

## Description

The IDT XL devices (XO and VCXO options) are ultra-precision crystal oscillators with 750 to 890fs typical phase jitter over 12kHz to 20MHz bandwidth. Available in a wide frequency range from 0.750MHz to 1350MHz, the XL series crystal oscillators utilize a family of proprietary ASICs, with a key focus on noise reduction technologies.

The 3rd order Delta Sigma Modulator reduces noise to the levels that are comparable to traditional Bulk Quartz and SAW oscillators. With short lead-time, low cost, low noise, wide frequency range, excellent ambient performance, the XL devices are an excellent choice over the conventional technologies. The XL (XO option) devices have stabilities as tight as  $\pm 20$ ppm and the XL (VCXO option) devices have  $\pm 50$ ppm APR. Either option provides extremely quick delivery for both standard and custom frequencies.

## Features

- Output types: LVDS, LVPECL, LVCMOS
- Phase jitter (12kHz to 20MHz): 750fs to 890fs typical
- Supply voltage: 2.5V or 3.3V
- Package options:
  - $3.2 \times 2.5 \times 1.0$  mm (not available for VCXO)
  - $5.0 \times 3.2 \times 1.2$  mm
  - $7.0 \times 5.0 \times 1.3$  mm
- Operating temperature:  $-20^{\circ}\text{C}$  to  $+70^{\circ}\text{C}$ 
  - Frequency stability options:  $\pm 20$ ,  $\pm 25$ ,  $\pm 50$ , or  $\pm 100$  ppm (XO only)
  - $\pm 50$ ppm APR (VCXO only)
- Operating temperature:  $-40^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$ 
  - Frequency stability options:  $\pm 25$ ,  $\pm 50$ , or  $\pm 100$  ppm (XO only)
  - $\pm 50$ ppm APR (VCXO only)
- Operating temperature:  $-40^{\circ}\text{C}$  to  $+105^{\circ}\text{C}$  (XO only)
  - Frequency stability options:  $\pm 50$  or  $\pm 100$  ppm
- kV of 85ppm/volt typical from 0.5VDC to VDD (VCXO only)
  - Better than  $\pm 10\%$  linearity for Vc range

## Pin Assignments (XO option)

**NOTE:** To minimize power supply line noise, a  $0.01\mu\text{F}$  bypass capacitor should be placed between VDD (Pin 6) and GND (Pin 3) on 6-pin devices, or VDD (Pin 4) and GND (Pin 2) on 4-pin devices.



**Table 1. XO 6-pin Package**

| Number | Name            | Description                                    |
|--------|-----------------|------------------------------------------------|
| 1      | E/D<br>NC       | Enable/Disable <sup>[a][b]</sup><br>No connect |
| 2      | NC<br>E/D       | No connect<br>Enable/Disable <sup>[a][b]</sup> |
| 3      | GND             | Connect to ground                              |
| 4      | OUT             | Output                                         |
| 5      | OUT2            | Complementary output                           |
| 6      | V <sub>DD</sub> | Supply voltage                                 |



**Table 2. XO 4-pin Package**

| Number | Name            | Description                      |
|--------|-----------------|----------------------------------|
| 1      | E/D             | Enable/Disable <sup>[a][b]</sup> |
| 2      | GND             | Connect to ground                |
| 3      | OUT             | Output                           |
| 4      | V <sub>DD</sub> | Supply voltage                   |

[a] Pulled high internally.

[b] Low = output disabled.

See [Ordering Information \(XO\)](#) for more details.

## Pin Assignments (VCXO option)

**NOTE:** To minimize power supply line noise, a 0.01μF bypass capacitor should be placed between V<sub>DD</sub> (Pin 6) and GND (Pin 3).



**Table 3. VCXO 6-pin Package**

| Number | Name            | Description                      |
|--------|-----------------|----------------------------------|
| 1      | Vc              | Voltage control                  |
| 2      | E/D             | Enable/Disable <sup>[a][b]</sup> |
| 3      | GND             | Connect to ground                |
| 4      | OUT             | Output                           |
| 5      | OUT2            | Complementary output (NC LVCMOS) |
| 6      | V <sub>DD</sub> | Supply voltage                   |

[a] Pulled high internally.

[b] Low = output disabled.

See [Ordering Information \(VCXO\)](#) for more details.

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## Absolute Maximum Ratings

Stresses above the ratings listed below can cause permanent damage to the device. These ratings, which are standard values for IDT commercially rated parts, are stress ratings only. Functional operation of the device at these or any other conditions above those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods can affect product reliability. Electrical parameters are guaranteed only over the recommended operating temperature range.

**Table 4. Absolute Maximum Ratings**

| Item                         | Rating                   |           |                    |           |                    |           |
|------------------------------|--------------------------|-----------|--------------------|-----------|--------------------|-----------|
| $V_{DD}$                     | -0.5 to +5.0V            |           |                    |           |                    |           |
| E/D                          | -0.5V to $V_{DD} + 0.5V$ |           |                    |           |                    |           |
| OUT                          | -0.5V to $V_{DD} + 0.5V$ |           |                    |           |                    |           |
| Storage Temperature          | -55°C to 125°C           |           |                    |           |                    |           |
| Maximum Junction Temperature | 125°C                    |           |                    |           |                    |           |
| Core Current                 | 65mA maximum             |           |                    |           |                    |           |
| Theta $J_A$                  | JU6                      | 75.9 °C/W | JS6                | 89.6 °C/W | JX6                | 94.7 °C/W |
| Theta $J_B$                  | 7.0 × 5.0 × 1.3 mm       | 48.6°C/W  | 5.0 × 3.2 × 1.2 mm | 54.3 °C/W | 3.2 × 2.5 × 1.0 mm | 66.8 °C/W |

## ESD Compliance

**Table 5. ESD Compliance**

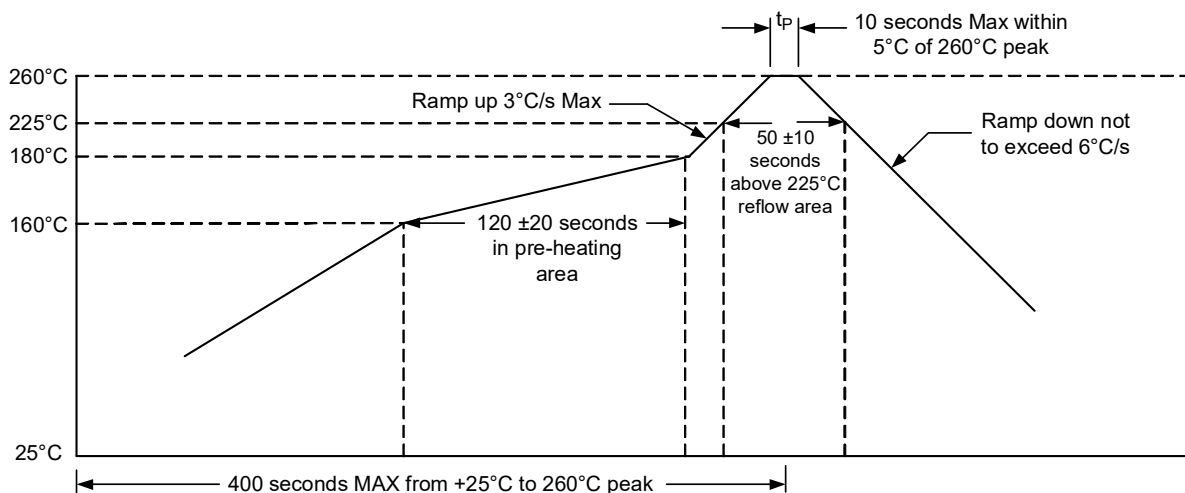
|                        |       |
|------------------------|-------|
| Human Body Model (HBM) | 1000V |
| Machine Model (MM)     | 150V  |

## Mechanical Testing

**Table 6. Mechanical Testing**

| Parameter                | Test Method                                                                       |
|--------------------------|-----------------------------------------------------------------------------------|
| Mechanical Shock         | Drop from 75cm to hardwood surface—3 times.                                       |
| Mechanical Vibration     | 10–55Hz, 1.5mm amplitude, 1 minute sweep; 2 hours each in 3 directions (X, Y, Z). |
| High Temperature Burn-in | Under power at 125°C for 2000 hours.                                              |
| Hermetic Seal            | He pressure: 4 ±1kgf/cm <sup>2</sup> 2 hour soak.                                 |

## Solder Reflow Profile



## DC Electrical Characteristics

**Table 7. 3.3V IDD DC Electrical Characteristics**

$V_{DD} = 3.3V \pm 5\%$ ,  $T_A = -20^{\circ}C$  to  $+70^{\circ}C$ ;  $-40^{\circ}C$  to  $+85^{\circ}C$ ,  $-40^{\circ}C$  to  $+105^{\circ}C$ .

| Symbol   | Parameter            | Output Type | Conditions         | Minimum | Typical | Maximum | Units |
|----------|----------------------|-------------|--------------------|---------|---------|---------|-------|
| $I_{DD}$ | Power Supply Current | LVDS        | —                  | —       | —       | 100     | mA    |
|          |                      | LVPECL      | —                  | —       | —       | 120     |       |
|          |                      | LVCMOS      | 0.75MHz to 20MHz.  | —       | —       | 32      |       |
|          |                      |             | 20+MHz to 50MHz.   | —       | —       | 35      |       |
|          |                      |             | 50+MHz to 130MHz.  | —       | —       | 47      |       |
|          |                      |             | 130+MHz to 200MHz. | —       | —       | 55      |       |
|          |                      |             | 200+MHz to 250MHz. | —       | —       | 60      |       |

**Table 8. 2.5V IDD DC Electrical Characteristics**

$V_{DD} = 2.5V \pm 5\%$ ,  $T_A = -20^{\circ}C$  to  $+70^{\circ}C$ ;  $-40^{\circ}C$  to  $+85^{\circ}C$ ,  $-40^{\circ}C$  to  $+105^{\circ}C$ .

