

Surface Mount

High Isolation Switch

50Ω SPDT, Reflective DC³ to 4500 MHz

Features

- high isolation, 55 dB typ. at 1 GHz
- low insertion loss, 0.7 dB typ.
- integral TTL driver
- aqueous washable

Applications

- automated switching networks
- transmitters/receiver isolation

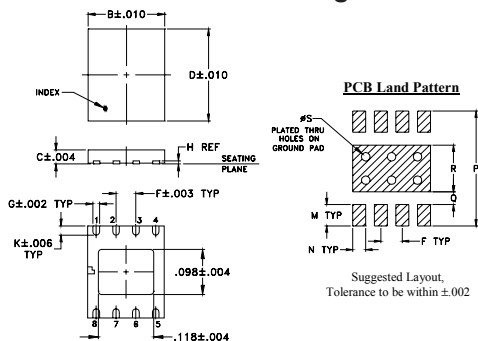
Maximum Ratings

Operating Temperature	-40°C to 85°C
Storage Temperature	-55°C to 100°C
Power and Voltage	see note 1
Permanent damage may occur if any of these limits are exceeded.	

Pin Connections

RF IN	6
RF OUT 1	1
RF OUT 2	4
TTL IN	2
+5V	5
-5V	7
TTL GND	3
GND	8
GND	PADDLE

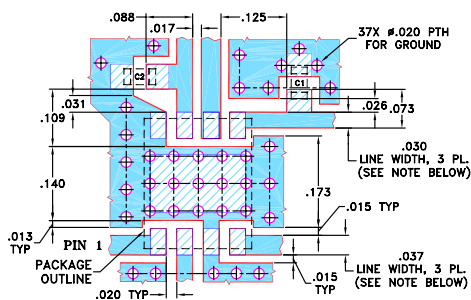
Outline Drawing



Outline Dimensions (inch)

A	B	C	D	E	F	G	H	J	K
—	.193	.035	.236	—	.050	.017	.008	—	.024
—	4.90	0.90	6.00	—	1.27	0.43	0.20	—	0.60
L	M	N	P	Q	R	S	T	wt	
—	.050	.030	.270	.030	.110	.020	—	grams	
—	1.27	0.76	6.86	0.76	2.79	0.51	—	0.08	

Demo Board MCL P/N: TB-161-1+ Suggested PCB Layout (PL-122)



NOTE:

1. CAPACITORS C1 & C2: 10 ± 2% pF, 0603 SIZE
2. TRACE WIDTH IS SHOWN FOR ROGERS RO4350 WITH DIELECTRIC THICKNESS .020" ± .002". COPPER: 1/2 OZ. EACH SIDE.
3. FOR OTHER MATERIALS TRACE WIDTH MAY NEED TO BE MODIFIED
4. BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.

- DENOTES PCB COPPER LAYOUT
- DENOTES COPPER LAND PATTERN FREE OF SOLDERMASK

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.
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SWM-2-50DR+



CASE STYLE: DL1020

+RoHS Compliant

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

Electrical Specifications (T_{AMB}=25°C)

FREQ. ³ (MHz)	INSERTION LOSS (dB)								1dB COMPR. (dBm)								IN-OUT ISOLATION (dB)							
	DC-100 MHz		100-1000 MHz		1000-2000 MHz		2000-4500 MHz		DC-100 MHz		100-1000 MHz		1000-2000 MHz		2000-4500 MHz		DC-100 MHz		100-1000 MHz		1000-2000 MHz		2000-4500 MHz	
	f _L	f _U	Typ.	Max.	Typ.	Max.	Typ.	Max.	Typ.	Typ.	Typ.	Typ.	Typ.	Typ.	Typ.	Typ.	Typ.	Min.	Typ.	Min.	Typ.	Min.	Typ.	Min.
DC	4500	0.6	0.9	0.7	1.2	0.9	1.4	1.6	1.9	20 ¹	25	25	25	24	75	65	55	45	45	37	35	27		

¹drops to 17.0 dBm at 10 MHz

Switching Specifications

Power Supply Voltage	Current, mA	
+5V ± .20	9 max.	
-5V ± .20	9 max.	
TTL Control low threshold	Voltage, V	Current, mA
high threshold	0 min., 0.8 max.	0.2 max.
	2 min., 5 max.	5 max.
VSWR* (:1)	1.15 typ. to 2GHz, 1.3 typ. to 4.5 GHz	
Rise/Fall Time, ns	5 typ., 15 max.	
Switching Time, ns turn on/off	10 typ., 20 max.	
Video leakage**, mV p-p	30 typ.	

