

Surface Mount

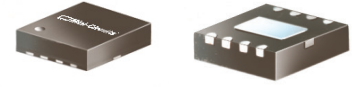
High Isolation Switch

50Ω SPDT, Reflective

DC³ to 4500 MHz

NON-CATALOG

M3SW-2-50DR+



CASE STYLE: DL805

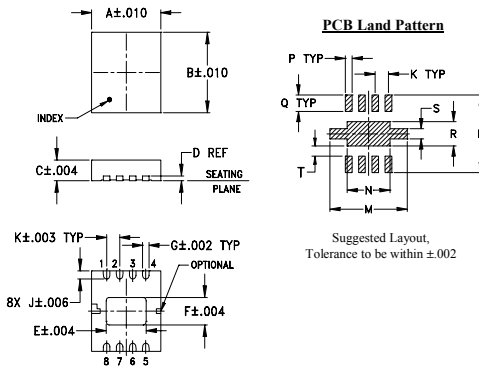
Maximum Ratings

Operating Temperature	-55°C to 100°C
Storage Temperature	-55°C to 100°C
Supply V, Input Power	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

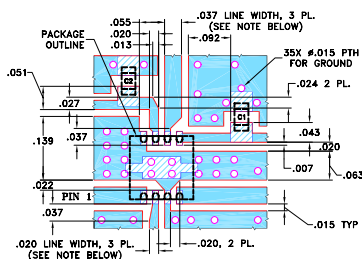


Outline Dimensions (inch)

A	B	C	D	E	F	G	H	J	K
0.128	0.128	0.035	0.008	0.080	0.047	0.013	--	0.014	0.026
3.25	3.25	0.89	0.20	2.03	1.19	0.33	--	0.36	0.66
L	M	N	P	Q	R	S	T	wt	
0.158	0.158	0.084	0.013	0.030	0.048	0.020	0.025	grams	
4.01	4.01	2.13	0.33	0.76	1.22	0.51	0.64	0.02	

Demo Board MCL P/N: TB-159

Suggested PCB Layout (PL-120)



CAPACITORS C1 & C2: 10 ± 2% pF, 0803 SIZE.

NOTES: 1. TRACE WIDTH IS SHOWN FOR ROGERS RO4350B WITH DIELECTRIC THICKNESS 0.020" ± 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.

3. DENOTES PCB COPPER LAYOUT WITH SMOBC (SOLDER MASK OVER BARE COPPER)

4. DENOTES COPPER LAND PATTERN FREE OF SOLDER MASK

Features

- high isolation, 65 dB typ. at 1 GHz
- low insertion loss, 0.7 dB typ.
- integral TTL driver
- miniature case style DL805

Applications

- automated switching networks
- transmitters/receivers

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.	Max.	Typ.	Min.	Typ.	Min.	Typ.	Min.	Typ.	Min.	Typ.	Min.	Typ.	Min.	Typ.	Min.
DC 4500			0.6	1.0	0.7	1.2	0.9	1.4	1.5	1.9	20 ¹	25	25	20	85	70	60	53	50	44	35	30		

¹drops to 17.0 dBm at 10 MHz

Additional Specifications

Power Supply Voltage @ -40°C to 85°C +4.80 to +5.25V -5.25 to -4.80V	@ -55°C to 100°C +4.90 to +5.25V -5.25 to -4.90V	Current, mA 9 max. 9 max.
TTL Control low threshold high threshold	Voltage, V 0 min., 0.8 max. 2 min., 5 max.	Current, mA 0.2 max. 5 max.
VSWR* (:1)	1.1 Typ. to 2GHz, 1.25 Typ. to 4.5 GHz	
Rise/Fall Time, ns	5 Typ., 10 Max.	
Switching Time, ns turn on/off	10 Typ., 15 Max.	
Video Leakage ² , mVp-p	30 Typ.	

* For all states of reflective switch in "ON" condition; "OFF" port² 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.

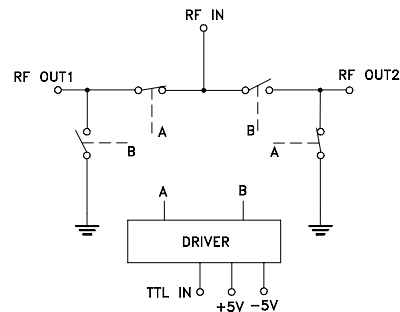
3. All RF connections must be DC blocked or held at 0V DC.

