



Mini-Circuits

MMIC SURFACE MOUNT

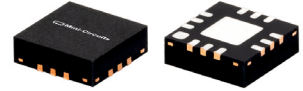
Power Splitter/Combiner

WP4L+

4 Way-0° 50Ω 2700 to 3800 MHz

FEATURES

- Excellent Isolation, Typ. 24 dB
- Good Phase Unbalance. Max. 9 deg.
- Good Amplitude Unbalance, Max. 0.2 dB
- Small Size, 3x3 mm
- High ESD Level
- Aqueous Washable



Generic photo used for illustration purposes only

CASE STYLE: DQ1225

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

APPLICATIONS

- WLAN
- WIMAX
- WCDMA
- Radar

ELECTRICAL SPECIFICATIONS AT +25°C

Parameter	Frequency (MHz)	Min.	Typ.	Max.	Units
Frequency Range		2700		3800	MHz
Insertion Loss* (Above 6.0 dB)	2700-3800		0.7	2.1	dB
Isolation	2700-3800	16	24		dB
Amplitude Unbalance	2700-3800			0.5	dB
Phase Unbalance	2700-3800			9	deg.
VSWR (Port S)	2700-3800		1.6		:1
VSWR (Ports 1,2,3,4)	2700-3800		1.35		:1

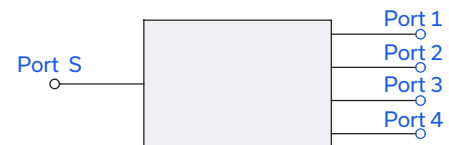
* Includes fixture loss, 0.2 dB typ.

ABSOLUTE MAXIMUM RATINGS

Parameter	Ratings
Operating Temperature	-40°C to +85°C
Storage Temperature	-65°C to +150°C
Power Input (as a Splitter)	1.5 W max.
Internal Dissipation	0.375 W max.

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

ELECTRICAL SCHEMATIC

REV. D
ECO-026468
WP4L+
MCL NY
250806

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PAGE 1 OF 3



Power Splitter/Combiner

WP4L+

4 Way-0° 50Ω 2700 to 3800 MHz

OUTLINE DRAWING

SUM PORT	2
PORT 1	12
PORT 2	10
PORT 3	6
PORT 4	4
GROUND	1,3,5,7,8,9,11, Paddle

[illegible]

1. TRACE WIDTH IS SHOWN FOR ROGERS R04350B WITH DIELECTRIC THICKNESS .020" ± .0015"; COPPER: 1/2 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH AND GAP MAY NEED TO BE MODIFIED.
2. BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.
3. SIGNAL TRACES ARE NOT ALLOWED INSIDE HATCHED AREAS (APPROX. .030 X .030) AT 4 PLACES AS SHOWN.

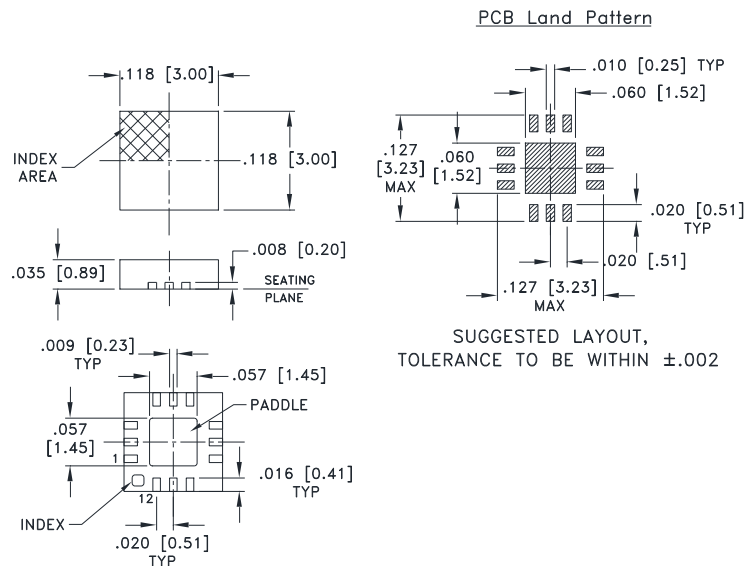
-  DENOTES PCB COPPER LAYOUT WITH SMOBC
 (SOLDER MASK OVER BARE COPPER)
 DENOTES COPPER LAND PATTERN FREE OF SOLDER MASK

Diagram illustrating the components of a model family designation:

- Index**: Points to the white circle.
- Black Body**: Points to the text **MCL**.
- Model Family Designation**: Points to the text **XXXX**.

