

IT2200M



Overview

Low cost SMD TCXO using an analogue IC for compensation and Enable/Disable pin for efficient power management.

Description

The IT2200M employs an analogue IC for the oscillator and temperature compensation in a 2.5mm x 2.0mm size package. The device can be placed in a power down mode through the use of an industry standard Enable/Disable pin for efficient power management.

Recommended Applications

Handset, GPS, PDA, PCMCIA CDPD cards, LBS Handset, Automotive, Consumer Products, PND, WiFi, WiMAX/WLAN, Communications, Other.

Features

- 1uA current consumption during power down
- Excellent phase noise performance
- Frequency slope and perturbation specifications can be customized to the application requirement
- Power down using Enable/Disable function
- Standard temperature stability choices are $\pm 0.5\text{ppm}$, $\pm 1\text{ppm}$, $\pm 1.5\text{ppm}$ and $\pm 2.5\text{ppm}$ over -30°C to 85°C . Narrower temperature ranges can achieve as low as $\pm 0.28\text{ppm}$

IT2200M Specifications

1.0 Specification References

| | | |
|-----|-------------------|---------|
| 1.1 | Model Description | IT2200M |
| 1.2 | RoHS compliant | Yes |

2.0 Frequency Characteristics

| | Parameter | Test Condition | Value | Units |
|------|--------------------------------------|--|-----------|-----------------------------|
| 2.1 | Frequency range | Frequency range available | 10 to 40 | MHz |
| 2.2 | Frequency calibration | Offset from nominal frequency measured at $25^\circ\text{C} \pm 2^\circ\text{C}$ | 1 max | $\pm\text{ppm}$ |
| 2.3 | Reflow shift | Two consecutive reflows at the attached reflow profile after 1 hour relaxation at 25°C | 1 max | $\pm\text{ppm}$ |
| 2.4 | Frequency stability over temperature | Referenced to the midpoint between minimum and maximum frequency value over the specified temperature range (Note 1, 2) | 0.5 to 5 | $\pm\text{ppm}$ |
| 2.5 | Temperature range | The operating temperature range over which the frequency stability is measured (Note 3) | -30 to 85 | $^\circ\text{C}$ |
| 2.6 | Frequency slope | Minimum of 1 frequency reading every 2°C , over the operating temperature range (Note1, 4) | 0.05 to 1 | $\text{ppm}/^\circ\text{C}$ |
| 2.7 | Static temperature hysteresis | Frequency change after reciprocal temperature ramped over the operating range. Frequency measured before and after at 25°C . | 0.6 max | ppm |
| 2.8 | Supply voltage stability | Supply voltage varied $\pm 5\%$ at 25°C (Note 4) | 0.1 max | $\pm\text{ppm}$ |
| 2.9 | Load sensitivity | $\pm 10\%$ load change | 0.2 max | $\pm\text{ppm}$ |
| 2.10 | Long term stability | Frequency drift over 1 year (Note 4) | 2 max | $\pm\text{ppm}$ |

3.0 Power Supply

| | Parameter | Test Condition | Value | Units |
|-----|------------------|---------------------------------------|----------|-------|
| 3.1 | Supply voltage | Nominal supply voltage range (Note 5) | 1.7 to 3 | V |
| 3.2 | Current | At maximum supply voltage (Note 6) | 1.5 max | mA |
| 3.3 | Stand-by current | Typical value | 1 | uA |

4.0 Oscillator Output

| | Parameter | Test Condition | Value | Units |
|-----|-------------------------|--|-------------|-------|
| 4.1 | Output waveform | DC coupled clipped sinewave (Note 7) | | |
| 4.2 | Output voltage level | At minimum supply voltage (Note 6) | 0.8 | V |
| 4.3 | Output load resistance | Refer to test circuit | 9.5 to 10.5 | kOhm |
| 4.4 | Output load capacitance | Refer to test circuit | 9.5 to 10.5 | pF |
| 4.5 | Start-up amplitude | 90% of specified output level (Note 8) | 500 max | us |
| 4.6 | Start-up frequency | Within $\pm 0.5\text{ppm}$ of steady state. Typical time for 26.0MHz is 1.5ms (Note 8) | | |

