

Fast Switching

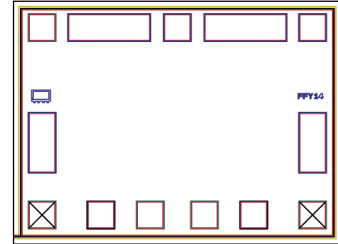
SPDT RF Switch Die

M3SWA-250DRBD+

50Ω, DC to 4500 MHz, Absorptive Switch with internal driver

The Big Deal

- High Isolation, 56 dB typ.
- High Input IP3, +46.5 dBm typ
- Low insertion loss, 0.6 dB typ
- Fast Rise/Fall time, 3.3 ns / 4.6 ns typ.



Product Overview

Mini-Circuits' M3SWA-250DRBD+ is a MMIC SPDT absorptive switch die with an internal driver designed for wideband operation from DC to 4.5 GHz supporting many applications requiring fast switching across a wide frequency range. This model provides excellent isolation, fast switching speed and high linearity.

Key Features

Feature	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.
Absorptive Switch	In the OFF condition, RF output ports which are not switched ON are terminated into 50Ω. This enables proper impedance termination of the circuitry following the RF output ports, preventing any unintended action such as oscillation.
High Isolation: <ul style="list-style-type: none">• 62 dB at 1000 MHz• 35 dB at 4500 MHz	High isolation significantly reduces leakage of power into OFF ports.
High linearity: Input power at P1dB, 25.4 dBm typ. Input IP3, +46.5 dBm typ.	High linearity minimizes unwanted intermodulation 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.
Unpackaged die	Enables user to integrate it directly into hybrids.



Fast Switching

SPDT RF Switch Die

M3SWA-250DRBD+

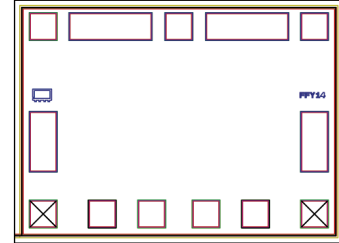
50Ω, DC to 4500 MHz, Absorptive Switch with internal driver

Product Features

- High Isolation, 56 dB typ.
- Low insertion loss, 0.6 dB typ.
- Fast Rise/Fall time, 3.3 ns / 4.6 ns typ.
- High Input IP3, +46.5 dBm typ.

Typical Applications

- Defense
- Communication Infrastructure
- Test and Measurements



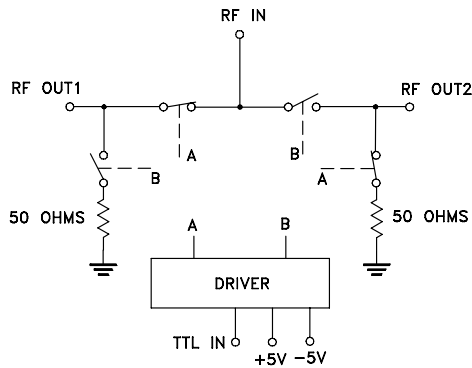
+RoHS Compliant
The +Suffix identifies RoHS Compliance. See our web site for RoHS Compliance methodologies and qualifications

Ordering Information: Refer to Last Page

General Description

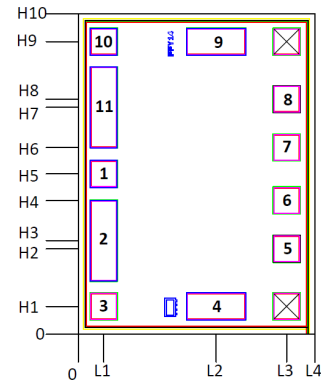
Mini-Circuits' M3SWA-250DRBD+ is a MMIC SPDT absorptive switch die with an internal driver designed for wideband operation from DC to 4.5 GHz supporting many applications requiring fast switching across a wide frequency range. This model provides excellent isolation, fast switching speed and high linearity.

Simplified Schematic and Pad description



Pad#	Function
1	RF-IN
3	V _{EE}
4	RF OUT 1
6	TTL
7	TTL GROUND
9	RF OUT 2
10	V _{DD}
2,5,8,11	GROUND

Bonding Pad Position



Dimensions in μm, Typical

L1	L2	L3	L4	H1	H2	H3	H4	H5	H6	H7	H8	H9	H10
76	408	617	700	83	254	278	397	475	554	673	697	867	950

Thickness	Die size	Pad Size 1,3,5,6,7,8 & 10	Pad size 2&11	Pad size 4&9
100	700 x 950	74 x 74	74 x 234	169x74