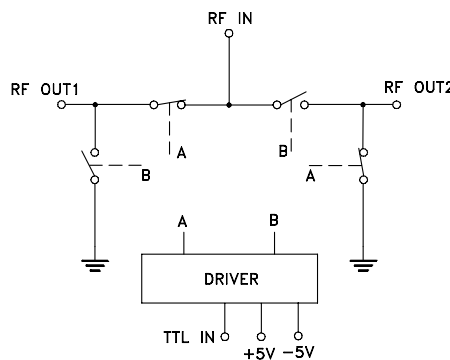
* For all states of reflective switch in "ON" condition, "OFF port" 5:1 VSWR typ.

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

1. Absolute maximum power and voltage rating:
RF input power, 250mW
Supply voltage: ±6V DC
2. OFF state of RF output is low impedance.
3. All RF connections must be DC blocked or held at 0V DC.
4. ESD ratings

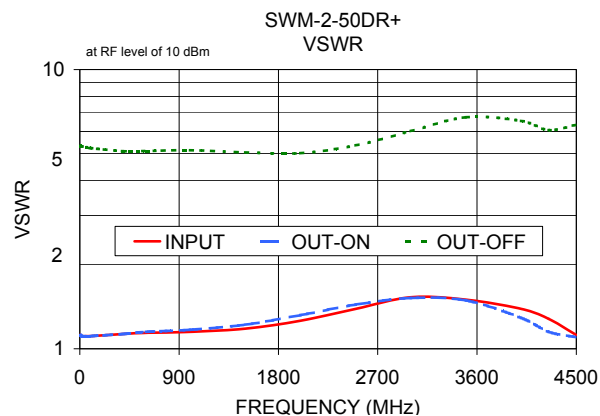
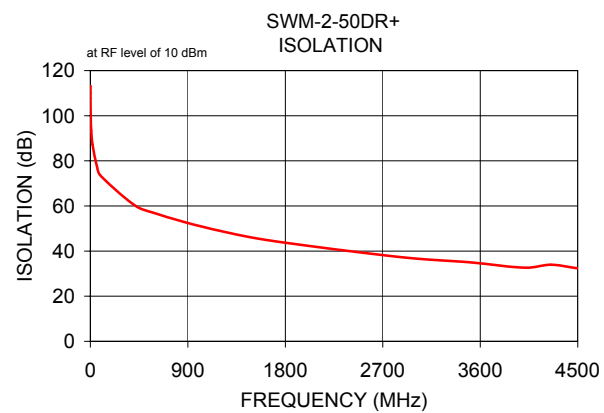
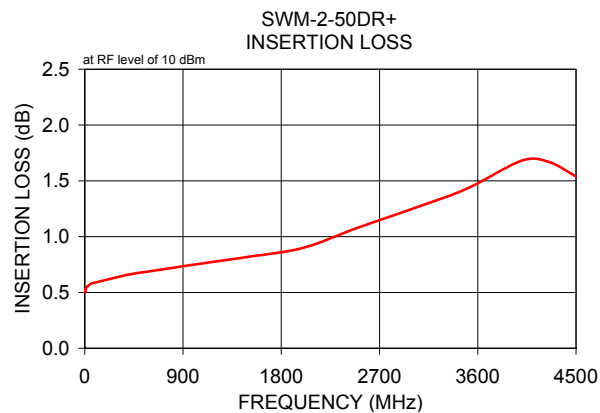
Human Body Model (HBM): Class 1C(1000 to <2000V) in accordance with ESD STM5.1-2001
Machine Model(MM): Class M1(<100V) in accordance with ESD STM5.2-1999

