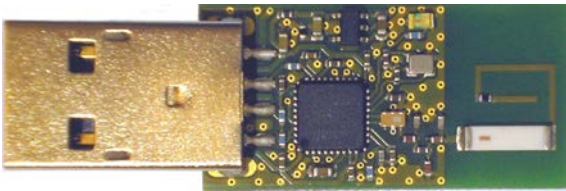
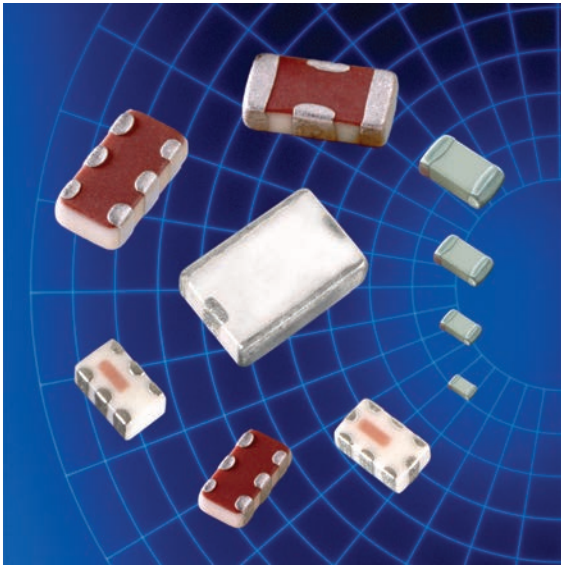


INTEGRATED PASSIVE COMPONENTS



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.

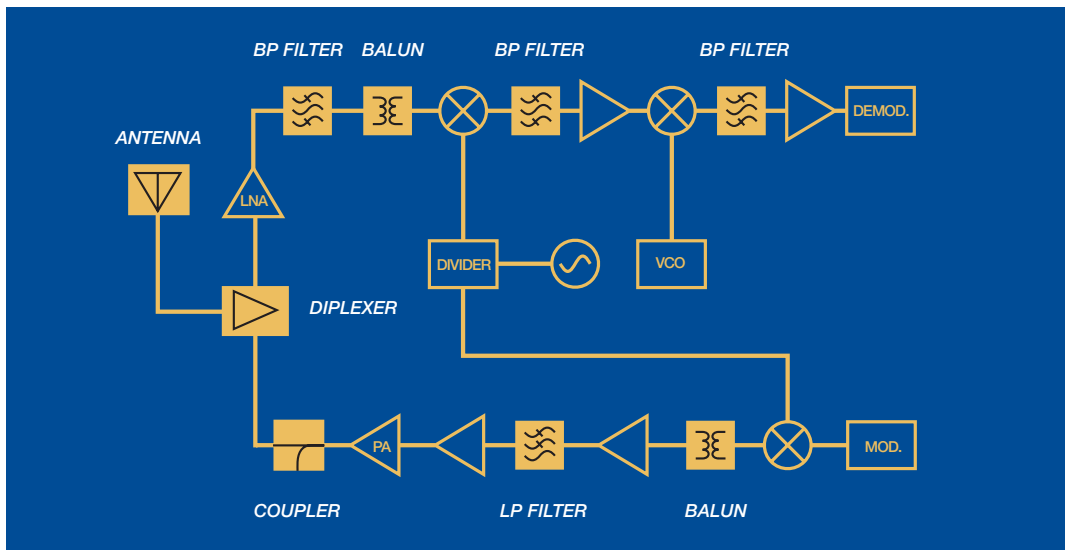
In addition to the array of listed components we can support custom solutions for high volume applications with design flexibility and short development times. Contact us today with your specific technical requirements.

