



Mini-Circuits®

ULTRA-SMALL CERAMIC

Power Splitter/Combiner

QCN-45AT+

2 Way-90° 50Ω 2500 to 4500 MHz

FEATURES

- Low insertion loss, 0.4 dB typ.
- Wide band, 2500-4500 MHz
- Wrap-around terminal for excellent solderability
- Ultra small, 0.12"X0.06"X0.035"
- Patent pending
- AEC-Q200 qualified component family



Generic photo used for illustration purposes only

CASE STYLE: FV1206-1

+RoHS CompliantThe +Suffix identifies RoHS Compliance.
See our website for methodologies and qualifications

APPLICATIONS

- Automotive

ELECTRICAL SPECIFICATIONS¹ AT +25°C

Parameter	Frequency (MHz)	Min.	Typ.	Max.	Unit
Frequency Range		2500		4500	MHz
Insertion Loss, above 3.0 dB	2500-3500		0.4	0.7	dB
	3500-4500		0.5	0.8	
Isolation	2500-3500	16	22		dB
	3500-4500	15	19		
Phase Unbalance	2500-3500		1	4	Degree
	3500-4500		3	6	
Amplitude Unbalance	2500-3500		0.5	1.7	dB
	3500-4500		1.0	2.1	
VSWR	2500-3500		1.2		(:1)
	3500-4500		1.2		

1. Tested on TB-405 using QCN-45+ with evaluation board losses de-embedded.

2. For applications requiring DC voltage to be applied to the RF ports, add suffix letter "D" to part no. DC resistance to ground is 100 Mohms min.

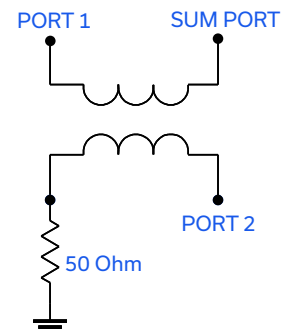
ABSOLUTE MAXIMUM RATINGS

Parameter	Ratings
Operating Temperature	-40°C to +105°C
Storage Temperature	-40°C to +105°C
Power Input (as a splitter)*	15 W max. at +25°C

* Derate linearly to 7 W at +105°C ambient.

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

ELECTRICAL SCHEMATIC (NOTE 1)



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REV. OR
NPO-005333
QCN-45AT+
ED-12169
MCL NY
250611
PAGE 1 OF 3



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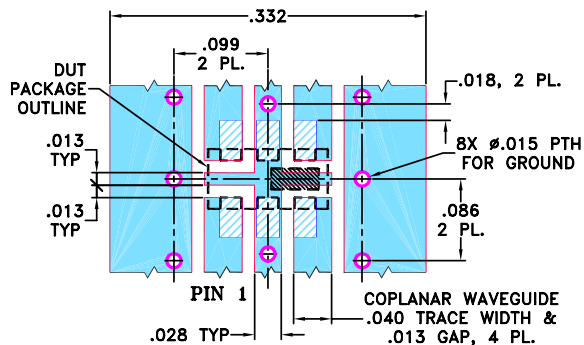
2 Way-90° 50Ω 2500 to 4500 MHz

PIN CONNECTIONS

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

PRODUCT MARKING: SA

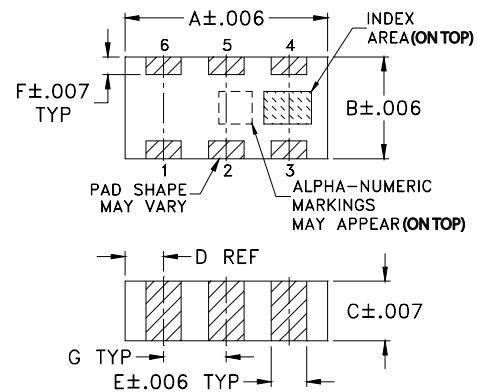
DEMO BOARD MCL P/N: TB-405
SUGGESTED PCB LAYOUT (PL-250)



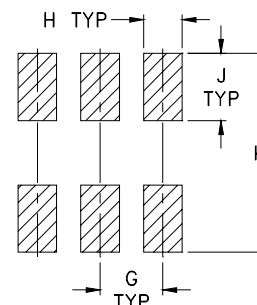
NOTES: 1. TRACE WIDTH IS SHOWN FOR ROGERS RO4350B WITH DIELECTRIC THICKNESS $0.020'' \pm 0.0015''$; COPPER: 1/2 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH MAY NEED TO BE MODIFIED.
2. BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.

