Surface Mount

Power Splitter/Combiner

2 Way-90° 50Ω 820 to 980 MHz

LRPQ-980+
LRPQ-980

CASE STYLE: QQQ130
PRICE: contact sales dept.

+ RoHS compliant in accordance with EU Directive (2002/95/EC)

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

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

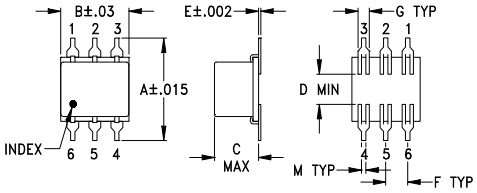
Features

- low insertion loss, 0.15 dB typ.
- excellent phase unbalance 1 deg. typ.
- aqueous washable

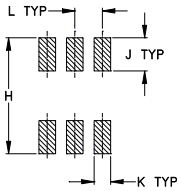
Applications

- *land mobile*
- *ISM*

Outline Drawing



PCB Land Pattern



Suggested Layout,
Tolerance to be within ±.002

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

Electrical Specifications

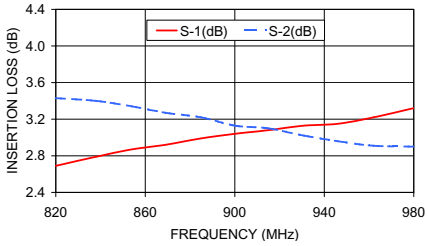
FREQ. RANGE (MHz)	ISOLATION (dB)		INSERTION LOSS (dB) Avg. of Coupled Outputs less 3 dB		PHASE UNBALANCE (Degrees)	AMPLITUDE UNBALANCE (dB)
f_L-f_U	Typ.	Min.	Typ.	Max.	Max.	Max.
820-980	28	20	0.15	0.5	4	1.0

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

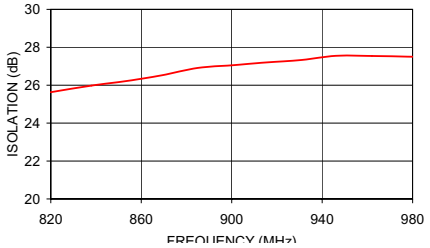
Typical Performance Data

Frequency (MHz)	Insertion Loss (dB) S-1	Insertion Loss (dB) S-2	Amplitude Unbalance (dB)	Isolation (dB)	Phase Unbalance (deg.)	VSWR S	VSWR 1	VSWR 2
820.00	2.69	3.43	0.74	25.63	89.05	1.07	1.11	1.08
838.00	2.79	3.40	0.61	25.98	89.12	1.06	1.11	1.08
854.00	2.87	3.34	0.47	26.23	89.07	1.06	1.11	1.08
869.00	2.92	3.27	0.35	26.52	89.15	1.06	1.11	1.07
885.00	2.99	3.22	0.23	26.91	89.09	1.05	1.11	1.07
900.00	3.04	3.13	0.09	27.05	89.12	1.05	1.11	1.07
915.00	3.08	3.10	0.02	27.20	89.09	1.05	1.11	1.07
931.00	3.13	3.02	0.11	27.33	89.17	1.05	1.11	1.08
946.00	3.15	2.96	0.19	27.55	89.25	1.05	1.11	1.08
962.00	3.22	2.91	0.31	27.54	89.28	1.05	1.11	1.08
980.00	3.32	2.90	0.42	27.50	89.36	1.05	1.11	1.08