RF Electrical Specifications¹, 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		dB
	100-1000		0.5		
	1000-2000		0.6		
	2000-4000		0.7		
	4000-4500		1.4		
Isolation between Output Port 1 & 2	10-100		78		dB
	100-1000		59		
	1000-2000		49		
	2000-4000		39		
	4000-4500		32		
Isolation between Common Port & Output Ports	10-100		97		dB
	100-1000		75		
	1000-2000		56		
	2000-4000		43		
	4000-4500		36		
Input Return Loss	10-100		29		dB
	100-1000		30		
	1000-2000		27		
	2000-4000		23		
	4000-4500		22		
Output Return Loss (Both ON STATE & OFF STATE)	10-100		29		dB
	100-1000		28		
	1000-2000		22		
	2000-4000		19		
	4000-4500		14		
Input Power at P1dB ²	10-100		19.2		dBm
	100-1000		24.5		
	1000-2000		25.4		
	2000-4000		25.0		
	4000-4500		23.8		
Input IP3 (Pout =0dBm/Tone)	10-100		39.7		dBm
	100-1000		44.7		
	1000-2000		46.5		
	2000-4000		44.0		
	4000-4500		40.1		
Thermal Resistance (Junction-to-ground Lead at 85°C stage temperature)			34.2		degC/W

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

Notes:

- Die is packaged in 3.25 x 3.25mm, 8-lead MCLP package and soldered on TB-M3SWA250DRB+.
- Input Power at P1dB compression drops to 13 dBm at 10 MHz.
- 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

Absolute Maximum Ratings⁴

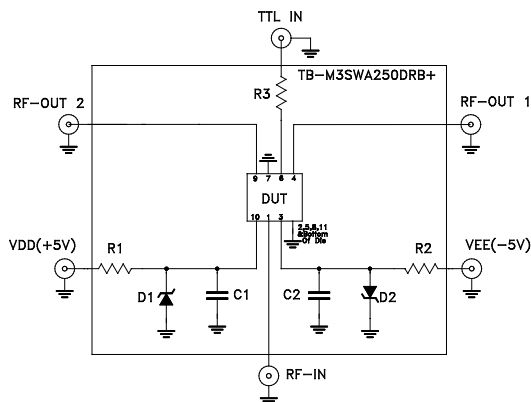
Parameter	Ratings
Operating temperature	-55°C to +100°C
RF Input power	+24 dBm
Junction Temperature	134°C
Total Power Dissipation	0.4W
DC Voltage, Pad 10	+6V
DC Voltage, Pad 3	-6V

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

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.

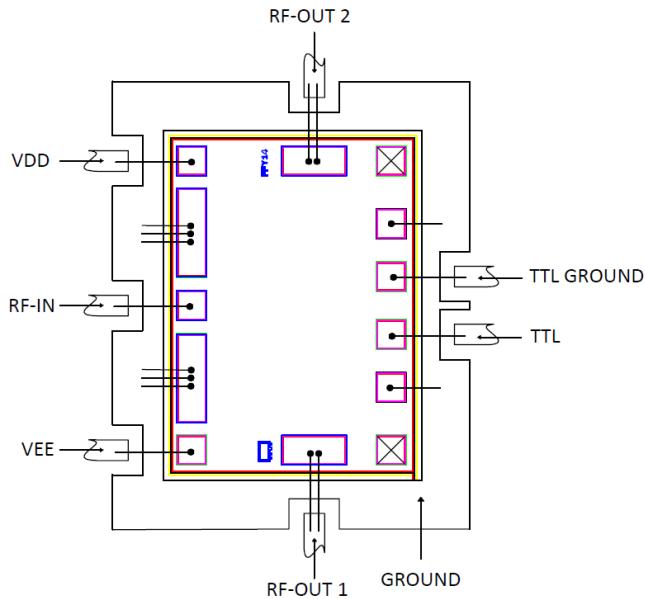
Figure 1. Characterization & Application Circuit

Note: (DUT is packaged in 3.25x3.25mm, 8-lead MCLP package and soldered on Mini-Circuits Characterization & Application Test Board TB-M3SWA250DRB+). 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.

Assembly Diagram



Assembly and Handling Procedure

1. Storage

Dice should be stored in a dry nitrogen purged desiccators or equivalent.

2. ESD

MMIC SPDT Absorptive Switch dice are susceptible to electrostatic and mechanical damage. Dice are supplied in antistatic protected material, which should be opened in clean room conditions at an appropriately grounded anti-static workstation. Devices need careful handling using correctly designed collets, vacuum pickup tips or sharp antistatic tweezers to deter ESD damage to dice.

3. Die Attach

The die mounting surface must be clean and flat. Using conductive silver filled epoxy, recommended epoxies are DieMat DM6030HK-PT/H579 or Ablestik 84-1LMISR4. Apply sufficient epoxy to meet required epoxy bond line thickness, epoxy fillet height and epoxy coverage around total die periphery. Parts shall be cured in a nitrogen filled atmosphere per manufacturer's cure condition. It is recommended to use antistatic die pick up tools only.

