NON-CATALOG

Surface Mount

High Isolation Switch

50Ω SPDT, Reflective DC[3] to 4500 MHz

M3SW-2-50DR+

CASE STYLE: DL805

+RoHS Compliant

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

Available Tape and Reel at no extra cost

Reel Size	Devices/Reel
7"	20, 50, 100, 200, 500,1000

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

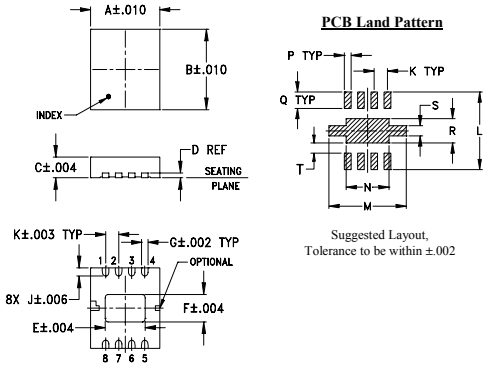
Features

- 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

Outline Drawing

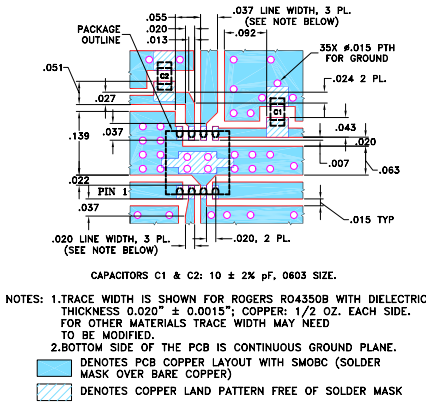


Outline Dimensions (inch / mm)

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)



Electrical Specifications (T_{AMB}=25ºC)

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.	Typ.	Typ.	Typ.	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†	25	25	20	85	70	60	53	50	44	35	30

†drops to 17.0 dBm at 10 MHz

Additional Specifications		
Power Suppply Voltage @-40ºC to 85ºC +4.80 to +5.25V -5.25 to -4.80V	@-55ºC to 100ºC +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 Switching Time, ns turn on/off	5 Typ., 10 Max. 10 Typ., 15 Max.	
Video Leakage**, mVp-p	30 Typ.	

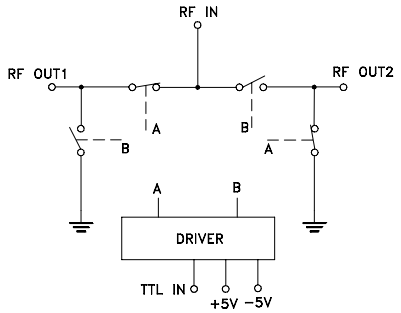
TTL	CONTROL LOGIC	
	RF1	RF2
LOW	ON	OFF
HIGH	OFF	ON

