

Surface Mount Power Splitter/Combiner

2 Way-90° 50Ω 65 to 75 MHz

LRPQ-70



CASE STYLE: QQQ130

Maximum Ratings

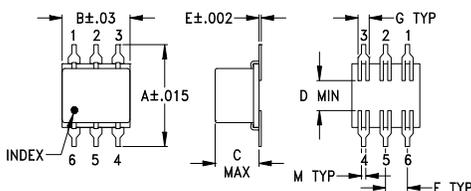
| | |
|-----------------------------|----------------|
| Operating Temperature | -40°C to 85°C |
| Storage Temperature | -55°C to 100°C |
| Power Input (as a splitter) | 1W max. |

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

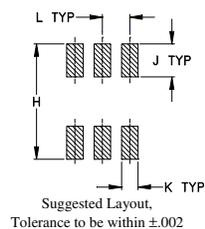
Pin Connections

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

Outline Drawing



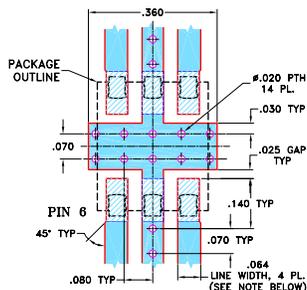
PCB Land Pattern



Outline Dimensions (inch/mm)

| A | B | C | D | E | F | G |
|-------|------|------|------|------|-------|------|
| .400 | .31 | .200 | .10 | .010 | .100 | .050 |
| 10.16 | 7.87 | 5.08 | 2.54 | 0.25 | 2.54 | 1.27 |
| H | J | K | L | M | wt | |
| .420 | .120 | .060 | .100 | .020 | grams | |
| 10.67 | 3.05 | 1.52 | 2.54 | 0.51 | 0.55 | |

Demo Board MCL P/N: TB-226 Suggested PCB Layout (PL-140)



- NOTE:**
- TRACE WIDTH IS SHOWN FOR ROGERS RO4350B WITH DIELECTRIC THICKNESS .030" ± .002", 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 SOLDER MASK
- Notes**

Features

- low insertion loss, 0.1 dB typ.
- high isolation, 30 dB typ.
- excellent phase unbalance 1 deg. typ.
- excellent return loss, VSWR 1.12:1 typ.

Applications

- VHF
- instrumentation
- modulators
- balanced amplifiers

Electrical Specifications

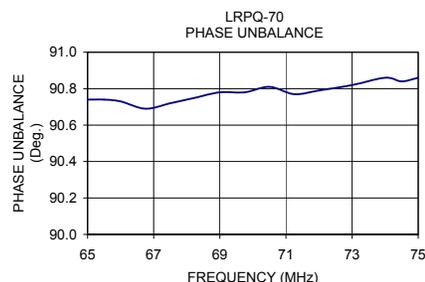
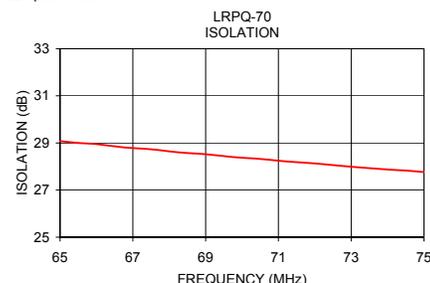
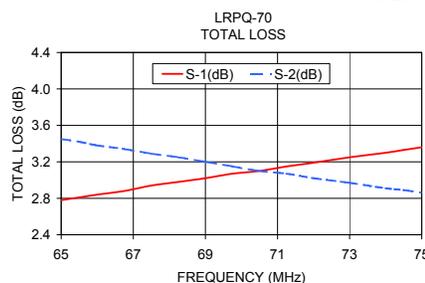
| FREQ. RANGE (MHz) | ISOLATION (dB) | INSERTION LOSS (dB) Avg. of Coupled Outputs ABOVE 3 dB | PHASE UNBALANCE (Degrees) | AMPLITUDE UNBALANCE (dB) |
|-------------------|----------------|---|---------------------------|--------------------------|
| f_L - f_U | Typ. Min. | Typ. Max. | Max. | Max. |
| 65-75 | 30 20 | 0.1 0.5 | 3 | 1.0 |

LRPQ units have bottom barrier ground plane insulated with glass barrier.

