

Helping Customers Innovate, Improve & Grow



[PX-501]

#### Features

*Reflow Process Compatible*  
*Surface Mount Package*  
*AT-Cut Crystal*  
*SONET Minimum Clock Specification*  
*Low Phase Noise*  
*Tight Tolerances*

#### Typical Applications

*Base Stations*  
*Test Equipment*  
*Synthesizers*

**Previous Vectron Model Number** C1310

**Frequency Range** 1 MHz – 1200 MHz

**Standard frequencies** 10; 20; 24.705; 30.720; 32.768; 50; 68.768; 76.8; 77.76MHz;  
 100; 125; 150; 155.52; 156.25; 175; 200; 250; 280; 312.5MHz;  
 340; 400; 622,08 MHz

#### Frequency stabilities<sup>1</sup> [Standard]

| Parameter                                                | Min   | Typ | Max   | Units | Operating temp range             |
|----------------------------------------------------------|-------|-----|-------|-------|----------------------------------|
| vs. operating temperature range<br>(Referenced to +25°C) | -10.0 |     | +10.0 | ppm   | -20 ... +70°C                    |
| Parameter                                                | Min   |     | Max   | Units | Condition                        |
| Initial tolerance                                        | -5.0  |     | +5.0  | ppm   | V <sub>S</sub> ± 5%<br>Load ± 5% |
| vs. supply voltage change                                | -1.0  |     | +1.0  | ppm   |                                  |
| vs. load change                                          | -1.0  |     | +1.0  | ppm   |                                  |
| vs. aging /1. Year                                       | -3.0  |     | +3.0  | ppm   |                                  |
| vs. aging / year (following Years)                       | -1.0  |     | +1.0  | ppm   |                                  |

## Frequency stabilities<sup>1</sup> [meets SONET Minimum Clock Specification-Option]

| Parameter                       | Min   | Typ | Max   | Units | Operating temp range                            |
|---------------------------------|-------|-----|-------|-------|-------------------------------------------------|
| vs. operating temperature range |       |     |       |       | -20 ... +70°C                                   |
| Parameter                       | Min   |     | Max   | Units | Condition                                       |
| overall tolerance               | -20.0 |     | +20.0 | ppm   | ( 15 Years aging, temp, initial, supply, load ) |

## Supply Voltage (Vs)

| Parameter           | Min   | Typ | Max   | Units | Condition                                                     |
|---------------------|-------|-----|-------|-------|---------------------------------------------------------------|
| Supply voltage (Vs) | 4.75  | 5.0 | 5.25  | VDC   | @ HCMOS < 155 MHz<br>@ PECL < 155 MHz                         |
| Current consumption |       |     | 40    | mA    |                                                               |
| Current consumption |       |     | 90    | mA    |                                                               |
| Supply voltage (Vs) | 3.135 | 3.3 | 3.465 | VDC   | @ LVHCMOS < 155 MHz<br>@ LVPECL < 155 MHz<br>@ LVDS < 155 MHz |
| Current consumption |       |     | 30    | mA    |                                                               |
| Current consumption |       |     | 80    | mA    |                                                               |
| Current consumption |       |     | 25    | mA    |                                                               |

## RF Output

| Parameter          | Min      | Typ  | Max | Units | Condition                 |
|--------------------|----------|------|-----|-------|---------------------------|
| Signal             | HCMOS    |      |     |       |                           |
| Load               |          | 15.0 |     | pF    | @15 pF 10 to 90%<br>@Vs/2 |
| Rise and Fall Time |          |      | 5   | ns    |                           |
| Duty cycle         | 40       |      | 60  | %     |                           |
| Signal             | PECL     |      |     |       |                           |
| Load               |          | 50   |     | Ω     | Vs-2V<br>20-80%           |
| Rise and Fall Time |          |      | 1   | ns    |                           |
| Duty cycle         | 45       |      | 55  | %     |                           |
| Signal             | LVDS     |      |     |       |                           |
| Load               |          | 100  |     | Ω     | 10 to 90 %                |
| Rise and Fall time |          |      | 1   | ns    |                           |
| Duty cycle         | 40       |      | 60  | %     |                           |
| Signal             | Sinewave |      |     |       |                           |
| Load               |          | 50   |     | Ω     |                           |
| Output Power       | -3       | 0    | 3   | dBm   |                           |

