



TOKEN ELECTRONICS IND. CO., LTD.

HONESTY PERFECTION SHARING

Catalogue of Ceramic Filters And Ceramic Resonators

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Ceramic Resonator ZTA Series

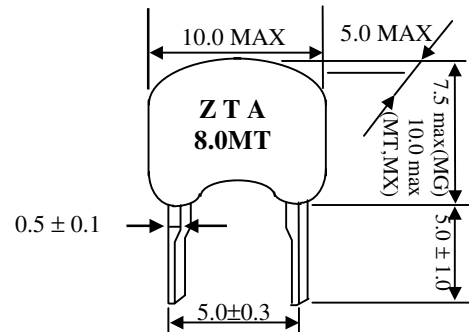
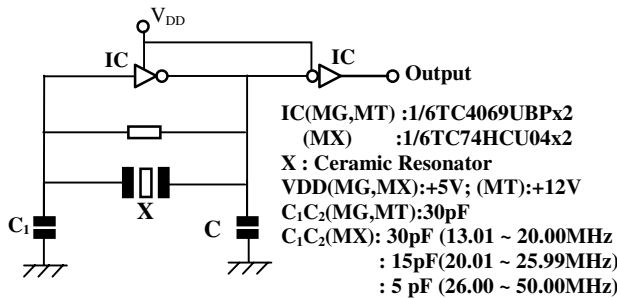
1.80-50.00 MHz

ZTA Series of Ceramic Resonator (Compatible to Murata CSA)

Token ZTA Series of ceramic resonators cover the frequency range of 1.80 MHz to 50.00 MHz with an initial frequency tolerance of $\pm 0.5\%$. Since the ZTA Series utilizes the thickness mode of vibration of the piezoelectric element, there is little dimensional change with frequency. All ZTA resonators are epoxy coated and completely washable. Tape and reel packaging is available.

TECHNICAL CHARACTERISTICS

| Part Number | Frequency Range (MHz) | Frequency Accuracy (25°C) % | Stability in Temperature (-20°C ~ +80°C) % | Operating Temperature (°C) | Aging For Ten Years (%) |
|-------------|-----------------------|-----------------------------|--|----------------------------|-------------------------|
| ZTA□□□MG | 1.80-6.00 | ± 0.5 | ± 0.3 | -20 ~ +80 | ± 0.3 |
| ZTA□□□MT | 6.01-13.00 | ± 0.5 | ± 0.3 | -20 ~ +80 | ± 0.3 |
| ZTA□□□MX | 13.01-50.00 | ± 0.5 | ± 0.3 | -20 ~ +80 | ± 0.3 |



Ceramic Resonator ZTT Series With Built-in Capacitor

1.80-50.00 MHz

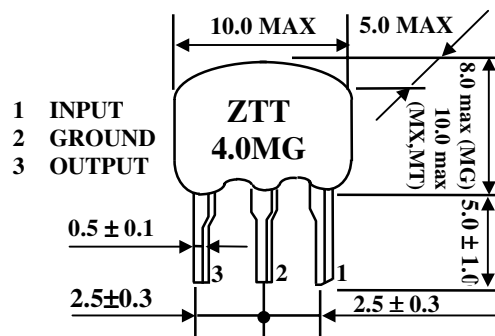
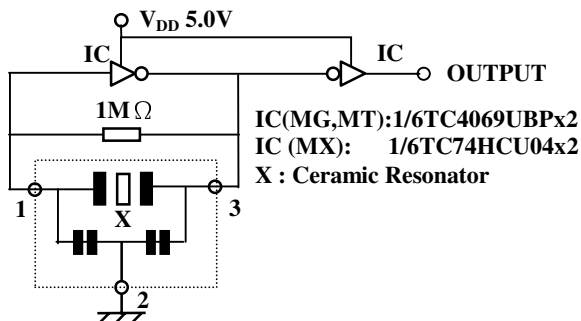
ZTT Series of Ceramic Resonator (Compatible to Murata CST)

Token ZTT series of ceramic resonators features a built-in load capacitance. This feature eliminates any need for external loading capacitors and reduces component count, increases reliability and reduces size. These units are offered in the frequency range from 1.80 MHz to 50.00 MHz with an initial frequency tolerance of $\pm 5\%$.

TECHNICAL CHARACTERISTICS

| Part Number | Frequency Accuracy 25°C (%) | Stability in Temperature -20°C ~ +80°C (%) | Aging For Ten Years (%) |
|------------------|-----------------------------|--|-------------------------|
| ZTT1.80-6.00MG | ± 0.5 | ± 0.3 | ± 0.3 |
| ZTT6.01-13.00MT | ± 0.5 | ± 0.3 | ± 0.3 |
| ZTT13.01-50.00MX | ± 0.5 | ± 0.3 | ± 0.3 |

ZTT TEST CIRCUIT FOR MOS IC

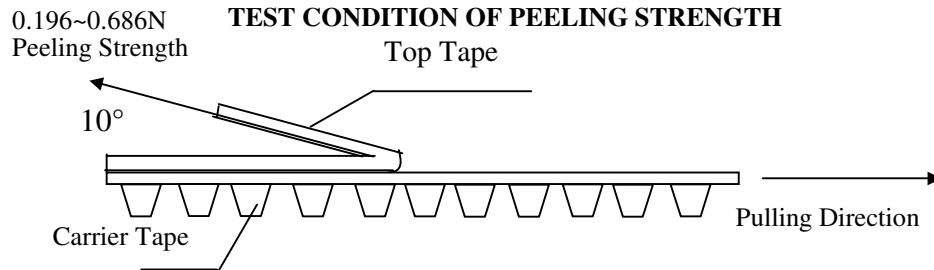
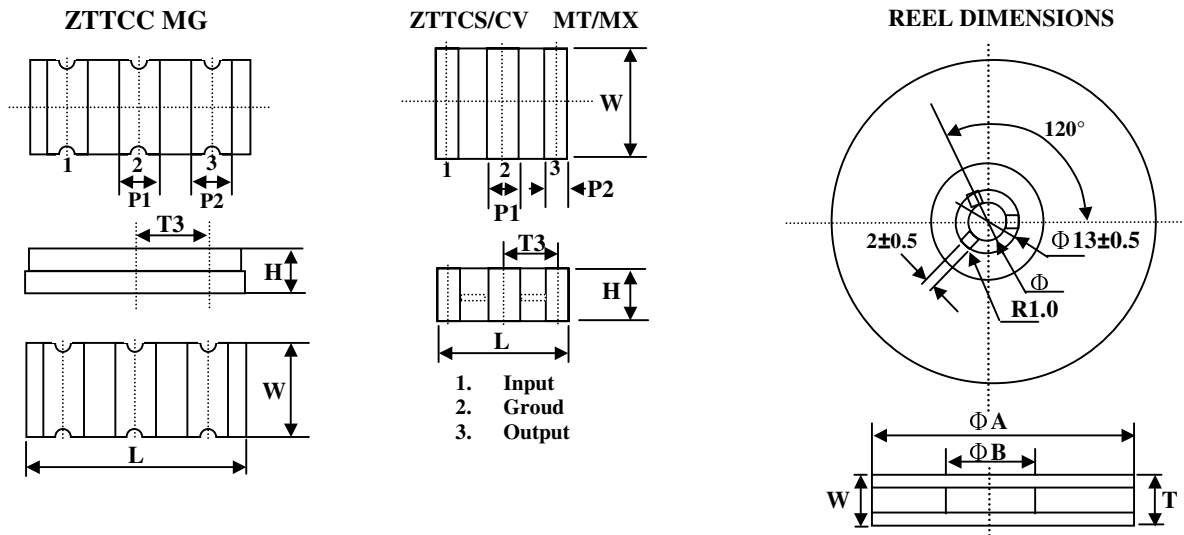




| | | |
|-------------------|-----------------------------------|---------------|
| Ceramic Resonator | ZTACC/CS/CV □MG/MT/MX → Chip Type | 2.00-50.0 MHz |
| Ceramic Resonator | ZTTCC/CS/CV □MG/MT/MX → Chip Type | |

ZTACC/ ZTTCC series of Ceramic Resonator (Compatible to Murata CSAC\CATC)

Token ZTTC series of chip ceramic resonators features a built-in load capacitance. This feature eliminates any need for external loading capacitors and reduces component count, increases reliability and reduces size. These units are offered in the frequency range from 2.00 MHz to 50.00 MHz with an initial frequency tolerance of $\pm 0.5\%$. Token ZTAC series has two terminals, while ZTTC with three terminals.

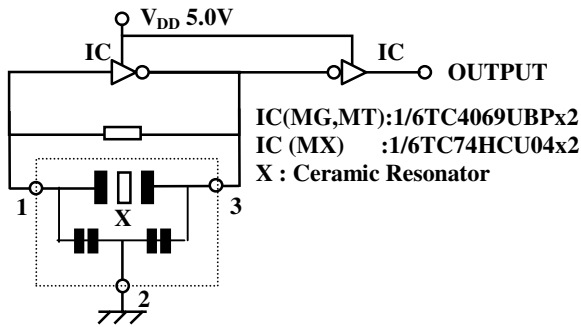


| DIMENSIONS OF CHIP TYPE SERIES | | | | | | | | | |
|--------------------------------|-----------------|---------|---------|---------|---------|---------|---------|----------|---------|
| PART NUMBER | DIMENSIONS (mm) | | | | | | | | |
| | L | W | H | P1 | P2 | T1 | T2 | T3 | W1 |
| ZTTCC □MG | 7.4±0.3 | 3.4±0.3 | 1.8±0.3 | 1.2±0.3 | 1.2±0.3 | 1.5±0.3 | 1.7±0.3 | 2.5±0.3 | 4.0±0.3 |
| ZTTCS □MT/MX | 4.7±0.2 | 4.7±0.2 | 1.6±0.3 | 1.0±0.4 | 0.8±0.4 | 1.3±0.2 | 0.8±0.2 | 1.95±0.2 | 5.1±0.2 |
| ZTTCV □MT/MX | 3.7±0.2 | 3.1±0.2 | 1.2±0.3 | 0.9±0.3 | 0.7±0.3 | 1.0±0.2 | 0.7±0.2 | 1.5±0.2 | 4.1±0.2 |

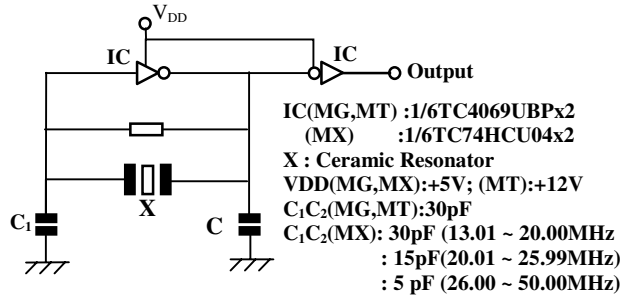
| ZTACC/ ZTTCC TECHNICAL CHARATERISTICS | | | | |
|---------------------------------------|-----------------------|--------------------|--|-------------------------|
| Part Number | Frequency Range (MHz) | Frequency Accuracy | Stability in Temperature -20°C~+80°C (%) | Aging For Ten Years (%) |
| ZTACC □MG | 2.00-6.99 | ±0.5 | ±0.3 | ±0.3 |
| ZTTCC □MG | 2.00-6.99 | ±0.5 | ±0.3 | ±0.3 |
| ZTACS/CV □MT/MX | 7.00-13.00 | ±0.5 | ±0.4 | ±0.3 |
| ZTACS/CV □MT/MX | 13.0-50.00 | ±0.5 | ±0.3 | ±0.3 |



