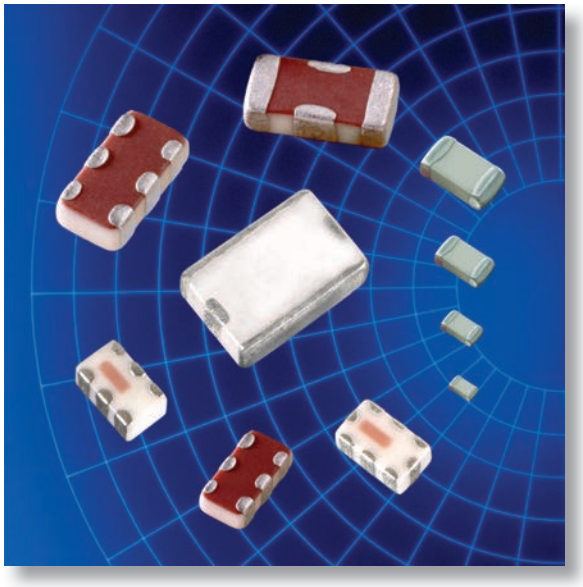
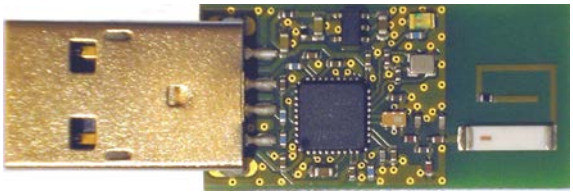
# Integrated Passive Components





Johanson Technology has developed a line of small, highly reliable RF ceramic components manufactured with a proprietary LTCC (low temperature co-fired ceramic) process. These components operate over several bands from 900MHz to 6 GHz covering Cellular, DECT, WLAN, Bluetooth, 802.11 (a,b and g) and GPS applications.

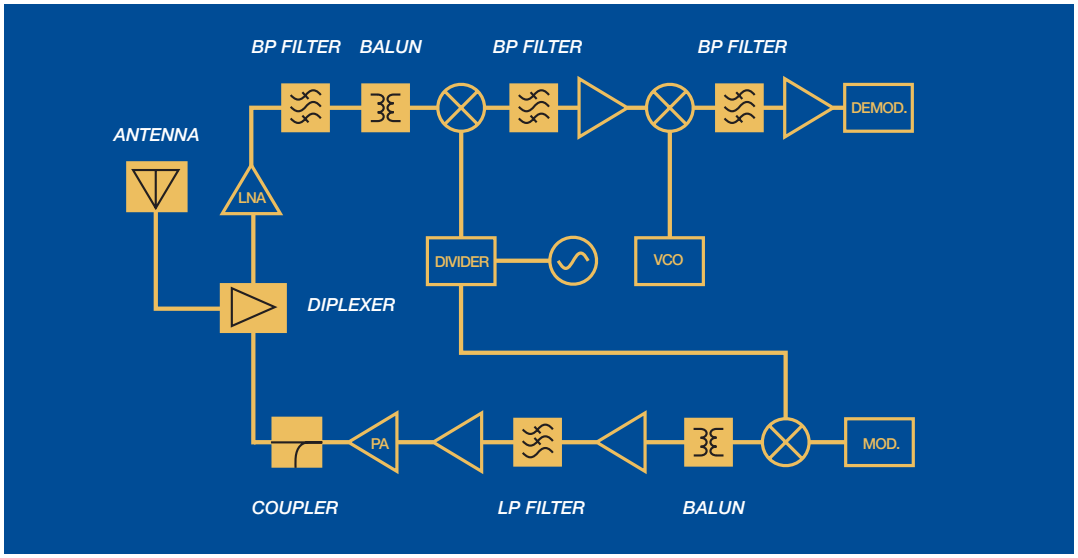
In addition to the array of listed components we can support custom solutions for high volume applications with design flexibility and short development times. Contact us today with your specific technical requirements.

## Key Features

- Custom Solutions
- LTCC Based Designs
- Low Insertion Loss
- Miniature Size / Low Profile
- Temperature Stable
- Surface Mount
- RoHS Compliant, Standard, Use No Suffix
- Tin / Lead Term. Option, Add "/Pb" Suffix

## Supported Application Bands

- Wireless LAN, Bluetooth, Home RF
- GSM/EDGE/GPRS/DCS/PCS/WCDMA
- WiMAX 802.16 d/e
- 2.4 GHz & 5.5 GHz ISM Band
- Zigbee
- MIMO
- GPS
- UNII
- UWB