| Symbol   | Parameter            | Output Type | Conditions          | Minimum | Typical | Maximum | Units |
|----------|----------------------|-------------|---------------------|---------|---------|---------|-------|
| $I_{DD}$ | Power Supply Current | LVDS        | 0.75MHz to 20MHz.   | —       | —       | 26      | mA    |
|          |                      |             | 20+MHz to 220MHz.   | —       | —       | 34      |       |
|          |                      |             | 220+MHz to 630MHz.  | —       | —       | 44      |       |
|          |                      |             | 630+MHz to 1000MHz. | —       | —       | 65      |       |
|          |                      | LVPECL      | 0.75MHz to 20MHz.   | —       | —       | 33      |       |
|          |                      |             | 20+MHz to 220MHz.   | —       | —       | 41      |       |
|          |                      |             | 220+MHz to 630MHz.  | —       | —       | 63      |       |
|          |                      |             | 630+MHz to 1000MHz. | —       | —       | 72      |       |
|          |                      | LVCMOS      | 0.75MHz to 20MHz.   | —       | —       | 22      |       |
|          |                      |             | 20+MHz to 50MHz.    | —       | —       | 25      |       |
|          |                      |             | 50+MHz to 100MHz.   | —       | —       | 29      |       |
|          |                      |             | 100+MHz to 130MHz.  | —       | —       | 32      |       |
|          |                      |             | 130+MHz to 160MHz.  | —       | —       | 35      |       |
|          |                      |             | 160+MHz to 180MHz.  | —       | —       | 37      |       |

**Table 9. LVDS DC Electrical Characteristics**
 $V_{DD} = 3.3V, 2.5V \pm 5\%$ ,  $T_A = -20^{\circ}C$  to  $+70^{\circ}C$ ;  $-40^{\circ}C$  to  $+85^{\circ}C$ ,  $-40^{\circ}C$  to  $+105^{\circ}C$ . Below are guaranteed for listed standard frequencies.

| Symbol   | Parameter                                          | Conditions              | Minimum      | Typical | Maximum      | Units |
|----------|----------------------------------------------------|-------------------------|--------------|---------|--------------|-------|
| $V_{OD}$ | Differential Output Voltage                        | $V_{DD} = 3.3V \pm 5\%$ | —            | —       | 0.6          | V     |
|          |                                                    | $V_{DD} = 2.5V \pm 5\%$ | —            | —       | 0.4          |       |
| $V_{OS}$ | Output Offset Voltage                              | $V_{DD} = 3.3V \pm 5\%$ | —            | —       | 1.3          |       |
|          |                                                    | $V_{DD} = 2.5V \pm 5\%$ | —            | —       | 1.25         |       |
| $V_{IH}$ | Enable/Disable Input High Voltage (Output enabled) | —                       | 70% $V_{DD}$ | —       | —            |       |
| $V_{IL}$ | Enable/Disable Input Low Voltage (Output disabled) | —                       | —            | —       | 30% $V_{DD}$ |       |

**Table 10. LVPECL DC Electrical Characteristics**
 $V_{DD} = 3.3V, 2.5V \pm 5\%$ ,  $T_A = -20^{\circ}C$  to  $+70^{\circ}C$ ;  $-40^{\circ}C$  to  $+85^{\circ}C$ ,  $-40^{\circ}C$  to  $+105^{\circ}C$ . Below are guaranteed for listed standard frequencies.

| Symbol   | Parameter                                          | Conditions              | Minimum      | Typical | Maximum      | Units |
|----------|----------------------------------------------------|-------------------------|--------------|---------|--------------|-------|
| $V_{OD}$ | Differential Output Voltage                        | $V_{DD} = 3.3V \pm 5\%$ | 2.055        | —       | 2.405        | V     |
|          |                                                    | $V_{DD} = 2.5V \pm 5\%$ | —            | 1.4     | —            |       |
| $V_{OS}$ | Output Offset Voltage                              | $V_{DD} = 3.3V \pm 5\%$ | 1.305        | —       | 1.65         |       |
|          |                                                    | $V_{DD} = 2.5V \pm 5\%$ | —            | 0.68    | —            |       |
| $V_{IH}$ | Enable/Disable Input High Voltage (Output enabled) | —                       | 70% $V_{DD}$ | —       | —            |       |
| $V_{IL}$ | Enable/Disable Input Low Voltage (Output disabled) | —                       | —            | —       | 30% $V_{DD}$ |       |

**Table 11. LVCMOS DC Electrical Characteristics**

$V_{DD} = 3.3V, 2.5V \pm 5\%$ ,  $T_A = -20^\circ C$  to  $+70^\circ C$ ;  $-40^\circ C$  to  $+85^\circ C$ ,  $-40^\circ C$  to  $+105^\circ C$ . Below are guaranteed for listed standard frequencies.

| Symbol   | Parameter                                          | Conditions              |                    | Minimum      | Typical | Maximum      | Units |
|----------|----------------------------------------------------|-------------------------|--------------------|--------------|---------|--------------|-------|
| $V_{OH}$ | Output High Voltage                                | $V_{DD} = 3.3V \pm 5\%$ | 0.75MHz to 150MHz. | 90% $V_{DD}$ | —       | —            | V     |
|          |                                                    |                         | 150+MHz to 250MHz. | 80% $V_{DD}$ | —       | —            |       |
|          |                                                    | $V_{DD} = 2.5V \pm 5\%$ | 0.75MHz to 160MHz. | 90% $V_{DD}$ | —       | —            |       |
|          |                                                    |                         | 160+MHz to 180MHz. | 80% $V_{DD}$ | —       | —            |       |
| $V_{OL}$ | Output Low Voltage                                 | $V_{DD} = 3.3V \pm 5\%$ | 0.75MHz to 150MHz. | —            | —       | 10% $V_{DD}$ |       |
|          |                                                    |                         | 150+MHz to 250MHz. | —            | —       | 20% $V_{DD}$ |       |
|          |                                                    | $V_{DD} = 2.5V \pm 5\%$ | 0.75MHz to 160MHz. | —            | —       | 10% $V_{DD}$ |       |
|          |                                                    |                         | 160+MHz to 180MHz. | —            | —       | 20% $V_{DD}$ |       |
| $V_{IH}$ | Enable/Disable Input High Voltage (Output enabled) | —                       | —                  | 70% $V_{DD}$ | —       | —            |       |
| $V_{IL}$ | Enable/Disable Input Low Voltage (Output disabled) | —                       | —                  | —            | —       | 30% $V_{DD}$ |       |

# AC Electrical Characteristics

**Table 12. 3.3V AC Electrical Characteristics**
 $V_{DD} = 3.3V \pm 5\%$ ,  $T_A = -20^{\circ}C$  to  $+70^{\circ}C$ ;  $-40^{\circ}C$  to  $+85^{\circ}C$ ,  $-40^{\circ}C$  to  $+105^{\circ}C$ .

| Symbol    | Parameter                   | Test Condition                                                  |                          | Minimum  | Typical | Maximum   | Units    |
|-----------|-----------------------------|-----------------------------------------------------------------|--------------------------|----------|---------|-----------|----------|
| F         | Output Frequency Range      | LVDS.                                                           |                          | 0.75     | —       | 1350      | MHz      |
|           |                             | LVPECL.                                                         |                          | 0.75     | —       | 1350      |          |
|           |                             | LVCMOS.                                                         |                          | 0.75     | —       | 250       |          |
|           | Frequency Stability         | Temperature = $-20^{\circ}C$ to $+70^{\circ}C$ .                |                          | $\pm 20$ | —       | $\pm 100$ | ppm      |
|           |                             | Temperature = $-40^{\circ}C$ to $+85^{\circ}C$ .                |                          | $\pm 25$ | —       | $\pm 100$ | ppm      |
|           |                             | Temperature = $-40^{\circ}C$ to $+105^{\circ}C$ .               |                          | $\pm 50$ | —       | $\pm 100$ | ppm      |
|           | Aging (1st year)            | $T_A = 25^{\circ}C$ .                                           |                          | —        | —       | $\pm 3$   | ppm      |
|           | Aging (10 years)            | $T_A = 25^{\circ}C$ .                                           |                          | —        | —       | $\pm 10$  | ppm      |
|           | Output Load                 | LVDS.                                                           | Differential.            | —        | 100     | —         | $\Omega$ |
|           |                             | LVPECL.                                                         | $V_{DD} - 2.0V$ .        | —        | 50      | —         |          |
|           |                             | LVCMOS.                                                         | To GND.                  | —        | 15      | —         | pF       |
| $T_{ST}$  | Start-up Time               | Output valid time after $V_{DD}$ meets minimum specified level. |                          | —        | —       | 10        | ms       |
| $t_R$     | Output Rise Time            | LVDS.                                                           | 20% to 80% $V_{pp}$ .    | —        | —       | 400       | ps       |
|           |                             | LVPECL.                                                         |                          | —        | —       | 400       |          |
|           |                             | LVCMOS.                                                         | 10% to 90% $V_{DD}$ .    | —        | —       | 3         | ns       |
| $t_F$     | Output Fall Time            | LVDS.                                                           | 80% to 20% $V_{pp}$ .    | —        | —       | 400       | ps       |
|           |                             | LVPECL.                                                         |                          | —        | —       | 400       |          |
|           |                             | LVCMOS.                                                         | 90% to 10% $V_{DD}$ .    | —        | —       | 3         | ns       |
| $O_{DC}$  | Output Clock Duty Cycle     | LVDS.                                                           |                          | 45       | —       | 55        | %        |
|           |                             | LVPECL.                                                         |                          | 45       | —       | 55        |          |
|           |                             | LVCMOS.                                                         | $F_{OUT} \leq 62.5MHz$ . | 45       | —       | 55        |          |
|           |                             |                                                                 | $F_{OUT} > 62.5MHz$ .    | 40       | —       | 60        |          |
| $T_{OE}$  | Output Enable/ Disable Time | —                                                               |                          | —        | —       | 100       | ns       |
| $J_{PER}$ | Period Jitter, RMS          | LVDS.                                                           |                          | —        | 3       | —         | ps       |
|           |                             | LVPECL.                                                         |                          | —        | 5.8     | —         |          |
|           |                             | LVCMOS.                                                         | $F_{OUT} = 125MHz$ .     | —        | 5       | —         |          |
| $R_J$     | Random Jitter               | LVDS.                                                           |                          | —        | 1.3     | —         | ps       |
|           |                             | LVPECL.                                                         |                          | —        | 1.29    | —         |          |
|           |                             | LVCMOS.                                                         | $F_{OUT} = 125MHz$ .     | —        | 0.6     | —         |          |
| $D_J$     | Deterministic Jitter        | LVDS.                                                           |                          | —        | 5.8     | —         | ps       |
|           |                             | LVPECL.                                                         |                          | —        | 9.3     | —         |          |
|           |                             | LVCMOS.                                                         | $F_{OUT} = 125MHz$ .     | —        | 10      | —         |          |