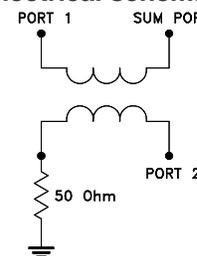
Typical Performance Data

| Frequency (MHz) | Total Loss ¹ (dB) | | Amplitude Unbalance (dB) | Isolation (dB) | Phase Unbalance (deg.) | VSWR S | VSWR 1 | VSWR 2 |
|-----------------|------------------------------|------|--------------------------|----------------|------------------------|--------|--------|--------|
| | S-1 | S-2 | | | | | | |
| 65.00 | 2.78 | 3.45 | 0.68 | 29.08 | 90.74 | 1.12 | 1.11 | 1.06 |
| 65.50 | 2.81 | 3.42 | 0.61 | 29.00 | 90.74 | 1.12 | 1.11 | 1.06 |
| 66.00 | 2.84 | 3.38 | 0.54 | 28.95 | 90.73 | 1.12 | 1.11 | 1.06 |
| 66.75 | 2.88 | 3.34 | 0.45 | 28.81 | 90.69 | 1.12 | 1.11 | 1.06 |
| 67.50 | 2.94 | 3.29 | 0.35 | 28.73 | 90.72 | 1.12 | 1.11 | 1.06 |
| 68.25 | 2.98 | 3.25 | 0.27 | 28.60 | 90.75 | 1.12 | 1.11 | 1.06 |
| 69.00 | 3.02 | 3.20 | 0.18 | 28.52 | 90.78 | 1.12 | 1.11 | 1.06 |
| 69.75 | 3.07 | 3.15 | 0.09 | 28.40 | 90.78 | 1.12 | 1.11 | 1.06 |
| 70.50 | 3.10 | 3.10 | 0.00 | 28.32 | 90.81 | 1.12 | 1.11 | 1.06 |
| 71.25 | 3.15 | 3.07 | 0.08 | 28.21 | 90.77 | 1.12 | 1.11 | 1.06 |
| 72.00 | 3.19 | 3.02 | 0.17 | 28.13 | 90.79 | 1.12 | 1.11 | 1.06 |
| 73.00 | 3.25 | 2.97 | 0.29 | 27.99 | 90.82 | 1.12 | 1.11 | 1.06 |
| 74.00 | 3.30 | 2.91 | 0.39 | 27.87 | 90.86 | 1.12 | 1.11 | 1.06 |
| 74.50 | 3.33 | 2.89 | 0.45 | 27.83 | 90.84 | 1.12 | 1.11 | 1.06 |
| 75.00 | 3.36 | 2.86 | 0.50 | 27.76 | 90.86 | 1.12 | 1.11 | 1.06 |

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



electrical schematic



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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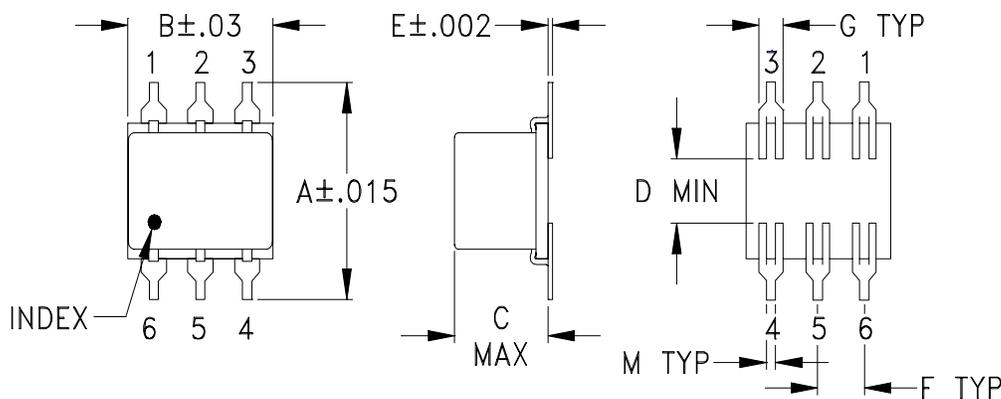


