Surface Mount

# Power Splitter/Combiner

## QBA-07

2 Way-90° 50Ω 340 to 680 MHz

CASE STYLE: SM1L

### Maximum Ratings

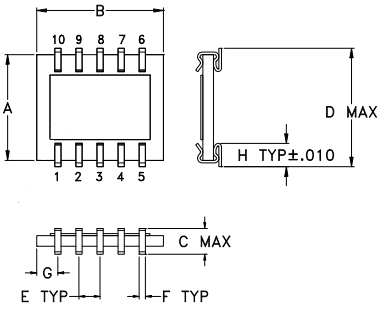
| | |
|---|---|
| Operating Temperature | -55°C to +100°C |
| Storage Temperature | -55°C to +100°C |

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

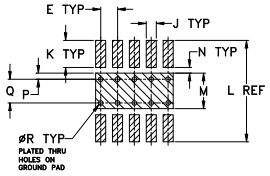
### Pin Connections

| | |
|---|---|
| SUM PORT | 1 |
| PORT 1 (+90°) | 10 |
| PORT 2 (0°) | 6 |
| GROUND | 2,3,4,7,8,9 |
| 50 OHM TERM EXTERNAL | 5 |

### Outline Drawing




PCB Land Pattern



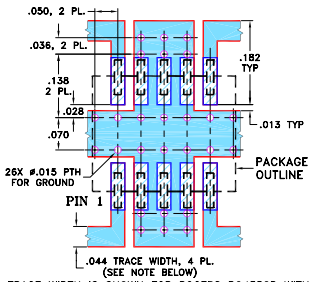

Suggested Layout,
Tolerance to be within ±.002

ADJACENT GROUND PINS SHALL BE CONNECTED TO EACH OTHER AND TO GROUND PAD

### Outline Dimensions (inch/mm)

| A | B | C | D | E | F | G | H | |
|---|---|---|---|---|---|---|---|---|
| .250 | .300 | .070 | .320 | .050 | .015 | .050 | .075 | |
| 6.35 | 7.62 | 1.78 | 8.12 | 1.27 | 0.38 | 1.27 | 1.91 | |
| J | K | L | M | N | P | Q | R | wt |
| .030 | .095 | .330 | .100 | .020 | .015 | .070 | .014 | grams |
| 0.76 | 2.41 | 8.38 | 2.54 | 0.51 | 0.38 | 1.78 | 0.36 | 0.3 |

Demo Board MCL P/N: TB-115+
Suggested PCB Layout (PL-004)




NOTE: 1. TRACE WIDTH IS SHOWN FOR ROGERS RO4350B WITH DIELECTRIC THICKNESS .020 ± .0015; COPPER: 1/2 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH MAY NEED TO BE MODIFIED
2. 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 SOLDER MASK

### Features

- low insertion loss, 0.5 dB typ.
- high power capability, 27W
- hermetically sealed
- low variation with temperature
- low profile, 0.07" height
- aqueous washable
- protected by U.S. Patent 5,534,830

### Applications

- NMT
- land mobile radio
- broadcasting

### Electrical Specifications

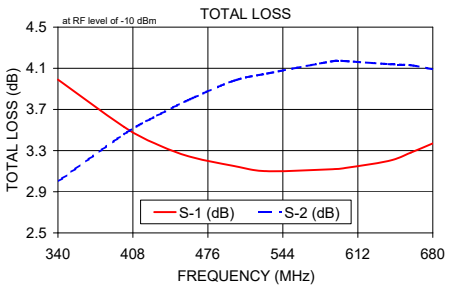
| FREQ. RANGE (MHz) | ISOLATION (dB) | | INSERTION LOSS (dB) Avg. of Coupled Outputs ABOVE 3 dB | | PHASE UNBALANCE (Degrees) | | AMPLITUDE UNBALANCE (dB) | | THERMAL RESISTANCE θjc, °C/W | POWER (W) |
|---|---|---|---|---|---|---|---|---|---|---|
| $f_L$-$f_U$ | Typ. | Min. | $\overline{X}$ | σ | Typ. | Max. | Typ. | Max. | Typ. | |
| 340-680 | 22 | 16 | 0.8 | 0.1 | 3.0 | 7.0 | 0.7 | 2.0 | 20 | 21* |
| 340-530 | 23 | 18 | 0.5 | 0.1 | 1.7 | 4.0 | 0.7 | 2.0 | 20 | 27** |

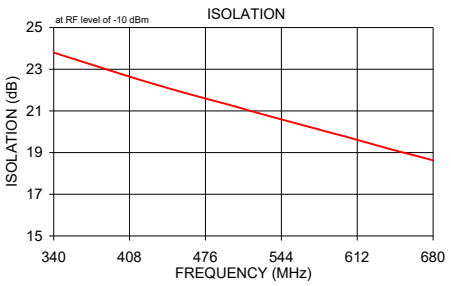
* Derate linearly to 9W at 100°C
** Derate linearly to 12W at 100°C

