

# Engineering Development Model

## Power Splitter/Combiner

## LRPS-ED9782/1

### 3 Way-0°

#### Important Note

This model has been designed, built and tested in our engineering department. Performance data represents model capability. At present it is a non-catalog model. On request, we can supply a final specification sheet, part number and price/delivery information.



Please click "Back", and then click "Contact Us" for Applications support.

**CASE STYLE : QQQ130**

ELECTRICAL SPECIFICATIONS 50Ω @ +25°C					
Parameter		Min.	Typ.	Max.	Units
<b>Frequency</b>		0.04		440	MHz
<b>Isolation</b>	0.04 - 0.4 MHz		19		dB
	0.4 - 220 MHz		31		dB
	220 - 440 MHz		29		dB
<b>Insertion Loss Above 4.8 dB</b>	0.04 - 0.4 MHz		0.73		dB
	0.4 - 220 MHz		0.26		dB
	220 - 440 MHz		1.11		dB
<b>Phase Unbalance</b>	0.04 - 0.4 MHz		3.514		deg.
	0.4 - 220 MHz		0.550		deg.
	220 - 440 MHz		2.023		deg.
<b>Amplitude Unbalance</b>	0.04 - 0.4 MHz		0.694		dB
	0.4 - 220 MHz		0.092		dB
	220 - 440 MHz		0.283		dB
<b>VSWR</b>	SUM Port		1.21		(:1)
	OUT Ports		1.44		(:1)

MAXIMUM RATINGS	
Operating Temperature	-40°C to 85°C
Storage Temperature	-55°C to 100°C

PIN CONNECTIONS	
SUM PORT	6
PORT 1	1
PORT 2	3
PORT 3	4
GND EXT	2, 5

#### Functional Diagram



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## Typical Performance Data

FREQ. (MHz)	TOTAL LOSS <sup>1</sup> (dB)			AMP. UNBAL. (dB)	ISOLATION (dB)			PHASE UNBAL. (deg.)	FREQ. (MHz)	VSWR (:1)			
	S-1	S-2	S-3		1-2	1-3	2-3			S	1	2	3
0.04	5.57	6.63	6.11	1.06	16.78	14.59	16.57	3.43	0.04	2.01	3.56	4.53	4.24
0.05	5.31	6.24	5.78	0.93	17.50	15.10	17.09	3.92	0.05	1.79	2.99	3.67	3.50
0.07	5.18	5.98	5.58	0.80	18.27	15.71	17.70	4.08	0.07	1.65	2.62	3.13	3.02
0.08	5.10	5.80	5.46	0.70	19.05	16.34	18.34	4.01	0.08	1.55	2.36	2.76	2.69
0.09	5.07	5.68	5.38	0.61	19.81	16.98	18.97	3.95	0.09	1.48	2.16	2.48	2.44
0.10	5.05	5.59	5.32	0.54	20.53	17.58	19.57	3.78	0.10	1.42	2.02	2.29	2.26
0.40	5.02	5.24	5.13	0.22	28.10	24.63	26.41	1.43	0.40	1.15	1.31	1.37	1.38
0.70	4.99	5.18	5.09	0.19	30.24	26.68	28.41	1.02	0.70	1.12	1.23	1.27	1.28
1.00	4.97	5.13	5.05	0.16	31.46	27.86	29.52	0.84	1.00	1.10	1.19	1.23	1.23
2.00	4.93	5.05	5.00	0.12	33.81	30.31	31.67	0.56	2.00	1.08	1.13	1.16	1.16
5.00	4.91	5.01	4.96	0.10	36.20	32.92	33.69	0.24	5.00	1.06	1.08	1.10	1.11
8.00	4.91	5.00	4.96	0.09	36.77	33.55	34.04	0.14	8.00	1.05	1.07	1.09	1.09
11.00	4.91	5.00	4.96	0.09	36.86	33.68	34.02	0.09	11.00	1.05	1.06	1.08	1.09
14.00	4.92	5.01	4.97	0.09	36.82	33.66	33.88	0.10	14.00	1.05	1.06	1.08	1.08
17.00	4.92	5.01	4.96	0.09	36.74	33.55	33.68	0.05	17.00	1.05	1.06	1.08	1.08
20.00	4.92	5.01	4.97	0.09	36.54	33.38	33.41	0.10	20.00	1.05	1.06	1.07	1.08
36.00	4.95	5.03	4.99	0.08	35.59	32.60	32.27	0.17	36.00	1.05	1.05	1.07	1.08
52.00	4.97	5.06	5.01	0.09	34.63	31.87	31.18	0.30	52.00	1.05	1.05	1.07	1.08
68.00	4.99	5.08	5.04	0.09	33.79	31.23	30.26	0.35	68.00	1.06	1.05	1.06	1.07
84.00	5.02	5.10	5.05	0.08	33.18	30.73	29.48	0.42	84.00	1.06	1.04	1.06	1.07
100.00	5.05	5.12	5.07	0.07	32.65	30.30	28.78	0.51	100.00	1.06	1.04	1.06	1.07
116.00	5.08	5.14	5.10	0.06	32.25	29.99	28.22	0.61	116.00	1.07	1.04	1.05	1.06
132.00	5.10	5.16	5.11	0.05	31.96	29.72	27.73	0.71	132.00	1.07	1.03	1.05	1.06
148.00	5.14	5.18	5.13	0.04	31.86	29.57	27.37	0.70	148.00	1.07	1.03	1.04	1.06
164.00	5.17	5.21	5.15	0.06	31.86	29.54	27.09	0.86	164.00	1.07	1.02	1.04	1.06
180.00	5.21	5.23	5.17	0.05	32.09	29.67	26.94	0.92	180.00	1.06	1.02	1.04	1.05
190.00	5.23	5.24	5.18	0.06	32.29	29.77	26.86	0.96	190.00	1.06	1.02	1.04	1.05
200.00	5.26	5.25	5.20	0.06	32.61	29.96	26.84	1.03	200.00	1.06	1.02	1.04	1.06
260.00	5.44	5.36	5.31	0.13	37.59	33.19	27.62	1.37	260.00	1.05	1.03	1.06	1.07
320.00	5.71	5.53	5.47	0.23	36.59	49.90	28.79	1.70	320.00	1.14	1.07	1.10	1.12
380.00	6.17	5.87	5.84	0.33	25.62	28.45	24.95	2.14	380.00	1.37	1.13	1.16	1.19
440.00	7.02	6.59	6.58	0.44	19.46	20.87	19.14	2.88	440.00	1.77	1.21	1.22	1.27