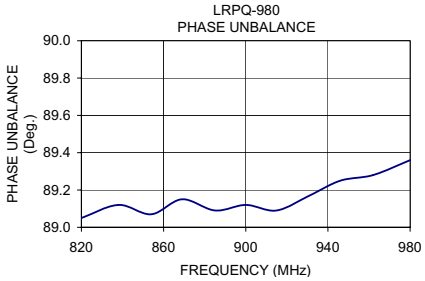
LRPQ-980
INSERTION LOSS



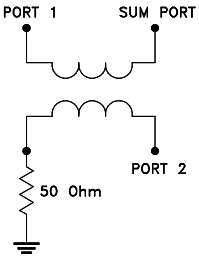
LRPQ-980
ISOLATION



LRPQ-980
PHASE UNBALANCE



electrical schematic



REV. A
M108697
LRPQ-980
HY/TD/CP
091117

2 Way-90° Power Splitter/Combiner LRPQ-980+

Typical Performance Data

FREQUENCY (MHz)	TOTAL LOSS[1] (dB) S-1	S-2	AVG.	AMPLITUDE UNBALANCE (dB)	ISOLATION (dB) 1-2	PHASE UNBALANCE (deg.)
820.0	2.69	3.43	3.06	0.74	25.63	89.05
838.0	2.79	3.40	3.10	0.61	25.98	89.12
854.0	2.87	3.34	3.11	0.47	26.23	89.07
869.0	2.92	3.27	3.10	0.35	26.52	89.15
885.0	2.99	3.22	3.11	0.23	26.91	89.09
900.0	3.04	3.13	3.09	0.09	27.05	89.12
915.0	3.08	3.10	3.09	0.02	27.20	89.09
931.0	3.13	3.02	3.08	0.11	27.33	89.17
946.0	3.15	2.96	3.06	0.19	27.55	89.25
962.0	3.22	2.91	3.07	0.31	27.54	89.28
980.0	3.32	2.90	3.11	0.42	27.50	89.36

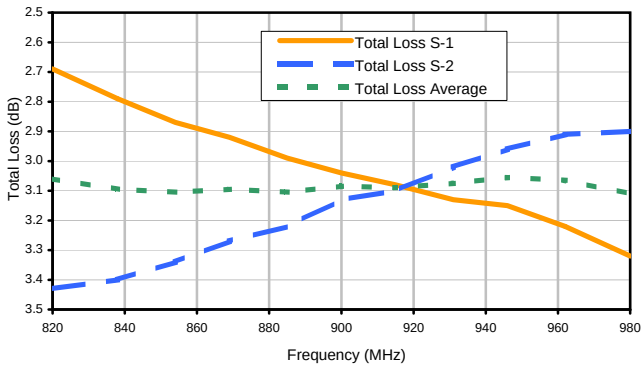
FREQUENCY (MHz)	VSWR (:1) S	1	2
820.0	1.07	1.11	1.08
838.0	1.06	1.11	1.08
854.0	1.06	1.11	1.08
869.0	1.06	1.11	1.07
885.0	1.05	1.11	1.07
900.0	1.05	1.11	1.07
915.0	1.05	1.11	1.07
931.0	1.05	1.11	1.08
946.0	1.05	1.11	1.08
962.0	1.05	1.11	1.08
980.0	1.05	1.11	1.08

[1] Total Loss = Insertion Loss+ 3dB Splitter Loss

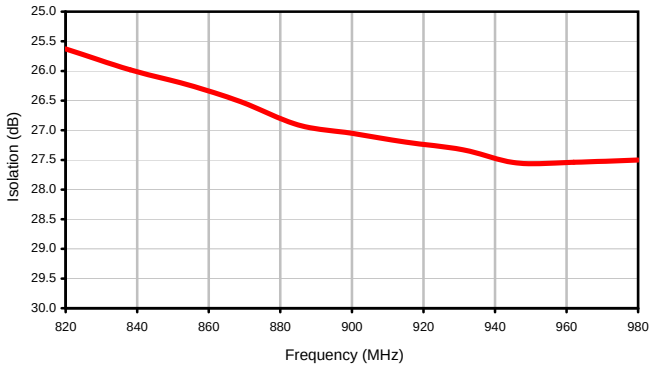
2 Way-90° Power Splitter/Combiner LRPQ-980+

