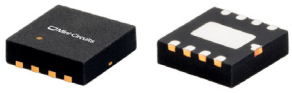
FAST SWITCHING

SPDT RF Switch M3SW-2-50DRA+

50Ω DC to 4500 MHz Reflective RF Switch with Internal Driver

THE BIG DEAL

- High Isolation, 48 dB typ.
- High Input IP3, +47.3 dBm typ.
- Low Insertion loss, 0.6 dB typ.
- Fast Rise/Fall time, 3.3 ns / 4.6 ns typ.
- Tiny Size, 3.25 x 3.25 x 0.9 mm



Generic photo used for illustration purposes only

CASE STYLE: DL805

+RoHS Compliant
The +Suffix identifies RoHS Compliance.
See our website for methodologies and qualifications

APPLICATIONS

- Defense
- Communication Infrastructure
- Test and Measurement

PRODUCT OVERVIEW

M3SW-2-50DRA+ is a high isolation fast switching reflective GaAs PHEMT SPDT switch with an internal driver. It operates at +5V & -5V power supplies and has a single TLL compatible control port. It has been designed for wideband operation and packaged in a tiny 3.25mm x 3.25mm, 8-lead package.

KEY FEATURES

Features	Advantages
Wideband, DC to 4.5 GHz	One model can be used in many applications, saving component count. Also ideal for wideband applications such as military and instrumentation.
High Isolation: • 52 dB at 1000 MHz • 36 dB at 4500 MHz	High isolation significantly reduces leakage of power into OFF ports.
High linearity: • Input power at P1dB, 25 dBm typ. • Input IP3, +47.3 dBm typ.	High linearity minimizes unwanted inter modulation products which are difficult or impossible to filter in multi-carrier environments such as CATV, or in the presence of strong interfering signal from adjacent circuitry or received by antenna.
Form-fit compatible with M3SW-2-50DR+	Fits into existing PCB footprint designed for M3SW-2-50DR+ with minor electrical differences.
Tiny size, 3.25 x 3.25 mm MCLP package	Tiny footprint saves space in dense layouts while providing low inductance, repeatable transitions, and excellent thermal contact to the PCB.

REV. A
ECO-014399
M3SW-2-50DRA+
GY/RS/CP
220729

SPDT RF Switch M3SW-2-50DRA+

50Ω DC to 4500 MHz Reflective RF Switch with Internal Driver

RF ELECTRICAL SPECIFICATIONS[1], T_{AMB}=25°C, 50Ω, V_{DD}= +5V, V_{EE}= -5V

Parameter	Condition (MHz)	Min.	Typ.	Max.	Units
Frequency Range[3]		DC		4500	MHz
Insertion Loss	10-100		0.5	1.0	dB
	100-1000		0.5	1.2	
	1000-2000		0.6	1.4	
	2000-4000		0.7	2.1	
	4000-4500		1.4	2.5	
Isolation between Output Port 1 & 2	10-100		78		dB
	100-1000		59		
	1000-2000		48		
	2000-4000		40		
	4000-4500		34		
Isolation between Common Port & Output Ports	10-100	70	79		dB
	100-1000	49	59		
	1000-2000	41	48		
	2000-4000	30	39		
	4000-4500	30	35		
Input Return Loss	10-100		30		dB
	100-1000		30		
	1000-2000		25		
	2000-4000		21		
	4000-4500		21		
Output Return Loss (ON STATE)	10-100		29		dB
	100-1000		27		
	1000-2000		21		
	2000-4000		18		
	4000-4500		13		
Output Return Loss (OFF STATE)	10-100		3		dB
	100-1000		3		
	1000-2000		3		
	2000-4000		3		
	4000-4500		3		
Input Power at P1dB[2]	10-100		18.8		dBm
	100-1000		24.1		
	1000-2000		25		
	2000-4000		24.8		
	4000-4500		23.6		
Input IP3 (Pout =0dBm/Tone)	10-100		38.5		dBm
	100-1000		45.3		
	1000-2000		47.3		
	2000-4000		44.9		
	4000-4500		40.2		
Thermal Resistance (Junction-To-Ground Lead at 85°C Stage Temperature)			34.2		degC/W

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DC ELECTRICAL SPECIFICATIONS

Parameter	Min.	Typ.	Max.	Units
Positive Supply Voltage, V_{DD}	4.75	5	5.25	V
Negative Supply voltage, V_{EE}	-5.25	-5	-4.75	V
Positive Supply Current, I_{DD}	—	5	9	mA
Negative Supply Current, I_{EE}	-9	-3	—	mA
Control Voltage Low	—	0	0.8	V
Control Voltage High	2.1	2.3	5	V
Control Current Low	—	0	0.2	mA
Control Current High	—	0.4	5	mA

1. Tested on Mini-Circuits' test board TB-M3SW-250DRA+ (See Fig.1)
2. Input Power at P1dB compression drops to 13 dB at 10 MHz.
3. All RF-ports must be DC blocked or held at 0V DC

SWITCHING SPECIFICATIONS

Parameter	Condition	Min.	Typ.	Max.	Units
ON Time, 50% control to 90% RF	RF Pin= 0 dBm RF Freq.= 500 MHz Control Freq.= 500 KHz Control High= 2.3V Control Low= 0V		14.4		ns
OFF Time, 50% control to 10% RF			11.3		ns
Video Leakage			42.5		mV
Rise Time, 10% RF to 90% RF 10 to 90% or 90 to 10%			3.3		ns
Fall Time, 90% RF to 10% RF			4.6		ns

MAXIMUM RATINGS[4]

Parameter	Ratings
Operating temperature	-55°C to +100°C
Storage temperature	-55°C to +100°C
RF Input power	+24 dBm
Junction Temperature	134°C
Total Power Dissipation	0.4W
DC Voltage, Pin 5	+6V
DC Voltage, Pin 7	-6V

4. Permanent damage may occur if any of these limits are exceeded. Electrical Maximum ratings are not intended for continuous normal operation.

