

50Ω SP4T, TTL Driver, Absorptive DC¹ to 3 GHz

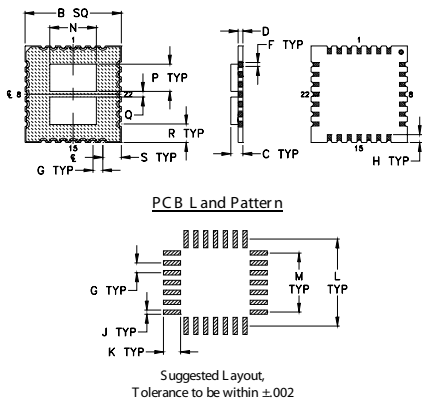
Maximum Ratings

Operating Temperature	-30°C to 85°C
Storage Temperature	-55°C to 100°C
Input Power	see table
Vcontrol	(V+) +0.4V
Permanent damage may occur if any of these limits are exceeded.	

Pin Connections

RF IN	1
RF OUT 1	25
RF OUT 2	21
RF OUT 3	9
RF OUT 4	5
CONTROL 1	15
CONTROL 2	16
CONTROL 3	13
CONTROL 4	14
+5V (V+)	12
-5V (V-)	18
GROUND	all other pins

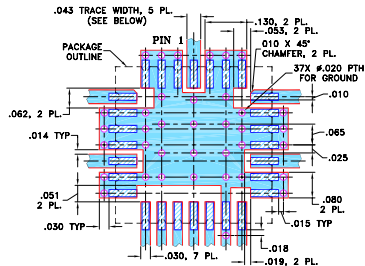
Outline Drawing



Outline Dimensions (inch/mm)

A	B	C	D	E	F	G	H	J
—	.487	.06	.025	—	.020	.050	.040	.022
—	12.37	1.55	0.64	—	0.51	1.27	1.02	0.56
K	L	M	N	P	Q	R	S	wt
.087	.441	.300	.236	.138	.03	.094	.094	grams
2.21	11.20	7.62	5.99	3.51	0.76	2.39	2.39	0.71

Demo Board MCL PIN: TB-91 Suggested PCB Layout (PL-221)



Features

- wideband, DC to 3 GHz
- high isolation, 37 dB typ.
- low video leakage, 30 mVp-p typ.
- integral TTL driver
- aqueous washable

Applications

- cellular, PCN
- satellite communication
- receiver antenna switching



CASE STYLE: AN1102

+RoHS Compliant

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

Electrical Specifications

FREQ. ¹ (GHz)			INSERTION LOSS (dB)				1dB COMPR. (dBm)			IN-OUT ISOLATION (dB)					
			DC-500 MHz		500-2000 MHz		2000-3000 MHz			DC-500 MHz		500-2000 MHz		2000-3000 MHz	
f _L	f _U	Typ.	Max.	Typ.	Max.	Typ.	Max.	Typ.	Typ.	Typ.	Min.	Typ.	Min.	Typ.	Min.
DC	3	1.25	1.8	2.0	3.0	2.75	3.9	23*	25	25	50	40	37	32	26

*1dB compression gradually decreases to 10 dBm @ 1 MHz

Additional Specifications

*Control Voltage	0/V+		
Low Threshold	0.8 max.		
High Threshold	3.5 min.		
Control Current, mA	High V: 0.2 max.; Low V: 0.02 max.		
Positive Supply V. (V+)	+5±0.5		
Negative Supply V. (V-)	-5±0.25		
Positive Supply Current, mA	4 max		
Negative Supply Current, mA	20 max.		
VSWR(:1)	1.28 typ., ON DC-2 GHz 1.24 typ., OFF DC-2 GHz		
Rise/Fall time (10%-90%), ns	25 typ.		
Switching time, 50% of Control to 90% RF (Turn-on), ns	45 typ.		
10% RF (Turn-off), ns	30 typ.		
**Video Leakage, mVp-p	30 typ.		
0/+5V Control	30X10 ⁶		
MTBF, hrs @85°C case	30X10 ⁶		
Max. Input Power, dBm	DC-100 MHz	100-500 MHz	500-3000 MHz
Steady state control	+20	+24	+30
As modulator	+8	+14	+20