## Ceramic Chip Antennas

| Part Number | Frequency (MHz) | Peak Gain | Ave. Gain | Return Loss (min) | Case Size |
|---|---|---|---|---|---|
| 0433AT62A0020 | 423 - 443 | -4 dBi typ. (XZ-total) | -4 dBi typ. (XZ-total) | 9.5 dB | See Spec Sheet |
| 0490AT62A0040 | 423-443 | -3.0 dBi typ. (XZ-total) | -6.0 dBi typ. (XZ-total) | 4.4 dB | See Spec Sheet |
| 0783AT43A0008 | 779 - 787 | -2.0 dBi typ. (XZ-total) | -5.0 dBi typ. (XZ-total) | 9.5 dB | 43-1 |
| 0868AT43A0020 | 858 - 878 | -1.0 dBi typ (XZ-total) | -4.0 dBi typ (XZ-total) | 9.5 dB | 43-1 |
| 0830AT54A2200 | 700-800<br>1700-2100<br>824-960<br>1710-2690 | 2.0<br>-1.6 | 2.0<br>-1.0 | 3.5<br>4.5 | See Spec Sheet |
| 0915AT43A0026 | 902 - 928 | -1.0 dBi typ (XZ-total) | -4.0 dBi typ (XZ-total) | 8.5 dB | 43-1 |
| 0953AT43A0006 | 950 - 956 | -1.0 dBi typ.(XZ-total) | -1.0 dBi typ.(XZ-total) | 9.5 dB | 43-1 |
| 1575AT43A0040 | 1555 - 1595 | - 1.5 dBi typ (XZ-V) | -2.5 dBi typ (XZ-V) | 9.5 dB | 43-1 |
| 1575AT44A0010 | 1570 - 1580 | 0.5 dBi typ (XZ-V) | -2.0 dBi typ (XZ-V) | 9.5 dB | See Spec Sheet |
| 1575AT54A0010 | 1570 - 1580 | 1.3 dBi typ (YZ-Total) | -0.7 dBi typ (YZ-Total) | 9.5 dB | See Spec Sheet |
| 1600AT45A0040 | 1580 - 1620 | 0.0 dBi typ (XZ-Total) | -1.0 dBi typ (XZ-Total) | 9.5 dB | 45-1 |
| 1905AT45A0050 | 1880 - 1930 | 0.5 dBi typ (XZ-Total) | -1.1 dBi typ (XZ-Total) | 9.5 dB | See Spec Sheet |
| 2000AT18A0075 | 1965 - 2040 | 0.3 dBi typ (XZ-V) | -3 dBi typ (XZ-V) | 9.5 dB | 18-4 |
| 2450AD14A5500 | 2400 - 2480<br>5150 - 5850 | 1.0 dBi typ (YZ-Total)<br>4.0 dBi typ (YZ-Total) | 3.5 dBi typ (XZ-Total)<br>2.5 dBi typ (XZ-Total) | 6.0 dB<br>6.0 dB | See Spec Sheet |
| 2450AD18A7250 | 2400-2480<br>6000-8500 | +3.0 (YZ-cut)<br>+5.5 (YZ-cut) | +0.4 (YZ-cut)<br>+1.0 (YZ-cut) | 6.5 min. | See Spec Sheet |
| 2450AT07A0100 | 2400 - 2500 | 1.0 dBi typ (XZ-Total) | 1.5 dBi typ (XZ-Total) | 6.5 dB | See Spec Sheet |
| 2450AT18A100 | 2400 - 2500 | 0.5 dBi typ (XZ-V) | -0.5 dBi typ (XZ-V) | 9.5 dB | 18-4 |
| 2450AT18B100 | 2400 - 2500 | 0.5 dBi typ (XZ-V) | -0.5 dBi typ (XZ-V) | 9.5 dB | 18-4 |
| 2450AT18D0100 | 2400 - 2500 | 1.5 dBi typ.(XZ-V) | -1.0 dBi typ.(XZ-V) | 6.0 dB | 18-5 |
| 2450AT42A100 | 2400 - 2500 | 0 dBi typ (XZ-V) | -1 dBi typ (XZ-V) | 9.5 dB | 42-1 |
| 2450AT42B100 | 2400 - 2500 | 0 dBi typ (XZ-V) | -1.5 dBi typ (XZ-V) | 9.5 dB | 42-1 |
| 2450AT42D0100 | 2400 - 2500 | 0.5 dBi typ (XZ-total) | -2.0 dBi typ (XZ-V) | 6.0 dB | 42-1 |
| 2450AT42E0100 | 2400 - 2480 | -2.0 dBi typ (YZ-V) | - | -5.0 dB | See Spec Sheet |
| 2450AT43A100 | 2400 - 2500 | 2.0 dBi typ (XZ-V) | 0.5 dBi typ (XZ-V) | 9.5 dB | 43-1 |
| 2450AT43B100 | 2400 - 2500 | 1.3 dBi typ (XZ-V) | -0.5 dBi typ (XZ-V) | 9.5 dB | 43-2 |
| 2450AT43F0100 | 2400 - 2500 | 2.1 dBi typ (XZ-total) | 1.0 dBi typ (XZ-total) | --- | See Spec Sheet |
| 2450AT45A100 | 2400 - 2500 | 3.0 dBi typ (XZ-V) | 1.0 dBi typ (XZ-V) | 9.5 dB | 45-1 |
| 2450AD46A5400 (Dual Band) | LB: 2400 - 2500<br>HB: 4900 - 5900 | 1.0 dBi typ (XZ-V)<br>-1.5 dBi typ (XZ-V) | -2.5 dBi typ (YZ-V)<br>-2.5 dBi typ (YZ-V) | 8.5 dB<br>8.5 dB | 46-1 |
| 2500AT43A0100 | 2450 - 2550 | 0.6 dBi typ (YZ-total) | -2.1 dBi typ (XZ-total) | 3.0 dB | 43-1 |
| 2500AT44M0400 | 2300 - 2700 | 2.5 dBi typ | 0.5 dBi typ | 9.5 dB | 44-2 |
| 2600AT44A0600 | 2300 - 2900 | 2.0 dBi | 0.0 dBi typ. | 9.5 dB | 42-2 |
| 2650AT43A0100 | 2600 - 2700 | 0.5 dBi typ (YZ-total) | -1.7 dBi typ (XZ-total) | 3.0 dB | 50 |
| 3100AT51A7200 | 3100 - 10300 | 1.5 dBi typ | -3.5 dBi typ | 9.5 dB | 51-1 |
| 4000AT44A1800 | 3100 - 4900 | 2.7 dBi typ | -3.5 dBi typ | 7.4 dB | See Spec Sheet |
| 5400AT18A1000 | 4900 - 5900 | 2.0 dBi typ (XZ-V) | -2.5 dBi typ (XZ-V) | 8.5 dB | 18-4 |
| 5500AT18A0725 | 5150 - 5875 | 2.0 dBi typ. (XZ-V) | -2.5 dBi typ. (XZ-V) | 9.5 dB | 18-4 |
| 5500AT07A0900 | 5725 - 5825 | 3.9 dBi typ (XZ-V) | -1.5 dBi typ (XZ-V) | 9.5 dB | 43-1 |
| 7000AT18A1600 | 6200 - 7800 | 2.0 dBi typ | -0.5 dBi typ | 10 dB | See Spec Sheet |

Detailed specifications and performance curves for the RF Ceramic Component line are located on our website.