Electrical Schematic



Typical Performance Data

FREQ. (MHz)	ON INSERTION LOSS (dB) Control @ -5V IN-OUT		OFF ISOLATION (dB) Control @ 0V IN-OUT		VSWR		
					IN	ON X	OUT OFF X
	$\bar{X}$	σ	$\bar{X}$	σ			
0.30	0.52	0.00	113.18	10.77	1.12	1.12	5.30
0.50	0.51	0.00	113.06	3.58	1.12	1.12	5.33
0.80	0.51	0.00	109.96	6.86	1.12	1.12	5.34
1.00	0.51	0.00	107.70	6.84	1.12	1.12	5.34
4.00	0.52	0.00	97.85	1.38	1.12	1.12	5.33
8.00	0.53	0.00	93.45	0.78	1.12	1.12	5.32
20.00	0.55	0.00	87.22	1.53	1.11	1.11	5.31
60.00	0.58	0.01	77.63	1.27	1.11	1.11	5.27
100.00	0.59	0.01	73.10	1.40	1.11	1.11	5.23
400.00	0.66	0.01	60.63	1.23	1.13	1.13	5.10
600.00	0.69	0.01	56.70	1.15	1.14	1.15	5.11
1000.00	0.75	0.01	51.22	1.02	1.15	1.17	5.14
1500.00	0.82	0.01	45.93	0.87	1.18	1.22	5.05
2000.00	0.90	0.01	42.42	0.87	1.26	1.32	5.02
2500.00	1.08	0.02	39.36	0.87	1.39	1.44	5.35
3000.00	1.25	0.03	36.68	0.73	1.53	1.52	6.02
3500.00	1.43	0.02	35.06	0.72	1.50	1.49	6.75
4000.00	1.68	0.02	32.67	0.53	1.39	1.29	6.55
4250.00	1.67	0.01	33.95	0.58	1.28	1.15	6.07
4500.00	1.54	0.01	32.31	0.44	1.12	1.10	6.34