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 | • 2.4 GHz & 5.5 GHz ISM Band | • GPS |
| • GSM/EDGE/GPRS/DCS/PCS/WCDMA | • Zigbee | • UNII |
| • WiMAX 802.16 d/e | • MIMO | • 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 | | | | See Spec Sheet |
| | 1700-2100 | 2.0 | 2.0 | 3.5 | |
| | 824-960 | -1.6 | -1.0 | 4.5 | |
| | 1710-2690 | | | | |
| 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 | 1.0 dBi typ (YZ-Total) | 3.5 dBi typ (XZ-Total) | 6.0 dB | See Spec Sheet |
| | 5150 - 5850 | 4.0 dBi typ (YZ-Total) | 2.5 dBi typ (XZ-Total) | 6.0 dB | |
| 2450AD18A7250 | 2400-2480 | +3.0 (YZ-cut) | +0.4 (YZ-cut) | 6.5 min. | See Spec Sheet |
| | 6000-8500 | +5.5 (YZ-cut) | +1.0 (YZ-cut) | | |
| 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 HB: 4900 - 5900 | 1.0 dBi typ (XZ-V) | -2.5 dBi typ (YZ-V) | 8.5 dB | 46-1 |
| | | -1.5 dBi typ (XZ-V) | -2.5 dBi typ (YZ-V) | 8.5 dB | |
| 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 15dB @ 2300-6000MHz 25dB @ 1250-1290MHz 30dB @ 2400-2500MHz 25dB @ 2500-2570MHz | 9.5 dB | 1206 |
| 2450BP07A0100 | 2400 - 2500 | 2.5 dB | 25 dB @ 824 - 960 MHz 25 dB @ 1710 - 1910 MHz 25 dB @ 4800 - 5000 MHz 15 dB @ 7200 - 7500 MHz | 9.5 dB | 0402 |
| 2450BP08A0100 | 2400 - 2500 | 1.0 max@ 25°C | 15 min@5-960MHz 10 min@1710-1990MHz 25 min@4800-7200MHz | 9.0 dB | 0504 |
| 2450BP14D0100 | 2400 - 2500 | 1.7 dB | 30 dB @ 880 - 915 MHz 30 dB @ 1710 - 1785 MHz 25 dB @ 1850 - 1910 MHz 25 dB @ 4800 - 5000 MHz 15 dB @ 7200 - 7500 MHz | 9.5 dB | 0603 |
| 2450BP14E0100 | 2400 - 2500 | 2.5 dB | 35 dB @ 824 - 960 MHz 38 dB @ 1710 - 1910 MHz 25 dB @ 4800 - 5000 MHz 20 dB @ 7200 - 7500 MHz | 9.5 dB | 0603 |
| 2450BP14F0100 | 2400-2500 | 2.5 max (25°C) 2.8 max (-40 to +85) | 40dB @ 880-915MHz 40dB @ 1710-1850MHz 40dB @ 1850-1910MHz 40dB @ 1920-1990MHz 25dB @ 2100-2170MHz | 10 dB | 0603 |
| 2450BP15B100 | 2400 - 2500 | 2.2 dB | 25 @ 1200 - 1300 MHz 10 @ 2000 MHz 12 @ 3000 MHz 30 @ 3600 - 3800 MHz 34 @ 4800 - 5000 MHz | 9.5 dB | 0805 |
| 2450BP15C100 | 2400 - 2500 | 2.2 dB | 30 dB @ 1200 - 1300 MHz 15 dB @ 2000 MHz 25 dB @ 3000 MHz 20 dB @ 3600 - 3800 MHz 20 dB @ 4800 - 5000 MHz | 9.5 dB | 0805 |
| 2450BP15E0100 | 2400 - 2500 | 1.5 dB | 30 dB @ 880 - 915 MHz 30 dB @ 1710 - 1785 MHz 25 dB @ 1850 - 1910 MHz 25 dB @ 4800 - 5000 MHz 15 dB @ 7200 - 7500 MHz | 9.5 dB | 0805 |
| 2450BP15F0100 | 2400 - 2500 | 2.5 dB | 35 dB @ 824 - 960 MHz 38 dB @ 1710 - 1910 MHz 25 dB @ 4800 - 5000 MHz 20 dB @ 7200 - 7500 MHz | 9.5 dB | 0805 |
| 2450BP15H0100 | 2400 - 2500 | 1.5 max.@ 25°C 1.8 max. @ -40 - 85°C | 25 dB @ 1200 - 1300 MHz 10 dB @ 2000 MHz 12 dB @ 3000 MHz 30 dB @ 3600 - 3800 MH 34 dB @ 4800 - 5000 MHz | 9.5 dB | 0805 |
| 2450BP18C100E | 2400 - 2500 | 2.5 dB | 40 dB @ 1200 - 1800 MHz 25 dB @ 2100 MHz 35 dB @ 4800 - 5000 MHz 25 dB @ 7200 - 7500 MHz | 9.5 dB | 1206 |
| 2450BP39C100A | 2400 - 2500 | 2.5 dB | 42 dB @ 1710 - 1990 MHz 30 dB @ 2100 MHz 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 30 dB @ 1710 - 1785 MHz 25 dB @ 1850 - 1910 MHz 25 dB @ 4800 - 5000 MHz 15 dB @ 7200 - 7500 MHz | 9.5 dB | 2520 |
| 2450BP39C100D | 2450 ± 50 | 2.2 dB | 30 dB @ 880 - 915MHz 30 dB @ 1710 - 1785MHz 25 dB @ 1850 - 1910MHz 25 dB @ 2100MHz 25 dB @ 4800 - 5000MHz 15 dB @ 7200 - 7500MHz | 9.5 dB | 2520 |
| 2450BP39D100B | 2400 - 2500 | 2.5 dB | 35 dB @ 880 - 915 MHz 18 dB @ 1710 - 1990 MHz 12 dB @ 2100 MHz 35 dB @ 3200 MHz 22 dB @ 4800 - 5000 MHz 22 dB @ 7200 - 7500 MHz | 9.5 dB | 2520 |
| 2450BP39D100C | 2400 - 2500 | 1.2 dB | 30 dB @ 880 - 915 MHz 30 dB @ 1710 - 1785 MHz 25 dB @ 1850 - 1910 MHz 25 dB @ 4800 - 5000 MHz 15 dB @ 7200 - 7500 MHz | 9.5 dB | 2520 |
| 3350BP39A0500 | 3100 - 3600 | 2.0 dB | 35dB @ 500-2000MHz 30dB @ 2500MHz 5dB @ 2950MHz 10dB @ 4000MHz 28dB @ 5000MHz | 9.5 dB | 1008 |
| 2450BP39D100E | 2400 - 2500 | 1.2 dB | 30 @ 880 - 915 MHz 30 @ 1710 - 1785 MHz 25 @ 1850 - 1910 MHz 2 @ 2700 MHz 25 @ 4800 - 5000 MHz 15 @ 7200 - 7500 MHz | 9.5 dB | 2520 |
| 2450BP39F100A | 2400 - 2500 | 2.4 dB | 45 dB @ 880 - 915 MHz 48 dB @ 1710 - 1990 MHz 20 dB @ 2110 - 2170 MHz 30 dB @ 4800 - 5000 MHz 36 dB @ 7200 - 7500 MHz | 9.5 dB | 2520 |
| 2450BP41D100A | 2400 - 2500 | 2.3 dB | 40 dB @ 1200 - 1800 GHz 30 dB @ 2100 GHz 12 dB @ 2200 GHz 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

