



A Product Line of  
Diodes Incorporated



## SPECIFICATION FOR APPROVAL

CUSTOMER \_\_\_\_\_

NOMINAL FREQUENCY 125.000000 MHz

PRODUCT TYPE TYPE FN 7.0x5.0 SEAM SEALED CRYSTAL CLOCK OSCILLATOR

SPEC. NO. ( P/N ) FNC500170

CUSTOMER P/N \_\_\_\_\_

ISSUE DATE May 17, 2018

VERSION C

| APPROVED          | PREPARED           | QA               |
|-------------------|--------------------|------------------|
| <i>Brenda Kuo</i> | <i>Sylvia Yang</i> | <i>Dony Yang</i> |

### Diodes Incorporated

No.2, Ziqiang 5th Rd., Zhongli Industrial Park,  
Zhongli Dist., Taoyuan City 32063, Taiwan (R.O.C.)  
TEL: 886-3-451-8888  
FAX: 886-3-461-3865  
<https://www.diodes.com>

\*Pb-free  
\*RoHS Compliant  
\*HF-Halogen Free  
\*REACH Compliant

**TYPE FN 7.0x5.0 SEAM SEALED CRYSTAL CLOCK OSCILLATOR**

***FNC500170***

VER. C 17-May-18

**VERSION HISTORY**

| Version No. | Version Date | Description   | Notes |
|-------------|--------------|---|-------|
| A           | Apr.7,2010   | Initial Release   |       |
| B           | Apr.1,2011   | Added Phase jitter: 1ps max, Accumulated jitter: 3ps max, Start up time: 10ms max |       |
| C           | May.17,2018  | Updated Logo  |       |
|             |              |   |       |
|             |              |   |       |
|             |              |   |       |
|             |              |   |       |
|             |              |   |       |
|             |              |   |       |
|             |              |   |       |
|             |              |   |       |
|             |              |   |       |
|             |              |   |       |
|             |              |   |       |
|             |              |   |       |
|             |              |   |       |
|             |              |   |       |
|             |              |   |       |
|             |              |   |       |
|             |              |   |       |
|             |              |   |       |
|             |              |   |       |
|             |              |   |       |
|             |              |   |       |
|             |              |   |       |
|             |              |   |       |



# TYPE FN 7.0x5.0 SEAM SEALED CRYSTAL CLOCK OSCILLATOR

## FNC500170

VER. C 17-May-18

### ELECTRICAL SPECIFICATIONS

SRe Part Number : FNC500170

| Item                            | Symbol                         | Specifications      | Units | Notes                                    |
|---------------------------------|--------------------------------|---------------------|-------|--|
| Nominal Frequency               | Fo                             | 125.000000          | MHz   |  |
| Frequency Stability             | FT                             | ± 20                | ppm   | **See note                               |
| Operating Temperature Range     | TR                             | -20 to +70          | °C    |  |
| Supply Voltage                  | V <sub>DD</sub>                | +2.5 ± 5.0%         | V     |  |
| Logic Type                      | LT                             | LVC MOS             |       |  |
| Supply Current, Output Enabled  | I <sub>DD</sub> /OE            | 35                  | mA    | Max.                                     |
| Supply Current, Output Disabled | I <sub>DD</sub> /OD            | 10                  | µA    | Max.                                     |
| Duty Cycle (Symmetry)           | DC/SY                          | 47.5 ~ 52.5         | %     | Measured 50% of Waveform                 |
| Rise / Fall Time                | T <sub>R</sub> /T <sub>F</sub> | 3                   | ns    | Max. measured 20/80% of Waveform         |
| Output Voltage "0" Level        | V <sub>OL</sub>                | 10% V <sub>DD</sub> | V     | Max.                                     |
| Output Voltage "1" Level        | V <sub>OH</sub>                | 90% V <sub>DD</sub> | V     | Min.                                     |
| Output Load                     | CL                             | 15                  | pF    | Max                                      |
| Jitter, Phase                   | RMS                            | 0.4 / 0.6           | ps    | Typ / /Max, 12KHz ~ 20MHz Frequency Band |
| Jitter, Accumulated             | RMS(1-σ)                       | 3                   | ps    | Max, 20,000 Consecutive Periods          |
| Jitter, Peak to Peak            | Pk-Pk                          | 30                  | ps    | Max, 100,000 Random Periods              |
| Start Up Time                   |                                | 10                  | ms    | Max                                      |
| Storage Temperature Range       |                                | -55 to +125         | °C    |  |

※ This product doesn't include harmful substance that stipulated by SONY SS-00259 Level 1 and S-AT2-001 Level 1 standard. RoHS Compliant (Pb - Free).