TRUTH TABLE

State of Control Voltage	RF-IN to RF-OUT1	RF-IN to RF-OUT 2
LOW	ON	OFF
HIGH	OFF	ON

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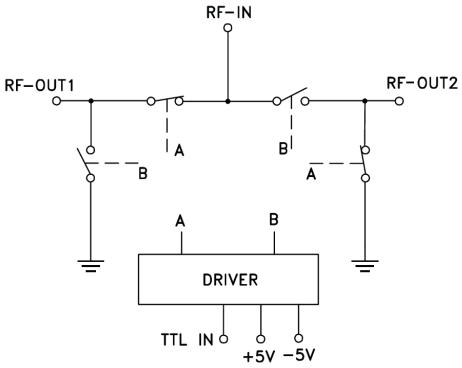
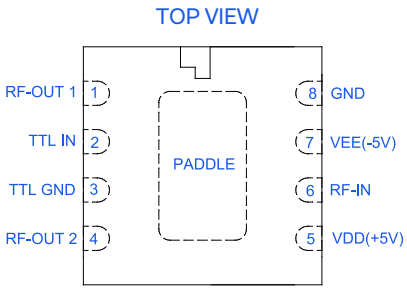
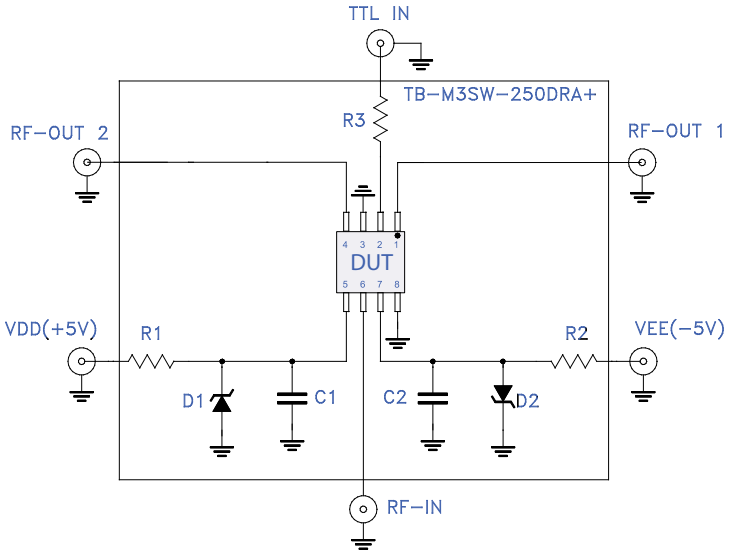
SIMPLIFIED SCHEMATIC AND PAD DESCRIPTION





Function	Pad Number	Description
RF-IN	6	RF Common/ SUM port
RF-OUT1	1	RF Output port #1
RF-OUT2	4	RF Output port #2
TTL IN	2	TTL Compatible Control Voltage Input
TTL GND	3	TTL Ground
V_{DD}(+5V)	5	Positive Supply Voltage V_{DD}
V_{EE}(-5V)	7	Negative Supply Voltage V_{EE}
GND	8, paddle	Ground

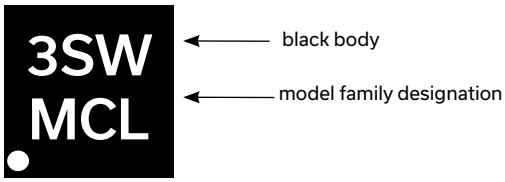
CHARACTERIZATION & APPLICATION CIRCUIT



Component	Size	Value	P/N	Manufacturer
DUT	3.25x3.25	N/A	M3SW-2-50DRA+	MCL
D1, D2	SOD-123	Vz = 5.6V	MMSZ4690T1G	ON Semiconductor
R1, R2	0603	11.5Ω	RK73H1JTTD11R5F	KOA
R3	0603	100Ω	RK73H1JTTD1000F	KOA
C1, C2	0603	10pF	06031A100GAT2A	AVX

Note: D1&D2 are optional.
Figure 1. Characterization & Application Circuit
Note: (DUT soldered on Mini-Circuits Characterization & Application Test Board TB-M3SW-2-50DRA+).
Insertion Loss, Amplitude Unbalance, Isolation, Return Loss, Input Power at 1dB Compression (P1dB) & Input IP3 tested using E5071C microwave network analyzer.
Condition:
1. Insertion Loss, Amplitude Unbalance, Isolation & Return Loss: Pin = 0dBm
2. Input IP3(IIP3):Two tones, spaced 1 MHz apart, 0dBm/tone output.

PRODUCT MARKING



Marking may contain other features or characters for internal lot control

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ADDITIONAL DETAILED TECHNICAL INFORMATION IS AVAILABLE ON OUR DASH BOARD. TO ACCESS CLICK HERE

Performance Data	Data Table Swept Graphs
Case Style	DL805 Plastic package, exposed paddle , lead finish=Matte-Tin
Tape & Reel	F58
Standard quantities available on reel	7" reels with 1000 devices 13" reels with 2000, 4000 devices
Suggested Layout for PCB Design	PL-120
Evaluation Board	TB-M3SW-2-50DRA+
Environmental Ratings	ENV16

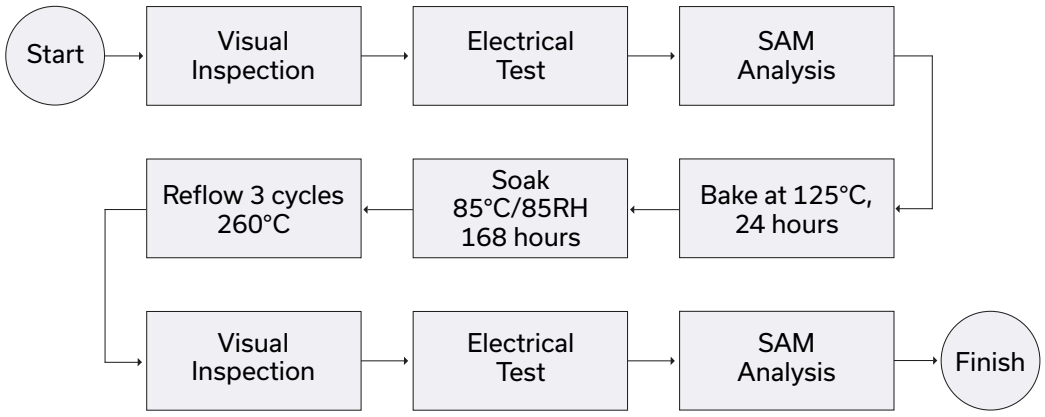
ESD RATING

Human Body Model (HBM): Class 0 (Pass 100V) in accordance with ESD STM5.1-2001

MSL RATING

Moisture Sensitivity: MSL1 in accordance with IPC/JEDEC J-STD-020D

MSL TEST FLOW CHART



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.
C. The parts covered by this specification document are subject to Mini-Circuits standard limited warranty and terms and conditions (collectively, "Standard Terms"); Purchasers of this part are entitled to the rights and benefits contained therein. For a full statement of the standard terms and the exclusive rights and remedies thereunder, please visit Mini-Circuits' website at www.minicircuits.com/terms/viewterm.html