Marking may contain other features or characters for internal lot control.

OUTLINE DRAWING



Weight: .02 Grams
Dimensions are in inches [mm]. Tolerances in inches: 2 Pl. $\pm .01$; 3 Pl. $\pm .004$ inches

TAPE & REEL INFORMATION: F66



Mini-Circuits

MMIC SURFACE MOUNT

Power Splitter/Combiner

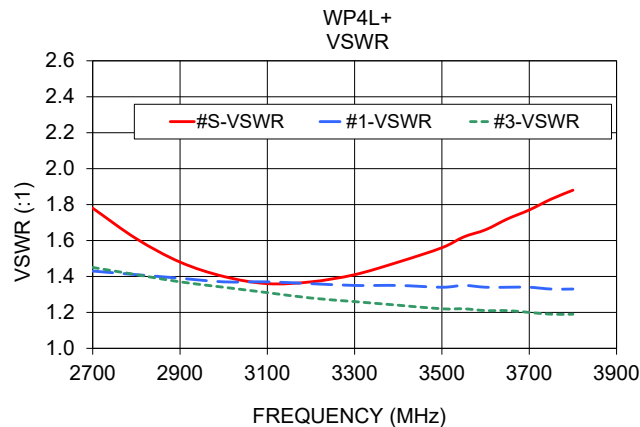
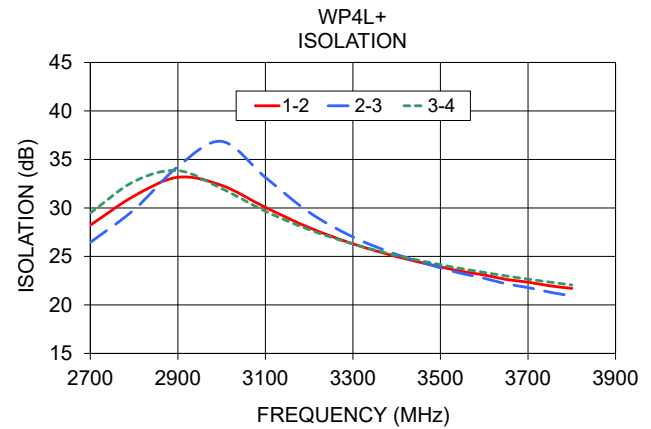
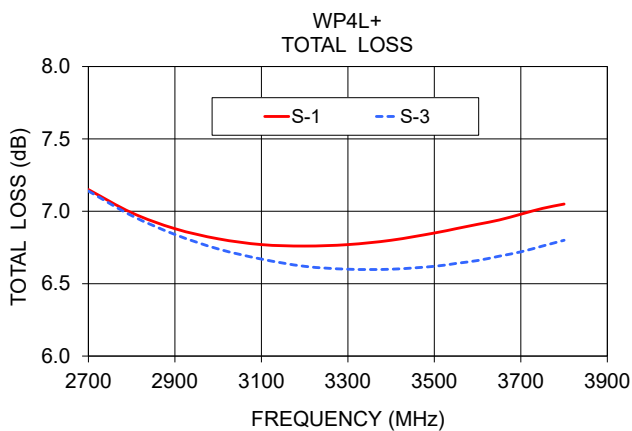
WP4L+