* Do not apply control voltage high prior to applying V+

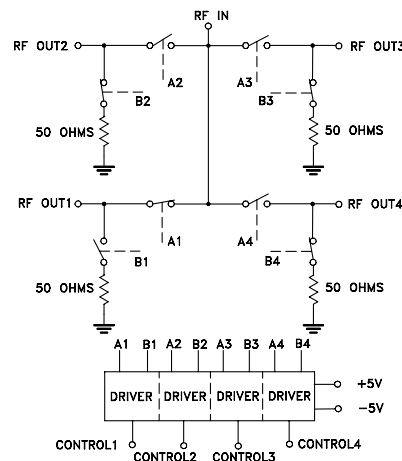
** Video leakage or break through is defined as leakage of TTL switching signal to RF output ports.

1. All RF connections must be DC blocked or held at 0V DC.

CONTROL LOGIC

Control Ports				RF outputs			
1	2	3	4	1	2	3	4
Low	High	High	High	On	Off	Off	Off
High	Low	High	High	Off	On	Off	Off
High	High	Low	High	Off	Off	On	Off
High	High	High	Low	Off	Off	Off	On

Electrical Schematic



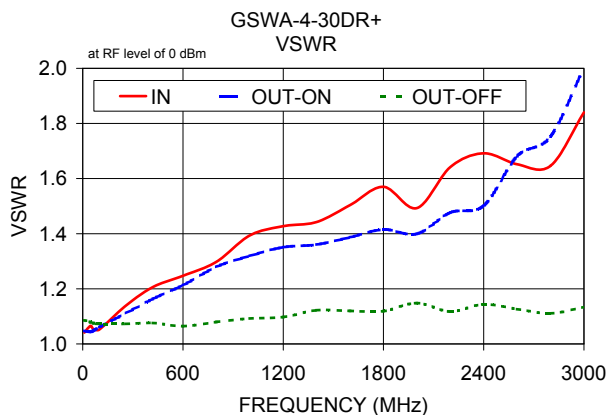
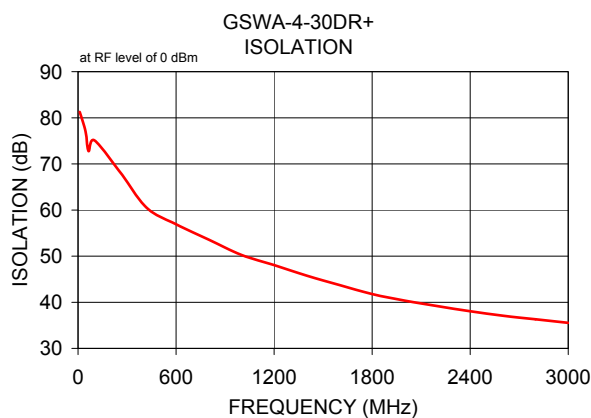
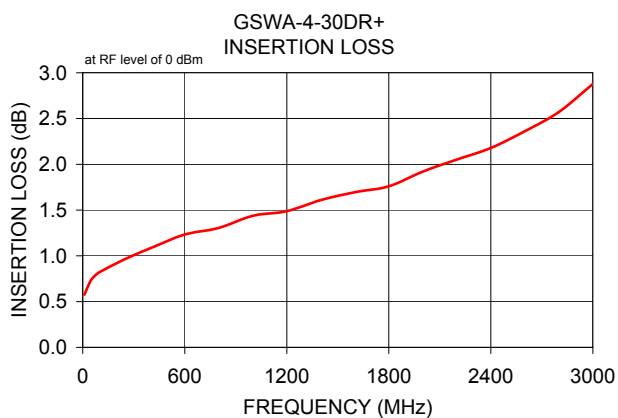
ESD rating
Human body model (HBM): Class 1B(500 to <1000 V) in accordance with ANSI/ESD 5.1-2001

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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Typical Performance Data