## Band-Pass Filters: 2.45 GHz

| Part Number | Frequency (MHz) | Insertion Loss (max.) | Attenuation (min) | Return Loss (min) | Case Size (EIA) |
|---|---|---|---|---|---|
| 1905BP18A0050 | 1880 - 1930 | 1.65 dB | 20dB @ 100-1500MHz<br>15dB @ 2300-6000MHz<br>25dB @ 1250-1290MHz<br>30dB @ 2400-2500MHz<br>25dB @ 2500-2570MHz | 9.5 dB | 1206 |
| 2450BP07A0100 | 2400 - 2500 | 2.5 dB | 25 dB @ 824 - 960 MHz<br>25 dB @ 1710 - 1910 MHz<br>25 dB @ 4800 - 5000 MHz<br>15 dB @ 7200 - 7500 MHz | 9.5 dB | 0402 |
| 2450BP08A0100 | 2400 - 2500 | 1.0 max@ 25°C | 15 min@5-960MHz<br>10 min@1710-1990MHz<br>25 min@4800-7200MHz | 9.0 dB | 0504 |
| 2450BP14D0100 | 2400 - 2500 | 1.7 dB | 30 dB @ 880 - 915 MHz<br>30 dB @ 1710 - 1785 MHz<br>25 dB @ 1850 - 1910 MHz<br>25 dB @ 4800 - 5000 MHz<br>15 dB @ 7200 - 7500 MHz | 9.5 dB | 0603 |
| 2450BP14E0100 | 2400 - 2500 | 2.5 dB | 35 dB @ 824 - 960 MHz<br>38 dB @ 1710 - 1910 MHz<br>25 dB @ 4800 - 5000 MHz<br>20 dB @ 7200 - 7500 MHz | 9.5 dB | 0603 |
| 2450BP14F0100 | 2400-2500 | 2.5 max (25°C)<br>2.8 max (-40 to +85) | 40dB @ 880-915MHz<br>40dB @ 1710-1850MHz<br>40dB @ 1850-1910MHz<br>40dB @ 1920-1990MHz<br>25dB @ 2100-2170MHz | 10 dB | 0603 |
| 2450BP15B100 | 2400 - 2500 | 2.2 dB | 25 @ 1200 - 1300 MHz<br>10 @ 2000 MHz<br>12 @ 3000 MHz<br>30 @ 3600 - 3800 MHz<br>34 @ 4800 - 5000 MHz | 9.5 dB | 0805 |
| 2450BP15C100 | 2400 - 2500 | 2.2 dB | 30 dB @ 1200 - 1300 MHz<br>15 dB @ 2000 MHz<br>25 dB @ 3000 MHz<br>20 dB @ 3600 - 3800 MHz<br>20 dB @ 4800 - 5000 MHz | 9.5 dB | 0805 |
| 2450BP15E0100 | 2400 - 2500 | 1.5 dB | 30 dB @ 880 - 915 MHz<br>30 dB @ 1710 - 1785 MHz<br>25 dB @ 1850 - 1910 MHz<br>25 dB @ 4800 - 5000 MHz<br>15 dB @ 7200 - 7500 MHz | 9.5 dB | 0805 |
| 2450BP15F0100 | 2400 - 2500 | 2.5 dB | 35 dB @ 824 - 960 MHz<br>38 dB @ 1710 - 1910 MHz<br>25 dB @ 4800 - 5000 MHz<br>20 dB @ 7200 - 7500 MHz | 9.5 dB | 0805 |
| 2450BP15H0100 | 2400 - 2500 | 1.5 max.@ 25°C<br>1.8 max.<br>@ -40 - 85°C | 25 dB @ 1200 - 1300 MHz<br>10 dB @ 2000 MHz<br>12 dB @ 3000 MHz<br>30 dB @ 3600 - 3800 MH<br>34 dB @ 4800 - 5000 MHz | 9.5 dB | 0805 |
| 2450BP18C100E | 2400 - 2500 | 2.5 dB | 40 dB @ 1200 - 1800 MHz<br>25 dB @ 2100 MHz<br>35 dB @ 4800 - 5000 MHz<br>25 dB @ 7200 - 7500 MHz | 9.5 dB | 1206 |
| 2450BP39C100A | 2400 - 2500 | 2.5 dB | 42 dB @ 1710 - 1990 MHz<br>30 dB @ 2100 MHz<br>30 dB @ 4800 - 5000 MHz | 9.5 dB | 2520 |

Detailed specifications and performance curves for the RF Ceramic Component line are located on our website.

## Band-Pass Filters: 2.45 GHz

| Part Number | Frequency (MHz) | Insertion Loss (max.) | Attenuation (min) | Return Loss (min) | Case Size (EIA) |
|---|---|---|---|---|---|
| 2450BP39C100C | 2400 - 2500 | 1.5 dB | 30 dB @ 800 - 915 MHz<br>30 dB @ 1710 - 1785 MHz<br>25 dB @ 1850 - 1910 MHz<br>25 dB @ 4800 - 5000 MHz<br>15 dB @ 7200 - 7500 MHz | 9.5 dB | 2520 |
| 2450BP39C100D | 2450 ± 50 | 2.2 dB | 30 dB @ 880 - 915MHz<br>30 dB @ 1710 - 1785MHz<br>25 dB @ 1850 - 1910MHz<br>25 dB @ 2100MHz<br>25 dB @ 4800 - 5000MHz<br>15 dB @ 7200 - 7500MHz | 9.5 dB | 2520 |
| 2450BP39D100B | 2400 - 2500 | 2.5 dB | 35 dB @ 880 - 915 MHz<br>18 dB @ 1710 - 1990 MHz<br>12 dB @ 2100 MHz<br>35 dB @ 3200 MHz<br>22 dB @ 4800 - 5000 MHz<br>22 dB @ 7200 - 7500 MHz | 9.5 dB | 2520 |
| 2450BP39D100C | 2400 - 2500 | 1.2 dB | 30 dB @ 880 - 915 MHz<br>30 dB @ 1710 - 1785 MHz<br>25 dB @ 1850 - 1910 MHz<br>25 dB @ 4800 - 5000 MHz<br>15 dB @ 7200 - 7500 MHz | 9.5 dB | 2520 |
| 3350BP39A0500 | 3100 - 3600 | 2.0 dB | 35dB @ 500-2000MHz<br>30dB @ 2500MHz<br>5dB @ 2950MHz<br>10dB @ 4000MHz<br>28dB @ 5000MHz | 9.5 dB | 1008 |
| 2450BP39D100E | 2400 - 2500 | 1.2 dB | 30 @ 880 - 915 MHz<br>30 @ 1710 - 1785 MHz<br>25 @ 1850 - 1910 MHz<br>2 @ 2700 MHz<br>25 @ 4800 - 5000 MHz<br>15 @ 7200 - 7500 MHz | 9.5 dB | 2520 |
| 2450BP39F100A | 2400 - 2500 | 2.4 dB | 45 dB @ 880 - 915 MHz<br>48 dB @ 1710 - 1990 MHz<br>20 dB @ 2110 - 2170 MHz<br>30 dB @ 4800 - 5000 MHz<br>36 dB @ 7200 - 7500 MHz | 9.5 dB | 2520 |
| 2450BP41D100A | 2400 - 2500 | 2.3 dB | 40 dB @ 1200 - 1800 GHz<br>30 dB @ 2100 GHz<br>12 dB @ 2200 GHz<br>35 dB @ 4800 - 5000 GHz | 9.5 dB | See Spec Sheet |

We design, develop, and manufacture passive RF Diplexers/Triplexer for GPS/GLNSS+BLE/WiFi + WLAN for portable applications. Small EIA 0603 or 0805 are achievable using LTCC technology integrated to receive and filter, and split 1.5, 2.45, and 5.5GHz signals for various RF chipsets who offer combined functionality. These components are also used in wideband antenna systems where diplexing/triplexing RF signals is required

Detailed specifications and performance curves for the RF Ceramic Component line are located on our website.