**Table 12. 3.3V AC Electrical Characteristics (Cont.)**
 $V_{DD} = 3.3V \pm 5\%$ ,  $T_A = -20^\circ C$  to  $+70^\circ C$ ;  $-40^\circ C$  to  $+85^\circ C$ ,  $-40^\circ C$  to  $+105^\circ C$ .

| Symbol       | Parameter                  | Test Condition               | Minimum | Typical | Maximum | Units |
|--------------|----------------------------|------------------------------|---------|---------|---------|-------|
| $T_J$        | Total Jitter               | LVDS.                        | —       | 23.6    | —       | ps    |
|              |                            | LVPECL.                      | —       | 27.7    | —       |       |
|              |                            | LVC MOS. $F_{OUT} = 125MHz.$ | —       | 19      | —       |       |
| $f_{JITTER}$ | Phase Jitter (12kHz–20MHz) | LVDS.                        | —       | 890     | —       | fs    |
|              |                            | LVPECL.                      | —       | 860     | —       |       |
|              |                            | LVC MOS. $F_{OUT} = 125MHz.$ | —       | 750     | —       |       |

**Table 13. 2.5V AC Electrical Characteristics**
 $V_{DD} = 2.5V \pm 5\%$ ,  $T_A = -20^\circ C$  to  $+70^\circ C$ ;  $-40^\circ C$  to  $+85^\circ C$ ,  $-40^\circ C$  to  $+105^\circ C$ .

| Symbol   | Parameter                   | Test Condition                                                  | Minimum  | Typical | Maximum   | Units    |
|----------|-----------------------------|-----------------------------------------------------------------|----------|---------|-----------|----------|
| F        | Output Frequency Range      | LVDS.                                                           | 0.75     | —       | 1000      | MHz      |
|          |                             | LVPECL.                                                         | 0.75     | —       | 1000      |          |
|          |                             | LVC MOS.                                                        | 0.75     | —       | 180       |          |
|          | Frequency Stability         | Temperature = $-20^\circ C$ to $+70^\circ C$ .                  | $\pm 20$ | —       | $\pm 100$ | ppm      |
|          |                             | Temperature = $-40^\circ C$ to $+85^\circ C$ .                  | $\pm 25$ | —       | $\pm 100$ | ppm      |
|          |                             | Temperature = $-40^\circ C$ to $+105^\circ C$ .                 | $\pm 50$ | —       | $\pm 100$ | ppm      |
|          | Aging (1st year)            | $T_A = 25^\circ C$ .                                            | —        | —       | $\pm 3$   | ppm      |
|          | Aging (10 years)            | $T_A = 25^\circ C$ .                                            | —        | —       | $\pm 10$  | ppm      |
|          | Output Load                 | LVDS. Differential.                                             | —        | 100     | —         | $\Omega$ |
|          |                             | LVPECL. $V_{DD} - 2.0V$ .                                       | —        | 50      | —         |          |
|          |                             | LVC MOS. To GND.                                                | —        | 15      | —         | pF       |
| $T_{ST}$ | Start-up Time               | Output valid time after $V_{DD}$ meets minimum specified level. | —        | —       | 10        | ms       |
| $t_R$    | Output Rise Time            | LVDS. 20% to 80% $V_{pp}$ .                                     | —        | —       | 400       | ps       |
|          |                             | LVPECL.                                                         | —        | —       | 400       |          |
|          |                             | LVC MOS. 10% to 90% $V_{DD}$ .                                  | —        | —       | 3.5       | ns       |
| $t_F$    | Output Fall Time            | LVDS. 80% to 20% $V_{pp}$ .                                     | —        | —       | 400       | ps       |
|          |                             | LVPECL.                                                         | —        | —       | 400       |          |
|          |                             | LVC MOS. 90% to 10% $V_{DD}$ .                                  | —        | —       | 3         | ns       |
| $O_{DC}$ | Output Clock Duty Cycle     | LVDS.                                                           | 45       | —       | 55        | %        |
|          |                             | LVPECL.                                                         | 45       | —       | 55        |          |
|          |                             | LVC MOS.                                                        | 45       | —       | 55        |          |
| $T_{OE}$ | Output Enable/ Disable Time | —                                                               | —        | —       | 100       | ns       |

**Table 13. 2.5V AC Electrical Characteristics (Cont.)**
 $V_{DD} = 2.5V \pm 5\%$ ,  $T_A = -20^{\circ}C$  to  $+70^{\circ}C$ ;  $-40^{\circ}C$  to  $+85^{\circ}C$ ,  $-40^{\circ}C$  to  $+105^{\circ}C$ .

| Symbol       | Parameter                  | Test Condition               | Minimum | Typical | Maximum | Units |
|--------------|----------------------------|------------------------------|---------|---------|---------|-------|
| $J_{PER}$    | Period Jitter, RMS         | LVDS.                        | —       | 4       | —       | ps    |
|              |                            | LVPECL.                      | —       | 5.12    | —       |       |
|              |                            | LVC MOS. $F_{OUT} = 125MHz.$ | —       | 3.3     | —       |       |
| $R_J$        | Random Jitter              | LVDS.                        | —       | 1.4     | —       | ps    |
|              |                            | LVPECL.                      | —       | 1.36    | —       |       |
|              |                            | LVC MOS. $F_{OUT} = 125MHz.$ | —       | 1.3     | —       |       |
| $D_J$        | Deterministic Jitter       | LVDS.                        | —       | 9.2     | —       | ps    |
|              |                            | LVPECL.                      | —       | 10      | —       |       |
|              |                            | LVC MOS. $F_{OUT} = 125MHz.$ | —       | 6.7     | —       |       |
| $T_J$        | Total Jitter               | LVDS.                        | —       | 29.2    | —       | ps    |
|              |                            | LVPECL.                      | —       | 29.3    | —       |       |
|              |                            | LVC MOS. $F_{OUT} = 125MHz.$ | —       | 25.6    | —       |       |
| $f_{JITTER}$ | Phase Jitter (12kHz–20MHz) | LVDS.                        | —       | 1040    | —       | fs    |
|              |                            | LVPECL.                      | —       | 1200    | —       |       |
|              |                            | LVC MOS. $F_{OUT} = 125MHz.$ | —       | 850     | —       |       |

Notes for all AC Electrical Characteristics tables:

<sup>1</sup> All jitter values provided at 156.25MHz, unless noted otherwise.

## Output Waveforms – LVDS

Output Levels/Rise Time/Fall Time Measurements



Oscillator Symmetry

Ideally, Symmetry should be 50/50 for  $\frac{1}{2}$  period –Other expressions are 45/55 or 55/45



## Output Waveforms – LVPECL

Rise Time/Fall Time Measurements



Oscillator Symmetry



## Output Waveforms – LVCMOS

Rise Time / Fall Time Measurements



Oscillator Symmetry



## Package Outline Drawings

The package outline drawings are appended at the end of this document and are accessible from the links below. The package information is the most current data available.

[www.idt.com/document/psc/js6-package-outline-50-x-32-mm-body-11-mm-thick](http://www.idt.com/document/psc/js6-package-outline-50-x-32-mm-body-11-mm-thick)

[www.idt.com/document/psc/jx6-package-outline-32-x-25-mm-body-09-mm-thick](http://www.idt.com/document/psc/jx6-package-outline-32-x-25-mm-body-09-mm-thick)

[www.idt.com/document/psc/ju6-package-outline-70-x-50-mm-body-13-mm-thick](http://www.idt.com/document/psc/ju6-package-outline-70-x-50-mm-body-13-mm-thick)

[www.idt.com/document/psc/js4-package-outline-50-x-32-mm-body-11-mm-thick](http://www.idt.com/document/psc/js4-package-outline-50-x-32-mm-body-11-mm-thick)