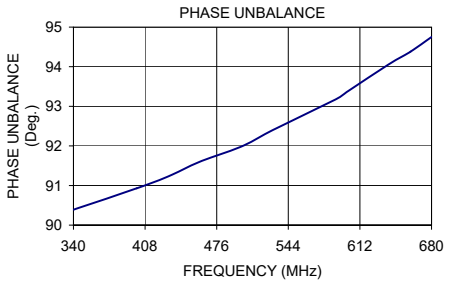
### Typical Performance Data

| Frequency (MHz) | Total Loss[1] (dB) | | Amplitude Unbalance (dB) | Isolation (dB) | Phase Unbalance (deg.) | VSWR S | VSWR 1 | VSWR 2 |
|---|---|---|---|---|---|---|---|---|
| | S-1 | S-2 | | | | | | |
| 340.00 | 3.99 | 3.00 | 0.99 | 23.80 | 90.39 | 1.14 | 1.08 | 1.12 |
| 400.00 | 3.53 | 3.46 | 0.07 | 22.78 | 90.93 | 1.17 | 1.10 | 1.14 |
| 430.00 | 3.36 | 3.64 | 0.27 | 22.29 | 91.23 | 1.19 | 1.11 | 1.14 |
| 460.00 | 3.24 | 3.80 | 0.56 | 21.83 | 91.60 | 1.20 | 1.12 | 1.15 |
| 500.00 | 3.15 | 3.98 | 0.83 | 21.25 | 91.99 | 1.22 | 1.14 | 1.17 |
| 530.00 | 3.10 | 4.05 | 0.96 | 20.80 | 92.41 | 1.24 | 1.15 | 1.18 |
| 590.00 | 3.12 | 4.17 | 1.05 | 19.93 | 93.19 | 1.27 | 1.18 | 1.20 |
| 600.00 | 3.13 | 4.17 | 1.04 | 19.79 | 93.37 | 1.27 | 1.19 | 1.21 |
| 640.00 | 3.20 | 4.14 | 0.94 | 19.19 | 94.07 | 1.29 | 1.21 | 1.22 |
| 660.00 | 3.28 | 4.13 | 0.85 | 18.91 | 94.38 | 1.30 | 1.22 | 1.23 |
| 680.00 | 3.37 | 4.09 | 0.73 | 18.63 | 94.75 | 1.31 | 1.23 | 1.24 |

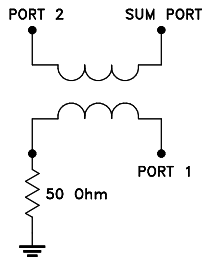
1. Total Loss = Insertion Loss + 3dB splitter loss.




### electrical schematic




Notes
A. Performance and quality attributes and conditions not expressly stated in this specification document are intended to be excluded and do not form a part of this specification document.
B. Electrical specifications and performance data contained in this specification document are based on Mini-Circuit's applicable established test performance criteria and measurement instructions.
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# 2 Way-90° Power Splitter/Combiner QBA-07

## *Typical Performance Data*

TEST CONDITIONS: INPUT POWER = 0dBm @Temperature = +25°C

| FREQ. (MHz) | TOTAL LOSS[1] (dB) | | | AMP. UNBAL. (dB) | PHASE UNBAL. From 90° (deg.) | ISOLATION (dB) | VSWR (:1) | | |
|---|---|---|---|---|---|---|---|---|---|
| | S-1 | S-2 | AVG. | | | 1-2 | S | 1 | 2 |
| 100 | 10.49 | 0.64 | 5.56 | 9.85 | 1.94 | 31.23 | 1.09 | 1.09 | 1.11 |
| 125 | 8.89 | 0.87 | 4.88 | 8.01 | 1.80 | 29.74 | 1.11 | 1.10 | 1.12 |
| 150 | 7.67 | 1.13 | 4.40 | 6.54 | 1.67 | 28.68 | 1.13 | 1.11 | 1.13 |
| 175 | 6.72 | 1.39 | 4.05 | 5.33 | 1.56 | 27.92 | 1.13 | 1.11 | 1.13 |
| 200 | 5.96 | 1.66 | 3.81 | 4.30 | 1.47 | 27.39 | 1.14 | 1.11 | 1.13 |
| 225 | 5.34 | 1.93 | 3.64 | 3.41 | 1.33 | 26.99 | 1.14 | 1.10 | 1.12 |
| 250 | 4.84 | 2.19 | 3.51 | 2.65 | 1.19 | 26.76 | 1.14 | 1.09 | 1.11 |
| 275 | 4.43 | 2.45 | 3.44 | 1.98 | 1.04 | 26.46 | 1.13 | 1.08 | 1.11 |
| 300 | 4.09 | 2.68 | 3.38 | 1.41 | 0.90 | 26.27 | 1.13 | 1.07 | 1.10 |
| 320 | 3.86 | 2.87 | 3.36 | 0.99 | 0.80 | 26.14 | 1.13 | 1.06 | 1.09 |
| 340 | 3.67 | 3.04 | 3.35 | 0.63 | 0.67 | 26.01 | 1.13 | 1.06 | 1.09 |
| 360 | 3.49 | 3.19 | 3.34 | 0.30 | 0.58 | 25.88 | 1.12 | 1.05 | 1.09 |
| 380 | 3.35 | 3.34 | 3.34 | 0.01 | 0.47 | 25.76 | 1.12 | 1.05 | 1.09 |
| 400 | 3.23 | 3.48 | 3.35 | 0.25 | 0.39 | 25.61 | 1.13 | 1.05 | 1.09 |
| 420 | 3.12 | 3.61 | 3.37 | 0.48 | 0.31 | 25.43 | 1.13 | 1.06 | 1.10 |
| 440 | 3.04 | 3.72 | 3.38 | 0.67 | 0.22 | 25.23 | 1.13 | 1.07 | 1.11 |
| 460 | 2.98 | 3.81 | 3.39 | 0.83 | 0.16 | 25.05 | 1.14 | 1.08 | 1.12 |
| 480 | 2.93 | 3.90 | 3.42 | 0.97 | 0.10 | 24.85 | 1.15 | 1.09 | 1.13 |
| 500 | 2.89 | 3.96 | 3.43 | 1.07 | 0.04 | 24.64 | 1.15 | 1.10 | 1.14 |
| 520 | 2.87 | 4.01 | 3.44 | 1.14 | 0.01 | 24.43 | 1.16 | 1.11 | 1.14 |
| 530 | 2.86 | 4.04 | 3.45 | 1.17 | 0.05 | 24.31 | 1.16 | 1.11 | 1.15 |
| 560 | 2.87 | 4.07 | 3.47 | 1.20 | 0.11 | 23.94 | 1.17 | 1.13 | 1.16 |
| 580 | 2.89 | 4.08 | 3.49 | 1.19 | 0.17 | 23.68 | 1.18 | 1.14 | 1.17 |
| 600 | 2.93 | 4.06 | 3.50 | 1.14 | 0.23 | 23.41 | 1.19 | 1.15 | 1.18 |
| 620 | 2.98 | 4.04 | 3.51 | 1.06 | 0.29 | 23.15 | 1.19 | 1.16 | 1.19 |
| 640 | 3.06 | 3.99 | 3.53 | 0.94 | 0.34 | 22.88 | 1.20 | 1.17 | 1.19 |
| 660 | 3.15 | 3.94 | 3.54 | 0.79 | 0.41 | 22.62 | 1.21 | 1.18 | 1.20 |
| 680 | 3.25 | 3.86 | 3.56 | 0.61 | 0.51 | 22.37 | 1.21 | 1.19 | 1.21 |
| 700 | 3.38 | 3.76 | 3.57 | 0.38 | 0.62 | 22.14 | 1.22 | 1.21 | 1.21 |
| 750 | 3.83 | 3.47 | 3.65 | 0.36 | 1.03 | 21.69 | 1.25 | 1.24 | 1.24 |
| 800 | 4.50 | 3.08 | 3.79 | 1.42 | 1.77 | 21.40 | 1.29 | 1.30 | 1.28 |
| 850 | 5.52 | 2.65 | 4.08 | 2.88 | 2.95 | 21.50 | 1.36 | 1.36 | 1.34 |
| 900 | 7.08 | 2.20 | 4.64 | 4.89 | 4.95 | 22.29 | 1.43 | 1.44 | 1.41 |