Notes

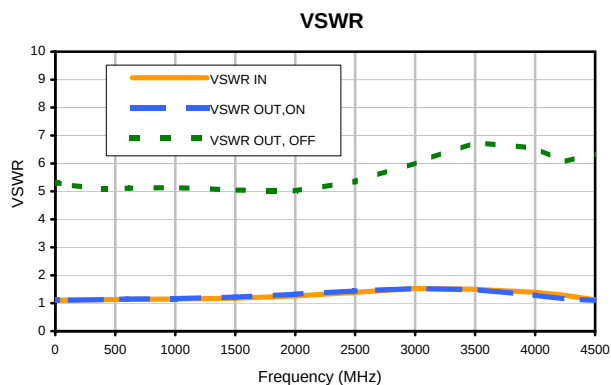
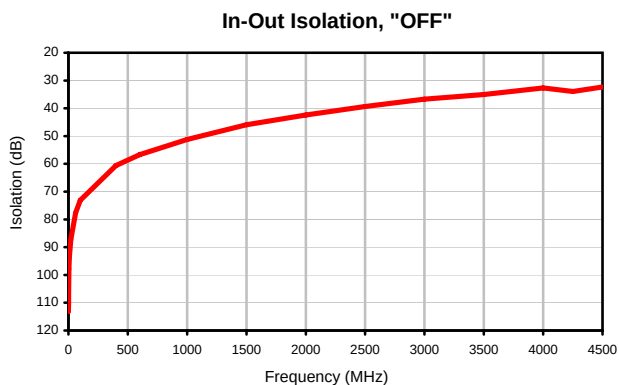
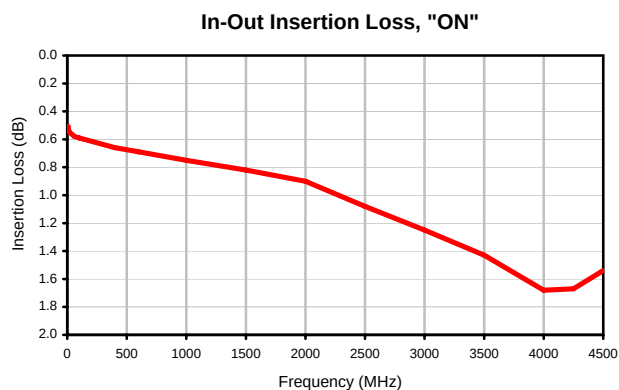
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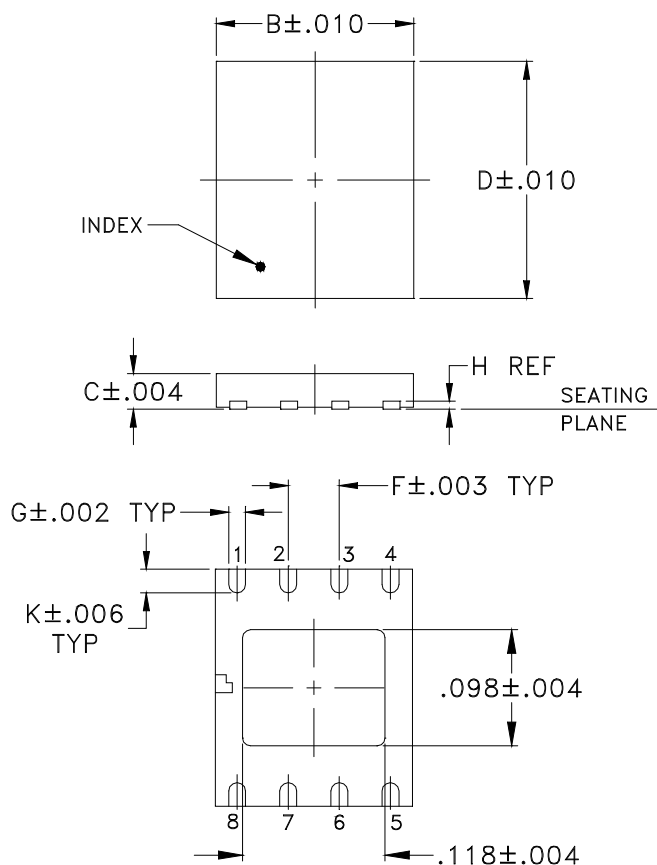
Typical Performance Data

FREQUENCY (MHz)	INSERTION LOSS Control @ -5V (dB) IN-OUT , "ON"	ISOLATION Control @ 0V (dB) IN-OUT , "OFF"	VSWR		
			IN	(:1) OUT , "ON"	OUT , "OFF"
0.3	0.52	113.18	1.12	1.12	5.30
0.5	0.51	113.06	1.12	1.12	5.33
0.8	0.51	109.96	1.12	1.12	5.34
1	0.51	107.70	1.12	1.12	5.34
4	0.52	97.85	1.12	1.12	5.33
8	0.53	93.45	1.12	1.12	5.32
20	0.55	87.22	1.11	1.11	5.31
60	0.58	77.63	1.11	1.11	5.27
100	0.59	73.10	1.11	1.11	5.23
400	0.66	60.63	1.13	1.13	5.10
600	0.69	56.70	1.14	1.15	5.11
1000	0.75	51.22	1.15	1.17	5.14
1500	0.82	45.93	1.18	1.22	5.05
2000	0.90	42.42	1.26	1.32	5.02
2500	1.08	39.36	1.39	1.44	5.35
3000	1.25	36.68	1.53	1.52	6.02
3500	1.43	35.06	1.50	1.49	6.75
4000	1.68	32.67	1.39	1.29	6.55
4250	1.67	33.95	1.28	1.15	6.07
4500	1.54	32.31	1.12	1.10	6.34

