

# Power Splitter/Combiner

LRPS-2-11A+

2 Way-0° 50Ω 20 to 2000 MHz



Generic photo used for illustration purposes only  
CASE STYLE: QQQ1358

### Maximum Ratings

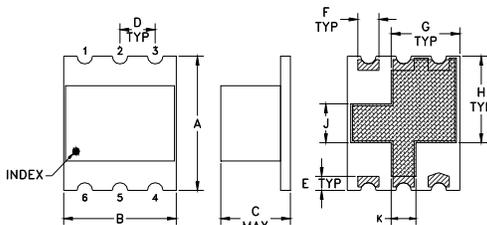
Operating Temperature	-40°C to 85°C
Storage Temperature	-55°C to 100°C
Power Input (as a splitter)	1W max.
Internal Dissipation	0.125W max.

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

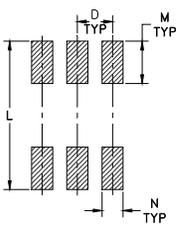
### Pin Connections

SUM PORT	6
PORT 1	4
PORT 2	3
GROUND	1,2,5

### Outline Drawing



### PCB Land Pattern

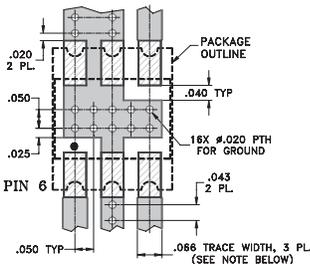


Suggested Layout,  
Tolerance to be within ±.002

### Outline Dimensions (inch/mm)

A	B	C	D	E	F	G
.380	.32	.215	.100	.040	.060	.195
9.65	8.13	5.46	2.54	1.02	1.52	4.95
H	J	K	L	M	N	wt
0.25	.110	.070	.420	.120	.060	grams
6.35	2.79	1.78	10.67	3.05	1.52	0.43

Demo Board MCL P/N: TB-480+  
Suggested PCB Layout (PL-290)



- NOTES:
- 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.
  - 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

### Notes

- 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.
- Electrical specifications and performance data contained in this specification document are based on Mini-Circuit's applicable established test performance criteria and measurement instructions.
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### Features

- very wideband, 20 to 2000 MHz
- low insertion loss, 0.7 dB typ.
- good isolation, 21 dB typ.

### Applications

- cellular
- GPS
- communications systems

### Electrical Specifications

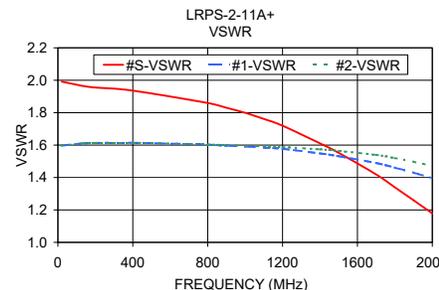
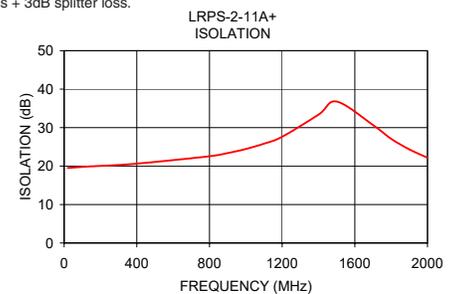
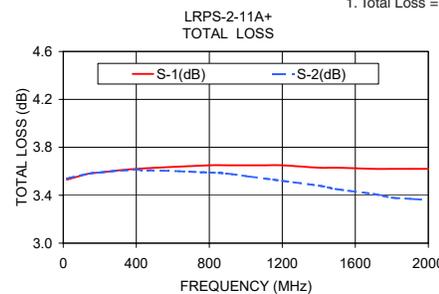
FREQ. RANGE (MHz)	ISOLATION (dB)						INSERTION LOSS (dB) ABOVE 3.0 dB						PHASE UNBALANCE (Degrees)			AMPLITUDE UNBALANCE (dB)		
	L		M		U		L		M		U		L	M	U	L	M	U
$f_1-f_2$	Typ.	Min.	Typ.	Min.	Typ.	Min.	Typ.	Max.	Typ.	Max.	Typ.	Max.	Max.	Max.	Max.	Max.	Max.	Max.
20-2000	19	15	21	15	30	15	0.6	0.8	0.7	1.0	0.8	1.5	2.0	3.0	5.0	0.2	0.3	0.7