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



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-Circuits' applicable established test performance criteria and measurement instructions.

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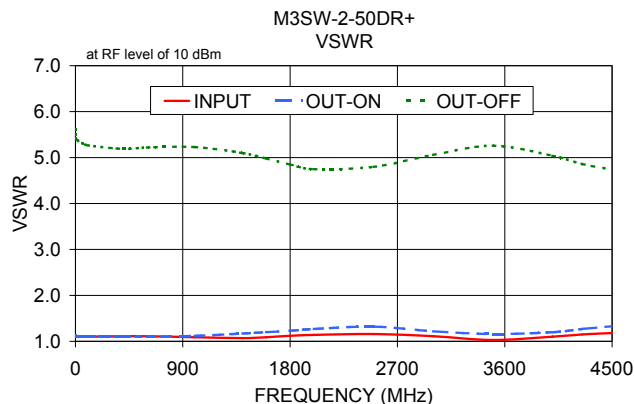
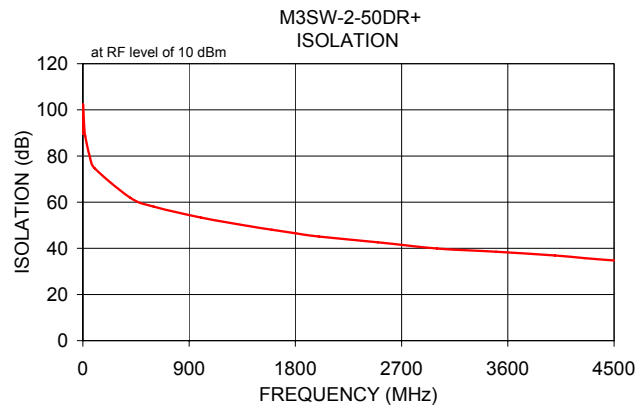
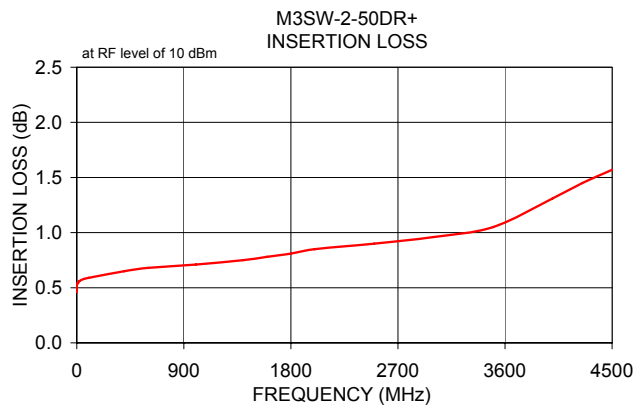


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REV. H
M151777
M3SW-2-50DR+
ED-9656A
RS/TD/CP/AM
160328
Page 1 of 2

Typical Performance Data

FREQ. (MHz)	ON	INSERTION LOSS (dB)		OFF ISOLATION (dB)		VSWR		
		IN-OUT		IN-OUT		IN	OUT	OFF
		$\overline{x}$	σ	$\overline{x}$	σ			
0.03	0.46	0.01	90.55	2.57	1.12	1.12	5.61	
0.10	0.47	0.01	89.66	3.24	1.12	1.12	5.61	
1.00	0.54	0.01	102.38	5.74	1.12	1.12	5.41	
10.00	0.54	0.01	93.55	1.66	1.11	1.11	5.39	
20.00	0.56	0.01	88.66	1.05	1.11	1.11	5.37	
60.00	0.58	0.01	79.56	0.62	1.10	1.10	5.31	
100.00	0.59	0.01	74.67	0.50	1.10	1.10	5.27	
400.00	0.65	0.01	61.97	0.33	1.11	1.10	5.19	
600.00	0.68	0.01	58.10	0.29	1.11	1.10	5.22	
1000.00	0.71	0.01	53.36	0.28	1.09	1.12	5.23	
1400.00	0.75	0.01	49.71	0.24	1.07	1.17	5.10	
1600.00	0.78	0.01	48.08	0.24	1.09	1.20	4.98	
1800.00	0.81	0.01	46.53	0.22	1.12	1.23	4.85	
2000.00	0.85	0.01	45.10	0.21	1.14	1.27	4.75	
2500.00	0.90	0.01	42.61	0.21	1.16	1.32	4.80	
3000.00	0.96	0.01	39.91	0.19	1.11	1.22	5.06	
3500.00	1.05	0.01	38.53	0.20	1.03	1.16	5.26	
4000.00	1.31	0.02	36.88	0.20	1.10	1.20	5.04	
4250.00	1.45	0.02	35.73	0.18	1.15	1.27	4.86	
4500.00	1.57	0.02	34.73	0.14	1.18	1.33	4.74	