FREQ. (MHz)	ON	INSERTION LOSS (dB) TTL Low @ 0V IN-OUT	OFF ISOLATION (dB) TTL High @ 5V IN-OUT	VSWR	IN	OUT	OFF
	$\bar{x}$	σ	$\bar{x}$	σ	$\bar{x}$	$\bar{x}$	$\bar{x}$
10	0.58	0.025	81.27	4.21	1.04	1.05	1.09
28	0.66	0.018	73.11	4.37	1.06	1.04	1.08
64	0.77	0.017	72.78	6.25	1.05	1.05	1.08
100	0.82	0.015	75.11	4.71	1.05	1.06	1.07
260	0.97	0.010	68.08	5.57	1.14	1.11	1.07
420	1.10	0.012	60.51	1.69	1.21	1.16	1.08
600	1.23	0.014	56.91	1.13	1.25	1.21	1.06
800	1.31	0.011	53.59	1.34	1.30	1.28	1.08
1000	1.44	0.018	50.26	0.95	1.39	1.32	1.09
1200	1.49	0.019	48.06	0.56	1.43	1.35	1.10
1400	1.61	0.023	45.78	0.44	1.44	1.36	1.12
1600	1.70	0.025	43.73	0.35	1.50	1.39	1.12
1800	1.76	0.018	41.79	0.33	1.57	1.42	1.12
2000	1.92	0.025	40.34	0.40	1.49	1.40	1.15
2200	2.05	0.025	39.17	0.37	1.64	1.48	1.12
2400	2.18	0.026	38.05	0.41	1.69	1.50	1.14
2600	2.36	0.030	37.08	0.32	1.65	1.68	1.13
2800	2.57	0.037	36.32	0.30	1.65	1.75	1.11
3000	2.88	0.048	35.55	0.34	1.84	2.00	1.13



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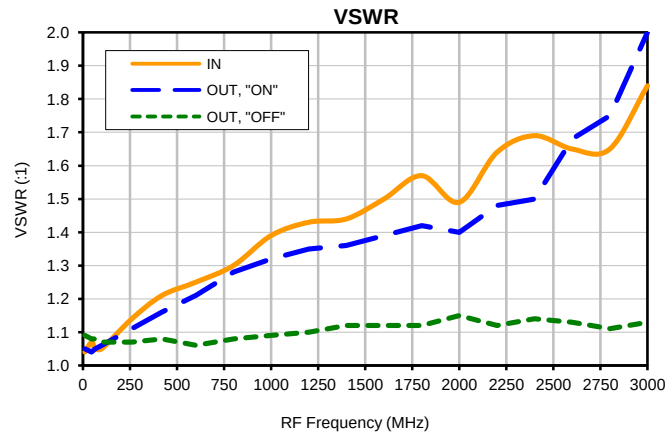
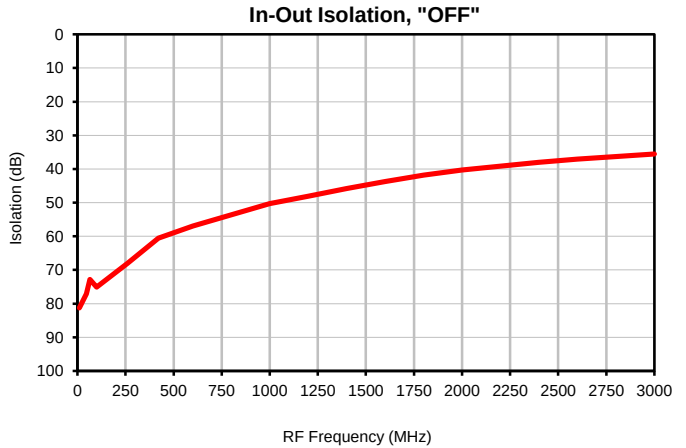
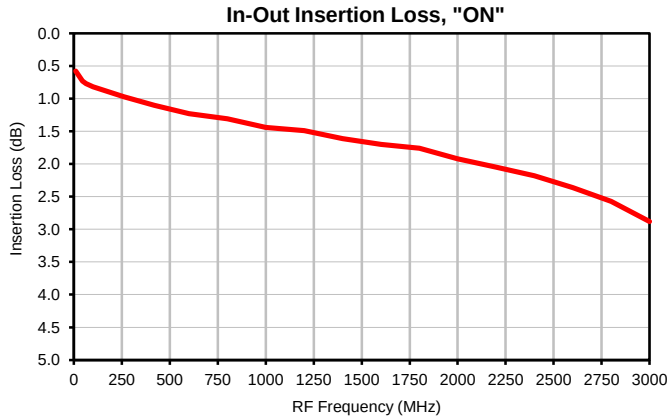
Switch SP4T, 50Ω

