# Model 375

## HFF LVDS VCXO

### Features

- Ceramic Surface Mount Package
- Ultra-Low Phase Jitter Performance
- High Frequency Fundamental Crystal Design
- Frequency Range 100 – 250MHz *
- +2.5V or +3.3V Operation
- Output Enable Standard
- Tape and Reel Packaging, EIA-418

Part Dimensions:
5.0 × 3.2 × 1.2mm • 62.28mg

Standard Frequencies

| | |
|---|---|
| - 100.00MHz | - 156.25MHz |
| - 122.88MHz | - 166.00MHz |
| - 125.00MHz | - 200.00MHz |
| - 153.60MHz | - 204.80MHz |
| - 155.52MHz | - 245.76MHz |

* Check with factory for availability.

### Applications

- Small Cells
- Wireless Communication
- Broadband Access
- SONET/SDH/DWDM
- Base Stations
- Ethernet/GbE/SyncE
- Digital Video
- Test and Measurement

### Description

CTS Model 375 is a low cost, small size, high performance VCXO. Employing the latest IC technology, coupled with a high frequency fundamental crystal, M375 has excellent stability and low jitter/phase noise performance.

### Ordering Information

| Model | Supply Voltage | Absolute Pull Range | Frequency Stability | Temperature Range | Frequency Code [MHz] | Packaging |
|---|---|---|---|---|---|---|
| 375 | L | B | 3 | I | XXX or XXXX | T |

| Code | Voltage |
|---|---|
| L | +3.3V ±5% |
| N | +2.5V ±5% |

| Code | Stability |
|---|---|
| 3 | ±50ppm |
| 5 | ±25ppm |
| 6 | ±20ppm [1] |

| Code | Frequency |
|---|---|
| | Product Frequency Code [2] |

| Code | APR |
|---|---|
| B | ±50ppm [3] |

| Code | Temp. Range |
|---|---|
| C | -20°C to +70°C |
| I | -40°C to +85°C |

| Code | Packing |
|---|---|
| T | 1k pcs./reel |

Notes:

1] Only available with "C" temperature range.

2] Refer to document 016-1454-0, Frequency Code Tables.
3-digits for frequencies <100MHz, 4-digits for frequencies 100MHz or greater.

3] Frequencies ≥200MHz, APR is ±30ppm.

**Not all performance combinations and frequencies may be available.**
**Contact your local CTS Representative or CTS Customer Service for availability.**



©2015 CTS® Corporation. Information/product(s) subject to change. No warranty that product(s) will meet the stated specifications for customer specific applications or test equipment. Visit www.ctscorp.com for list of applicable patent(s), more information, or to request a quote.

# Electrical Specifications

## Operating Conditions

| PARAMETER | SYMBOL | CONDITIONS | MIN | TYP | MAX | UNIT |
|---|---|---|---|---|---|---|
| Maximum Supply Voltage | $V_{CC}$ | - | -0.3 | - | 5.0 | V |
| Maximum Control Voltage | $V_C$ | - | -0.5 | - | $V_{CC}$ | V |
| Supply Voltage | $V_{CC}$ | ±5% | 3.14<br>2.38 | 3.3<br>2.5 | 3.47<br>2.63 | V |
| Supply Current | $I_{CC}$ | LVDS Load | - | 20 | 55 | mA |
| Output Load | $R_L$ | Between Outputs | - | 100 | - | Ohms |
| Operating Temperature | $T_A$ | - | -20<br>-40 | +25 | +70<br>+85 | °C |
| Storage Temperature | $T_{STG}$ | - | -40 | - | +100 | °C |

## Frequency Stability

| PARAMETER | SYMBOL | CONDITIONS | MIN | TYP | MAX | UNIT |
|---|---|---|---|---|---|---|
| Frequency Range | $f_O$ | - | | 100 - 250 | | MHz |
| Frequency Stability [Note 1] | $\Delta f/f_O$ | ±20ppm stability, -20°C to +70°C only | | 20, 25 or 50 | | ±ppm |
| Absolute Pull Range [Note 2] | APR | Frequencies ≥200MHz, APR is ±30ppm | 50 | - | - | ±ppm |
| Aging | $\Delta f/f_{25}$ | First Year @ +25°C, nominal $V_{CC}$ and $V_C$ | -3 | - | 3 | ppm |

1] Inclusive of initial tolerance at time of shipment, changes in supply voltage, load, temperature and 1st year aging.