5.0 Power Down Mode (Enable/Disable)

| Parameter | Test Condition | Value | Units |
|---------------------------------------|--|------------|-------|
| 5.1 Power down | RF disabled | 0 to 0.2 | Vcc |
| 5.2 Normal operating mode | RF enabled | 0.8 to 1.1 | Vcc |
| 5.3 Frequency startup from power down | Typical time to be within ± 0.5 ppm of steady state for 26.0MHz is 1.5ms | | |
| 5.4 Power down delay | Delay prior to oscillator power down | 2.5 to 10 | ms |

6.0 SSB Phase Noise

| Parameter | Test Condition | Value | Units |
|--|---|----------|--------|
| 6.1 SSB phase noise power density at 1Hz offset | Typical values for a 26.0MHz oscillator at 25°C | -67 max | dBc/Hz |
| 6.2 SSB phase noise power density at 10Hz offset | Typical values for a 26.0MHz oscillator at 25°C | -92 max | dBc/Hz |
| 6.3 SSB phase noise power density at 100Hz offset | Typical values for a 26.0MHz oscillator at 25°C | -115 max | dBc/Hz |
| 6.4 SSB phase noise power density at 1KHz offset | Typical values for a 26.0MHz oscillator at 25°C | -135 max | dBc/Hz |
| 6.5 SSB phase noise power density at 10KHz offset | Typical values for a 26.0MHz oscillator at 25°C | -148 max | dBc/Hz |
| 6.6 SSB phase noise power density at 100KHz offset | Typical values for a 26.0MHz oscillator at 25°C | -151 max | dBc/Hz |

7.0 Environmental

| Parameter | Test Condition |
|-------------------------|---|
| 7.1 Shock | Half sinewave acceleration of 100G peak amplitude for 6ms duration, 3 cycles each plain. |
| 7.2 Humidity | After 48 hours at 85°C ± 2 °C 85% relative humidity non-condensing |
| 7.3 Thermal shock | Exposed at -40°C for 30 minutes then to 85°C for 30 minutes repeatedly for a period of 5 days |
| 7.4 Vibration | 10G RMS from 30Hz to 1500Hz random in each of the 3 axis for 4 hours; total of 12 hours |
| 7.5 Storage temperature | -40 to 85°C |

8.0 Marking

| Parameter | Test Condition |
|------------|---------------------|
| 8.1 Type | Engraved |
| 8.2 Line 1 | R and Product code |
| 8.3 Line 2 | Pin 1 and Date code |

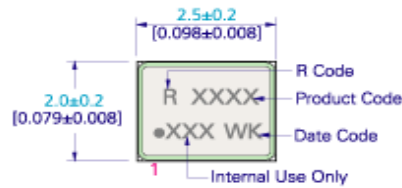
9.0 Manufacturing Information

| Parameter | Test Condition |
|---------------------------|---|
| 9.1 Reflow | Solder reflow process as per attached profile |
| 9.2 Packaging description | Refer to packaging information |

10.0 Specification Notes

| Parameter | Test Condition |
|-------------|---|
| 10.1 Note 1 | A maximum frequency stability over the temperature is required to be specified. Standard options are ± 0.5 ppm, ± 1 ppm, ± 1.5 ppm and ± 2.5 ppm |
| 10.2 Note 2 | Parts should be shielded from drafts causing unexpected thermal gradients. Temperature changes due to ambient air currents on the oscillator can lead to short term frequency drift |
| 10.3 Note 3 | The operating temperature range needs to be specified. The extremes for this model are -40 and 85°C |
| 10.4 Note 4 | The maximum value is the specification. A minimum value, if present indicates the best specification available |
| 10.5 Note 5 | The unit will operate on any voltage between minimum and maximum values |
| 10.6 Note 6 | Specified for load stated in 4.3 and 4.4 at 25°C |
| 10.7 Note 7 | External AC-Coupling capacitor required. 1nF or greater recommended |
| 10.8 Note 8 | Startup parameters depends on crystal oscillation frequency starts up faster |

