



### features

- Low dielectric loss at high frequency (high Q)
- Narrow tolerance of capacitance
- Excellent temperature characteristics
- High reliability and no polarity by single layer ceramic substrate construction
- 0.10 - 1.3 pF available by 0.05 pF range (HFC1005 series)
- 0.10 - 1.20 pF available by 0.05 pF range (HFC1410, 1608, 1610, 1612 series)
- Marking: Brown body color with no marking
- Products with lead-free terminations meet EU RoHS requirements

### dimensions and construction



| Size        | Dimensions inches (mm)  |                        |                         |
|-------------|-------------------------|------------------------|-------------------------|
|             | L                       | W                      | t                       |
| <b>1005</b> | .039±.006<br>(1.0±0.15) | .02±.004<br>(0.5±0.1)  | .02±.004<br>(0.5±0.1)   |
| <b>1410</b> | .055±.006<br>(1.4±0.15) | .039±.004<br>(1.0±0.1) | .039±.004<br>(1.0±0.1)  |
| <b>1608</b> | .063±.006<br>(1.6±0.15) | .031±.004<br>(0.8±0.1) | .028±.008<br>(0.7±0.2)  |
| <b>1610</b> | .063±.006<br>(1.6±0.15) | .039±.004<br>(1.0±0.1) | .033±.01<br>(0.85±0.25) |
| <b>1612</b> | .063±.006<br>(1.6±0.15) | .047±.004<br>(1.2±0.1) | .043±.008<br>(1.1±0.2)  |

capacitors

### ordering information

|            |            |  |  |                      |   |   |
|------------|------------|--|--|----------------------|---|---|
| New Part # | <b>HFC</b> | <b>1608</b>  | <b>C</b>                                       | <b>T</b>             | <b>TD</b>   | <b>R10</b>  |
|            | Type       | Size   | Material Code                                  | Termination Material | Packaging   | Nominal Capacitance   |
|            |            | 1005: 1.0 x 0.5 mm<br>1410: 1.4 x 1.0 mm<br>1608: 1.6 x 0.8 mm<br>1610: 1.6 x 1.0 mm<br>1612: 1.6 x 1.2 mm | B<br>C<br>G<br>H<br>K<br>N<br>S<br>T<br>V<br>W | T: Sn                | TD: Paper tape (1005 only - 10,000 pieces/reel)<br>TE: Embossed taping (1410, 1610, 1612 - 3,000 pieces/reel)<br>(1608 - 4,000 pieces/reel) | 2 significant digits + zeros<br>"R" indicates decimal point |

For further information on packaging, please refer to Appendix A.

## characteristics of dielectric materials

### HFC1005 Series

| Material Code | $\epsilon_r$ | $\tau_r$ (ppm/°C) |
|---------------|--------------|-------------------|
| T             | 37.0±1.5     | 0±10              |
| N             | 70.0±3.0     | 6±10              |
| K             | 92.0±2.0     | 6±10              |
| V             | 113.0±5.0    | 30±10             |
| H             | 140.0±3.0    | 0±30              |
| G             | 160.0±4.0    | 0±30              |
| S             | 180.0±4.0    | 0±30              |

### HFC1005 Series (continued)

| Material Code | $\epsilon_r$ | $\tau_r$ (ppm/°C) |
|---------------|--------------|-------------------|
| B             | 200.0±5.0    | 0±30              |
| W             | 260.0±5.0    | 0±60              |

### HFC1410, 1608, 1610, 1612 Series

| Material Code | $\epsilon_r$ | $\tau_r$ (ppm/°C) |
|---------------|--------------|-------------------|
| C             | 21.5±2.0     | 0±10              |
| T             | 37.0±1.5     | 0±10              |
| N             | 70.0±3.0     | 6±10              |
| V             | 113.0±5.0    | 30±10             |