GSWA-4-30DR+

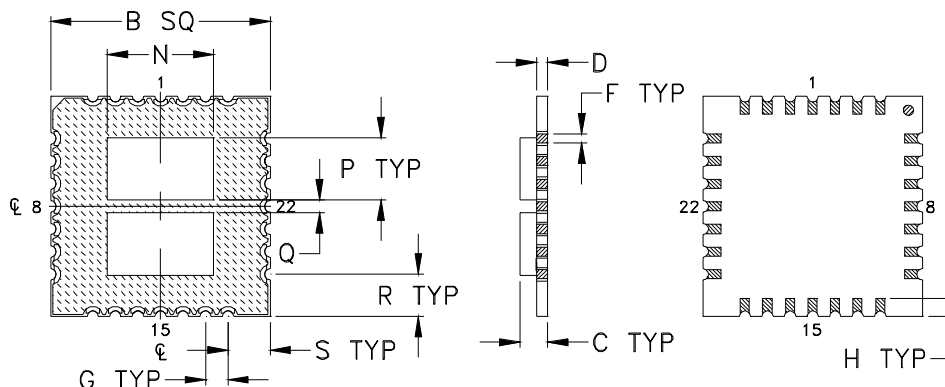
Typical Performance Data

FREQUENCY (MHz)	INSERTION LOSS TTL Low @ 0V (dB) IN-OUT, "ON"	ISOLATION TTL High @ 5V (dB) IN-OUT, "OFF"	VSWR (:1)		
			IN	OUT, "ON"	OUT, "OFF"
10.0	0.58	81.27	1.04	1.05	1.09
46.0	0.73	77.05	1.07	1.04	1.08
64.0	0.77	72.78	1.05	1.05	1.08
100.0	0.82	75.11	1.05	1.06	1.07
260.0	0.97	68.08	1.14	1.11	1.07
420.0	1.10	60.51	1.21	1.16	1.08
600.0	1.23	56.91	1.25	1.21	1.06
800.0	1.31	53.59	1.30	1.28	1.08
1000.0	1.44	50.26	1.39	1.32	1.09
1200.0	1.49	48.06	1.43	1.35	1.10
1400.0	1.61	45.78	1.44	1.36	1.12
1600.0	1.70	43.73	1.50	1.39	1.12
1800.0	1.76	41.79	1.57	1.42	1.12
2000.0	1.92	40.34	1.49	1.40	1.15
2200.0	2.05	39.17	1.64	1.48	1.12
2400.0	2.18	38.05	1.69	1.50	1.14
2600.0	2.36	37.08	1.65	1.68	1.13
2800.0	2.57	36.32	1.65	1.75	1.11
3000.0	2.88	35.55	1.84	2.00	1.13

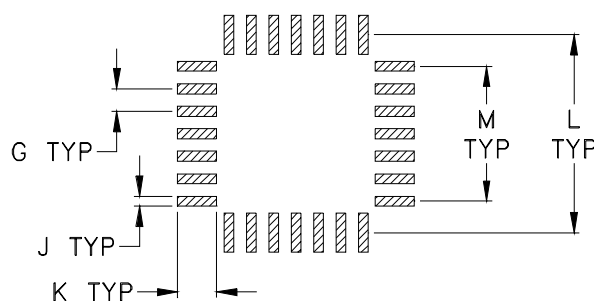
Typical Performance Curves



Outline Dimensions



PCB Land Pattern



Suggested Layout,
Tolerance to be within ± 0.002

CASE#	A	B	C	D	E	F	G	H	J	K	L	M	N
AN1102	--	.487 (12.37)	.06 (1.55)	.025 (0.64)	--	.020 (0.51)	.050 (1.27)	.040 (1.02)	.022 (0.56)	.087 (2.21)	.441 (11.20)	.300 (7.62)	.236 (5.99)