2.] Minimum guaranteed frequency shift from $f_O$ over variations in temperature, aging, power supply and load.

## Output Parameters

| PARAMETER | SYMBOL | CONDITIONS | MIN | TYP | MAX | UNIT |
|---|---|---|---|---|---|---|
| Output Type | - | - | | LVDS | | - |
| Output Voltage Levels | $V_{OH}$<br>$V_{OL}$ | LVDS Load<br>LVDS Load | -<br>0.90 | 1.43<br>1.10 | 1.60<br>- | V |
| Differential Output Voltage | $V_{OD}$ | $R_L$ = 100 Ohms | 247 | 350 | 454 | mV |
| Offset Voltage | $V_{OS}$ | $R_L$ = 100 Ohms | 1.125 | 1.25 | 1.375 | V |
| Output Duty Cycle | SYM | @ 1.25V | 45 | - | 55 | % |
| Rise and Fall Time | $T_R$, $T_F$ | @ 20%/80% Levels | - | 0.4 | 1.0 | ns |
| Start Up Time | $T_S$ | Application of $V_{CC}$ | - | 5 | 10 | ms |
| Enable Function | | | | | | |
| Enable Input Voltage | $V_{IH}$ | Pin 2 Logic '1', Output Enabled | 0.7$V_{CC}$ | - | - | V |
| Disable Input Voltage | $V_{IL}$ | Pin 2 Logic '0', Output Disabled | - | - | 0.3$V_{CC}$ | V |
| Standby Current | $I_{STB}$ | Pin 2 Logic '0', Output Standby | - | - | 10 | µA |
| Enable Time | $T_{PLZ}$ | Pin 2 Logic '1' | - | - | 20 | µs |
| Phase Jitter, RMS | tjrms | Bandwidth 12 kHz - 20 MHz | - | 70 | 500 | fs |
| Phase Noise | - | See Typical Plots | - | - | - | - |



©2015 CTS® Corporation. Information/product(s) subject to change. No warranty that product(s) will meet the stated specifications for customer specific applications or test equipment. Visit www.ctscorp.com for list of applicable patent(s), more information, or to request a quote.

# Electrical Specifications

## Enable Truth Table

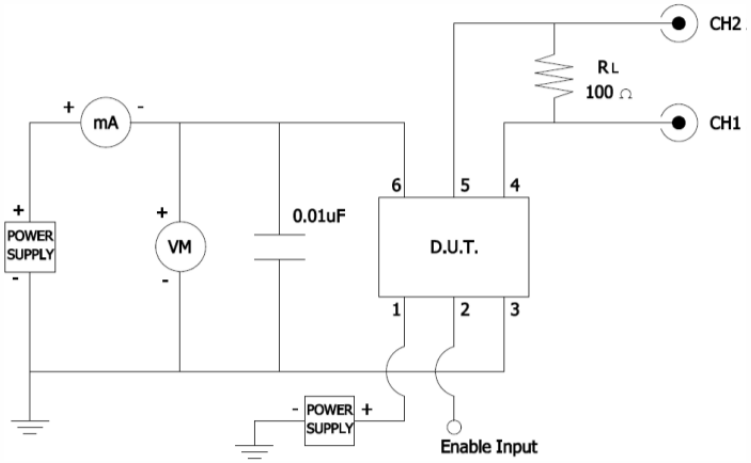
| Pin 2 | Pin 4 & 5 | Pin 2 | Pin 4 & 5 | Pin 2 | Pin 4 & 5 |
|---|---|---|---|---|---|
| Logic '1' | Output | Open | Output | Logic '0' | High Imp. |