[1] Total Loss = Insertion Loss+ 3dB Splitter Loss

# 2 Way-90° Power Splitter/Combiner QBA-07

## *Typical Performance Data*

TEST CONDITIONS: INPUT POWER = 0dBm @Temperature = -55°C

| FREQ. (MHz) | TOTAL LOSS[1] (dB) | | | AMP. UNBAL. (dB) | PHASE UNBAL. From 90° (deg.) | ISOLATION (dB) | VSWR (:1) | | |
|---|---|---|---|---|---|---|---|---|---|
| | S-1 | S-2 | AVG. | | | 1-2 | S | 1 | 2 |
| 100 | 10.49 | 0.55 | 5.52 | 9.94 | 1.94 | 32.09 | 1.06 | 1.07 | 1.08 |
| 125 | 8.88 | 0.78 | 4.83 | 8.10 | 1.82 | 30.77 | 1.11 | 1.10 | 1.12 |
| 150 | 7.65 | 1.03 | 4.34 | 6.62 | 1.71 | 30.30 | 1.11 | 1.10 | 1.11 |
| 175 | 6.67 | 1.28 | 3.97 | 5.39 | 1.63 | 29.51 | 1.10 | 1.09 | 1.09 |
| 200 | 5.90 | 1.54 | 3.72 | 4.36 | 1.60 | 28.39 | 1.11 | 1.09 | 1.10 |
| 225 | 5.28 | 1.81 | 3.54 | 3.47 | 1.53 | 27.70 | 1.13 | 1.09 | 1.11 |
| 250 | 4.77 | 2.06 | 3.41 | 2.71 | 1.42 | 27.83 | 1.13 | 1.08 | 1.10 |
| 275 | 4.34 | 2.31 | 3.33 | 2.04 | 1.33 | 27.85 | 1.11 | 1.07 | 1.08 |
| 300 | 3.99 | 2.54 | 3.26 | 1.45 | 1.27 | 27.44 | 1.10 | 1.07 | 1.07 |
| 320 | 3.76 | 2.72 | 3.24 | 1.04 | 1.19 | 26.95 | 1.11 | 1.06 | 1.08 |
| 340 | 3.56 | 2.89 | 3.23 | 0.66 | 1.09 | 26.58 | 1.12 | 1.05 | 1.08 |
| 360 | 3.38 | 3.05 | 3.22 | 0.33 | 1.04 | 26.46 | 1.12 | 1.04 | 1.08 |
| 380 | 3.23 | 3.20 | 3.22 | 0.03 | 1.00 | 26.40 | 1.11 | 1.03 | 1.09 |
| 400 | 3.10 | 3.33 | 3.21 | 0.23 | 0.96 | 26.16 | 1.11 | 1.03 | 1.09 |
| 420 | 2.99 | 3.46 | 3.23 | 0.46 | 0.93 | 25.80 | 1.11 | 1.03 | 1.10 |
| 440 | 2.91 | 3.57 | 3.24 | 0.65 | 0.89 | 25.43 | 1.12 | 1.05 | 1.10 |
| 460 | 2.84 | 3.66 | 3.25 | 0.82 | 0.86 | 25.19 | 1.13 | 1.06 | 1.11 |
| 480 | 2.78 | 3.74 | 3.26 | 0.96 | 0.82 | 25.00 | 1.13 | 1.06 | 1.12 |
| 500 | 2.73 | 3.80 | 3.27 | 1.07 | 0.77 | 24.75 | 1.14 | 1.07 | 1.12 |
| 520 | 2.71 | 3.85 | 3.28 | 1.14 | 0.72 | 24.40 | 1.15 | 1.09 | 1.13 |
| 530 | 2.70 | 3.88 | 3.29 | 1.18 | 0.70 | 24.21 | 1.15 | 1.09 | 1.13 |
| 560 | 2.69 | 3.91 | 3.30 | 1.22 | 0.69 | 23.77 | 1.17 | 1.11 | 1.15 |
| 580 | 2.70 | 3.92 | 3.31 | 1.22 | 0.67 | 23.51 | 1.17 | 1.13 | 1.16 |
| 600 | 2.74 | 3.90 | 3.32 | 1.17 | 0.68 | 23.25 | 1.18 | 1.14 | 1.16 |
| 620 | 2.78 | 3.88 | 3.33 | 1.10 | 0.67 | 22.90 | 1.19 | 1.15 | 1.17 |
| 640 | 2.84 | 3.84 | 3.34 | 1.00 | 0.63 | 22.46 | 1.20 | 1.17 | 1.17 |
| 660 | 2.92 | 3.78 | 3.35 | 0.86 | 0.62 | 22.16 | 1.21 | 1.18 | 1.18 |
| 680 | 3.01 | 3.70 | 3.36 | 0.69 | 0.57 | 21.93 | 1.21 | 1.18 | 1.19 |
| 700 | 3.12 | 3.61 | 3.36 | 0.49 | 0.56 | 21.76 | 1.21 | 1.19 | 1.20 |
| 750 | 3.52 | 3.31 | 3.42 | 0.22 | 0.36 | 21.16 | 1.24 | 1.23 | 1.22 |
| 800 | 4.14 | 2.93 | 3.53 | 1.20 | 0.07 | 20.77 | 1.28 | 1.27 | 1.26 |
| 850 | 5.08 | 2.49 | 3.78 | 2.59 | 0.82 | 20.71 | 1.34 | 1.35 | 1.31 |
| 900 | 6.52 | 2.02 | 4.27 | 4.50 | 2.39 | 21.24 | 1.42 | 1.41 | 1.39 |