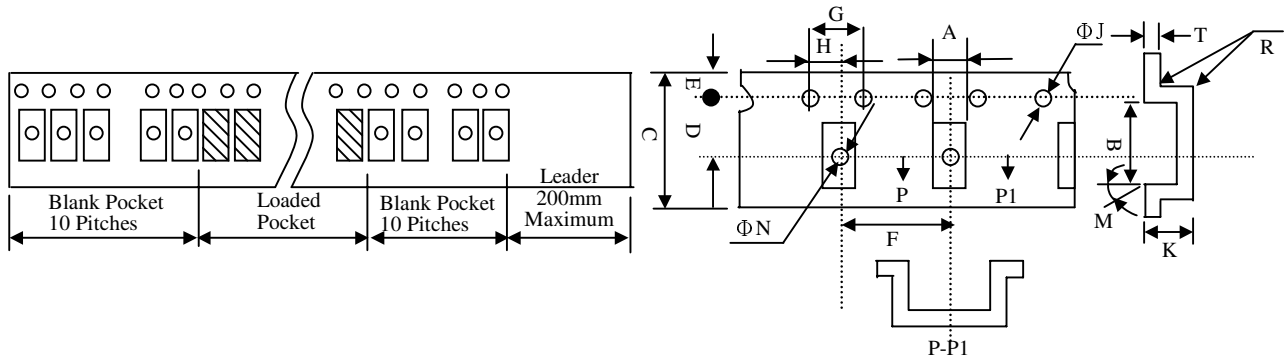
ZTTCC TEST CIRCUIT FOR MOS IC



ZTACC TEST CIRCUIT FOR MOS IC



PACKING METHOD

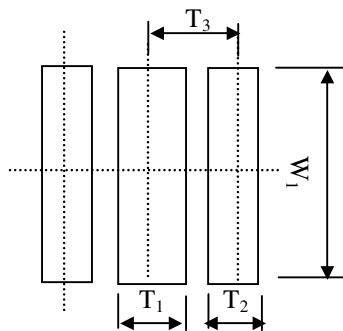


| REEL DIMENSIONS (mm) | | | | | |
|----------------------|-------|-------|-------|-----------------|-------------------|
| ΦA | ΦB | W Min | T Max | Pieces Per Reel | Carrier Tape Size |
| 179±2 | 60typ | 12.4 | 19.4 | 1000 | 12 |
| 179±2 | 60typ | 16.4 | 22.4 | 1000 | 16 |
| 330±3 | 80Min | 12.4 | 19.4 | 4000 | 12 |
| 330±3 | 80Min | 16.4 | 22.4 | 4000 | 16 |

Tape- Typical Value

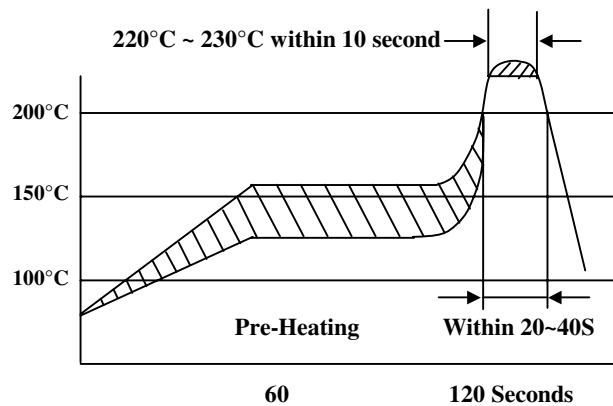
| TAPE DIMENSION (mm) | | | | | | | | | | | | | | |
|---------------------|------|------|------|------|------|------|------|------|------|------|-----------------|------|------|------|
| Part Number | A | B | C | D | E | F | G | H | ΦJ | ΦN | M | R | K | T |
| | ±0.2 | ±0.2 | ±0.3 | ±0.1 | ±0.1 | ±0.1 | ±0.1 | ±0.1 | ±0.1 | ±0.1 | Max. | Max. | ±0.2 | ±0.1 |
| ZTACC □MG | 3.8 | 7.8 | 160 | 7.5 | 1.75 | 8.0 | 4.0 | 2.0 | 1.5 | 1.6 | 10 ⁰ | 0.3 | 2.1 | 0.3 |
| ZTTCC □MG | 3.8 | 7.8 | 160 | 7.5 | 1.75 | 8.0 | 4.0 | 2.0 | 1.5 | 1.6 | 10 ⁰ | 0.3 | 2.1 | 0.3 |
| ZTACS □MT/MX | 5.0 | 4.4 | 120 | 5.5 | 1.75 | 8.0 | 4.0 | 2.0 | 1.5 | 1.6 | 10 ⁰ | 0.3 | 1.8 | 0.3 |
| ZTTCS □MT/MX | 5.0 | 4.4 | 120 | 5.5 | 1.75 | 8.0 | 4.0 | 2.0 | 1.5 | 1.6 | 10 ⁰ | 0.3 | 1.8 | 0.3 |
| ZTACV □MT/MX | 3.4 | 4.0 | 120 | 5.5 | 1.75 | 8.0 | 4.0 | 2.0 | 1.5 | 1.6 | 10 ⁰ | 0.3 | 1.3 | 0.3 |
| ZTTCV □MT/MX | 3.4 | 4.0 | 120 | 5.5 | 1.75 | 8.0 | 4.0 | 2.0 | 1.5 | 1.6 | 10 ⁰ | 0.3 | 1.3 | 0.3 |

RECOMMENDED LAND PATTERN



* See "Dimensions of Chip Resonator Series" in page 2

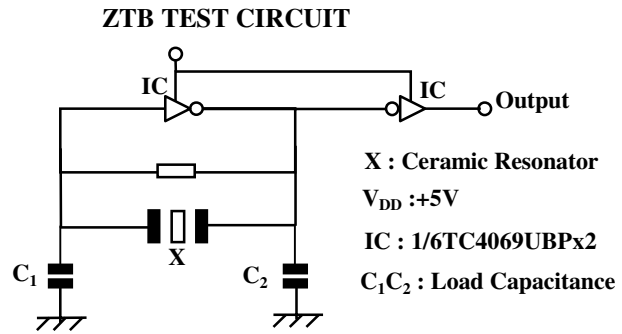
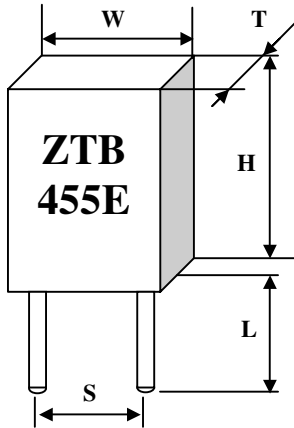
RECOMMENDED REFLOW SOLDERING STANDARD CONDITIONS





**ZTB Series of Ceramic Resonator (190-1250 KHz)
(Compatible to Murata CSB)**

Token ZTB series of ceramic resonators is designed to provide the design engineer with a rugged, relatively low frequency device in the frequency range of 190 KHz to 1,250 KHz. Initial frequency tolerance is $\pm 0.5\%$ which compares very favorably to the nominal $\pm 2\% \sim \pm 3\%$ requirements of one chip microprocessors. Token ZTB series utilizes the area vibration mode of the piezoelectric ceramic element.



ZTB DIMENSIONS

| Frequency Range (KHz) | Width W (mm) | Thickness T (mm) | Height H (mm) | Lead Space S (mm) | Lead Length L (mm) |
|-----------------------|--------------|------------------|---------------|-------------------|--------------------|
| 190-249 | 13.5 | 3.8 | 14.7 | 10.0 | 8.0 |
| 250-374 | 11.0 | 3.8 | 12.2 | 7.7 | 7.0 |
| 375-400 | 7.9 | 3.6 | 9.3 | 5.0 | 7.7 |
| 401-699 | 7.0 | 3.5 | 9.0 | 5.0 | 4.0(6.0) |
| 700-1300 | 5.2 | 2.8 | 6.8 | 2.5 | 3.5(5.0) |
| 1000J | 5.1 | 2.3 | 6.3 | 2.5 | 4.0 |

TECHNICAL CHARACTERISTICS

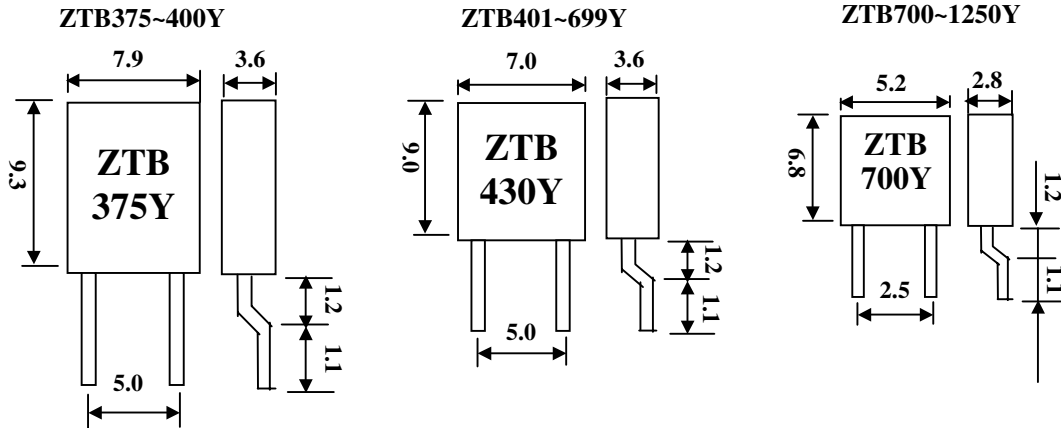
| Part Number | Frequency Accuracy | Resonant Impedance(Ω) | Stability in Temperature -20~+80°C (%) | Aging For Ten Years (%) | Load Capacitance (pF) | |
|---------------|--------------------|--------------------------------|--|-------------------------|-----------------------|----------------|
| | | | | | C ₁ | C ₂ |
| ZTB82~189 * | ± 2 KHz | ≤ 20 | ± 0.3 | ± 0.3 | / | / |
| ZTB190~249D | ± 1 KHz | ≤ 20 | ± 0.3 | ± 0.3 | 330 | 470 |
| ZTB250~374D | ± 1 KHz | ≤ 20 | ± 0.3 | ± 0.3 | 220 | 470 |
| ZTB375~429P | ± 2 KHz | ≤ 20 | ± 0.3 | ± 0.3 | 120 | 470 |
| ZTB430~509E | ± 2 KHz | ≤ 20 | ± 0.3 | ± 0.3 | 100 | 100 |
| ZTB510~699P | ± 2 KHz | ≤ 30 | ± 0.3 | ± 0.3 | 100 | 100 |
| ZTB700~999J | $\pm 0.5\%$ | ≤ 70 | ± 0.3 | ± 0.3 | 100 | 100 |
| ZTB1000~1300J | $\pm 0.5\%$ | ≤ 100 | ± 0.3 | ± 0.3 | 100 | 100 |

* ZTB82~189 series is new products of custom design.



**ZTBY KHz series of Ceramic Resonator
(Compatible to Murata CSBF)**

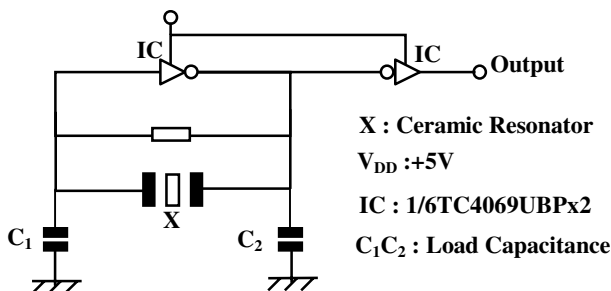
Token ZTBY series of ceramic resonators is a surface mountable device unit of ZTB Width the frequency range of 375 KHz to 1,250 KHz. Initial frequency tolerance is $\pm 0.5\%$ which compares very favorably to the nominal $\pm 2\% \sim \pm 3\%$ requirements of one chip microprocessors. Token ZTBY series utilizes the area vibration mode of the piezoelectric ceramic element.



TECHNICAL CHARACTERISTICS

| Part Number | Frequency Accuracy | Resonant Impedance (Ω) | Stability in Temperature -20~+80°C (%) | Aging For Ten Years (%) | Load (pF) Capacitance | |
|---------------|--------------------|---------------------------------|--|-------------------------|-----------------------|----------------|
| | | | | | C ₁ | C ₂ |
| ZTB375~429Y | ± 0.5 | ≤ 20 | ± 0.3 | ± 0.3 | 120 | 470 |
| ZTB430~509Y | ± 0.5 | ≤ 20 | ± 0.3 | ± 0.3 | 100 | 100 |
| ZTB510~699Y | ± 0.5 | ≤ 30 | ± 0.3 | ± 0.3 | 100 | 100 |
| ZTB700~900Y | ± 0.5 | ≤ 50 | ± 0.3 | ± 0.3 | 100 | 100 |
| ZTB901~1000Y | ± 0.5 | ≤ 70 | ± 0.3 | ± 0.3 | 100 | 100 |
| ZTB1001~1250Y | ± 0.5 | ≤ 100 | ± 0.3 | ± 0.3 | 100 | 100 |

ZTBY TEST CIRCUIT



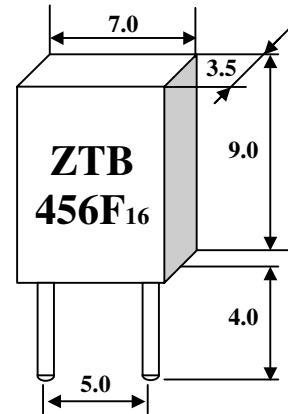


ZTB456F Series Of Ceramic Resonator (456KHz)

(Compatible to Murata CSB456F)

Token ceramic resonator ZTB 456F multiplexes series is designed to provide frequency modulation for HI-FI stereo application. These units are offered in the frequency accuracy 19.000 ± 38 Hz and 456 KHz ± 2 KHz Width different applicable IC.

| TECHNICAL CHARACTERISTICS | | |
|---------------------------|----------------------|--------------------|
| Part Number | Frequency Accuracy | Applicable IC |
| ZTB456F ₁₁ | 19.000KHz \pm 38Hz | LA3430 (SANYO) |
| ZTB456F ₁₄ | 19.000KHz \pm 38Hz | TA7413AP (TOSHIBA) |
| ZTB456F ₁₅ | 456KHz \pm 2KHz | LA1832 (SANYO) |
| ZTB456F ₁₆ | 19.000KHz \pm 38Hz | TA8122AN (TOSHIBA) |
| ZTB456F ₁₈ | 19.000KHz \pm 38Hz | TA8132N (TOSHIBA) |
| ZTB456F ₃₃ | 456KHz \pm 2KHz | LA2232 (SANYO) |

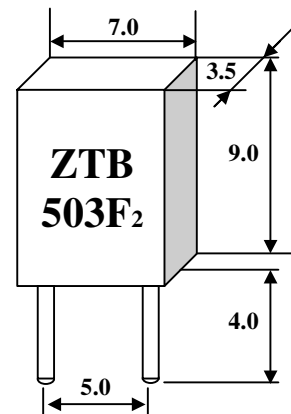


ZTB503/500F Ceramic Resonator (503/500KHz)

(Compatible to Murata CSB503F)

Token ceramic resonator ZTB 503/500F series is designed for TV horizontal synthesizer circuits. These units are offered in the following frequency accuracy Width different applicable IC.

