



Mini-Circuits

LUMPED LC SURFACE MOUNT

Diplexer

RDP-6500+

50Ω DC to 6500 MHz (DC-100, 1400-6500 MHz)

KEY FEATURES

- Low Insertion Loss, 1.5 dB Typ.
- Good Stopband Rejection, 40 dB Typ.
- Miniature Shielded Package

APPLICATIONS

- Military Radio Communication
- Transmitter and Receiver
- Wireless Communication Systems

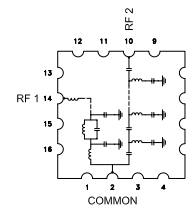
PRODUCT OVERVIEW

RDP-6500+ is a lowpass + highpass diplexer. Lowpass port is designed for DC to 100 MHz and highpass port is designed for 1400 to 6500 MHz. The low pass channel offers a very good rejection and the high pass channel works for a broad frequency band until 6500 MHz offering low insertion loss. This diplexer can be used in military radio communication systems.



Generic photo used for illustration purposes only

FUNCTIONAL DIAGRAM



ELECTRICAL SPECIFICATIONS^{1,2} AT +25°C

Parameter		Function (Port)	Frequency (MHz)	Min.	Typ.	Max.	Unit
Pass Band	Insertion Loss	Low Pass (RF COM-RF1)	DC - 100	—	0.5	1	dB
		High Pass (RF COM-RF2)	1400 - 3500	—	0.3	1	
			3500 - 4400	—	0.5	1.2	
			4400 - 6500	—	1.5	3	
	Return Loss	Low Pass (RF1)	DC - 100	14	21	—	dB
		High Pass (RF2)	1400-3000	14	20	—	
			3000-4400	10	17	—	
			4400-6500	—	8	—	
		Common (COM)	DC-100	14	21	—	
			1400 - 3000	14	20	—	
			3000 - 4400	10	17	—	
			4400 - 6500	—	8	—	
Stop Band Rejection	Low Pass (RF COM-RF1)		1400 - 2500	50	60	—	dB
			2500 - 4400	30	43	—	
			4400 - 6500	20	28	—	
	High Pass (RF COM-RF2)		DC-100	60	75	—	

1. Tested in Evaluation Board P/N TB-RDP-6500+.

2. Bi-Directional. See S-Parameters for actual performance.

ABSOLUTE MAXIMUM RATINGS³

Operating Temperature	-40°C to +85°C
Storage Temperature	-55°C to +100°C
Input Power (RF COM)	1.5 W
Input Power (RF1)	1.5 W
Input Power (RF2)	1.5 W