[1] Total Loss = Insertion Loss+ 3dB Splitter Loss

# 2 Way-90° Power Splitter/Combiner QBA-07

## *Typical Performance Data*

TEST CONDITIONS: INPUT POWER = 0dBm @Temperature = +100°C

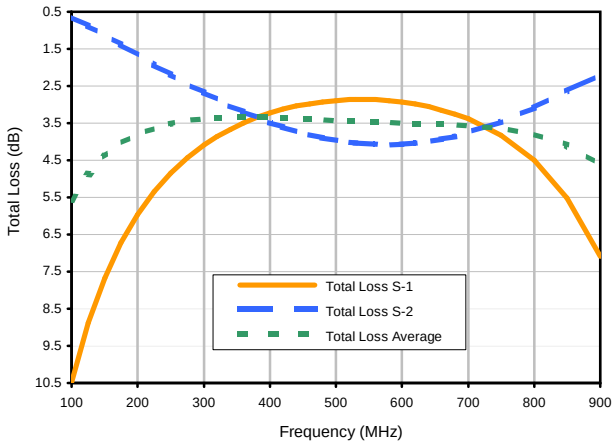
| FREQ. (MHz) | TOTAL LOSS[1] (dB) | | | AMP. UNBAL. (dB) | PHASE UNBAL. From 90° (deg.) | ISOLATION (dB) | VSWR (:1) | | |
|---|---|---|---|---|---|---|---|---|---|
| | S-1 | S-2 | AVG. | | | 1-2 | S | 1 | 2 |
| 100 | 10.47 | 0.71 | 5.59 | 9.76 | 2.07 | 30.27 | 1.12 | 1.11 | 1.14 |
| 125 | 8.89 | 0.94 | 4.91 | 7.94 | 1.88 | 28.73 | 1.12 | 1.11 | 1.13 |
| 150 | 7.68 | 1.21 | 4.44 | 6.47 | 1.78 | 27.21 | 1.14 | 1.12 | 1.14 |
| 175 | 6.74 | 1.48 | 4.11 | 5.26 | 1.65 | 26.25 | 1.17 | 1.14 | 1.17 |
| 200 | 5.99 | 1.75 | 3.87 | 4.24 | 1.49 | 26.07 | 1.18 | 1.13 | 1.17 |
| 225 | 5.38 | 2.02 | 3.70 | 3.36 | 1.33 | 25.94 | 1.16 | 1.11 | 1.15 |
| 250 | 4.88 | 2.28 | 3.58 | 2.60 | 1.15 | 25.63 | 1.15 | 1.11 | 1.13 |
| 275 | 4.48 | 2.54 | 3.51 | 1.95 | 0.93 | 25.10 | 1.16 | 1.10 | 1.13 |
| 300 | 4.15 | 2.78 | 3.46 | 1.37 | 0.78 | 24.95 | 1.16 | 1.09 | 1.13 |
| 320 | 3.92 | 2.96 | 3.44 | 0.96 | 0.63 | 25.06 | 1.15 | 1.08 | 1.12 |
| 340 | 3.72 | 3.13 | 3.42 | 0.59 | 0.48 | 25.08 | 1.14 | 1.07 | 1.11 |
| 360 | 3.55 | 3.29 | 3.42 | 0.26 | 0.37 | 25.02 | 1.14 | 1.07 | 1.10 |
| 380 | 3.41 | 3.44 | 3.43 | 0.03 | 0.24 | 24.88 | 1.14 | 1.07 | 1.10 |
| 400 | 3.30 | 3.58 | 3.44 | 0.28 | 0.14 | 24.69 | 1.15 | 1.08 | 1.11 |
| 420 | 3.19 | 3.71 | 3.45 | 0.51 | 0.05 | 24.59 | 1.15 | 1.09 | 1.11 |
| 440 | 3.12 | 3.82 | 3.47 | 0.70 | 0.00 | 24.53 | 1.15 | 1.09 | 1.12 |
| 460 | 3.06 | 3.92 | 3.49 | 0.86 | 0.06 | 24.45 | 1.16 | 1.10 | 1.13 |
| 480 | 3.01 | 4.00 | 3.50 | 0.99 | 0.19 | 24.30 | 1.16 | 1.11 | 1.14 |
| 500 | 2.97 | 4.06 | 3.52 | 1.08 | 0.29 | 24.11 | 1.17 | 1.12 | 1.15 |
| 520 | 2.96 | 4.11 | 3.54 | 1.15 | 0.40 | 23.92 | 1.18 | 1.13 | 1.16 |
| 530 | 2.95 | 4.13 | 3.54 | 1.18 | 0.43 | 23.81 | 1.18 | 1.14 | 1.17 |
| 560 | 2.96 | 4.16 | 3.56 | 1.20 | 0.51 | 23.59 | 1.19 | 1.15 | 1.18 |
| 580 | 2.99 | 4.16 | 3.58 | 1.17 | 0.60 | 23.33 | 1.20 | 1.17 | 1.19 |
| 600 | 3.04 | 4.14 | 3.59 | 1.11 | 0.68 | 23.14 | 1.21 | 1.17 | 1.20 |
| 620 | 3.10 | 4.12 | 3.61 | 1.02 | 0.76 | 22.96 | 1.21 | 1.18 | 1.21 |
| 640 | 3.18 | 4.07 | 3.62 | 0.90 | 0.87 | 22.70 | 1.22 | 1.19 | 1.21 |
| 660 | 3.28 | 4.00 | 3.64 | 0.72 | 0.98 | 22.56 | 1.22 | 1.20 | 1.22 |
| 680 | 3.39 | 3.92 | 3.66 | 0.53 | 1.12 | 22.35 | 1.23 | 1.21 | 1.23 |
| 700 | 3.54 | 3.83 | 3.68 | 0.29 | 1.24 | 22.16 | 1.24 | 1.23 | 1.24 |
| 750 | 4.02 | 3.53 | 3.77 | 0.49 | 1.80 | 21.85 | 1.27 | 1.26 | 1.27 |
| 800 | 4.75 | 3.16 | 3.95 | 1.59 | 2.69 | 21.76 | 1.32 | 1.32 | 1.31 |
| 850 | 5.86 | 2.74 | 4.30 | 3.13 | 4.06 | 22.03 | 1.39 | 1.40 | 1.37 |
| 900 | 7.55 | 2.30 | 4.92 | 5.25 | 6.58 | 23.17 | 1.46 | 1.47 | 1.44 |