* 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



Notes
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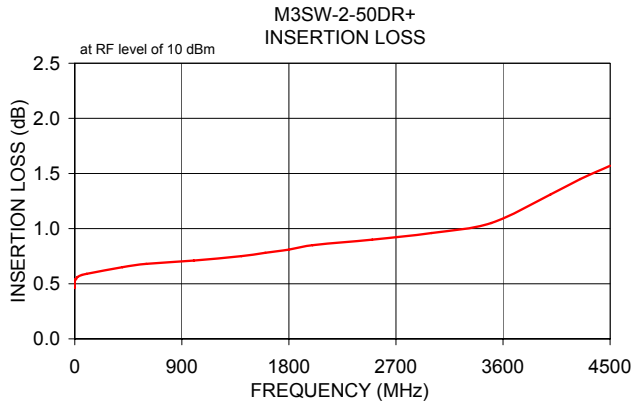
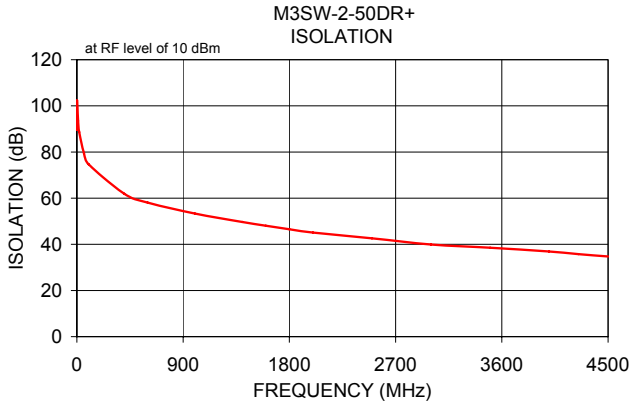
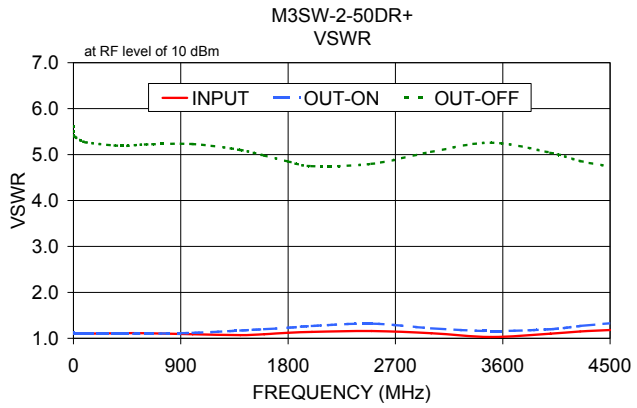
NON-CATALOG

Typical Performance Data

FREQ. (MHz)	ON INSERTION LOSS (dB) IN-OUT		OFF ISOLATION (dB) IN-OUT		VSWR IN	VSWR OUT	
	$\overline{x}$	σ	$\overline{x}$	σ	$\overline{x}$	ON $\overline{x}$	OFF $\overline{x}$
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







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Switch SPDT , 50W

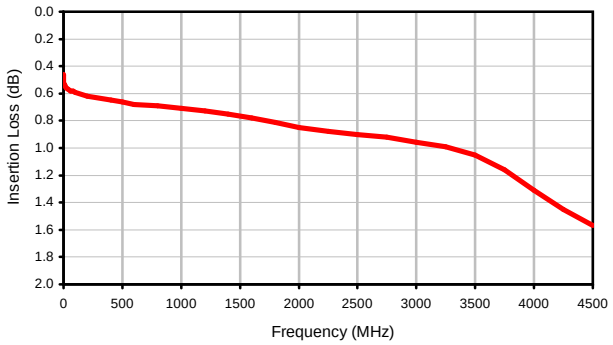
M3SW-2-50DR+

Typical Performance Data

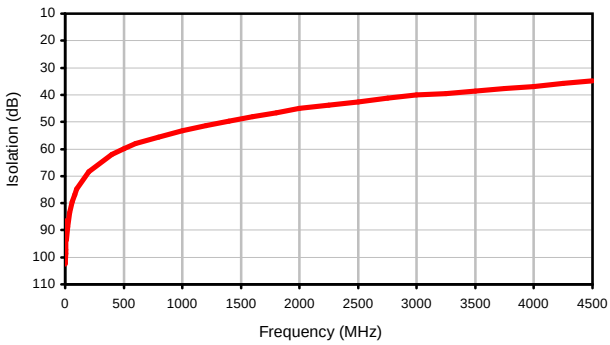
FREQUENCY (MHz)	INSERTION LOSS (dB) IN-OUT , "ON"	ISOLATION (dB) IN-OUT , "OFF"	VSWR (:1) IN	VSWR (:1) OUT , "ON"	VSWR (:1) OUT , "OFF"
0.03	0.46	90.55	1.12	1.12	5.61
0.1	0.47	89.66	1.12	1.12	5.61
0.5	0.53	86.66	1.12	1.12	5.48
1	0.54	102.38	1.12	1.12	5.41
2	0.53	102.16	1.12	1.12	5.40
4	0.53	98.56	1.11	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