Typical Performance Curves

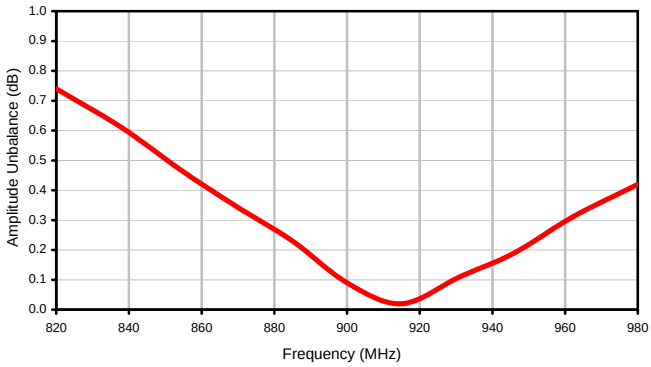
Total Loss



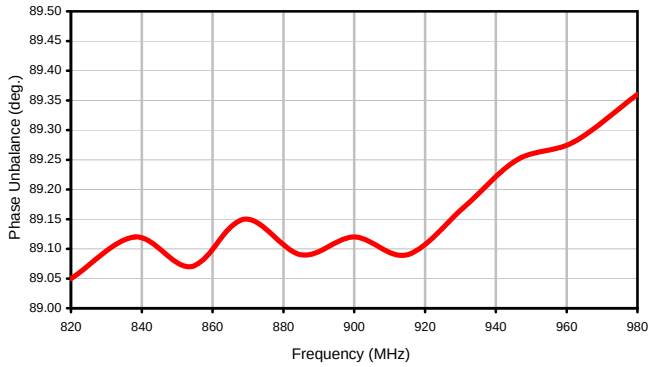
Isolation



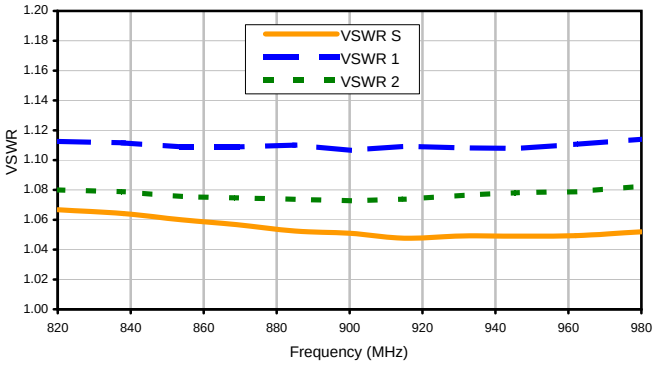
Amplitude Unbalance



Phase Unbalance



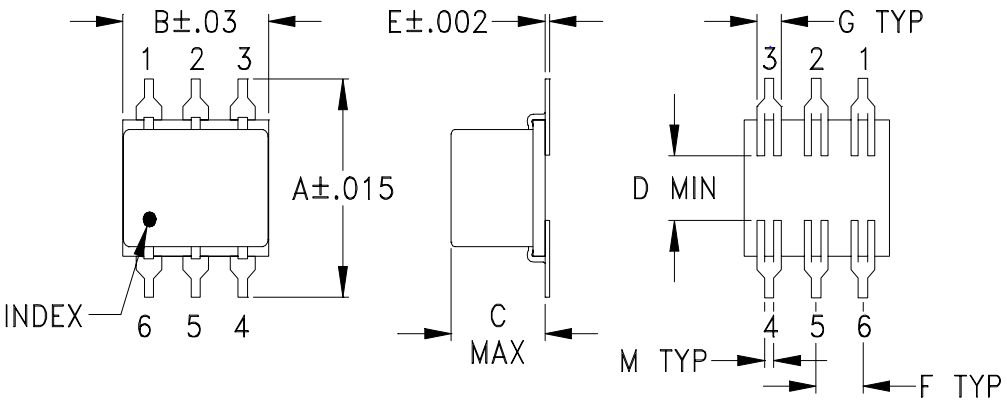
VSWR



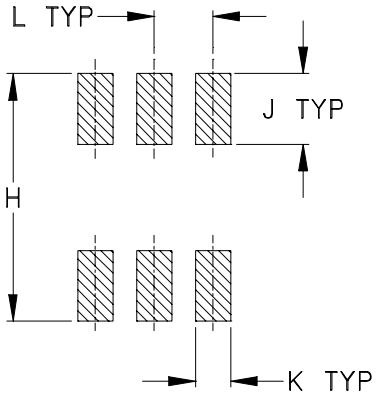
Case Style QQQ

QQQ130 (non-waterproof)
QQQ828 (washable)

Outline Dimensions



PCB Land Pattern



Suggested Layout,
Tolerance to be within ±.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. ± .01; 3 Pl. ± .005

Notes:

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

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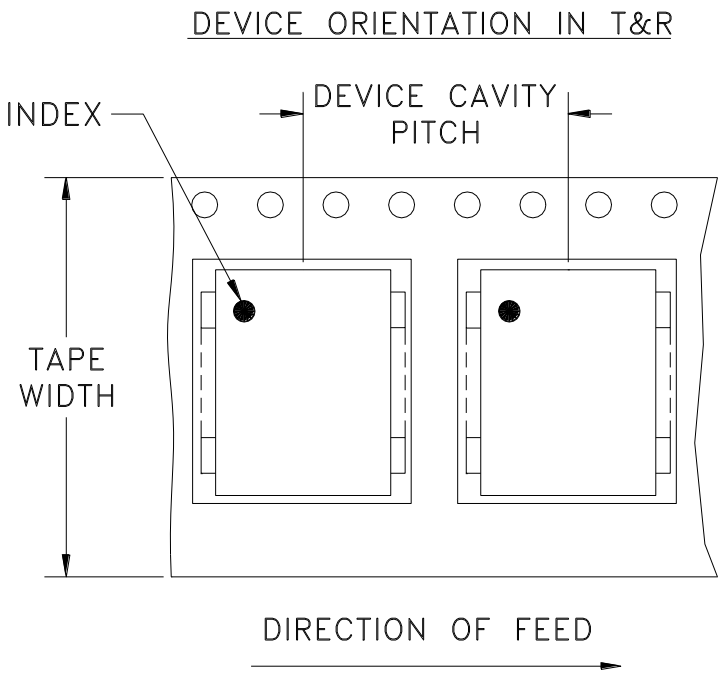
Tape & Reel Packaging TR-F10