[1] Total Loss = Insertion Loss+ 3dB Splitter Loss

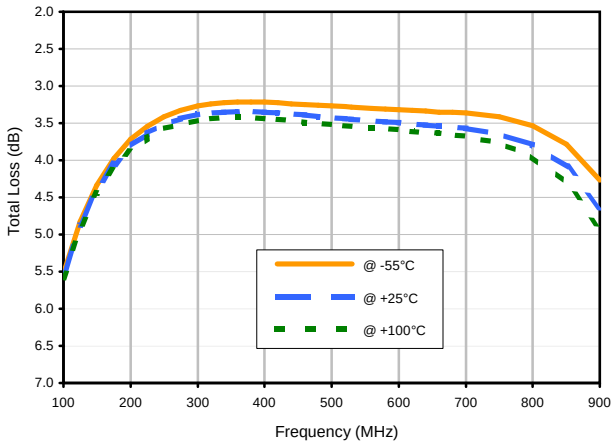
# 2 Way-90° Power Splitter/Combiner QBA-07

*Typical Performance Curves*

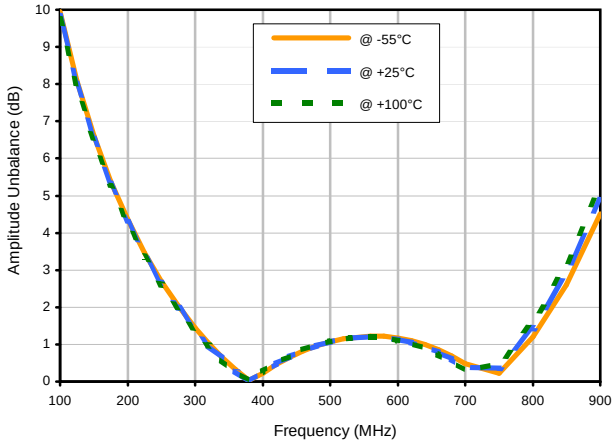
**Total Loss**



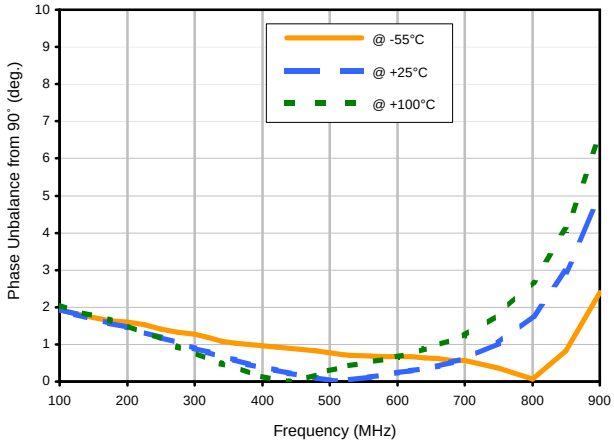

**Average Total Loss vs. TEMPERATURE**



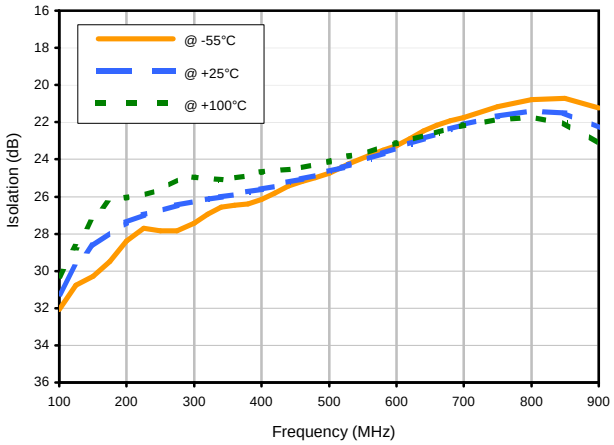

**Amplitude Unbalance vs. TEMPERATURE**




**Phase Unbalance vs. TEMPERATURE**

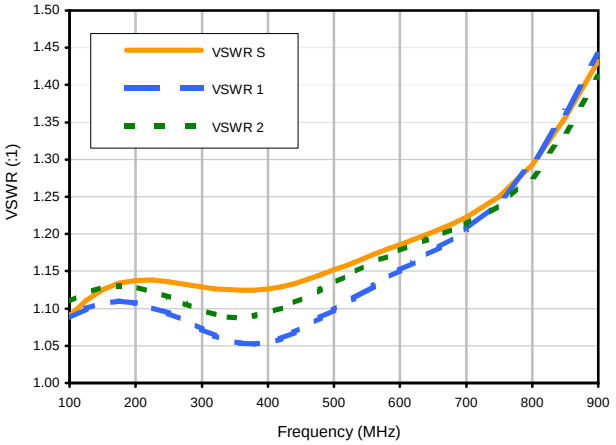



**Isolation 1-2 vs. TEMPERATURE**

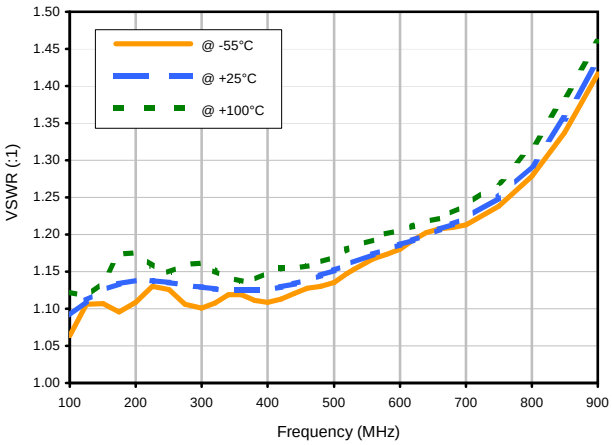


## *Typical Performance Curves*

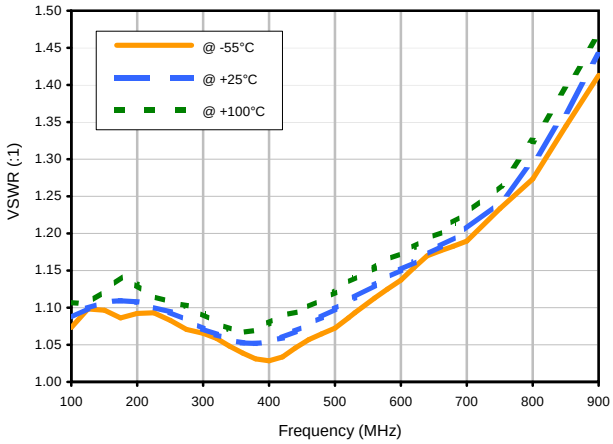
**VSWR**




**VSWR SUM vs. TEMPERATURE**



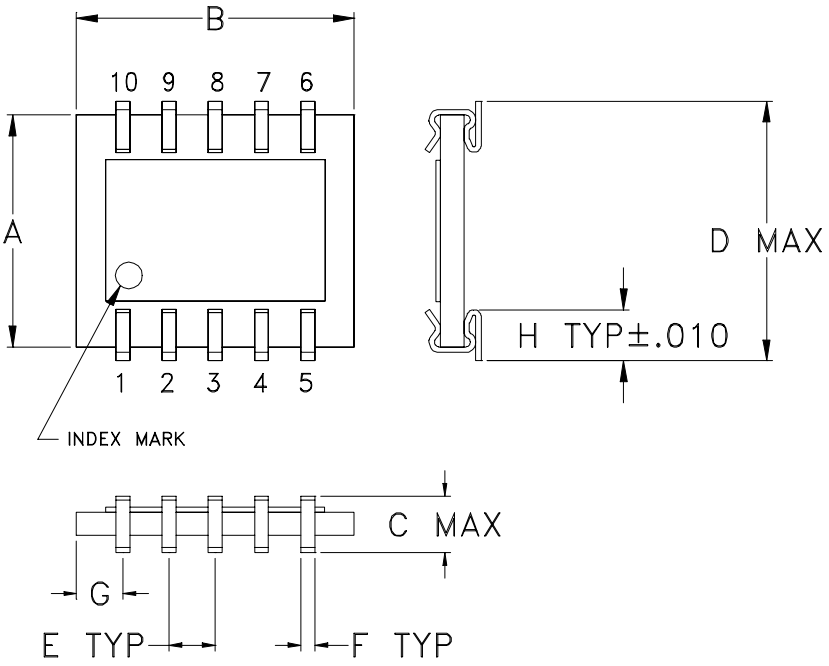

**VSWR OUT1 vs. TEMPERATURE**



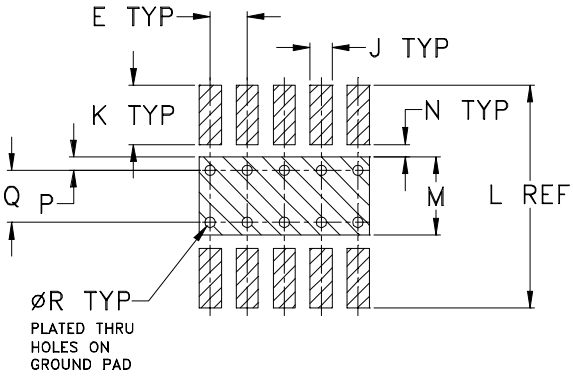
# Case Style SM1L

**SM1L**

## Outline Dimensions




## PCB Land Pattern




Suggested Layout,