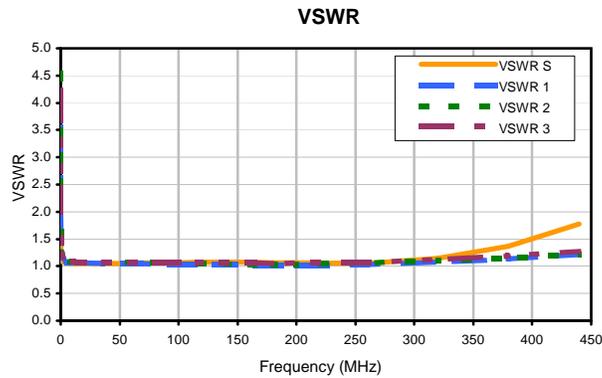
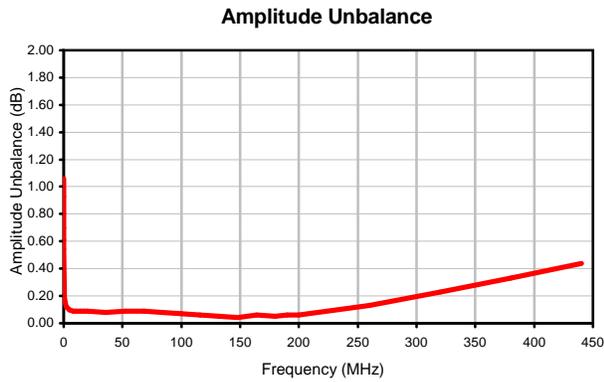
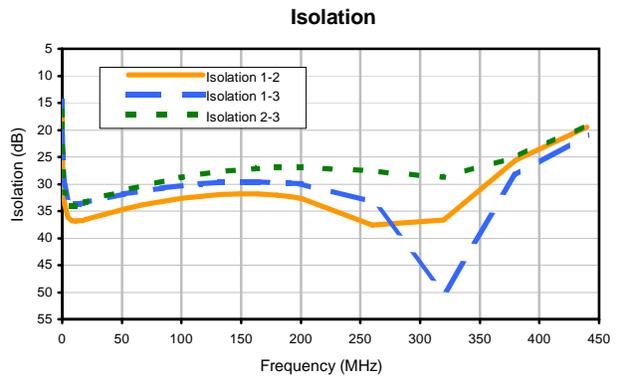
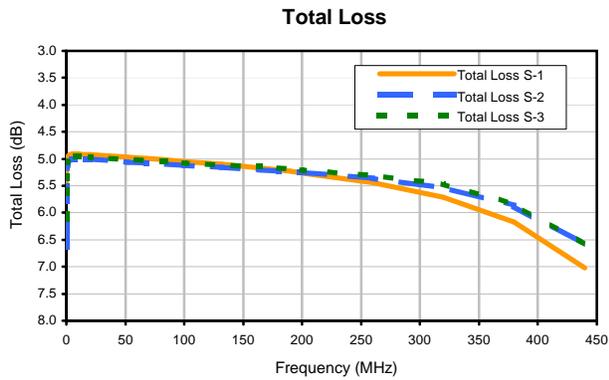
<sup>1</sup>Total Loss = Insertion Loss + 4.8dB Splitter Loss