4 Way-0° 50Ω 2700 to 3800 MHz

TYPICAL PERFORMANCE DATA AND CHARTS

Frequency (MHz)	Total Loss ¹ (dB)				Amplitude Unbalance (dB)	Isolation (dB)			Phase Unbalance (deg.)	VSWR S	VSWR 1	VSWR 2	VSWR 3	VSWR 4
	S-1	S-2	S-3	S-4		1-2	2-3	3-4						
2700.00	7.15	7.19	7.14	7.10	0.09	28.23	26.45	29.48	0.92	1.78	1.43	1.46	1.45	1.40
2800.00	6.99	7.02	6.97	6.95	0.07	31.23	29.82	32.73	0.59	1.61	1.41	1.42	1.41	1.37
2900.00	6.88	6.89	6.84	6.83	0.06	33.16	34.26	33.85	0.86	1.48	1.39	1.39	1.37	1.35
3000.00	6.81	6.79	6.74	6.76	0.07	32.33	36.86	32.00	1.42	1.40	1.37	1.36	1.34	1.34
3100.00	6.77	6.73	6.67	6.72	0.10	30.06	33.15	29.66	1.97	1.36	1.37	1.34	1.31	1.33
3200.00	6.76	6.68	6.62	6.71	0.14	27.97	29.55	27.76	2.46	1.37	1.36	1.30	1.28	1.32
3300.00	6.77	6.66	6.60	6.72	0.17	26.30	27.01	26.28	2.93	1.41	1.35	1.28	1.26	1.31
3400.00	6.80	6.65	6.60	6.75	0.20	24.98	25.20	25.10	3.35	1.48	1.35	1.25	1.24	1.31
3500.00	6.85	6.67	6.62	6.80	0.23	23.93	23.83	24.15	3.74	1.56	1.34	1.24	1.22	1.30
3550.00	6.88	6.69	6.64	6.83	0.24	23.45	23.23	23.73	3.94	1.62	1.35	1.25	1.22	1.31
3600.00	6.91	6.71	6.66	6.86	0.25	23.09	22.75	23.35	4.10	1.66	1.34	1.23	1.21	1.30
3650.00	6.94	6.74	6.69	6.90	0.25	22.63	22.18	22.99	4.29	1.72	1.34	1.22	1.21	1.30
3700.00	6.98	6.77	6.72	6.93	0.26	22.35	21.79	22.66	4.45	1.77	1.34	1.23	1.20	1.30
3750.00	7.02	6.81	6.76	6.97	0.26	21.97	21.31	22.35	4.60	1.83	1.33	1.21	1.19	1.30
3800.00	7.05	6.84	6.80	7.01	0.25	21.71	20.93	22.06	4.76	1.88	1.33	1.22	1.19	1.30

1. Total Loss = Insertion Loss + 6 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



4 Way-0° Power Splitter/Combiner

WP4L+

Typical Performance Data

FREQ. (MHz)	TOTAL LOSS ¹ (dB)				AMP. UNBAL. (dB)	ISOLATION (dB)			PHASE UNBAL. (deg.)	FREQ. (MHz)	VSWR (:1)				
	S-1	S-2	S-3	S-4		1-2	1-3	3-4			S	1	2	3	4
2700.0	7.15	7.19	7.14	7.10	0.09	28.23	24.14	29.48	0.92	2700.0	1.78	1.42	1.46	1.45	1.40
2750.0	7.07	7.10	7.05	7.02	0.08	29.72	25.04	31.18	0.63	2750.0	1.68	1.41	1.45	1.42	1.38
2800.0	6.99	7.02	6.97	6.95	0.07	31.23	25.92	32.73	0.59	2800.0	1.61	1.40	1.42	1.41	1.37
2850.0	6.94	6.95	6.90	6.89	0.06	32.53	26.78	33.74	0.62	2850.0	1.53	1.39	1.40	1.39	1.36
2900.0	6.88	6.89	6.84	6.83	0.06	33.16	27.39	33.85	0.86	2900.0	1.48	1.38	1.39	1.37	1.35
2950.0	6.84	6.83	6.78	6.79	0.06	33.13	27.98	33.12	1.12	2950.0	1.42	1.37	1.37	1.35	1.34
3000.0	6.81	6.79	6.74	6.76	0.07	32.33	28.17	32.00	1.42	3000.0	1.40	1.37	1.36	1.34	1.34
3050.0	6.79	6.75	6.70	6.74	0.09	31.37	28.28	30.78	1.67	3050.0	1.36	1.37	1.33	1.32	1.33
3100.0	6.77	6.73	6.67	6.72	0.10	30.06	27.91	29.66	1.97	3100.0	1.36	1.36	1.34	1.31	1.33
3150.0	6.77	6.69	6.65	6.72	0.12	29.13	27.62	28.65	2.18	3150.0	1.35	1.36	1.31	1.30	1.32
3200.0	6.76	6.68	6.62	6.71	0.14	27.97	26.97	27.76	2.46	3200.0	1.37	1.36	1.30	1.28	1.32
3250.0	6.77	6.66	6.61	6.72	0.16	27.22	26.47	26.98	2.71	3250.0	1.38	1.35	1.30	1.27	1.32
3300.0	6.77	6.66	6.60	6.72	0.17	26.30	25.82	26.28	2.93	3300.0	1.41	1.35	1.28	1.26	1.31
3350.0	6.79	6.65	6.60	6.74	0.19	25.73	25.30	25.65	3.14	3350.0	1.44	1.35	1.28	1.25	1.31
3400.0	6.80	6.65	6.60	6.75	0.20	24.98	24.69	25.10	3.35	3400.0	1.48	1.35	1.25	1.24	1.31
3450.0	6.82	6.66	6.61	6.77	0.22	24.46	24.11	24.60	3.56	3450.0	1.52	1.34	1.26	1.24	1.31
3500.0	6.85	6.67	6.62	6.80	0.23	23.93	23.65	24.15	3.74	3500.0	1.56	1.35	1.24	1.22	1.30
3550.0	6.88	6.69	6.64	6.83	0.24	23.45	23.09	23.73	3.94	3550.0	1.62	1.34	1.25	1.22	1.31
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3700.0	6.98	6.77	6.72	6.93	0.26	22.35	21.89	22.66	4.45	3700.0	1.77	1.33	1.23	1.20	1.30
3750.0	7.02	6.81	6.76	6.97	0.26	21.97	21.48	22.35	4.60	3750.0	1.83	1.33	1.21	1.19	1.30
3800.0	7.05	6.84	6.80	7.01	0.25	21.71	21.13	22.06	4.76	3800.0	1.88	1.33	1.22	1.19	1.30