Typical Performance Data

FREQ (MHz)	INSERTION LOSS @ VDD=+5V, VEE =-5V OVER TEMPERATURE					
	RF COM-RF1 (dB) *STATE 2**			RF COM-RF2 (dB) *STATE 1**		
	-55°C	+25°C	+100°C	-55°C	+25°C	+100°C
10	0.55	0.40	0.41	0.53	0.39	0.41
50	0.64	0.48	0.48	0.62	0.48	0.48
100	0.65	0.49	0.48	0.63	0.49	0.49
200	0.66	0.51	0.51	0.64	0.51	0.51
400	0.66	0.53	0.53	0.64	0.52	0.53
600	0.65	0.53	0.55	0.63	0.53	0.55
800	0.64	0.53	0.56	0.62	0.53	0.56
1000	0.63	0.53	0.57	0.62	0.53	0.57
1100	0.63	0.53	0.57	0.62	0.54	0.58
1200	0.63	0.53	0.58	0.62	0.54	0.59
1300	0.63	0.54	0.59	0.62	0.55	0.59
1400	0.63	0.54	0.59	0.63	0.55	0.59
1500	0.62	0.54	0.60	0.62	0.55	0.60
1600	0.62	0.55	0.62	0.62	0.56	0.61
1700	0.63	0.56	0.62	0.62	0.56	0.62
1800	0.64	0.57	0.63	0.63	0.57	0.63
1900	0.64	0.57	0.64	0.63	0.58	0.63
2000	0.64	0.58	0.65	0.63	0.59	0.64
2100	0.63	0.58	0.66	0.63	0.59	0.65
2200	0.64	0.58	0.66	0.64	0.59	0.66
2300	0.64	0.59	0.67	0.64	0.59	0.66
2400	0.65	0.60	0.67	0.64	0.60	0.67
2500	0.65	0.60	0.67	0.64	0.60	0.68
2600	0.64	0.60	0.67	0.63	0.60	0.67
2800	0.64	0.61	0.69	0.64	0.61	0.69
3000	0.65	0.62	0.70	0.63	0.62	0.70
3200	0.66	0.64	0.74	0.66	0.65	0.74
3400	0.67	0.67	0.79	0.66	0.66	0.77
3600	0.74	0.74	0.89	0.70	0.72	0.83
3800	0.79	0.82	0.99	0.76	0.80	0.91
4000	0.94	1.00	1.19	0.90	0.95	1.09
4200	1.29	1.34	1.56	1.21	1.24	1.39
4400	1.62	1.66	1.86	1.51	1.50	1.68
4500	1.90	1.90	2.01	1.75	1.72	1.86
5000	1.46	1.49	1.63	1.29	1.36	1.56
5200	1.36	1.39	1.64	1.21	1.28	1.50

FREQ (MHz)	ISOLATION @ VDD=+5V, VEE =-5V OVER TEMPERATURE											
	RF COM-RF1 (dB) *STATE 1**			RF COM-RF2 (dB) *STATE 2**			RF1-RF2 (dB) *STATE 2**			RF1-RF2 (dB) *STATE 1**		
	-55°C	+25°C	+100°C	-55°C	+25°C	+100°C	-55°C	+25°C	+100°C	-55°C	+25°C	+100°C
10	84.26	78.08	70.53	83.81	69.79	73.26	79.21	68.21	79.51	75.81	95.17	71.66
50	73.82	79.44	79.75	74.09	71.35	71.69	72.20	69.81	72.92	74.28	76.76	75.73
100	76.57	73.69	72.28	74.26	72.94	74.65	70.72	72.46	71.76	71.06	71.24	71.08
200	69.21	66.57	67.23	70.42	68.30	68.67	65.15	65.63	65.52	64.73	65.20	65.33
400	62.37	60.95	60.88	64.15	62.15	62.01	59.54	59.52	59.90	59.33	59.86	59.78
600	58.33	57.25	57.15	59.50	58.06	57.92	56.15	56.55	56.34	56.10	56.73	56.32
800	55.42	53.87	53.93	56.96	55.41	55.55	53.81	54.01	54.00	53.69	54.28	54.09
1000	53.00	51.89	51.87	54.43	53.10	53.08	51.83	51.92	51.91	51.76	52.00	51.93
1100	51.92	50.89	50.62	53.35	52.00	51.96	50.89	50.95	50.75	50.75	51.01	50.91
1200	51.04	49.99	49.82	52.18	51.09	51.00	50.09	50.05	50.08	49.91	50.27	50.09
1300	49.93	49.02	48.99	51.15	50.10	50.10	49.32	49.46	49.31	49.38	49.54	49.45
1400	49.11	48.17	48.23	50.26	49.24	49.35	48.51	48.64	48.62	48.66	48.85	48.68
1500	48.20	47.37	47.34	49.42	48.53	48.56	47.65	47.83	47.85	47.86	48.02	47.88
1600	47.31	46.52	46.44	48.49	47.55	47.48	46.95	47.08	47.09	47.16	47.30	47.12
1700	46.66	45.84	45.68	47.66	46.84	46.73	46.26	46.37	46.35	46.51	46.70	46.59
1800	46.00	45.16	45.09	46.89	46.17	46.12	45.68	45.90	45.85	45.85	46.06	46.01
1900	45.00	44.38	44.31	45.99	45.37	45.33	44.88	45.14	45.24	45.17	45.47	45.42
2000	44.34	43.72	43.71	45.37	44.72	44.74	44.24	44.67	44.73	44.62	45.00	44.95
2100	43.57	43.09	43.06	44.70	44.23	44.07	43.84	44.21	44.21	44.05	44.50	44.47
2200	43.12	42.50	42.57	44.16	43.63	43.54	43.10	43.56	43.42	43.45	43.99	43.82
2300	42.29	42.00	42.02	43.52	42.98	42.86	42.68	43.02	43.04	42.96	43.41	43.35
2400	41.75	41.27	41.51	42.93	42.56	42.45	42.22	42.78	42.60	42.55	43.25	43.11
2500	41.24	40.84	40.93	42.24	42.00	41.76	41.74	42.30	42.20	42.03	42.57	42.62
2600	40.80	40.44	40.57	41.79	41.54	41.45	41.06	41.72	41.54	41.45	42.14	42.12
2800	39.77	39.58	39.70	40.84	40.88	40.69	40.01	40.82	40.57	40.56	41.40	41.24
3000	39.15	38.91	39.01	39.84	39.70	39.58	39.08	40.02	39.78	39.36	40.41	40.29
3200	38.25	38.19	38.17	38.77	38.99	38.92	38.31	39.24	39.08	38.57	39.71	39.63
3400	37.56	37.35	37.35	38.52	38.46	38.53	36.88	38.13	38.04	37.57	39.10	38.90
3600	36.63	36.59	36.56	38.38	38.10	38.38	35.61	36.72	36.60	36.56	38.02	37.78
3800	36.24	36.34	36.20	37.27	36.72	37.73	34.54	36.04	35.73	35.80	37.00	36.52
4000	35.27	35.36	35.28	37.13	37.35	37.60	33.42	34.63	34.46	35.09	36.70	36.39
4200	35.04	35.41	35.29	37.70	37.80	38.18	32.26	33.65	33.43	33.87	35.55	35.23
4400	34.71	35.37	35.27	37.61	38.63	38.13	30.90	32.22	32.18	32.44	33.91	33.71
4500	34.78	36.21	36.30	37.27	37.90	37.62	31.20	32.59	32.44	31.86	33.12	32.90
5000	32.69	34.11	34.57	33.72	34.75	34.29	29.82	31.10	30.90	29.33	30.61	30.81
5200	31.56	32.68	32.99	32.79	33.47	33.61	29.39	30.88	30.71	28.84	30.34	30.46