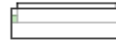
MODEL DRAWING



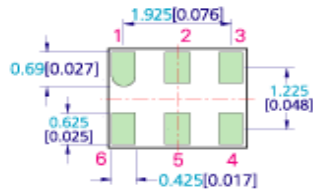
TOP VIEW



SIDE VIEW



END VIEW



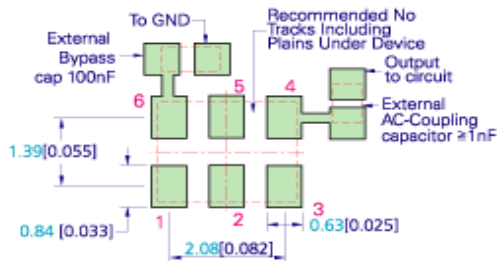
BOTTOM VIEW

| PIN CONNECTIONS | |
|-----------------|--------------------|
| 1 | GND |
| 2 | ENABLE / DISABLE * |
| 3 | GND |
| 4 | OUTPUT |
| 5 | NC |
| 6 | VCC |

NOTE: * Connect to VCC or floating to enable TCXO.

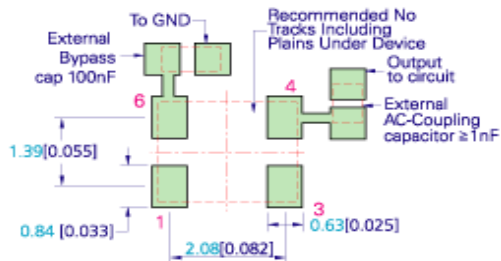
RECOMMENDED PAD LAYOUT - TOP VIEW

6 PADS - With Power Down Function



RECOMMENDED PAD LAYOUT - TOP VIEW

4 PADS - Without Power Down Function



TITLE: IT2200M MODEL

RELATED DRAWINGS:

FILENAME: CAT476

REVISION: E

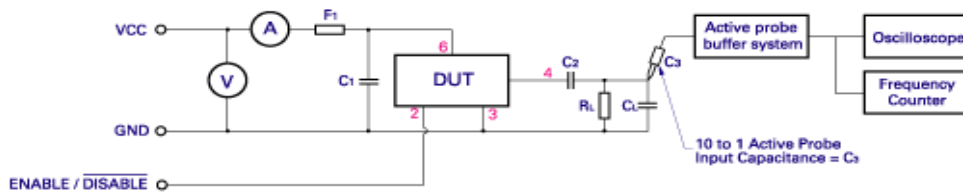
DATE: 10-Sep-09

SCALE: 10 : 1

Millimetres [inch]

Tolerance:
 XX = ±0.5
 X.X = ±0.2
 X.XX = ±0.10
 X.XXX = ±0.05
 X^o = ±1.0°
 Hole = ±0.10

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- C1: 100nF
- C2: ≥ 1nF
- Ri: 10K
- C3 - C4 + C5 (C5 - Oscilloscope probe capacitance)
- C5 as stated in OSCILLATOR OUTPUT section
- F1: A ferrite bead or a resistor between 22Ω - 47Ω recommended.