## applications and ratings

| Part Designation | Capacitance (pF) | Tolerance Code (pF) | Material Code | Rated Voltage DC (V) | Operating Temperature Range |
|------------------|------------------|---------------------|---------------|----------------------|-----------------------------|
| HFC1005TTTDR10   | 0.10             | ±0.015              | T             | 50                   | -55°C to +125°C             |
| HFC1005TTTDR15   | 0.15             |                     |               |                      |                             |
| HFC1005NTTDR20   | 0.20             | ±0.030              | N             |                      |                             |
| HFC1005NTTDR25   | 0.25             |                     |               |                      |                             |
| HFC1005KTTDR30   | 0.30             |                     |               |                      |                             |
| HFC1005KTTDR35   | 0.35             |                     | K             |                      |                             |
| HFC1005VTTDR40   | 0.40             |                     |               |                      |                             |
| HFC1005VTTDR45   | 0.45             |                     |               |                      |                             |
| HFC1005VTTDR50   | 0.50             | ±0.050              | V             |                      |                             |
| HFC1005VTTDR55   | 0.55             |                     |               |                      |                             |
| HFC1005VTTDR60   | 0.60             |                     |               |                      |                             |
| HFC1005HTTDR65   | 0.65             |                     |               |                      |                             |
| HFC1005HTTDR70   | 0.70             |                     |               |                      |                             |
| HFC1005HTTDR75   | 0.75             |                     |               |                      |                             |
| HFC1005GTTDR80   | 0.80             |                     |               |                      |                             |
| HFC1005GTTDR85   | 0.85             |                     |               |                      |                             |
| HFC1005GTTDR90   | 0.90             |                     | G             |                      |                             |
| HFC1005GTTDR95   | 0.95             |                     |               |                      |                             |
| HFC1005STTD1R0   | 1.00             |                     |               |                      |                             |
| HFC1005BTTD1R1   | 1.10             |                     |               |                      |                             |
| HFC1005WTTD1R2   | 1.20             | W                   |               |                      |                             |
| HFC1005WTTD1R3   | 1.30             |                     |               |                      |                             |

Specifications given herein may be changed at any time without prior notice. Please confirm technical specifications before you order and/or use.

3/10/07

applications and ratings (continued)

| Part Designation | Capacitance (pF) | Tolerance Code (pF) | Material Code | Rated Voltage DC (V) | Operating Temperature Range |        |   |    |                 |
|------------------|------------------|---------------------|---------------|----------------------|-----------------------------|--------|---|----|-----------------|
| HFC1410VTTE1R1   | 1.10             | ±0.075              | V             | 50                   | -55°C to +125°C             |        |   |    |                 |
| HFC1410VTTE1R2   | 1.20             |                     |               |                      |                             |        |   |    |                 |
| HFC1410VTTE1R3   | 1.30             |                     |               |                      |                             |        |   |    |                 |
| HFC1608CTTER10   | 0.10             | ±0.015              | C             | 50                   | -55°C to +125°C             |        |   |    |                 |
| HFC1608TTTER15   | 0.15             |                     | T             |                      |                             |        |   |    |                 |
| HFC1608NTTER20   | 0.20             | ±0.030              | N             | 50                   | -55°C to +125°C             |        |   |    |                 |
| HFC1608NTTER25   | 0.25             |                     |               |                      |                             |        |   |    |                 |
| HFC1608NTTER30   | 0.30             |                     |               |                      |                             |        |   |    |                 |
| HFC1608NTTER35   | 0.35             |                     |               |                      |                             |        |   |    |                 |
| HFC1608VTTER40   | 0.40             |                     |               |                      |                             |        |   |    |                 |
| HFC1608VTTER45   | 0.45             |                     | V             |                      |                             |        |   |    |                 |
| HFC1608VTTER50   | 0.50             |                     |               |                      |                             |        |   |    |                 |
| HFC1608VTTER55   | 0.55             |                     |               |                      |                             |        |   |    |                 |
| HFC1610VTTER60   | 0.60             |                     |               |                      |                             | ±0.030 | V | 50 | -55°C to +125°C |
| HFC1610VTTER65   | 0.65             |                     |               |                      |                             |        |   |    |                 |
| HFC1610VTTER70   | 0.70             |                     |               |                      |                             |        |   |    |                 |
| HFC1610VTTER75   | 0.75             | ±0.050              | V             | 50                   | -55°C to +125°C             |        |   |    |                 |
| HFC1610VTTER80   | 0.80             |                     |               |                      |                             |        |   |    |                 |
| HFC1610VTTER85   | 0.85             |                     |               |                      |                             |        |   |    |                 |
| HFC1610VTTER90   | 0.90             |                     |               |                      |                             |        |   |    |                 |
| HFC1612VTTER95   | 0.95             |                     |               |                      |                             | ±0.050 | V | 50 | -55°C to +125°C |
| HFC1612VTTE1R0   | 1.00             |                     |               |                      |                             |        |   |    |                 |