STATE	CONTROL INPUT	RF Com to RF1	RF Com to RF2
1	High	OFF	ON
2	Low	ON	OFF

Typical Performance Data

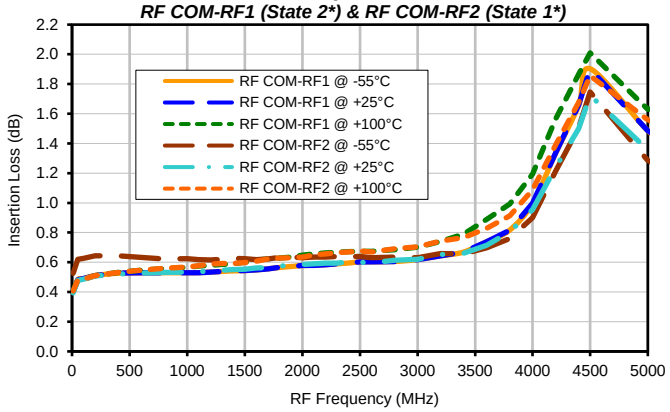
FREQ (MHz)	RETURN LOSS @ Vdd=+5V OVER TEMPERATURE																	
	RF COM (dB) *STATE 2**			RF COM (dB) *STATE 1**			RF1 (dB) *STATE 2**			RF1 (dB) *STATE 1**			RF2 (dB) *STATE 2**			RF2 (dB) *STATE 1**		
	-55°C	+25°C	+100°C	-55°C	+25°C	+100°C	-55°C	+25°C	+100°C	-55°C	+25°C	+100°C	-55°C	+25°C	+100°C	-55°C	+25°C	+100°C
10	25.95	28.97	28.49	26.11	29.12	28.38	26.43	29.66	29.63	4.83	3.26	3.27	4.78	3.25	3.27	26.79	29.68	29.61
50	27.70	30.88	30.47	28.07	31.03	30.77	27.22	30.75	30.10	4.89	3.30	3.31	4.82	3.30	3.32	27.37	30.58	30.14
100	27.45	30.65	29.39	27.94	30.53	29.44	26.99	30.36	30.06	4.91	3.32	3.32	4.85	3.32	3.33	27.07	30.22	29.83
200	27.11	30.14	28.74	27.19	30.08	28.94	26.51	29.67	29.89	4.95	3.35	3.34	4.90	3.35	3.36	26.66	29.47	29.41
400	26.58	29.81	28.60	27.30	30.16	29.48	26.17	28.98	29.83	4.88	3.35	3.35	4.86	3.36	3.38	25.66	28.28	28.76
600	27.77	30.83	29.30	27.79	31.00	31.20	25.75	28.58	29.96	4.82	3.31	3.35	4.78	3.34	3.40	25.07	27.39	27.72
800	29.36	32.39	30.72	29.82	31.82	30.55	25.32	27.60	28.69	4.78	3.29	3.32	4.75	3.31	3.38	24.96	26.38	25.86
1000	30.48	34.32	38.48	29.85	31.41	32.37	25.20	26.70	26.56	4.72	3.26	3.32	4.75	3.30	3.37	23.52	25.09	24.75
1100	32.11	34.38	36.01	29.12	30.12	29.93	24.76	25.89	24.37	4.72	3.27	3.38	4.71	3.32	3.43	23.61	24.28	22.93
1200	33.17	32.36	31.76	29.48	28.28	26.90	23.65	24.79	23.26	4.77	3.29	3.41	4.74	3.34	3.47	23.08	23.34	21.68
1300	31.28	30.07	30.50	28.03	26.55	25.77	22.42	23.73	22.96	4.82	3.32	3.41	4.84	3.37	3.45	21.52	22.43	21.43
1400	29.41	28.35	29.77	25.45	25.10	25.78	21.72	22.97	22.43	4.82	3.34	3.43	4.88	3.38	3.42	20.35	21.69	21.69
1500	28.86	27.17	27.64	24.44	24.09	25.63	21.34	22.36	21.21	4.81	3.35	3.50	4.83	3.39	3.44	20.17	21.09	21.44
1600	28.13	26.05	25.21	24.42	23.21	24.25	20.77	21.68	20.12	4.84	3.38	3.58	4.82	3.41	3.51	20.18	20.63	20.52
1700	26.77	24.78	23.99	23.93	22.57	22.72	19.78	20.76	19.49	4.93	3.43	3.63	4.90	3.43	3.56	19.44	20.09	19.65
1800	25.11	23.42	23.29	22.80	21.84	21.96	18.91	19.79	19.12	5.03	3.49	3.65	4.98	3.47	3.55	18.51	19.47	19.22
1900	23.89	22.33	22.53	21.76	21.13	21.71	18.36	19.01	18.66	5.06	3.54	3.66	4.96	3.49	3.52	18.09	18.85	19.09
2000	23.33	21.78	21.72	21.33	20.59	21.60	18.08	18.67	18.13	5.08	3.55	3.69	4.91	3.50	3.51	18.05	18.46	18.95
2100	22.77	21.53	20.96	20.94	20.29	21.09	17.82	18.51	17.66	5.07	3.54	3.70	4.91	3.47	3.52	17.78	18.21	18.55
2200	22.29	21.43	20.76	20.57	20.24	20.67	17.54	18.39	17.44	5.06	3.53	3.69	4.87	3.44	3.52	17.44	18.24	18.21
2300	21.71	21.10	20.83	20.42	20.36	20.63	17.21	18.08	17.40	5.05	3.54	3.66	4.78	3.39	3.51	17.36	18.31	18.07
2400	21.11	20.70	21.00	20.56	20.56	21.07	16.84	17.73	17.52	5.05	3.55	3.61	4.68	3.36	3.48	17.67	18.50	18.28
2500	20.73	20.44	21.24	20.85	21.00	21.66	16.57	17.51	17.82	5.02	3.54	3.54	4.63	3.32	3.42	17.94	18.79	18.72
2600	20.82	20.55	21.77	21.17	21.42	22.39	16.66	17.67	18.33	4.92	3.47	3.48	4.61	3.27	3.35	17.89	19.01	19.34
2800	21.69	21.30	23.01	22.12	22.48	23.60	17.41	18.28	19.12	4.68	3.35	3.40	4.43	3.21	3.33	18.40	19.87	20.35
3000	21.58	21.31	23.62	23.50	23.67	24.66	17.31	18.40	20.41	4.64	3.30	3.26	4.31	3.17	3.31	19.51	20.76	20.94
3200	22.04	21.59	22.85	24.37	24.53	25.34	17.62	18.68	19.95	4.47	3.21	3.28	4.29	3.13	3.23	19.67	21.31	21.80
3400	21.90	21.43	21.14	24.43	24.44	24.22	17.98	18.78	18.60	4.36	3.15	3.33	4.17	3.07	3.26	20.04	21.26	20.72
3600	20.84	20.52	19.58	23.58	22.88	23.07	17.07	17.82	17.07	4.40	3.17	3.36	4.13	3.09	3.27	19.50	19.82	19.40
3800	20.52	20.25	18.33	21.71	21.68	21.99	16.98	17.22	15.02	4.31	3.15	3.61	4.30	3.16	3.28	17.79	18.24	18.36
4000	20.18	19.68	18.50	21.79	21.20	21.66	15.68	15.50	14.04	4.32	3.18	3.62	4.25	3.23	3.48	17.12	16.71	16.08
4200	21.56	21.35	20.59	23.85	23.87	25.10	13.87	13.75	12.60	4.44	3.27	3.73	4.35	3.25	3.40	15.08	15.32	15.35
4400	23.83	22.78	23.13	25.39	25.94	26.35	12.98	12.49	11.98	4.32	3.29	3.78	4.38	3.28	3.44	13.98	14.23	13.84
4500	27.09	23.52	24.08	40.26	29.18	24.75	11.96	11.74	12.28	4.38	3.31	3.63	4.23	3.31	3.56	13.99	13.66	13.15
5000	12.89	12.62	13.15	15.44	14.74	14.05	10.81	10.78	12.17	4.59	3.53	3.42	4.06	3.22	3.47	14.79	13.88	13.08
5200	11.52	11.09	11.12	13.57	13.17	13.06	10.53	10.43	10.58	4.85	3.66	3.44	4.16	3.27	3.54	13.61	13.66	13.51