4. Wire Bonding

Bond pad openings in the surface passivation above the bond pads are provided to allow wire bonding to the dice gold bond pads. Thermosonic bonding is used with minimized ultrasonic content. Bond force, time, ultrasonic power and temperature are all critical parameters. Suggested wire is pure gold, 1 mil diameter. Bonds must be made from the bond pads on the die to the package or substrate. All bond wires should be kept as short as low as reasonable to minimize performance degradation due to undesirable series inductance.

Additional Detailed Technical Information*additional information is available on our dash board.*

Performance Data	Data Table	
	Swept Graphs	
	S-Parameter (S2P Files) Data Set with and without port extension(.zip file)	
Case Style	Die	
Die Ordering and packaging information	Quantity, Package Small, Gel - Pak: 5,10,50,100 KGD* Medium†, Partial wafer: KGD*<1880 Large†, Full Wafer	Model No. M3SWA-250DRBDG+ M3SWA-250DRBDP+ M3SWA-250DRBDF+
	†Available upon request contact sales representative Refer to AN-60-067	
Environmental Ratings	ENV80	

*Known Good Dice ("KGD") means that the dice in question have been subjected to Mini-Circuits DC test performance criteria and measurement instructions and that the parametric data of such dice fall within a predefined range. While DC testing is not definitive, it does help to provide a higher degree of confidence that dice are capable of meeting typical RF electrical parameters specified by Mini-Circuits.

ESD Rating**

Human Body Model (HBM): Class 0 (Pass 100V) in accordance with ANSI/ESD STM 5.1 - 2001

** Tested in industry standard MCLP 3.25x3.25 mm, 8-lead package.

Additional 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/MCLStore/terms.jsp
- D. Mini-Circuits does not warrant the accuracy or completeness of the information, text, graphic and other items contained within this document and same are provided as an accommodation and on an "As is" basis with all faults.
- E. Purchaser of this part solely responsible for proper storing, handling, assembly and processing of Known Good Dice (including, without limitation, proper ESD preventive measures, die preparation, die attachment, wire bonding and related assembly and test activities), and Mini-Circuits assumes no responsibility for environmental effects on Known Good Dice.
- F. Mini-Circuits and the Mini-Circuits logo are registered trademarks of Scientific Components Corporation d/b/a Mini-Circuits. All other third-party trademarks are the property of their respective owners. A reference to any third-party trademark does not constitute or imply any endorsement, affiliation, sponsorship, or recommendation by any such third-party of Mini-Circuits or its products.