3. Permanent damage may occur if any of these limits are exceeded.

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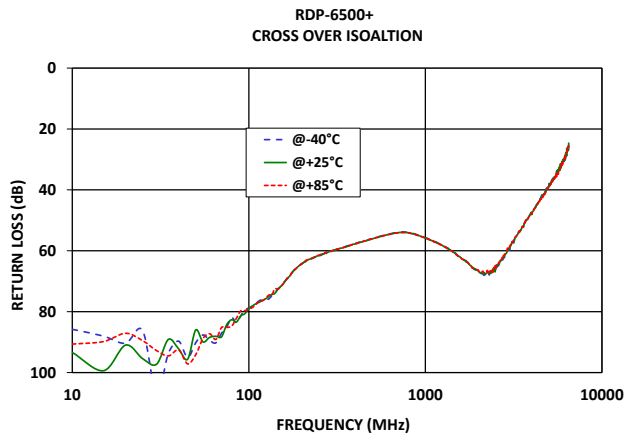
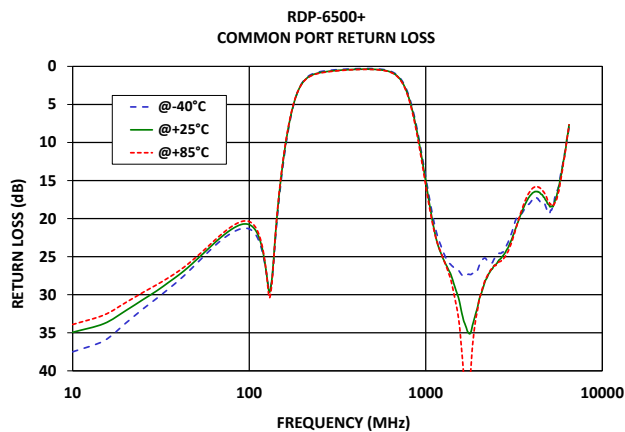
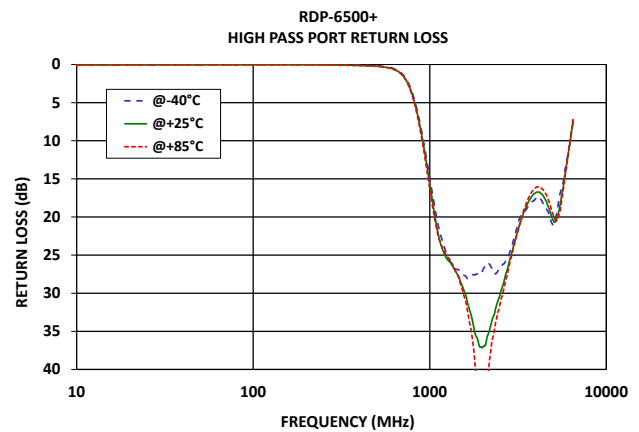
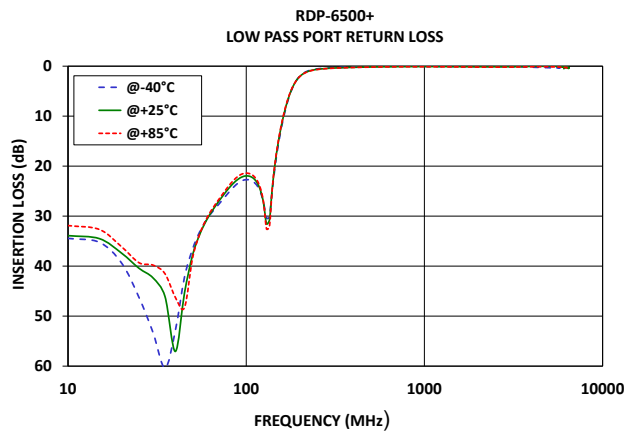
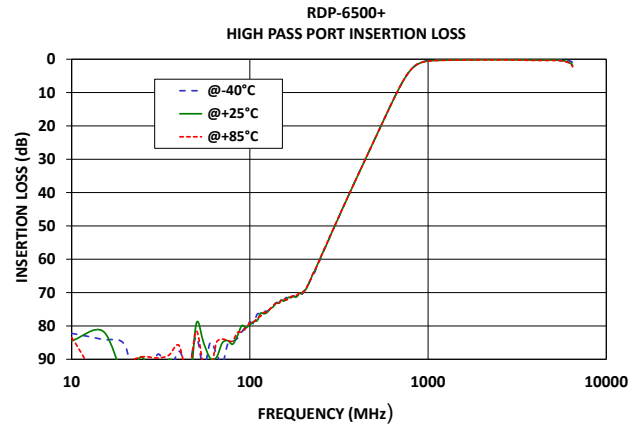
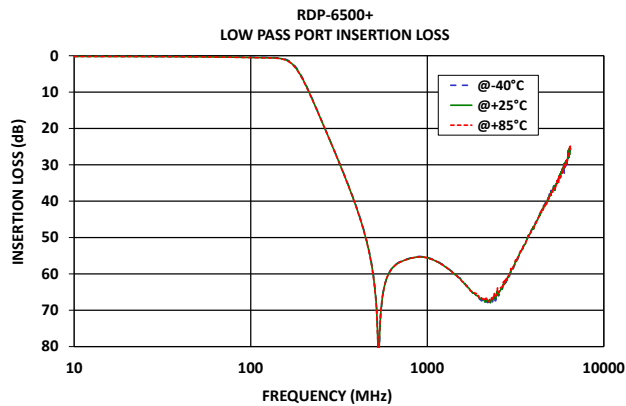
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REV. A
ECO-026123
RDP-6500+
EDU3099
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PAGE 1 OF 4



TYPICAL PERFORMANCE GRAPHS





FUNCTIONAL DIAGRAM

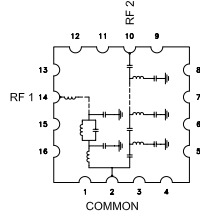
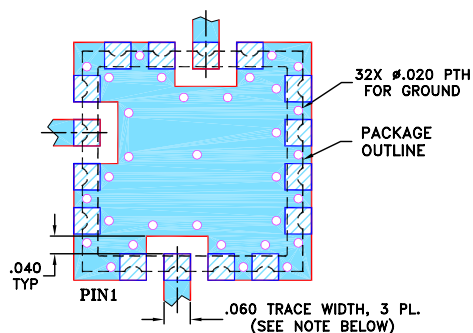


Figure 1. RDP-6500+ Functional Diagram

PAD DESCRIPTION

Port	Pad Number	Description
COMMON	2	Connects to Common Port
RF1 ²	14	Connects to Low Pass Port
RF2 ²	10	Connects to High Pass Port
GROUND	1,3-9,11-13,15,16	Connects to Ground on PCB, (See drawing PL-012)
NC	—	No connection, not used internally. See drawing PL-012 for connection to PCB

SUGGESTED PCB LAYOUT (PL-012)