¹Total Loss = Insertion Loss + 6dB Splitter Loss



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IF/RF MICROWAVE COMPONENTS



REV. X2

WP4L+

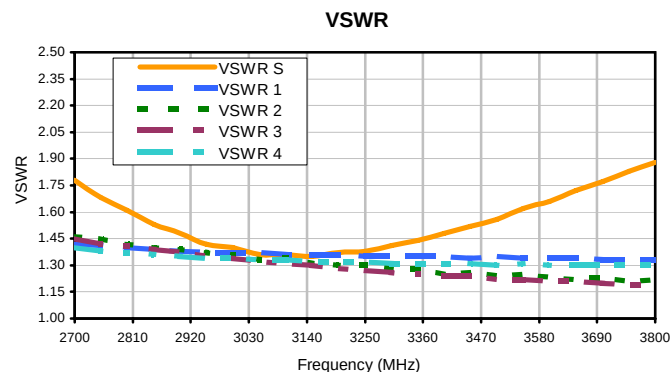
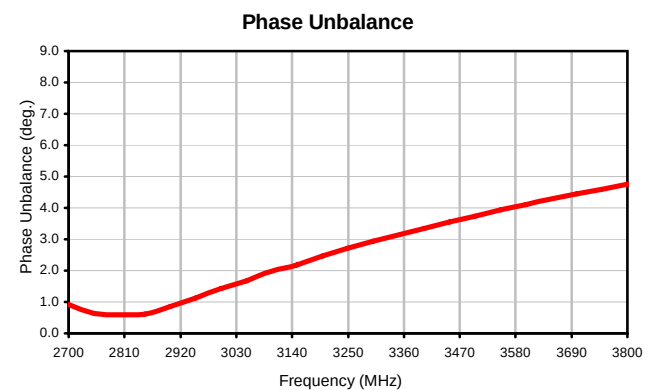
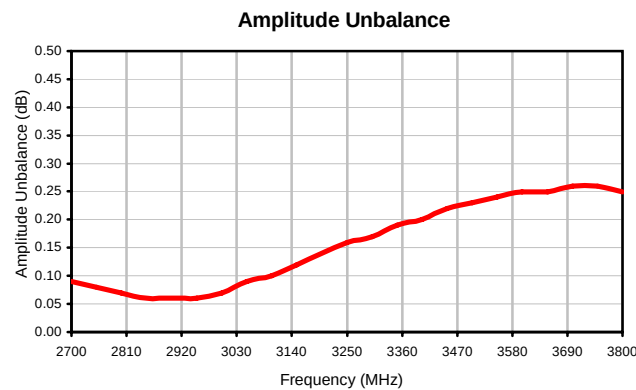
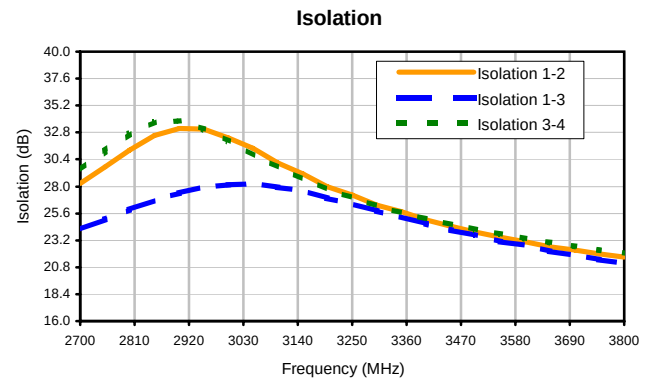
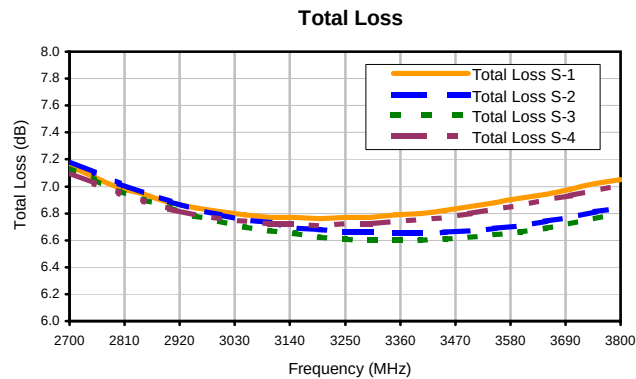
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4 Way-0° Power Splitter/Combiner