## Band-Pass Filters: 2.45 GHz

| Part Number | Frequency (MHz) | Insertion Loss (max.) | Attenuation (min) | Return Loss (min) | Case Size (EIA) |
|---|---|---|---|---|---|
| 2450BP41D100B | 2400 - 2500 | 1.3 dB | 30 dB @ 880 - 915 MHz<br>30 dB @ 1710 - 1785 MHz<br>20 dB @ 1850 - 1910 MHz<br>25 dB @ 4800 - 5000 MHz<br>20 dB @ 7200 - 7500 MHz | 9.5 dB | See Spec Sheet |
| 2500BP15M400 | 2300 - 2700 | 2.0 dB | 15 dB @ 100 - 1800 MHz<br>20 dB @ 3400 - 11700 MHz | 9.5 dB | 2520 |

## Band-Pass Filters: 5.5 GHz

| Part Number | Frequency (MHz) | Insertion Loss (max.) | Attenuation (min) | Return Loss (min) | Case Size |
|---|---|---|---|---|---|
| 5130BP18U4060 | 3100-7160 | 1.6 dB | 25dB @ 824 -960MHz<br>25dB @ 1710-1990MHz<br>15dB @ 2400 -2500MHz<br>20dB @ 10100-10600MHz | 9.5 dB | 1206 |
| 5400BP14A0950 | 4900-5850 | 1.5max @25°C<br>1.7max @-40°C to 85C | 33dB @ 100-2170MHz<br>29dB @ 2170-2500MHz<br>32dB @ 9800-12000MHz | 9.5 dB | 0603 |
| 5515BP15B725 | 5150-5875 | 1.5 dB | 30dB @ 3500MHz<br>25dB @ 9800 - 11840MHz<br>5dB @ 14700 - 17760MHz | 9.5 dB | 0805 |
| 5515BP15B975 | 4900 - 5875 | 1.5 dB | 30 dB @ 3500 MHz | 9.5 dB | 0805 |
| 5515BP15C725 | 5150 - 5875 | 2.0 dB | 30 dB @ 500 - 4000 MHz<br>20 dB @ 4600 MHz<br>15 dB @ 10300 - 11800 MHz | 9.5 dB | 0805 |
| 5515BP15C975 | 4900 - 5875 | 1.8 dB | 30 dB @ 500 - 4000MHz<br>20 dB @ 4200MHz<br>15 dB @ 9800 - 11750MHz | 8.5 dB | 0805 |
| 5515BP15C1020 | 4900 - 5920 | 1.5 dB | 30 dB @ 3500 MHz | 9.5 dB | 0805 |
| 5525BP15B0750 | 5150-5900 | 3.5 dB | 35min.@ 4000MHz<br>35min.@ 4500MHz<br>40min.@ 4600MHz | 7.4 dB | 0805 |
| 5550BP14A0800 | 5150-5950 | 0.7 typ.@25°C<br>0.9 max.@-40C~ 85°C | 35min.@ 700-2690MHz<br>30min.@ 3400-3800MHz<br>12min.@ 7250-7800MHz<br>20min.@10300-11700MHz | 9.5 dB | 0805 |
| 5697BP44A0360 | 5490 - 5835 | 2.2 typ. /2.5 max | 30min. @2400-2500MHz<br>40min. @5170-5330MHz<br>25min. @10980-11670MHz | 9.5 dB | See Spec Sheet |
| 5235BP44A0180 | 5170-5330 | 2.2 typ./2.5 max | 30min. @2400-2500MHz<br>40min. @5490-5835MHz<br>25min. @10340-10660MHz | 9.5 dB | See Spec Sheet |

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Compact SMD filters developed with "easy RF" in mind provide passive >35dB attenuation levels very close to passband without compromising insertion loss. The recommended application is MoCA D-Band. This cost effective filter was designed to use a small effective footprint and easily matched to 75ohm systems. p/n 1400BP41A0550

Detailed specifications and performance curves for the RF Ceramic Component line are located on our website.

## Band-Pass Filters: Other

| Part Number | Frequency (MHz) | Insertion Loss (max) | Attenuation (min) | Return Loss (min) | Case Size (EIA) |
|---|---|---|---|---|---|
| 1200BP44A575 | 950 - 1525 | 2.8 dB | 25 dB @ 100 - 480 MHz<br>25 dB @ 1900 - 3050 MHz | 7.0 dB | 1812 |
| 1810BP07B200 | 1700 - 1900 | 1.8 dB | 20 dB @ 855-955 (Prelim.)<br>10 dB @ 2565-2865 (Prelim.) | TBD | 0402 |
| 2600BP14M0200 | 2500 - 2700 | 2.2 dB max @ 25°C<br>2.5 dB max @ -40 - 85°C | 30 dB @ 806 - 915MHz<br>30 dB @ 1710 - 1785MHz<br>30 dB @ 1850 - 1910MHz<br>30 dB @ 1920 - 1980MHz<br>13 dB @ 3300 - 3900MHz<br>20 dB @ 4900 - 5900MHz | 9.5 dB | See Spec Sheet |
| 3600BP14M0600 | 3300 - 3700 | 1.8 dB max @ 25°C<br>2.0 dB max @ -40 - 85°C | 30 dB @ 806 - 915MHz<br>30 dB @ 1710 - 1785MHz<br>30 dB @ 1850 - 1910MHz<br>30 dB @ 1920 - 1980MHz<br>31 dB @ 2400 - 2500MHz<br>18 dB @ 4900 - 5900MHz | 12 dB | See Spec Sheet |
| 3600BP15M600 | 3300 - 3900 | 1.8 dB | 15 dB @ 100 - 2600 MHz<br>9 dB @ 4400 MHz<br>20 dB @ 6000 - 9900 MHz | 9.5 dB | 0805 |
| 3750BP14A0900 | 3300-4200 | 2.3 typ. (2.7 max.) | 44 typ. (40 min.)@DC - 2170 MHz<br>41 typ. (30 min.)@2300 - 2700 MHz<br>22 typ. (20 min.)@5500 - 5850 MHz | 10 dB | 0603 |
| 3960BP39A1584 | 3168 - 4752 | 2.5 dB | 30 dB @ 2400 - 2500 MHz<br>12 dB @ 5150 MHz<br>25 dB @ 5950 MHz | 9.5 dB | See Spec Sheet |
| 4000BP15U1800 | 3100 - 4900 | 2.0 dB | 25 dB @ 1.75 GHz<br>13 dB @ 2.10 GHz | 8.5 dB | 0805 |
| 4560BP39A0180 | 4470 - 4650 | 2.97 dB | 48.3 dB @ < 2540 MHz<br>19.1 dB @ 4020 MHz<br>19 dB @ 5150 - 5350 MHz<br>35.9 dB @ 5725 - 7000 MHz | 17.5 dB | See Spec Sheet |
| 4700BP14A0600 | 4400-5000 | 1.9 typ. (2.5 max.) | 42 typ. (38 min.)@DC - 2170 MHz<br>42 typ. (30 min.)@2300 - 2700 MHz<br>23 typ. (20 min.)@5500 - 5850 MHz | 10 dB | 0603 |
| 4700BP15A0600 | 4400-5000 | 0.7 typ. (0.9 max.) | 36 typ. (30 min.)@500 - 2690 MHz<br>18 typ. (15 min.)@2700 - 3800 MHz<br>30 typ. (15 min.)@8800 - 10000 MHz<br>30 typ. (15 min.)@13200 - 15000 MHz | 10 dB | 0805 |
| 7000BP15A1600 | 6200-7800 | 1.75 typ. / 2.0 max. | 30min. @3000-3400GHz<br>35min. @3400-3800GHz<br>30min. @3800-5600GHz<br>5min. @4900-5850GHz<br>25min. @8500-16000GHz | 12 typ. / 10 min. | See Spec Sheet |