GPS/GLNSS



Bluetooth



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 30 dB @ 1710 - 1785 MHz 20 dB @ 1850 - 1910 MHz 25 dB @ 4800 - 5000 MHz 20 dB @ 7200 - 7500 MHz | 9.5 dB | See Spec Sheet |
| 2500BP15M400 | 2300 - 2700 | 2.0 dB | 15 dB @ 100 - 1800 MHz 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 25dB @ 1710-1990MHz 15dB @ 2400 -2500MHz 20dB @ 10100-10600MHz | 9.5 dB | 1206 |
| 5400BP14A0950 | 4900-5850 | 1.5max @25°C 1.7max @-40°C to 85°C | 33dB @ 100-2170MHz 29dB @ 2170-2500MHz 32dB @ 9800-12000MHz | 9.5 dB | 0603 |
| 5515BP15B725 | 5150-5875 | 1.5 dB | 30dB @ 3500MHz 25dB @ 9800 - 11840MHz 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 20 dB @ 4600 MHz 15 dB @ 10300 - 11800 MHz | 9.5 dB | 0805 |
| 5515BP15C975 | 4900 - 5875 | 1.8 dB | 30 dB @ 500 - 4000MHz 20 dB @ 4200MHz 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 35min.@ 4500MHz 40min.@ 4600MHz | 7.4 dB | 0805 |
| 5550BP14A0800 | 5150-5950 | 0.7 typ.@25°C 0.9 max.@-40°C~85°C | 35min.@ 700-2690MHz 30min.@ 3400-3800MHz 12min.@ 7250-7800MHz 20min.@10300-11700MHz | 9.5 dB | 0805 |
| 5697BP44A0360 | 5490 - 5835 | 2.2 typ. /2.5 max | 30min. @2400-2500MHz 40min. @5170-5330MHz 25min. @10980-11670MHz | 9.5 dB | See Spec Sheet |
| 5235BP44A0180 | 5170-5330 | 2.2 typ./2.5 max | 30min. @2400-2500MHz 40min. @5490-5835MHz 25min. @10340-10660MHz | 9.5 dB | See Spec Sheet |