Case Style

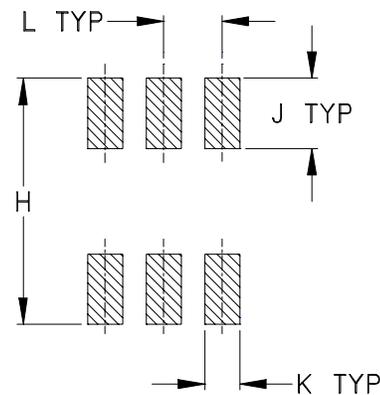
QQQ

QQQ130 (non-waterproof)
QQQ828 (washable)

Outline Dimensions



PCB Land Pattern



Suggested Layout,
Tolerance to be within $\pm .002$

| CASE# | A | B | C | D | E | F | G | H | J | K | L | M | WT, GRAM |
|--------|-----------------|---------------|----------------|---------------|---------------|----------------|----------------|-----------------|----------------|----------------|----------------|---------------|----------|
| QQQ130 | .400 (10.16) | .31 (7.87) | .200 (5.08) | .10 (2.54) | .010 (.25) | .100 (2.54) | .050 (1.27) | .420 (10.67) | .120 (3.05) | .060 (1.52) | .100 (2.54) | .020 (.51) | .55 |
| QQQ828 | | | .050 (1.27) | | | | | | | | | | .20 |

Dimensions are in inches (mm). Tolerances: 2 Pl. $\pm .01$; 3 Pl. $\pm .005$

Notes:

- Case material: Ceramic.
- Termination finish:
 - For RoHS Case Styles: Tin plate over Nickel plate.
 - For RoHS-5 Case Styles: Tin-Lead plate.



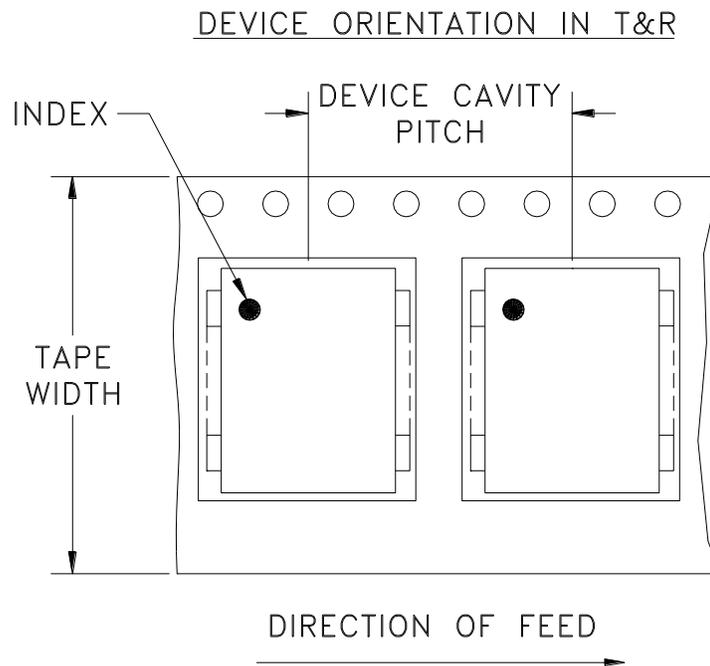
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Tape & Reel Packaging TR-F10



| Tape Width, mm | Device Cavity Pitch, mm | Reel Size, inches | Devices per Reel |
|----------------|-------------------------|-------------------|------------------|
| 24 | 16 | 7 | 10,20,50,100 |
| | | 13 | 200,500 |

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

Note: Please consult individual model data sheet to determine device per reel availability.