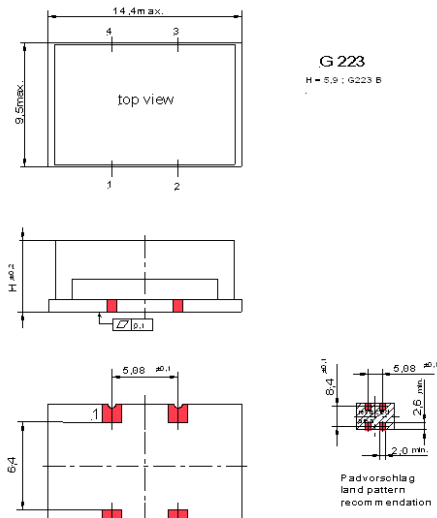
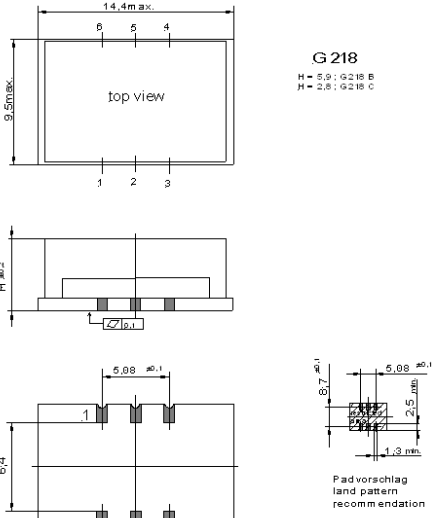
## Additional Parameters

| Parameter   | Min | Typ  | Max | Units  | Condition          |     |             |
|-------------|-----|------|-----|--------|--------------------|-----|-------------|
| Phase Noise |     | -85  |     | dBc/Hz | 10                 | Hz  | @49,408 MHz |
|             |     | -120 |     | dBc/Hz | 100                | Hz  | HCMOS       |
|             |     | -145 |     | dBc/Hz | 1                  | kHz | 3,3V        |
|             |     | -155 |     | dBc/Hz | 10                 | kHz |             |
|             |     | -160 |     | dBc/Hz | 100                | kHz |             |
| Jitter      |     | 0,2  |     | ps RMS | @ 12 kHz to 20 MHz |     |             |

## Additional Parameters

| Parameter            | Min                        | Typ  | Max | Uniits | Condition          |     |          |
|----------------------|----------------------------|------|-----|--------|--------------------|-----|----------|
| Phase Noise          |                            | -80  |     | dBc/Hz | 10                 | Hz  | @125 MHz |
|                      |                            | -115 |     | dBc/Hz | 100                | Hz  | PECL     |
|                      |                            | -135 |     | dBc/Hz | 1                  | kHz | 3,3V     |
|                      |                            | -141 |     | dBc/Hz | 10                 | kHz |          |
|                      |                            | -141 |     | dBc/Hz | 100                | kHz |          |
| Jitter               |                            | 0,6  |     | ps RMS | @ 12 kHz to 20 MHz |     |          |
| Parameter            | Min                        | Typ  | Max | Units  | Condition          |     |          |
| Phase Noise          |                            | -62  |     | dBc/Hz | 10                 | Hz  | @400 MHz |
|                      |                            | -93  |     | dBc/Hz | 100                | Hz  | PECL     |
|                      |                            | -124 |     | dBc/Hz | 1                  | kHz | 3,3V     |
|                      |                            | -142 |     | dBc/Hz | 10                 | kHz |          |
|                      |                            | -143 |     | dBc/Hz | 100                | kHz |          |
| Jitter               |                            | 0,2  |     | ps RMS | @ 12 kHz to 20 MHz |     |          |
| Weight               |                            |      | 2   | g      |                    |     |          |
| Processing & Packing | handling & processing note |      |     |        |                    |     |          |