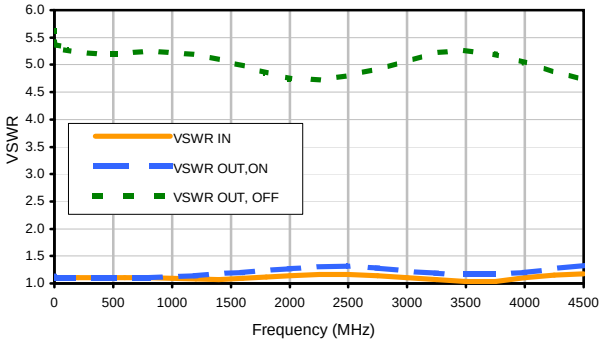
In-Out Insertion Loss, "ON"



In-Out Isolation, "OFF"



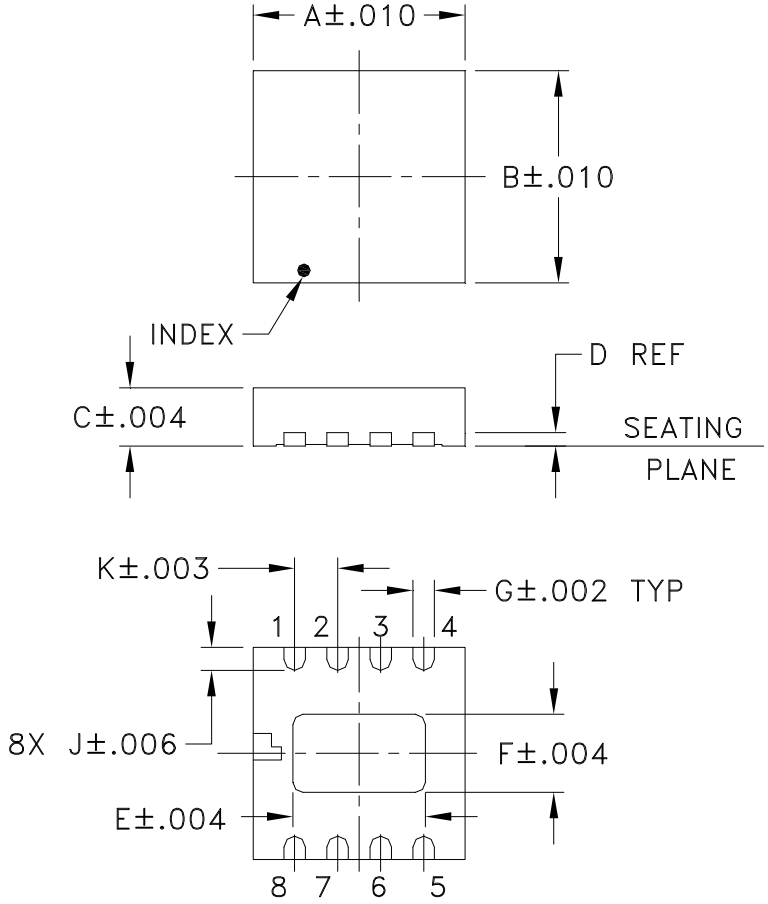
VSWR



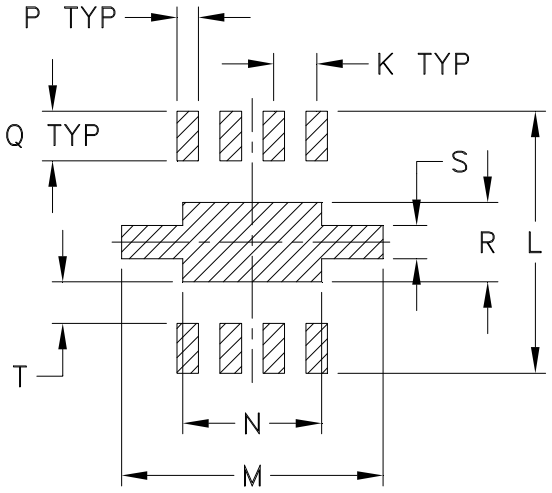
Case Style DL

DL805

Outline Dimensions



PCB Land Pattern



Suggested Layout,
Tolerance to be within ±.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. ± .01; 3Pl. ± .004

Notes:

1. Case material: Plastic.
2. 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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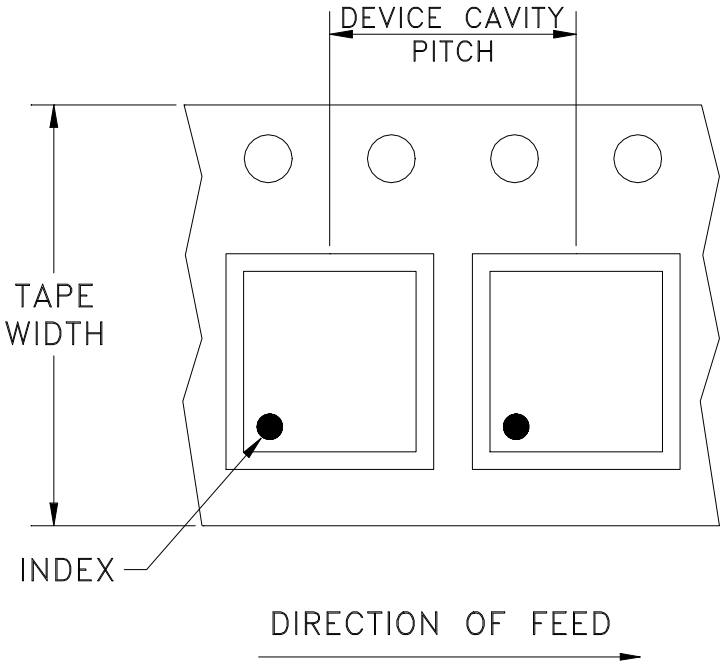
Tape & Reel Packaging TR-F58

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

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.