\*\*Stability includes all combinations of Operating Temperature, Load changes, rated Input (Supply) Voltage changes, Initial Calibration Tolerance (25°C), Aging (1 year at 25°C Average Effective Ambient Temperature), Shock and Vibration.

#### Output Enable / Disable Function

| Parameter  | Min.               | Typ. | Max.               | Units | Notes          |
|--|--------------------|------|--------------------|-------|----------------|
| Input Voltage (Pin1), Output Enable                      | 0.7V <sub>DD</sub> |      |                    | V     | Or Open        |
| Input Voltage (Pin1), Output Disable (low power standby) |                    |      | 0.3V <sub>DD</sub> | V     | Output is Hi-Z |
| Internal Pullup Resistance                               | 30                 |      |                    | KΩ    |                |
| Output Disable Delay                                     |                    |      | 200                | ns    |                |
| Output Enable Delay                                      |                    |      | 2                  | ms    |                |

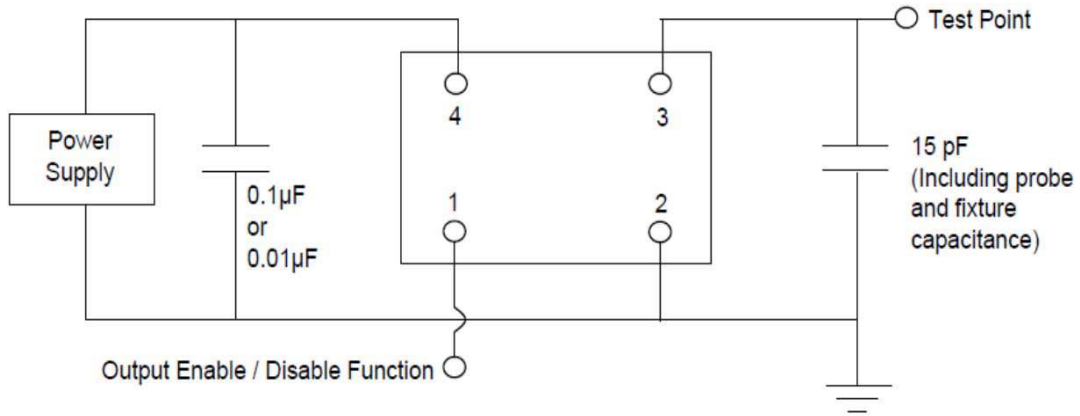