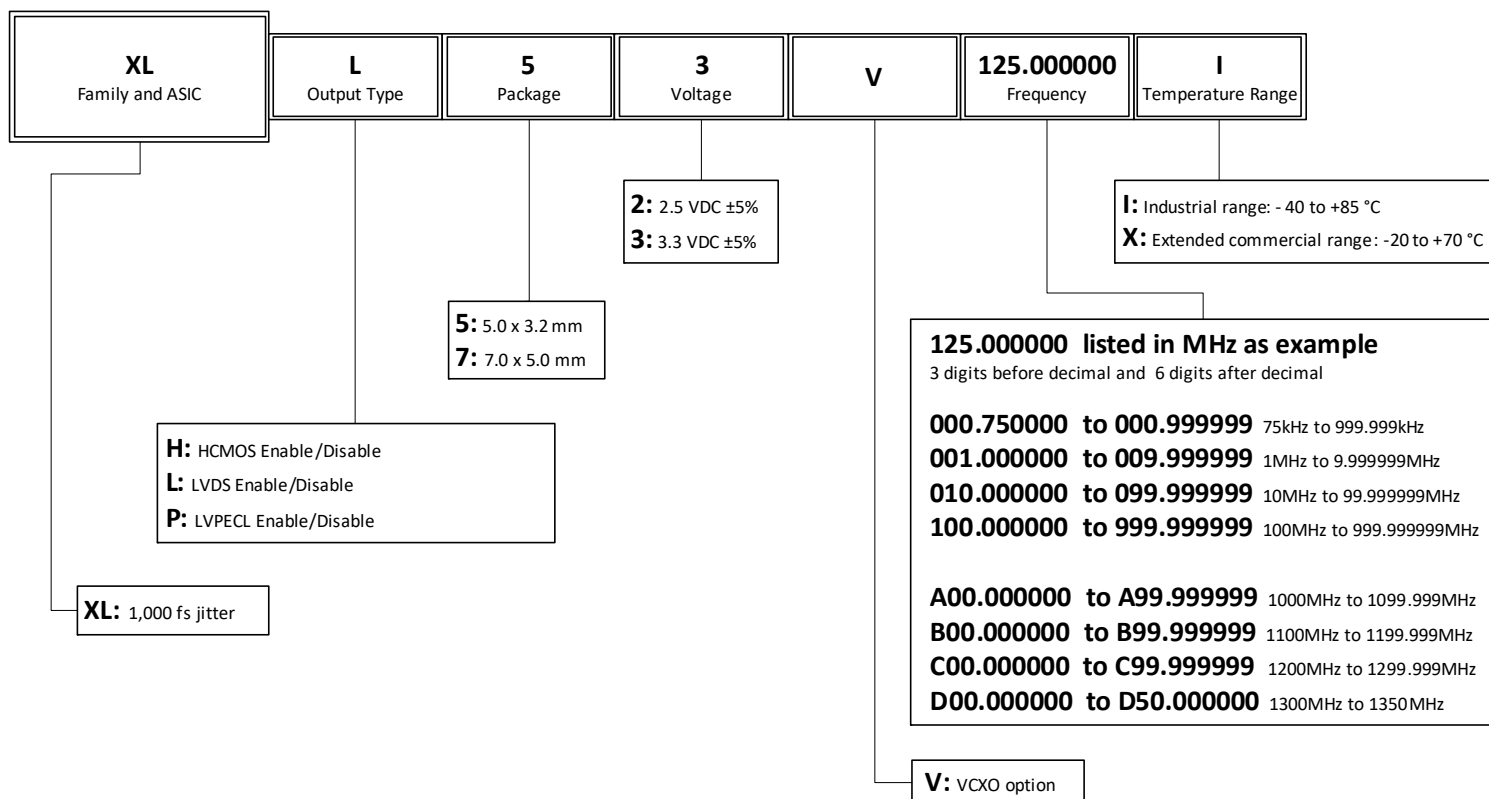
[www.idt.com/document/psc/ju4-package-outline-70-x-50-mm-body-13-mm-thick](http://www.idt.com/document/psc/ju4-package-outline-70-x-50-mm-body-13-mm-thick)

[www.idt.com/document/psc/jx4-package-outline-32-x-25-mm-body-09-mm-thick](http://www.idt.com/document/psc/jx4-package-outline-32-x-25-mm-body-09-mm-thick)

## Ordering Information (XO)



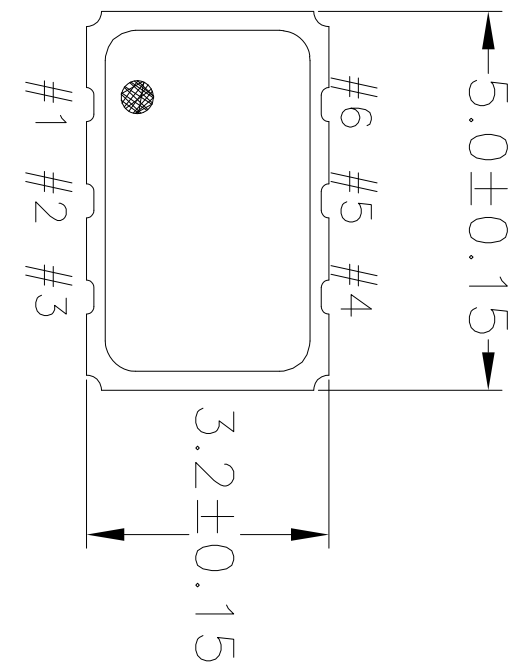
# Ordering Information (VCXO)



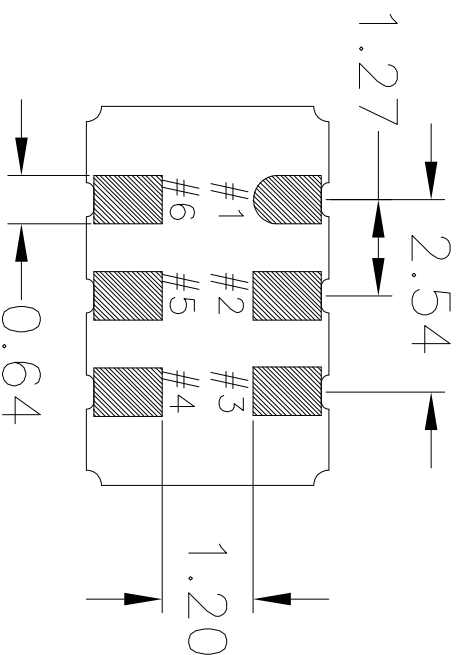
## Revision History

| Revision Date     | Description of Change                                                                                                                                                                                                                         |
|-------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| April 27, 2020    | Updated ODC parameter. 2nd LVCMOS row to be changed from $\leq$ to $>$ 62.5 MHz.                                                                                                                                                              |
| September 7, 2018 | Updated frequency stability options value from $\pm 20$ ppm to $\pm 25$ ppm for $-40^{\circ}\text{C}$ to $+85^{\circ}\text{C}$ XO only.                                                                                                       |
| June 25, 2018     | <ul style="list-style-type: none"> <li>Updated Package Outline Drawings section.</li> </ul>                                                                                                                                                   |
| May 4, 2018       | <ul style="list-style-type: none"> <li>Added XO and VCXO options.</li> <li>Updated description and Features sections.</li> <li>Updated Package Outline Drawings section.</li> <li>Added VCXO Ordering Information decoder diagram.</li> </ul> |
| January 12, 2018  | Initial release.                                                                                                                                                                                                                              |

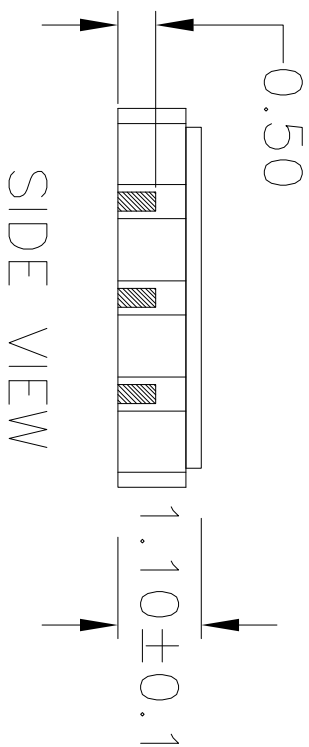
| REVISIONS |                        |          |          |
|-----------|------------------------|----------|----------|
| REV       | DESCRIPTION            | DATE     | APPROVED |
| 00        | INITIAL RELEASE        | 04/2/12  | DP       |
| 01        | ADDED LID IN TOP VIEW  | 07/12/12 | KS       |
| 02        | UPDATED LID TOLERANCES | 12/03/12 | KS       |
| 03        | UPDATE PACKAGE DRAWING | 8/8/14   | JHUA     |



TOP VIEW



BOTTOM VIEW



SIDE VIEW

NOTES:

1. ALL DIMENSIONS IN MM.

|                                |             |                                                                                                                                                 |              |
|--------------------------------|-------------|-------------------------------------------------------------------------------------------------------------------------------------------------|--------------|
| TOLERANCES<br>UNLESS SPECIFIED |             | 6024 Silver Creek Valley Rd<br>San Jose, CA 95138<br>PHONE: (408) 727-6116<br>FAX: (408) 492-8674                                               |              |
| DECIMAL                        | ANGULAR     |  <b>IDT™</b><br><a href="http://www.IDT.com">www.IDT.com</a> |              |
| XX±                            | ±           |                                                                                                                                                 |              |
| XXX±                           |             |                                                                                                                                                 |              |
| XXXX±                          |             |                                                                                                                                                 |              |
| APPROVALS                      | DATE        | TITLE JS6 PACKAGE OUTLINE                                                                                                                       |              |
| DRAWN <i>02AC</i>              | 04/2/12     | 5.0 x 3.2 mm BODY                                                                                                                               |              |
| CHECKED                        |             | 1.1 mm Thick                                                                                                                                    |              |
| SIZE                           | DRAWING No. | REV                                                                                                                                             |              |
| C                              | PSC-4411    | 03                                                                                                                                              |              |
| DO NOT SCALE DRAWING           |             |                                                                                                                                                 | SHEET 1 OF 2 |



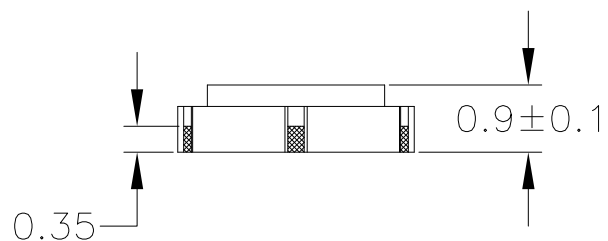
| REVISIONS                              |                 |              |        |
|----------------------------------------|-----------------|--------------|--------|
| REV                                    | DESCRIPTION     | DATE CREATED | AUTHOR |
| 00                                     | INITIAL RELEASE | 8/11/14      | J.HUA  |
| 01                                     | ADD PITCH       | 11/17/16     | J.HUA  |
| REFER TO DCP FOR OFFICIAL RELEASE DATE |                 |              |        |