L = 20-200 MHz M = 200-1000 MHz U = 1000-2000 MHz

### Typical Performance Data

Frequency (MHz)	Total Loss <sup>1</sup> (dB)		Amplitude Unbalance (dB)	Isolation (dB)	Phase Unbalance (deg.)	VSWR S	VSWR 1	VSWR 2
	S-1	S-2						
20.00	3.54	3.54	0.00	19.18	0.01	1.99	1.58	1.58
140.00	3.58	3.58	0.01	19.39	0.23	1.96	1.59	1.59
200.00	3.59	3.59	0.01	19.49	0.35	1.95	1.59	1.59
400.00	3.62	3.60	0.02	19.96	0.62	1.92	1.58	1.58
800.00	3.63	3.56	0.07	21.25	1.00	1.81	1.54	1.53
900.00	3.63	3.54	0.09	21.81	1.29	1.76	1.52	1.51
1000.00	3.60	3.51	0.09	22.43	1.52	1.72	1.50	1.50
1100.00	3.60	3.49	0.10	23.16	1.30	1.67	1.49	1.48
1200.00	3.61	3.48	0.12	23.85	1.28	1.62	1.47	1.46
1400.00	3.63	3.46	0.17	24.72	1.01	1.51	1.43	1.43
1500.00	3.64	3.45	0.19	24.59	1.10	1.46	1.41	1.41
1700.00	3.68	3.44	0.24	22.76	0.92	1.38	1.36	1.39
1800.00	3.71	3.46	0.25	21.43	0.76	1.36	1.34	1.38
1900.00	3.76	3.49	0.27	20.06	0.54	1.37	1.32	1.37
2000.00	3.84	3.53	0.30	18.74	0.23	1.41	1.31	1.37

1. Total Loss = Insertion Loss + 3dB splitter loss.



### electrical schematic



# 2 Way-0° Power Splitter/Combiner

# LRPS-2-11A+

## Typical Performance Data

FREQUENCY (MHz)	TOTAL LOSS <sup>1</sup> (dB)		AMPLITUDE UNBALANCE (dB)	ISOLATION (dB) 1-2	PHASE UNBALANCE (deg.)	FREQUENCY (MHz)	VSWR (:1)		
	S-1	S-2					S	1	2
20.0	3.54	3.54	0.00	19.18	0.01	20.0	1.99	1.58	1.58
40.0	3.55	3.55	0.00	19.19	0.05	40.0	1.99	1.58	1.58
60.0	3.56	3.56	0.00	19.23	0.09	60.0	1.98	1.59	1.58
80.0	3.57	3.56	0.00	19.28	0.14	80.0	1.97	1.59	1.59
100.0	3.57	3.57	0.00	19.32	0.17	100.0	1.97	1.59	1.59
120.0	3.58	3.57	0.00	19.36	0.19	120.0	1.97	1.59	1.59
140.0	3.58	3.58	0.01	19.39	0.23	140.0	1.96	1.59	1.59
160.0	3.59	3.58	0.01	19.42	0.28	160.0	1.96	1.59	1.59
180.0	3.59	3.59	0.01	19.45	0.30	180.0	1.96	1.59	1.59
200.0	3.59	3.59	0.01	19.49	0.35	200.0	1.95	1.59	1.59
400.0	3.62	3.60	0.02	19.96	0.62	400.0	1.92	1.58	1.58
600.0	3.62	3.59	0.03	20.49	0.94	600.0	1.87	1.57	1.56
800.0	3.63	3.56	0.07	21.25	1.00	800.0	1.81	1.54	1.53
900.0	3.63	3.54	0.09	21.81	1.29	900.0	1.76	1.52	1.51
1000.0	3.60	3.51	0.09	22.43	1.52	1000.0	1.72	1.50	1.50
1100.0	3.60	3.49	0.10	23.16	1.30	1100.0	1.67	1.49	1.48
1200.0	3.61	3.48	0.12	23.85	1.28	1200.0	1.62	1.47	1.46
1300.0	3.61	3.46	0.15	24.44	1.29	1300.0	1.57	1.45	1.44
1400.0	3.63	3.46	0.17	24.72	1.01	1400.0	1.51	1.43	1.43
1500.0	3.64	3.45	0.19	24.59	1.10	1500.0	1.46	1.41	1.41
1600.0	3.65	3.44	0.21	23.88	1.04	1600.0	1.42	1.38	1.40
1700.0	3.68	3.44	0.24	22.76	0.92	1700.0	1.38	1.36	1.39
1800.0	3.71	3.46	0.25	21.43	0.76	1800.0	1.36	1.34	1.38
1900.0	3.76	3.49	0.27	20.06	0.54	1900.0	1.37	1.32	1.37
2000.0	3.84	3.53	0.30	18.74	0.23	2000.0	1.41	1.31	1.37