TITLE: IT2200M SERIES TEST CIRCUIT

RELATED DRAWINGS:

FILENAME: CAT480

REVISION: B

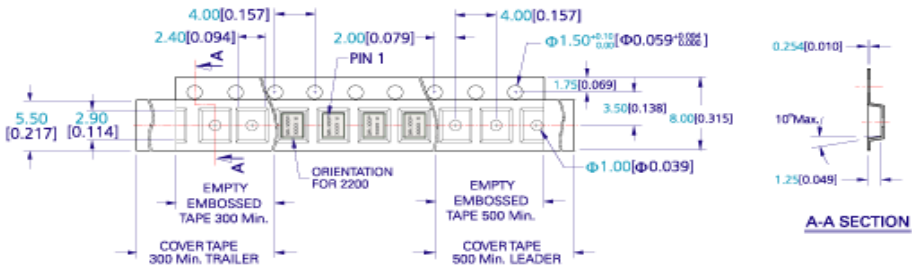
DATE: 15-Apr-08

SCALE: NTS

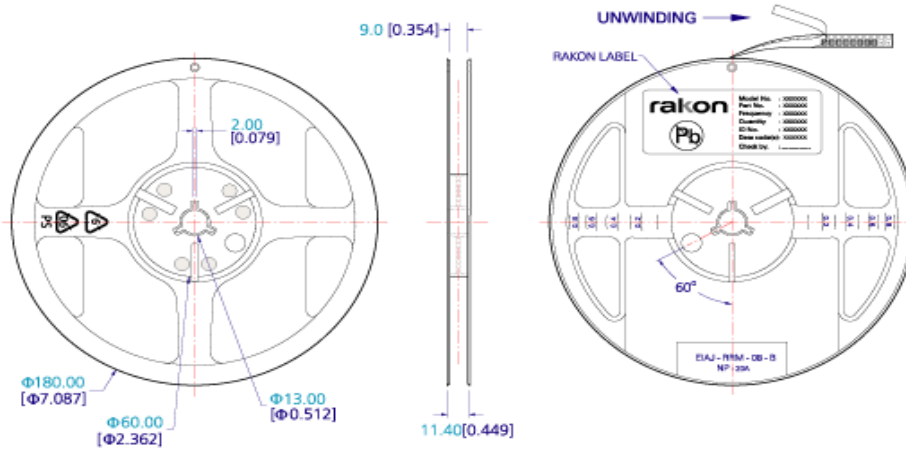
Millimetres [inch]

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TAPE DETAIL (SCALE 2 : 1)



REEL DETAIL (SCALE 1 : 2.5)



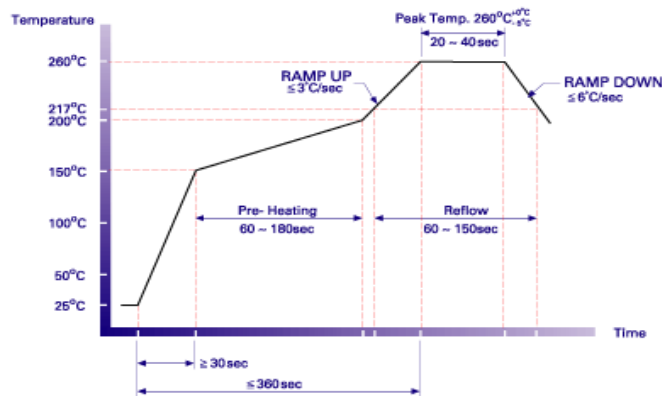
NOTE: 1. Φ180mm REEL STANDARD PACKING QUANTITY IS 3000 OSCILLATORS PER REEL.

TITLE: 2200 SERIES TAPE & Φ180 REEL
RELATED DRAWINGS:

FILENAME: CAT422
REVISION: B
DATE: 12-Feb-09
SCALE: See above
Millimetres [inch]

Tolerance:
XX = ±0.5
X.X = ±0.2
X.XX = ±0.10
X.XXX = ±0.05
X⁰ = ±1.0°
Hole = ±0.10

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NOTE:
The product has been tested to withstand the Reflow Profile shown. The Reflow Profile used to solder Rakon TCXO is determined by the solder paste manufacturer's specification. It is recommended that the Reflow Profile used does not exceed the one shown above.

TITLE: 2200 SERIES Pb-FREE REFLOW
RELATED DRAWINGS:

FILENAME: CAT423
REVISION: A
DATE: 16-Apr-09
SCALE: NTS
Millimetres [inch]

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