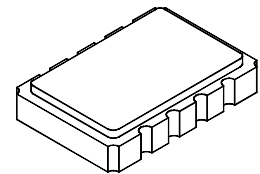




# OP4011B

## 719.734 MHz Optical Timing Clock



SMC-08

- Quartz SAW Stabilized and Filtered "Diff Sine" Technology
- Fundamental-Mode Oscillation at 719.734 MHz
- Voltage Tunable for Phase Lock Loop Operations
- Optical Timing Reference for Forward Error Correction Applications

The output of this device is generated and filtered by narrowband quartz SAW elements at 719.734 MHz. The configuration of this clock is intended to provide a pure signal for optical timing applications in noisy signal environments. The Q/Qbar differential output swing of  $\pm 1$  volt about 0 vdc has symmetry better than  $\pm 1\%$  into loads from 40 ohms to 70 ohms; determined by customer application. The long term frequency accuracy is set by an external reference source allowing this device to complete a Phase Lock Loop design without the usual noise and jitter problems associated with PLL's.

### Absolute Maximum Ratings

| Rating            | Value      | Units |
|-------------------|------------|-------|
| DC Supply Voltage | 0 to 5.5   | VDC   |
| Tune Voltage      | 0 to 6     | VDC   |
| Case Temperature  | -55 to 100 | °C    |

### Electrical Characteristics

| Characteristic                       |   | Sym              | Notes      | Minimum | Typical   | Maximum | Units             |
|--------------------------------------|---|------------------|------------|---------|-----------|---------|-------------------|
| Operating Frequency                  | Absolute Frequency                                      | $f_O$            | 1, 9       |         | 719.734   |         | MHz               |
|                                      | Tune Range  |                  | 2          |         | $\pm 100$ |         | ppm               |
|                                      | Tune Voltage  |                  | 1          | 0       |           | +3      | VDC               |
|                                      | Tuning Linearity  |                  | 1, 8       |         | $\pm 3\%$ |         |                   |
|                                      | Modulation Bandwidth                                    |                  |            |         | 50        |         | kHz               |
| Q and Q Output                       | Voltage into 50 $\Omega$ (VSWR $\leq 1.2$ )             | $V_O$            | 1, 3       | 0.60    |           | 1.1     | $V_{P-P}$         |
|                                      | Operating Load VSWR                                     |                  | 1, 3       |         |           | 2:1     |                   |
|                                      | Symmetry  |                  | 3, 4, 5    | 49      |           | 51      | %                 |
|                                      | Harmonic Spurious                                       |                  | 3, 4, 6    |         |           | -30     | dBc               |
|                                      | Nonharmonic Spurious                                    |                  | 3, 4, 6, 7 |         |           | -60     | dBc               |
| Phase Noise                          | dBc/Hz@100Hz offset                                     |                  |            |         | -75       |         | dBc/Hz            |
|                                      | 1kHz offset   |                  |            |         | -105      |         | dBc/Hz            |
|                                      | 10k offset  |                  |            |         | -125      |         |                   |
|                                      | Noise Floor   |                  |            |         | -155      |         |                   |
| Q and Q Jitter                       | RMS Jitter  |                  | 3, 4, 6, 7 |         | 2         |         | PS <sub>P-P</sub> |
|                                      | No Noise on $V_{CC}$                                    |                  | 3, 4, 6, 7 |         | 12        |         | PS <sub>P-P</sub> |
|                                      | 200 mV <sub>P-P</sub> from 1MHz to $\frac{1}{2} f_O$ on |                  | 3          |         | 12        |         | PS <sub>P-P</sub> |
| Output DC Resistance (between Q & Q) |   |                  | 1, 3       | 50      |           |         | K $\Omega$        |
| DC Power Supply                      | Operating Voltage                                       | $V_{CC}$         | 1, 3       | 3.13    | 3.3, 5.0  | 5.25    | VDC               |
|                                      | Operating Current                                       | $I_{CC}$         | 1, 3       |         |           | 70      | mA                |
| Operating Ambient Temperature        |   | $T_C$            | 1, 3       | -40°C   |           | +85°C   | °C                |
| Lid Symbolization (YY=Year, WW=Week) |   | RFM OP4011B YYWW |            |         |           |         |                   |