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 25 dB @ 1900 - 3050 MHz | 7.0 dB | 1812 |
| 1810BP07B200 | 1700 - 1900 | 1.8 dB | 20 dB @ 855-955 (Prelim.) 10 dB @ 2565-2865 (Prelim.) | TBD | 0402 |
| 2600BP14M0200 | 2500 - 2700 | 2.2 dB max @ 25°C 2.5 dB max @ -40 - 85°C | 30 dB @ 806 - 915MHz 30 dB @ 1710 - 1785MHz 30 dB @ 1850 - 1910MHz 30 dB @ 1920 - 1980MHz 13 dB @ 3300 - 3900MHz 20 dB @ 4900 - 5900MHz | 9.5 dB | See Spec Sheet |
| 3600BP14M0600 | 3300 - 3700 | 1.8 dB max @ 25°C 2.0 dB max @ -40 - 85°C | 30 dB @ 806 - 915MHz 30 dB @ 1710 - 1785MHz 30 dB @ 1850 - 1910MHz 30 dB @ 1920 - 1980MHz 31 dB @ 2400 - 2500MHz 18 dB @ 4900 - 5900MHz | 12 dB | See Spec Sheet |
| 3600BP15M600 | 3300 - 3900 | 1.8 dB | 15 dB @ 100 - 2600 MHz 9 dB @ 4400 MHz 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 41 typ. (30 min.)@2300 - 2700 MHz 22 typ. (20 min.)@5500 - 5850 MHz | 10 dB | 0603 |
| 3960BP39A1584 | 3168 - 4752 | 2.5 dB | 30 dB @ 2400 - 2500 MHz 12 dB @ 5150 MHz 25 dB @ 5950 MHz | 9.5 dB | See Spec Sheet |
| 4000BP15U1800 | 3100 - 4900 | 2.0 dB | 25 dB @ 1.75 GHz 13 dB @ 2.10 GHz | 8.5 dB | 0805 |
| 4560BP39A0180 | 4470 - 4650 | 2.97 dB | 48.3 dB @ < 2540 MHz 19.1 dB @ 4020 MHz 19 dB @ 5150 - 5350 MHz 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 42 typ. (30 min.)@2300 - 2700 MHz 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 18 typ. (15 min.)@2700 - 3800 MHz 30 typ. (15 min.)@8800 - 10000 MHz 30 typ. (15 min.)@13200 - 15000 MHz | 10 dB | 0805 |
| 7000BP15A1600 | 6200-7800 | 1.75 typ. / 2.0 max. | 30min. @3000-3400GHz 35min. @3400-3800GHz 30min. @3800-5600GHz 5min. @4900-5850GHz 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 48 typ. (42 min.) @ 3453 - 3547 MHz 45 typ. (40 min.) @ 3667 - 3883 MHz 52 typ. (50 min.) @ 5490 - 5850 MHz | 3312 |
| 5697CR45A0360 | 5490 - 5850 | 1.7 dB | 10 typ. | 48 typ. (43 min.) @ 30-2700 MHz 45 typ. (42 min.) @ 3453-3547 MHz 45 typ. (40 min.) @ 3667-3883 MHz 52 typ. (50 min.) @ 5150 - 5330 MHz | 3315 |

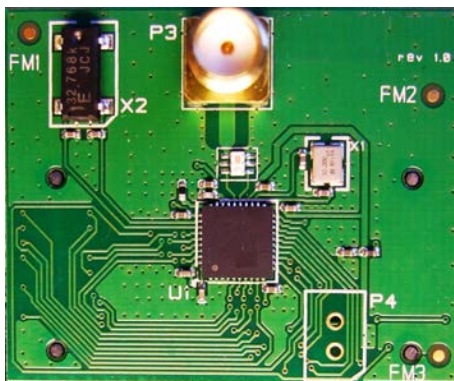
HIGH-PASS FILTERS

| 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 20 dB @ 1917 MHz | 9.5 dB | 1210 |
| 2450HP15A100 | 2400 - 2500 | 0.85 dB | 25 dB @ 875 - 920 MHz 20 dB @ 1705 - 1790 MHz 19 dB @ 1845 - 1915 MHz | 9.5 dB | See Spec Sheet |
| 3550HP15A0500 | 3300 - 3800 | 0.6 dB max. @ 25°C 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 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