Note:

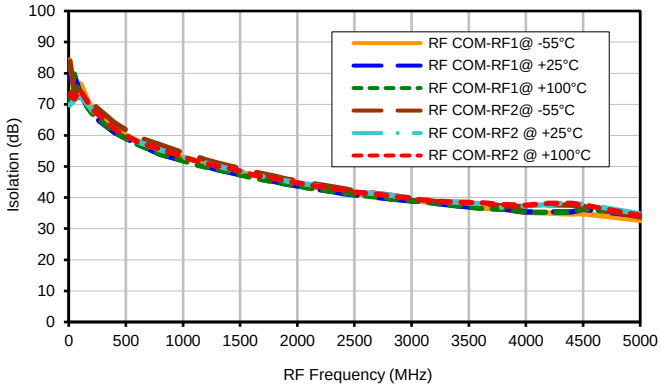
STATE	CONTROL INPUT	RF Com to RF1	RF Com to RF2
1	High	OFF	ON
2	Low	ON	OFF

Typical Performance Curves

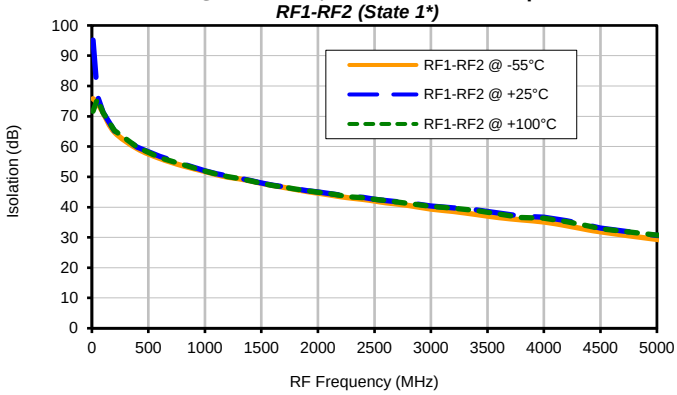
Insertion Loss @ VDD=+5V,VEE =-5V over Temperature
RF COM-RF1 (State 2*) & RF COM-RF2 (State 1*)



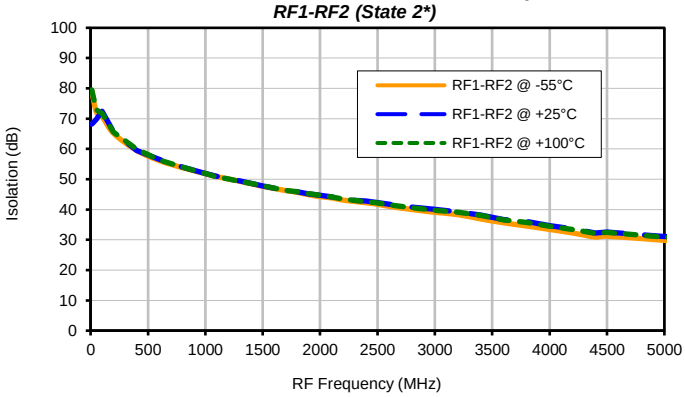
Isolation @ VDD=+5V, VEE =-5Vover Temperature
RF COM-RF1 (State 1*) & RF COM-RF2 (State 2*)



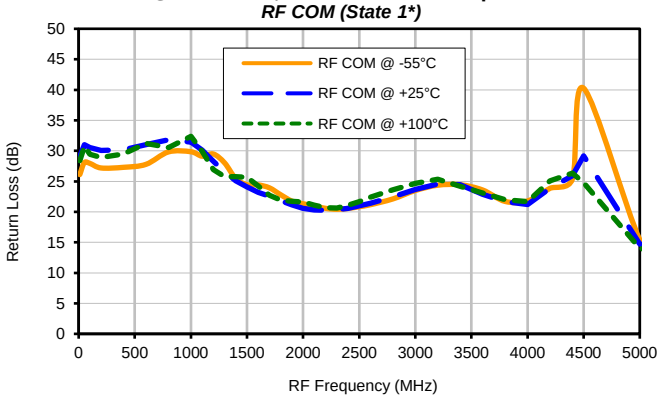
Isolation @ VDD=+5V, VEE =-5V over Temperature
RF1-RF2 (State 1*)