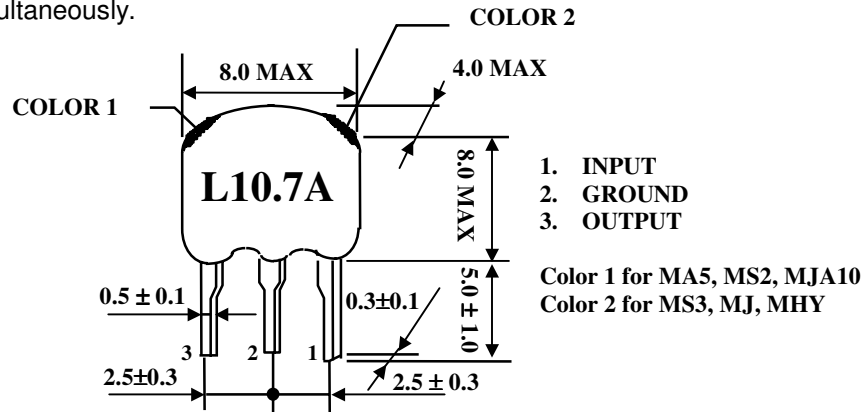
| TECHNICAL CHARACTERISTICS | | |
|---------------------------|-----------------------|-----------------------|
| Part Number | Frequency Accuracy | Applicable IC |
| ZTB503F ₂ | 503.5 \pm 2KHZ | μ PC1401 (NEC) |
| ZTB503F ₅ | 504.5 \pm 2KHZ | LA7620 (SANYO) |
| ZTB503F ₆ | 519 \pm 2KHZ | M51370 (MITSUBISHI) |
| ZTB503F ₁₀ | 15.734 \pm 0.5% | TA7777P (TOSHIBA) |
| ZTB503F ₁₂ | 503.5KHz \pm 2KHz | TDA3586 (THOMSON) |
| ZTB503F ₁₅ | 505.1KHz \pm 2KHz | LTA7650 (SANYO) |
| ZTB503F ₃₀ | 503.5KHz \pm 1.5KHz | TA8654AN (TOSHIBA) |
| ZTB503F ₃₈ | 15.734KHz \pm 62Hz | AN5302 (MATSUSHITA) |
| ZTB500F ₂ | 500.0Hz \pm 2KHz | μ PC1401 (NEC) |
| ZTB500F ₉ | 500.0Hz \pm 2KHz | M51308SP (MITSUBISHI) |
| ZTB500F ₁₃ | 500.0Hz \pm 2KHz | M51367SP (MITSUBISHI) |
| ZTB500F ₂₈ | 15.680KHz \pm 0.4% | LA7680 (SANYO) |
| ZTB500F ₄₀ | 15.680KHz \pm 0.4% | TA8691N (TOSHIBA) |
| ZTB500F ₅₅ | 15.680KHz \pm 0.4% | LA7685 (SANYO) |





**LT10.7 Series Of Ceramic Filter (10.7MHz)
(Compatible to Murata SFE 10.7 FM-IF)**

Token's LT10.7 MHz series of ceramic filters are monolithic device, which utilize the energy- trapped thickness Vibration mode. This principle of operation is based upon the fact that an excellent resonating element Width low spurious vibration can be obtained by adhering to certain theoretical parameters of design. These parameters include the physical dimensions of the ceramic element, the electrode pattern, and the associated mass loading effect of the electrodes. In addition to employing the principle of energy-trapped thickness shear vibration-mode, Token also utilizes the theory of the multi-coupling mode. In short, this theory utilizes divided electrodes to "trap" different frequencies simultaneously.



LT10.7M SERIES FOR FM TECHNICAL CHARACTERISTICS

| Part Number | 3dB Band Width (KHz) | 20dB Band Width (KHz) Max. | Insertion Loss (dB) Max. | Spurious Attenuation 9-12 MHz (dB) Min. |
|-------------|----------------------|----------------------------|---------------------------|---|
| LT10.7MA5 | 280±50 | 650 | 6 | 30 |
| LT10.7MS2 | 230±50 | 600 | 6 | 40 |
| LT10.7MS3 | 180±40 | 520 | 7 | 40 |
| LT10.7MJ | 150±40 | 400 | 10 | 38 |

* Input/Output Impedance: 330Ω

LT10.7M A10 SERIES TECHNICAL CHARACTERISTICS

| Part Number | 3dB Band Width (KHz) | 20dB Band Width (KHz) Max. | Insertion Loss (dB) | Spurious Attenuation 9-12MHz (dB) Min. |
|--------------|----------------------|----------------------------|---------------------|--|
| LT10.7MA5A10 | 280±50 | 590 | 2.5±2.0 | 30 |
| LT10.7MS2A10 | 230±50 | 520 | 3.0±2.0 | 35 |
| LT10.7MS3A10 | 180±40 | 470 | 3.5±1.5 | 35 |
| LT10.7MJA10 | 150±40 | 360 | 4.5±2.0 | 35 |

* Input/Output Impedance:330Ω

WIDE/NARROW BAND-WIDTH TYPE LT10.7M SERIES TECHNICAL CHARACTERISTICS

| Part Number | 3dB Band Width (KHz) | 20dB Band Width (KHz) Max. | Insertion Loss (dB) | Spurious Attenuation 9-12MHz (dB) Min. |
|-------------|----------------------|----------------------------|---------------------|--|
| LT10.7MA19 | 350Min. | 950 | 3±2 | 20 |
| LT10.7MA20 | 330±50 | 680 | 4±2 | 30 |
| LT10.7MHY | 110±30 | 350 | 7±2 | 30 |
| LT10.7MFP | 20Min | 95 | 6.0Max. | 24 |

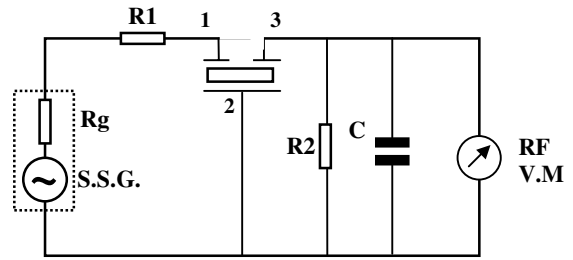
* Input/Output Impedance:470Ω (MA19),330Ω (MA20,MHY),600Ω (MFP)

* Spurious Attenuation range of LT10.7MFP: 10.7±1MHZ

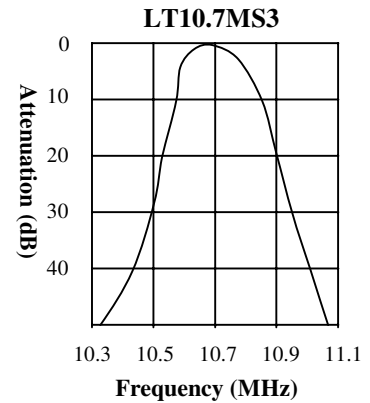
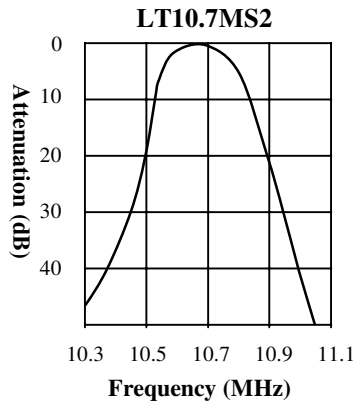
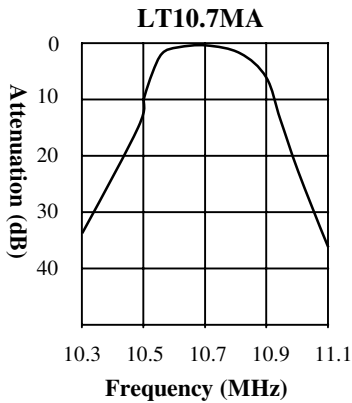


| STANDARD RULE | |
|-------------------|--------|
| Center frequency | Color |
| D: 10.64MHz±30KHz | Black |
| B: 10.67MHz±30KHz | Blue |
| A: 10.70MHz±30KHz | Red |
| C: 10.73MHz±30KHz | Orange |
| E: 10.76MHz±30KHz | White |

LT10.7M TEST CIRCUIT



$R_g + R_1 = R_2 = 330\Omega$; $C = 10pF$
Including Stray Capacitance and Input Capacitance of RF Voltmeter.



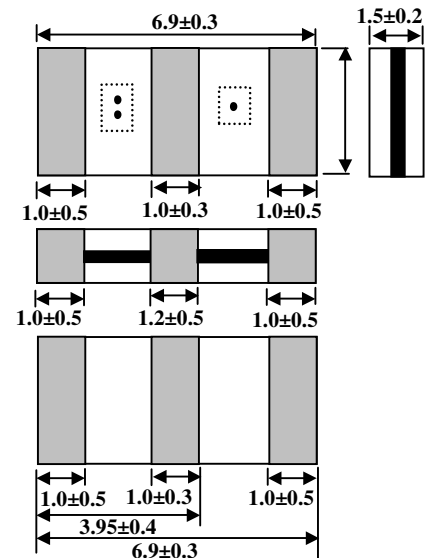
Ceramic Filter LTCA/CV10.7M Series → Chip Type **10.7 MHz**

Chip Type LTCA/CV10.7M Series Of Ceramic Filter (Compatible to Murata SFECV10.7)

Token LTCA 10.7M piezo filters surface device for AM along with the development of the AM chip filter, IF chip filters for AM/FM radios have also been made smaller, thinner and in a chip configuration for surface mounting. This is one more example of Token's leadership in converting conventional electronic components to chip technology.

| TECHNICAL CHARACTERISTICS | | | | |
|---------------------------|----------------------|----------------------------|--------------------------|--|
| Part Number | 3dB Band Width (KHz) | 20dB Band Width (KHz) Max. | Insertion Loss (dB) Max. | Spurious Attenuation (9-12MHz) (dB) Min. |
| LTCA10.7MA5 | 280±50 | 650 | 6.0 | 30 |
| LTCA10.7MS2 | 230±50 | 600 | 6.0 | 30 |
| LTCV10.7MA5 | 280±50 | 590 | 3.0±2.0 | 35 |
| LTCV10.7MS2 | 230±50 | 510 | 3.5±2.0 | 35 |
| LTCV10.7MS3 | 180±40 | 470 | 4.0±2.0 | 35 |

* Input/Output Impedance: 330Ω





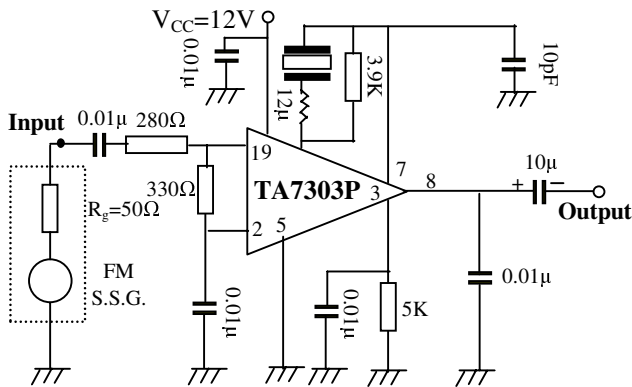
**JT10.7M Series of Ceramic Discriminator For FM (10.7MHz)
(Compatible to Murata CDA10.7)**

Token JT 10.7 line of ceramic discriminators are resonate devices that offer adjustment free audio detection in both wide and narrow bandwidths. These IC dependent devices utilize FM specific detection methods to convert changes in frequency into an intelligible audio signal.