capacitors

environmental applications

HFC1410, 1608, 1610, 1612 Series Type: HFC1612VT1R0R05M50 (1.0 PF)

Self Resonant Frequency (SRF)  
vs. Capacitance Value



Q vs. Frequency



ESR vs. Frequency

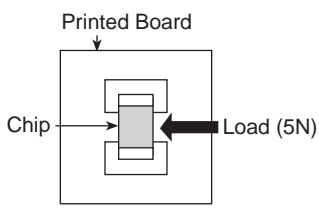
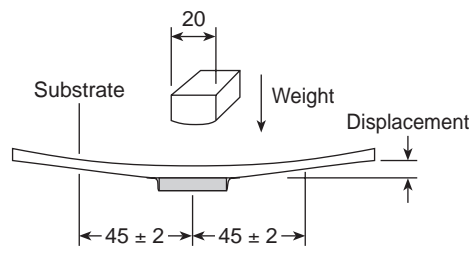


**environmental applications** (continued)

**Electrical Characteristics**

| Parameter             | Requirement                             | Test Method  |
|-----------------------|---|--|
| Capacitance           | Within the specified tolerance of parts | Frequency: 1 MHz<br>Voltage: 1 Vrms<br>Instrument: YHP4278A  |
| Q Value               | 100 or more                             | Frequency: 1 MHz<br>Voltage: 1 Vrms<br>Instrument: YHP4278A  |
| Insulation Resistance | 10,000 MΩ or more                       | Test Voltage: Rated voltage<br>Electrification Time: 60 seconds ± 5 seconds  |
| Breakdown Voltage     | No breakdown                            | Test Voltage: 300% of the rated voltage<br>Electrification Time: 1 second to 5 seconds<br>Limit Surge Current: 50 mA or less |

**Mechanical Characteristics**

| Parameter              | Requirement   | Test Method  |
|------------------------|---|--|
| Adhesion of Electrodes | No mechanical damage  | A static load of 5N (0.5 kgf) shall be applied in the direction of the arrow as follows<br> |
| Core Body Strength     | No mechanical damage  | A static load of 5N (0.5 kgf) using a R 0.5 pressure rod shall be applied on the core of the component and held for 10 seconds   |
| Substrate Bending Test | Visual Examination: No mechanical damage<br>Capacitance: Within ±2.0% or ±0.02 pF whichever is more<br>Q value: 100 or more<br>Insulation Resistance: 10,000 MΩ or more | Solder a specimen to the substrate and bend it (Displacement: 2mm)<br>                       |