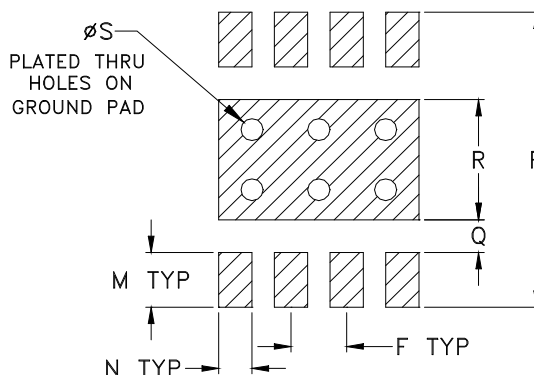
Typical Performance Curves



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	N
DL1020	--	.193 (4.90)	.035 (0.90)	.236 (6.00)	--	.050 (1.27)	.017 (0.42)	.008 (0.20)	--	.024 (0.60)	--	.050 (1.27)	.030 (0.76)

CASE #	P	Q	R	S	T	WT. GRAM
DL1020	.270 (6.86)	.030 (0.76)	.110 (2.79)	.020 (0.51)	--	.08

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

Notes:

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

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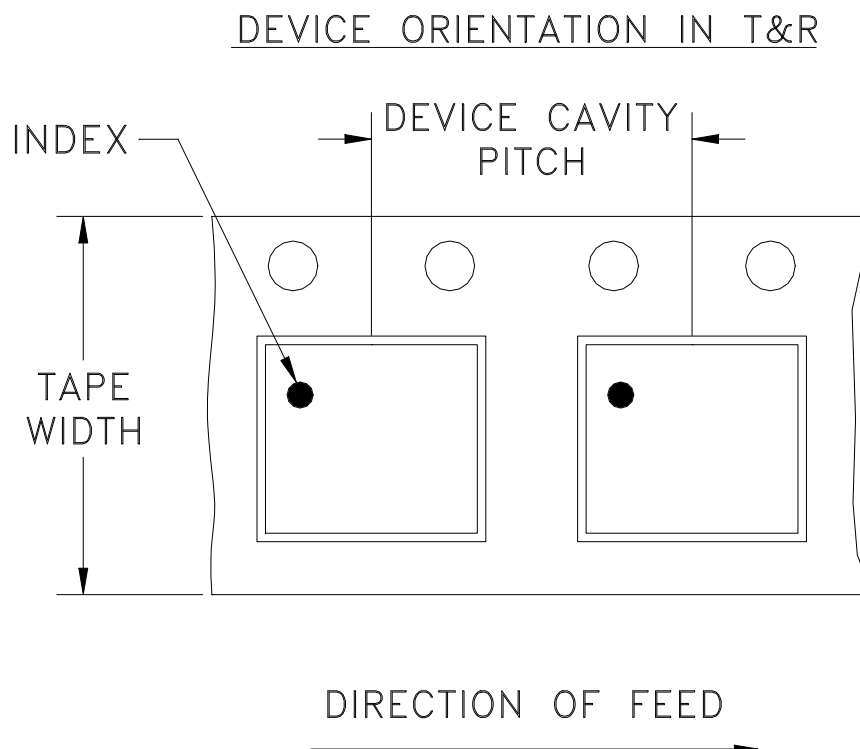
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RF/IF MICROWAVE COMPONENTS

Tape & Reel Packaging TR-F68



Tape Width, mm	Device Cavity Pitch, mm	Reel Size, inches	Devices per Reel see note	
12	8	7	Small quantity standard	20
				50
				100
				200
				500
		7	Standard	1000
		13	Standard	2000
				3000
				4000