# TYPE FN 7.0x5.0 SEAM SEALED CRYSTAL CLOCK OSCILLATOR

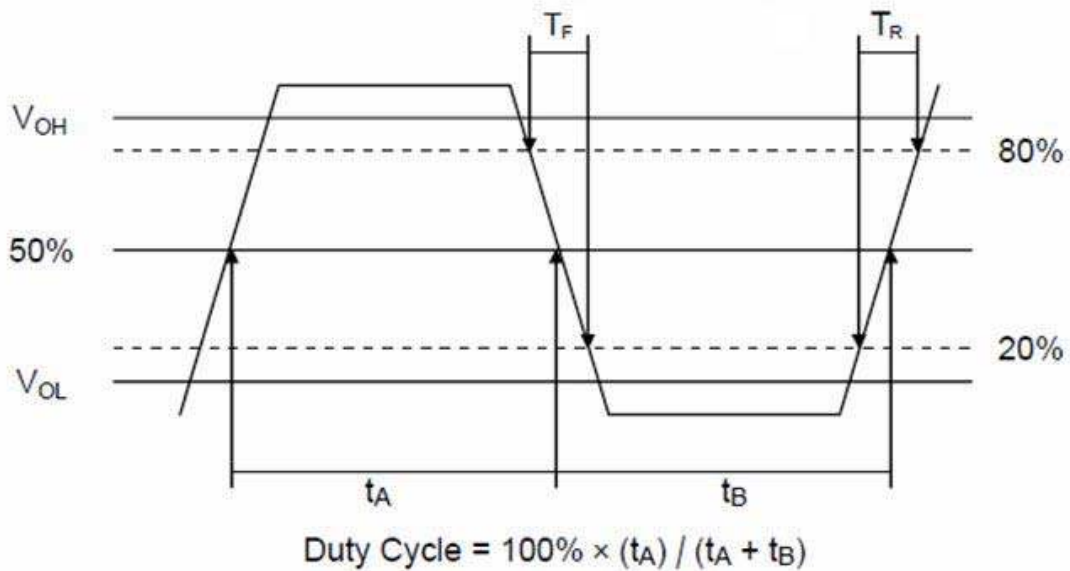
## FNC500170

VER. C 17-May-18

### TEST CIRCUIT



### OUTPUT WAVEFORM



# TYPE FN 7.0x5.0 SEAM SEALED CRYSTAL CLOCK OSCILLATOR

**FNC500170**

VER. C 17-May-18

## RELIABILITY SPECIFICATIONS

### ENVIRONMENTAL:

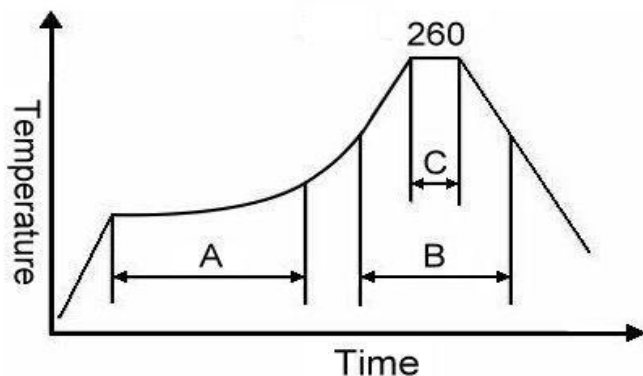
- a) THERMAL SHOCK: MIL-STD-883, Method 1011, Condition A
- b) MOISTURE RESISTANCE: MIL-STD-883, Method 1004
- c) VIBRATION: MIL-STD-883, Method 2007, Condition A
- d) RESISTANCE TO SOLDERING HEAT: J-STD-020D Table 5-2 Pb-free devices (except 2 cycles max)
- e) HAZARDOUS SUBSTANCE: Pb - free and RoHS Compliant.

### MECHANICAL:

- a) SHOCK: MIL-STD-883, Method 2002, Condition B
- b) SOLDERABILITY: JESD22-B102-D Method 2 (Preconditioning E)
- c) TERMINAL STRENGTH: MIL-STD-883, Method 2004, Test Condition D
- d) GROSS LEAK: MIL-STD-883, Method 1014, Condition C
- e) FINE LEAK: MIL-STD-883, Method 1014, Condition A2,  $R1=2 \times 10^{-8}$  atm cc/s
- f) SOLVENT RESISTANCE: MIL-STD-202, Method 215

## SUGGESTED IR REFLOW PROFILE

\*As per IPC-JEDEC J-STD-020D



Note:

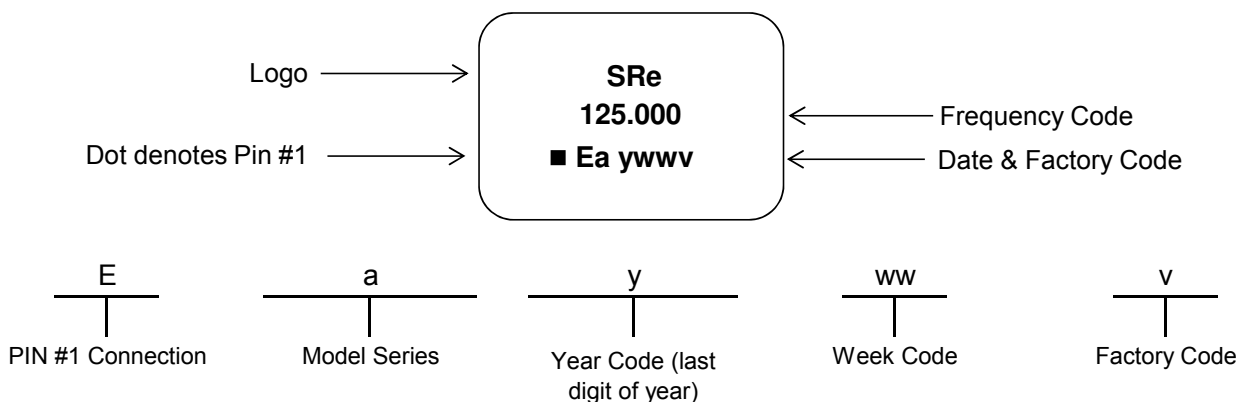
|   | Stage        | Temperature | Time       |
|---|--------------|-------------|------------|
| A | Preheat      | 150~200°C   | 60~120 Sec |
| B | Primary Heat | 217°C       | 60~150 Sec |
| C | Peak         | 260°C       | 10 Sec     |

# TYPE FN 7.0x5.0 SEAM SEALED CRYSTAL CLOCK OSCILLATOR

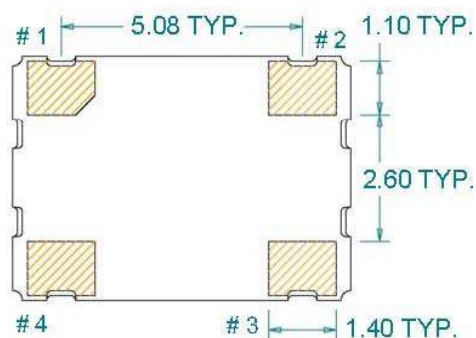
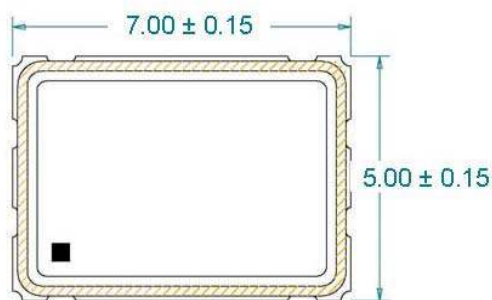
**FNC500170**

VER. C 17-May-18

## MARKING

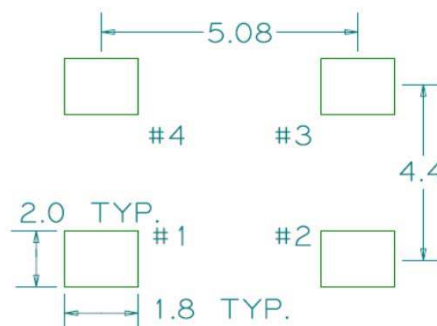


## MECHANICAL DRAWINGS ( Scale:None. Dimensions are in mm.)



(Bottom View)

### Recommended Land Pattern\*



\*External high-frequency power decoupling is recommended. (see test circuit for minimum recommendation). To ensure optimal performance, do not route traces beneath the package.