# 3 Way-0° Power Splitter/Combiner

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## Typical Performance Curves

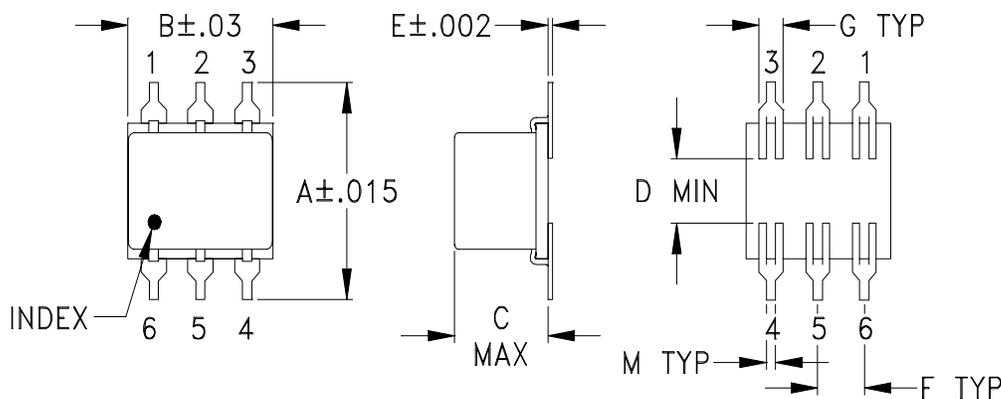


# Case Style

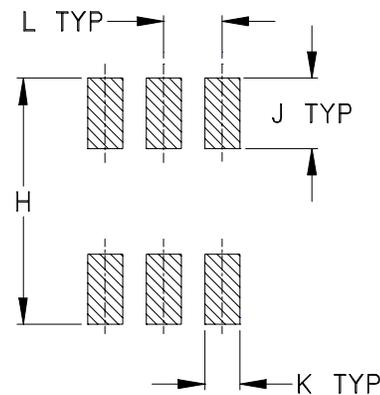
# QQQ

QQQ130 (non-waterproof)  
QQQ828 (washable)

## 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	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.  $\pm .01$ ; 3 Pl.  $\pm .005$

### Notes:

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



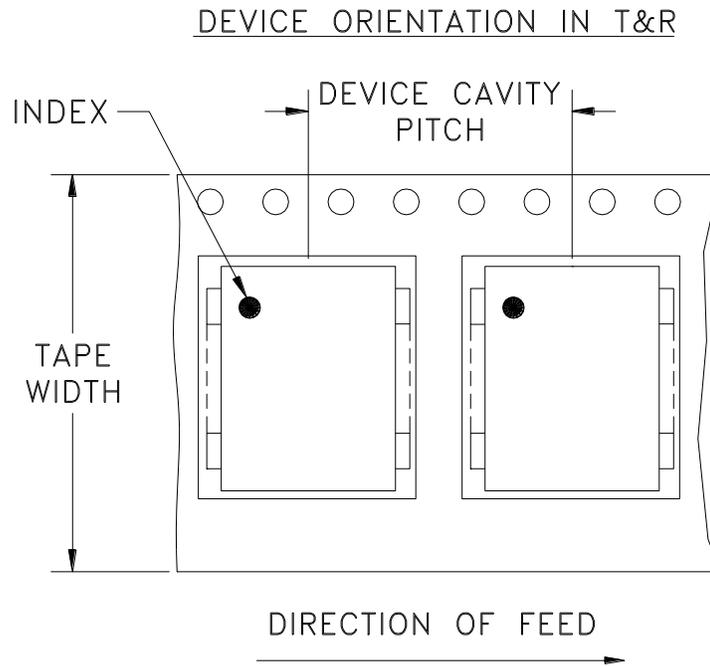
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# Tape & Reel Packaging TR-F10