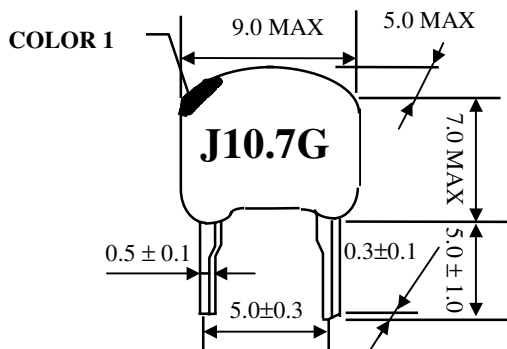
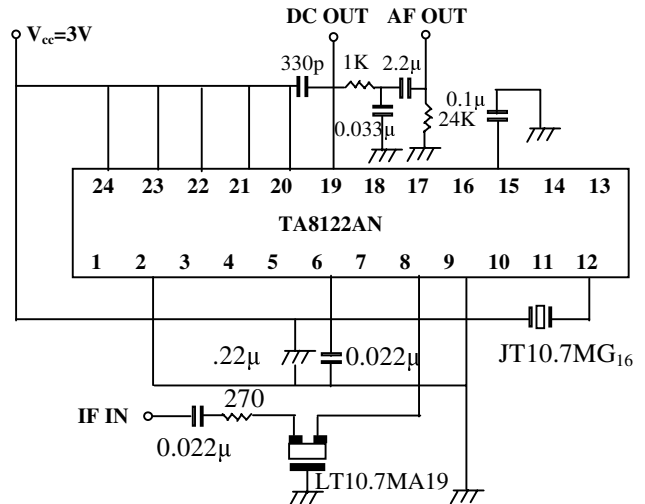
| TECHNICAL CHARACTERISTICS | | | | |
|---------------------------|--|------------------------------------|---------------------------------------|--|
| Part Number | Demodulation Output at f_o (mv) Min. | Distortion Factor at f_o (%)Max. | Demodulation 3dB Bandwidth KHz (Min.) | Applicable IC |
| JT10.7MG1 | 25 | 1.0 | 345 | CX-2009, CX-20111 |
| JT10.7MG3 | 650 | 1.0 | ±150 | TA7303P, TA7130, μ PC1028H, LA1150 |
| JT10.7MG16 | 60~90 | 0.9 | 300 | TA8122AN |
| JT10.7MG18 | 60~90 | 0.9 | 300 | TA8132N |
| JT10.7MG33 | 45 | 0.7 | 250 | TA2007 |
| JT10.7MG80 | 65 | 1.0 | 300 | TA2104AFN |
| JT10.7MG82 | 90 | 0.8 | 320 | TA2099N |
| JT10.7MG92 | 60 | 1.0 | 300 | TA2132P |
| JT10.7MC1 | 35 | 1.0 | 242 | CXA1019M, CX-20091 |

| STANDARD RULE | | | | | |
|------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|
| Center Frequency | D 10.64MHz ±30KHz | B 10.67MHz ±30KHz | A 10.70MHz ±30KHz | C 10.73MHz ±30KHz | E 10.76MHz ±30KHz |
| Color | Black | Blue | Red | Orange | White |

JT10.7MG₃ TEST CIRCUIT



JT10.7MG₁₆ TEST CIRCUIT

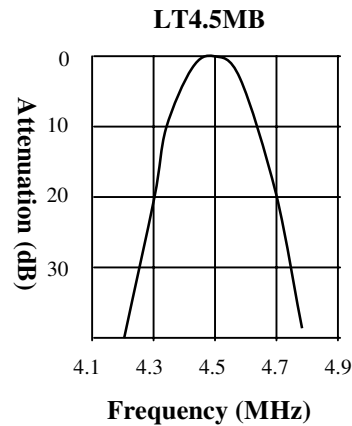
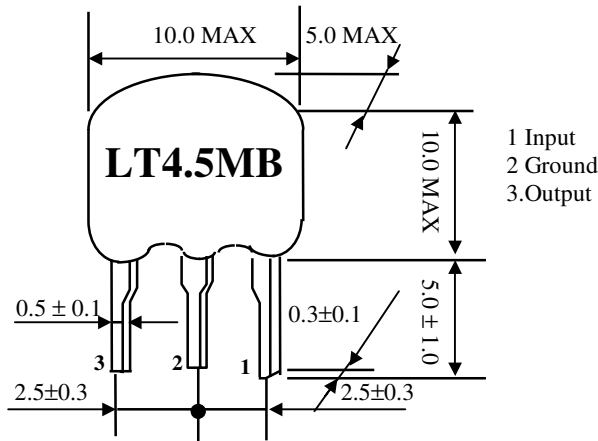




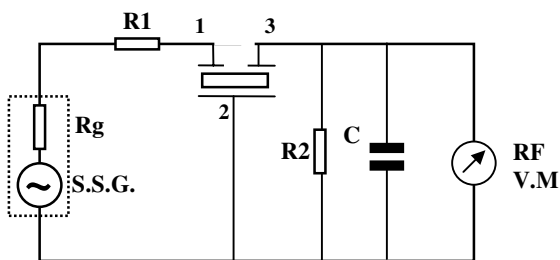
**LT MB Series of Ceramic Filter For TV/VCR Stage
(Compatible to Murata SFE MB)**

Token ceramic filter LT MB series is a high selectivity filter for 2-channel multi-sound TV. Features with frequency adjustment-free, high performance and durability, and high selectivity.

| TECHNICAL CHARACTERISTICS | | | | | | |
|---------------------------|-------------------------------------|---------------------------|---------------------------|--------------------------|---|----------------------------|
| Part Number | Nominal Center Frequency (fn) (MHz) | 3dB Band Width (KHz) Min. | 20dB Band Width (KHz) Max | Insertion Loss (dB) Max. | Spurious Attenuation (dB) Min. | Input/Output Impedance (Ω) |
| LT4.5MB | 4.500 | fn±50 | 530 | 6.0 | 20(4.5 ^{+0.8} _{-1.0} MHz) | 1000 |
| LT5.5MB | 5.500 | fn±75 | 550 | 6.0 | 25(5.5±1MHz) | 600 |
| LT6.0MB | 6.000 | fn±80 | 600 | 6.0 | 25(6.0±1MHz) | 470 |
| LT6.5MB | 6.500 | fn±80 | 630 | 6.0 | 25(6.5+1MHz) 30(6.5-1MHz) | 470 |



LT_MB TEST CIRCUIT



$R_g + R_1 = R_2 = 330\Omega$; $C = 10pF$
Including Stray Capacitance and
Input Capacitance of RF Voltmeter.



TOKEN MEANS QUALITY AND SERVICE

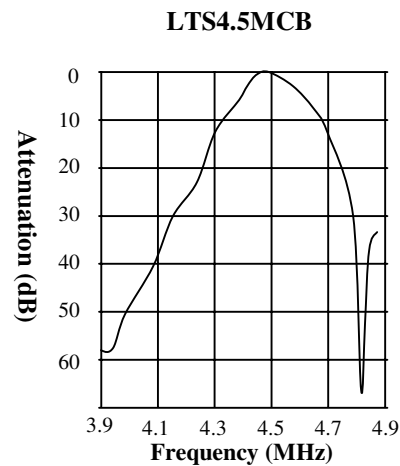
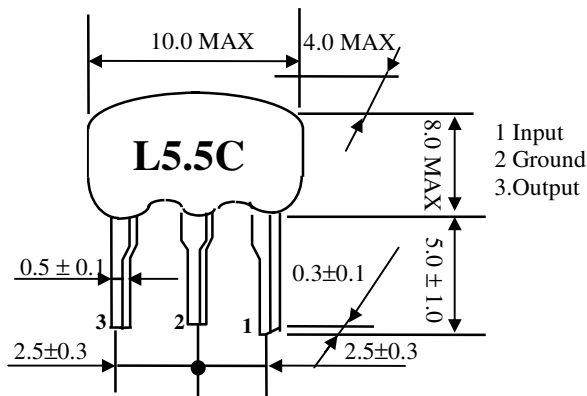
Ceramic Filter LTS MCB/MDB Series For TV/VCR Stage (Low Spurious Type) 4.5-6.5MHz

LTS MCB/MDB Series of Ceramic Filter (4.5-6.5MHz) (Compatible to Murata SFSH MCB/MDB)

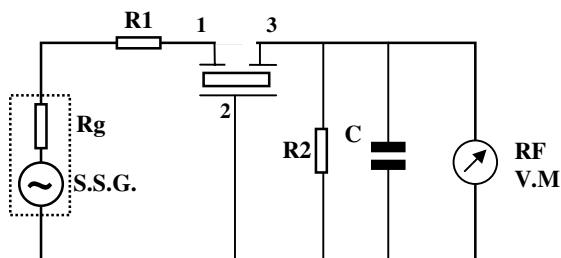
Token ceramic filter LTS MCB/MDB series use thickness shear vibration mode. Features with excellent spurious characteristics within Video Signal Band, and 3 types bandwidths prepared to respond customer requests. LTS MCB/MDB is suitable for Multiplex Sound TV in America.

TECHNICAL CHARACTERISTICS

| Part Number | Nominal Center Frequency (fn) (MHz) | 3dB Band Width (KHz) Min. | 20dB Band Width (KHz) Max. | Insertion Loss (dB) Max. | Spurious Attenuation (dB) Min. | Input/Output Impedance (Ω) |
|-------------|-------------------------------------|---------------------------|----------------------------|--------------------------|--------------------------------|----------------------------|
| LTS4.5MCB | 4.500 | fn+60 | 600 | 6.0 | 30(0~fn) | 1000 |
| LTS4.5MDB | 4.500 | fn+70 | 750 | 6.0 | 30(0~fn) | 1000 |
| LTS5.5MCB | 5.500 | fn+60 | 600 | 6.0 | 30(0~fn) | 600 |
| LTS5.5MDB | 5.500 | fn±80 | 750 | 6.0 | 30(0~fn) | 600 |
| LTS6.0MCB | 6.000 | fn+60 | 600 | 6.0 | 30(0~fn) | 470 |
| LTS6.0MDB | 6.000 | fn±80 | 750 | 6.0 | 30(0~fn) | 470 |
| LTS6.5MCB | 6.500 | fn±70 | 650 | 6.0 | 30(0~fn) | 470 |
| LTS6.5MDB | 6.500 | fn±80 | 800 | 6.0 | 30(0~fn) | 470 |



LTS_MCB/MDB TEST CIRCUIT



$R_g + R_1 = R_2 = 330\Omega$; $C = 10\text{pF}$
Including Stray Capacitance and
Input Capacitance of RF Voltmeter.



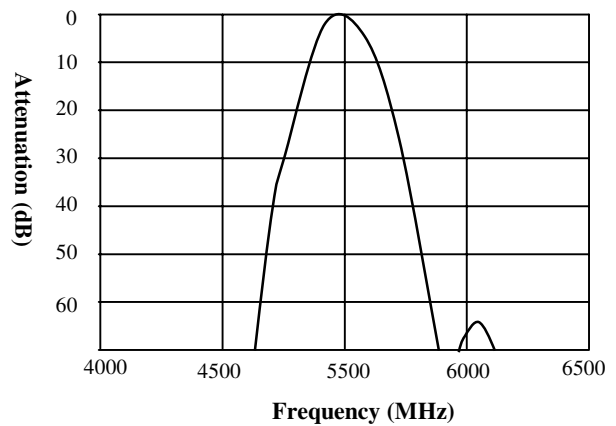
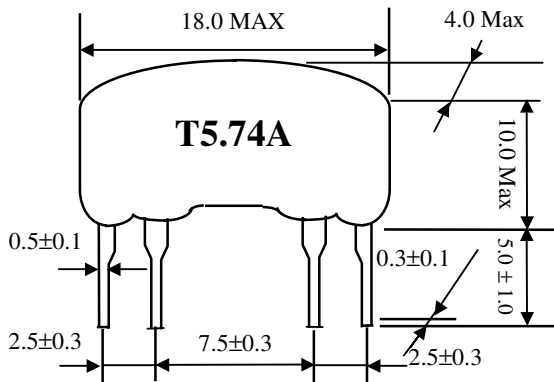
**LTT MA Series of Ceramic Filter (4.5-6.74MHz)
(Compatible to Murata SFT)**

Token LTT ceramic filters are 4 element devices that offer more selectivity than the conventional LT series (Murata SFE series) of filters. The improved spurious suppression of these filters eliminates the need for cascading multiple filtering devices; therefore, it is possible to design a more compact circuit board configuration.