## Control Voltage

| PARAMETER | SYMBOL | CONDITIONS | MIN | TYP | MAX | UNIT |
|---|---|---|---|---|---|---|
| Control Voltage | $V_C$ | - | 0.30 | 1.65 | 3.00 | V |
| Frequency Deviation | $\Delta f/f_O$ | $V_C$ = 0.0V<br>$V_C$ = 3.3V | | -155 to -75<br>75 to 155 | | ppm |
| Linearity | L | Best Straight Line Fit | - | 5 | 10 | % |
| Gain Transfer | $K_V$ | Pull Sensitivity; @ +1.65V, +25°C | - | 75 | - | ppm/V |
| Input Impedance | $Z_{Vc}$ | - | 10 | - | - | MOhms |
| Modulation Roll-off | - | @ -3dB | 20 | - | - | kHz |
| Transfer Function | - | - | | Positive | | - |

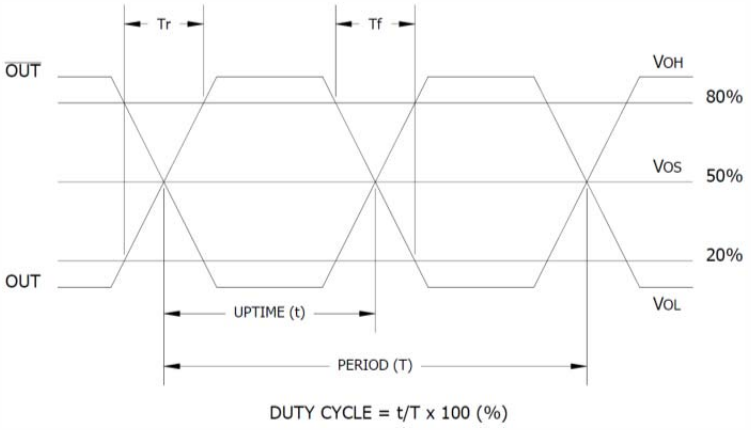
## Test Circuit

LVDS




## Output Waveform

LVDS





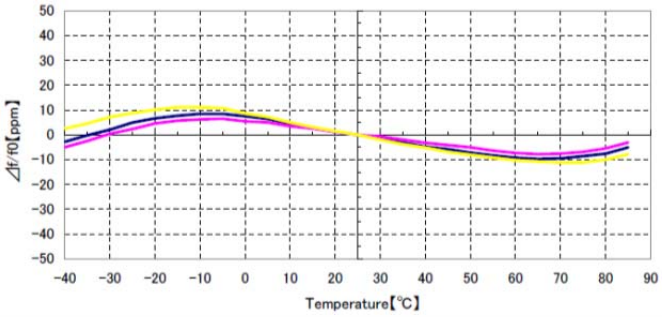

©2015 CTS® Corporation. Information/product(s) subject to change. No warranty that product(s) will meet the stated specifications for customer specific applications or test equipment. Visit www.ctscorp.com for list of applicable patent(s), more information, or to request a quote.