WP4L+

Typical Performance Curves



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ISO 9001 ISO 14001 AS 9100 CERTIFIED

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



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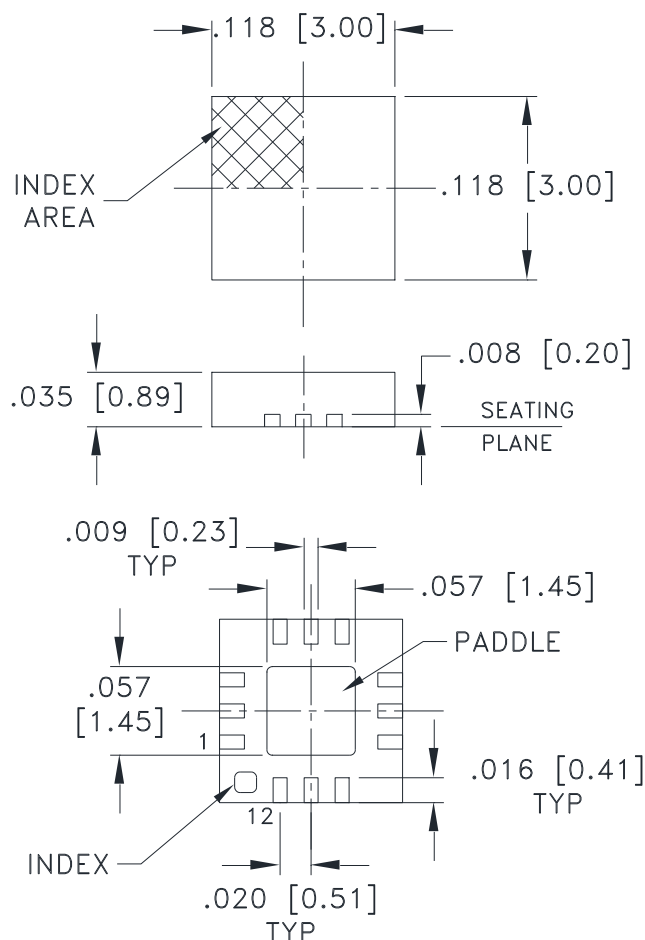
REV. X2

WP4L+

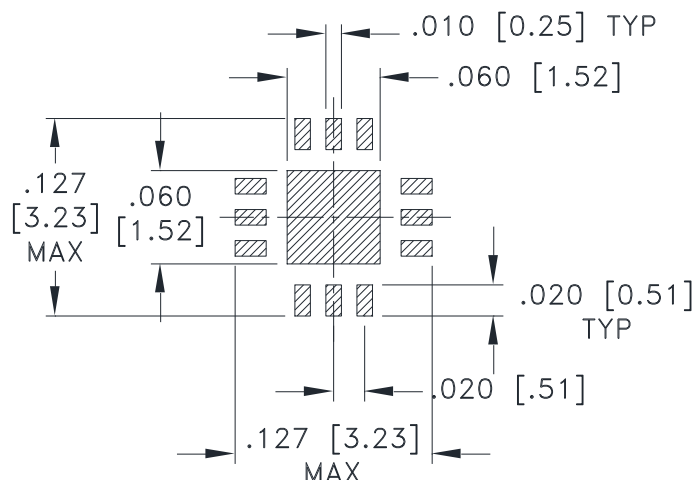
8/5/2010

Page 1 of 1

Outline Dimensions



PCB Land Pattern



SUGGESTED LAYOUT,
TOLERANCE TO BE WITHIN ± 0.002

Weight: .02 Grams

Dimensions are in inches (mm). Tolerances: 2Pl. $\pm .01$; 3 Pl. $\pm .004$

Notes:

- Case material: Plastic.
- Termination finish:
 - For RoHS Case Styles: Tin-Silver alloy plate over Nickel barrier or Matte-Tin. All models, (+) suffix. See Data sheet.
 - For RoHS-5 Case Styles: Tin-Lead plate. All models, no (+) suffix.



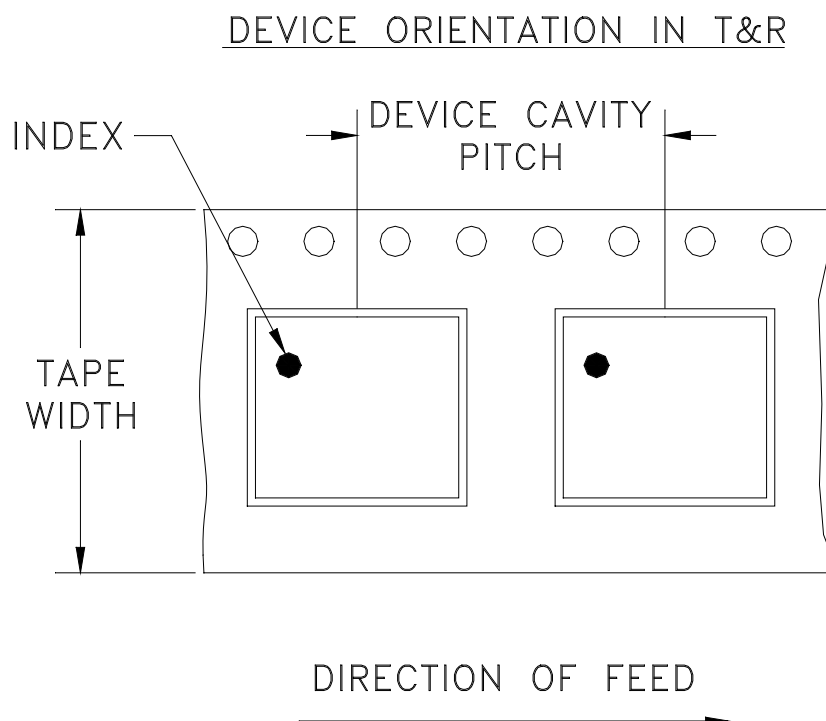
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Mini-Circuits ISO 9001 & ISO 14001 Certified

Tape & Reel Packaging TR-F66



Tape Width, mm	Device Cavity Pitch, mm	Reel Size, inches	Devices per Reel see note	
8	4	7	Small quantity standard	20
				50
				100
				200
				500
		7	Standard	1000, 2000, 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