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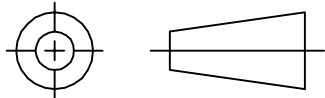
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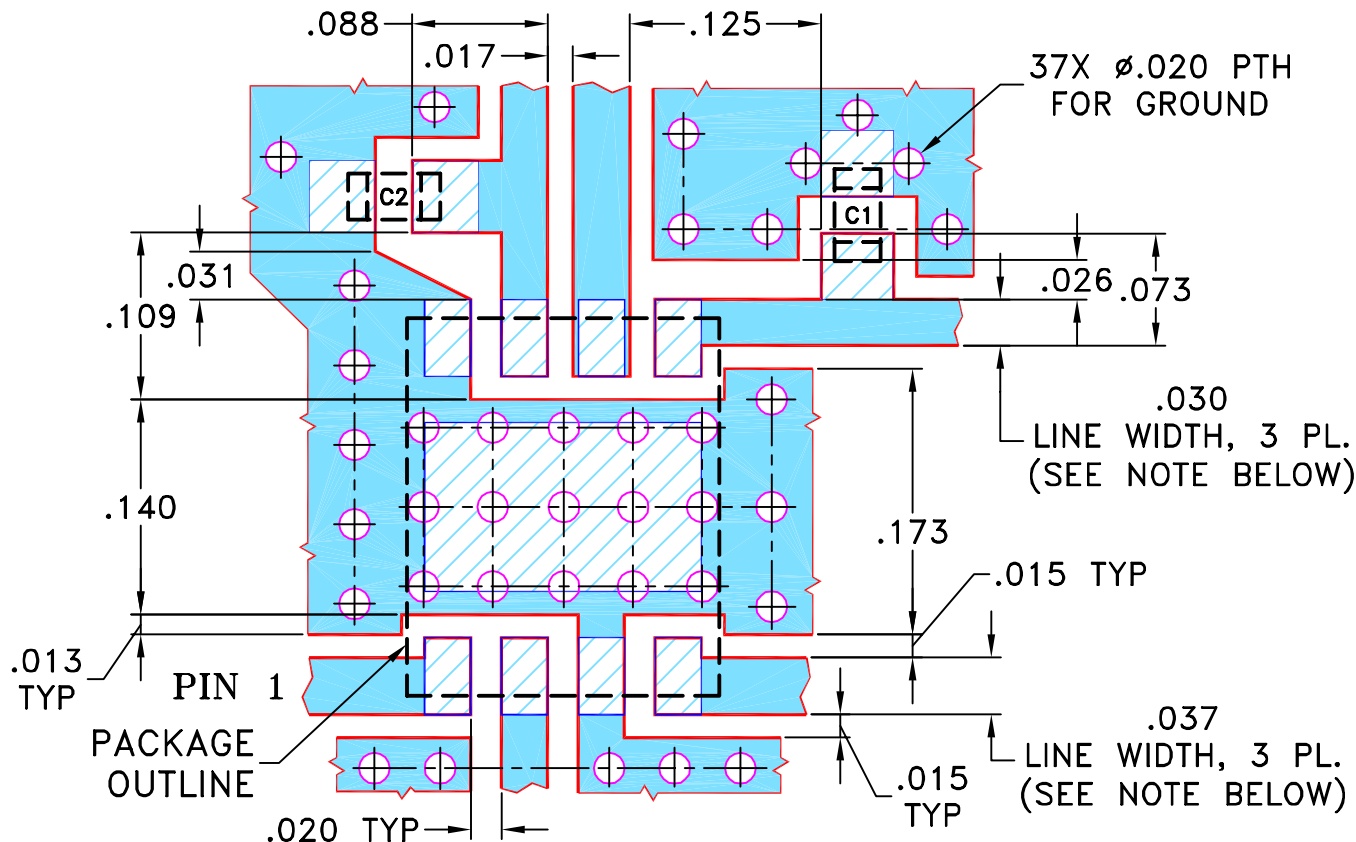
THIRD ANGLE PROJECTION



REVISIONS

REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
OR	M80484	NEW RELEASE	11/12/02	MMG	MM
A	M90819	CHANGED CASE STYLE	02/05/04	GF	WP
B	M91639	REMOVED NOTE 2	04/14/04	AV	DJ
C	M102713	CHNG DESCRIPTION, ADDED "...WITH SMOBC"	01/16/06	GF	IL

**SUGGESTED MOUNTING CONFIGURATION
FOR DL1020 CASE STYLE, "nr" PIN CONNECTION.**



CAPACITORS C1 & C2: $10 \pm 2\%$ pF, 0603 SIZE

NOTES: 1. TRACE WIDTH IS SHOWN FOR ROGERS RO4350B WITH DIELECTRIC THICKNESS $0.020'' \pm 0.0015''$; 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