Typical Performance Data ⁽¹⁾

FREQ (MHz)	INSERTION LOSS @ VDD=+5V, VEE =-5V OVER TEMPERATURE						FREQ (MHz)	ISOLATION @ VDD=+5V, VEE =-5V OVER TEMPERATURE											
	RF COM-RF1 (dB)			RF COM-RF2 (dB)				RF COM-RF1 (dB)			RF COM-RF2 (dB)			RF1-RF2 (dB)			RF1-RF2 (dB)		
	STATE 2*			STATE 1*				STATE 1*			STATE 2*			STATE 2*			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	0.56	0.40	0.41	0.57	0.40	0.41	10	75.71	73.96	74.25	69.98	74.07	72.97	68.02	74.12	78.54	68.70	68.70	65.34
50	0.65	0.48	0.47	0.66	0.49	0.48	50	76.31	78.78	77.76	83.80	76.09	73.96	69.13	71.43	80.91	70.26	76.64	70.17
100	0.66	0.49	0.48	0.67	0.49	0.49	100	78.97	99.21	93.28	81.82	86.50	95.03	68.32	72.48	72.31	71.25	71.97	71.59
200	0.67	0.51	0.51	0.69	0.52	0.51	200	80.72	84.70	82.41	78.69	84.18	83.86	63.20	65.96	66.80	65.74	66.49	66.75
400	0.67	0.52	0.53	0.69	0.53	0.53	400	82.88	81.71	76.90	76.18	81.67	74.51	59.16	60.25	60.87	60.20	61.12	61.33
600	0.66	0.53	0.55	0.68	0.53	0.55	600	81.12	74.49	70.31	83.57	71.78	70.34	56.42	57.37	58.12	56.74	57.92	58.24
800	0.66	0.53	0.57	0.67	0.53	0.56	800	75.64	69.23	66.80	71.97	66.18	64.99	53.97	55.57	55.72	54.24	55.16	55.30
1000	0.65	0.53	0.57	0.66	0.53	0.57	1000	67.14	64.86	63.49	65.73	63.62	62.42	52.43	53.39	53.23	52.51	53.13	53.12
1100	0.65	0.53	0.58	0.66	0.54	0.58	1100	64.33	62.91	61.75	63.20	61.65	60.56	51.57	52.38	52.16	51.47	52.34	52.17
1200	0.65	0.54	0.59	0.66	0.54	0.58	1200	61.96	61.01	59.79	61.68	60.77	59.13	50.93	51.57	51.35	50.59	51.39	51.23
1300	0.65	0.54	0.60	0.66	0.54	0.59	1300	60.53	59.94	58.74	59.67	58.69	57.75	49.93	50.86	50.55	49.70	50.53	50.40
1400	0.65	0.55	0.60	0.66	0.54	0.59	1400	58.81	58.39	57.30	58.09	57.27	56.95	49.31	50.01	49.67	48.93	49.69	49.45
1500	0.65	0.55	0.60	0.65	0.55	0.60	1500	57.41	56.97	56.35	56.75	56.01	55.87	48.38	49.09	48.91	48.07	49.03	48.74
1600	0.65	0.55	0.61	0.66	0.55	0.61	1600	55.62	55.60	55.04	55.31	54.98	54.44	47.54	48.45	48.08	47.26	48.14	47.87
1700	0.65	0.55	0.62	0.66	0.55	0.61	1700	54.35	54.60	53.80	54.14	53.80	53.28	46.99	47.76	47.46	46.59	47.50	47.30
1800	0.65	0.56	0.62	0.66	0.56	0.62	1800	54.25	53.71	53.29	53.65	52.82	52.35	46.43	46.96	46.76	45.95	46.81	46.45
