

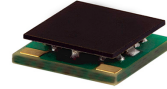
# Surface Mount <sup>top hat®</sup> Low Pass Filter

## ULP-70+

50Ω DC to 70 MHz

### The Big Deal

- Low Insertion loss, 1.5dB Typ.
- High rejection, > 40dB
- Sharp insertion loss roll-off
- Good VSWR
- Ultra miniature surface mount package



CASE STYLE: QA2224

### Product Overview

The ULP-70+ is a lowpass filter in a top hat package (size of 0.25" x 0.25") fabricated using SMT technology. Covering DC to 70 MHz band width, these units offer good matching within the passband and high rejection. This model uses a miniature high Q capacitors and chip inductors for high reliability. In addition it has repeatable performance across production lots and consistent performance across temperature.

### Key Features

| Feature                            | Advantages  |
|------------------------------------|---|
| Low passband insertion loss        | Passband insertion loss 1.5dB typical ensures low signal loss throughout the passband                                     |
| Excellent stopband rejection       | Rejection of 40 dB ensures unwanted spurious are eliminated   |
| Excellent return loss at DC-70 MHz | This makes signal transmission with very less reflections and well-matched with the adjacent component used in the system |
| Small size, 0.25" x 0.25"          | The Ultra miniature surface mount package enables the ULP-70+ to be used in compact designs.                              |

#### Notes

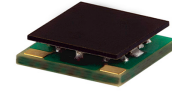
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50Ω DC to 70 MHz

## ULP-70+



CASE STYLE: QA2224

### Features

- High rejection
- Sharp insertion loss roll-off
- Good VSWR, 1.1:1 typ at passband
- Ultra miniature surface mount package

### Applications

- Wireless communications
- Receivers / Transformers
- Lab use

### Electrical Specifications at 25°C

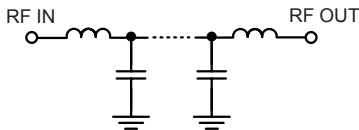
| Parameter | F#             | Frequency (MHz) | Min.     | Typ. | Max. | Unit |    |
|-----------|----------------|-----------------|----------|------|------|------|----|
| Pass Band | Insertion Loss | DC-F1           | DC-70    | —    | 1.5  | 2.0  | dB |
|           | Freq. Cut-Off  | F2              | 77       | —    | 3.0  | —    | dB |
|           | VSWR           | DC-F1           | DC-70    | —    | 1.1  | —    | :1 |
| Stop Band | Rejection Loss | F3-F4           | 100-115  | 20   | 27   | —    | dB |
|           |                | F4-F5           | 115-700  | 40   | 47   | —    | dB |
|           | VSWR           | F5-F6           | 700-3000 | —    | 20   | —    | dB |
|           |                | F3-F5           | 100-700  | —    | 20   | —    | :1 |

### Maximum Ratings

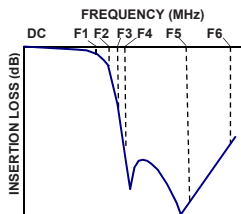
|                       |                |
|-----------------------|----------------|
| Operating Temperature | -40°C to 85°C  |
| Storage Temperature   | -55°C to 100°C |
| RF Power Input        | 0.1W max.      |

Permanent damage may occur if any of these limits are exceeded.

### Functional Schematic



### Typical Frequency Response

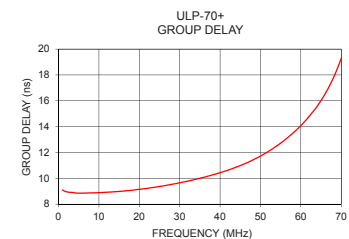
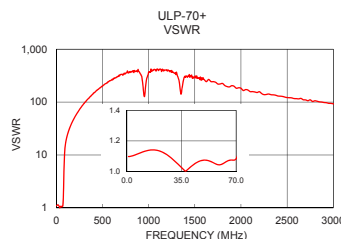
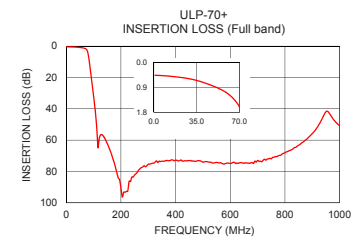
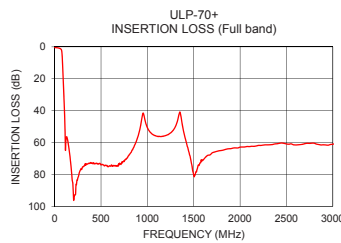