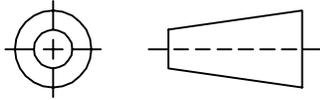
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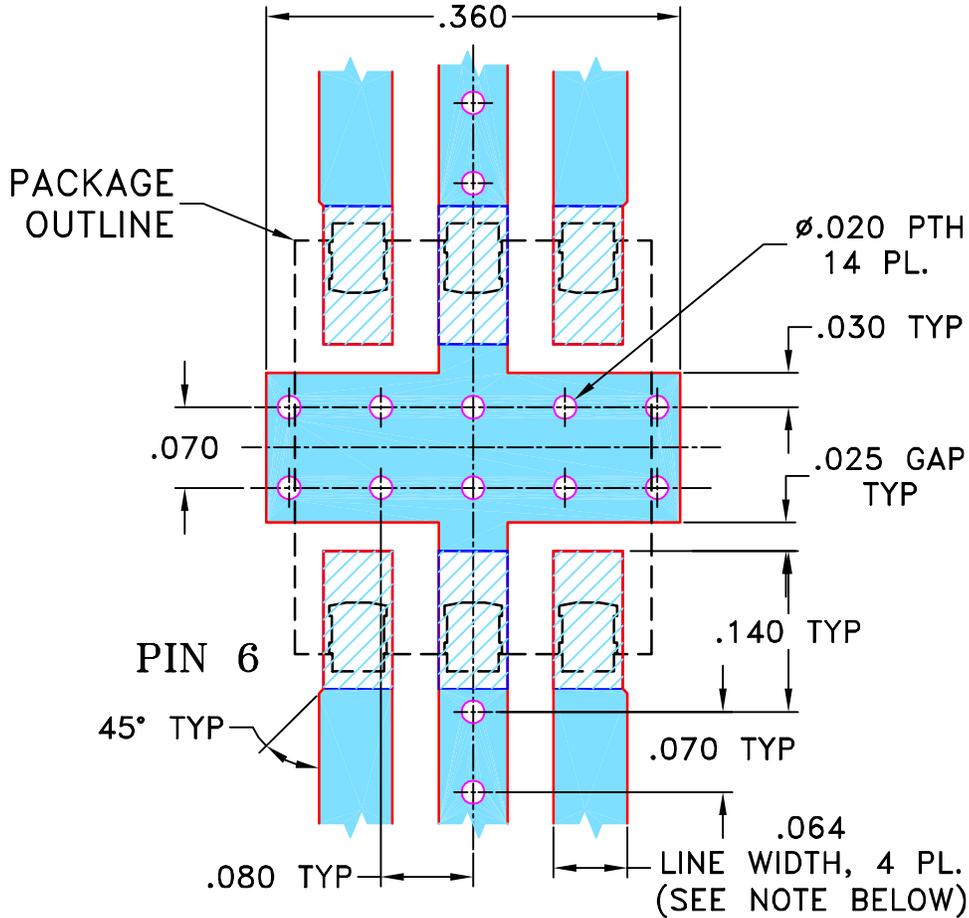
THIRD ANGLE PROJECTION



REVISIONS

| REV | ECN No. | DESCRIPTION | DATE | DR | AUTH |
|-----|---------|------------------------------------|----------|----|------|
| OR | M88792 | NEW RELEASE | 10/20/03 | GF | HY |
| A | M100924 | CHANGED ORIENTATION PIN 1 TO PIN 6 | 09/23/05 | GT | HY |
| B | M102713 | ADDED "...WITH SMOBC" | 01/12/06 | GF | IL |

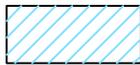
**SUGGESTED MOUNTING CONFIGURATION
FOR QQQ569 CASE STYLE, "ay/lr" PIN CONNECTION.**



- NOTE:**
- TRACE WIDTH IS SHOWN FOR ROGERS R04350B WITH DIELECTRIC THICKNESS $.030" \pm .002"$; 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 SOLDER MASK

| UNLESS OTHERWISE SPECIFIED | INITIALS | DATE |
|----------------------------|-------------|----------|
| DIMENSIONS ARE IN INCHES | DRAWN GF | 09/18/03 |
| TOLERANCES ON: | CHECKED IL | 10/20/03 |
| 2 PL DECIMALS \pm | APPROVED HY | 10/20/03 |
| 3 PL DECIMALS \pm .005 | | |
| ANGLES \pm 1° | | |
| FRACTIONS \pm | | |