## Enclosure

| Type G223A<br>for HCMOS and LVHCMOS Version                                                               |                      | Type G218B<br>for HCMOS; PECL; LVPECL and LVDS Version                                                     |                      |
|-----------------------------------------------------------------------------------------------------------|----------------------|------------------------------------------------------------------------------------------------------------|----------------------|
| Height "H"<br>5,9                                                                                         | Pin Length "L"<br>NA | Height "H"<br>5,9                                                                                          | Pin Length "L"<br>NA |
|  <p>Dimensions: mm</p> |                      |  <p>Dimensions: mm</p> |                      |

| Pin Connections        |                           | Pin Connections        |                                             |
|------------------------|---------------------------|------------------------|---------------------------------------------|
| 1                      | NC / Enable (optional)    | 1                      | N/C                                         |
| 2                      | Ground (Case)             | 2                      | N/C / Enable (optional)                     |
| 3                      | RF Output                 | 3                      | Ground (Case)                               |
| 4                      | Supply Voltage Input (Vs) | 4                      | RF Output                                   |
|                        |                           | 5                      | Complementary RF Output / (N/C: HCMOS only) |
|                        |                           | 6                      | Supply Voltage Input (Vs)                   |
| Outline Drawing: G223B |                           | Outline Drawing: G218B |                                             |

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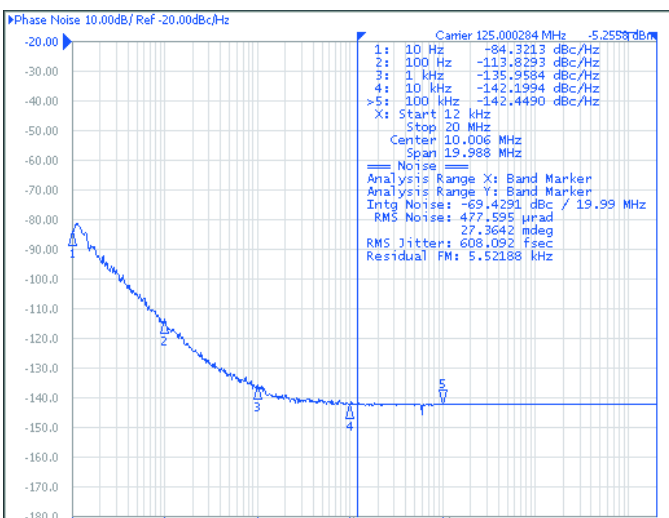
## Enclosure

|                                         | Enable true table | HCMOS         |       | LVPECL / LVDS |             |
|-----------------------------------------|-------------------|---------------|-------|---------------|-------------|
|                                         | Pin 2             | Pin 4         | Pin 5 | Pin 4         | Pin 5       |
|                                         | High              | Data          | N/C   | No Data       | No Data     |
|                                         | Open              | Data          | N/C   | Data          | compl. Data |
|                                         | Low               | High Tristate | N/C   | Data          | compl. Data |
| Marking                                 |                   |               |       |               |             |
| C1310A1-xxxx<br>frequency<br>* VI AYYWW |                   |               |       |               |             |