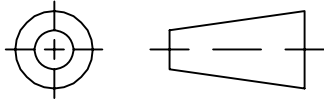
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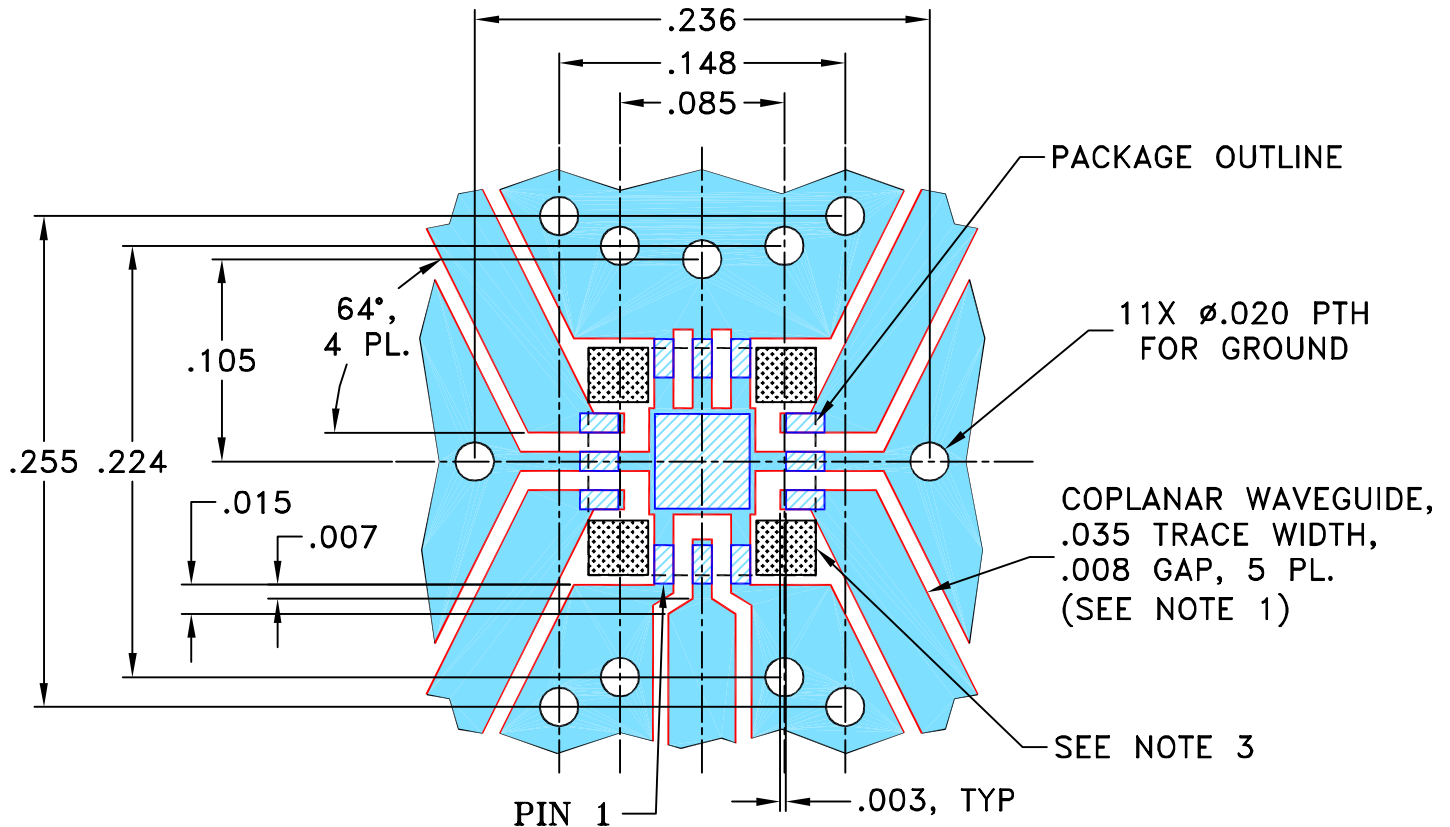
THIRD ANGLE PROJECTION



REVISIONS

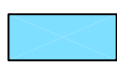
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A	M112849	UPDATED NOTE 3	08/03/07	AV	WP

SUGGESTED MOUNTING CONFIGURATION FOR DQ1225 CASE STYLE, "rx" PIN CONNECTION



NOTES:

1. TRACE WIDTH IS SHOWN FOR ROGERS R04350B WITH DIELECTRIC THICKNESS .020" $\pm$.0015"; COPPER: 1/2 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH AND GAP MAY NEED TO BE MODIFIED.
2. BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.
3. SIGNAL TRACES ARE NOT ALLOWED INSIDE HATCHED AREAS (APPROX. .030 X .030) AT 4 PLACES AS SHOWN.