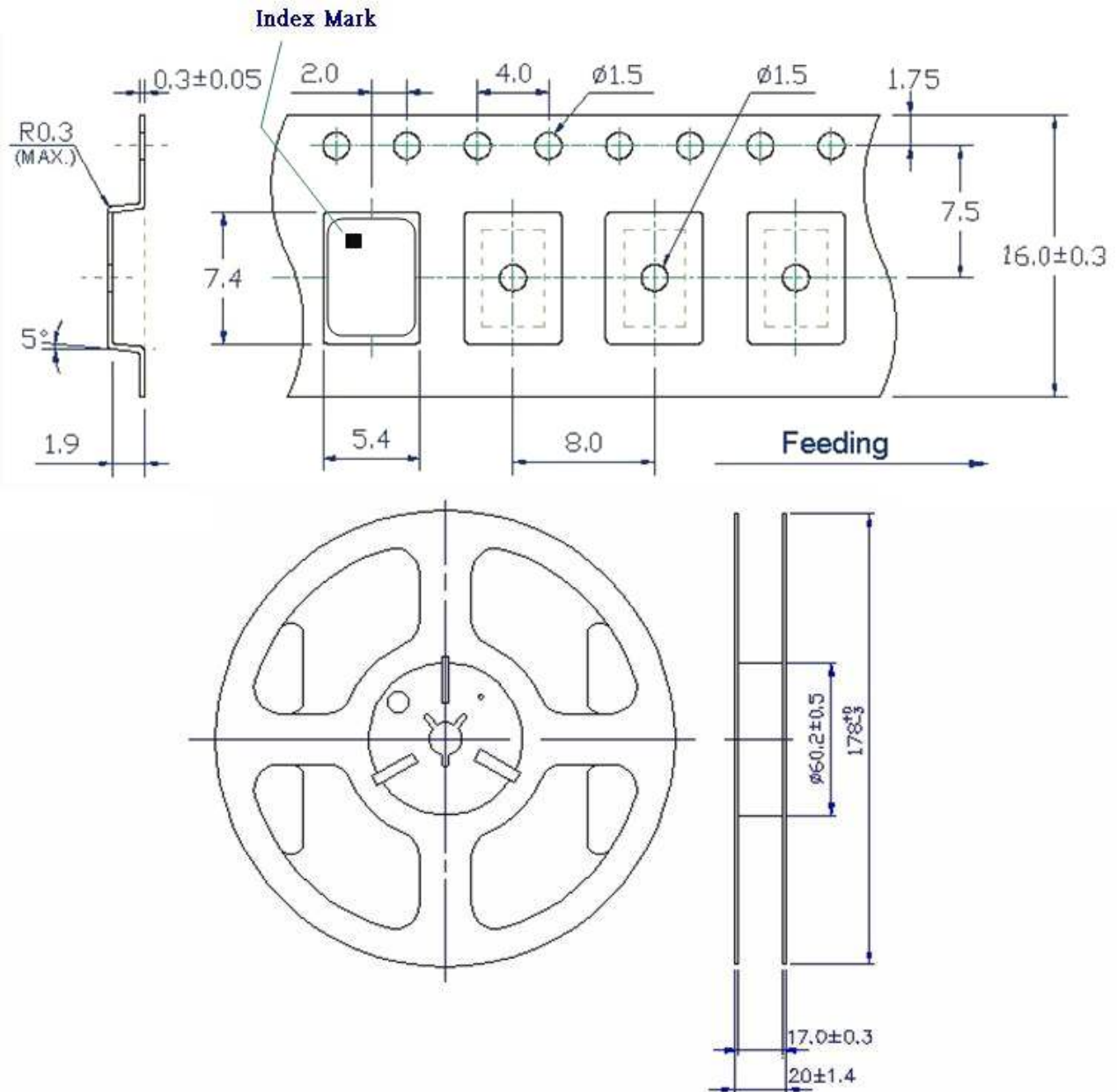
| Pin | Function        |
|-----|-----------------|
| 1   | OE              |
| 2   | Ground          |
| 3   | Clock Output    |
| 4   | V <sub>DD</sub> |

# TYPE FN 7.0x5.0 SEAM SEALED CRYSTAL CLOCK OSCILLATOR

**FNC500170**

VER. C 17-May-18

## TAPE&REEL



1. 230mm minimum leader which consist of carrier and/or tape followed by a minimum of 160mm of empty carrier tape sealed with cover tape.
2. 160mm minimum trailer of empty carrier tape sealed with cover tape.

# TYPE FN 7.0x5.0 SEAM SEALED CRYSTAL CLOCK OSCILLATOR

## FNC500170

VER. C 17-May-18

### PACKING