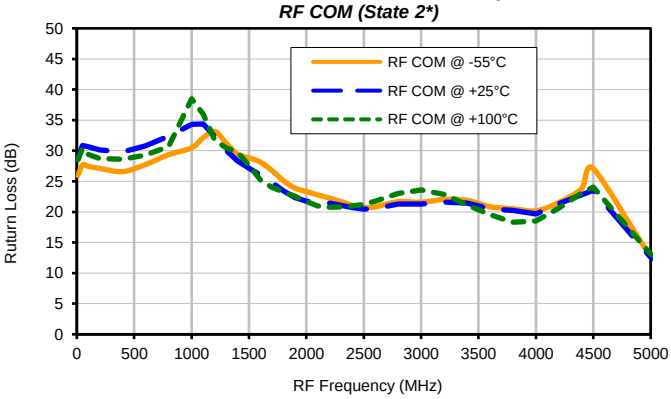
Isolation @ VDD=+5V, VEE =-5V over Temperature
RF1-RF2 (State 2*)



RL @ VDD=+5V, VEE =-5V over Temperature
RF COM (State 1*)



RL @ VDD=+5V, VEE =-5Vover Temperature
RF COM (State 2*)

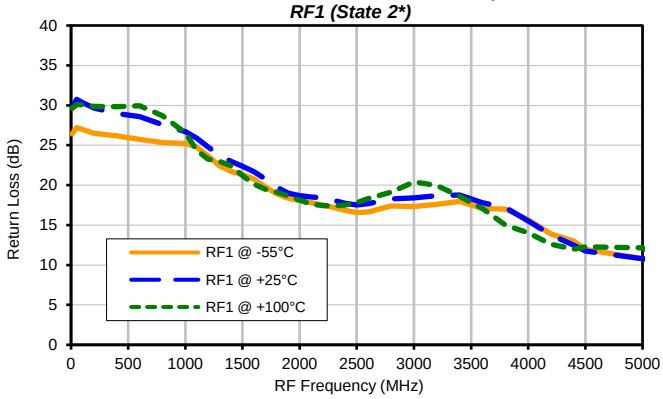


***Note:**

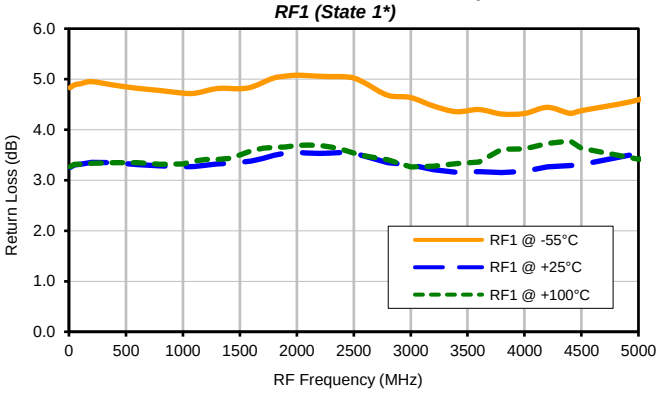
STATE	CONTROL INPUT	RF Com to RF1	RF Com to RF2
1	High	OFF	ON
2	Low	ON	OFF

Typical Performance Curves

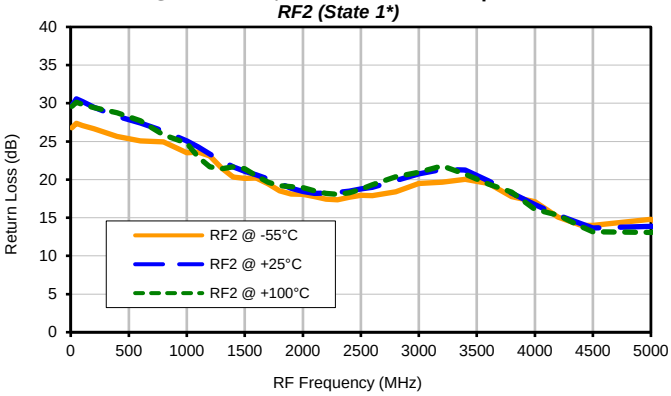
RL @ VDD=+5V, VEE =-5V over Temperature
RF1 (State 2*)



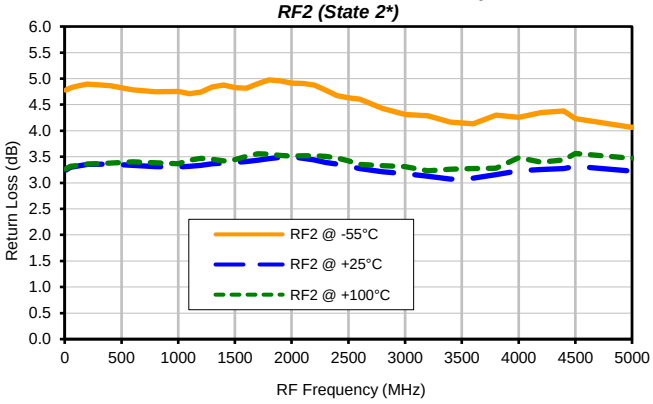
RL @ VDD=+5V, VEE =-5V over Temperature
RF1 (State 1*)



RL @ VDD=+5V, VEE =-5V over Temperature
RF2 (State 1*)



RL @ VDD=+5V, VEE =-5V over Temperature
RF2 (State 2*)