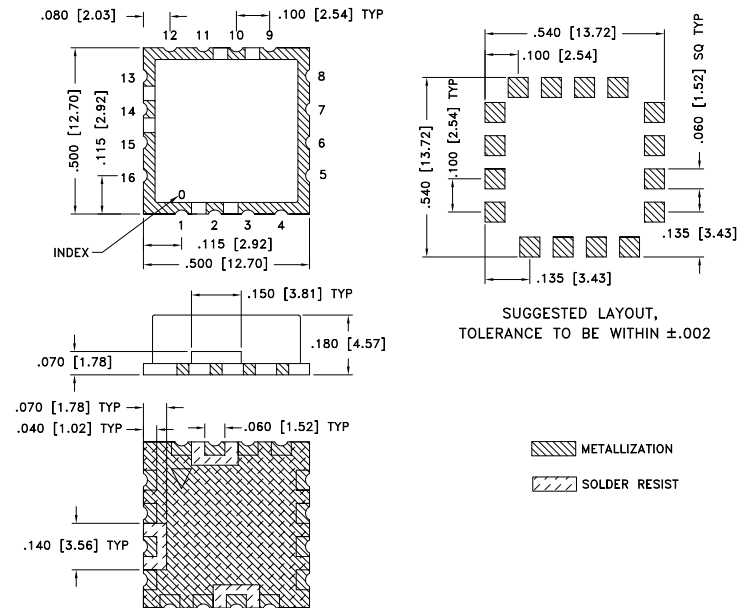


- NOTES: 1. TRACE WIDTH IS SHOWN FOR FR4 WITH DIELECTRIC THICKNESS .030" ± .002"; COPPER: 1/2 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH MAY NEED TO BE MODIFIED.
2. BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.

-  DENOTES PCB COPPER LAYOUT WITH SMOBC (SOLDER MASK OVER BARE COPPER)
-  DENOTES COPPER LAND PATTERN FREE OF SOLDER MASK

Figure 2. Suggested PCB Layout PL-012

CASE STYLE DRAWING



Weight: 1.2 gram

Dimensions are in inches (mm). Tolerances: 2Pl. ± .03; 3Pl. ± .015

PRODUCT MARKING*: RDP-6500

*Marking may contain other features or characters for internal lot control.



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Diplexer

RDP-6500+

50Ω DC to 6500 MHz (DC-100, 1400-6500 MHz)

ADDITIONAL DETAILED INFORMATION IS AVAILABLE ON OUR DASH BOARD.

[CLICK HERE](#)

Performance Data & Graphs	Data Graphs S-Parameter (S3P Files) Data Set (.zip file) De-embedded to device pads
Case Style	CK605 Lead Finish: Gold over Nickel Plate
RoHS Status	Compliant
Tape and Reel	TR-F37
Suggested Layout for PCB Design	PL-012
Evaluation Board	TB-RDP-6500+ Gerber File
Environmental Rating	ENV02T1