1900	0.65	0.56	0.63	0.66	0.56	0.62	1900	52.30	52.57	51.72	51.40	51.72	50.95	45.39	46.40	45.84	44.92	46.05	45.60
2000	0.65	0.57	0.63	0.66	0.57	0.63	2000	51.15	51.47	50.62	50.49	50.49	50.19	44.60	45.74	45.27	44.19	45.37	45.01
2100	0.65	0.57	0.64	0.67	0.57	0.64	2100	50.13	50.41	49.91	49.56	49.75	49.37	43.83	44.83	44.49	43.24	44.58	44.17
2200	0.65	0.57	0.65	0.67	0.58	0.65	2200	49.11	49.60	49.07	48.74	48.90	48.63	43.58	44.24	44.23	43.02	43.97	43.88
2300	0.65	0.58	0.66	0.66	0.58	0.65	2300	48.00	48.73	48.20	47.72	47.98	47.74	42.45	43.71	43.18	41.98	43.36	42.87
2400	0.66	0.59	0.68	0.67	0.58	0.66	2400	47.10	47.79	47.21	46.67	46.98	46.55	42.22	43.32	43.25	41.61	42.89	42.80
2500	0.65	0.59	0.68	0.67	0.59	0.67	2500	46.36	46.80	46.73	45.88	46.22	45.69	41.41	42.45	42.15	40.78	42.04	41.53
2600	0.65	0.59	0.68	0.67	0.59	0.68	2600	45.65	46.34	45.88	45.16	45.53	45.12	40.53	41.90	41.40	39.99	41.49	41.09
2800	0.66	0.60	0.71	0.67	0.60	0.70	2800	44.13	44.86	44.42	43.64	44.25	43.79	39.26	40.56	40.22	38.76	40.17	39.88
3000	0.66	0.62	0.73	0.68	0.62	0.73	3000	42.97	43.80	43.28	42.85	43.20	42.97	37.95	39.29	38.79	37.42	38.88	38.51
3200	0.69	0.65	0.77	0.69	0.65	0.77	3200	41.52	42.57	42.09	41.38	41.90	41.45	36.94	38.28	37.91	36.37	37.84	37.49
3400	0.70	0.67	0.81	0.71	0.68	0.81	3400	41.00	41.62	40.99	40.44	40.93	40.50	35.77	37.08	36.77	35.11	36.56	36.25
3600	0.75	0.73	0.87	0.77	0.75	0.89	3600	40.55	41.18	40.55	39.62	39.93	39.40	34.60	35.97	35.54	33.69	35.12	34.72
3800	0.81	0.80	0.96	0.84	0.83	0.98	3800	39.46	40.02	39.63	38.27	38.66	38.25	33.71	34.96	34.54	32.54	34.03	33.63
4000	0.94	0.96	1.13	0.98	1.01	1.16	4000	39.15	39.50	39.20	37.32	37.77	37.29	32.72	33.83	33.38	31.52	32.90	32.36
4200	1.18	1.19	1.35	1.23	1.29	1.45	4200	37.87	38.25	37.81	36.54	36.98	36.38	31.67	32.68	32.31	30.42	31.76	31.46
4400	1.43	1.45	1.63	1.50	1.59	1.77	4400	37.00	37.51	36.73	35.39	35.88	35.51	30.55	31.63	31.19	29.22	30.80	30.59
4500	1.77	1.72	1.89	1.90	1.90	2.06	4500	37.29	37.18	37.06	35.03	35.57	35.41	30.07	30.93	30.58	28.86	30.43	30.09
5000	1.56	1.55	1.76	1.75	1.67	1.86	5000	32.57	33.21	32.72	32.41	33.18	32.90	27.89	28.53	28.10	27.92	29.02	28.53
5200	1.40	1.43	1.68	1.49	1.46	1.71	5200	31.90	32.24	32.08	31.79	32.27	32.05	27.15	27.76	27.40	27.26	28.23	27.85