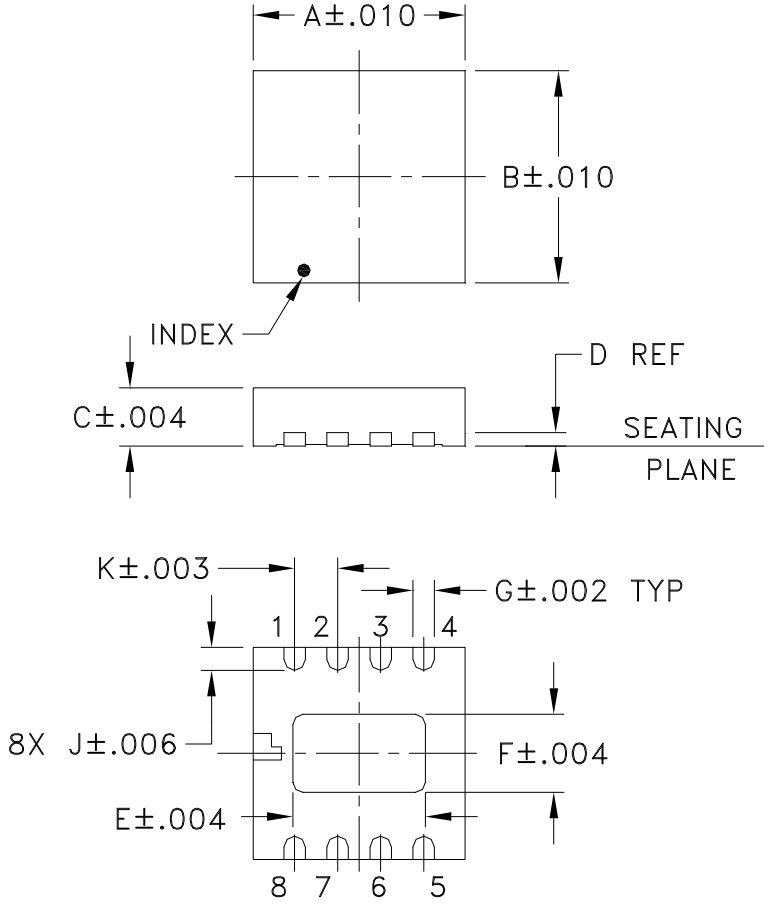
***Note:**

STATE	CONTROL INPUT	RF Com to RF1	RF Com to RF2
1	High	OFF	ON
2	Low	ON	OFF

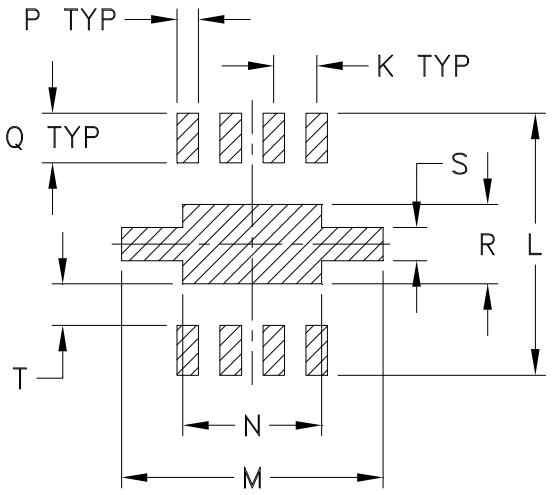
Case Style DL

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

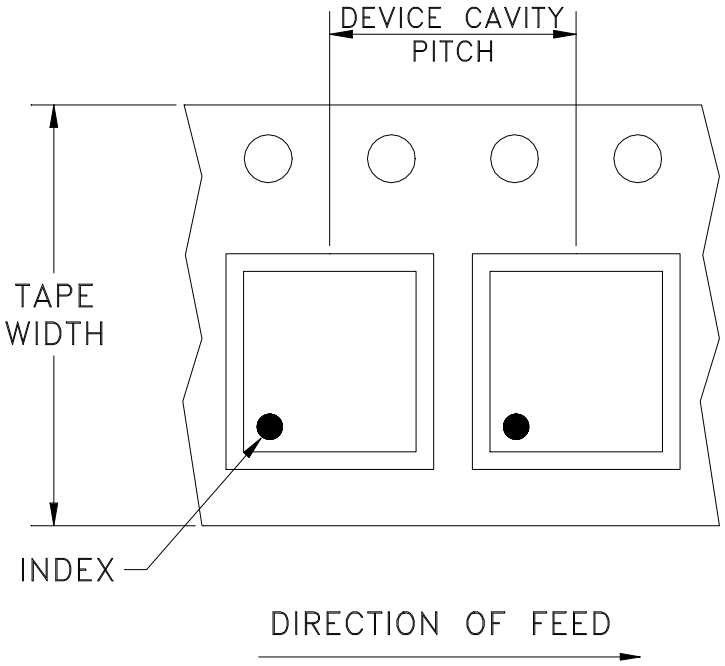
Dimensions are in inches (mm). Tolerances: 2 Pl. ± .01; 3Pl. ± .004

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.

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.

Go to: www.minicircuits.com/pages/pdfs/tape.pdf

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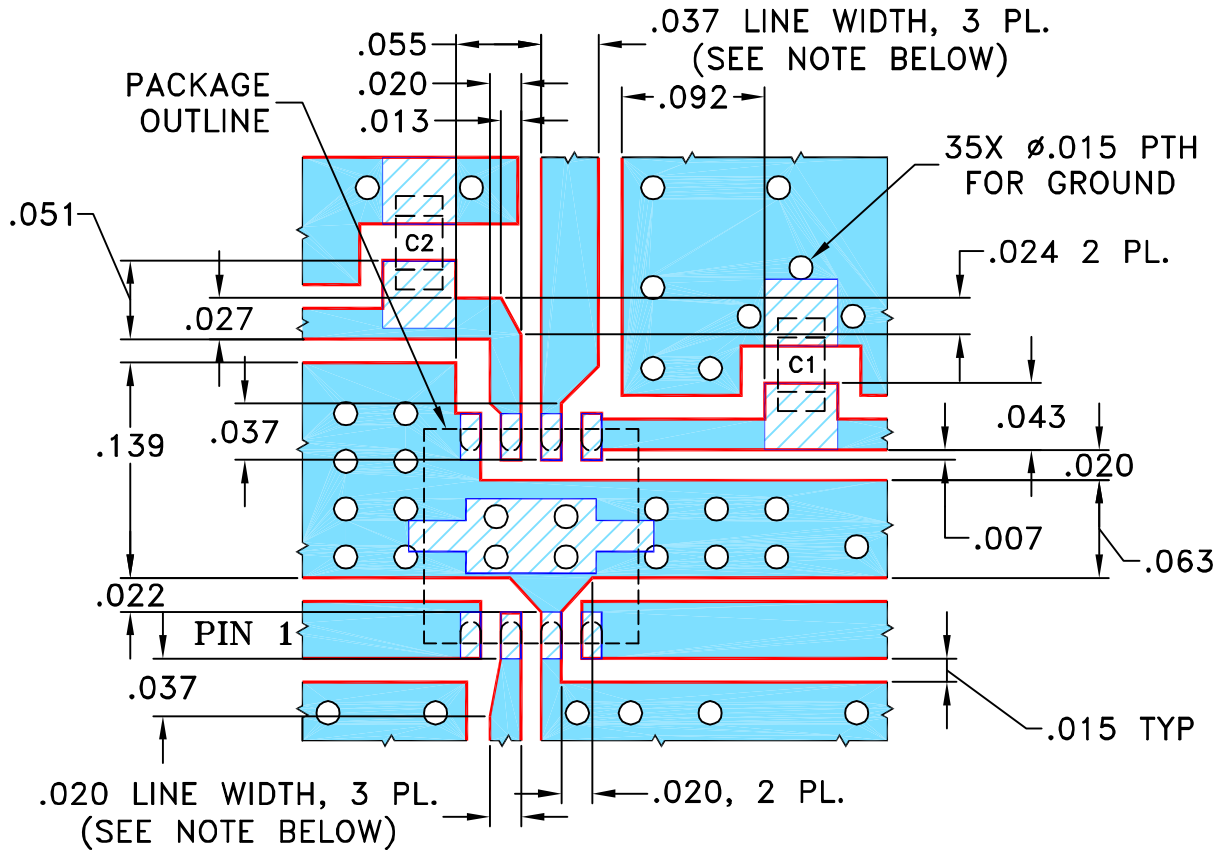
THIRD ANGLE PROJECTION