NOTES

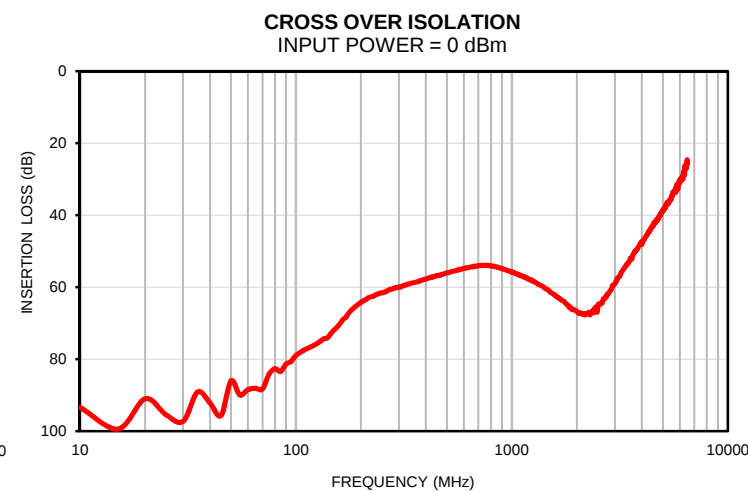
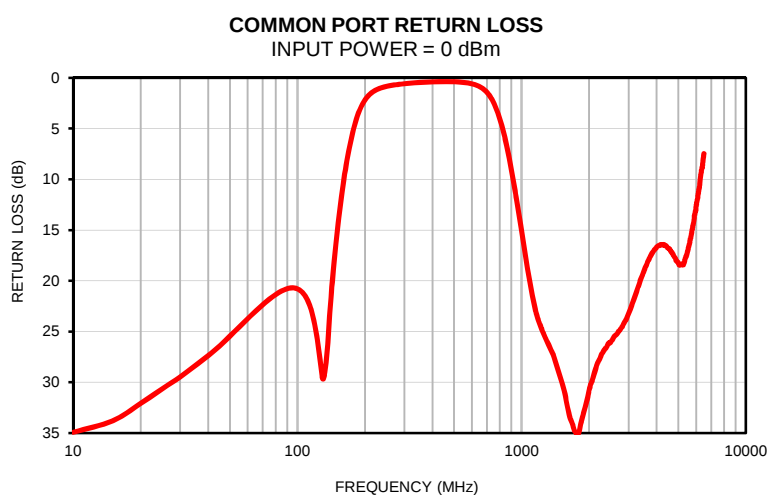
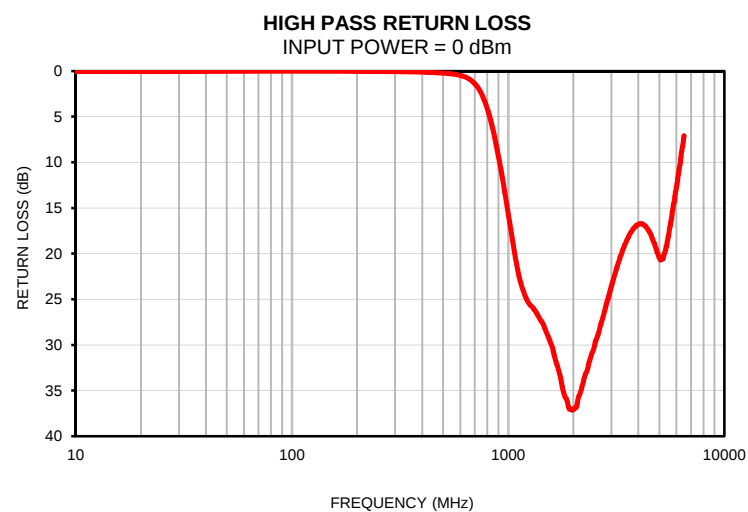
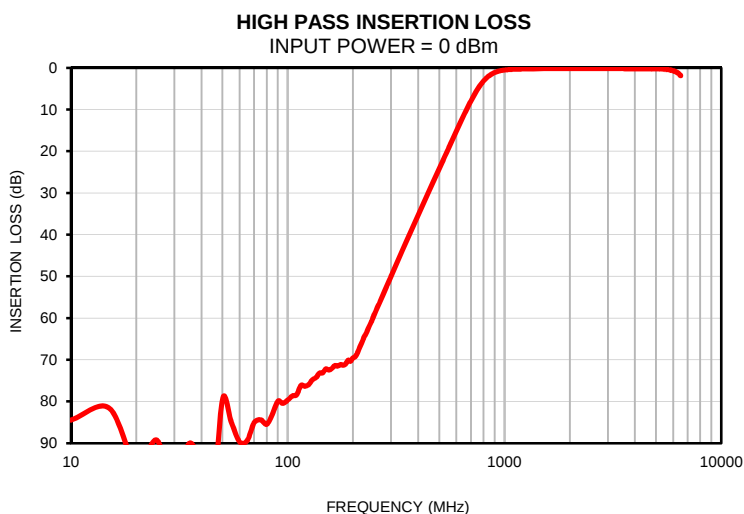
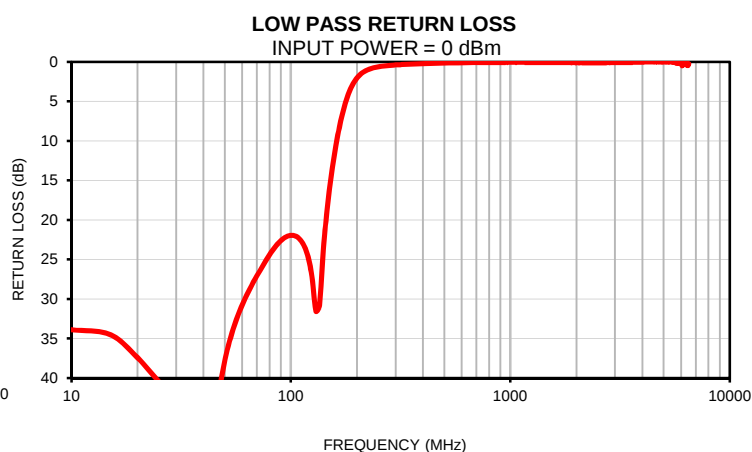
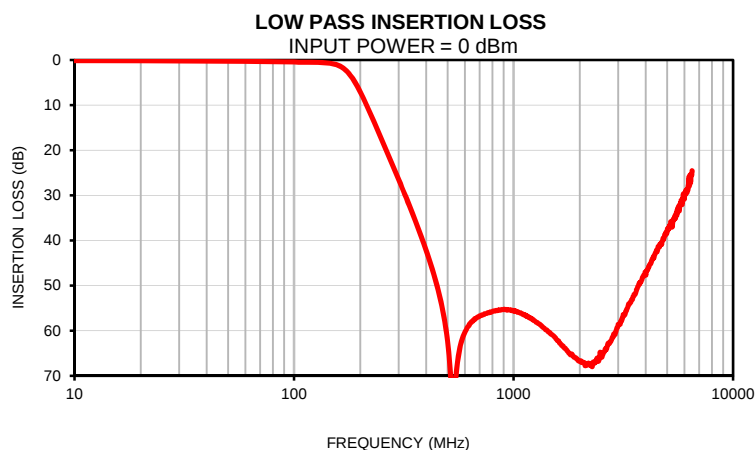
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Typical Performance Data