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

OUTLINE DRAWING



PCB Land Pattern



Suggested Layout,
Tolerance to be within ± 0.002

OUTLINE DIMENSIONS (Inches)
mm

A	B	C	D	E	F
.126	.063	.035	.024	.022	.011
3.20	1.60	0.89	0.61	0.56	0.28
G	H	J	K		wt
.039	.024	.042	.123		grams
0.99	0.61	1.07	3.12		.020

TAPE & REEL INFORMATION: F75





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ULTRA-SMALL CERAMIC

Power Splitter/Combiner

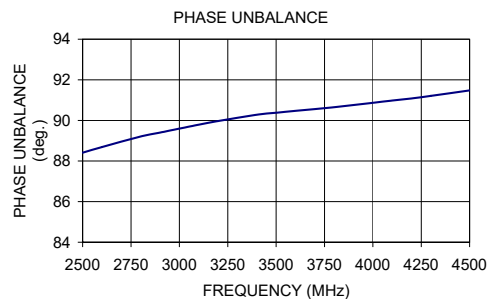
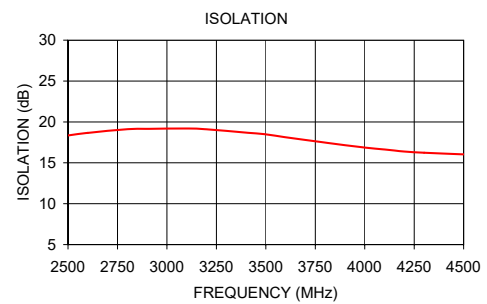
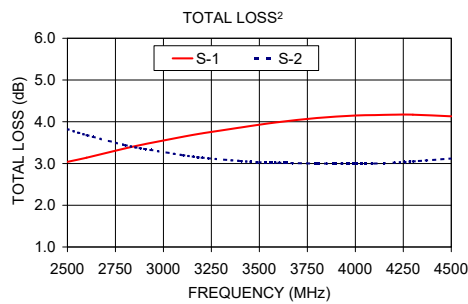
QCN-45AT+

2 Way-90° 50Ω 2500 to 4500 MHz

TYPICAL PERFORMANCE DATA

Frequency (MHz)	Total Loss ² (dB)		Amplitude Unbalance (dB)	Isolation (dB)	Phase Unbalance (deg.)	VSWR (:1)		
	S-1	S-2				S	1	2
2500	3.04	3.82	0.78	18.35	88.41	1.20	1.21	1.26
2600	3.14	3.68	0.54	18.66	88.69	1.19	1.18	1.24
2800	3.36	3.44	0.09	19.11	89.21	1.18	1.13	1.20
2900	3.46	3.35	0.11	19.15	89.40	1.19	1.11	1.18
3100	3.64	3.20	0.44	19.20	89.79	1.22	1.08	1.17
3200	3.72	3.14	0.57	19.10	89.97	1.22	1.08	1.16
3400	3.86	3.06	0.80	18.69	90.28	1.25	1.08	1.12
3500	3.93	3.03	0.90	18.48	90.38	1.27	1.09	1.11
3600	3.99	3.02	0.97	18.13	90.47	1.29	1.10	1.12
3800	4.09	3.00	1.09	17.47	90.65	1.32	1.11	1.12
4000	4.15	3.00	1.15	16.86	90.87	1.33	1.12	1.12
4100	4.16	3.00	1.16	16.63	90.98	1.34	1.12	1.13
4200	4.17	3.02	1.15	16.38	91.08	1.35	1.12	1.13
4300	4.17	3.05	1.13	16.23	91.21	1.35	1.13	1.14
4500	4.13	3.12	1.01	16.03	91.48	1.36	1.13	1.13

2. Total Loss = Insertion Loss + 3 dB splitter 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.
- C. The parts covered by this specification document are subject to Mini-Circuits standard limited warranty and terms and conditions (collectively, "Standard Terms"); Purchasers of this part are entitled to the rights and benefits contained therein. For a full statement of the standard. Terms and the exclusive rights and remedies thereunder, please visit Mini-Circuits' website at www.minicircuits.com/terms/viewterm.html



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	N	P	WT. GRAM
FV1206-1	.126 (3.20)	.063 (1.60)	.035 (0.89)	.024 (0.61)	.022 (0.56)	.011 (0.28)	.039 (0.99)	.024 (0.61)	.042 (1.07)	.123 (3.12)	--	--	--	--	.020

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

Notes:

- Open style, ceramic base.
- Termination finish: **as shown below or indicated on Data Sheet.**
For RoHS Case Styles: Tin plate over Nickel plate. All models, (+) suffix.
For RoHS-5 Case Styles: Tin-Lead plate. All models, no (+) suffix.