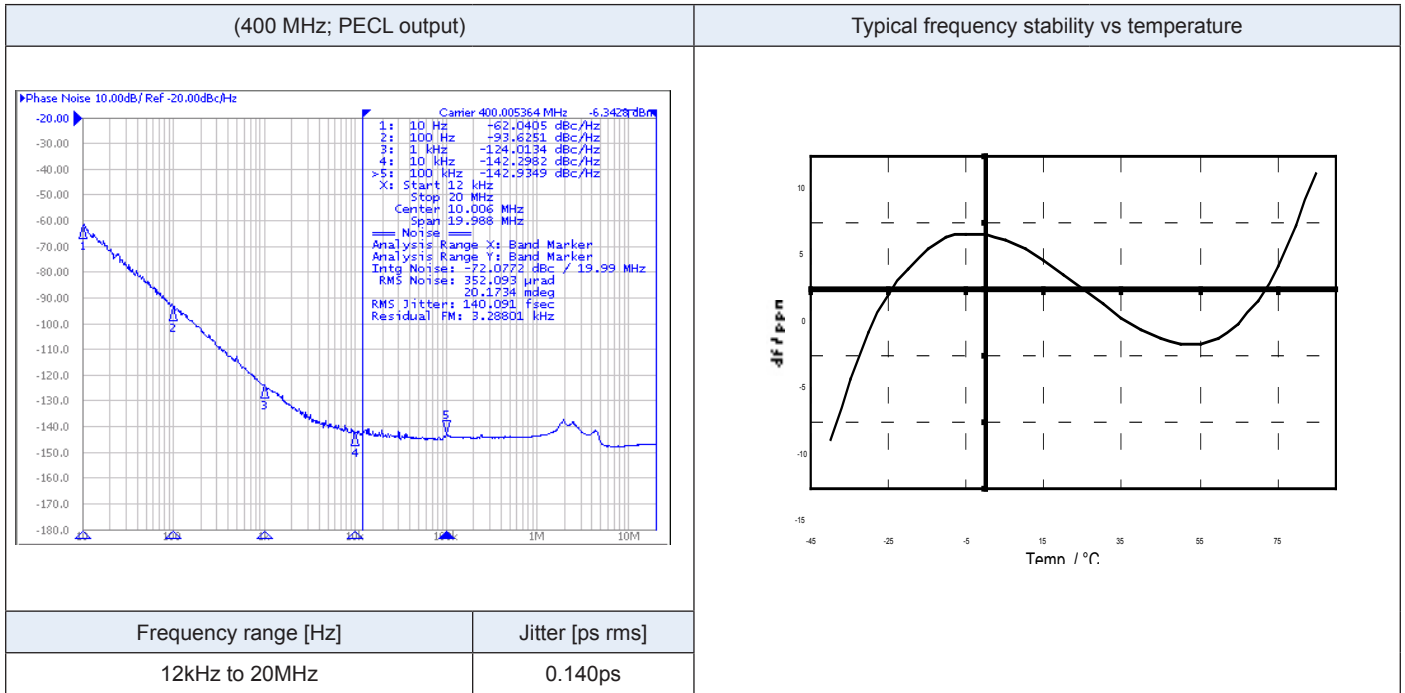
## Absolute Maximum Ratings

| Parameter                  | Min | Typ | Max. | Units | Condition |
|----------------------------|-----|-----|------|-------|-----------|
| Supply voltage (Vs)        |     |     | 7    | V     |           |
| Operable temperature range | -30 |     | +80  | °C    |           |
| Storage temperature range  | -40 |     | +90  | °C    |           |