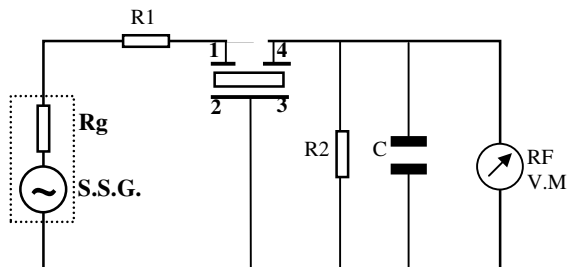
TECHNICAL CHARACTERISTICS

| Part Number | Nominal Center Frequency (fn) (MHz) | 3dB Band Width (KHz) Min. | 20dB Band Width (KHz) Min. | Insertion Loss (dB) Max. | Spurious Attenuation (dB) Min. | Input/Output Impedance (Ω) |
|-------------|-------------------------------------|---------------------------|----------------------------|--------------------------|--------------------------------|-------------------------------------|
| LTT4.5MA | 4.500 | fn \pm 40 | 370 | 10.0 | 40(4.5 \pm 1MHz) | 1000 |
| LTT4.72MA | 4.724 | fn \pm 40 | 370 | 10.0 | 40(4.72 \pm 1MHz) | 1000 |
| LTT5.5MA | 5.500 | fn \pm 50 | 350 | 9.0 | 50(5.5 \pm 1MHz) | 600 |
| LTT5.74MA | 5.742 | fn \pm 50 | 350 | 9.0 | 50(5.74 \pm 1MHz) | 600 |
| LTT6.0MA | 6.000 | fn \pm 50 | 400 | 9.0 | 50(6.0 \pm 1MHz) | 470 |
| LTT6.25MA | 6.250 | fn \pm 50 | 400 | 9.0 | 50(6.25 \pm 1MHz) | 470 |
| LTT6.5MA | 6.500 | fn \pm 50 | 400 | 9.0 | 50(6.5 \pm 1 MHz) | 470 |
| LTT6.74MA | 6.742 | fn \pm 50 | 400 | 9.0 | 50(6.74 \pm 1MHz) | 470 |

LTT5.5MA



LTT_MA TEST CIRCUIT



Rg + R1 = R2 = Input and Output Impedance
C = 10pF (Including Stray Capacitance and Input Capacitance of RF Voltmeter.)



Ceramic Trap XT MB Series For TV/VCR Stage

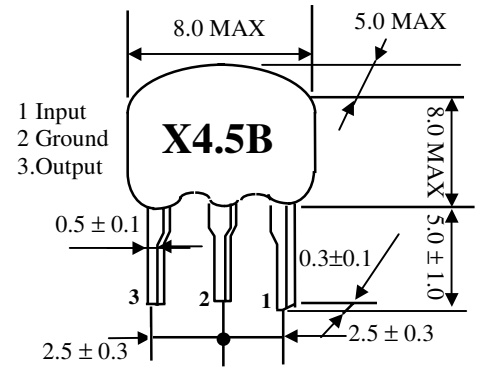
4.5-6.5MHz

XT MB Series of Ceramic Trap (4.5-6.5MHz) (Compatible to Murata SFE MB)

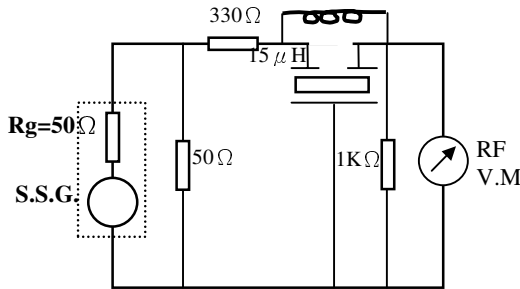
Token XT MJ/MB lines of ceramic traps are band reject filters used for video and sound IF attenuation. The 3-terminal XT MB Series contains 2 trap elements on one substrate for additional attenuation. This line of traps can be used in the sound IF of CATV/VCR receivers.

| TECHNICAL CHARACTERISTICS | | | |
|---------------------------|-----------------------------|-------------------------------|-------------------------------------|
| Part Number | Center Frequency (fn1)(MHz) | Attenuation (at fn1) (dB)Min. | 30dB Attenuation BW (fn1) (KHz)Min. |
| XT3.58MB | 3.580 | 25 | 40(25dB Att. BW) |
| XT4.43MB | 4.430 | 30 | 40 |
| XT4.5MB | 4.500 | 35 | 50 |
| XT5.5MB | 5.500 | 35 | 70 |
| XT5.74MB | 5.742 | 35 | 70 |
| XT6.0MB | 6.000 | 35 | 70 |
| XT6.5MB | 6.500 | 35 | 70 |

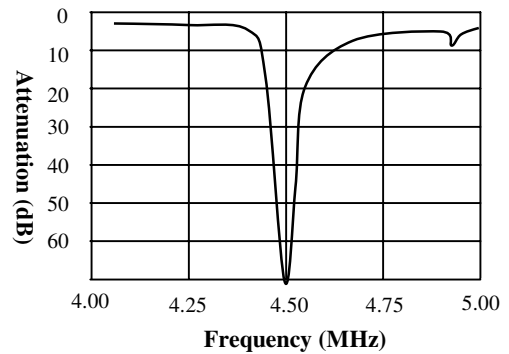
* The level at 1MHz shall be made for a reference (0dB)



XT MB TEST CIRCUIT



XT4.5MB



Ceramic Trap XT MW Series Of Double Trap

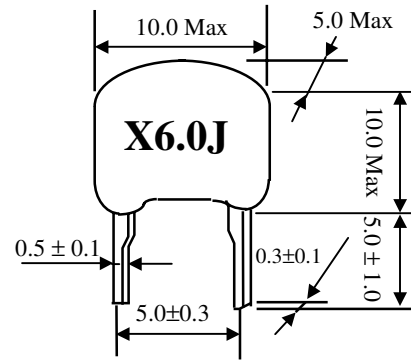
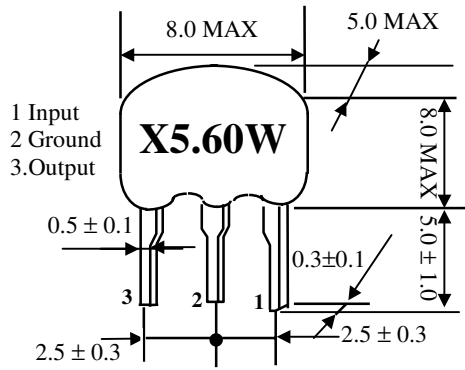
4.5-6.5MHz

XT MW Series of Double Ceramic Trap (Compatible to Murata TPWA)

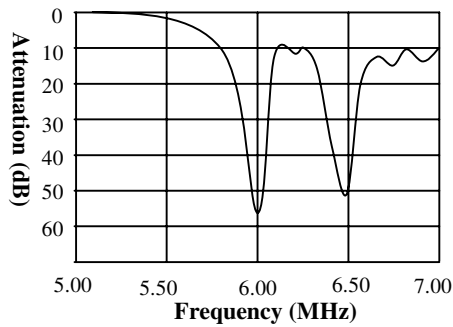
Token ceramic trap XT MW TPWA series consists of 2 wafers with 2 trap frequencies. Recommended for Multi standard set. Features with good performance of attenuation and space saving with 3-terminal type.

| TECHNICAL CHARACTERISTICS | | | | | |
|---------------------------|------------------------------|------------------------------|-------------------------------|-------------------------------|-------------------------------------|
| Part Number | Center Frequency (fn1) (MHz) | Center Frequency (fn2) (MHz) | Attenuation (at fn1) (dB) min | Attenuation (at fn2) (dB) min | 30dB Attenuation BW (fn1) (KHz) min |
| XT4.47MW | 4.500 | 4.724 | 30 | 30 | 50 |
| XT4.60MW | 4.500 | 6.000 | 30 | 30 | 50 |
| XT5.67MW | 5.500 | 5.742 | 30 | 30 | 50 |
| XT5.60MW | 5.500 | 6.000 | 30 | 30 | 50 |
| XT5.65MW | 5.500 | 6.500 | 30 | 30 | 50 |
| XT6.65MW | 6.000 | 6.500 | 30 | 30 | 70 |

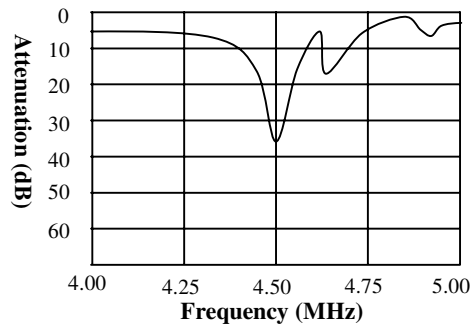
* The level at 1MHz shall be made for a reference (0dB)



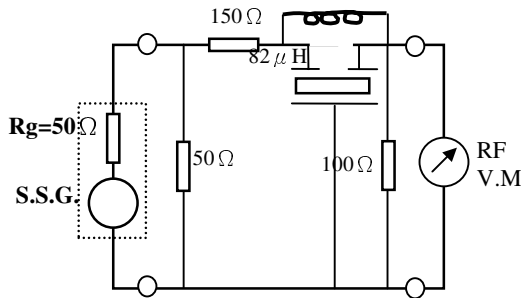
XT6.65MW



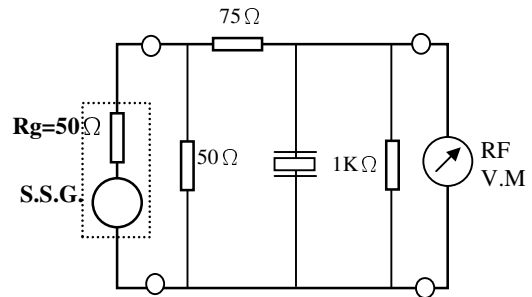
XT4.5MJ



XT MW TEST CIRCUIT



XT MJ TEST CIRCUIT



Ceramic Trap XT MJ Series For Chrominance Carrier 3.58-6.5MHz

**XT MJ Series of Ceramic Trap
(Compatible to Murata TPS MJ)**

Token XT MJ/MB lines of ceramic traps are band reject filters used for video and sound IF attenuation. The 2 terminal XT MJ Series can be used to attenuate either the sound signal in B/W receivers or the chroma signal in video.

| TECHNICAL CHARACTERISTICS | | | |
|---------------------------|------------------------------|--------------------------------|-------------------------------------|
| Part Number | Center Frequency (fn1) (MHz) | Attenuation (at fn1) (dB) min | 30dB Attenuation BW (fn1) (KHz) min |
| XT3.58MJ | 3.580 | 20 | 20 |
| XT4.43MJ | 4.430 | 20 | 30 |
| XT4.5MJ | 4.500 | 20 | 30 |
| XT5.5MJ | 5.500 | 20 | 30 |
| XT5.74MJ | 5.742 | 20 | 40 |
| XT6.0MJ | 6.000 | 20 | 40 |
| XT6.5MJ | 6.500 | 20 | 40 |

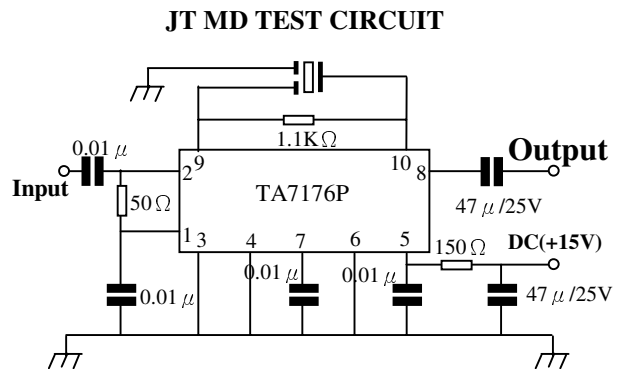
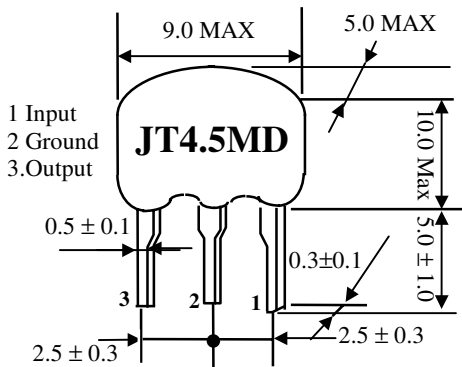
* The level at 1MHz shall be made for a reference (0dB)



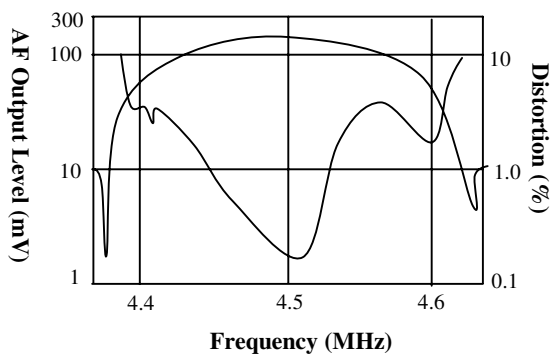
**JT MD Series of Ceramic Discriminator
(Compatible to Murata CDA MD)**