Continuing the mobile network evolution, Johanson has developed its first series of n77, n78, and n79 bands band pass filters for 5G networks. These small case size (EIA 0603/0805) BPFs with low profile are optimized for small cell systems, IoT (industrial, medical, AR/VR), automotive, among other applications. These 3.5GHz, 3.7GHz, and 4.7GHz SMD/SMT ceramic filters are cost effective, low insertion loss, and offer formidable attenuation for their size and price. P/N's:

3600BP15M600

3750BP14A0900

4700BP14A0600

4700BP15A0600

Detailed specifications and performance curves for the RF Ceramic Component line are located on our website.

## Ceramic Coaxial Resonator Band Pass Filter

| Part Number | Frequency (MHz) | Insertion Loss (max) | Return Loss (min) | Attenuation | Case Size (EIA) |
|---|---|---|---|---|---|
| 5235CR45A0180 | 5150 - 5330 | 1.8 dB | 10 typ. | 25dB @ 100-48055 typ. (45 min.) @ 30 - 2700 MHz<br>48 typ. (42 min.) @ 3453 - 3547 MHz<br>45 typ. (40 min.) @ 3667 - 3883 MHz<br>52 typ. (50 min.) @ 5490 - 5850 MHz | 3312 |
| 5697CR45A0360 | 5490 - 5850 | 1.7 dB | 10 typ. | 48 typ. (43 min.) @ 30-2700 MHz<br>45 typ. (42 min.) @ 3453-3547 MHz<br>45 typ. (40 min.) @ 3667-3883 MHz<br>52 typ. (50 min.)@ 5150 - 5330 MHz | 3315 |

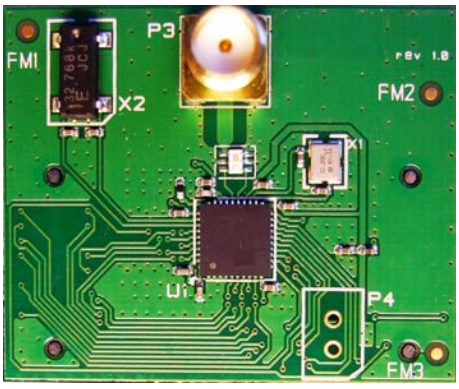
## High-Pass Filters

| Part Number | Frequency (MHz) | Insertion Loss (max) | Attenuation (min) | Return Loss (min) | Case Size (EIA) |
|---|---|---|---|---|---|
| 1900HP41B500 | 1650 - 2150 | 2.0 dB (Prelim) | 27 dB @ 950 - 1450 MHz (Prelim) | 8.5 dB | 1210 |
| 1900HP41C0500 | 1650 - 2150 | 2.0 dB | 27 dB @ 950 - 1450 MHz | 8.5 dB | 1210 |
| 2450HP14A100 | 2400 - 2500 | 1.0 dB | 9 dB @ 824 - 960 MHz<br>20 dB @ 1917 MHz | 9.5 dB | 1210 |
| 2450HP15A100 | 2400 - 2500 | 0.85 dB | 25 dB @ 875 - 920 MHz<br>20 dB @ 1705 - 1790 MHz<br>19 dB @ 1845 - 1915 MHz | 9.5 dB | See Spec Sheet |
| 3550HP15A0500 | 3300 - 3800 | 0.6 dB max. @ 25°C<br>0.8 dB max. @ -40-85°C | 40 dB @ 1710-1910 MHz | 9.5 dB | See Spec Sheet |
| 5200HP15A4200 | 3100 - 7300 | 2.5 dB | 30 dB @ < 2540 MHz<br>12 dB @ 2800 MHz | 9.5 dB | See Spec Sheet |

## EMI Filter

| Part Number | No. of Sections | Cutoff Freq (MHz) | Attenuation (min) | Case Size |
|---|---|---|---|---|
| 0400FA15A0400 | 4 | 400 | 20 dB @ 800 - 1000 MHz | See Spec Sheet |

## Johanson-Texas Instruments Reference Design - CC2530




T.I. CC2530 Reference Design using Johanson

Complete passive component integration for RF Chipsets layout and design.

Johanson matched-impedance balun-filter integrated passive with TI CC2530 RF chipset.

Note: Only one component between chip and antenna SMA

Johanson p/n: 2450BM15A0002

Detailed specifications and performance curves for the RF Ceramic Component line are located on our website.