TOLERANCES ON:
2 PL DECIMALS $\pm$
3 PL DECIMALS $\pm$.005
ANGLES $\pm$
FRACTIONS $\pm$

DRAWN

MMG

11/07/02

CHECKED

AV

11/12/02

APPROVED

MM

11/12/02



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PL, nr, DL1020, SWM/SWMA, TB-161

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SIZE

A

CODE IDENT

15542

DRAWING NO:

98-PL-122

REV:

C

FILE:

98PL122

SCALE:

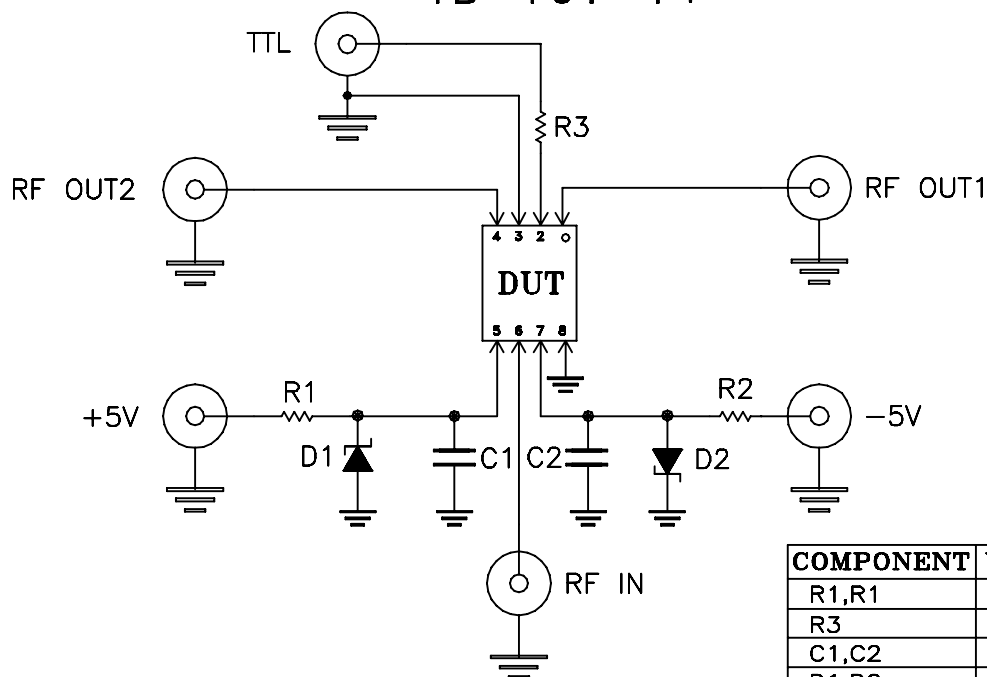
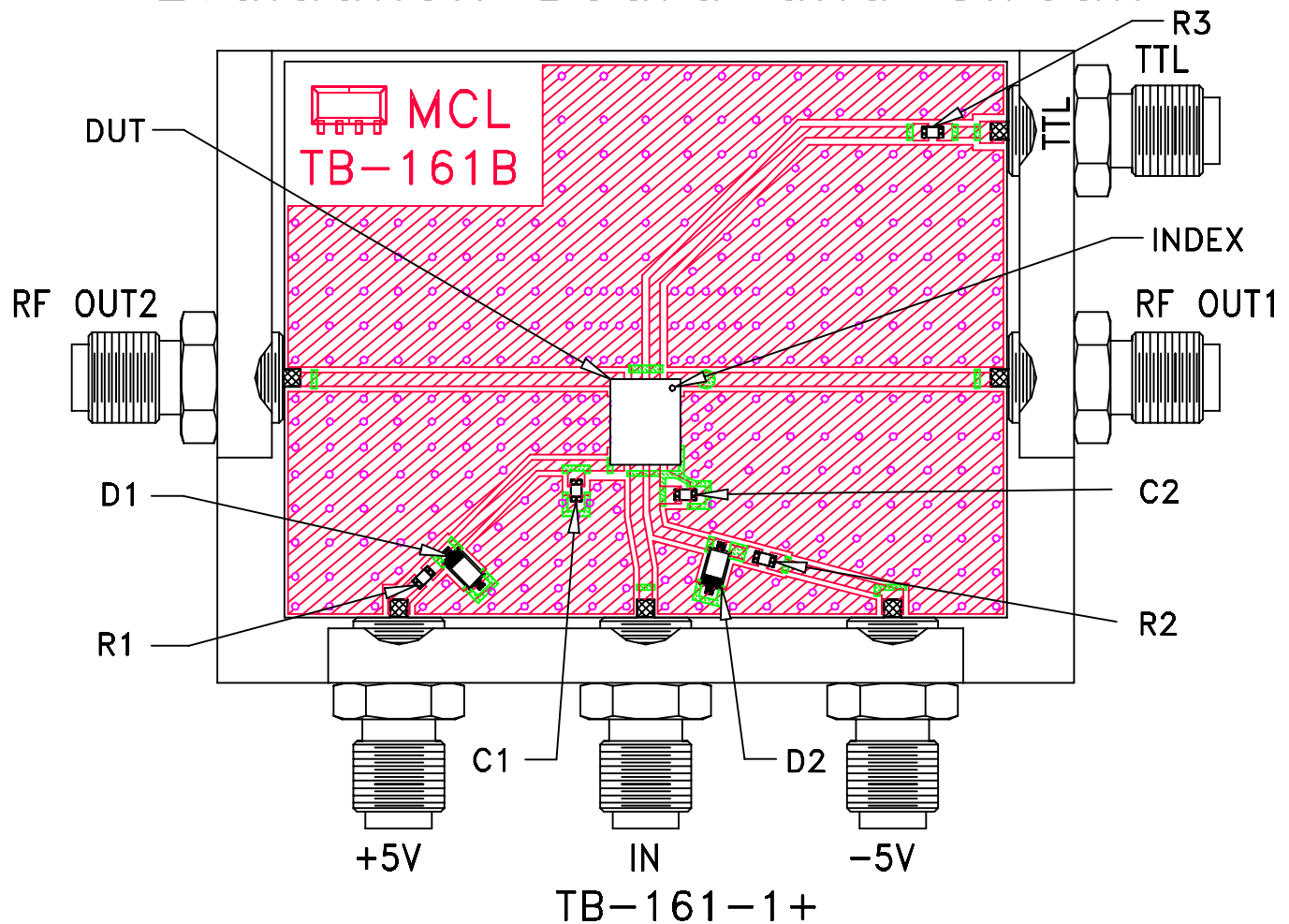
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SHEET:

1 OF 1

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

Evaluation Board and Circuit



Schematic Diagram

COMPONENT	VALUE/PART #
R1,R1	11.5 Ohms
R3	100 Ohms
C1,C2	10 pF
D1,D2	5.6 V
DUT	SWM-2-50DR+,MCL

1. SMA Female connectors.
2. PCB material: Rogers R04350 or equivalent, dielectric constant=3.5, dielectric thickness=.020 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
Thermal Shock	-55° to 100°C, 100 cycles	MIL-STD-202, Method 107, Condition A-3, except +100°C
Mechanical Shock	1.5Kg, 0.5 ms, 5 shock pulses, Y1 direction only	MIL-STD-883, Method 2002, Condition B, except Y1 direction only
Vibration (Variable Frequency)	50g peak	MIL-STD-883, Method 2007, Condition B
Autoclave	15 psig, 100% RH, 121°C, 96 hours	JESD22-A102, Condition C
HAST	130°C, 85% RH, 96 hours	JESD22-A110
Solderability	10X Magnification	J-STD-002, Para 4.2.5, Test S, 95% Coverage
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 260°C peak	J-STD-020
Marking Resistance to Solvents	Isopropyl alcohol + mineral spirits at 25°C; terpene defluxer at 25°C; distilled water + proylene glycol monomethyl ether +	MIL-STD-202, Method 215



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Specification	Test/Inspection Condition	Reference/Spec
	monoethanolamine at 63°C to 70°C	