# Electrical Specifications

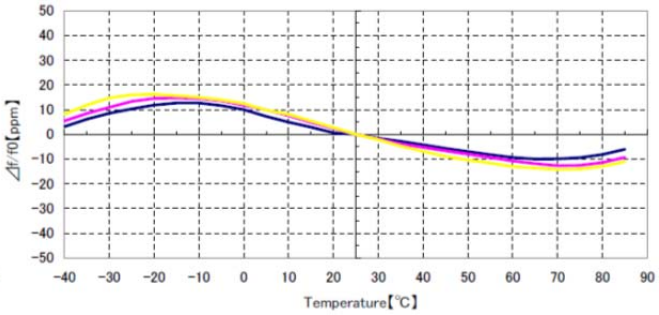
## Performance Data

### Frequency Deviation – Over Temperature [typical]

122.88MHz, $V_{CC}$ = 3.3V, $V_C$ = 1.65V

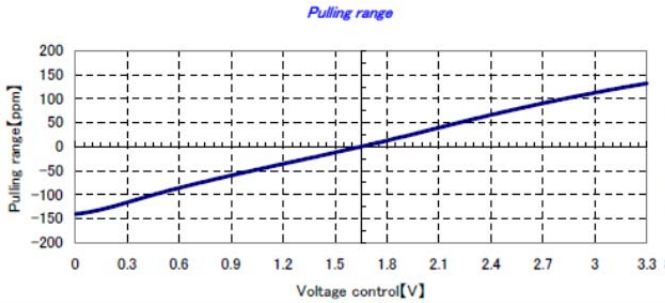



156.25MHz, $V_{CC}$ = 3.3V, $V_C$ = 1.65V

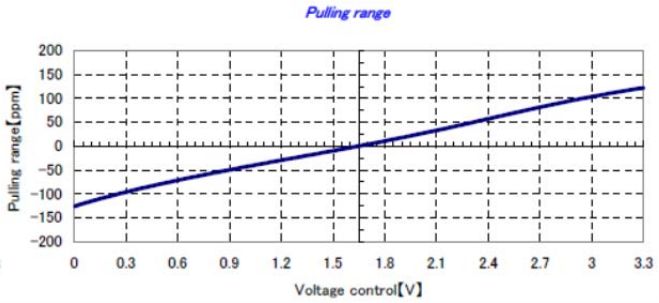



### Frequency Deviation – Pulling Range [typical]

122.88MHz, $V_{CC}$ = 3.3V, $T_A$ = +25°V

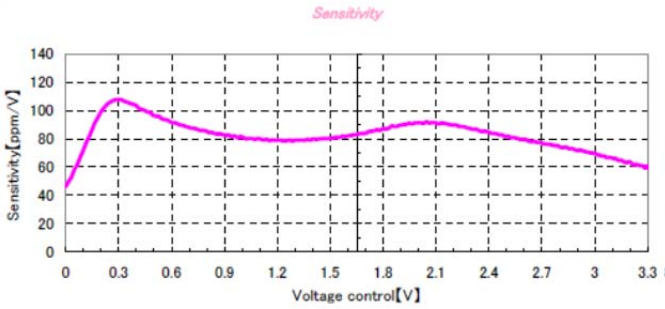



156.25MHz, $V_{CC}$ = 3.3V, $T_A$ = +25°V