FREQUENCY (MHz)	INSERTION LOSS (dB)		Cross over isolation (dB) (between LPF and HPF)	RETURN LOSS (dB)		
	Lowpass port	Highpass port		Common port	Lowpass port	Highpass port
10	0.19	84.48	93.39	34.93	33.90	0.04
20	0.21	95.39	90.99	32.08	37.41	0.04
30	0.23	103.10	97.28	29.48	42.36	0.03
40	0.26	96.04	92.20	27.39	57.06	0.03
50	0.29	79.37	86.02	25.45	37.78	0.03
60	0.32	89.72	88.44	23.74	30.75	0.03
70	0.36	85.10	88.28	22.36	27.07	0.03
80	0.40	85.49	82.64	21.36	24.39	0.03
90	0.44	79.95	81.37	20.78	22.61	0.02
100	0.48	79.70	78.93	20.79	21.95	0.02
150	0.84	72.20	71.91	15.42	16.04	0.02
160	1.27	72.09	70.13	10.49	10.76	0.03
170	2.07	71.53	68.41	7.01	7.10	0.03
180	3.34	71.30	66.49	4.64	4.62	0.03
190	5.04	70.11	65.20	3.12	3.02	0.03
200	7.03	69.58	64.25	2.19	2.05	0.03
210	9.15	68.30	63.55	1.63	1.46	0.03
220	11.31	65.89	62.80	1.29	1.11	0.04
250	17.51	59.28	61.61	0.84	0.63	0.05
265	20.39	56.45	61.01	0.73	0.53	0.05
275	22.23	54.52	60.55	0.68	0.48	0.06
300	26.59	49.88	59.96	0.58	0.40	0.06
325	30.69	45.80	59.35	0.51	0.34	0.08
350	34.61	42.03	58.78	0.46	0.30	0.09
400	42.21	35.29	57.76	0.39	0.24	0.13
440	48.65	30.53	57.01	0.37	0.20	0.16
475	55.40	26.72	56.47	0.37	0.18	0.19
500	62.26	24.18	56.02	0.38	0.16	0.23
540	74.34	20.37	55.53	0.43	0.14	0.30
600	60.31	15.18	54.85	0.58	0.12	0.48
700	56.74	7.96	54.04	1.43	0.10	1.38
750	56.20	5.21	53.96	2.44	0.09	2.42
1000	55.58	0.54	55.84	15.15	0.07	15.62
1200	57.26	0.30	57.81	24.18	0.08	24.69
1400	59.78	0.23	59.92	27.63	0.08	27.15
1600	62.24	0.20	62.56	32.42	0.10	30.23
1800	65.14	0.18	64.81	34.94	0.11	35.14
2000	66.79	0.17	66.80	30.76	0.12	37.05
2200	67.19	0.16	67.60	27.95	0.12	34.47
2500	65.31	0.16	65.69	26.02	0.12	30.24
2600	64.49	0.16	64.34	25.44	0.12	28.90
2800	61.89	0.16	61.81	24.57	0.11	26.16
3000	58.56	0.17	59.05	23.21	0.11	23.58
3200	56.55	0.19	56.04	21.54	0.10	21.31
3500	52.50	0.22	52.74	19.13	0.08	18.81
3600	51.64	0.23	52.11	18.44	0.08	18.15
3800	49.14	0.25	49.54	17.35	0.06	17.22
4000	47.70	0.26	48.13	16.68	0.04	16.78
4200	45.21	0.26	45.79	16.47	0.03	16.79
4400	43.12	0.26	43.76	16.55	0.02	17.24
4500	42.45	0.26	43.11	16.79	0.01	17.63
4600	41.51	0.25	42.23	16.98	0.02	18.09
4700	40.71	0.25	41.25	17.27	0.01	18.69
4800	39.55	0.25	40.36	17.64	0.00	19.29
5000	38.05	0.24	39.01	18.27	0.00	20.41
5200	35.90	0.27	36.80	18.39	0.01	20.55
5400	35.23	0.31	35.92	17.59	0.03	19.19
5600	32.93	0.40	33.80	16.39	0.02	17.07
5800	31.14	0.49	31.66	14.59	0.11	14.77
6500	24.57	1.90	25.60	7.48	0.26	7.09