Token JT MD lines of ceramic discriminators are IC dependent devices used in the recovery of audio signals. The JT MC discriminators have three terminals with IC μ PC1382C and quadrature detection while the JT MD discriminators with IC TA7176P and differential peak detection.

| TECHNICAL CHARACTERISTICS | | | | | |
|---------------------------|------------------------------|--------------------------------------|-----------------------|-------------------|---------------|
| Part Number | Recovered Audio Voltage (mV) | Recovered Audio 3dB Band Width (KHz) | Distortion Factor (%) | Detection Method | Applicable IC |
| JT4.5MD | ≥ 100 | $\geq \pm 50$ | ≤ 3 | Differential Peak | TA7176P |
| JT5.5MD | ≥ 100 | $\geq \pm 50$ | ≤ 3 | | TA7176P |
| JT6.0MD | ≥ 100 | $\geq \pm 50$ | ≤ 3 | | TA7176P |
| JT6.5MD | ≥ 100 | $\geq \pm 50$ | ≤ 3 | | TA7176P |



JT4.5MD

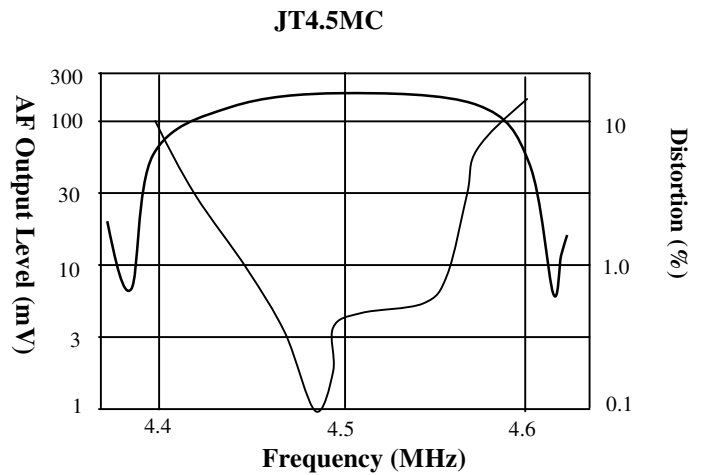
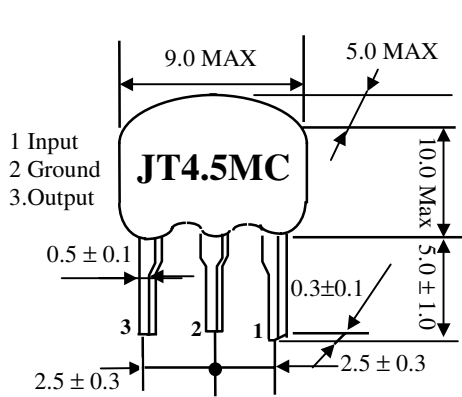




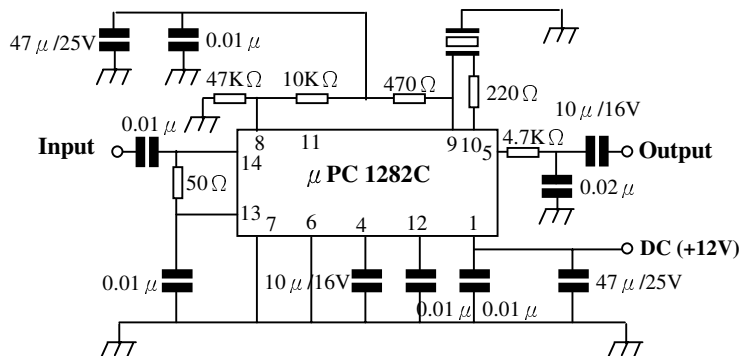
**JT MC Series of Ceramic Discriminator
(Compatible to Murata CDA MC)**

Token JT MC lines of ceramic discriminators are IC dependent devices used in the recovery of audio signals. The JT MC discriminators have three terminals with IC μ PC1382C and quadrature detection while the JT MD discriminators with IC TA7176P and differential peak detection.

| TECHNICAL CHARACTERISTICS | | | | | |
|---------------------------|------------------------------|--------------------------------------|-----------------------|------------------|---------------|
| Part Number | Recovered Audio Voltage (mV) | Recovered Audio 3dB Band Width (KHz) | Distortion Factor (%) | Detection Method | Applicable IC |
| JT4.5MC | ≥ 140 | $\geq \pm 55$ | ≤ 1.5 | Quadrature | μ PC1382C |
| JT5.5MC | ≥ 140 | $\geq \pm 55$ | ≤ 1.5 | | μ PC1382C |
| JT6.0MC | ≥ 140 | $\geq \pm 60$ | ≤ 1.5 | | μ PC1382C |
| JT6.5MC | ≥ 200 | $\geq \pm 60$ | ≤ 1.5 | | μ PC1382C |

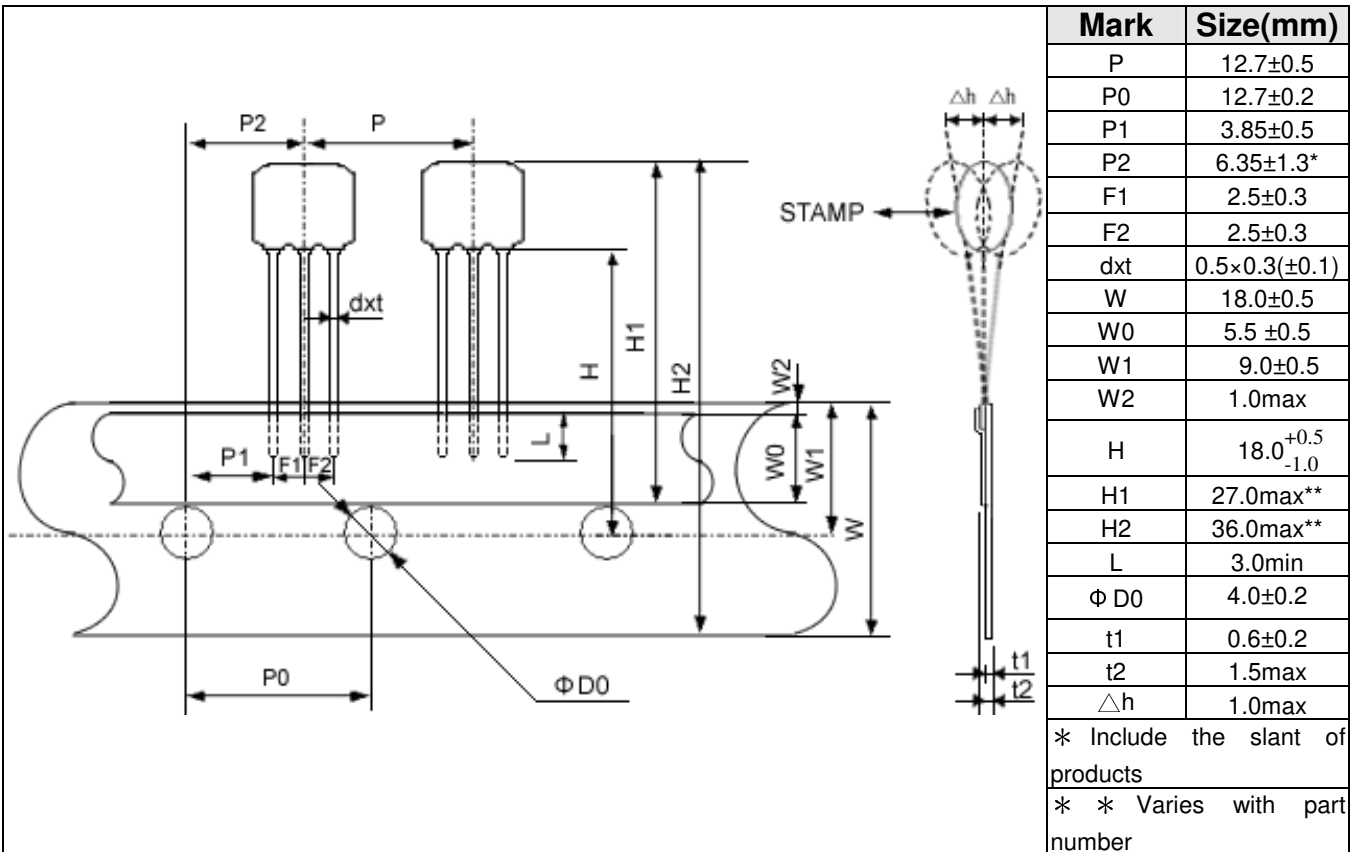
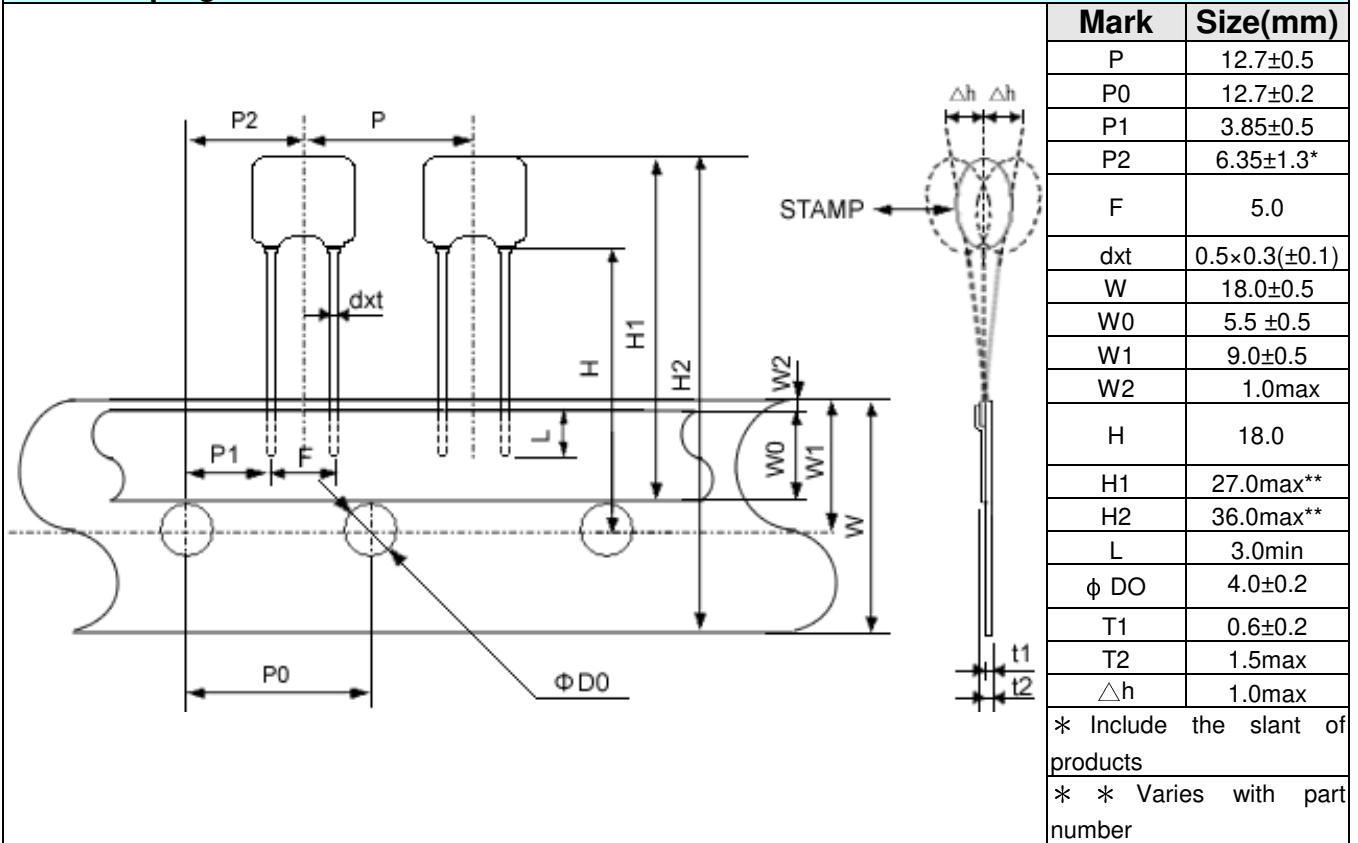


JT MC TEST CIRCUIT





Radial Taping Dimensions

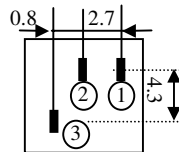
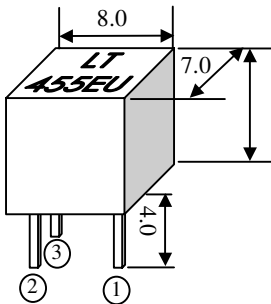




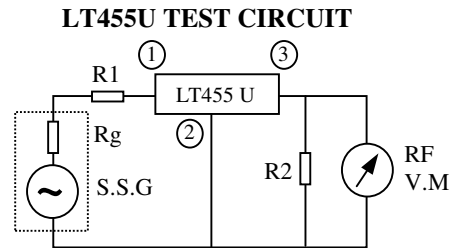
**LT455/450 U/W Series of Ceramic Filter
(Compatible to Murata CF,SF)**

Token LT 455/450 U/W ceramic filters are 4-element and 6-element devices connected in ladder form. These highly selective filters are designed to address the G.D.T. characteristics required in digital communications. The excellent G.D.T. characteristics allow these filters tube utilized in areas such as the mobile cellular markets as well as a variety of stereo applications. (Also available in 450KHz version.)