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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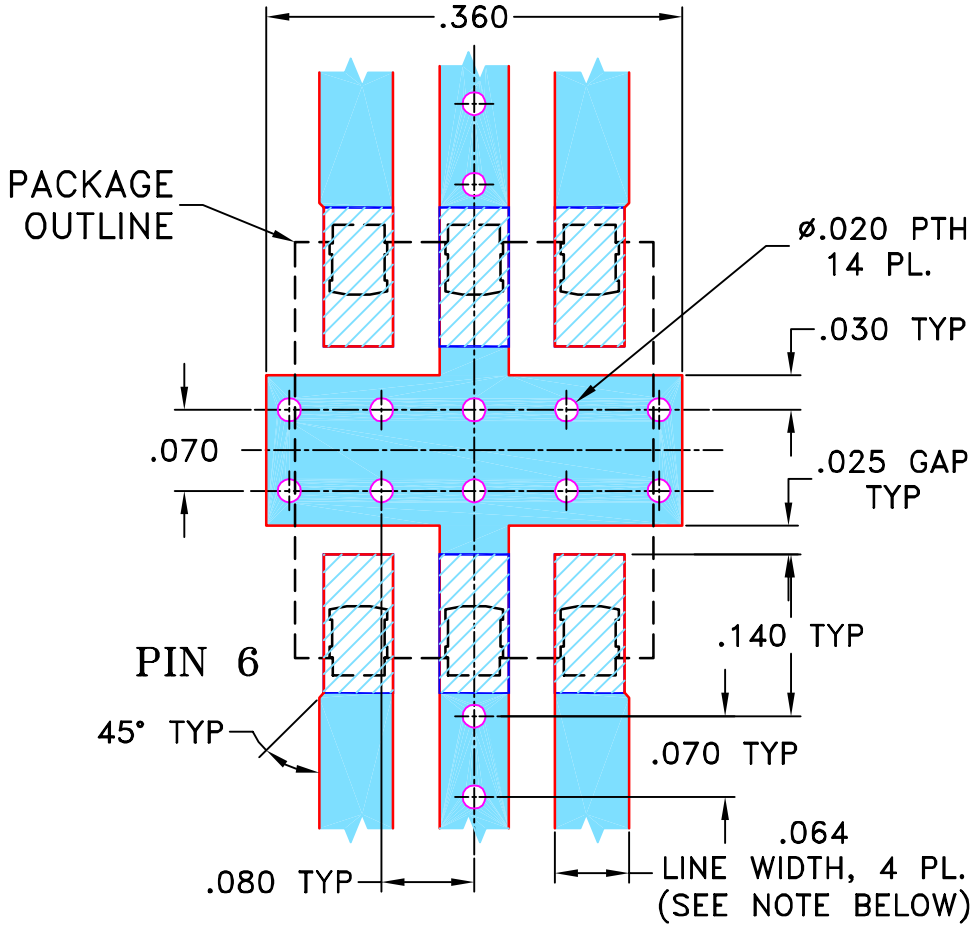
THIRD ANGLE PROJECTION

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:

1. 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.
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		INITIALS	DATE
DIMENSIONS ARE IN INCHES	DRAWN	GF	09/18/03
TOLERANCES ON:	CHECKED	IL	10/20/03
2 PL DECIMALS ±	APPROVED	HY	10/20/03
3 PL DECIMALS ± .005			
ANGLES ± 1°			
FRACTIONS ±			

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

Mini-Circuits® 13 Neptune Avenue Brooklyn NY 11235

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

SIZE	CODE IDENT	DRAWING NO:	REV:
A	15542	98-PL-140	B

FILE:	SCALE:	SHEET:
98PL140	6:1	1 OF 1

Mini-Circuits

Environmental Specifications ENV02T1

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