CASE#	P	Q	R	S	WT. GRAM
AN1102	.138 (3.51)	.03 (0.76)	.094 (2.39)	.094 (2.39)	.71

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

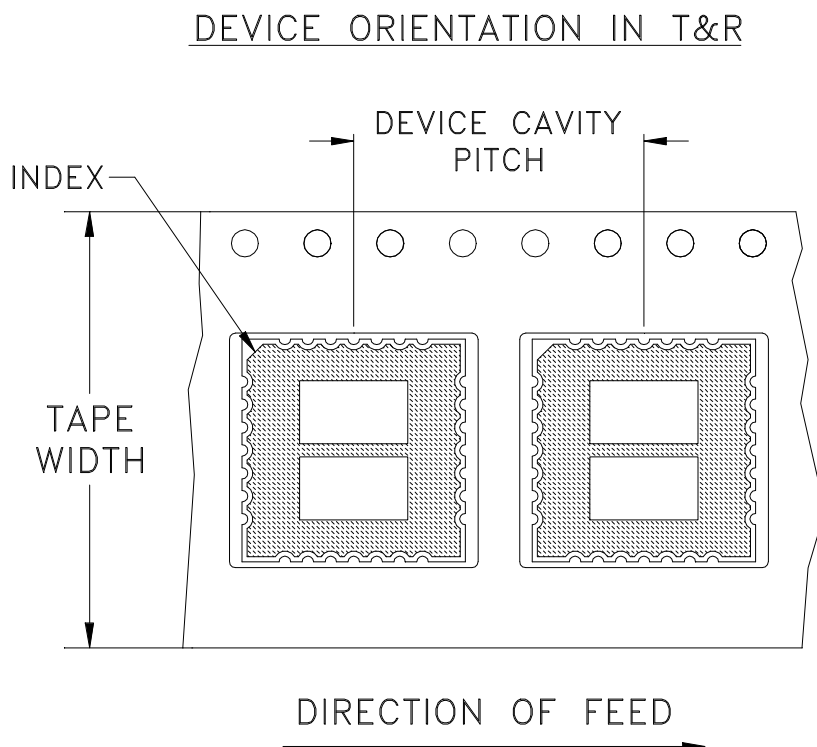
Notes:

- Case material: Plastic.
- Termination finish:
For RoHS Case Styles: Tin plate. All models, (+) suffix.
For RoHS-5 Case Styles: Tin-Lead plate. All models, no (+) suffix.



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Tape Width, mm	Device Cavity Pitch, mm	Reel Size, inches	Devices per Reel
24	16	13	500

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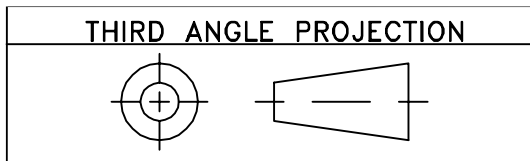