Notes

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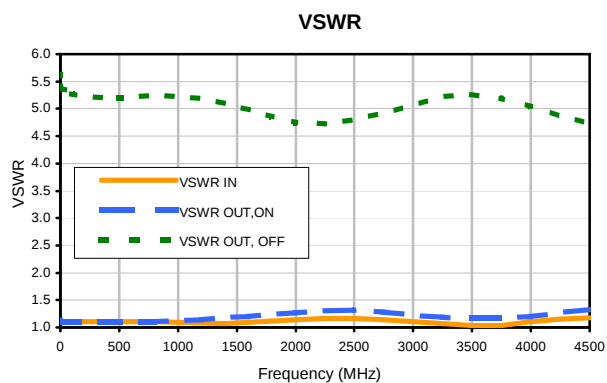
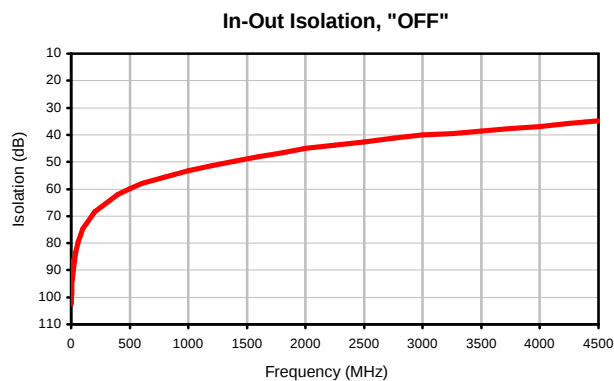
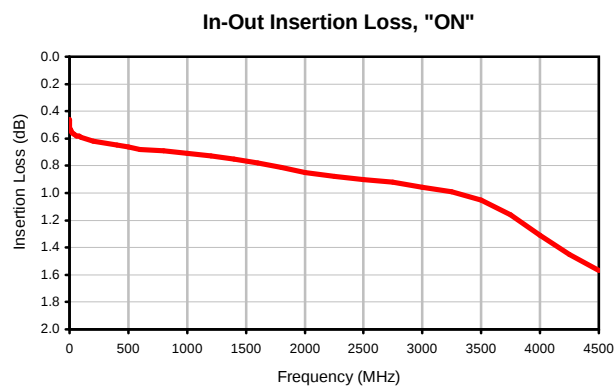
Switch SPDT , 50W