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](http://www.minicircuits.com/pages/pdfs/tape.pdf)

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



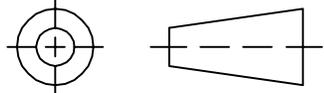
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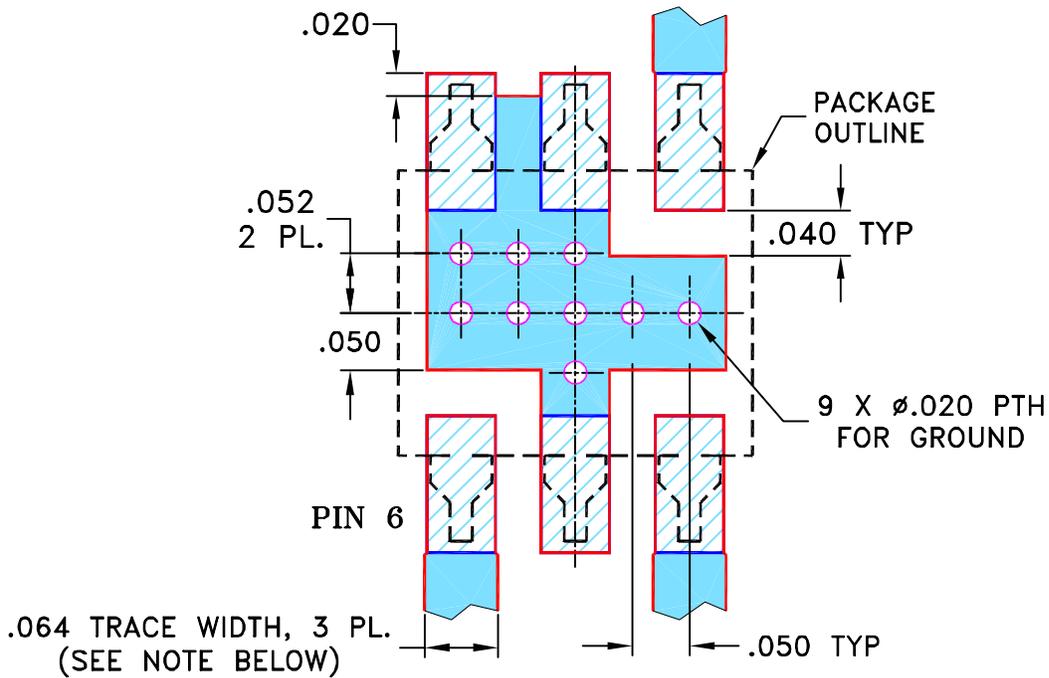
THIRD ANGLE PROJECTION



REVISIONS

REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
OR	M82272	NEW RELEASE	08/05/02	GF	DJ
A	M102713	ADDED NOTE 2 & "...WITH SMOBC", QQQ130/828 WAS QQQ569/828 CASE STYLE	01/18/06	MMG	LC

SUGGESTED MOUNTING CONFIGURATION FOR  
QQQ130/828 CASE STYLE, "gn" PIN CONNECTION



- NOTES: 1. TRACE WIDTH IS SHOWN FOR ROGERS R04350B 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	07/17/02
TOLERANCES ON:	CHECKED HY	08/01/02
2 PL DECIMALS ±	APPROVED DJ	08/05/02
3 PL DECIMALS ± .005		
ANGLES ±		
FRACTIONS ±		



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PL, gn, QQQ130/828, LRPS/SCL, TB-100

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SIZE A	CODE IDENT 15542	DRAWING NO: 98-PL-057	REV: A
FILE: 98PL057	SCALE: 6:1	SHEET: 1 OF 1	

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