

# Surface Mount Power Splitter/Combiner

## AMT-32+

2 Way-0°/180° 50Ω 1 to 300 MHz

### The Big Deal

- Low amplitude unbalance, 0.2 dB typ.
- Low phase unbalance,  $\pm 3^\circ$  typ.
- High isolation, 35 dB typ.



CASE STYLE: CD636

### Product Overview

Mini-Circuits' AMT-32+ is a wideband, 2 way, 0°/180° surface mount magic T splitter/combiner. It provides very low amplitude and phase unbalance with good isolation over the full frequency range. It handles up to 0.5W of input power and comes in a small case with excellent thermal performance (-40°C to 85°C operating).

### Key Features

| Feature  | Advantages  |
|--|---|
| Wideband   | Wide frequency coverage from 1 to 300 MHz supports many applications DOCSIS 3.1                                 |
| Low amplitude unbalance and phase unbalance<br>0.2 dB typ. for amplitude unbalance<br>$\pm 3^\circ$ typ. for phase unbalance | 0.2 dB typ for amplifier unbalance $\pm 3^\circ$ typ. for phase unbalance produces nearly equal output signals. |
| Good return loss:<br>• 18 dB typ., for all ports   | Well matched for 50Ω systems.   |
| Good isolation<br>• 30 dB typ., for ports 1 & 2<br>• 35 dB typ., for S, J - ports  | Good isolation over the entire band minimizes effect of load changes at one output port on another output port. |
| 0.5W max. input power  | High power handling accommodates a wide range of system power requirements.                                     |
| Small size, 0.27 x 0.31 x 0.22 in.   | Accommodates dense PCB layouts.   |

\*Does not include coupling loss

#### 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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Surface Mount

# Power Splitter/Combiner

## AMT-32+

2 Way-0°/180° 50Ω 1 to 300 MHz

### Maximum Ratings

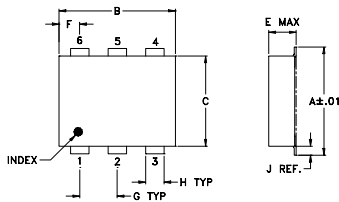
|                             |                |
|-----------------------------|----------------|
| Operating Temperature       | -40°C to 85°C  |
| Storage Temperature         | -55°C to 100°C |
| Power Input (as a splitter) | 0.5W max.      |
| Internal Dissipation        | 0.125W max.    |

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

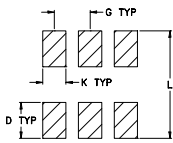
### Pin Connections

|          |     |
|----------|-----|
| SUM PORT | 3   |
| PORT 1   | 6   |
| PORT 2   | 4   |
| PORT J   | 1   |
| GROUND   | 2,5 |

### Outline Drawing



#### PBC Land Pattern

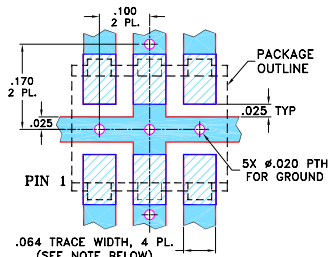


Suggested Layout, Tolerance to be within ±.002

### Outline Dimensions (inch/mm)

| A    | B    | C    | D    | E     | F    | G    |
|------|------|------|------|-------|------|------|
| .272 | .310 | .220 | .100 | .162  | .055 | .100 |
| 6.91 | 7.87 | 5.59 | 2.54 | 4.11  | 1.40 | 2.54 |
| H    | J    | K    | L    | wt    |      |      |
| .030 | .026 | .065 | .300 | grams |      |      |
| 0.76 | 0.66 | 1.65 | 7.62 | 0.25  |      |      |

### Demo Board MCL P/N: TB-211 Suggested PCB Layout (PL-097)



- NOTES:
- 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

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### Features

- low insertion S-1 and S-2, 0.5 dB typ; J-1 and J-2, 0.5 dB typ.
- very good input VSWR, 1.3 typ. and good output VSWR, 1.35 typ.
- excellent amplitude unbalance, 0.2 dB typ.
- excellent phase unbalance, 2 deg. typ.
- high isolation S-J ports and 1-2 ports, 35 dB typ.
- protected under US Patent 6,133,525

### Applications

- HF, VHF radios, Aircraft communications, FM Broadcast
- IF receiver



Generic photo used for illustration purposes only  
CASE STYLE: CD636

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

Available Tape and Reel at no extra cost

| Reel Size | Devices/Reel     |
|-----------|------------------|
| 7"        | 20, 50, 100, 200 |
| 13"       | 500, 1000        |

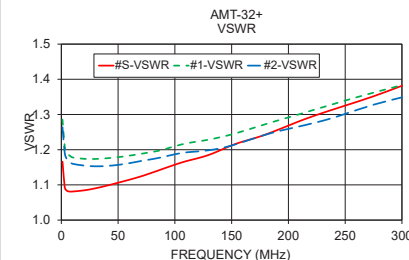
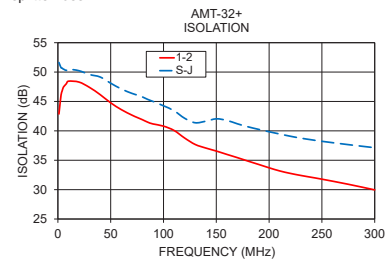
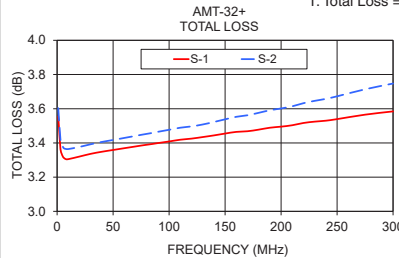
### Electrical Specifications at 25°C