Tolerance to be within ±.002

ADJACENT GROUND PINS SHALL BE CONNECTED TO EACH OTHER AND TO GROUND PAD

| CASE # | A | B | C | D | E | F | G | H | J | K | L | M | N | P |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SM1L | .250 (6.35) | .300 (7.62) | .070 (1.78) | .320 (8.12) | .050 (1.27) | .015 (0.38) | .050 (1.27) | .075 (1.91) | .030 (0.76) | .095 (2.41) | .330 (8.38) | .100 (2.54) | .020 (0.51) | .015 (0.38) |

| CASE # | Q | R | WT. GRAM |
|---|---|---|---|
| SM1L | .070 (1.78) | .014 (0.36) | .3 |

**Dimensions are in inches (mm). Tolerances: ± .005**

**Notes:**

1. Open style, ceramic base.
2. Termination finish:
   For RoHS Case Styles: Tin plate over Nickel plate.
   For RoHS-5 Case Styles: Tin-Lead plate.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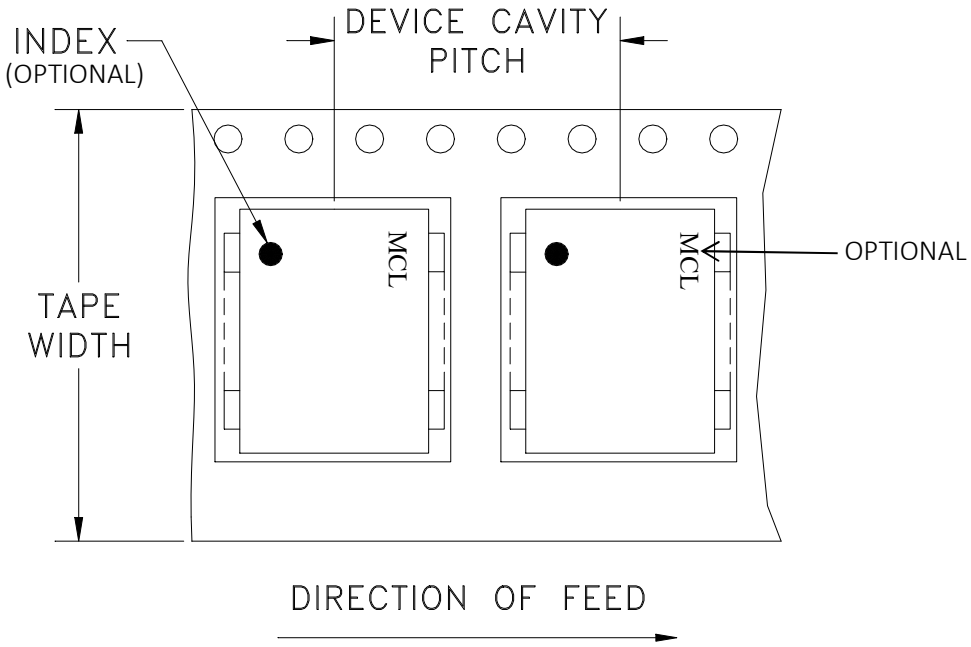
# Tape & Reel Packaging TR-F34