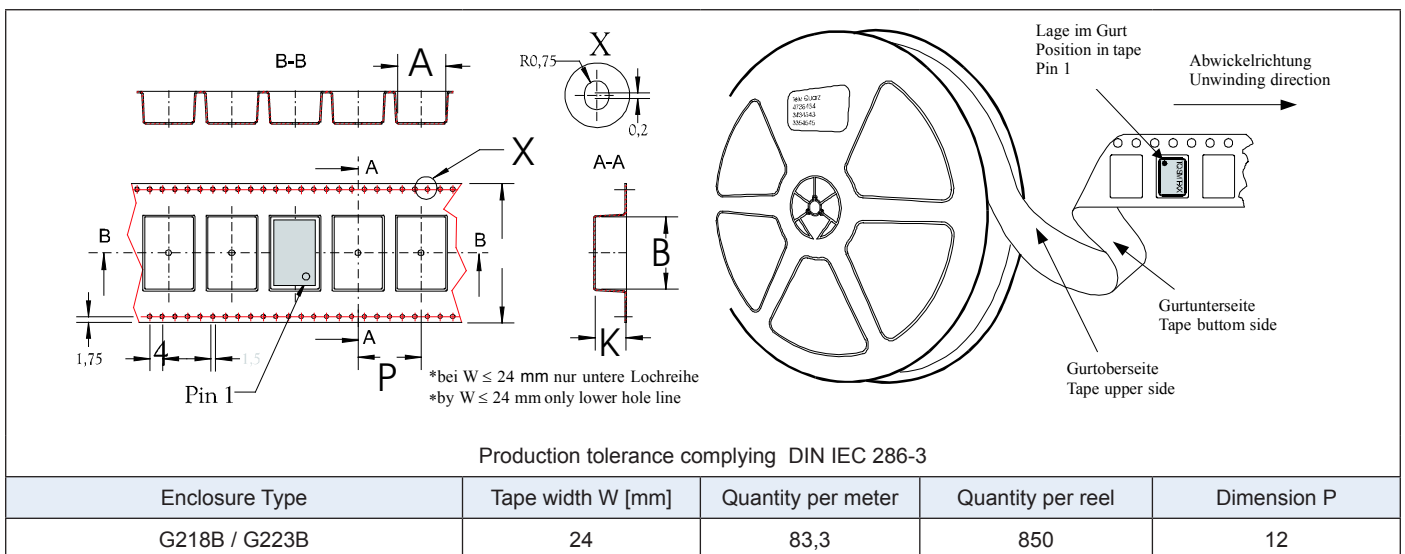
## Typical Phase Noise and Jitter

| (125 MHz; PECL output) |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                 |
|------------------------|--|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
|                        |  |  <p>Phase Noise 10.00dB/ Ref -20.00dBc/Hz</p> <p>Carrier 125.000284 MHz -5.2598dBm</p> <p>1: 10 Hz -84.3213 dBc/Hz<br/>2: 100 Hz -113.8293 dBc/Hz<br/>3: 1 kHz -135.3984 dBc/Hz<br/>4: 10 kHz -142.1994 dBc/Hz<br/>5: 100 kHz -142.4490 dBc/Hz</p> <p>X: Start 12 kHz<br/>Stop 20 MHz<br/>Center 10.006 MHz<br/>Span 19.988 MHz</p> <p>Analysis Range X: Band Marker<br/>Analysis Range Y: Band Marker<br/>Intg Noise: -69.4291 dBc / 19.99 MHz<br/>RMS Noise: 477.595 μrad<br/>RMS Jitter: 608.092 fsec<br/>Residual FM: 5.52188 kHz</p> |                 |
|                        |  | Frequency range [Hz]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Jitter [ps rms] |
|                        |  | 12kHz to 20MHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 0.608ps         |