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PL, ay/lr, QQQ569, LRPQ-J, TB-226

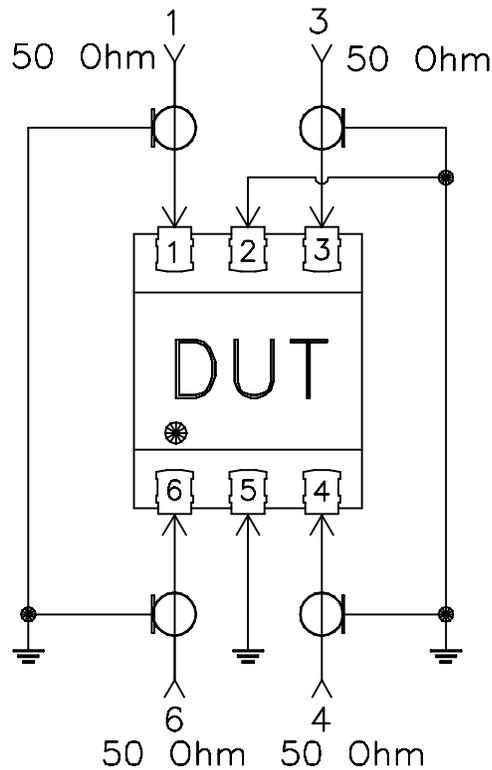
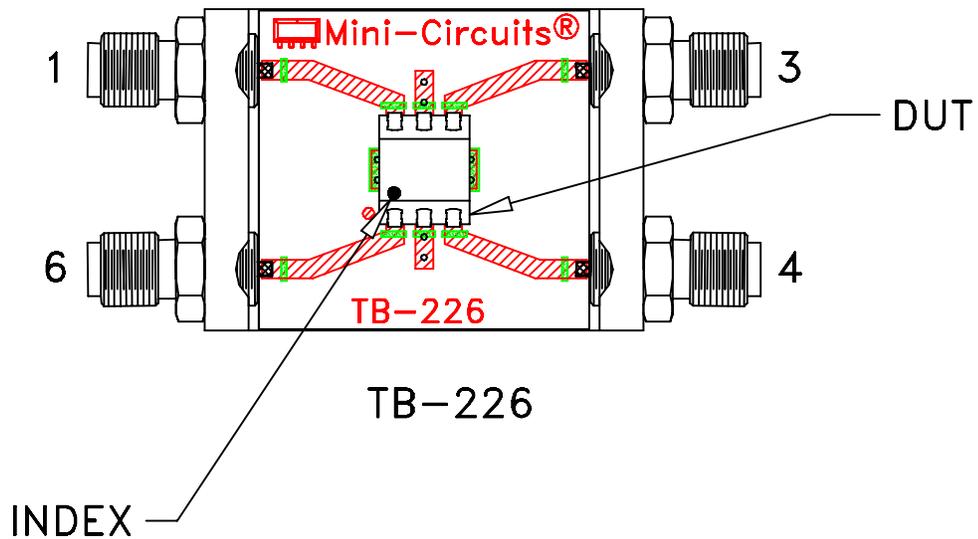
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ASHEETA1.DWG REV:A DATE:01/12/95

| SIZE | CODE IDENT | DRAWING NO: | REV: |
|-------|------------|-------------|--------|
| A | 15542 | 98-PL-140 | B |
| FILE: | 98PL140 | SCALE: | SHEET: |
| | | 6:1 | 1 OF 1 |

Evaluation Board and Circuit

For Pin Connections refer to Data Sheet of the DUT



Schematic Diagram

Notes:

1. SMA Female connectors.
2. PCB Material: Rogers R04350 or equivalent, Dielectric Constant=3.5, Thickness=.030 inch.

 Mini-Circuits®

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 | -40° to 85°C Ambient Environment | Individual Model Data Sheet |
| Storage Temperature | -55° to 100° C 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 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; distilled water + proylene glycol monomethyl ether + monoethanolamine at 63°C to 70°C | MIL-STD-202, Method 215 |