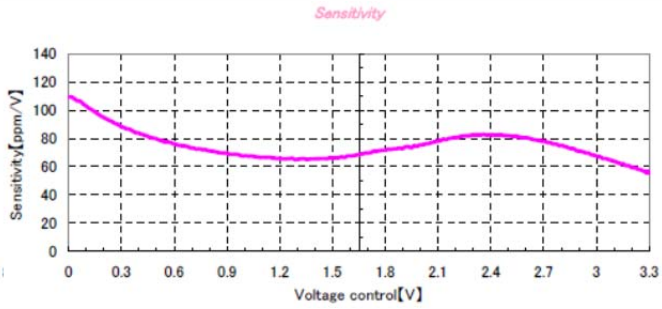



### Frequency Deviation – Gain Transfer [typical]

122.88MHz, $V_{CC}$ = 3.3V, $T_A$ = +25°V




156.25MHz, $V_{CC}$ = 3.3V, $T_A$ = +25°V





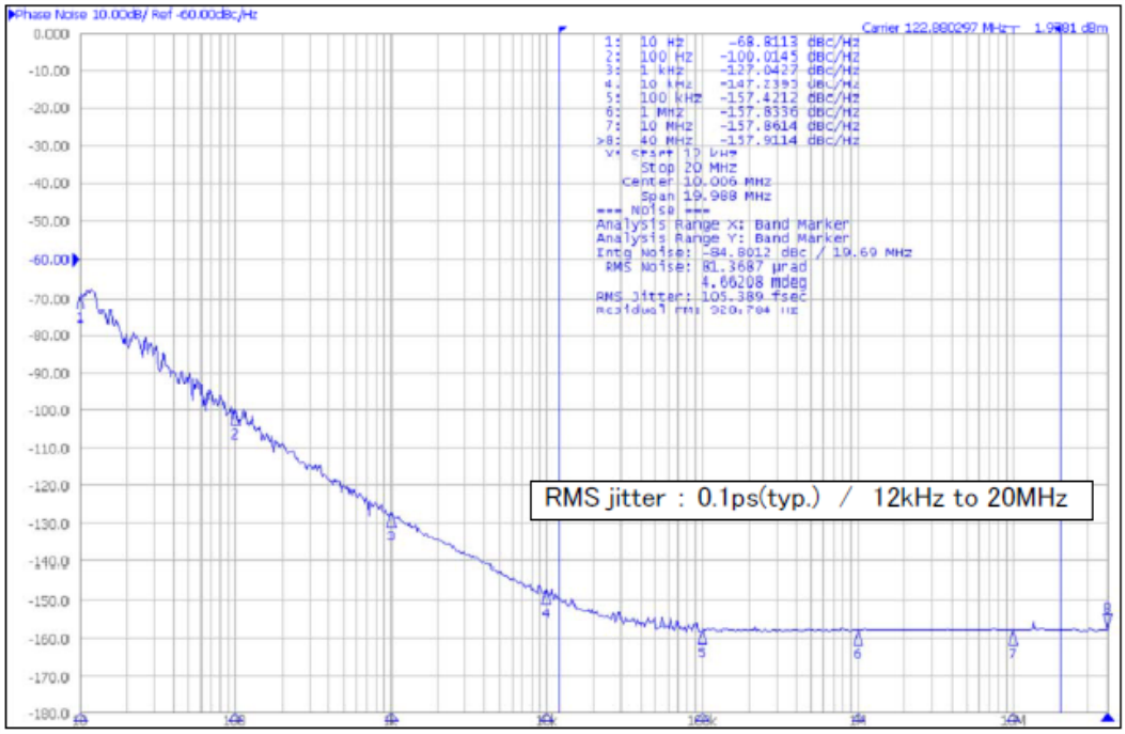

©2015 CTS® Corporation. Information/product(s) subject to change. No warranty that product(s) will meet the stated specifications for customer specific applications or test equipment. Visit www.ctscorp.com for list of applicable patent(s), more information, or to request a quote.