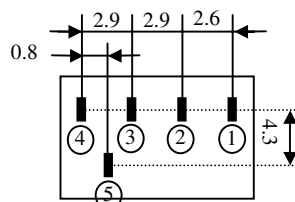
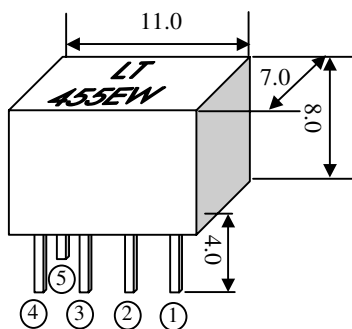
| Part Number | | Center Frequency (KHz) | Insertion Loss (dB) Max | Pass Band Ripple (dB) Max | 6dB Band Width (KHz) Min | 40dB Band Width (KHz) Max (LT 455: U) | 50dB Band Width (KHz) Max (LT 455: W) | Stop Band Attenuation $f_o \pm 100\text{KHz}$ (dB) Min | | Input/output Impedance (Ω) |
|-------------|----------|-----------------------------|-------------------------------|-----------------------------------|--------------------------------|---|---|--|-------------|--|
| | | | | | | | | LT (455: U) | LT (455: W) | |
| LT455BU | LT455BW | 455±2.0 | 4 | 2 | ±15 | ±30 | ±30 | 28 | 40 | 1500 |
| LT455CU | LT455CW | 455±2.0 | 4 | 2 | ±12.5 | ±24 | ±24 | 28 | 40 | 1500 |
| LT455DU | LT455DW | 455±1.5 | 4 | 2 | ±10 | ±20 | ±20 | 28 | 40 | 1500 |
| LT455EU | LT455EW | 455±1.5 | 6 | 2 | ±7.5 | ±15 | ±15 | 28 | 40 | 1500 |
| LT455FU | LT455FW | 455±1.5 | 6 | 2 | ±6 | ±12.5 | ±12.5 | 28 | 40 | 2000 |
| LT455GU | LT455GW | 455±1.5 | 6 | 2 | ±4.5 | ±10 | ±10 | 28 | 40 | 2000 |
| LT455HU | LT455HW | 455±1.0 | 6 | 2 | ±3 | ±9 | ±9 | 28 | 40 | 2000 |
| LT455IU | LT455IW | 455±1.0 | 6 | 2 | ±2 | ±7.5 | ±7.5 | 28 | 40 | 2000 |
| LT455HTU | LT455HTW | 455±1.0 | 6 | 2 | ±3 | ±9 | ±9 | 35 | 60 | 2000 |



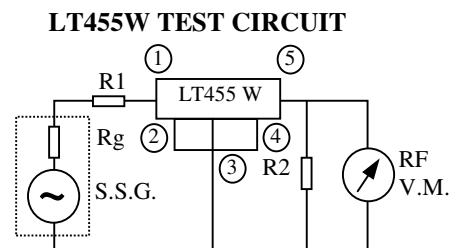
- 1. Input
- 2. Ground
- 3. Output



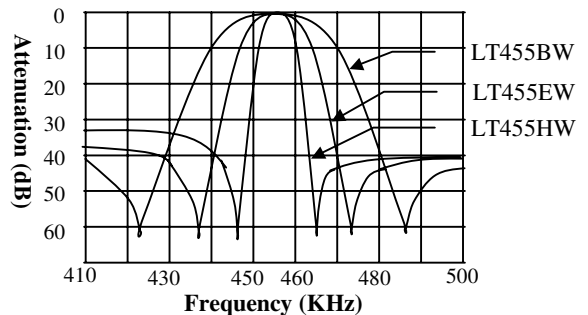
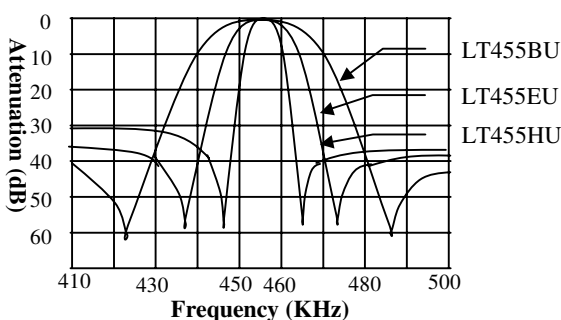
$R_g + R_1 = R_2 = \text{Input/Output Impedance}$



- 1. Input
- 2-3-4. Ground
- 5. output



$R_g + R_1 = R_2 = \text{Input/Output Impedance}$

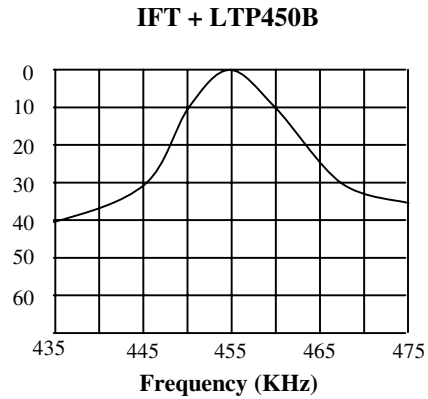
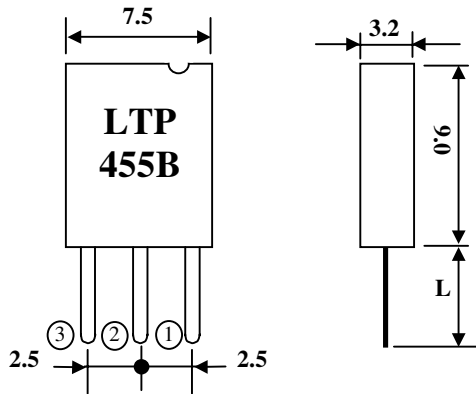




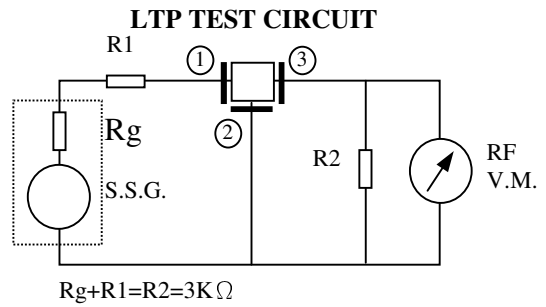
**LTP Series of Ceramic Filter For AM
(Compatible to Murata SFU450/455)**

Token LTP and LTZ ceramic filters were designed to address the needs of standard AM filtering requirements. These filters are recommended for use in low cost products where economically, efficient designs are critical.

| TECHNICAL CHARACTERISTICS | | | | | | | |
|---------------------------|----------------------|----------------------|-----------|-------------------------|----------------------|--------------------|-----|
| Part Number | 3dB Band Width (KHz) | Selectivity (dB) min | | Insertion Loss (dB) max | Composition | Lead Length L (mm) | |
| | | -9KHz off | +9KHz off | | | L1 | L2 |
| LTP455A | 10±3 | 5.0 | 3.0 | 5.0 | one element | 3.6 | 5.0 |
| LTP455B | 10±3 | 5.0 | 3.0 | 5.0 | one element with IFT | | |
| LTP450BY | 7±2 | 6.5 | 5.5 | 5.0 | | | |
| LTP450BY1 | 4.5±1.5 | 9.5 | 8.5 | 5.0 | | | |



| Type | LTP455B | | |
|--|---------|------|-----|
| <p>Winding Specification From bottom</p> | 1~2 | 2~3 | 4~6 |
| Winding Specification | 70T | 115T | 7T |
| Unload Qu | 105 | | |
| Tuning Capacity | 180pF | | |





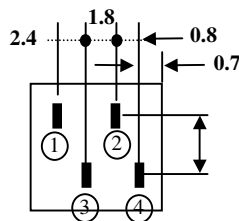
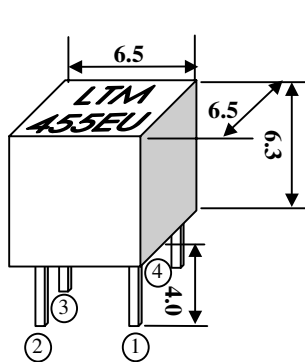
LTM455/450 U/W Series

(Compatible to Murata SFUM/WM 455/450)

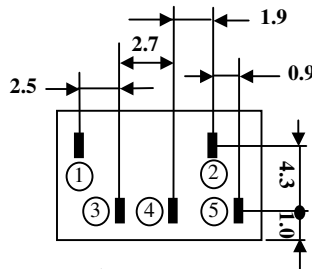
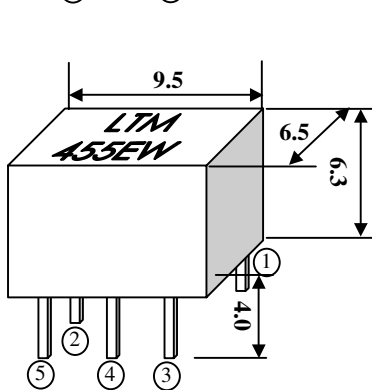
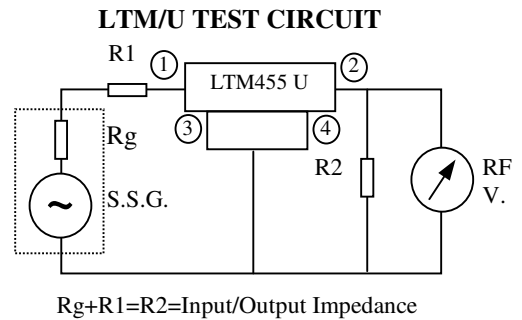
Token LTM 455/450 U/W series of ceramic filters are miniaturized versions of the Murata CFU/CFWS lines. These compact, highly selective filters are recommended for use in applications ranging from two-way radio to auxiliary filters in high-class transceivers. These ultra-miniature versions consume approximately 40% less volume while still offering the same high performance filter characteristics.

TECHNICAL CHARACTERISTICS

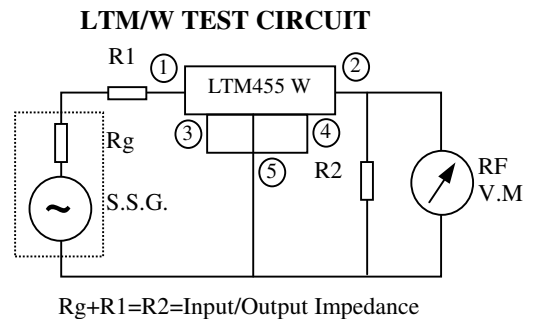
| Part Number | | Center Frequency (KHz) | Insertion Loss (dB) Max | Pass Band Ripple (dB) Max | 6dB Band Width (KHz) Min | 40dB Band Width (KHz) Max | 50dB Band Width (KHz) Max | Stop Band Attenuation $f_o \pm 100\text{KHz}$ (dB) Min | | Input/output Impedance (Ω) |
|-------------|-----------|---------------------------|-------------------------------|---------------------------------|--------------------------------|---------------------------------|---------------------------------|--|--------------|--|
| | | | | | | | | LTM 455 U | LTM 455 W | |
| LTM455BU | LTM455BW | 455±2.0 | 4 | 2 | ±15 | ±30 | ±30 | 28 | 40 | 1500 |
| LTM455CU | LTM455CW | 455±2.0 | 4 | 2 | ±12.5 | ±24 | ±24 | 28 | 40 | 1500 |
| LTM455DU | LTM455DW | 455±1.5 | 4 | 2 | ±10 | ±20 | ±20 | 28 | 40 | 1500 |
| LTM455EU | LTM455EW | 455±1.5 | 6 | 2 | ±7.5 | ±15 | ±15 | 28 | 40 | 1500 |
| LTM455FU | LTM455FW | 455±1.5 | 6 | 2 | ±6 | ±12.5 | ±12.5 | 28 | 40 | 2000 |
| LTM455GU | LTM455GW | 455±1.5 | 6 | 2 | ±4.5 | ±10 | ±10 | 28 | 40 | 2000 |
| LTM455HU | LTM455HW | 455±1.0 | 6 | 2 | ±3 | ±9 | ±9 | 28 | 40 | 2000 |
| LTM455IU | LTM455IW | 455±1.0 | 6 | 2 | ±2 | ±7.5 | ±7.5 | 28 | 40 | 2000 |
| LTM455HTU | LTM455HTW | 455±1.0 | 6 | 2 | ±3 | ±9 | ±9 | 35 | 60 | 2000 |