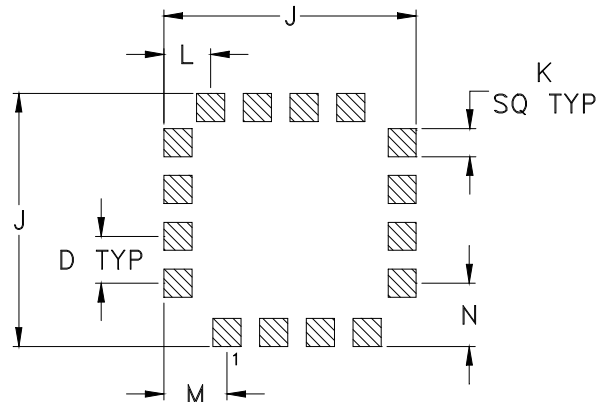
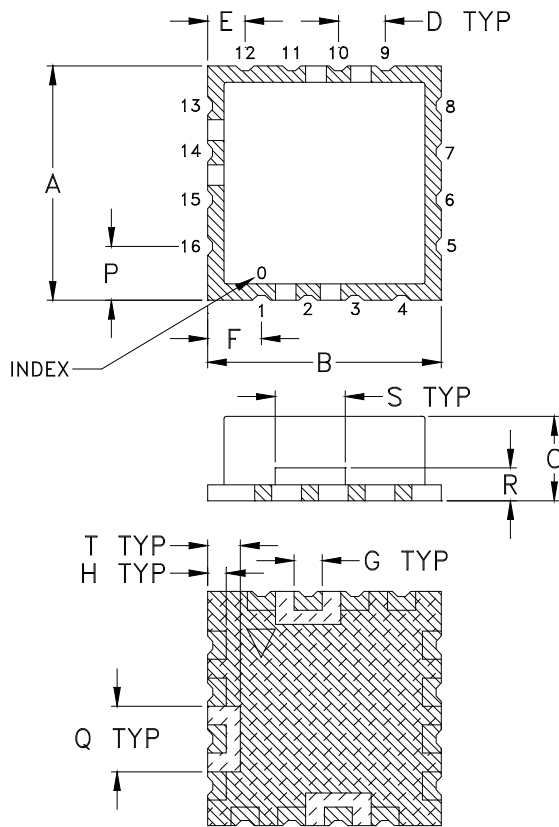
Typical Performance Curves



Outline Dimensions

CK605

PCB Land Pattern



Suggested Layout,
Tolerance to be within $\pm .002$

CASE #	A	B	C	D	E	F	G	H	J	K
CK605	.500 (12.70)	.500 (12.70)	.180 (4.57)	.100 (2.54)	.080 (2.03)	.115 (2.92)	.060 (1.52)	.040 (1.02)	.540 (13.72)	.060 (1.52)

CASE #	L	M	N	P	Q	R	S	T	WT. GRAM
CK605	.100 (2.54)	.135 (3.43)	.135 (3.43)	.115 (2.92)	.140 (3.56)	.070 (1.78)	.150 (3.81)	.070 (1.78)	1.2 +0.5 -0.0

Dimensions are in inches (mm). Tolerances: 2 Pl. $\pm .03$; 3Pl. $\pm .015$

Notes:

- Case material: Nickel-Silver alloy.
- Base: Printed wiring laminate.
- Termination finish:
For RoHS Case Styles: 3-5 μ inch (.08-.13 microns) Gold over 120-240 μ inch (3.05-6.10 microns) Nickel plate.
All models, (+) suffix.



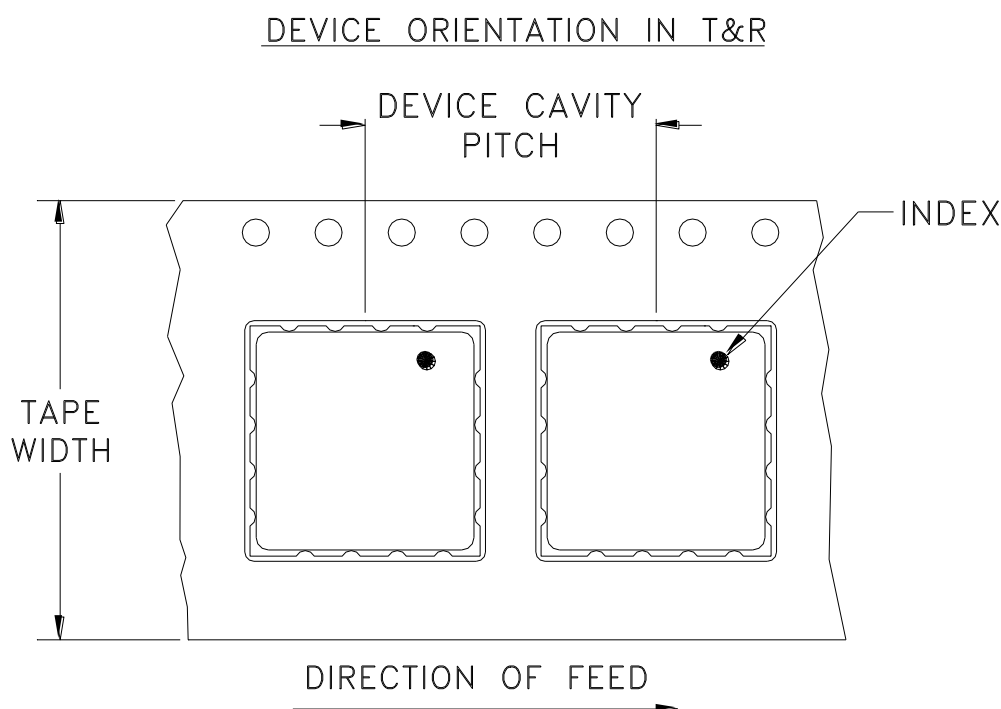
P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661 For detailed performance specs & shopping online see Mini-Circuits web site