TOP VIEW



END VIEW



SIDE VIEW



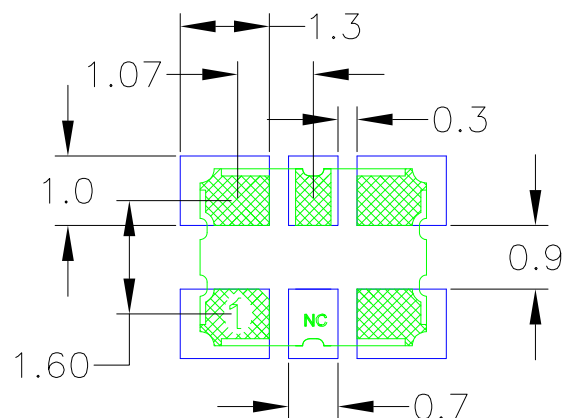
BOTTOM VIEW

NOTES:

1. ALL DIMENSIONS IN MM.

|                                |             |                                                                                                                                                                                                                                         |  |
|--------------------------------|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| TOLERANCES<br>UNLESS SPECIFIED |             |  6024 Silver Creek Valley Rd<br>San Jose, CA 95138<br>PHONE: (408) 727-6116<br>FAX: (408) 492-8674<br><a href="http://www.IDT.com">www.IDT.com</a> |  |
| DECIMAL                        | ANGULAR     |                                                                                                                                                                                                                                         |  |
| XX±                            | ±           |                                                                                                                                                                                                                                         |  |
| XXX±                           |             |                                                                                                                                                                                                                                         |  |
| XXXX±                          |             |                                                                                                                                                                                                                                         |  |
|                                |             | TITLE JX6 PACKAGE OUTLINE<br>3.2 x 2.5 mm BODY<br>0.9 mm Thick                                                                                                                                                                          |  |
| SIZE                           | DRAWING No. | REV                                                                                                                                                                                                                                     |  |
| C                              | PSC-4412    | 01                                                                                                                                                                                                                                      |  |
| DO NOT SCALE DRAWING           |             | SHEET 1 OF 2                                                                                                                                                                                                                            |  |

| REVISIONS                              |                 |              |        |
|----------------------------------------|-----------------|--------------|--------|
| REV                                    | DESCRIPTION     | DATE CREATED | AUTHOR |
| 00                                     | INITIAL RELEASE | 8/11/14      | J.HUA  |
| 01                                     | ADD PITCH       | 11/17/16     | J.HUA  |
| REFER TO DCP FOR OFFICIAL RELEASE DATE |                 |              |        |



## RECOMMENDED LAND PATTERN DIMENSION

### NOTES:

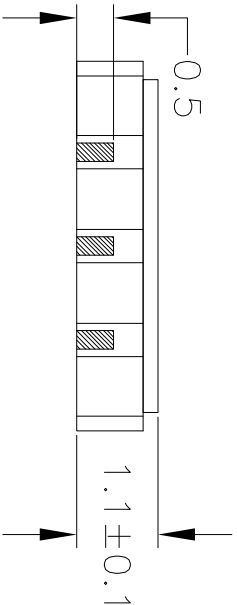
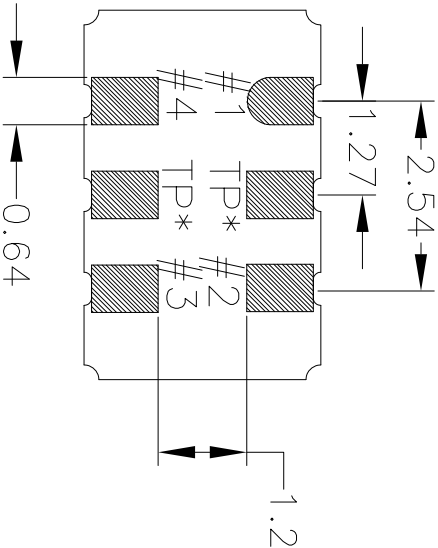
1. ALL DIMENSIONS ARE IN MM. ANGLES IN DEGREES.
2. TOP DOWN VIEW. AS VIEWED ON PCB.
3. COMPONENT OUTLINE SHOWS FOR REFERENCE IN GREEN.
4. LAND PATTERN IN BLUE. NSMD PATTERN ASSUMED.
5. LAND PATTERN RECOMMENDATION PER IPC-7351B GENERIC REQUIREMENT FOR SURFACE MOUNT DESIGN AND LAND PATTERN.

|                                |             |                                                                                                                                                                                                               |  |
|--------------------------------|-------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| TOLERANCES<br>UNLESS SPECIFIED |             |  6024 Silver Creek Valley Rd<br>San Jose, CA 95138<br>PHONE: (408) 727-6116<br>FAX: (408) 492-8674<br><b>www.IDT.com</b> |  |
| DECIMAL                        | ANGULAR     |                                                                                                                                                                                                               |  |
| XX±                            | ±           |                                                                                                                                                                                                               |  |
| XXX±                           |             |                                                                                                                                                                                                               |  |
| XXXX±                          |             |                                                                                                                                                                                                               |  |
|                                |             | TITLE JX6 PACKAGE OUTLINE<br>3.2 x 2.5 mm BODY<br>0.9 mm Thick                                                                                                                                                |  |
| SIZE                           | DRAWING No. | REV                                                                                                                                                                                                           |  |
| C                              | PSC-4412    | 01                                                                                                                                                                                                            |  |
| DO NOT SCALE DRAWING           |             | SHEET 2 OF 2                                                                                                                                                                                                  |  |





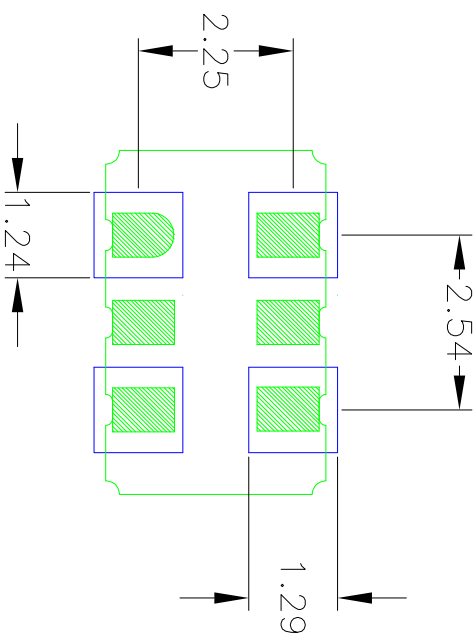
| REVISIONS |                        |          |          |
|-----------|------------------------|----------|----------|
| REV       | DESCRIPTION            | DATE     | APPROVED |
| 00        | INITIAL RELEASE        | 08/21/12 | K. Stahn |
| 01        | UPDATED LID TOLERANCES | 12/03/12 | K. Stahn |
| 02        | UPDATE PACKAGE DRAWING | 8/8/14   | JHUA     |



NOTES:  
1. ALL DIMENSIONS IN MM.

|                                |          |                                                                                                                         |              |
|--------------------------------|----------|-------------------------------------------------------------------------------------------------------------------------|--------------|
| TOLERANCES<br>UNLESS SPECIFIED |          | 6024 Silver Creek Valley Rd<br>San Jose, CA 95138<br>PHONE: (408) 727-8116<br>FAX: (408) 492-8674                       |              |
| DECIMAL                        | ANGULAR  |                                      |              |
| XXE                            | ±        |                                                                                                                         |              |
| XXX4                           |          |                                                                                                                         |              |
| XXXX4                          |          |                                                                                                                         |              |
| APPROVALS                      | DATE     | <b>TITLE</b> JS4 PACKAGE OUTLINE<br><b>SIZE</b> 5.0 x 3.2 mm BODY<br><b>DRAWING No.</b> 1.1 mm Thick<br><b>PSC-4429</b> |              |
| DRAWN XJS                      | 07/18/12 |                                                                                                                         |              |
| CHECKED                        |          |                                                                                                                         |              |
|                                |          |                                                                                                                         |              |
|                                |          | DO NOT SCALE DRAWING                                                                                                    | SHEET 1 OF 2 |

| REVISIONS |                        |          |          |
|-----------|------------------------|----------|----------|
| REV       | DESCRIPTION            | DATE     | APPROVED |
| 00        | INITIAL RELEASE        | 08/21/12 | K. Stahn |
| 01        | UPDATED LID TOLERANCES | 12/03/12 | K. Stahn |
| 02        | UPDATE PACKAGE DRAWING | 8/8/14   | JHUA     |



