

## 3 dB Hybrid Couplers

Rev. V4

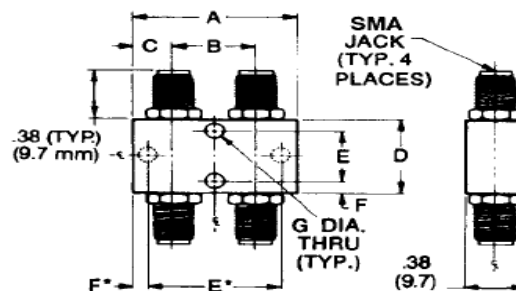
### Features

- 90° Quadrature Phase
- Frequency Range: 0.05 - 18 GHz
- Temperature Range: -65° to 125°C
- Meets MIL-E-5400 Environments
- Non-crossover Versions Available

### Description

3 dB quadrature mini-hybrids are the ultimate in compact, rugged high stress environment components. The crossover feature of the location of both outputs on one side allows simplicity in system or subsystem design. Multi-octave coverage of the complete frequency spectrum, along with high isolation performance, qualifies them as an asset to any system.

### Outline Drawing



All dimensions are  $\pm .020$  except mounting diameters ( $\pm .005$ ) and mounting hole location ( $\pm .010$ ).

### 90° Crossover Electrical Specifications

Part Number	Case Style	Freq. Range (GHz)	Amplitude Balance (dB)	Insertion Loss Max (dB)	Isolation Min. (dB)	VSWR Max	Power Avg. (W)	Power Pk. (kW)
2032-6344-00	3	1.0 - 2.0	$\pm 0.5$	0.20	22	1.20	30	3
2032-6345-00	4	2.0 - 4.0	$\pm 0.5$	0.25	22	1.25	30	3
2032-6347-00	5	4.0 - 8.0	$\pm 0.5$	0.30	20	1.25	30	3
2032-6348-00	5	8.0 - 12.4	$\pm 0.5$	0.50	18	1.35	30	3
2032-6349-00	5	12.4 - 18.0	$\pm 0.5$	0.50	18	1.45	30	3
2032-6350-00	6	0.5 - 2.0	$\pm 0.5$	0.60	24	1.20	30	3
2032-6352-00	7	2.0 - 8.0	$\pm 0.5$	0.50	20	1.30	30	3
2032-6354-00	8	4.0 - 12.4	$\pm 0.5$	0.60	20	1.25	50	3
2032-6371-00	10	2.0 - 18.0	$\pm 1.0$	0.60***	20****	1.45	50	3
2032-6374-00	5	6.5 - 18.0	$\pm 0.5$	0.60	18	1.35	30	3
2032-6375-00	11	4.0 - 18.0	$\pm 0.5$	1.0	18	1.45	100	5

\*\*\* Insertion loss is 1.2 dB from 6.0 to 12.4 GHz and 1.5 dB from 12.4 to 18.0 GHz.  
 \*\*\*\* Isolation is 15 dB from 12.4 to 18.0 GHz.

2032-6350-00 to 2032-6375-00 are multi-octave.  
 2032-6375-00 is high power.

### 90° Crossover Mechanical Specifications

Case Style	A Inch (mm)	B Inch (mm)	C Inch (mm)	D Inch (mm)	E Inch (mm)	F Inch (mm)	G Inch (mm)	Weight oz	Weight g
3	1.78 (45.2)	1.28 (32.5)	0.25 (6.35)	0.50 (12.7)	0.31 (7.9)	0.09 (2.4)	0.104 (2.6)	0.84	24
4	1.16 (29.4)	0.66 (16.7)	0.25 (6.35)	0.50 (12.7)	0.31 (7.9)	0.09 (2.4)	0.104 (2.6)	0.65	19
5	1.0 (25.4)	0.50 (12.7)	0.25 (6.35)	0.50 (12.7)	0.31 (7.9)	0.09 (2.4)	0.104 (2.6)	0.60	17
6	5.58 (141.7)	5.0 (127)	0.29 (7.3)	0.70 (17.9)	5.42 (137.7)	0.08 (2.0)	0.093 (2.4)	2.35	67
7	1.71 (43.4)	1.21 (30.7)	0.25 (6.33)	0.50 (12.7)	0.31 (7.9)	0.09 (2.4)	0.104 (2.6)	0.82	23
8	1.72 (43.7)	1.22 (31)	0.25 (6.33)	1.07 (27.2)	0.58 (14.7)	0.57 (14.5)	0.104 (2.6)	1.40	40
10	1.88 (47.6)	1.41 (35.9)	0.23 (5.7)	1.3 (33)	1.06 (26.9)	0.12 (3.1)	0.14 (3.6)	1.76	50
11	1.50 (38.1)	1.00 (25.4)	0.25 (6.4)	1.10 (28.0)	0.90 (23.0)	0.10 (2.5)	0.104 (2.6)	1.41	40