M3SW-2-50DR+

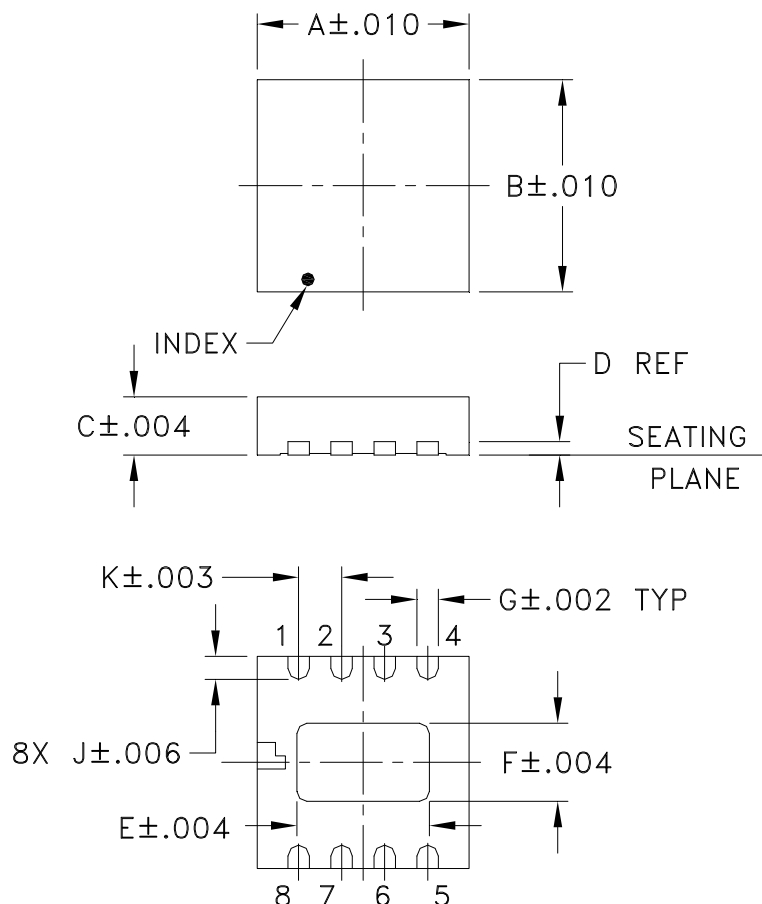
Typical Performance Data

FREQUENCY (MHz)	INSERTION LOSS	ISOLATION	VSWR		
	(dB) IN-OUT , "ON"	(dB) IN-OUT , "OFF"	IN	(:1) OUT , "ON"	OUT , "OFF"
0.03	0.46	90.55	1.12	1.12	5.61
0.1	0.47	89.66	1.12	1.12	5.61
0.5	0.53	86.66	1.12	1.12	5.48
1	0.54	102.38	1.12	1.12	5.41
2	0.53	102.16	1.12	1.12	5.40
4	0.53	98.56	1.11	1.11	5.39
6	0.53	97.30	1.11	1.11	5.39
8	0.54	94.00	1.11	1.11	5.38
10	0.54	93.55	1.11	1.11	5.39
20	0.56	88.66	1.11	1.11	5.37
40	0.57	83.41	1.10	1.10	5.34
60	0.58	79.56	1.10	1.10	5.31
80	0.58	76.94	1.10	1.10	5.29
100	0.59	74.67	1.10	1.10	5.27
200	0.62	68.29	1.11	1.10	5.23
400	0.65	61.97	1.11	1.10	5.19
500	0.66	59.86	1.11	1.10	5.20
600	0.68	58.10	1.11	1.10	5.22
800	0.69	55.68	1.10	1.10	5.25
1000	0.71	53.36	1.09	1.12	5.23
1200	0.73	51.48	1.08	1.14	5.19
1400	0.75	49.71	1.07	1.17	5.10
1600	0.78	48.08	1.09	1.20	4.98
1800	0.81	46.53	1.12	1.23	4.85
2000	0.85	45.10	1.14	1.27	4.75
2250	0.88	43.81	1.16	1.31	4.72
2500	0.90	42.61	1.16	1.32	4.80
2750	0.92	41.19	1.14	1.28	4.92
3000	0.96	39.91	1.11	1.22	5.06
3250	0.99	39.51	1.07	1.19	5.23
3500	1.05	38.53	1.03	1.16	5.26
3750	1.16	37.71	1.04	1.16	5.19
4000	1.31	36.88	1.10	1.20	5.04
4250	1.45	35.73	1.15	1.27	4.86
4500	1.57	34.73	1.18	1.33	4.74

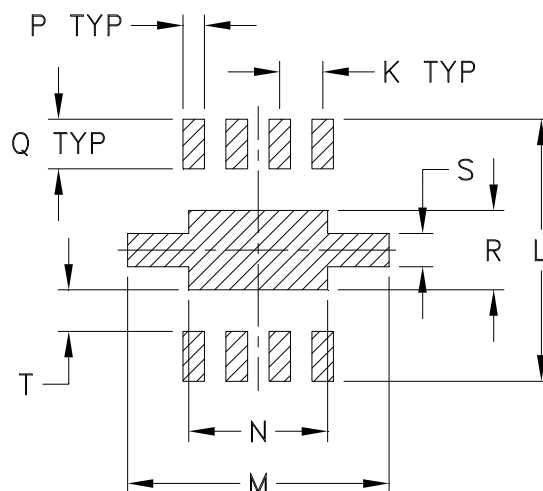
Typical Performance Curves



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
DL805	.128 (3.25)	.128 (3.25)	.035 (0.90)	.008 (0.20)	.080 (2.03)	.047 (1.19)	.013 (0.33)	-- --	.014 (0.36)	.026 (0.66)	.158 (4.01)	.158 (4.01)	.084 (2.13)

CASE #	P	Q	R	S	T	WT. GRAM
DL805	.013 (0.33)	.030 (0.76)	.048 (1.22)	.020 (0.51)	.025 (0.64)	.02

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 or Matte-Tin. All models, (+) suffix.
See model data sheet.