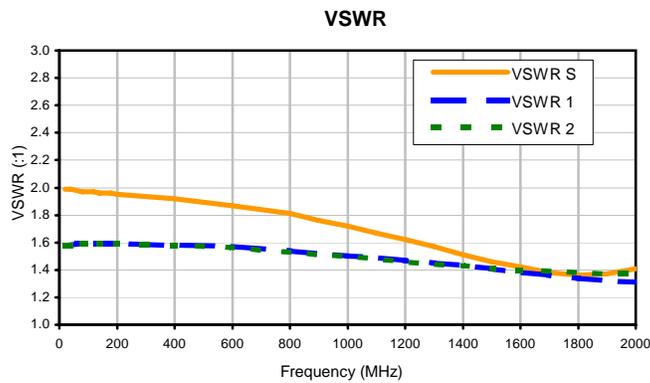
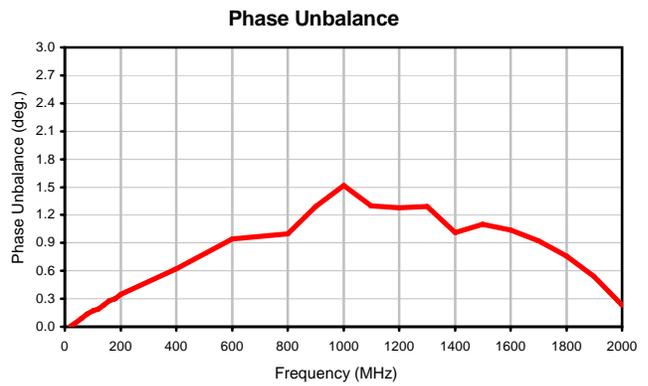
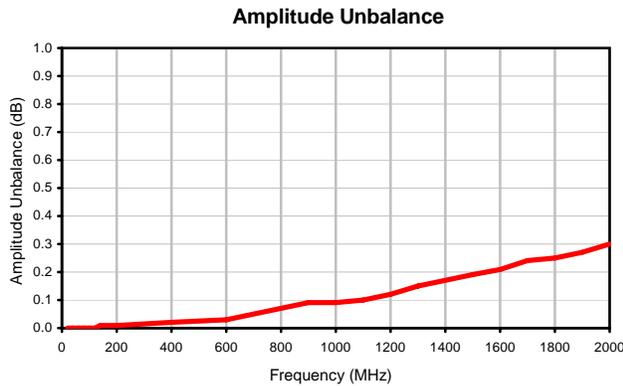
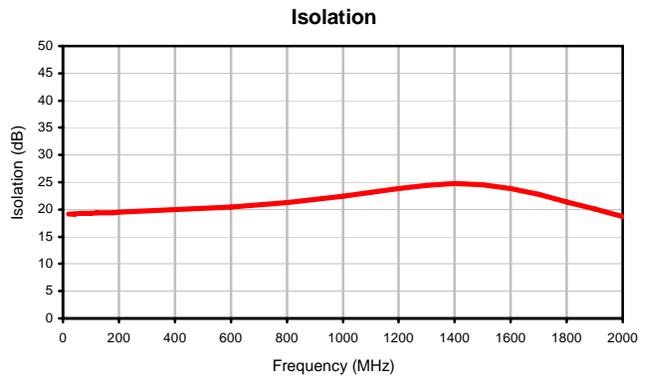
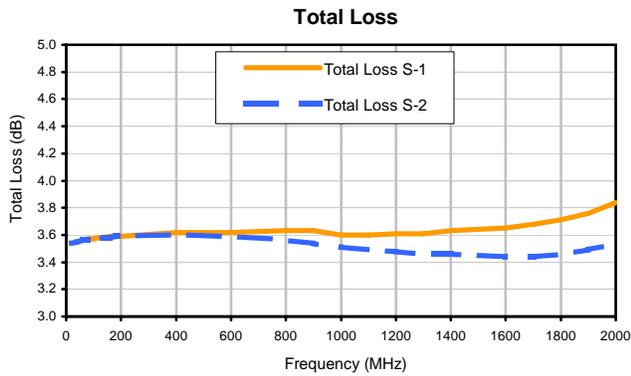
<sup>1</sup>Total Loss = Insertion Loss + 3dB Splitter Loss