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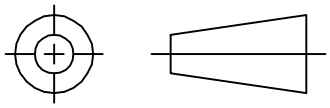
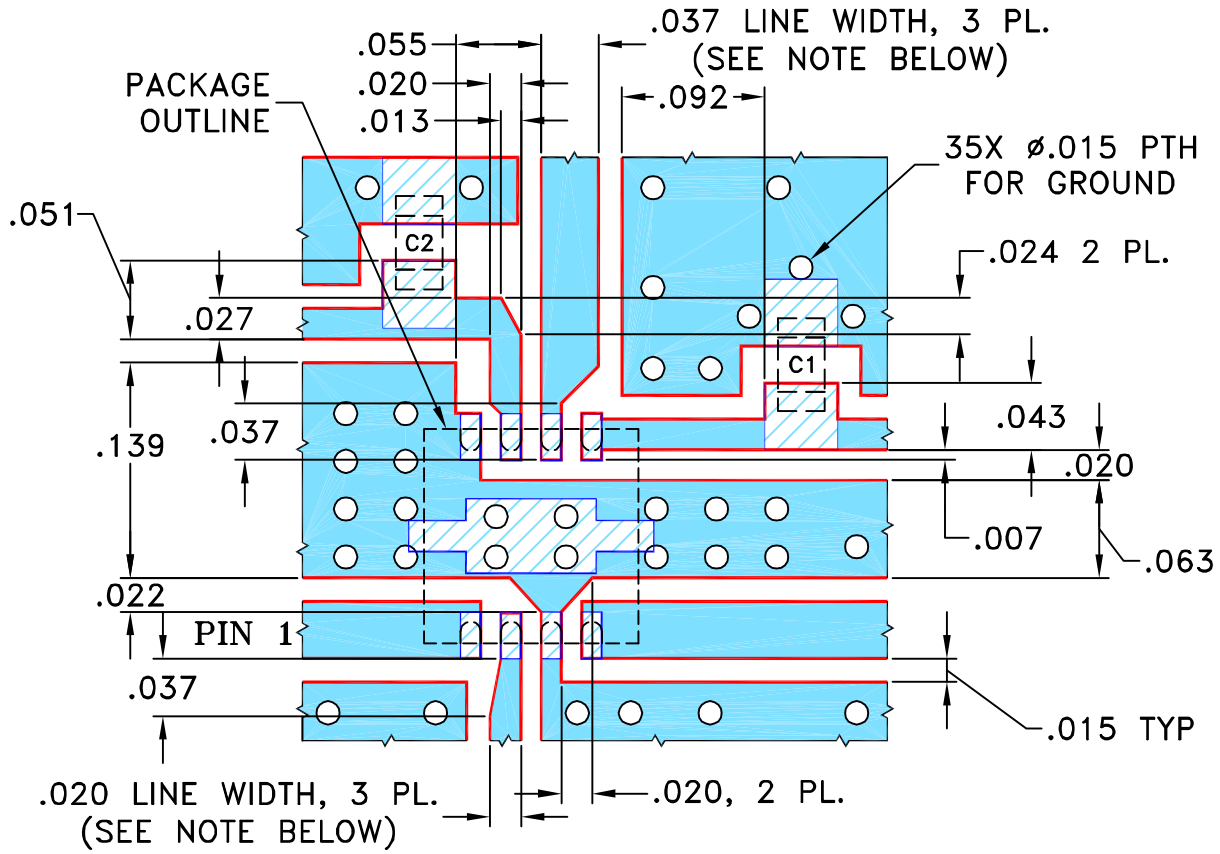
THIRD ANGLE PROJECTION



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" ± 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 ±	APPROVED	MM	11/15/02
3 PL DECIMALS ± .005			
ANGLES ± 1°			
FRACTIONS ±			

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

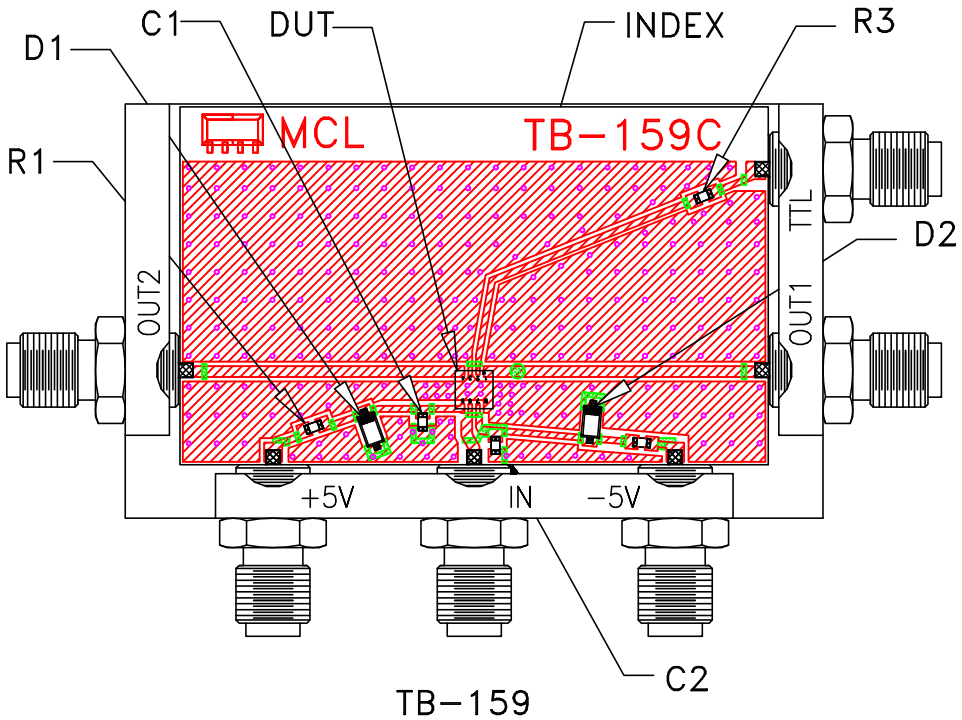
Mini-Circuits® 13 Neptune Avenue Brooklyn NY 11235