## Low-Pass Filters

| Part Number | Frequency (MHz) | Insertion Loss (max) | Attenuation (min) | Return Loss (min) | Case Size (EIA) |
|---|---|---|---|---|---|
| 0500LP15A500 | 0 - 500 | 0.7 dB | 9 dB @ 824 - 960 MHz<br>25 dB @ 1710 - 1990 MHz<br>25 dB @ 2400 - 4000 MHz | 9.5 dB | See Spec Sheet |
| 0868LP15A020 | 858 - 878 | 0.5 dB | 30 dB @ 2 x Fo<br>40 dB @ 3 x Fo | 14.0 dB | 0805 |
| 0869LD14D1810 | 824 - 915<br>1710 - 1910 | 0.6 dB<br>0.6 dB | 25 dB @ 1648-1830 - 25 dB @ 3420-3820<br>25 dB @ 2472 - 2745 - 25 dB @ 5130-5730 | 14 dB | 0603 |
| 0869LP14A090 | 824 - 915 | 0.6 dB | 20 dB @ 2xFo<br>15 dB @ 3xFo | 10.9 dB | 0603 |
| 0892LP07A136 | 824 - 960 | 0.7 dB | 18 dB @ 1648 - 1920 MHz<br>25 dB @ 2472 - 2880 MHz<br>25 dB @ 3296 - 3840 MHz | 9.5 dB | See Spec Sheet |
| 0898LP18A035 | 880 - 915 | 0.6 dB | 30 dB @ 2xFo<br>18 dB @ 3xFo | 10.9 dB | 1206 |
| 0915LP15A026 | 902 - 928 | 0.65 dB | 25 dB @ 2xFo<br>25 dB @ 3xFo | 9.5 dB | 0805 |
| 0915LP15B026 | 902 - 928 | 0.5 dB | 30 dB @ 2xFo<br>30 dB @ 3xFo | 14.0 dB | 0805 |
| 1175LP15A0550 | 900 - 1450 | 2.5 dB | 25 dB @ 1650 - 2200 MHz | 9.5 dB | 0805 |
| 1200LP41B0500 | 950 - 1450 | 2.0 dB | 24 dB @ 1650-2150 (+25°C) | 8.5 dB | See Spec Sheet |
| 1200LP41C0500 | 950 - 1450 | 2.0 dB | 24 dB @ 1650-2150 (+25°C) | 8.5 dB | See Spec Sheet |
| 1748LP18A075 | 1710 - 1785 | 0.6 dB | 30 dB @ 3500 MHz<br>20 dB @ 5240 MHz | 10.9 dB | 1206 |
| 1810LP07A200 | 1710 - 1910 | 0.5 dB | 20 dB @ 2xFo<br>20 dB @ 3xFo | 10.9 dB | 0402 |
| 1810LP07B200 | 1710 - 1910 | 0.6 dB | 26 dB @ 3420 - 3570 MHz<br>21 dB @ 3700 - 3820 MHz<br>21 dB @ 5130 - 5730 MHz | 9.5 dB | 0402 |
| 1810LP14A200 | 1710 - 1910 | 0.6 dB | 30 dB @ 3420 - 3570 MHz<br>25 dB @ 3700 - 3820 MHz<br>20 dB @ 5130 - 5730 MHz | 11.7 dB | 0603 |
| 1880LP14A060 | 1850 - 1910 | 0.6 dB | 27 dB @ 2xFo<br>19 dB @ 3xFo | 11.7 dB | 0603 |
| 2450LP15B050 | 2400 - 2500 | 0.5 dB | 32 dB @ 2 x Fo<br>30 dB @ 3 x Fo<br>30 dB @ 4 x Fo | 10.9 dB | See Spec Sheet |
| 2400LP18A0200 | 2300 - 2500 | 0.6 dB | 27 dB @ 2 x Fo<br>18 dB @ 3 x Fo | 10.9 dB | See Spec Sheet |
| 2450LP07A0100 | 2400 - 2500 | 0.45 dB max @ 25°C<br>0.55 dB max @ -40-85°C | 21 dB @ 4800 - 5000 MHz<br>21 dB @ 7200 - 7500 MHz | 11.7 dB | 0402 |
| 2450LP14A100 | 2400 - 2500 | 0.5 dB | 25 dB @ 2xFo<br>18 dB @ 3xFo | 14.0 dB | 0603 |
| 2450LP14B100 | 2400 - 2500 | 0.5 dB | 35 dB @ 2xFo<br>25 dB @ 3xFo | 14.0 dB | 0603 |
| 2450LP15A050 | 2400 - 2500 | 0.5 dB | 27 dB @ 2xFo<br>25 dB @ 3xFo | 10.9 dB | 0805 |
| 2500LP14A0400 | 2300 - 2700 | 0.55 dB | 35 dB @ 2 x Fo<br>25 dB @ 3 x Fo | 11.7 dB | 0603 |
| 3550LP14A300 | 3400 - 3700 | 0.65 dB | 25 dB @ 3xFo | 14.0 dB | 0603 |
| 5515LP15A730 | 5150 - 5875 | 0.5 dB | 25 dB @ 2xFo<br>18 dB @ 3xFo | 10.9 dB | 0805 |

## Couplers, Directional

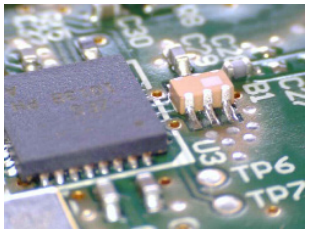
| Part Number | Frequency (MHz) | Insertion Loss (max) | Return Loss (min) | Coupling (dB) | Isolation (min.) | Case Size (EIA) |
|---|---|---|---|---|---|---|
| 0898CP14A035 | 880 - 915 | 0.28 dB | 15.6 dB | 18 ± 1.0 dB | 26.0 dB | 0603 |
| 1810CP14A200 | 1710 - 1910 | 0.30 dB | 15.6 dB | 20 ± 1.0 dB | 25.0 dB | 0603 |
| 2450CP14B100 | 2400 - 2500 | 0.34 dB | TBD dB | 17.65 ± 1.0 dB | 25.0 dB | 0603 |

## Coupler, Directional with Low Pass Filter

| Part Number | Frequency (MHz) | Insertion Loss (max) | Return Loss (min) | Coupling (dB) | Isolation (min.) | Attenuation (min.) 2 x Fo 3 x Fo | Case Size (EIA) |
|---|---|---|---|---|---|---|---|
| 0898CF15A035 | 880 - 915 | 0.7 dB | 14 dB | 20 ± 1.0 | 25.0 dB | 22.0 dB 17.0 dB | 0805 |
| 0910CF15B0100 | 860 - 960 | 1.2 dB | 20 dB | 10 ± 1.0 | 30.0 dB | 27 dB @ 2 x Fo<br>30 dB @ 3 x Fo<br>30 dB @ 4 x Fo<br>30 dB @ 5 x Fo | See Spec Sheet |
| 2450CF15A0100 | 2400 - 2500 | 0.8 dB | 20 dB | 15 ± 1.0 | 22.0 dB | 20.0 dB | 0805 |
| 5300CF15A0950 | 4900 - 5850 | 0.8 dB | 20 dB | 15 ± 1.0 | 22.0 dB | 20.0 dB | 0805 |

## Coupler, Directional 3dB Hybrid

| Part Number | Frequency (MHz) | Insertion Loss (max) | Return Loss (min) | Isolation (min.) | Case Size (EIA) |
|---|---|---|---|---|---|
| 0880CH15A060 | 850 - 910 | 3.3 ± 0.5 dB | 14.0 dB | 20.0 dB | 0805 |
| 1575CH15A0030 | 1560 - 1590 | 3.3 ± 0.5 dB max. | 10.0 dB | 16 | 0603 |
| 1585CH15A0070 | 1550-1620 | 3.3 ± 0.5 dB | 10 min. typ. | 16 | 0805 |
| 1950CH15A100 | 1900 - 2000 | 3.3 ± 0.5 dB | 14.0 dB | 16.0 dB | 0805 |




Reference design Co-development solutions with full RF Chipset impedance characterizations in all modes to design conjugate impedance balun, add a low pass, band pass or high pass filter. Integrating 25+ passives in small case size (i.e.EIA0402 -1206)

Detailed specifications and performance curves for the RF Ceramic Component line are located on our website.