# 2 Way-0° Power Splitter/Combiner

# LRPS-2-11A+

## Typical Performance Curves



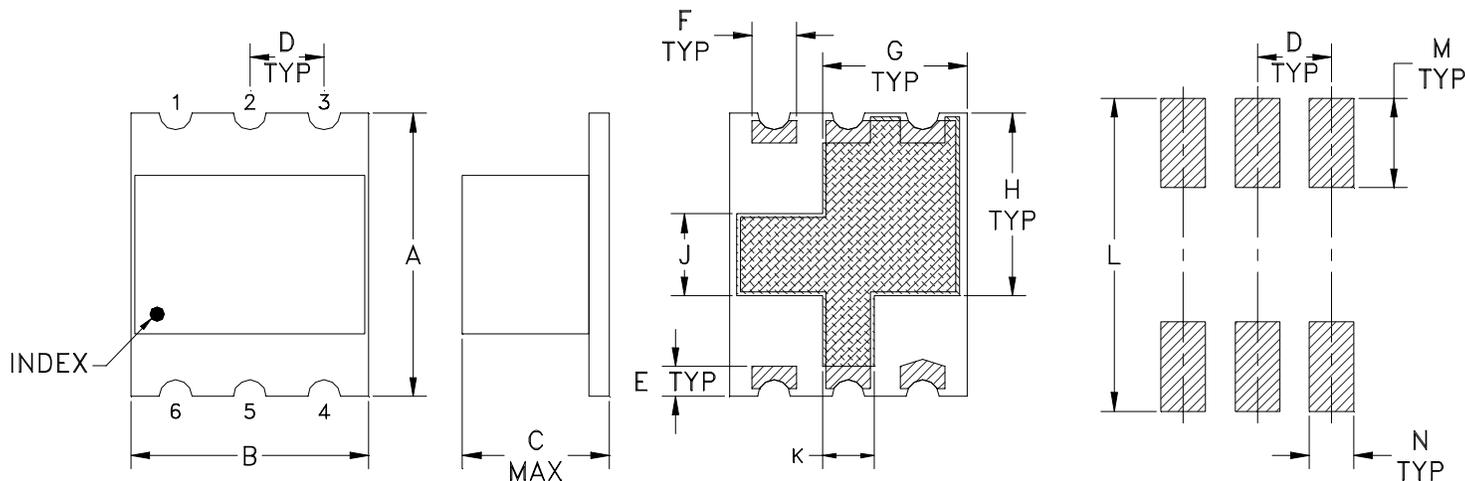
# Case Style

# QQQ

## Outline Dimensions

QQQ1358 (non-waterproof)

## 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	WT, GRAM
QQQ1358	.380 (9.65)	.32 (8.13)	.215 (5.46)	.100 (2.54)	.040 (1.02)	.060 (1.52)	.195 (4.95)	.25 (6.35)	.110 (2.79)	.070 (1.78)	.420 (10.67)	.120 (3.05)	.060 (1.52)	.43

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

### Notes:

- Case material: Plastic.
- Base: Printed Wiring Laminate
- Termination finish:  
For RoHS Case Styles: 3-5  $\mu$  inch (.08-.13 microns) Gold over 120-240  $\mu$  inch (3.05-6.10 microns) Nickel plate.  
All Models (+) suffix