⁽¹⁾Test data of Die packaged in industry standard, 3.25x3.25 mm, 8-lead MCLP package

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



Typical Performance Data ⁽¹⁾

FREQ (MHz)	RETURN LOSS @ Vdd=+5V OVER TEMPERATURE																	
	RF COM (dB)			RF COM (dB)			RF1 (dB)			RF1 (dB)			RF2 (dB)			RF2 (dB)		
	STATE 2*			STATE 1*			STATE 2*			STATE 1*			STATE 2*			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	25.84	28.99	28.65	25.52	29.15	28.85	26.07	29.36	29.14	28.66	38.25	36.61	28.82	37.96	36.18	25.76	29.44	29.28
50	27.58	30.89	30.39	27.07	31.19	30.66	26.91	30.49	29.94	28.97	37.30	35.50	28.80	37.33	35.30	26.60	30.54	30.02
100	27.60	30.64	29.69	26.94	30.34	29.40	26.69	30.19	29.97	28.94	36.77	34.59	28.89	36.96	34.36	26.33	30.14	30.02
200	27.19	30.02	28.86	26.56	29.68	28.46	26.22	29.49	29.74	28.75	37.00	33.82	28.74	36.86	33.48	25.90	29.55	29.96
400	26.95	30.18	29.76	26.09	29.74	29.45	25.55	28.32	28.70	29.29	37.11	34.65	30.07	36.01	34.19	25.88	28.78	28.96
600	27.24	30.77	31.43	26.79	30.45	30.60	25.08	27.31	27.15	30.40	36.62	36.52	31.16	34.75	34.50	25.50	28.16	28.04
800	28.61	31.72	31.32	28.11	32.06	31.62	24.53	26.47	25.81	30.14	36.45	37.06	31.30	33.57	33.28	25.24	27.79	27.34
1000	29.52	31.28	32.44	29.68	33.66	35.47	23.46	25.01	24.46	29.48	37.47	36.00	30.86	33.20	32.69	24.67	26.43	25.37
1100	29.39	30.04	30.47	30.76	33.05	33.14	23.12	24.30	23.16	29.26	38.57	38.72	30.01	33.10	34.18	24.38	25.79	24.10
1200	29.12	28.60	28.00	31.91	31.93	31.04	22.56	23.60	22.19	28.61	40.11	46.05	28.77	32.98	35.34	23.69	25.13	23.58
1300	28.25	27.22	26.81	32.18	30.78	31.04	21.80	22.94	21.99	27.87	42.23	47.57	27.80	32.72	33.78	22.87	24.41	23.69
1400	27.03	26.17	26.91	31.37	29.34	31.14	21.23	22.45	22.32	27.71	44.55	41.03	27.29	32.74	32.33	22.21	23.64	23.44
1500	26.13	25.40	27.06	30.65	28.05	29.66	20.92	22.06	22.36	27.96	46.43	40.07	26.79	32.94	32.14	21.71	22.90	22.57
1600	25.79	24.79	26.15	29.95	26.91	27.72	20.76	21.72	21.73	28.11	47.40	43.24	26.03	33.14	33.40	21.08	22.18	21.67
1700	25.56	24.22	24.82	28.69	25.92	26.64	20.41	21.31	20.98	27.74	50.80	69.71	25.36	33.49	35.70	20.38	21.53	21.31
1800	24.95	23.68	24.10	27.41	25.05	26.42	19.92	20.89	20.69	27.25	54.88	42.99	24.95	34.07	36.65	19.78	20.92	21.25
1900	23.96	23.21	24.15	26.29	24.32	26.24	19.42	20.52	20.88	26.98	47.63	37.83	24.87	35.36	36.20	19.29	20.41	21.11
2000	23.20	22.84	24.57	25.53	23.89	25.79	19.07	20.26	21.16	27.22	41.79	36.15	24.94	37.17	35.43	18.96	20.13	20.79
2100	22.88	22.66	24.67	24.97	23.65	25.16	18.94	20.14	21.13	27.99	37.94	36.37	25.26	39.21	35.77	18.73	19.99	20.32
2200	22.90	22.67	24.37	24.62	23.51	24.74	19.01	20.21	20.87	29.48	35.31	36.47	25.72	40.90	37.33	18.60	19.82	19.91
2300	23.20	23.00	24.37	24.26	23.30	24.60	19.16	20.40	20.67	31.25	33.35	35.14	26.01	43.40	40.80	18.41	19.66	19.72
2400	23.35	23.27	24.68	23.98	23.19	24.85	19.44	20.70	20.95	33.15	32.20	32.69	26.30	49.78	42.85	18.19	19.54	19.95
2500	23.73	23.73	25.64	23.77	23.22	25.16	19.51	21.00	21.54	34.27	31.26	30.58	26.88	52.08	37.77	18.07	19.58	20.29
2600	24.04	24.14	26.45	24.05	23.36	25.20	19.43	21.15	22.12	35.11	30.65	29.28	28.20	43.73	35.22	18.20	19.68	20.31
2800	25.31	25.07	26.70	24.98	23.53	24.16	20.01	21.61	22.21	42.59	29.09	28.75	31.42	36.91	38.53	18.83	19.83	19.44
3000	26.57	25.45	26.29	24.96	23.71	24.35	20.90	21.97	21.79	33.48	27.45	27.71	31.86	32.40	31.34	18.82	20.07	20.23
3200	26.11	25.58	26.03	25.04	23.27	23.05	20.25	21.96	21.98	31.11	26.27	25.33	32.04	30.07	28.83	19.13	19.86	19.29
3400	25.58	24.31	23.77	23.84	22.51	22.21	20.39	21.05	19.90	28.76	25.66	25.72	28.71	28.11	29.44	18.86	19.41	18.57
3600	23.59	22.83	22.74	22.48	21.59	21.77	19.21	19.67	18.87	25.81	25.64	26.20	26.50	26.30	24.92	17.90	18.45	18.25
3800	21.91	21.51	21.66	20.91	20.29	20.13	17.85	18.54	18.08	26.44	25.48	24.45	25.14	25.47	24.90	17.01	17.28	16.30
4000	21.35	21.06	21.19	19.77	19.62	19.89	17.09	17.01	16.23	25.48	25.66	26.04	23.59	24.53	24.35	15.60	15.69	15.53
4200	21.99	23.06	23.47	20.29	21.03	20.56	15.42	15.98	16.07	24.47	25.33	25.02	23.52	24.28	22.56	14.30	14.26	13.93
4400	21.95	23.51	24.46	20.28	21.05	21.14	14.36	14.73	14.66	25.95	24.69	23.29	22.92	23.65	23.53	13.35	12.95	12.71
4500	28.53	30.51	29.14	25.02	25.05	24.24	13.78	13.98	13.77	25.20	24.69	23.90	21.99	23.26	23.16	12.20	12.08	12.20
5000	17.26	16.68	16.23	14.89	14.73	14.70	13.81	13.57	13.24	22.32	21.51	20.35	20.00	21.42	21.07	10.97	11.30	11.43
5200	13.86	13.65	13.88	12.27	12.21	12.38	13.37	13.28	13.28	19.88	20.56	20.49	20.05	20.81	19.13	11.16	11.28	10.93