DEVICE ORIENTATION IN T&R




| Tape Width, mm | Device Cavity Pitch, mm | Reel Size, inches | Devices per Reel see note | |
|---|---|---|---|---|
| 16 | 12 | 7 | Small quantity standard (see note) | 20 |
| | | | | 50 |
| | | | | 100 |
| | | | | 200 |
| | | 13 | Standard | 500 |
| | | | | 1000 |

Note: Availability of small reel quantity varies by model.
Refer to pricing and availability on individual model dashboard.

Mini-Circuits carrier tape materials provide protection from ESD (Electro-Static Discharge) during handling and transportation. Tapes are static dissipative and comply with industry standards EIA-481/EIA-541.

Go to: www.minicircuits.com/pages/pdfs/tape.pdf

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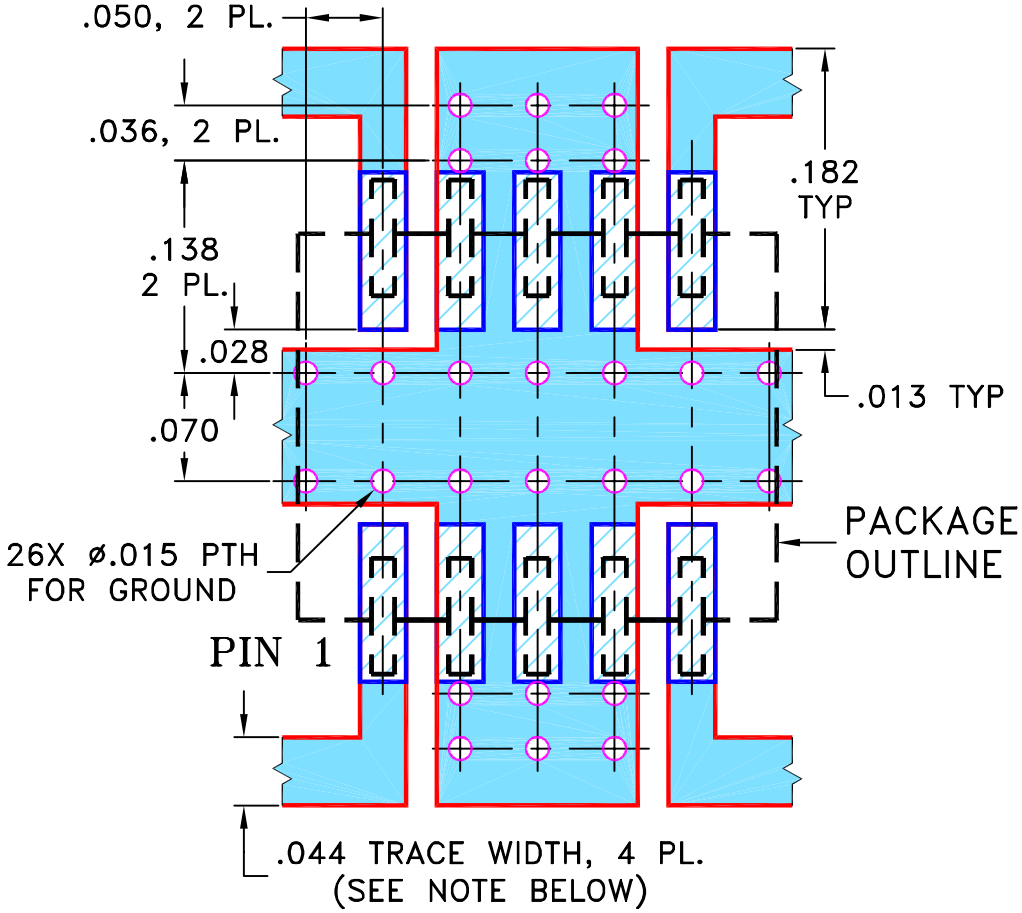
THIRD ANGLE PROJECTION

| REVISIONS | | | | | |
|---|---|---|---|---|---|
| REV | ECN No. | DESCRIPTION | DATE | DR | AUTH |
| A | M82377 | UPDATED DRAWING | 07/31/02 | AV | DB |
| B | M101085 | UPDATED DRAWING, ADDED | 10/06/05 | MMG | HY |
| | | DZ944 CASE STYLE & NOTE 2 | | | |
| C | M102713 | UPDATED NOTES | 01/10/06 | MMG | ABD |

# SUGGESTED MOUNTING CONFIGURATION FOR SM1L/SM33/DZ944 CASE STYLES, "lf/nl" PIN CONNECTIONS




NOTE: 1. TRACE WIDTH IS SHOWN FOR ROGERS RO4350B WITH DIELECTRIC THICKNESS .020 ± .0015; COPPER: 1/2 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH MAY NEED TO BE MODIFIED.