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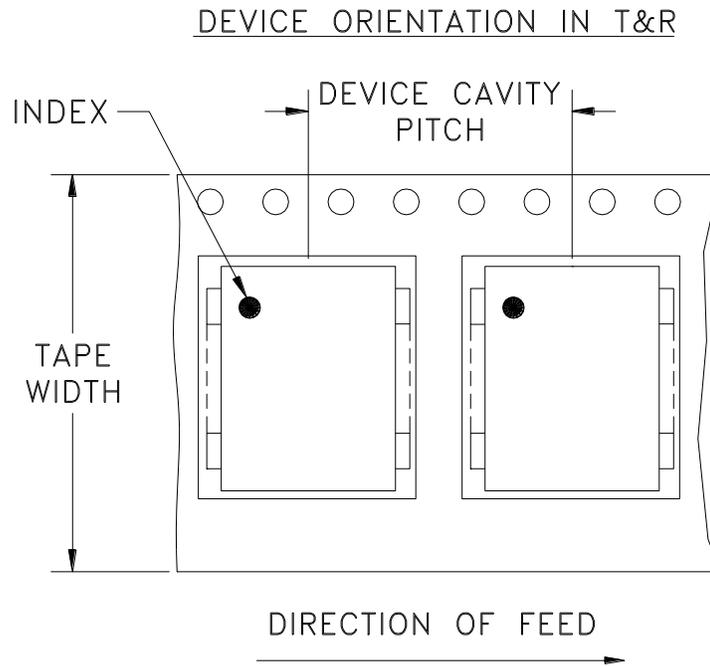
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# Tape & Reel Packaging TR-F10



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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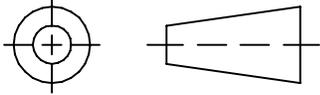
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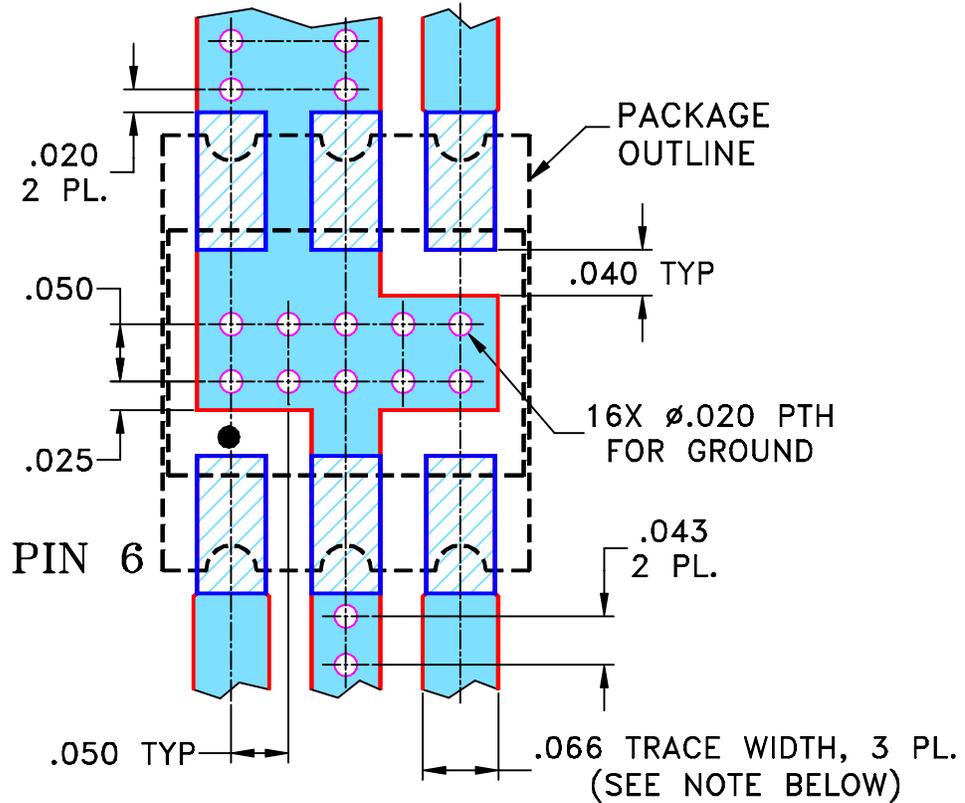
THIRD ANGLE PROJECTION