# RECOMMENDED LAND PATTERN

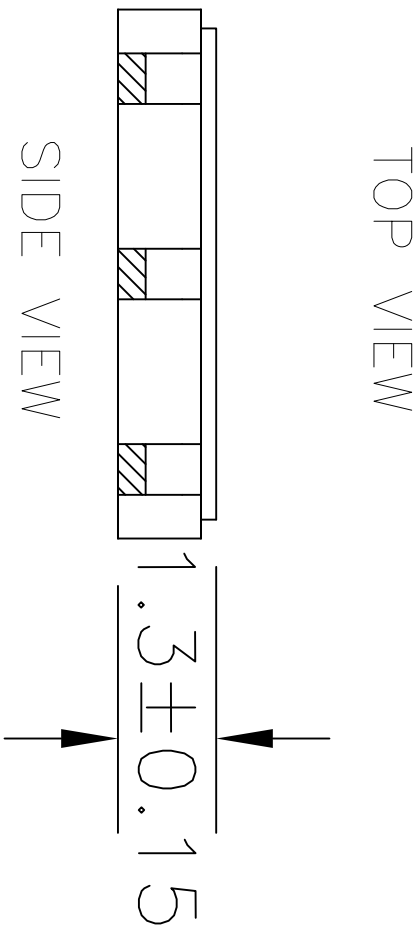
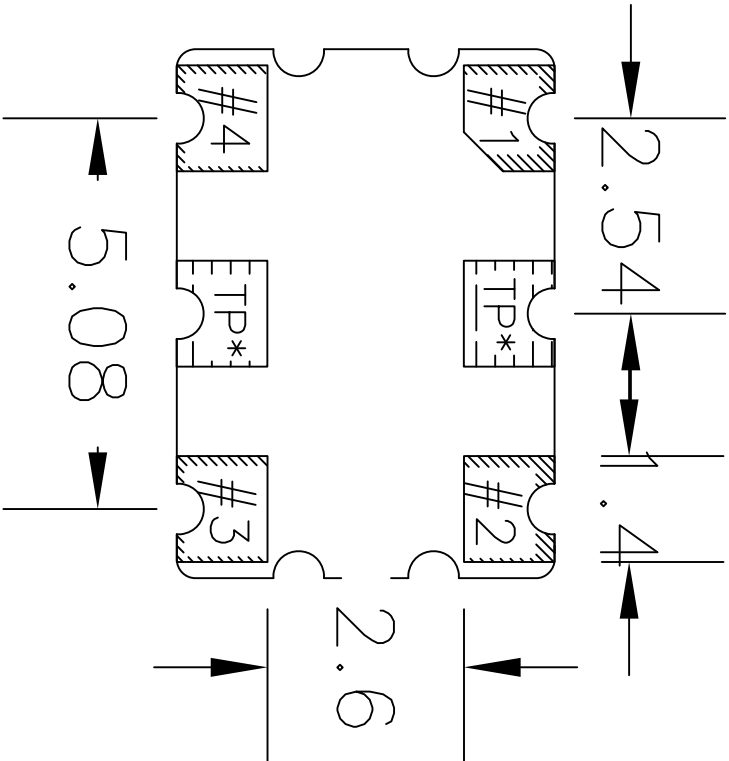
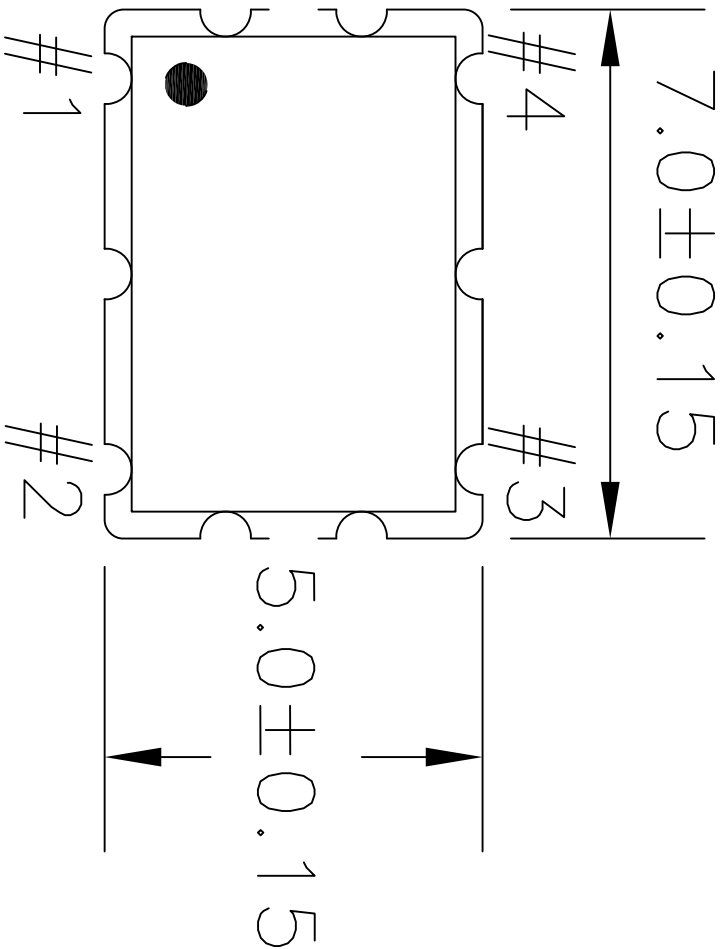
## NOTES:

1. ALL DIMENSION ARE IN mm. ANGLES IN DEGREES.
2. TOP DOWN VIEW. AS VIEWED ON PCB.
3. COMPONENT OUTLINE SHOW FOR REFERENCE IN GREEN.
4. LAND PATTERN IN BLUE. NSMD PATTERN ASSUMED.
5. LAND PATTERN RECOMMENDATION PER IPC-7351B GENERIC REQUIREMENT FOR SURFACE MOUNT DESIGN AND LAND PATTERN.

| TOLERANCES       |          |                      |              |
|------------------|----------|----------------------|--------------|
| UNLESS SPECIFIED |          |                      |              |
| DECIMAL          | ±        | ANGULAR              |              |
| SIZE             |          |                      |              |
| XXX±             |          |                      |              |
| XXXX±            |          |                      |              |
| APPROVALS        | DATE     | TITLE                |              |
| DRAWN <b>JS</b>  | 07/16/12 | JS4 PACKAGE OUTLINE  |              |
| CHECKED          |          | 5.0 x 3.2 mm BODY    |              |
|                  |          | 1.1 mm Thick         |              |
|                  |          | SIZE                 | REV          |
|                  |          | <b>C</b>             | <b>02</b>    |
|                  |          | DRAWING No.          |              |
|                  |          | FSC-4429             |              |
|                  |          | DO NOT SCALE DRAWING | SHEET 2 OF 2 |

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| REVISIONS |                       |          |          |
|-----------|-----------------------|----------|----------|
| REV       | DESCRIPTION           | DATE     | APPROVED |
| 00        | INITIAL RELEASE       | 10/09/12 | KS       |
| 01        | UPDATE PACKAGE DRWING | 8/11/14  | JHUA     |



NOTES:  
1. ALL DIMENSIONS IN MM.

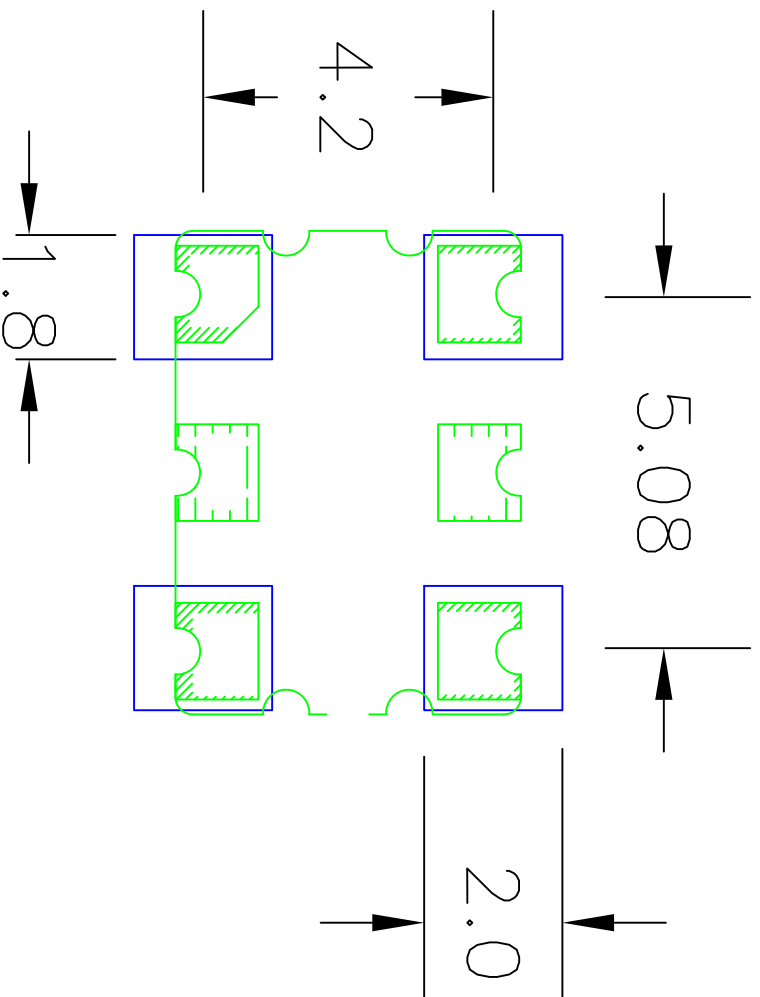
|                                |          |                     |             |
|--------------------------------|----------|---------------------|-------------|
| TOLERANCES<br>UNLESS SPECIFIED |          |                     |             |
| DECIMAL                        | ANGULAR  |                     |             |
| XX±                            | ±        |                     |             |
| XXX±                           |          |                     |             |
| XXXX±                          |          |                     |             |
| APPROVALS                      | DATE     | TITLE               |             |
| DRAWN JCS                      | 10/05/12 | JU4 PACKAGE OUTLINE |             |
| CHECKED                        |          | 7.0 x 5.0 mm BODY   |             |
|                                |          | 1.3 mm Thick        |             |
|                                |          | SIZE                | DRAWING No. |
|                                |          | C                   | PSC-4431    |
|                                |          |                     | REV         |
|                                |          |                     | 01          |
| DO NOT SCALE DRAWING           |          |                     |             |
|                                |          | SHEET               | 1 OF 2      |



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| REVISIONS |                        |          |          |
|-----------|------------------------|----------|----------|
| REV       | DESCRIPTION            | DATE     | APPROVED |
| 00        | INITIAL RELEASE        | 10/09/12 | KS       |
| 01        | UPDATE PACKAGE DRAWING | 8/11/14  | JHUA     |



# RECOMMENDED LAND PATTERN

## NOTES:

1. ALL DIMENSION ARE IN mm. ANGLES IN DEGREES.
2. TOP DOWN VIEW. AS VIEWED ON PCB.
3. COMPONENT OUTLINE SHOW FOR REFERENCE IN GREEN.
4. LAND PATTERN IN BLUE. NSMD PATTERN ASSUMED.
5. LAND PATTERN RECOMMENDATION PER IPC-7351B GENERIC REQUIREMENT FOR SURFACE MOUNT DESIGN AND LAND PATTERN.