### Typical Performance Data at 25°C

| Frequency (MHz) | Insertion Loss (dB) | VSWR (:1) | Frequency (MHz) | Group Delay (nsec) |
|-----------------|---------------------|-----------|-----------------|--------------------|
| 1.0             | 0.46                | 1.10      | 1               | 9.09               |
| 10.0            | 0.48                | 1.13      | 2               | 8.95               |
| 50.0            | 0.87                | 1.07      | 4               | 8.88               |
| 70.0            | 1.60                | 1.08      | 10              | 8.89               |
| 77.0            | 3.05                | 1.86      | 12              | 8.92               |
| 85.0            | 10.73               | 6.81      | 14              | 8.96               |
| 92.0            | 20.52               | 12.40     | 18              | 9.07               |
| 99.0            | 30.43               | 16.14     | 20              | 9.15               |
| 100.0           | 31.88               | 16.58     | 28              | 9.53               |
| 115.0           | 62.35               | 22.26     | 34              | 9.93               |
| 150.0           | 62.18               | 34.15     | 40              | 10.43              |
| 250.0           | 82.23               | 71.48     | 44              | 10.87              |
| 500.0           | 74.09               | 202.04    | 50              | 11.72              |
| 700.0           | 72.96               | 333.48    | 52              | 12.09              |
| 750.0           | 71.93               | 349.05    | 58              | 13.49              |
| 1000.0          | 50.72               | 369.47    | 60              | 14.08              |
| 1500.0          | 80.48               | 300.57    | 62              | 14.76              |
| 2000.0          | 62.90               | 182.55    | 64              | 15.56              |
| 2500.0          | 60.91               | 121.34    | 68              | 17.73              |
| 3000.0          | 61.09               | 92.42     | 70              | 19.28              |

### +RoHS Compliant

The +Suffix identifies RoHS Compliance. See our web site for RoHS Compliance methodologies and qualifications



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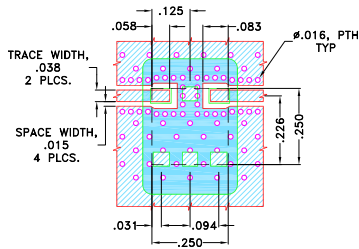
REV.A  
M161927  
ULP-70+  
EDU2383  
URJ  
170512  
Page 2 of 3

## Pad Connections

|        |         |
|--------|---------|
| INPUT  | 1       |
| OUTPUT | 3       |
| GROUND | 2,4,5,6 |

**Demo Board MCL P/N: TB-894+**  
**Suggested PCB Layout (PL-484)**

SUGGESTED MOUNTING CONFIGURATION FOR  
 QA2224 CASE STYLE "06FL09" PIN CODE

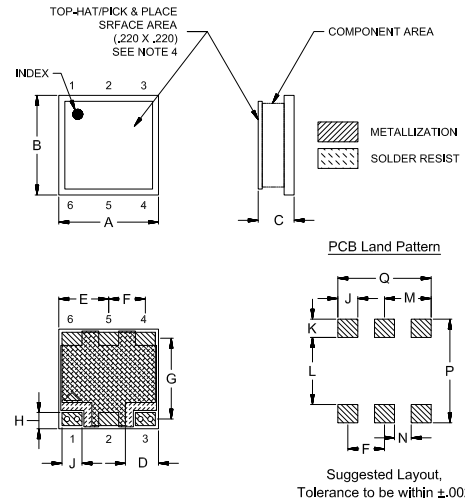


**NOTES:**

- TRACE WIDTH IS SHOWN FOR ROGERS (R04350B) WITH DIELECTRIC THICKNESS .020 $\pm$ .0015". COPPER: 1/2 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH MAY NEED TO BE MODIFIED.
- BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.

- DENOTES PCB COPPER LAYOUT WITH SMOBC (SOLDER MASK OVER BARE COPPER)
- DENOTES COPPER LAND PATTERN FREE OF SOLDERMASK

## Outline Drawing



## Outline Dimensions ( Inch )

| A    | B    | C    | D    | E    | F    | G    | H    | J    | K     |
|------|------|------|------|------|------|------|------|------|-------|
| -    | -    | Min  | Max  | -    | -    | -    | -    | -    | -     |
| .250 | .250 | .075 | .100 | .075 | .125 | .092 | .201 | .041 | .050  |
| 6.35 | 6.35 | 1.91 | 2.54 | 1.91 | 3.18 | 2.34 | 5.11 | 1.04 | 1.27  |
| L    | M    | N    | P    | Q    |      |      |      |      | Wt.   |
| -    | -    | -    | -    | -    |      |      |      |      | grams |
| .168 | .117 | .042 | .260 | .234 |      |      |      |      | 0.25  |
| 4.27 | 2.97 | 1.07 | 6.60 | 5.94 |      |      |      |      |       |

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