REVISIONS

REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
OR	M119204	NEW RELEASE	08/21/08	AV	HY

SUGGESTED MOUNTING CONFIGURATION FOR QQQ1358 CASE STYLE, "06SP05" PIN CODE



- 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 AV	08/14/08
TOLERANCES ON:	CHECKED IL	08/21/08
2 PL DECIMALS ±	APPROVED HY	08/21/08
3 PL DECIMALS ± .005		
ANGLES ±		
FRACTIONS ±		

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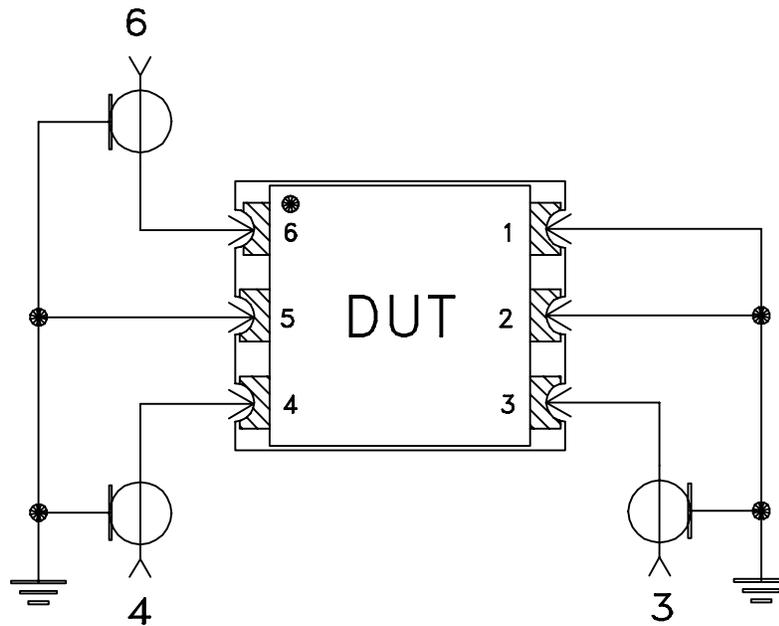
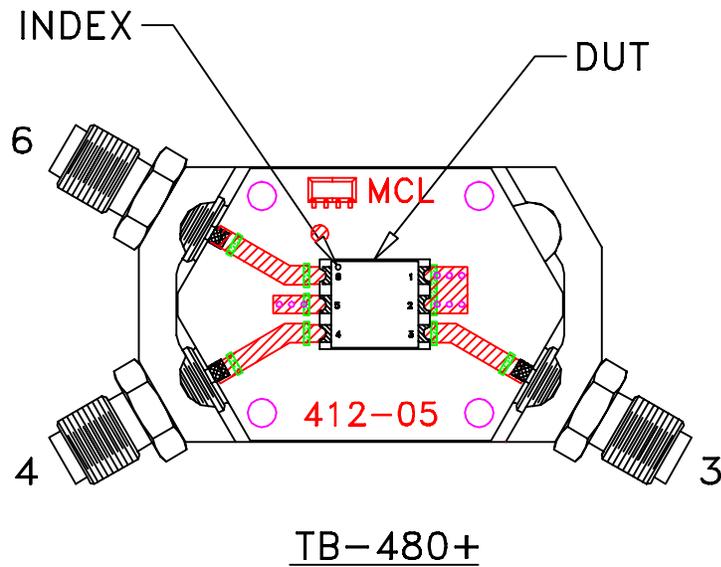
PL, 06SP05, QQQ1358, LRPS-2-11A+, TB-480+

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SIZE A	CODE IDENT 15542	DRAWING NO: 98-PL-290	REV: OR
FILE: 98PL290	SCALE: 6:1	SHEET: 1 OF 1	

# Evaluation Board and Circuit

For Pin Connections refer to Data Sheet of the DUT



Schematic Diagram

## Notes:

1. 50 Ohm SMA Female connectors.
2. PCB Material: Rogers R04350 or equivalent,  
Dielectric Constant=3.5, Thickness=.030 inch.

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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