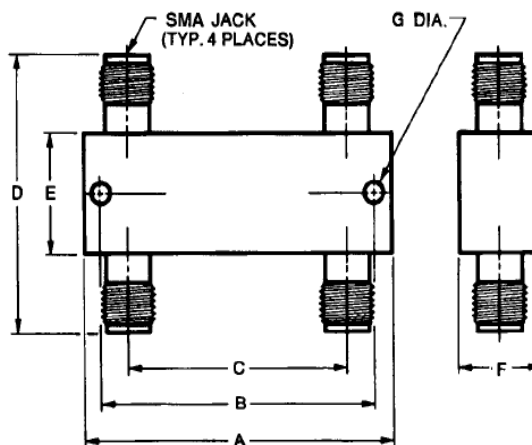
### Features

- Air Dielectric
- Non-crossover Design
- 90° Quadrature Phase
- Frequency Range: 1.0 - 18 GHz
- Temperature Range: -50° to +110°C
- Meets MIL-E-5400 Environments and MIL-E-16400 Environments
- MIL-C-15370/8 Equivalent

### Description

These 3dB coaxial hybrids are ultra-compact. A signal applied into any terminal appears at both outputs with one-half the amplitude and shifted 90 degrees out of phase. The units mount four SMA jack, low VSWR connectors. These couplers may be used in mixers, duplexers and other applications requiring equal power division.

### Outline Drawing



All dimensions are  $\pm .020$  except mounting diameters ( $\pm .005$ ) and mounting hole location ( $\pm .010$ ).

### 90° Non-Crossover Electrical Specifications

Part Number	Model No.	Case Style	Freq. Range (GHz)	Amplitude Balance (dB)	Insertion Loss Max (dB)	Isolation Min. (dB)	VSWR Max	Power Avg. (W)	Power Pk. (kW)
2035-6364-00	20153-3	1	1.0 - 2.0	$\pm 0.4$	0.20	20	1.25	50	3
2035-6365-00	20154-3	2	2.0 - 4.0	$\pm 0.5$	0.20	18	1.25	50	3
2035-6366-00	201545-3	3	2.6 - 5.2	$\pm 0.5$	0.20	18	1.25	50	3
2035-6367-00	20155-3	4	4.0 - 8.0	$\pm 0.5$	0.30	18	1.25	50	3
2035-6368-00	20156-3	5	8.0 - 12.4	$\pm 0.5$	0.35	15	1.30	50	3
2035-6369-00	20157-3	5	12.4 - 18.0	$\pm 0.5$	0.35	15	1.35	50	5

### 90° Non-Crossover Mechanical Specifications

Case Style	A Inch (mm)	B Inch (mm)	C Inch (mm)	D Inch (mm)	E Inch (mm)	F Inch (mm)	G Inch (mm)	Weight oz	Weight g
1	2.55 (64.8)	2.39 (60.8)	1.97 (50.1)	1.16 (29.5)	0.50 (12.7)	0.38 (9.7)	0.093 (2.4)	1.80	52
2	1.69 (42.7)	1.52 (38.7)	1.11 (28.2)	1.16 (29.5)	0.50 (12.7)	0.38 (9.7)	0.093 (2.4)	1.10	32
3	1.41 (35.6)	1.24 (31.5)	0.82 (20.8)	1.16 (29.5)	0.50 (12.7)	0.38 (9.7)	0.093 (2.4)	0.99	28
4	1.13 (28.7)	0.97 (24.7)	0.55 (14)	1.16 (29.5)	0.50 (12.7)	0.38 (9.7)	0.093 (2.4)	0.89	26
5	1.08 (27.4)	0.92 (23.4)	0.50 (12.7)	1.28 (32.5)	0.63 (15.9)	0.38 (9.7)	0.093 (2.4)	0.93	27

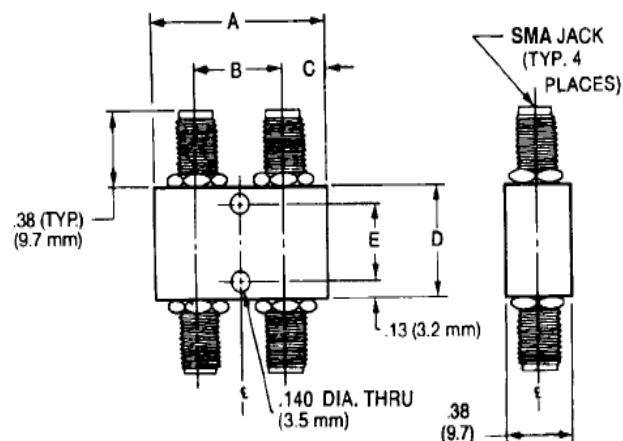
### Features

- Crossover Design
- 0° or 180° Phase Difference
- High Isolation
- Low VSWR
- Multi-Octave Frequency Range
- Temperature Range: -65° to +125°C
- Meets MIL-E-5400 and MIL-E-16400 Environments

### Description

These 3 dB 180° mini-hybrids are highly reliable rugged stripline-constructed units that can be used either to divide or combine R.F. power. A signal incident at the sum ( $\Sigma$ ) port will yield in-phase amplitude balanced signals at the output ports. Conversely, a signal applied to the difference ( $\Delta$ ) port will yield amplitude balanced and 180° out of phase signals at the output ports.