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



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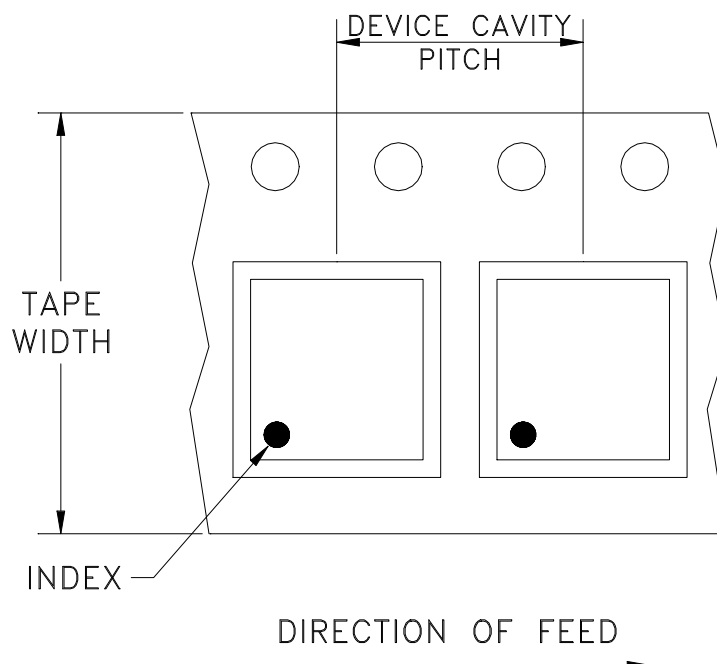


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RF/IF MICROWAVE COMPONENTS

Tape & Reel Packaging TR-F58

DEVICE ORIENTATION IN T&R



Tape Width, mm	Device Cavity Pitch, mm	Reel Size, inches	Devices per Reel
12	8	7	1000
		13	2000, 4000

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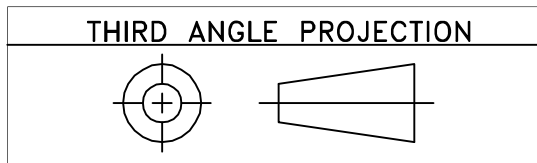


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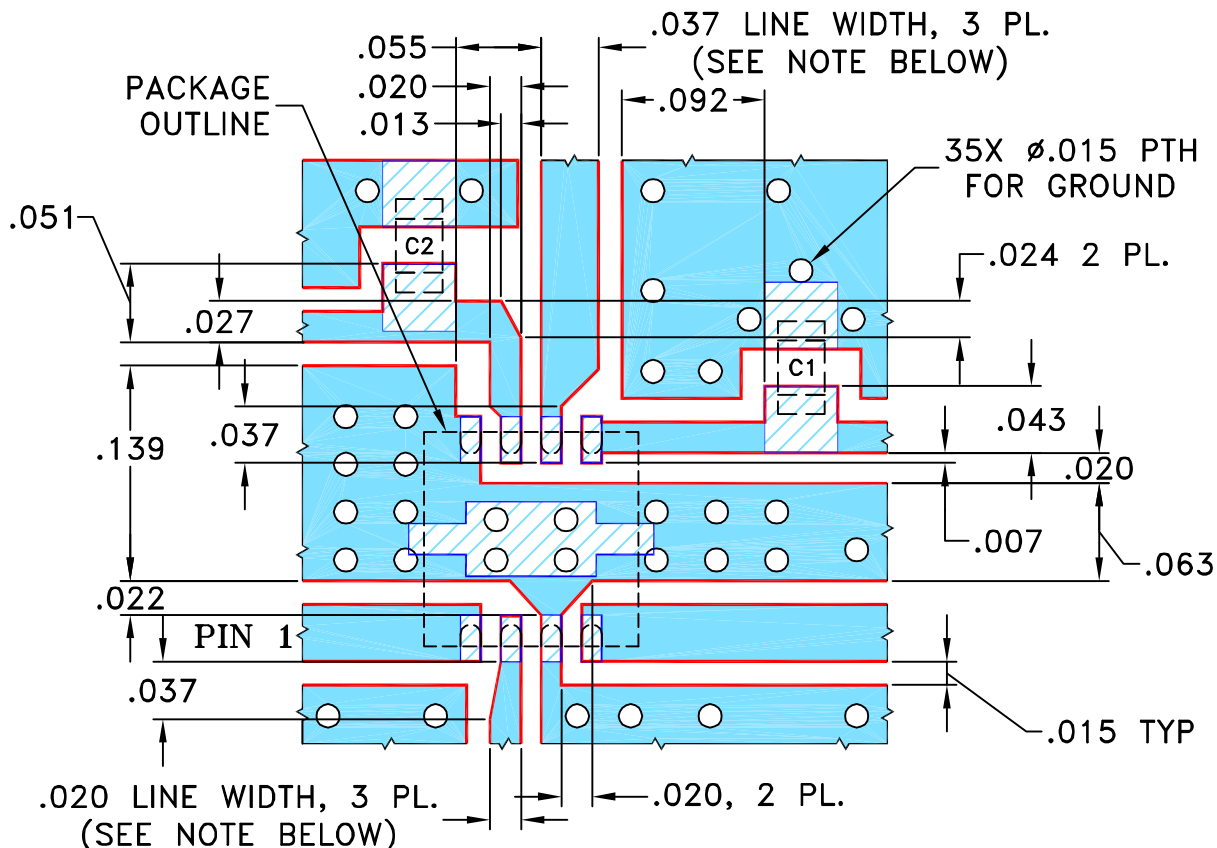
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REVISIONS					
REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
OR	M82940	NEW RELEASE	11/15/02	MMG	MM
A	M91639	REMOVED NOTE 2	04/14/04	AV	DJ
B	M102713	CHNG DESCRIPTION, ADDED "...WITH SMOBC"	01/16/06	GF	IL
C	M175851	UPDATED DESCRIPTION INFORMATION	08/09/19	CA	IL