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                 |                                                                                     |  |                                                                                                   |  |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|--|---------------------------------------------------------------------------------------------------|--|
| TOLERANCES<br>UNLESS SPECIFIED                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                 |  |  | 6024 Silver Creek Valley Rd<br>San Jose, CA 95138<br>PHONE: (408) 727-6116<br>FAX: (408) 942-8674 |  |
| DECIMAL                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | ANGULAR                                                                                         |                                                                                     |  |                                                                                                   |  |
| ± .005                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | ± .005                                                                                          |                                                                                     |  |                                                                                                   |  |
| ± .0025                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | ± .0025                                                                                         |                                                                                     |  |                                                                                                   |  |
| ± .00125                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | ± .00125                                                                                        |                                                                                     |  |                                                                                                   |  |
| ± .000625                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | ± .000625                                                                                       |                                                                                     |  |                                                                                                   |  |
| ± .0003125                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | ± .0003125                                                                                      |                                                                                     |  |                                                                                                   |  |
| ± .00015625                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | ± .00015625                                                                                     |                                                                                     |  |                                                                                                   |  |
| ± .000078125                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | ± .000078125                                                                                    |                                                                                     |  |                                                                                                   |  |
| ± .0000390625                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | ± .0000390625                                                                                   |                                                                                     |  |                                                                                                   |  |
| ± .00001953125                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | ± .00001953125                                                                                  |                                                                                     |  |                                                                                                   |  |
| ± .000009765625                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | ± .000009765625                                                                                 |                                                                                     |  |                                                                                                   |  |
| ± .0000048828125                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | ± .0000048828125                                                                                |                                                                                     |  |                                                                                                   |  |
| ± .00000244140625                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | ± .00000244140625                                                                               |                                                                                     |  |                                                                                                   |  |
| ± .000001220703125                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | ± .000001220703125                                                                              |                                                                                     |  |                                                                                                   |  |
| ± .0000006103515625                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | ± .0000006103515625                                                                             |                                                                                     |  |                                                                                                   |  |
| ± .00000030517578125                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | ± .00000030517578125                                                                            |                                                                                     |  |                                                                                                   |  |
| ± .000000152587890625                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | ± .000000152587890625                                                                           |                                                                                     |  |                                                                                                   |  |
| ± .0000000762939453125                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | ± .0000000762939453125                                                                          |                                                                                     |  |                                                                                                   |  |
| ± .00000003814697265625                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | ± .00000003814697265625                                                                         |                                                                                     |  |                                                                                                   |  |
| ± .000000019073486328125                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | ± .000000019073486328125                                                                        |                                                                                     |  |                                                                                                   |  |
| ± .0000000095367431640625                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | ± .0000000095367431640625                                                                       |                                                                                     |  |                                                                                                   |  |
| ± .00000000476837158203125                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | ± .00000000476837158203125                                                                      |                                                                                     |  |                                                                                                   |  |
| ± .000000002384185791015625                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | ± .000000002384185791015625                                                                     |                                                                                     |  |                                                                                                   |  |
| ± .0000000011920928955078125                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | ± .0000000011920928955078125                                                                    |                                                                                     |  |                                                                                                   |  |
| ± .00000000059604644775390625                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | ± .00000000059604644775390625                                                                   |                                                                                     |  |                                                                                                   |  |
| ± .000000000298023223876953125                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | ± .000000000298023223876953125                                                                  |                                                                                     |  |                                                                                                   |  |
| ± .0000000001490116119384765625                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | ± .0000000001490116119384765625                                                                 |                                                                                     |  |                                                                                                   |  |
| ± .00000000007450580596923828125                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | ± .00000000007450580596923828125                                                                |                                                                                     |  |                                                                                                   |  |
| ± .000000000037252902984619140625                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | ± .000000000037252902984619140625                                                               |                                                                                     |  |                                                                                                   |  |
| ± .0000000000186264514923095703125                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | ± .0000000000186264514923095703125                                                              |                                                                                     |  |                                                                                                   |  |
| ± .00000000000931322574615478515625                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | ± .00000000000931322574615478515625                                                             |                                                                                     |  |                                                                                                   |  |
| ± .000000000004656612873077392578125                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | ± .000000000004656612873077392578125                                                            |                                                                                     |  |                                                                                                   |  |
| ± .0000000000023283064365386962890625                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | ± .0000000000023283064365386962890625                                                           |                                                                                     |  |                                                                                                   |  |
| ± .00000000000116415321826934814453125                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | ± .00000000000116415321826934814453125                                                          |                                                                                     |  |                                                                                                   |  |
| ± .000000000000582076609134674072265625                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | ± .000000000000582076609134674072265625                                                         |                                                                                     |  |                                                                                                   |  |
| ± .0000000000002910383045673370361328125                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | ± .0000000000002910383045673370361328125                                                        |                                                                                     |  |                                                                                                   |  |
| ± .00000000000014551915228366851806640625                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | ± .00000000000014551915228366851806640625                                                       |                                                                                     |  |                                                                                                   |  |
| ± .000000000000072759576141834259033203125                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | ± .000000000000072759576141834259033203125                                                      |                                                                                     |  |                                                                                                   |  |
| ± .0000000000000363797880709171295166015625                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | ± .0000000000000363797880709171295166015625                                                     |                                                                                     |  |                                                                                                   |  |
| ± .00000000000001818989403545856475830078125                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | ± .00000000000001818989403545856475830078125                                                    |                                                                                     |  |                                                                                                   |  |
| ± .000000000000009094947017729282379150390625                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | ± .000000000000009094947017729282379150390625                                                   |                                                                                     |  |                                                                                                   |  |
| ± .0000000000000045474735088646141895751953125                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | ± .0000000000000045474735088646141895751953125                                                  |                                                                                     |  |                                                                                                   |  |
| ± .00000000000000227373675443230709478759765625                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | ± .00000000000000227373675443230709478759765625                                                 |                                                                                     |  |                                                                                                   |  |
| ± .000000000000001136868377216153547393798828125                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | ± .000000000000001136868377216153547393798828125                                                |                                                                                     |  |                                                                                                   |  |
| ± .0000000000000005684341886080767736968994140625                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | ± .0000000000000005684341886080767736968994140625                                               |                                                                                     |  |                                                                                                   |  |
| ± .0000000000000002842170943040383868484497203125                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | ± .0000000000000002842170943040383868484497203125                                               |                                                                                     |  |                                                                                                   |  |
| ± .00000000000000014210854715201919342422486015625                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | ± .00000000000000014210854715201919342422486015625                                              |                                                                                     |  |                                                                                                   |  |
| ± .000000000000000071054273576009596712112433078125                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | ± .000000000000000071054273576009596712112433078125                                             |                                                                                     |  |                                                                                                   |  |
| ± .0000000000000000355271367880047983560572165390625                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | ± .0000000000000000355271367880047983560572165390625                                            |                                                                                     |  |                                                                                                   |  |
| ± .00000000000000001776356839400239917802860826953125                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | ± .00000000000000001776356839400239917802860826953125                                           |                                                                                     |  |                                                                                                   |  |
| ± .0000000000000000088817841970011995890143041328125                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | ± .0000000000000000088817841970011995890143041328125                                            |                                                                                     |  |                                                                                                   |  |
| ± .00000000000000000444089209850059979450715206640625                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | ± .00000000000000000444089209850059979450715206640625                                           |                                                                                     |  |                                                                                                   |  |
| ± .000000000000000002220446049250299897253576033203125                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | ± .000000000000000002220446049250299897253576033203125                                          |                                                                                     |  |                                                                                                   |  |
| ± .0000000000000000011102230246251499486267880166015625                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | ± .0000000000000000011102230246251499486267880166015625                                         |                                                                                     |  |                                                                                                   |  |
| ± .0000000000000000005551115123125749724313394000830078125                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | ± .0000000000000000005551115123125749724313394000830078125                                      |                                                                                     |  |                                                                                                   |  |
| ± .00000000000000000027755575615628748621767970004150390625                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | ± .00000000000000000027755575615628748621767970004150390625                                     |                                                                                     |  |                                                                                                   |  |
| ± .000000000000000000138777878078143743108839850020751953125                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | ± .000000000000000000138777878078143743108839850020751953125                                    |                                                                                     |  |                                                                                                   |  |
| ± .0000000000000000000693889390390718715544199250103759765625                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | ± .0000000000000000000693889390390718715544199250103759765625                                   |                                                                                     |  |                                                                                                   |  |
| ± .00000000000000000003469446951953593577720996250518798828125                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | ± .00000000000000000003469446951953593577720996250518798828125                                  |                                                                                     |  |                                                                                                   |  |
| ± .000000000000000000017347234759767967888604981252593994140625                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | ± .000000000000000000017347234759767967888604981252593994140625                                 |                                                                                     |  |                                                                                                   |  |
| ± .0000000000000000000086736173798839839443024906262969970703125                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | ± .0000000000000000000086736173798839839443024906262969970703125                                |                                                                                     |  |                                                                                                   |  |
| ± .00000000000000000000433680868994199197215124531314849853515625                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | ± .00000000000000000000433680868994199197215124531314849853515625                               |                                                                                     |  |                                                                                                   |  |
| ± .000000000000000000002168404344970995986075622656574249267578125                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | ± .000000000000000000002168404344970995986075622656574249267578125                              |                                                                                     |  |                                                                                                   |  |
| ± .0000000000000000000010842021724854979930378113282871246337890625                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | ± .0000000000000000000010842021724854979930378113282871246337890625                             |                                                                                     |  |                                                                                                   |  |
| ± .00000000000000000000054210108624274899651890566414356231689453125                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | ± .00000000000000000000054210108624274899651890566414356231689453125                            |                                                                                     |  |                                                                                                   |  |
| ± .000000000000000000000271050543121374499825945283071781344472265625                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | ± .000000000000000000000271050543121374499825945283071781344472265625                           |                                                                                     |  |                                                                                                   |  |
| ± .0000000000000000000001355252715606872499429726415358906722361328125                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | ± .0000000000000000000001355252715606872499429726415358906722361328125                          |                                                                                     |  |                                                                                                   |  |
| ± .0000000000000000000000677626357803436249711488207679453361806640625                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | ± .0000000000000000000000677626357803436249711488207679453361806640625                          |                                                                                     |  |                                                                                                   |  |
| ± .00000000000000000000003388131789017181248557441038397266809033203125                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | ± .00000000000000000000003388131789017181248557441038397266809033203125                         |                                                                                     |  |                                                                                                   |  |
| ± .000000000000000000000016940658945085906242787205191986334045166015625                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | ± .000000000000000000000016940658945085906242787205191986334045166015625                        |                                                                                     |  |                                                                                                   |  |
| ± .000000000000000000000008470329472542953121143936025959931702283078125                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | ± .000000000000000000000008470329472542953121143936025959931702283078125                        |                                                                                     |  |                                                                                                   |  |
| ± .0000000000000000000000042351647362714765605719680129799658511415390625                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | ± .0000000000000000000000042351647362714765605719680129799658511415390625                       |                                                                                     |  |                                                                                                   |  |
| ± .00000000000000000000000211758236813573828028598400648998272557176953125                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | ± .00000000000000000000000211758236813573828028598400648998272557176953125                      |                                                                                     |  |                                                                                                   |  |
| ± .0000000000000000000000010587911840678691440142970032449913627858828125                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | ± .0000000000000000000000010587911840678691440142970032449913627858828125                       |                                                                                     |  |                                                                                                   |  |
| ± .00000000000000000000000052939559203393457200714850016249568113944140625                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | ± .00000000000000000000000052939559203393457200714850016249568113944140625                      |                                                                                     |  |                                                                                                   |  |
| ± .0000000000000000000000002646977960169672860035742500812478405697203125                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | ± .0000000000000000000000002646977960169672860035742500812478405697203125                       |                                                                                     |  |                                                                                                   |  |
| ± .00000000000000000000000013234889800848364300178712500406239202846015625                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | ± .00000000000000000000000013234889800848364300178712500406239202846015625                      |                                                                                     |  |                                                                                                   |  |
| ± .00000000000000000000000006617444900424182150089356250203119612233078125                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | ± .00000000000000000000000006617444900424182150089356250203119612233078125                      |                                                                                     |  |                                                                                                   |  |
| ± .000000000000000000000000033087224502120910750446781251015598061165390625                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | ± .000000000000000000000000033087224502120910750446781251015598061165390625                     |                                                                                     |  |                                                                                                   |  |
| ± .0000000000000000000000000165436122510604553752233906255077990305826953125                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | ± .0000000000000000000000000165436122510604553752233906255077990305826953125                    |                                                                                     |  |                                                                                                   |  |
| ± .00000000000000000000000000827180612553022768761169531275389951529134765625                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | ± .00000000000000000000000000827180612553022768761169531275389951529134765625                   |                                                                                     |  |                                                                                                   |  |
| ± .000000000000000000000000004135903062765113843805847656376997577645673828125                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | ± .000000000000000000000000004135903062765113843805847656376997577645673828125                  |                                                                                     |  |                                                                                                   |  |
| ± .0000000000000000000000000020679515313825669219029238281689987888228369140625                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | ± .0000000000000000000000000020679515313825669219029238281689987888228369140625                 |                                                                                     |  |                                                                                                   |  |
| ± .00000000000000000000000000103397576569128346095116191409499394441141845703125                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | ± .00000000000000000000000000103397576569128346095116191409499394441141845703125                |                                                                                     |  |                                                                                                   |  |
| ± .000000000000000000000000000516987882845641730475580957047496972220709228515625                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | ± .000000000000000000000000000516987882845641730475580957047496972220709228515625               |                                                                                     |  |                                                                                                   |  |
| ± .00000000000000000000000000025849394142282086523779047852374848611135461428125                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | ± .00000000000000000000000000025849394142282086523779047852374848611135461428125                |                                                                                     |  |                                                                                                   |  |
| ± .000000000000000000000000000129246970711410432618895239261872242430557307140625                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | ± .000000000000000000000000000129246970711410432618895239261872242430557307140625               |                                                                                     |  |                                                                                                   |  |
| ± .000000000000000000000000000064623485355705216309447619630936121217283653535703125                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | ± .000000000000000000000000000064623485355705216309447619630936121217283653535703125            |                                                                                     |  |                                                                                                   |  |
| ± .0000000000000000000000000000323117426778526081547238098154680606086418267678515625                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | ± .0000000000000000000000000000323117426778526081547238098154680606086418267678515625           |                                                                                     |  |                                                                                                   |  |
| ± .00000000000000000000000000001615587133892630407736190490773403030432091338392578125                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | ± .00000000000000000000000000001615587133892630407736190490773403030432091338392578125          |                                                                                     |  |                                                                                                   |  |
| ± .00000000000000000000000000000807793569128152162368095245386717015154680606086418267678515625                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | ± .00000000000000000000000000000807793569128152162368095245386717015154680606086418267678515625 |                                                                                     |  |                                                                                                   |  |
| ± .000000000000000000000000000004038967845642608126340476236809512575772827282728272827282728272827282728272827282728272827282728272827282728272827282728272827282728272827282728272827282728272827282728272827282728272827282728272827282728272827282728272827282728272827282728272827282728272827282728272827282728272827282728272827282728272827282728272827282728272827282728272827282728272827282728272827282728272827282728272827282728272827282728272827282728272827282728272827282728272827282728272827282728272827282728272827282728272827282728272827282728272827282728272827282728272827282728272827282728272827282728272827282728272827282728272827282728272827282728272827282728272827282728272827282728272827282728272827282728272827282728272827282728272827282728272827282728272827282728272827282728272827282728272827282728272827282728272827282728272827282728272827282728272827282728272827282728272827282728272827282728272827282728272827282728272827282728272827282728272827282728272827282728272827282728272827282728272827282728272827282728272827282728272827282728272827282728272827282728272827282728272827282728272827282728272827282728272827282728272827282728272827282728272827282728272827282728272827282728272827282728272827282728272827282728272827282728272827282728272827282728272827282728272827282728272827282728272827282728272827282728272827282728272827282728272827282728272827282728272827282728272827282728272827282728272827282728272827282728272827282728272827282728272827282728272827282728272827282728272827282728272827282728272827282728272827282728272827282728272827282728272827282728272827282728272827282728272827282728272827282728272827282728272827282728272827282728272827282728272827282728272827282728272827282728272827282728272827282728272827282728272827282728272827282728272827282728272 |                                                                                                 |                                                                                     |  |                                                                                                   |  |