### Outline Drawing



All dimensions are  $\pm .020$  except mounting diameters ( $\pm .005$ ) and mounting hole location ( $\pm .010$ ).

### 180° Crossover Electrical Specifications

Part Number	Case Style	Freq. Range (GHz)	Amplitude Balance (dB)	Insertion Loss Max (dB)	Isolation Min. (dB)	VSWR Max	Phase Balance (Degrees)	Power Avg. (W)	Power Pk. (kW)
2031-6330-00	1	0.5 - 1.0	$\pm 0.5$	0.40	25	1.30	$\pm 4$	30	3
2031-6331-00	2	1.0 - 2.0	$\pm 0.5$	0.50	25	1.35	$\pm 4$	30	3
2031-6332-00	3	2.0 - 4.0	$\pm 0.5$	0.70	22	1.35	$\pm 5$	30	3
2031-6333-00	4	2.6 - 5.2	$\pm 0.5$	0.70	20	1.35	$\pm 5$	30	3
2031-6334-00	4	4.0 - 8.0	$\pm 0.5$	0.70	20	1.35	$\pm 6$	30	3
2031-6335-00	7	8.0 - 12.4	$\pm 0.5$	0.80	17	1.45	$\pm 6$	30	3
2031-6336-00	7	12.4 - 18.0	$\pm 0.6$	1.20	12	1.70	$\pm 6$	30	3
2031-6338-00	6	4.0 - 12.4	$\pm 0.6$	1.00	17	1.50	$\pm 8$	30	3
2031-6339-00	7	7.0 - 18.0	$\pm 0.6$	1.2	14	1.70	$\pm 8$	20	2

2031-6338-00 and 2031-6339-00 are multi-octave

### 180° Crossover Mechanical Specifications

Case Style	A Inch (mm)	B Inch (mm)	C Inch (mm)	D Inch (mm)	E Inch (mm)	Weight oz	Weight g
1	3.25 (82.6)	2.5 (63.5)	0.50 (12.7)	1.25 (31.8)	1.0 (25.4)	2.8	70
2	2.0 (50.8)	1.25 (31.8)	0.50 (12.7)	1.25 (31.8)	1.0 (25.4)	2.0	47
3	1.44 (36.5)	0.69 (17.5)	0.50 (12.7)	1.25 (31.8)	1.0 (25.4)	1.5	38
4	1.25 (31.8)	0.50 (12.7)	0.38 (9.7)	1.25 (31.8)	1.0 (25.4)	1.5	38
6	1.5 (38.1)	0.75 (19.1)	0.38 (9.7)	1.0 (25.4)	0.75 (19.1)	1.2	34
7	1.25 (31.8)	0.50 (12.7)	0.38 (9.7)	1.0 (25.4)	0.75 (19.1)	1.1	31

M/A-COM Technology Solutions Inc. All rights reserved.

Information in this document is provided in connection with M/A-COM Technology Solutions Inc ("MACOM") products. These materials are provided by MACOM as a service to its customers and may be used for informational purposes only. Except as provided in MACOM's Terms and Conditions of Sale for such products or in any separate agreement related to this document, MACOM assumes no liability whatsoever. MACOM assumes no responsibility for errors or omissions in these materials. MACOM may make changes to specifications and product descriptions at any time, without notice. MACOM makes no commitment to update the information and shall have no responsibility whatsoever for conflicts or incompatibilities arising from future changes to its specifications and product descriptions. No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document.

THESE MATERIALS ARE PROVIDED "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, RELATING TO SALE AND/OR USE OF MACOM PRODUCTS INCLUDING LIABILITY OR WARRANTIES RELATING TO FITNESS FOR A PARTICULAR PURPOSE, CONSEQUENTIAL OR INCIDENTAL DAMAGES, MERCHANTABILITY, OR INFRINGEMENT OF ANY PATENT, COPYRIGHT OR OTHER INTELLECTUAL PROPERTY RIGHT. MACOM FURTHER DOES NOT WARRANT THE ACCURACY OR COMPLETENESS OF THE INFORMATION, TEXT, GRAPHICS OR OTHER ITEMS CONTAINED WITHIN THESE MATERIALS. MACOM SHALL NOT BE LIABLE FOR ANY SPECIAL, INDIRECT, INCIDENTAL, OR CONSEQUENTIAL DAMAGES, INCLUDING WITHOUT LIMITATION, LOST REVENUES OR LOST PROFITS, WHICH MAY RESULT FROM THE USE OF THESE MATERIALS.

MACOM products are not intended for use in medical, lifesaving or life sustaining applications. MACOM customers using or selling MACOM products for use in such applications do so at their own risk and agree to fully indemnify MACOM for any damages resulting from such improper use or sale.