2. 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 SOLDER MASK

| UNLESS OTHERWISE SPECIFIED | | INITIALS | DATE |
|---|---|---|---|
| DIMENSIONS ARE IN INCHES | DRAWN | MMG | 04/12/00 |
| TOLERANCES ON: | CHECKED | WP | 04/27/00 |
| 2 PL DECIMALS ± | APPROVED | DB | 04/27/00 |
| 3 PL DECIMALS ± .005 | | | |
| ANGLES ± | | | |
| FRACTIONS ± | | | |



ASHEETA1.DWG REV:A DATE:01/12/95

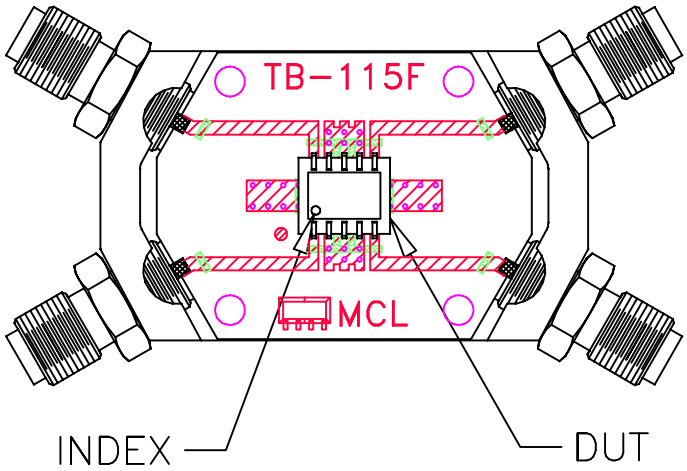
Mini-Circuits® 13 Neptune Avenue Brooklyn NY 11235

PL, lf/nl, SM1L/SM33/DZ944, BDCA/QBA, TB-115

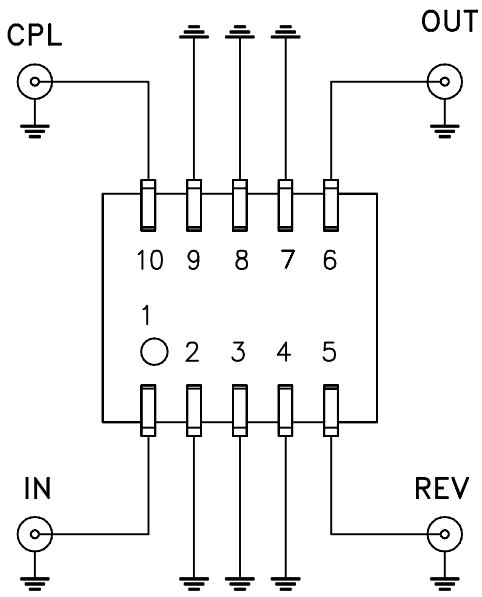
| SIZE | CODE IDENT | DRAWING NO: | REV: |
|---|---|---|---|
| A | 15542 | 98-PL-004 | C |

| FILE: | SCALE: | SHEET: |
|---|---|---|
| 98PL004 | 8:1 | 1 OF 1 |

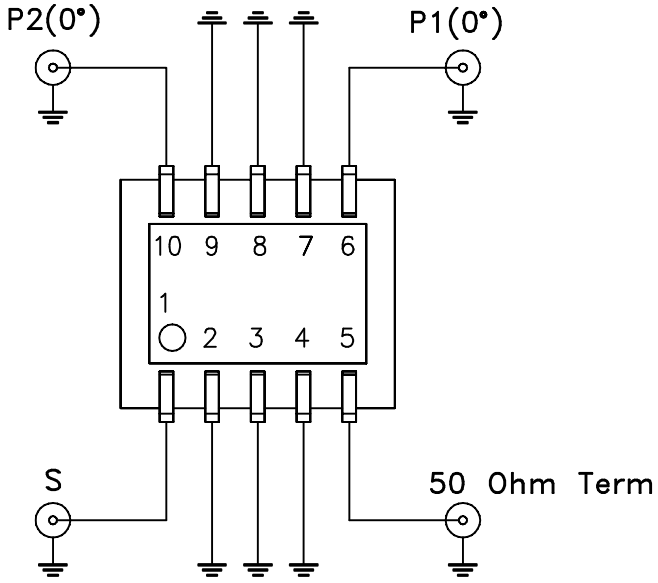
# Evaluation Board and Circuit




TB-115+




BDCA MODELS




QBA MODELS

## SCHEMATIC DIAGRAM

## Notes:

1. SMA Female connectors.
2. PCB Material: Rogers RO4350 or equivalent, Dielectric Constant=3.5, Thickness=.020 inch.

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# Environmental Specifications ENV02T2

All Mini-Circuits products are manufactured under exacting quality assurance and control standards, and are capable of meeting published specifications after being subjected to any or all of the following physical and environmental test.

| Specification | Test/Inspection Condition | Reference/Spec |
|---|---|---|
| Operating Temperature | -55° to 100°C<br>Ambient Environment | Individual Model Data Sheet |
| Storage Temperature | -55° to 100° C<br>Ambient Environment | Individual Model Data Sheet |
| Humidity | 90 to 95% RH, 240 hours, 50°C | MIL-STD-202, Method 103, Condition A, Except 50°C and end-point electrical test done within 12 hours |
| Thermal Shock | -55° to 100°C, 100 cycles | MIL-STD-202, Method 107, Condition A-3, except +100°C |
| Solder Reflow Heat | Sn-Pb Eutetic Process: 225°C peak<br>Pb-Free Process 245° - 250°C peak | J-STD-020, Table 4-1, 4-2 and 5-2, Figure 5-1 |
| Solderability | 10X Magnification | J-STD-002, 95% Coverage |
| Vibration (High Frequency) | 20g peak, 10-2000 Hz, 12 times in each of three perpendicular directions (total 36) | MIL-STD-202, Method 204, Condition D |
| Mechanical Shock | 50g, 11 ms, 1/2-sine, 18 shocks: 3 each direction, each of 3 axes | MIL-STD-202, Method 213, Condition A |
| Marking Resistance to Solvents | Isopropyl alcohol + mineral spirits at 25°C; terpene defluxer at 25°C;<br>distilled water + proylene glycol monomethyl ether + monoethanolamine at 63°C to 70°C | MIL-STD-202, Method 215 |