1.Input
3-4.Ground
2.Output

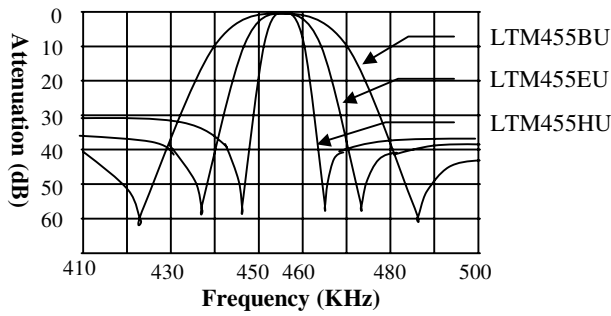


1.Input
3-4-5.Ground
2.Output

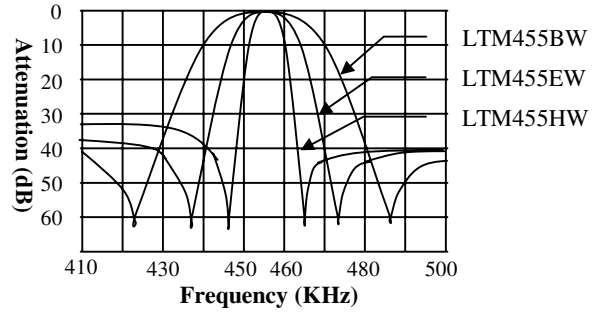




LTM455/U CHARACTERISTICS



LTM455/W CHARACTERISTICS



Ceramic Filter Miniature LT Series 450/470KHz

**Miniature LT Series of Ceramic Filter
(Compatible to Murata PFB)**

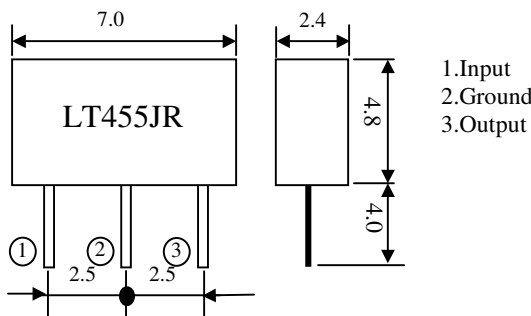
Token's ceramic filter for AM use is one of the most recommendable intermediate filters, having such distinctive features as high selectivity, high stability and adjustment-free operation. Additionally its easy matching with IC helps create an easy circuit design such as applications in Electric synthesized tuners, HiFi audio systems, AM stereo demodulations, One-chip non-adjustment IC's, and even smaller, thinner set structure to cope with these diversifying for AM receiver. Token ceramic filter features with center frequency between 450 and 470 KHz, standard tolerance ± 2 KHz, and synthesizers for the types of center frequencies 450, 459 and 468 KHz. Standard tolerance is ± 1 KHz.

| TECHNICAL CHARACTERISTICS | | | | |
|---------------------------|----------------------|---------------------------------|---------------------|-------------|
| Part Number | 3dB Band Width (KHz) | Selectivity ± 9 KHz off(dB) | Insertion Loss (dB) | Composition |
| LT455JR | 5.5 \pm 1.5 | ≥ 17 | ≤ 6 | 2 elements |

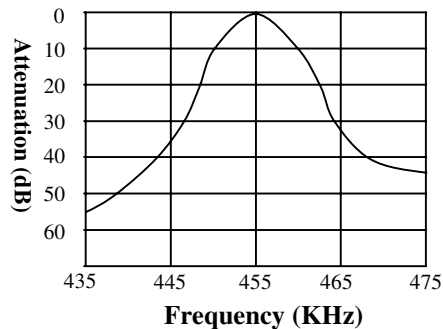
Center Frequency (fo) is available in a range of 450-470KHz

The nominal frequency tolerance is ± 2 KHz

| Type | 7x7mm | | | 5x5mm | | |
|------------------------------------|-------|-----|-----|-------|-----|-----|
| Winding Specification | 1~2 | 2~3 | 4~6 | 1~2 | 2~3 | 4~6 |
| <p>From bottom unloaded Qu</p> | 85T | 67T | 23T | 84T | 98T | 33T |
| Tuning Capacity | 180pF | | | 180pF | | |



IFT + LT455JR





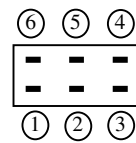
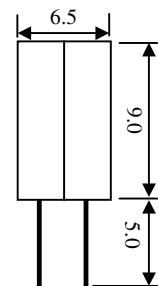
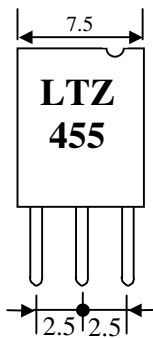
**LTZ Series of Ceramic Filter For AM
(Compatible to Murata SFZ)**

Token LTP and LTZ ceramic filters were designed to address the needs of standard AM filtering requirements. These filters are recommended for use in low cost products where economically, efficient designs are critical.

| TECHNICAL CHARACTERISTICS | | | | |
|---------------------------|----------------------|-----------------------------------|---------------------|---------------------------------|
| Part Number | 3dB Band Width (KHz) | Selectivity $\pm 9\text{KHz}$ Off | Insertion Loss (dB) | Composition |
| LTZ455HL | 4.0 ± 1 | 28 | 7 | 2 elements direct coupling type |
| LTZ455JL | 5.5 ± 1 | 18 | 7 | |

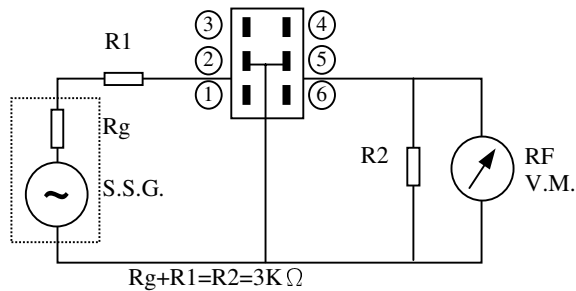
Center Frequency (f_0) is available in a range of 450-470KHz
The nominal frequency tolerance is $\pm 2\text{KHz}$

| Recommended IFT (7mm Square) | |
|------------------------------|-------------|
| Type | LTZ455HL/JL |
| Winding Specification | 1~2 2~3 4~6 |
| | 68T 84T 14T |
| From bottom | |
| Unloaded Q_u | 90 |
| Tuning Capacity | 180PF |

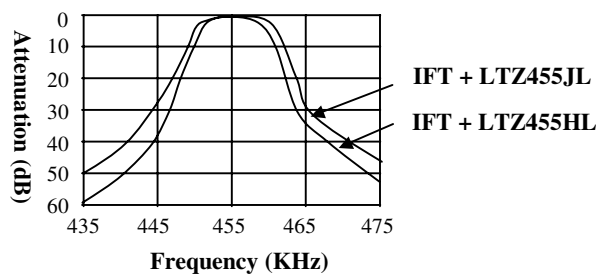


- 1. Input
- 5-2. Ground
- 4-3. Direct Couple
- 6. Output

LTZ TEST CIRCUIT



LTZ CHARACTERISTICS





Ceramic Filter LZU Series for Search-Stop Signal Detection

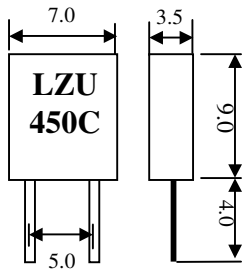
450KHz

LZU Series Of Ceramic Filter (Compatible to Murata BFU)

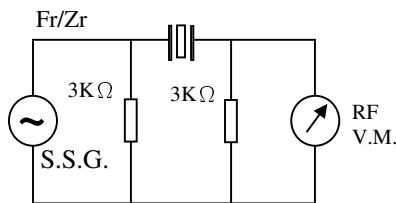
Token ceramic filter LZU 450 KHz search stop signal detection were specifically designed for signal detection circuitry used in applications such as that found in the search-stop functions of electronically tuned radios. Center frequency is also available in LTZ series a range of 450 KHz ~ 470 KHz.

TECHNICAL CHARACTERISTICS

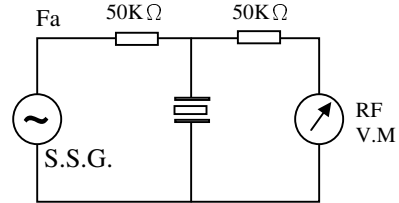
| Part Number | Resonant Frequency (KHz) | Resonant Resistance (Ω) max | Band Width (Fa-Fr) KHz | Application |
|-------------|--------------------------|--------------------------------------|------------------------|---------------------|
| LZU450C | 450 \pm 1 | 20 | 14 \pm 2 | IF signal detection |
| LZU450C4N | 450 \pm 0.8 | 30 | 9 \pm 2 | |



LZU TEST CIRCUIT-Fr/Zr



LZU TEST CIRCUIT-Fa



Ceramic Filter LT Series for Radio-Cassette Recorder

450/470KHz

LT SERIES FOR RADIO-CASSETTE RECORDER

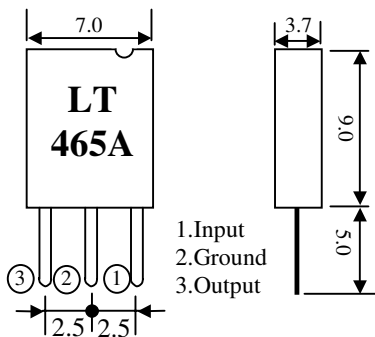
Token LT465A ceramic filters were designed to address the needs of standard radio cassette recorder requirements. These filters are recommended for use in low cost products where economically, efficient designs are critical. The nominal frequency tolerance is \pm 2 KHz.

TECHNICAL CHARACTERISTICS

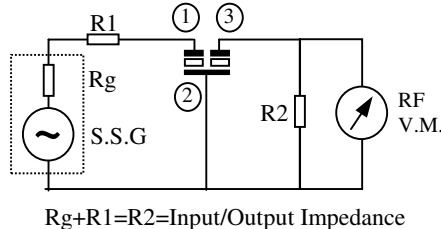
| Part Number | Insertion loss (db) | Pass Band Width (KHz) | Stop Band Width (KHz) | Selectivity \pm 9KHz off | Ripple (dB) | Input/Output Impedance (K Ω) |
|-------------|---------------------|-----------------------|-----------------------|----------------------------|-------------|--------------------------------------|
| LT465A | \leq 3 | \leq 8 | \leq 12 | \leq 11 | \leq 1 | 2 |

Center Frequency(f_0) is available in a range of 450-470KHz

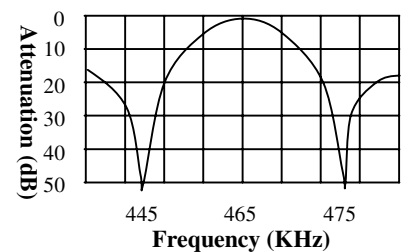
The nominal frequency tolerance is \pm 2KHz



LT TEST CIRCUIT



LT465A





JTM Series of Ceramic Discriminator For Communication (455kHz)

Token JTM discriminator including features with small in size and light weight, realize non-adjustment in detection circuit, high sensitivity and stability, wide range of standard products are available for various ICs, operating temperature range:-20°C to +80°C and storage temperature range:-40°C to +85°C. Standard line includes products for a wide range of applications, from cordless telephones to cellular telephones, making non-adjustment and shrinking of the detection circuit possible.

| TECHNICAL CHARACTERISTICS | | | | | |
|---------------------------|------------------------------|----------------------------------|---------------------------------|------------------------------------|---------------|
| Part Number | Center Frequency f_0 (KHz) | Recovered Audio 3dB BW (KHz) min | Recovered Audio Output (mV) min | Distortion Factor At f_0 (%) max | Applicable IC |
| JTM455C ₂ | 455±2 | | | 3 | TA8104F |
| JTM455C ₃ | 455±2 | | | 3 | CTA1184N |
| JTM455C ₂₈ | 455±2 | $f_n \pm 4$ | 40±25 | 3 | TA31142FN |
| JTM455C ₃₂ | 455±2 | $f_n \pm 4$ | 40±20 | 3 | TA31143 |