**SUGGESTED MOUNTING CONFIGURATION
FOR DL805 CASE STYLE, "08SW06" PIN CONNECTION.**

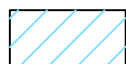


CAPACITORS C1 & C2: 0603 SIZE.

- 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. CHIP COMPONENTS FOOT PRINTS SHOWN FOR REFERENCE, FOR COMPONENT VALUES REFER TO TB-M3SW-250DRA+/TB-M3SWA250DRB+.
3. 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 11/13/02
TOLERANCES ON:	CHECKED	AV 11/15/02
2 PL DECIMALS $\pm$	APPROVED	MM 11/15/02
3 PL DECIMALS $\pm$.005		
ANGLES $\pm$ 1°		
FRACTIONS $\pm$		



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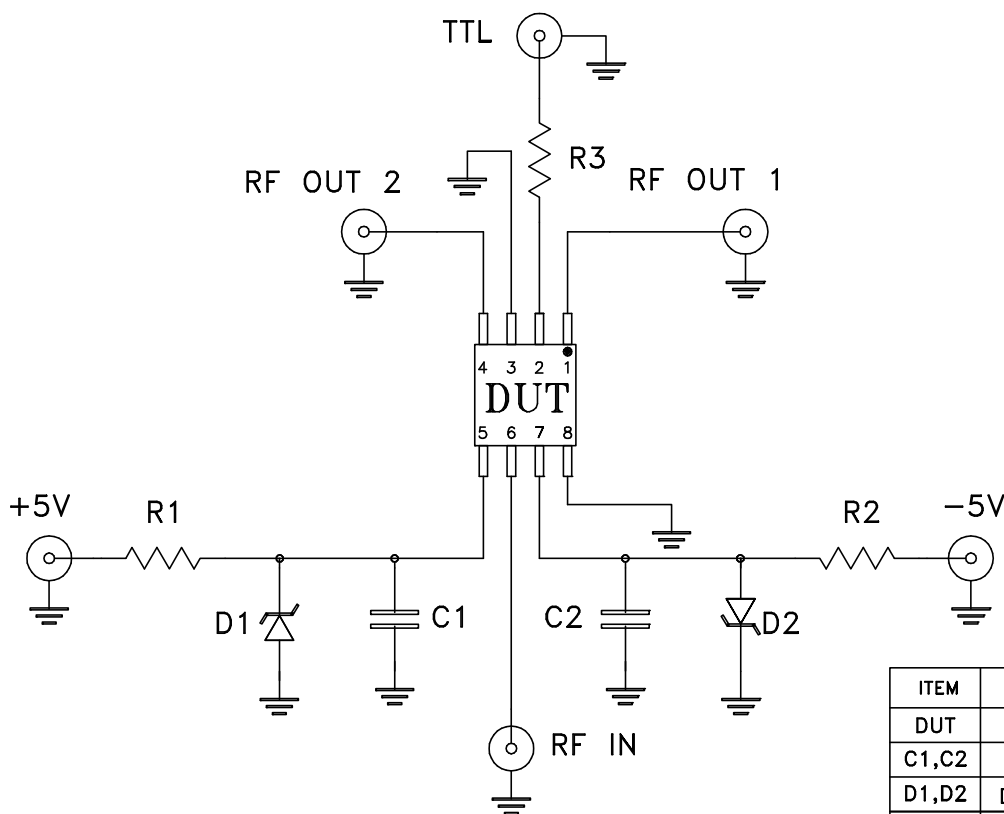
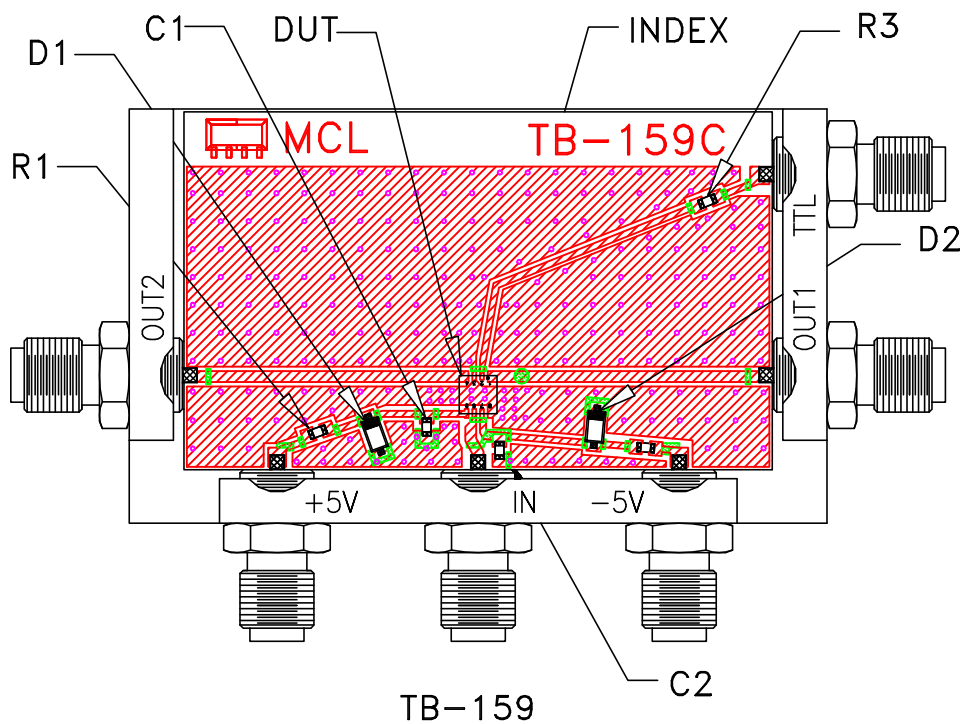
PL, DL805, TB-M3SW-250DRA+/TB-M3SWA250DRB+

SIZE	CODE IDENT	DRAWING NO:	REV:
A	15542	98-PL-120	C
FILE:	98PL120	SCALE:	8:1
		SHEET:	1 OF 1

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

Evaluation Board and Circuit



Schematic Diagram

ITEM	DESCRIPTION	SIZE
DUT	MCL SWITCH	3.25X3.25 MM
C1,C2	Capacitor 10 pF	0603
D1,D2	Diod Zener 5.6V	SOT-123
R1,R2	Resistor 11.5 Ohm	0603
R3	Resistor 100 Ohm	

Notes:

1. SMA Female connectors.
2. PCB Material: Rogers R04350 or equivalent,
Dielectric Constant=3.5, Thickness=.020 inch.

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Specification	Test/Inspection Condition	Reference/Spec
Operating Temperature	-55° to 100°C Ambient Environment	Individual Model 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
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
Vibration (Variable Frequency)	50g peak	MIL-STD-883, Method 2007, Condition B
Mechanical Shock	1.5Kg, 0.5 ms, 5 shock pulses, Y1 direction only	MIL-STD-883, Method 2002, Condition B, except Y1 direction only
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 + monoethanolamine at 63°C to 70°C	MIL-STD-202, Method 215