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

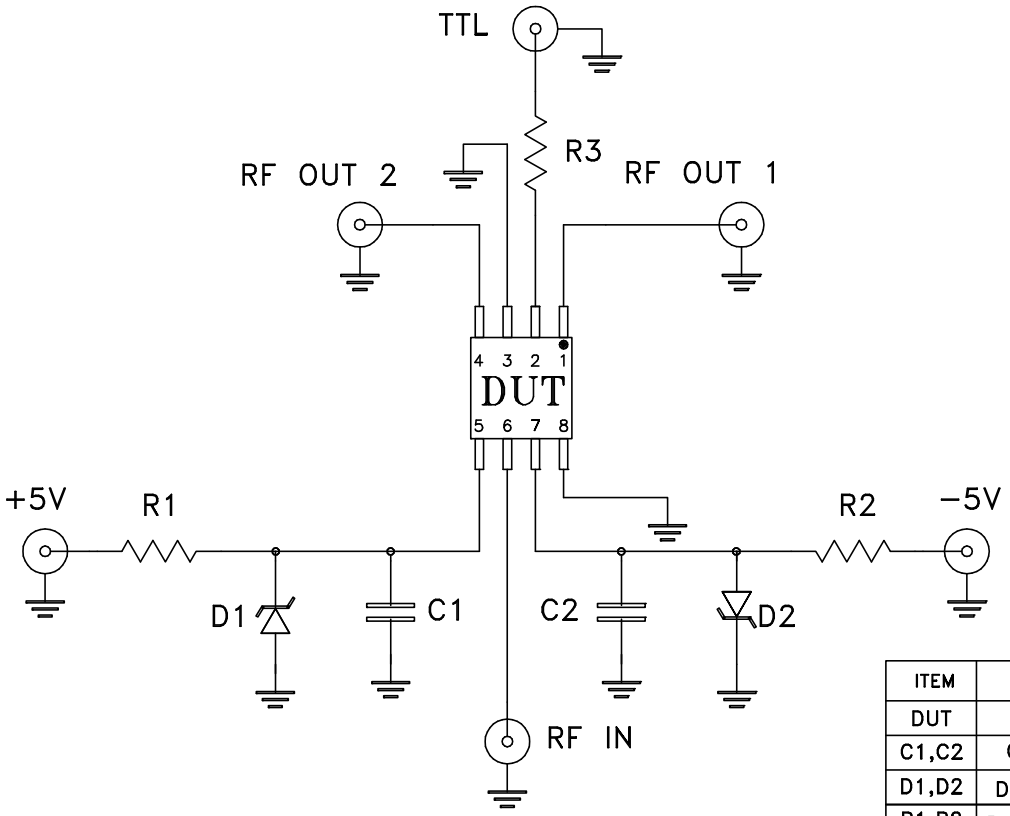
SIZE	CODE IDENT	DRAWING NO:	REV:
A	15542	98-PL-120	C

FILE:	SCALE:	SHEET:
98PL120	8:1	1 OF 1

Evaluation Board and Circuit



TB-159



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 RO4350 or equivalent, Dielectric Constant=3.5, Thickness=.020 inch.

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Environmental Specifications ENV16

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	-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

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