## Typical Phase Noise and Jitter



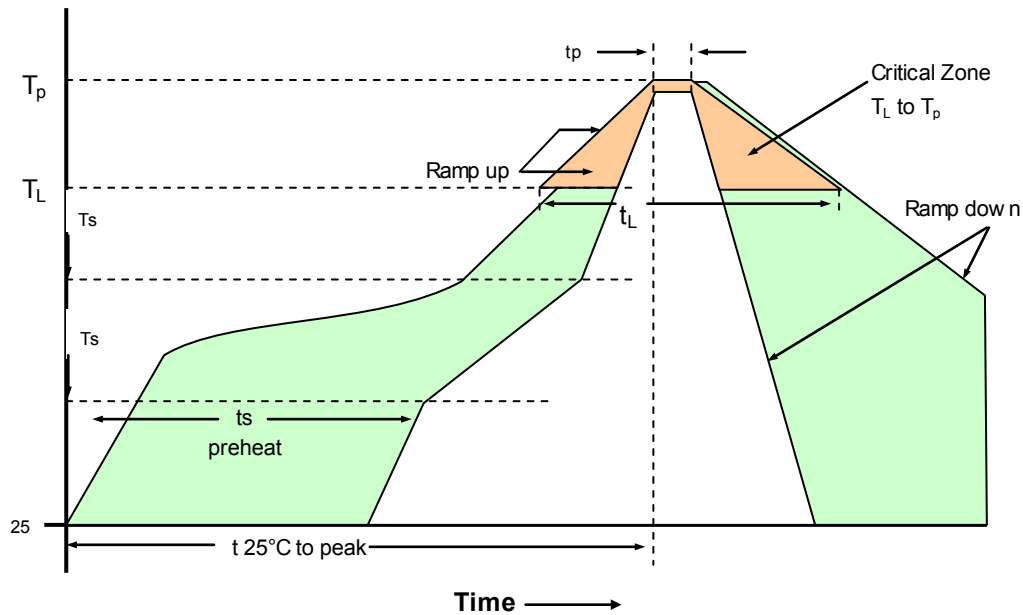
## Standard Shipping Methode



## Notes:

- 1 Contact factory for improved stabilities or additional product options. Not all options and codes are available at all frequencies.
- 2 Unless otherwise stated all values are valid after warm-up time and refer to typical conditions for supply voltage, frequency control voltage, load, temperature (25°C)
- 3 Phase noise degrades with increasing output frequency.
- 4 Subject to technical modification.
- 5 Contact factory for availability.

## Recommended Reflow Profile



| Profile Feature                                                                                                                                                                | Pb-Free Assembly/<br>Sn.Pb Assembly | Profile Feature                                                    | Pb-Free Assembly/<br>Sn.Pb Assembly |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|--------------------------------------------------------------------|-------------------------------------|
| Average ramp-up rate ( $T_L$ to $T_p$ )                                                                                                                                        | 3°C/second max.                     | Time 25°C to Peak Temperature                                      | 8 minutes max.                      |
| Preheat<br>-Temperature Min $T_{s_{min}}$<br>-Temperature Min $T_{s_{max}}$<br>-Time (min to max) ( $t_s$ )                                                                    | 150°C<br>200°C<br>60-180 seconds    | Time maintained above<br>-Temperature ( $T_L$ )<br>-Time ( $t_L$ ) | 217°C<br>60-150 seconds             |
| $T_{s_{max}}$ to $T_L$ -Ramp-up Rate                                                                                                                                           | 3°C/second max                      | Time within 5°C of actual Peak<br>Temperature ( $t_p$ )            | 20-40 seconds                       |
| Peak Temperature ( $T_p$ )                                                                                                                                                     | max 260°C                           | Ramp-down Rate                                                     | 6°C/ second max                     |
| Note: All temperatures refer to topside of the package, measured on the package body surface.<br>SMD oscillators must be on the top side of the PCB during the reflow process. |                                     |                                                                    |                                     |

## How to order this product:

| Use this worksheet to forward the following information to your factory representative: |        |   |                        |                   |                      |   |           |   |           |
|-----------------------------------------------------------------------------------------|--------|---|------------------------|-------------------|----------------------|---|-----------|---|-----------|
| Model                                                                                   | Height | - | Supply Voltage<br>Code | RF Output<br>Code | Temperature<br>Range | - | Stability | - | Frequency |
| PX-501                                                                                  | 1      | - | E                      | A                 | J                    | - | 105       | - | 10MHz     |

Height:  
1: 5,9 mm

Supply Voltage Code:  
E: 3,3 V  
D: 5 V

RF Output Code:  
A: HCMOS  
C: PECL  
D: LVDS  
E: Sinewave

Temperature Range/Stability Code:  
J-105: -20...+70°C ±10ppm  
J-205: -20...+70°C ±20ppm