# Electrical Specifications

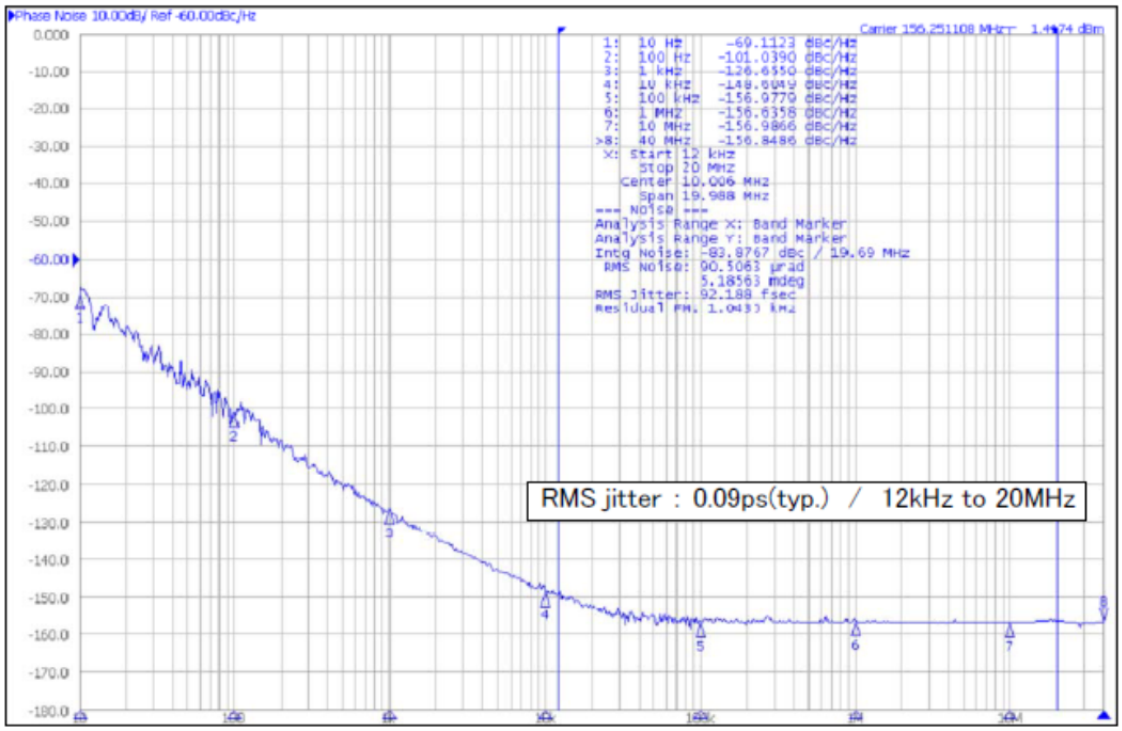
## Performance Data

### Phase Noise [typical]

122.88MHz, $V_{CC}$ = 3.3V, $V_C$ = 1.65V, $T_A$ = +25°C




156.25MHz, $V_{CC}$ = 3.3V, $V_C$ = 1.65V, $T_A$ = +25°C

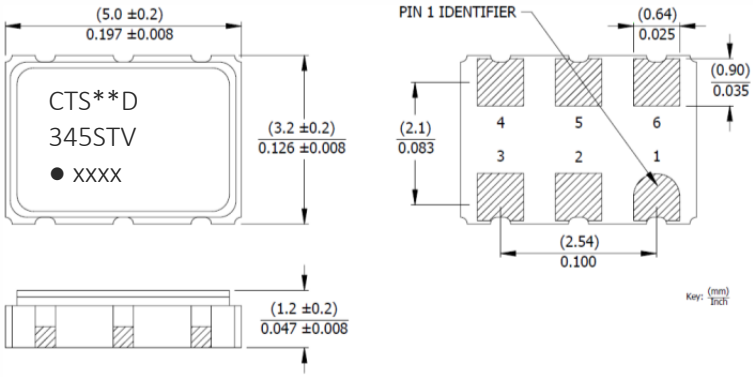





©2015 CTS® Corporation. Information/product(s) subject to change. No warranty that product(s) will meet the stated specifications for customer specific applications or test equipment. Visit www.ctscorp.com for list of applicable patent(s), more information, or to request a quote.

# Mechanical Specifications

## Package Drawing

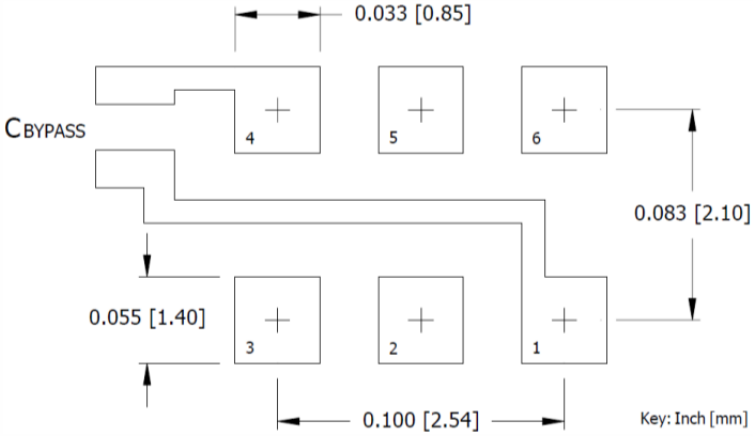



## Marking Information

1. ** - Manufacturing Site Code.
2. D – Date Code. See Table I for codes.
3. ST – Frequency Stability/Temperature Code. [Refer to Ordering Information]
4. V – Voltage Code. L = 3.3V, N = 2.5V
5. xxxx – Frequency Code. 4-digits required for frequencies 100MHz and above.