| Parameter                                 | Frequency (MHz) | Min.    | Typ. | Max. | Unit   |
|---|-----------------|---------|------|------|--------|
| Frequency                                 |                 | 1       |      | 300  | MHz    |
| Insertion Loss (above theoretical 3.0 dB) | S-1, S-2        | 1-300   | 0.5  | 1.0  | dB     |
|   | J-1, J-2        | 1-300   | 0.7  | 1.1  |        |
| Isolation                                 | J-S             | 1-100   | 30   | 40   | dB     |
|   |                 | 100-300 | 27   | 35   |        |
|   | 1-2             | 1-100   | 30   | 38   |        |
| Phase Unbalance                           |                 | 100-300 | 25   | 28   | Degree |
|   |                 | 1-100   | 1.0  | 3.0  |        |
|   |                 | 100-200 | 2.0  | 5.0  |        |
| Amplitude Unbalance                       |                 | 200-300 | 4.0  | 8.0  | dB     |
|   |                 | 1-300   | 0.2  | 0.5  |        |
| VSWR (Port S) (Port J)                    | 1-300           |         | 1.3  |      | :1     |
| VSWR (Port 1-2)                           | 1-300           |         | 1.35 |      | :1     |

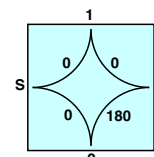
### Typical Performance Data

| Freq. (MHz) | Total Loss <sup>1</sup> (dB) |      | Amplitude Unbal. (dB) |             | Insertion Loss (dB) |      | Amplitude Unbal. (dB) |       | Isolation (dB) |             | Phase Unbal. (deg.) |      | VSWR |   |  |
|-------------|------------------------------|------|-----------------------|-------------|---------------------|------|-----------------------|-------|----------------|-------------|---------------------|------|------|---|--|
|             | S-1                          | S-2  | (S-1)-(S-2)           | (J-1)-(J-2) | J-1                 | J-2  | (J-1)-(J-2)           | 1-2   | S-J            | (S-1)-(S-2) | (J-1)-(J-2)         | S    | 1    | 2 |  |
| 1           | 3.56                         | 3.60 | 0.05                  | 3.52        | 3.61                | 0.09 | 42.87                 | 51.63 | 0.13           | 0.24        | 1.17                | 1.29 | 1.26 |   |  |
| 3           | 3.36                         | 3.42 | 0.05                  | 3.37        | 3.46                | 0.08 | 46.10                 | 50.74 | 0.03           | 0.13        | 1.09                | 1.21 | 1.19 |   |  |
| 5           | 3.32                         | 3.38 | 0.06                  | 3.35        | 3.43                | 0.08 | 47.34                 | 50.52 | 0.01           | 0.12        | 1.08                | 1.19 | 1.17 |   |  |
| 10          | 3.31                         | 3.36 | 0.06                  | 3.34        | 3.42                | 0.08 | 48.45                 | 50.50 | 0.09           | 0.14        | 1.08                | 1.18 | 1.16 |   |  |
| 20          | 3.32                         | 3.38 | 0.06                  | 3.37        | 3.44                | 0.08 | 48.30                 | 50.23 | 0.22           | 0.22        | 1.08                | 1.17 | 1.15 |   |  |
| 30          | 3.34                         | 3.39 | 0.06                  | 3.38        | 3.46                | 0.07 | 47.39                 | 49.58 | 0.32           | 0.32        | 1.09                | 1.17 | 1.15 |   |  |
| 50          | 3.36                         | 3.42 | 0.06                  | 3.42        | 3.48                | 0.07 | 44.77                 | 48.11 | 0.55           | 0.49        | 1.11                | 1.18 | 1.16 |   |  |
| 100         | 3.41                         | 3.48 | 0.07                  | 3.49        | 3.53                | 0.04 | 40.80                 | 44.26 | 1.10           | 0.98        | 1.16                | 1.21 | 1.19 |   |  |
| 130         | 3.43                         | 3.51 | 0.07                  | 3.53        | 3.55                | 0.02 | 37.68                 | 41.38 | 1.46           | 1.28        | 1.19                | 1.23 | 1.20 |   |  |
| 150         | 3.45                         | 3.54 | 0.08                  | 3.56        | 3.57                | 0.01 | 36.57                 | 42.04 | 1.67           | 1.47        | 1.21                | 1.24 | 1.21 |   |  |
| 200         | 3.50                         | 3.60 | 0.11                  | 3.63        | 3.59                | 0.04 | 33.71                 | 39.85 | 2.30           | 2.04        | 1.27                | 1.29 | 1.26 |   |  |
| 230         | 3.52                         | 3.65 | 0.12                  | 3.68        | 3.61                | 0.07 | 32.41                 | 38.76 | 2.70           | 2.42        | 1.30                | 1.32 | 1.28 |   |  |
| 250         | 3.54                         | 3.67 | 0.13                  | 3.71        | 3.62                | 0.09 | 31.78                 | 38.22 | 2.99           | 2.69        | 1.33                | 1.34 | 1.30 |   |  |
| 300         | 3.58                         | 3.75 | 0.16                  | 3.79        | 3.64                | 0.15 | 29.96                 | 37.13 | 3.73           | 3.41        | 1.38                | 1.38 | 1.35 |   |  |

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





### electrical schematic



- S-J ports, isolation 40 typical
- Inphase ports, S-1 and S-2 insertion loss 0.2 dB typical
- Amplitude unbalance defined by input S or J ports to output 1 and 2

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