## Baluns, Ceramic Chip

| Part Number | Frequency (MHz) | Impedance Unbal./Bal. | Insertion Loss (max) | Return Loss (min) | Phase Difference | Amplitude Difference (max) | Case Size (EIA) |
|---|---|---|---|---|---|---|---|
| 0430BL15A0100 | 400 - 460 | 50/100 | 1.0 dB | 9.5 dB | 180°±10° | 2.0 dB | 0805 |
| 0465BL15B100 | 460 - 470 | 50/100 | 1.0 dB | 9.5 dB | 180°±10° | 1.5 dB | 0805 |
| 0896BL14B050 | 851 - 941 | 50/50 | 1.5 dB | 9.5 dB | 180°±10° | 0.7 dB | 0603 |
| 0900BL15C050 | 800 - 1000 | 50/50 | 1.2 dB | 9.5 dB | 180°±10° | 2.0 dB | 0805 |
| 0900BL18B100 | 800 - 1000 | 50/100 | 1.0 dB | 9.5 dB | 180°±10° | 2.0 dB | 1206 |
| 0900BL18B200 | 800 - 1000 | 50/200 | 1.0 dB | 9.5 dB | 180°±10° | 2.0 dB | 1206 |
| 0900BL15A100 | 900 - 1000 | 50/100 | 1.2 dB | 9.5 dB | 180°±10° | 2.0 dB | 0805 |
| 0917BL18B100 | 889 - 945 | 50/100 | 1.0 dB | 9.5 dB | 180°±10° | 2.0 dB | 1206 |
| 1600BL15B050 | 1500 - 1700 | 50/50 | 1.0 dB | 9.5 dB | 180°±10° | 2.0 dB | 0805 |
| 1600BL15B100 | 1500 - 1700 | 50/100 | 1.0 dB | 9.5 dB | 180°±10° | 2.0 dB | 0805 |
| 1850BL15B050 | 1700 - 2000 | 50/50 | 1.0 dB | 9.5 dB | 180°±10° | 2.0 dB | 0805 |
| 1850BL15B100 | 1700 - 2000 | 50/100 | 1.0 dB | 9.5 dB | 180°±10° | 2.0 dB | 0805 |
| 1850BL15B200 | 1700 - 2000 | 50/200 | 1.0 dB | 9.5 dB | 180°±10° | 2.0 dB | 0805 |
| 2100BL15A100 | 2100 - 2200 | 50/100 | 1.0 dB | 9.5 dB | 180°±10° | 2.0 dB | 0805 |
| 2450BL07A0100 | 2400 - 2500 | 50/100 | 1.3 dB | 9.5 dB | 180°±10° | 2.0 dB | See Spec Sheet |
| 2450BL14C050 | 2400 - 2500 | 50/50 | 1.2 dB | 9.5 dB | 180°±10° | 2.0 dB | 0603 |
| 2450BL14C100 | 2400 - 2500 | 50/100 | 1.2 dB | 9.5 dB | 180°±10° | 1.5 dB | 0603 |
| 2450BL14C200 | 2400 - 2500 | 50/200 | 1.3 dB | 9.5 dB | 180°±10° | 2.0 dB | 0603 |
| 2450BL15B050 | 2400 - 2500 | 50/50 | 1.0 dB | 9.5 dB | 180°±10° | 2.0 dB | 0805 |
| 2450BL15B100 | 2400 - 2500 | 50/100 | 1.0 dB | 9.5 dB | 180°±10° | 2.0 dB | 0805 |
| 2450BL15B200 | 2400 - 2500 | 50/200 | 1.0 dB | 9.5 dB | 180°±10° | 2.0 dB | 0805 |
| 2450BL15K100 | 2400 - 2500 | 50/100 | 1.0 dB | 9.5 dB | 180°±10° | 2.0 dB | 0805 |
| 2500BL14M050 | 2300 - 2700 | 50/50 | 1.2 dB | 9.5 dB | 180°±15° | 1.5 dB | 0603 |
| 2500BL14M100 | 2300 - 2700 | 50/100 | 1.2 dB | 9.5 dB | 180°±15° | 1.5 dB | 0603 |
| 3600BL14M050 | 3300 - 3900 | 50/50 | 1.2 dB | 9.5 dB | 180°±15° | 1.5 dB | 14-1A |
| 3600BL14M100 | 3300 - 3900 | 50/100 | 1.2 dB | 9.5 dB | 180°±15° | 1.5 dB | 0603 |
| 3700BL15B100 | 3400 - 4000 | 50/100 | 1.0 dB | 9.5 dB | 180°±20° | 1.0 dB | 0805 |
| 3700BL15B200 | 3400 - 4000 | 50/200 | 1.2 dB | 9.5 dB | 180°±20° | 1.0 dB | 0805 |
| 4000BL14U100 | 3100 - 4800 | 50/100 | 1.2 dB | 9.5 dB | 180°±20° | 1.5 dB | 0603 |
| 5425BL07A0200 | 4900 - 5950 | 50/200 | 1.2 dB | 9.5 dB | 180°±15° | 2.0 dB | 0402 |
| 5400BL14B100 | 4900 - 5875 | 50/100 | 1.0 dB | 9.5 dB | 180°±10° | 1.5 dB | 0603 |
| 5400BL15B050 | 4900 - 5900 | 50/50 | 1.0 dB | 9.5 dB | 180°±10° | 2.0 dB | 0805 |
| 5400BL15B100 | 4900 - 5900 | 50/100 | 1.0 dB | 9.5 dB | 180°±10° | 2.0 dB | 0805 |
| 5400BL15B200 | 4900 - 5875 | 50/200 | 1.0 dB | 9.5 dB | 180°±10° | 2.0 dB | 0805 |
| 5400BL15K050 | 4900 - 5875 | 50/50 | 1.2 dB | 8.5 dB | 180°±10° | 2.0 dB | 0805 |
| 5500BL15U0100 | 3000 - 8000 | 50/100 | 1.8 dB | 9.5 dB | 180°±20° | 2.0 dB | 0805 |
| 5400BL14B100 | 5150 - 5875 | 50/100 | 1.0 dB | 11.7 dB | 180°±10° | 2.0 dB | 0805 |

Detailed specifications and performance curves for the RF Ceramic Component line are located on our website.