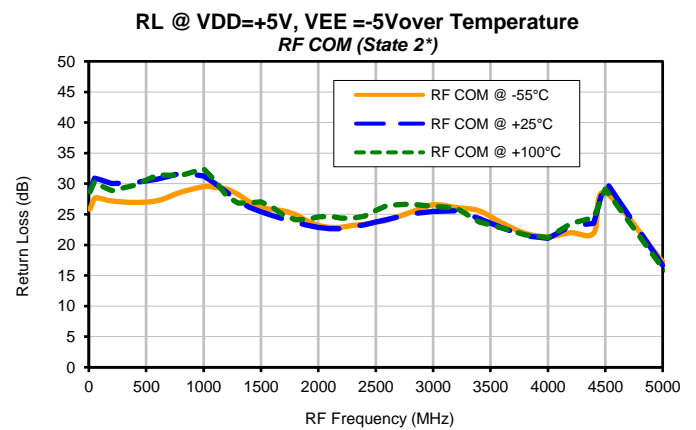
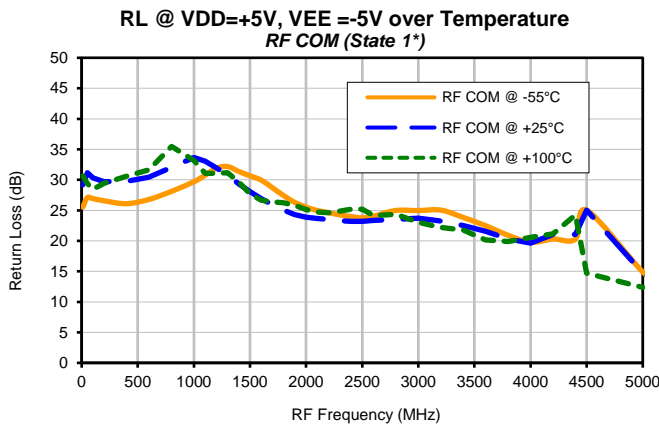
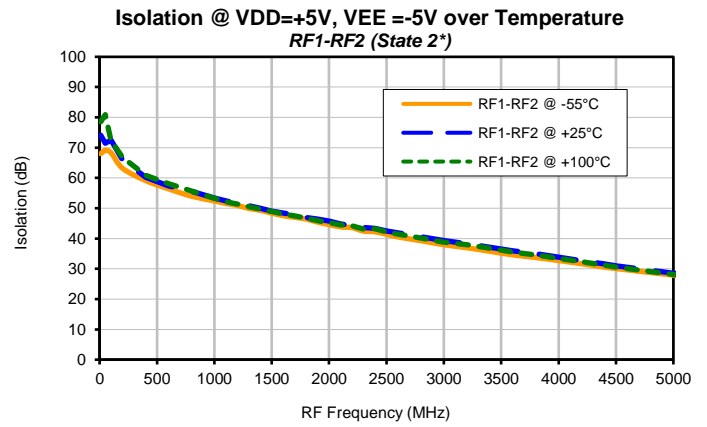
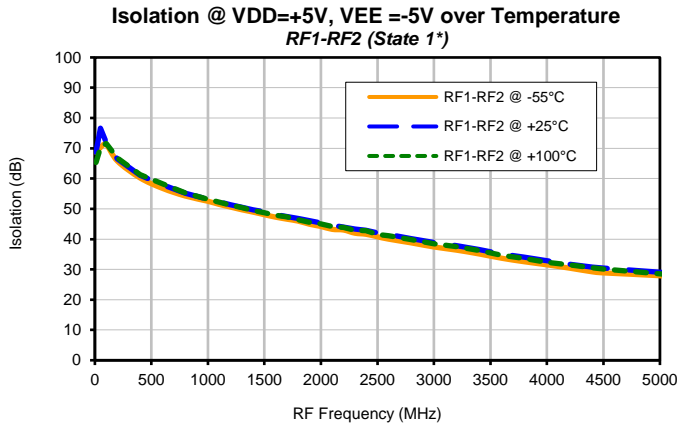
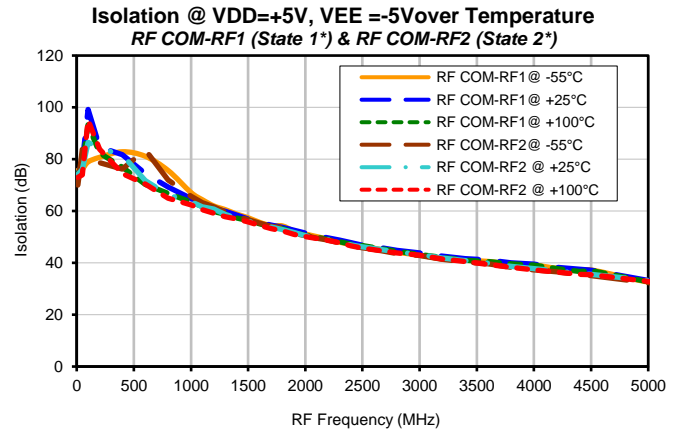
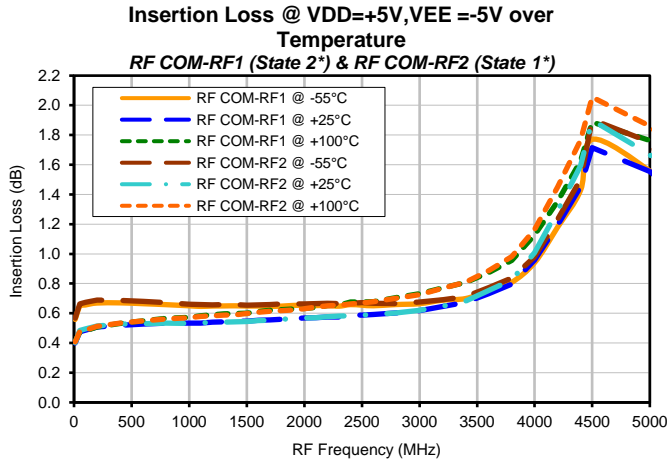
⁽¹⁾Test data of Die packaged in industry standard, 3.25x3.25 mm, 8-lead MCLP package

