactured in NXP's industry-leading QUBiC4X SiGe:C process, they offer better overall RF performance, are more robust than their GaAs equivalents, and consume much less power.



The process technology also enables higher integration, for added features. NXP owns the industrial base for production (wafer fab, test, assembly), so volume supplies can be assured.

The TFF1003HN is the basis for the entire family of LO generators. It has VCO coverage of 12.8 to 13.05 GHz and accepts input signals from 50 to 816 MHz. The divider can be set for 16, 32, 64, 128, or 256, and the output level is -5 dBm with a stability of ± 2 dB. The family of LO generators is completed by a range of 18 different devices operating in a center frequency

ranging from 7 to 15 GHz. The RF performance of all these devices is consistent with the TFF1003HN.

The TFF1007HN offers the highest performance. It has a VCO range of 14.75 to 15 GHz and supports input signals from 230.46 to 234.48 MHz. It offers improved in-band phase noise (PN) of -140 dBc/Hz and increased minimum output power (-4 dBm). The divider setting is 64 only. All the LO generators have very low power dissipation (typical 330 mW), and all are available in a space-saving 24-pin HVQFN package.

Low-noise LO generators for general microwave applications

| Type | Package | $f_{IN(REF)}$ | V_{cc} | I_{cc} | PLL phase noise @ N=64 | | PLL | | | Output buffer | | Input |
|------------|---------|---------------|----------|----------|------------------------|--------|-----------|----------|-------|---------------|-----|-------|
| | | | | | Typ | Typ | @ 100 kHz | @ 10 MHz | Min | Typ | Max | Min |
| | | | MHz | V | mA | dBc/Hz | dBc/Hz | GHz | GHz | GHz | dBm | dBm |
| TFF11070HN | SOT616 | 27 - 448 | 3.3 | 100 | -95 | -131 | 6.84 | 7.00 | 7.16 | -5 | -10 | -10 |
| TFF11073HN | SOT616 | 28 - 468 | 3.3 | 100 | -95 | -131 | 7.16 | 7.33 | 7.49 | -5 | -10 | -10 |
| TFF11077HN | SOT616 | 29 - 490 | 3.3 | 100 | -95 | -131 | 7.49 | 7.67 | 7.84 | -5 | -10 | -10 |
| TFF11080HN | SOT616 | 31 - 513 | 3.3 | 100 | -95 | -131 | 7.84 | 8.02 | 8.21 | -5 | -10 | -10 |
| TFF11084HN | SOT616 | 32 - 537 | 3.3 | 100 | -95 | -131 | 8.21 | 8.40 | 8.59 | -5 | -10 | -10 |
| TFF11088HN | SOT616 | 34 - 562 | 3.3 | 100 | -95 | -131 | 8.59 | 8.79 | 8.99 | -5 | -10 | -10 |
| TFF11092HN | SOT616 | 35 - 588 | 3.3 | 100 | -95 | -131 | 8.99 | 9.20 | 9.41 | -5 | -10 | -10 |
| TFF11096HN | SOT616 | 37 - 616 | 3.3 | 100 | -95 | -131 | 9.41 | 9.63 | 9.85 | -5 | -10 | -10 |
| TFF11101HN | SOT616 | 38 - 644 | 3.3 | 100 | -95 | -131 | 9.85 | 10.07 | 10.31 | -5 | -10 | -10 |
| TFF11105HN | SOT616 | 40 - 674 | 3.3 | 100 | -95 | -131 | 10.31 | 10.54 | 10.79 | -5 | -10 | -10 |
| TFF11110HN | SOT616 | 42 - 706 | 3.3 | 100 | -95 | -131 | 10.79 | 11.03 | 11.29 | -5 | -10 | -10 |
| TFF11115HN | SOT616 | 44 - 738 | 3.3 | 100 | -95 | -131 | 11.29 | 11.55 | 11.81 | -5 | -10 | -10 |
| TFF11121HN | SOT616 | 46 - 773 | 3.3 | 100 | -95 | -131 | 11.81 | 12.09 | 12.36 | -5 | -10 | -10 |
| TFF11126HN | SOT616 | 48 - 809 | 3.3 | 100 | -95 | -131 | 12.36 | 12.65 | 12.94 | -5 | -10 | -10 |
| TFF11132HN | SOT616 | 51 - 846 | 3.3 | 100 | -95 | -131 | 12.94 | 13.24 | 13.54 | -5 | -10 | -10 |
| TFF11139HN | SOT616 | 53 - 886 | 3.3 | 100 | -95 | -131 | 13.54 | 13.85 | 14.17 | -5 | -10 | -10 |
| TFF11145HN | SOT616 | 55 - 927 | 3.3 | 100 | -95 | -131 | 14.17 | 14.50 | 14.83 | -5 | -10 | -10 |
| TFF11152HN | SOT616 | 58 - 970 | 3.3 | 100 | -95 | -131 | 14.83 | 15.18 | 15.52 | -5 | -10 | -10 |

VSAT ICs

| Type | Package | $f_{IN(REF)}$ | V_{cc} | I_{cc} | PLL phase noise @ N=64 | | | PLL | | Output buffer | | Input |
|-----------|---------|---------------|----------|----------|------------------------|--------|---------|------------|----------|---------------|----------------|-----------------------|
| | | | | | Typ | Typ | @ 1 kHz | @ 100 kHz | @ 10 MHz | $f_{o(RF)}$ | P _o | RL _{out(RF)} |
| | | | MHz | V | mA | dBc/Hz | dBc/Hz | dBc/Hz | (GHz) | dBm | dB | dBm |
| TFF1003HN | SOT616 | 50~815 | 3.3 | 100 | -94 | -100 | -130 | 12.8~13.05 | -5 | -10 | -10 | -10 |
| TFF1007HN | SOT616 | 230.46~234.38 | 3.3 | 100 | -104 | -104 | -130 | 14.75~15 | -3 | -10 | -10 | -10 |