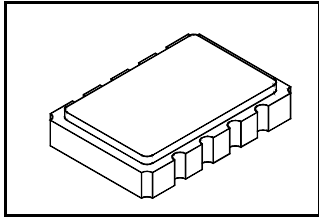


**CAUTION: Electrostatic Sensitive Device. Observe precautions for handling.**

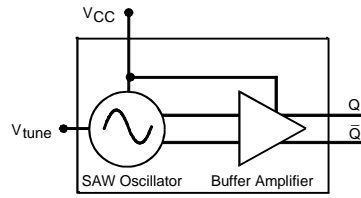
**COCOM CAUTION: Approval by the U.S. Department of Commerce is required prior to export of this device.**

### Notes:

1. Unless otherwise noted, all specifications include any combination of load VSWR, VCC, and TC. In addition, Q and  $\bar{Q}$  are terminated into 50  $\Omega$  loads to ground. (See: Typical Test Circuit.)
2. Customer useful tune range in excess of what part requires over temp, aging, pushing, pulling & accuracy.
3. The design, manufacturing process, and specifications of this device are subject to change without notice.
4. Only under the nominal conditions of 50  $\Omega$  load impedance with VSWR  $\leq 1.2$  and nominal power supply voltage.
5. Symmetry is defined as the pulse width (in percent of total period) measured at the 50% points of Q or  $\bar{Q}$ . (See: Timing Definitions.)
6. Jitter and other spurious outputs induced by externally generated electrical noise on  $V_{CC}$  or mechanical vibration are not included in this specification, except where noted. External voltage regulation and careful PCB layout are recommended for optimum performance.
7. Applies to period jitter of Q and  $\bar{Q}$ . Measurements are made with the Tektronix CSA803 signal analyzer with at least 1000 samples.
8. Linearity is a function of the percentage variation from a permitted linear deviation versus the amount of frequency tune range. See *Linearity Definition*.
9. One or more of the following United States patents apply: 4,616,197; 4,670,681; 4,760,352.



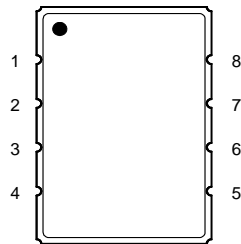
**BLOCK DIAGRAM**



| Dimension | mm           |       | Inches        |       |
|-----------|--------------|-------|---------------|-------|
|           | MIN          | MAX   | MIN           | MAX   |
| A         | 13.46        | 13.97 | 0.530         | 0.550 |
| B         | 9.14         | 9.66  | 0.360         | 0.380 |
| C         | 1.93 Nominal |       | 0.076 Nominal |       |
| D         | 3.56 Nominal |       | 0.141 Nominal |       |
| E         | 2.24 Nominal |       | 0.088 Nominal |       |
| F         | 1.27 Nominal |       | 0.050 Nominal |       |
| G         | 2.54 Nominal |       | 0.100 Nominal |       |
| H         | 3.05 Nominal |       | 0.120 Nominal |       |
| J         | 1.93 Nominal |       | 0.076 Nominal |       |
| K         | 5.54 Nominal |       | 0.218 Nominal |       |
| L         | 4.32 Nominal |       | 0.170 Nominal |       |
| M         | 4.83 Nominal |       | 0.190 Nominal |       |
| N         | 0.50 Nominal |       | 0.020 Nominal |       |

**ELECTRICAL CONNECTIONS**

| Terminal Number | Connection     |
|-----------------|----------------|
| 1               | Vcc            |
| 2               | Ground         |
| 3               | Enable/Disable |
| 4               | Q Output       |
| 5               | Q-bar Output   |
| 6               | Ground         |
| 7               |                |
| 8               | TUNE Input     |
| LID             | Ground         |



TOP VIEW