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

T.I. CC2530 Reference Design using Johanson

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 25 dB @ 1710 - 1990 MHz 25 dB @ 2400 - 4000 MHz | 9.5 dB | See Spec Sheet |
| 0868LP15A020 | 858 - 878 | 0.5 dB | 30 dB @ 2 x Fo 40 dB @ 3 x Fo | 14.0 dB | 0805 |
| 0869LD14D1810 | 824 - 915 1710 - 1910 | 0.6 dB 0.6 dB | 25 dB @ 1648-1830 - 25 dB @ 3420-3820 25 dB @ 2472 - 2745 - 25 dB @ 5130-5730 | 14 dB | 0603 |
| 0869LP14A090 | 824 - 915 | 0.6 dB | 20 dB @ 2x Fo 15 dB @ 3x Fo | 10.9 dB | 0603 |
| 0892LP07A136 | 824 - 960 | 0.7 dB | 18 dB @ 1648 - 1920 MHz 25 dB @ 2472 - 2880 MHz 25 dB @ 3296 - 3840 MHz | 9.5 dB | See Spec Sheet |
| 0898LP18A035 | 880 - 915 | 0.6 dB | 30 dB @ 2x Fo 18 dB @ 3x Fo | 10.9 dB | 1206 |
| 0915LP15A026 | 902 - 928 | 0.65 dB | 25 dB @ 2x Fo 25 dB @ 3x Fo | 9.5 dB | 0805 |
| 0915LP15B026 | 902 - 928 | 0.5 dB | 30 dB @ 2x Fo 30 dB @ 3x Fo | 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 20 dB @ 5240 MHz | 10.9 dB | 1206 |
| 1810LP07A200 | 1710 - 1910 | 0.5 dB | 20 dB @ 2x Fo 20 dB @ 3x Fo | 10.9 dB | 0402 |
| 1810LP07B200 | 1710 - 1910 | 0.6 dB | 26 dB @ 3420 - 3570 MHz 21 dB @ 3700 - 3820 MHz 21 dB @ 5130 - 5730 MHz | 9.5 dB | 0402 |
| 1810LP14A200 | 1710 - 1910 | 0.6 dB | 30 dB @ 3420 - 3570 MHz 25 dB @ 3700 - 3820 MHz 20 dB @ 5130 - 5730 MHz | 11.7 dB | 0603 |
| 1880LP14A060 | 1850 - 1910 | 0.6 dB | 27 dB @ 2x Fo 19 dB @ 3x Fo | 11.7 dB | 0603 |
| 2450LP15B050 | 2400 - 2500 | 0.5 dB | 32 dB @ 2 x Fo 30 dB @ 3 x Fo 30 dB @ 4 x Fo | 10.9 dB | See Spec Sheet |
| 2400LP18A0200 | 2300 - 2500 | 0.6 dB | 27 dB @ 2 x Fo 18 dB @ 3 x Fo | 10.9 dB | See Spec Sheet |
| 2450LP07A0100 | 2400 - 2500 | 0.45 dB max @ 25°C 0.55 dB max @ -40-85°C | 21 dB @ 4800 - 5000 MHz 21 dB @ 7200 - 7500 MHz | 11.7 dB | 0402 |
| 2450LP14A100 | 2400 - 2500 | 0.5 dB | 25 dB @ 2x Fo 18 dB @ 3x Fo | 14.0 dB | 0603 |
| 2450LP14B100 | 2400 - 2500 | 0.5 dB | 35 dB @ 2x Fo 25 dB @ 3x Fo | 14.0 dB | 0603 |
| 2450LP15A050 | 2400 - 2500 | 0.5 dB | 27 dB @ 2x Fo 25 dB @ 3x Fo | 10.9 dB | 0805 |
| 2500LP14A0400 | 2300 - 2700 | 0.55 dB | 35 dB @ 2 x Fo 25 dB @ 3 x Fo | 11.7 dB | 0603 |
| 3550LP14A300 | 3400 - 3700 | 0.65 dB | 25 dB @ 3x Fo | 14.0 dB | 0603 |
| 5515LP15A730 | 5150 - 5875 | 0.5 dB | 25 dB @ 2x Fo 18 dB @ 3x Fo | 10.9 dB | 0805 |



COUPLERS, DIRECTIONAL

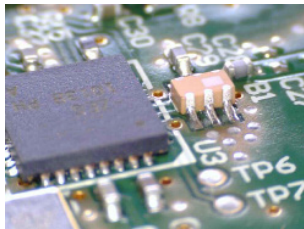
| Part Number | Frequency (MHz) | Insertion Loss (max) | Return Loss (min) | Coupling (dB) | Isolation (min.) | Case Size (EIA) |
|--------------|-----------------|----------------------|-------------------|----------------|------------------|-----------------|
| 0898CP14A035 | 880 - 915 | 0.28 dB | 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.) | | Case Size (EIA) |
|---------------|-----------------|----------------------|-------------------|---------------|------------------|--|---------|-----------------|
| | | | | | | 2 x Fo | 3 x Fo | |
| 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 30 dB @ 3 x Fo 30 dB @ 4 x Fo 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 |

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