ISO 9001 ISO 14001 CERTIFIED

P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661 For detailed performance specs & shopping online see Mini-Circuits web site



The Design Engineers Search Engine Provides ACTUAL Data Instantly From MINI-CIRCUITS At: www.minicircuits.com

RF/IF MICROWAVE COMPONENTS



DEVICE ORIENTATION IN T&R

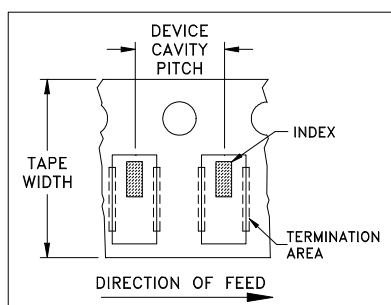


ILLUSTRATION 1



ILLUSTRATION 2



ILLUSTRATION 3

Applicable Case Styles

FV1206-1
FV1206-3

Applicable Case Styles

FV1206-4
FV1206-5
FV1206-6
FV1206-7
FV1206-9

Applicable Case Styles

FV1206-11
FV1206-12
GE0805C-18
NL1008C-6
NL1008C-7
NL1008C-9
NL1008C-10
NL1008C-12

Tape Width, mm	Device Cavity Pitch, mm	Reel Size, inches	Devices per Reel	
8	4	7	Small quantity standards (see note)	20
				50
				100
				200
				500
				1000
			Standard	3000

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

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

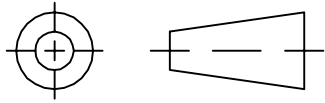


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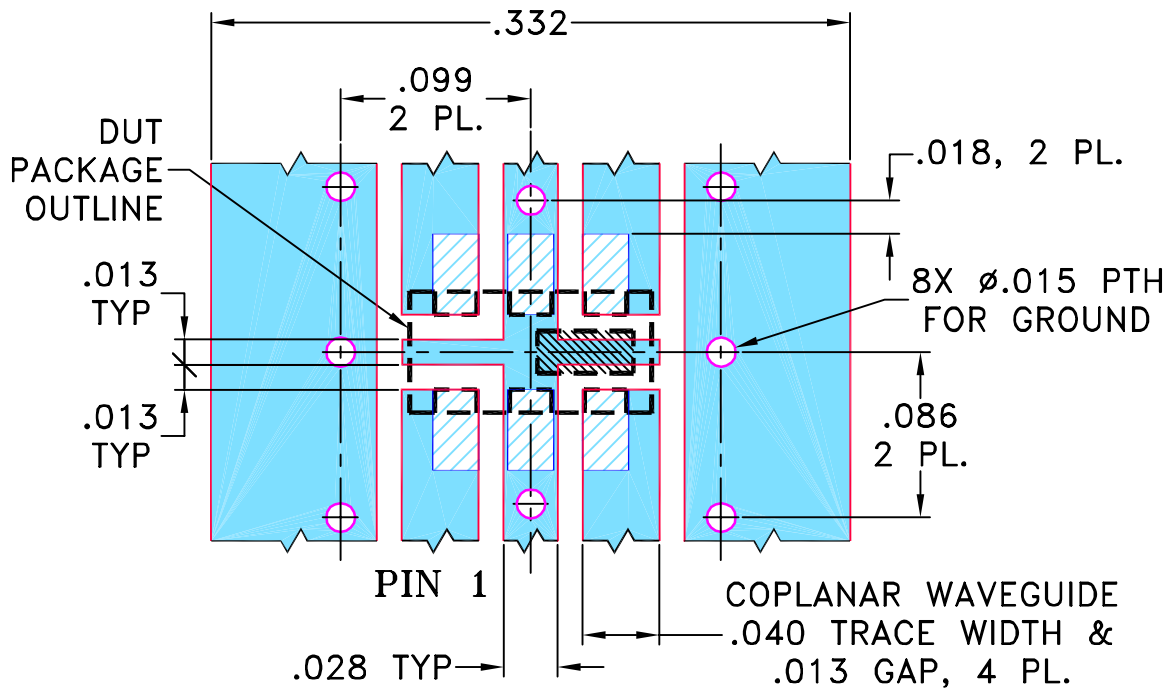
THIRD ANGLE PROJECTION



REVISIONS

REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
OR	M107907	NEW RELEASE	11/21/08	AV	ABD

SUGGESTED MOUNTING CONFIGURATION
FOR FV1206-1 CASE STYLE, "pb" PIN CONNECTIONS



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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

DIMENSIONS ARE IN INCHES

TOLERANCES ON:
 2 PL DECIMALS $\pm$
 3 PL DECIMALS $\pm$.005
 ANGLES $\pm$
 FRACTIONS $\pm$



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



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13 Neptune Avenue
 Brooklyn NY 11235

PL, pb, FV1206-1, QCN, TB-405

SIZE
 A

CODE IDENT
 15542

DRAWING NO:
 98-PL-250

REV:
 OR

FILE: 98PL250

SCALE: 10:1

SHEET: 1 OF 1