**environmental applications** (continued)

**Endurance Characteristics**

| Parameter                            | Requirement   | Test Method  |
|--------------------------------------|---|--|
| Solderability                        | A new coating of solder shall cover a minimum of 95% of the surface being immersed  | Flux: 25 wt% colophony<br>Solder: H60A (silver 3%)<br>Preheating: 150°C for 1 minute<br>Soldering Temperature: 230°C ± 5°C<br>Soldering Temperature: 215°C ± 5°C (HFC1005)<br>Immersion Time: 3 seconds ± 1 second |
| Resistance to Solder Heat            | Visual Examination: No mechanical damage<br>Capacitance: Within ±2.0% or ±0.02 pF whichever is more<br>Q value: 100 or more<br>Insulation Resistance: 10,000 MΩ or more | Flux: 25 wt% colophony<br>Solder: H60A (silver 3%)<br>Soldering Temperature: 270°C ± 5°C<br>Immersion Time: 10 seconds ± 1 second  |
| Resistance to Humidity (Load Test)   |   | Temperature: 60°C ± 2°C<br>Relative Humidity: 95% RH<br>Test Voltage: Rated voltage<br>Test Hours: 1000 -0/+48 hours   |
| Resistance to Humidity (Unload Test) |   | Temperature: 85°C ± 2°C<br>Relative Humidity: 85% RH<br>Test Hours: 1000 -0/+48 hours  |
| Resistance to High Temperature       |   | Temperature: 125°C ± 2°C<br>Test Voltage: Rated voltage<br>Test Hours: 1000 -0/+48 hours   |
| Resistance to Low Heat               |   | Temperature: -55°C ± 2°C<br>Test Hours: 1000 -0/+48 hours  |
| Temperature Cycle                    |   | Temperature: -55°C for 30 min., 125°C for 30 min.<br>Hours for 1 Cycle: 2 hours<br>Temperature Cycle: 50 cycles or more  |
| Vibration                            |   | Frequency of Vibration: 10 to 100 Hz<br>Sweeping: 10→100→10 Hz, 5 minutes, 5.0 G<br>This motion shall be applied for a period of 2 hours in each of 3 mutually perpendicular axis                                  |
| Shock                                |   | Half of sine wave (100 G) shall be applied for a period of 5 msec. in each of 3 mutually perpendicular axis  |

capacitors

The specimen shall be subjected to standard atmospheric condition for 24 hours after which measurement shall be made.

Компания «Океан Электроники» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

Наши преимущества:

- Поставка оригинальных импортных электронных компонентов напрямую с производств Америки, Европы и Азии, а так же с крупнейших складов мира;
- Широкая линейка поставок активных и пассивных импортных электронных компонентов (более 30 млн. наименований);
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Помощь Конструкторского Отдела и консультации квалифицированных инженеров;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Поставка электронных компонентов под контролем ВП;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- При необходимости вся продукция военного и аэрокосмического назначения проходит испытания и сертификацию в лаборатории (по согласованию с заказчиком);
- Поставка специализированных компонентов военного и аэрокосмического уровня качества (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Actel, Aeroflex, Peregrine, VPT, Syfer, Eurofarad, Texas Instruments, MS Kennedy, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits, General Dynamics и др.);

Компания «Океан Электроники» является официальным дистрибьютором и эксклюзивным представителем в России одного из крупнейших производителей разъемов военного и аэрокосмического назначения «JONHON», а так же официальным дистрибьютором и эксклюзивным представителем в России производителя высокотехнологичных и надежных решений для передачи СВЧ сигналов «FORSTAR».



## JONHON

«JONHON» (основан в 1970 г.)

Разъемы специального, военного и аэрокосмического назначения:

(Применяются в военной, авиационной, аэрокосмической, морской, железнодорожной, горно- и нефтедобывающей отраслях промышленности)

«FORSTAR» (основан в 1998 г.)

ВЧ соединители, коаксиальные кабели, кабельные сборки и микроволновые компоненты:

(Применяются в телекоммуникациях гражданского и специального назначения, в средствах связи, РЛС, а так же военной, авиационной и аэрокосмической отраслях промышленности).



Телефон: 8 (812) 309-75-97 (многоканальный)

Факс: 8 (812) 320-03-32

Электронная почта: [ocean@oceanchips.ru](mailto:ocean@oceanchips.ru)

Web: <http://oceanchips.ru/>

Адрес: 198099, г. Санкт-Петербург, ул. Калинина, д. 2, корп. 4, лит. А