| REVISIONS |                  |        |          |
|-----------|------------------|--------|----------|
| REV       | DESCRIPTION      | DATE   | APPROVED |
| 00        | INITIAL RELEASE  | 8/8/14 | J.HUA    |
| 01        | ADD OPTION 1 & 2 | 4/2/15 | J.HUA    |



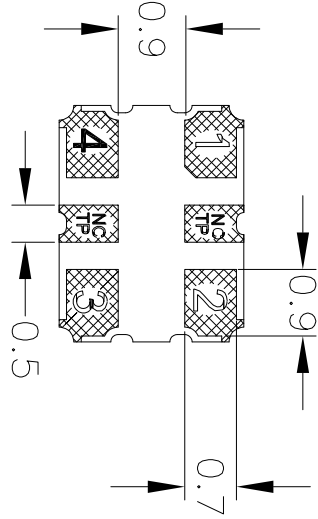
TOP VIEW



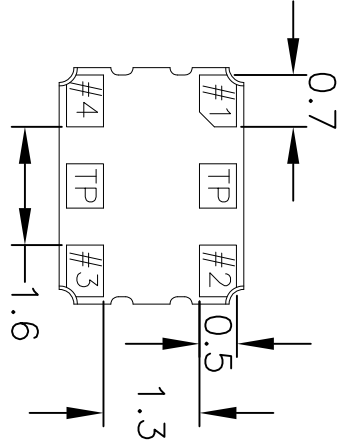
END VIEW



SIDE VIEW



OPTION 1  
BOTTOM VIEW



OPTION 2  
BOTTOM VIEW

NOTES:  
1. ALL DIMENSIONS IN MM.

|                                                |         |                                                                                                   |  |
|------------------------------------------------|---------|---------------------------------------------------------------------------------------------------|--|
| TOLERANCES<br>UNLESS SPECIFIED<br>DECIMAL<br>± |         | 6024 Silver Creek Valley Rd<br>San Jose, CA 95138<br>PHONE: (408) 727-6116<br>FAX: (408) 492-8674 |  |
| XX±                                            | ANGULAR |                |  |
| XXX±                                           |         |                                                                                                   |  |
| XXXX±                                          |         |                                                                                                   |  |
| APPROVALS                                      | DATE    | TITLE JX4 PACKAGE OUTLINE                                                                         |  |
| DRAWN RAG                                      | 8/8/14  | 3.2 x 2.5 mm BODY                                                                                 |  |
| CHECKED                                        |         | 0.9 mm Thick                                                                                      |  |
|                                                |         | SIZE C                                                                                            |  |
|                                                |         | DRAWING No. PSC-4489                                                                              |  |
|                                                |         | REV 01                                                                                            |  |
| DO NOT SCALE DRAWING                           |         | SHEET 1 OF 2                                                                                      |  |



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