## Specific RF Chipset Impedeance-Matched Balun/Filters Integrated Passives; Reference Designs

| Part Number | Frequency (MHz) | Unbalanced Impedance | Differential Balanced Imp. | Insertion Loss (max) | Return Loss (min) | Phase Difference |
|---|---|---|---|---|---|---|
| 0896BM15A0001 | 863 - 928 | 50 | Conj match to T.I. CC11XX and CC430 | 1.5 dB | 9.5 dB | 180°±10° |
| 0896FB15A0100 | 863 - 928 | 50 | Conj match to AT86RF212 | 1.5 dB | 9.5 dB | 180°±10° |
| 0953BM15A0001 | 950 - 956 | 50 | Conj. match to T.I. CC11XX | 2.1 dB | 9.5 dB | 180°±10° |
| 2450BM15B0009 | 2400 - 2500 | 50 | Conj match to ZIC2410 | 1.5 dB | 9.5 dB | 180°±10° |
| 2450FB15K0002 | 2400 - 2500 | 50 | Conj match to CSR BC03, BC04(16-j40) | 3 dB | 9.54 dB | 180°±10° |
| 2450FB15K0005 | 2400 - 2500 | 50 | Conj match to BC series of CSR | 3.5 dB | 9.5 dB | 180°±10° |
| 2450FB15K0008 | 2400 - 2500 | 50 | Conj match to BC series of CSR | 3.5 dB | 9.5 dB | 180°±10° |
| 2450FB15L0001 | 2400 - 2500 | 50 | Imp. match to AT86RF230/231 & ATmega128RFA1 | 1.5 dB | 9.5 dB | 180°±10° |
| 2450BM14A0002 | 2400 - 2500 | 50 | Conj match to nRF24L01/ nRF24L01 | 2.0 dB | 9.5 dB | 160°±15° |
| 2450BM15A0001 | 2400 - 2500 | 50 | Conj match to T.I. Chipsets CC2430 and CC2480 | 1.0 dB | 10.0 dB | 180°±15° |
| 2450BM15B0003 | 2400 - 2500 | 50 | Conj match to T.I. Chipset 2500 | 2.2 dB | 10.0 dB | 180°±12° |
| 2450BM15B0002 | 2400 - 2500 | 50 | Conjugate match to TI Chipset 2520 | 1.5 dB | 10.0 dB | 180°±15° |
| 2450BM15A0002 | 2400 - 2500 | 50 | Conjugate match to T.I. CC253X and CC2540 | 1.5 dB | 10.0 dB | 180°±15° |

## Balun-Filter, Ceramic Chip

| Part Number | Frequency (MHz) | Impedance Unbal./Bal. | Insertion Loss (max) | Return Loss (min) | Phase Difference | Case Size (EIA) |
|---|---|---|---|---|---|---|
| 0783FB15A0100 | 779 - 787 | 50/100 | 1.5 dB | 9.5 dB | 180°±15° | 0805 |
| 0896FB15A0100 | 868 - 915 | 50/100 | 1.5 dB | 11.7 dB | 180°±15° | 0805 |
| 2345FB39A0050 | 2300 - 2390 | 50/50 | 3.2 dB | 11.7 dB | 180°±10° | 1008 |
| 2450FB15A0100 | 2400 - 2500 | 50/100 | 1.5 dB | 9.5 dB | 180°±10 | 0805 |
| 2450FB39B100 | 2400 - 2500 | 50/100 | 2.0 dB | 9.5 dB | 180°±10° | 2025 |
| 2500FB16A0400 | 2300 - 2690 | 50/50+2.4nH | 3.8 dB | 9.5 dB | 180°± 10° | See Spec Sheet |
| 3500FB39A0050 | 3400 - 3600 | 50/50 | 2.9 dB | 9.5 dB | 180°± 12° | See Spec Sheet |

Detailed specifications and performance curves for the RF Ceramic Component line are located on our website.

## Diplexers, Ceramic Chip - LPF / HPF

| Part Number | Frequency (MHz) | Insertion Loss (max) | Attenuation Low Band | Attenuation High Band | Return Loss (min) |
|---|---|---|---|---|---|
| 0859DP18A1920 | 824 - 894<br>1850 - 1990 | 0.75 dB<br>0.55 dB | 20 dB min | 20 dB min | 12 dB |
| 0967DP18A1795_ | 954 - 980<br>1710 - 1880 | 0.75 dB<br>0.55 dB | 20 dB min. | 20 dB min. | 12 dB |
| 2450DP15A5512 | 2400 - 2500<br>5150 - 5875 | 0.70 dB<br>0.90 dB | 20 dB min | 15 dB min | 9.5 dB |
| 2450DP15K5400 | 2400 - 2500<br>5150 - 5875 | 0.70 dB<br>0.90 dB | 20 dB min | 15 dB min | 9.5 dB |

## Diplexers, Ceramic Chip - LPF / BPF

| Part Number | Frequency (MHz) | Insertion Loss (max) | Attenuation Low Band | Attenuation High Band | Return Loss (min) |
|---|---|---|---|---|---|
| 2450DP15D5400 | 2400 - 2500<br>4900 - 5875 | 0.7 dB<br>1.4 dB | 20 dB min. @<br>4.8 - 6.0 GHz<br>20 dB min. @<br>7.2 - 7.5 GHz | 19 dB min @<br>1.8 - 2.5 GHz<br>20 dB min. @<br>10.3 - 10.7 GHz | 9.5 dB |
| 2450DP15E5400 | 2400 - 2500<br>4900 - 5900 | 0.7 dB<br>1.6 dB | 20 dB min @<br>4.8 - 6.0 GHz<br>17 dB min @<br>1.8 - 2.5 GHz | 20 dB min @<br>7.2 - 7.5 GHz<br>20 dB typ. @<br>10.3 - 10.7 GHz | 9.5 dB |
| 2450DP15F5400 | 2400 - 2500<br>4900 - 5900 | 0.7 dB<br>1.0 dB | 18 dB min @<br>4.8 - 6.0 GHz<br>19 dB min @<br>1.8 - 2.5 GHz | 18 dB min @<br>7.2 - 7.5 GHz<br>25 dB typ. @<br>10.3 - 10.7 GHz | 9.5 dB |

## Diplexers, Ceramic Chip - BPF / NF

| Part Number | Frequency (MHz) | Insertion Loss | Attenuation | Case Size |
|---|---|---|---|---|
| 0500DP44A1215 | 950 - 1450 | 3.6 max. (25°C) | 30.0 min. @ 200 - 750MHz | See Spec Sheet |
| | | 3.9 max. (-40 - +85°C) | 30.0 min. @ 1650 - 2150MHz | |
| | 200 - 750 | 2.0 max. (25°C) | 30.0 min. @ 950 - 1450MHz | |
| | | 2.3 max. (-40 - +85°C) | | |
| | 1650 - 2150 | 3.5 max. (25°C) | | |
| | | 3.8 max. (-40 - +85°C) | | |

## Diplexers, Ceramic Chip - BPF / NF

| Part Number | Frequency (MHz) | Insertion Loss | Attenuation Low Band | Attenuation High Band | Return Loss |
|---|---|---|---|---|---|
| 1407DP15A2450 | 824 - 960 | 0.6 dB | 15 min. @<br>2400 - 2500 MHz | 20 min. @<br>824 - 1990 MHz | 9.5 dB min. |
| | 1710 - 1880 | 1.0 dB | | | 9.5 dB min. |
| | 1990 | 1.5 dB | | | - |
| | 2400 - 2500 | 2.0 dB | | | 9.5 dB min. |

Detailed specifications and performance curves for the RF Ceramic Component line are located on our website.

## Looking for pricing, stock, or lifecycle information?

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