*Note:

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



Typical Performance Data ⁽¹⁾

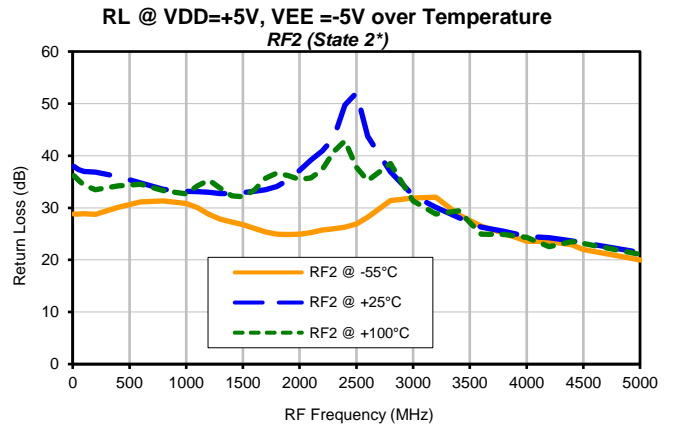
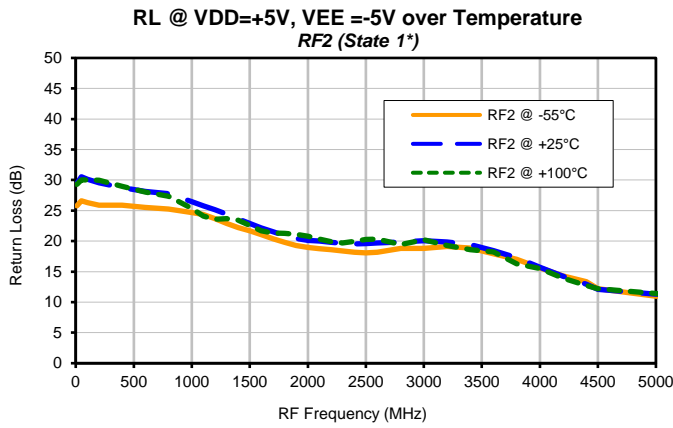
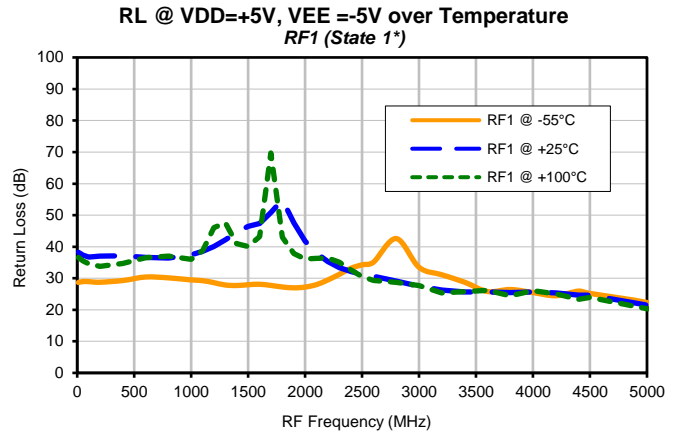
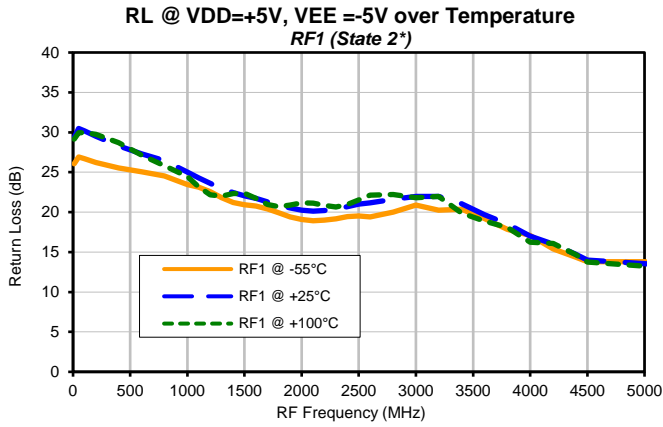


(1) Test data of Die packaged in industry standard, 3.25x3.25 mm, 8-lead MCLP package

*Note:

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

Typical Performance Data ⁽¹⁾



(1) Test data of Die packaged in industry standard, 3.25x3.25 mm, 8-lead MCLP package

*Note:

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

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	-40° to 85° C or -40° to 105° C or -55° to 105° C or -45° to 105° C Ambient Environment	Refer to Individual Model Data Sheet
Storage Environment (Die)	-65° to 150°C	Individual Model Data Sheet
Storage Environment(Packaging)	-40° to 70°C and 40 to 60% humidity (In Factory Shipped Package)	