[See document 016-1454-0, Frequency Code Tables.]

## Recommended Pad Layout




## Notes

1. Termination pads (e4). Barrier-plating is nickel [Ni] with gold [Au] flash plate.
2. Reflow conditions per JEDEC J-STD-020; +260°C maximum, 20 seconds.
3. MSL = 1.

## Pin Assignments

| Pin | Symbol | Function |
|---|---|---|
| 1 | $V_C$ | Control Voltage |
| 2 | EOH | Enable |
| 3 | GND | Circuit & Package |
| 4 | Output | RF Output |
| 5 | $\overline{\text{Output}}$ | RF Output, Complementary |
| 6 | $V_{CC}$ | Supply Voltage |

## Table I - Date Code

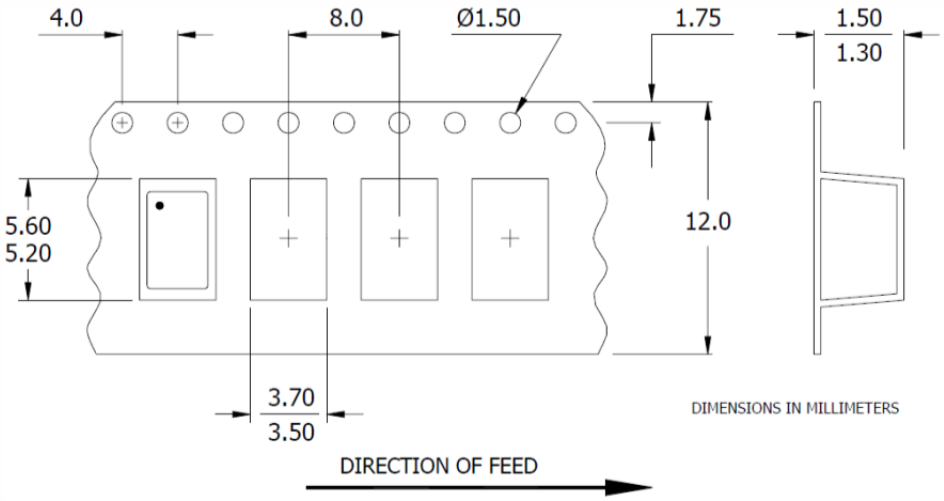
| YEAR / MONTH | | | | | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2001 | 2005 | 2009 | 2013 | 2017 | A | B | C | D | E | F | G | H | J | K | L | M |
| 2002 | 2006 | 2010 | 2014 | 2018 | N | P | Q | R | S | T | U | V | W | X | Y | Z |
| 2003 | 2007 | 2011 | 2015 | 2019 | a | b | c | d | e | f | g | h | j | k | l | m |
| 2004 | 2008 | 2012 | 2016 | 2020 | n | p | q | r | s | t | u | v | w | x | y | z |