The Design Engineers Search Engine Provides ACTUAL Data Instantly From MINI-CIRCUITS At: www.minicircuits.com

RF/IF MICROWAVE COMPONENTS

Tape & Reel Packaging TR-F37



Tape Width, mm	Device Cavity Pitch, mm	Reel Size, inches	Devices per Reel	
24	16	7	Small quantity standards (see note)	10
				20
				50
				100
		13	Standard	200
				500

Note: Please consult individual model data sheet to determine device per reel availability.

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



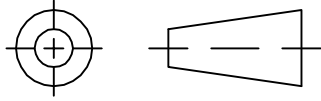
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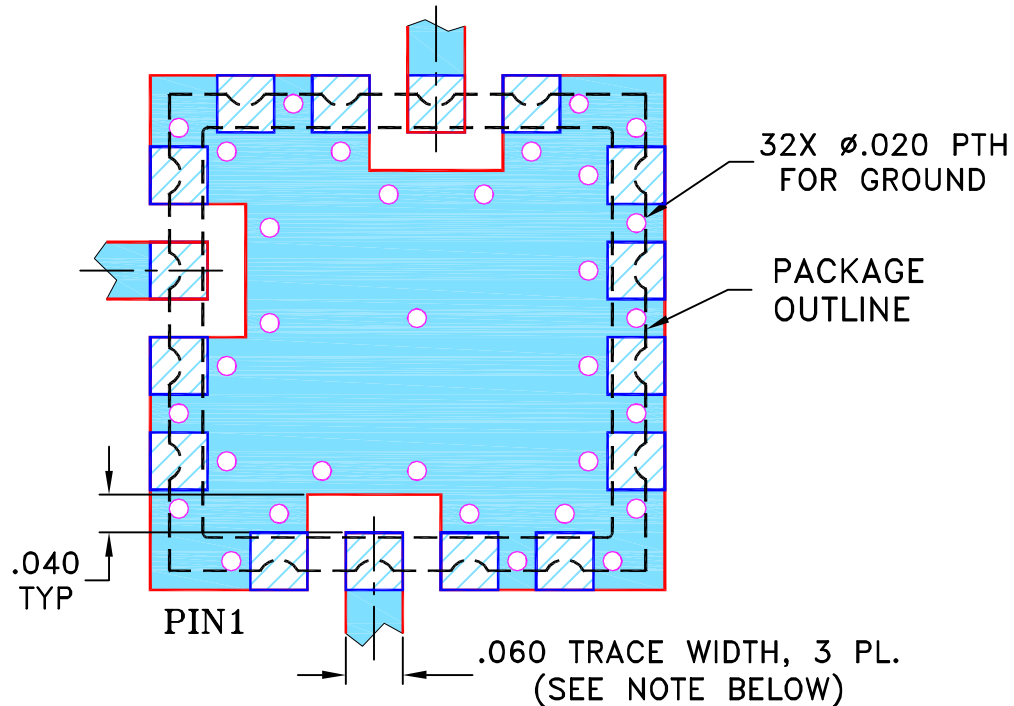
THIRD ANGLE PROJECTION



REVISIONS

REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
E	M105563	ADDED "rl" PIN CONNECTION	06/02/06	MMG	DJ
F	M105640	CORRECTED NOTE 2	06/08/06	MMG	MM
G	M124395	ADDED "RAMP"	09/09	EM	HH
G	R77589	ADDED "RAMP"	09/09	EM	HH

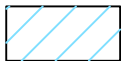
SUGGESTED MOUNTING CONFIGURATION FOR
CK605 CASE STYLE, "kg/rl/16AM01" PIN CONNECTION

NOTES:

1. TRACE WIDTH IS SHOWN FOR FR4 WITH DIELECTRIC THICKNESS .030" $\pm$.002"; COPPER: 1/2 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH MAY NEED TO BE MODIFIED.
2. BOTTOM SIDE OF THE BOTTOM 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 $\pm$.005ANGLES $\pm$ FRACTIONS $\pm$