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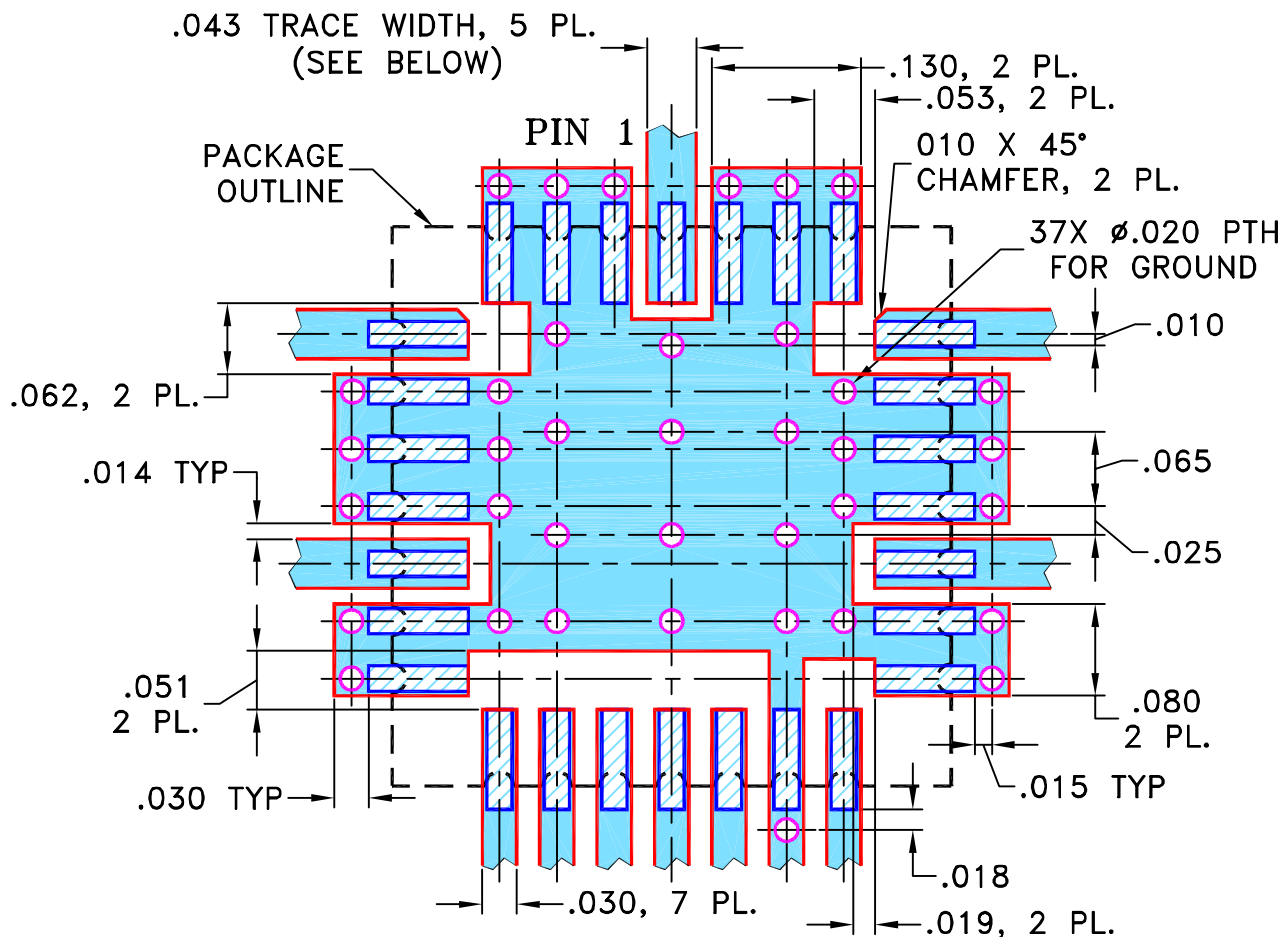
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REVISIONS					
REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
OR	M100872	NEW RELEASE	10/03/05	MMG	IG
A	M102713	ADDED "...WITH SMOBC"	01/12/06	GT	IL

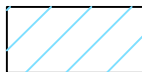
**SUGGESTED MOUNTING CONFIGURATION
FOR AN1102 CASE STYLE, "hb" PIN CONNECTION.**



- NOTE: 1. TRACE WIDTH IS SHOWN FOR ROGERS RO4350B WITH DIELECTRIC THICKNESS .020" $\pm$.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

UNLESS OTHERWISE SPECIFIED	INITIALS		DATE
DIMENSIONS ARE IN INCHES	DRAWN	MMG	09/21/05
TOLERANCES ON:	CHECKED	IL	10/03/05
2 PL DECIMALS $\pm$	APPROVED	IG	10/03/05
3 PL DECIMALS $\pm$.005			
ANGLES $\pm$			
FRACTIONS $\pm$			