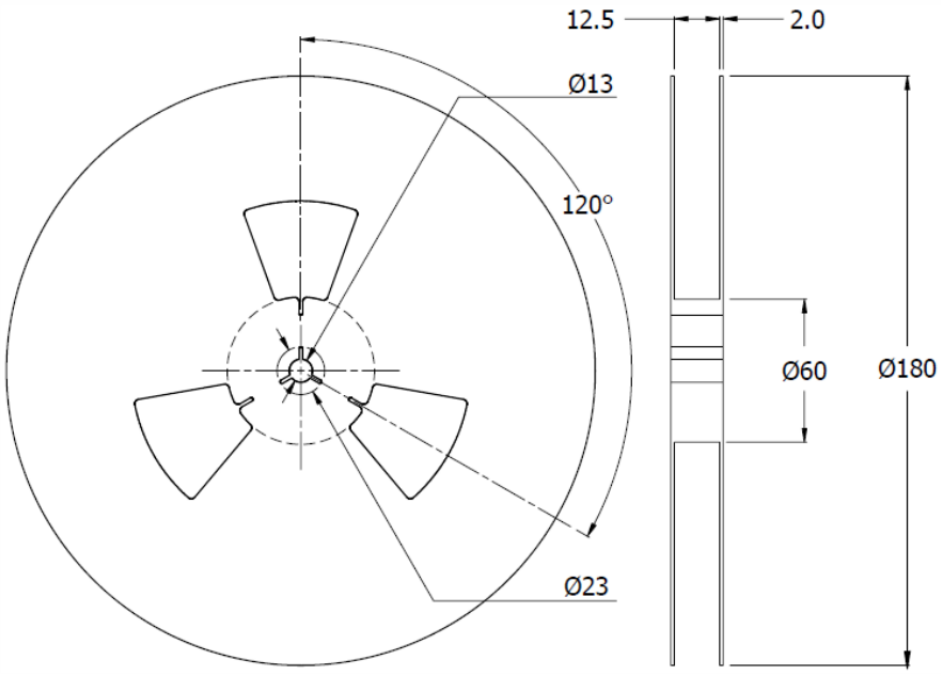
©2015 CTS® Corporation. Information/product(s) subject to change. No warranty that product(s) will meet the stated specifications for customer specific applications or test equipment. Visit www.ctscorp.com for list of applicable patent(s), more information, or to request a quote.

## Packaging - Tape and Reel

### Tape Drawing




### Reel Drawing




### Notes

1. Device quantity is 1k pieces maximum per 180mm reel.
2. Complete CTS part number, frequency value and date code information must appear on reel and carton labels.



©2015 CTS® Corporation. Information/product(s) subject to change. No warranty that product(s) will meet the stated specifications for customer specific applications or test equipment. Visit www.ctscorp.com for list of applicable patent(s), more information, or to request a quote.

LifeElectronics
Живое партнерство

**ООО «ЛайфЭлектроникс»** **“LifeElectronics” LLC**

*ИНН 7805602321 КПП 780501001 Р/С 40702810122510004610 ФАКБ "АБСОЛЮТ БАНК" (ЗАО) в г.Санкт-Петербурге К/С 30101810900000000703 БИК 044030703*

*Компания «Life Electronics» занимается поставками электронных компонентов импортного и отечественного производства от производителей и со складов крупных дистрибьюторов Европы, Америки и Азии.*

*С конца 2013 года компания активно расширяет линейку поставок компонентов по направлению коаксиальный кабель, кварцевые генераторы и конденсаторы (керамические, пленочные, электролитические), за счёт заключения дистрибьюторских договоров*

*Мы предлагаем:*

- *Конкурентоспособные цены и скидки постоянным клиентам.*
- *Специальные условия для постоянных клиентов.*
- *Подбор аналогов.*
- *Поставку компонентов в любых объемах, удовлетворяющих вашим потребностям.*

- *Приемлемые сроки поставки, возможна ускоренная поставка.*
- *Доставку товара в любую точку России и стран СНГ.*
- *Комплексную поставку.*
- *Работу по проектам и поставку образцов.*
- *Формирование склада под заказчика.*

- *Сертификаты соответствия на поставляемую продукцию (по желанию клиента).*
- *Тестирование поставляемой продукции.*
- *Поставку компонентов, требующих военную и космическую приемку.*
- *Входной контроль качества.*
- *Наличие сертификата ISO.*

*В составе нашей компании организован Конструкторский отдел, призванный помогать разработчикам, и инженерам.*

*Конструкторский отдел помогает осуществить:*

- *Регистрацию проекта у производителя компонентов.*
- *Техническую поддержку проекта.*
- *Защиту от снятия компонента с производства.*
- *Оценку стоимости проекта по компонентам.*
- *Изготовление тестовой платы монтаж и пусконаладочные работы.*

*Тел: +7 (812) 336 43 04 (многоканальный)*
*Email: org@lifeelectronics.ru*

***www.lifeelectronics.ru***