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 ±			

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

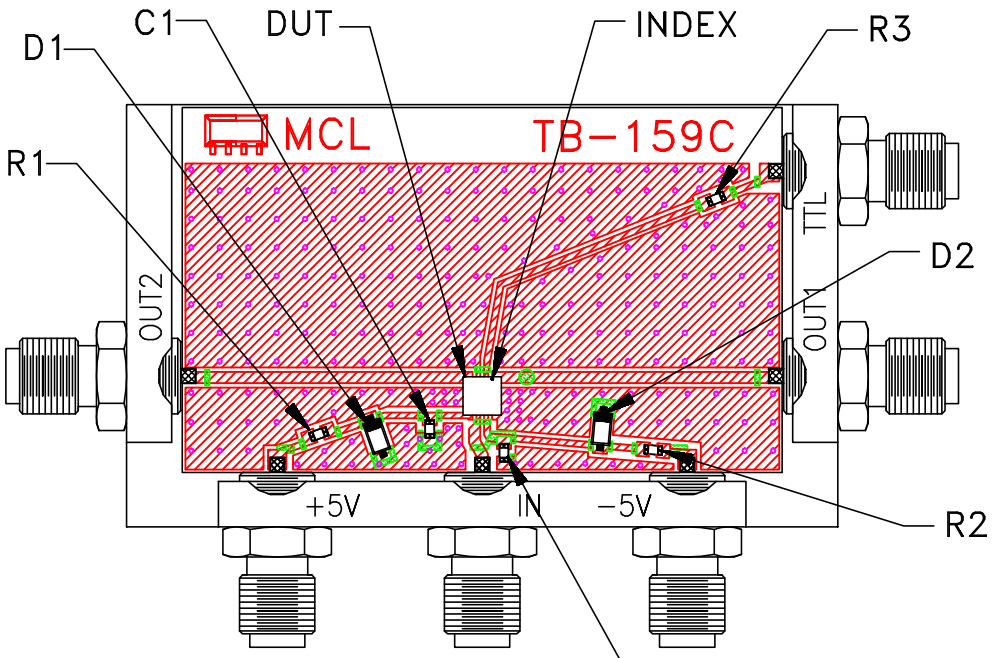
Mini-Circuits® 13 Neptune Avenue Brooklyn NY 11235

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

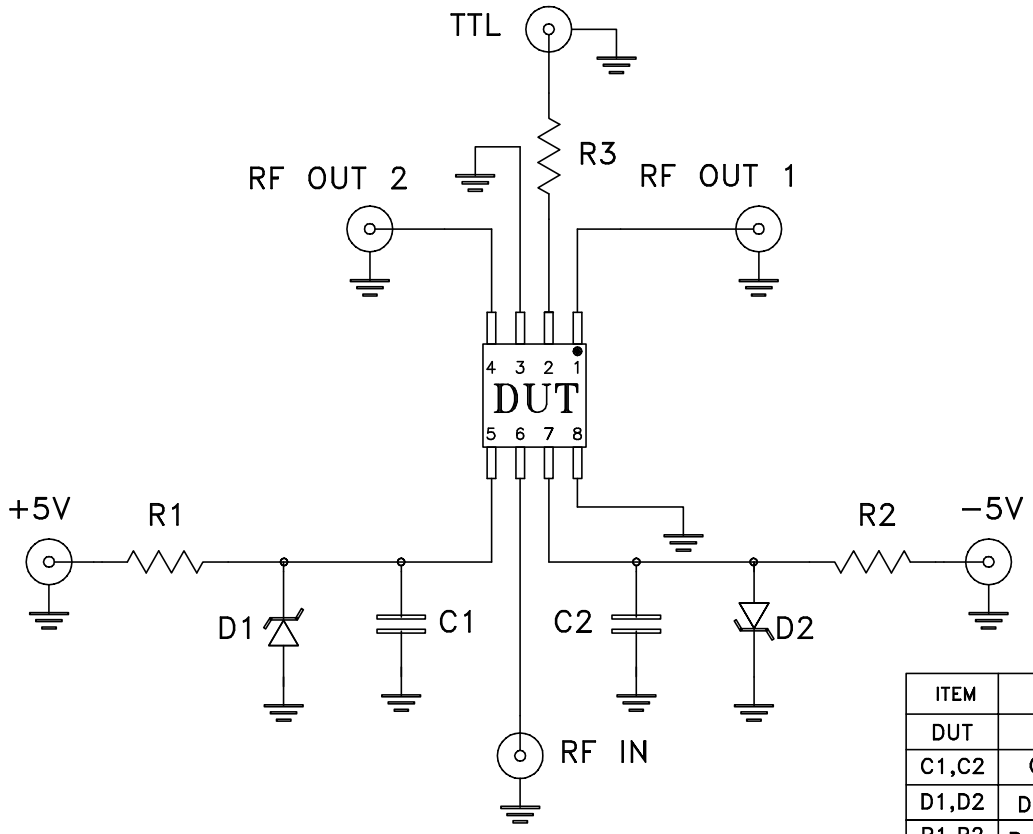
SIZE	CODE IDENT	DRAWING NO:	REV:
A	15542	98-PL-120	C

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

Evaluation Board and Circuit



TB-M3SW-250DRA+



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.
3. TB name "TB-159C" marked on PCB may be ignored. The correct TB name is TB-M3SW-250DRA+.

Mini-Circuits®

Mini-Circuits

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