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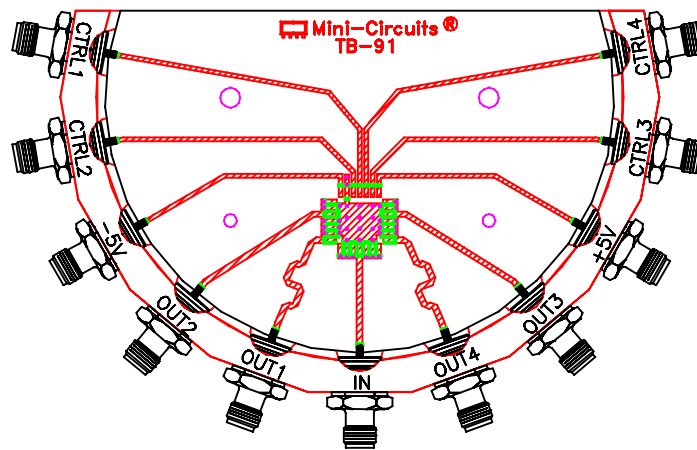
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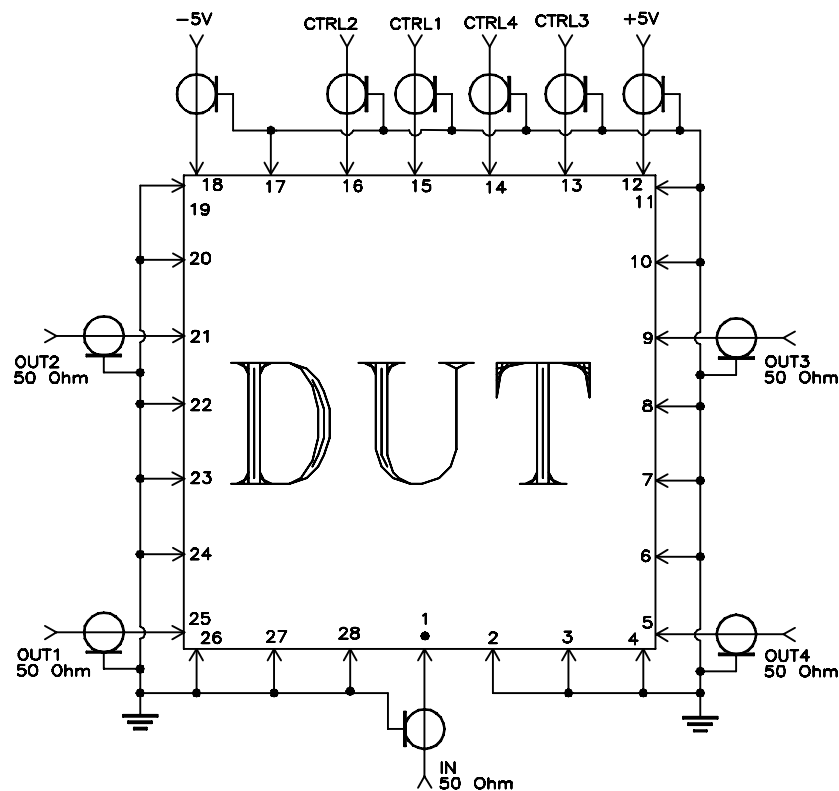
PL, hb, AN1102, GSWA-4-30DR, TB-91

SIZE A	CODE IDENT 15542	DRAWING NO: 98-PL-221	REV: A
FILE: 98PL221	SCALE: 6:1	SHEET: 1 OF 1	

Evaluation Board and Circuit



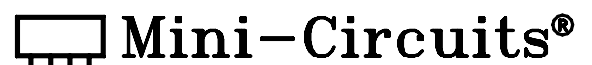
TB-91



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	-30° to 85°C Ambient Environment	Individual Data Sheet
Storage Temperature	-55° to 100° C Ambient Environment	Individual Model Data Sheet
Temperature Cycling	-55° to 100°C, 100 cycles	MIL-STD-883, Method 1010, Condition B, except 100°C
Mechanical Shock	100g, 6ms sawtooth, 3 shocks each direction 3 axes (total 18)	MIL-STD-202, Method 213, Condition I
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
Constant Acceleration	Y1 plane only, 5 Kg	MIL-STD-883, Method 2001, Condition A, except Y1 plane only
HAST	130°C, 85% RH, 96 hours	JESD22-A110
Solder Reflow Profile	Sn-Pb Eutetic Process: 240°C peak PB-Free Process: 250°C peak	J-STD-020, Table 4-1, 4-2 and 5-2; Figure 5-1
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