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 $\pm$ 1°
FRACTIONS $\pm$

INITIALS

DRAWN
CHECKED
APPROVED

PW
IL
WP

DATE

01/10/07
01/11/07
01/11/07



Mini-Circuits®

13 Neptune Avenue
Brooklyn NY 11235

PL, rx, DQ1225, WP4, TB-395+

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

SIZE
A

CODE IDENT
15542

DRAWING NO:
98-PL-259

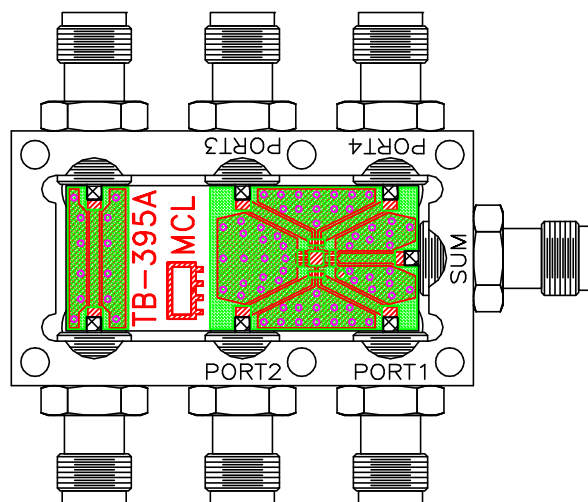
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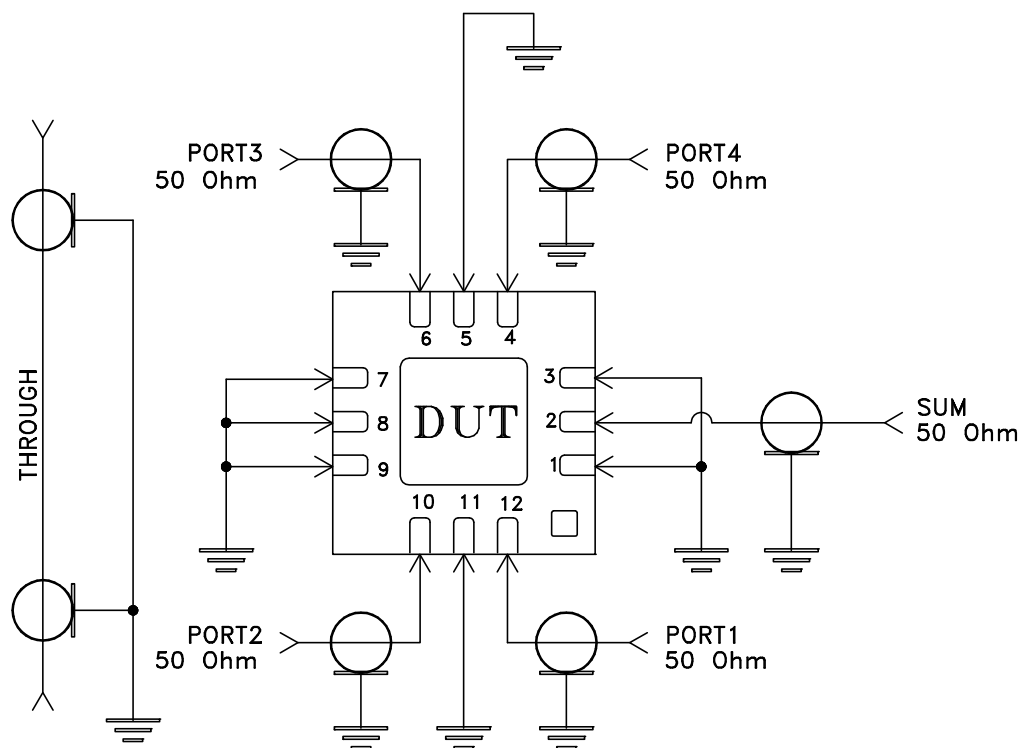
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SHEET: 1 OF 1

Evaluation Board and Circuit



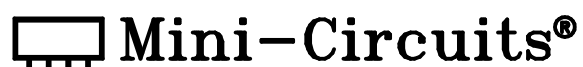
TB-395+



Schematic Diagram

Notes:

1. SMA Female connectors.
2. PCB Material: Rogers R04350 or equivalent,
Dielectric Constant=3.5, Thickness=.020 inch.





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	-65° to 150° C Ambient Environment	Individual Model Data Sheet
Autoclave	15 psig, 100% RH, 121°C, 96 hours	JESD22-A102-C, Condition C
Temperature Cycling	-65° to 150°C, 100 cycles	JESD22-A104
Temperature Humidity	85°C/ 85% RH, 168 hours	JESD22-113
Solder Reflow Heat	Sn-Pb Eutetic Process: 240°C peak Pb-Free Process: 260°C peak	J-STD-020, Table 4-1, 4-2 and 5-2; Figure 5-1
Moisture Sensitivity: Level 1	Bake at 125°C for 24 hours Soak at 85°C/85% RH for 168 hours, Reflow 3 cycles at 240°C peak (Non-RoHS) or 260°C (RoHS)	J-STD-020
Solderability	10X magnification, 95% coverage	JESD22-B102, Method 1: Dip and Look Test
Mechanical Shock	50g, 11 ms, 1/2-sine, 18 shocks: 3 each direction, each of 3 axes	MIL-STD-202, Method 213, Condition A
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