DRAWN

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08/07/00

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SK

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APPROVED

DB

08/08/00

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Brooklyn NY 11235

PL,kg/rl/16AM01,CK605,ROS/LAVI/RAMP

SIZE
A

CODE IDENT
15542

DRAWING NO:
98-PL-012

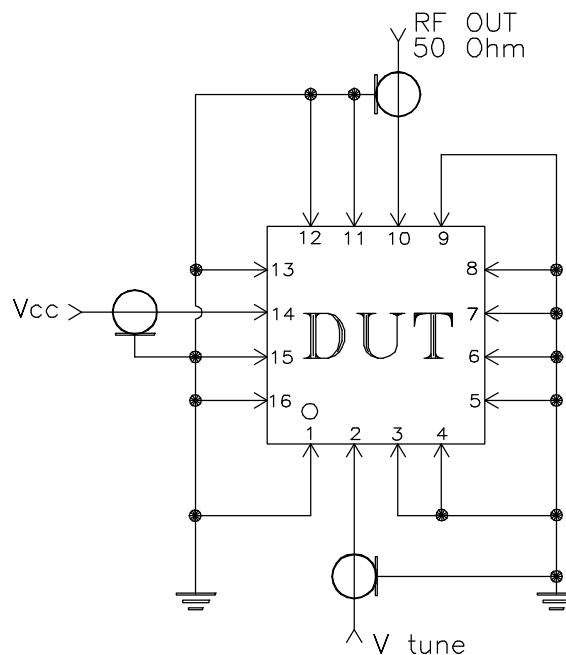
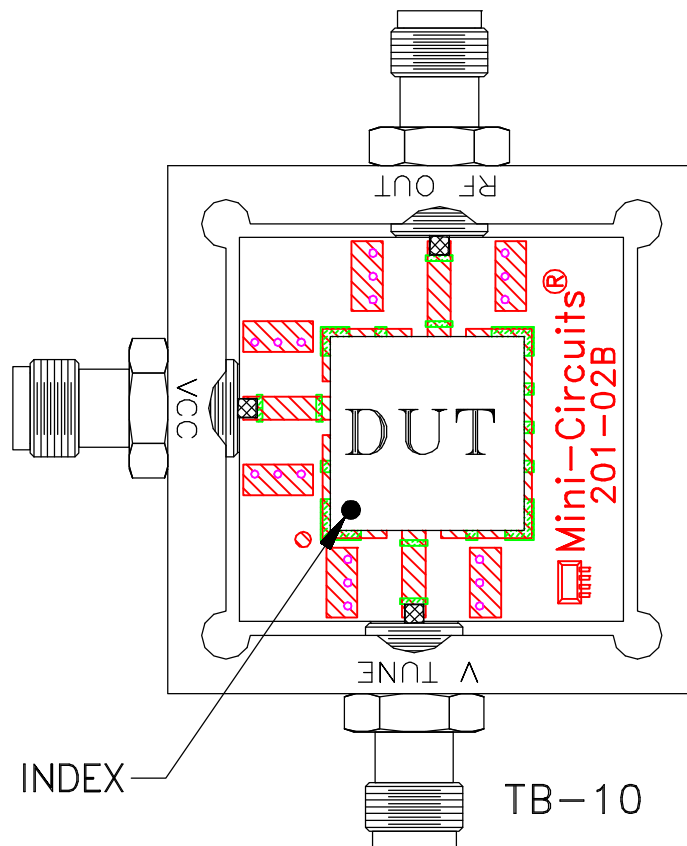
REV:
G

FILE: 98PL012

SCALE: 5:1

SHEET: 1 OF 1

Evaluation Board and Circuit



Schematic Diagram

Notes:

1. SMA Female connectors.
2. PCB Material: Rogers R04350 or equivalent,
Dielectric Constant=3.5, Thickness=.030 inch.

 **Mini-Circuits®**



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 Ambient Environment	Individual Model Data Sheet
Storage Temperature	-55° to 100° C Ambient Environment	Individual Model Data Sheet
Humidity	90 to 95% RH, 240 hours, 50°C	MIL-STD-202, Method 103, Condition A, Except 50°C and end-point electrical test done within 12 hours
Thermal Shock	-55° to 100°C, 100 cycles	MIL-STD-202, Method 107, Condition A-3, except +100°C
Solder Reflow Heat	Sn-Pb Eutetic Process: 225°C peak Pb-Free Process 245° - 250°C peak	J-STD-020, Table 4-1, 4-2 and 5-2, Figure 5-1
Solderability	10X Magnification	J-STD-002, 95% Coverage
Vibration (High Frequency)	20g peak, 10-2000 Hz, 12 times in each of three perpendicular directions (total 36)	MIL-STD-202, Method 204, Condition D
Mechanical Shock	50g, 11 ms, 1/2-sine, 18 shocks: 3 each direction, each of 3 axes	MIL-STD-202, Method 213, Condition A
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