

Engineering Development Model

Frequency Synthesizer

DSN-EDR8717

Important Note

This model has been designed, built and tested in our engineering department. Performance data represents model capability. At present it is a non-catalog model. On request, we can supply a final specification sheet, part number and price/delivery information.



Please click "Back", and then click "Contact Us" for Applications support.

CASE STYLE : KL942

ELECTRICAL SPECIFICATIONS 50Ω, over -45°C to +70°C				
Parameter	Min.	Typ.	Max.	Units
Frequency	900		2000	MHz
Step size		250		kHz
Settling Time Within ±1kHz		3		msec
Output Power	-7	-2	+2	dBm
Phase Noise				
at 100 Hz offset		-83		dBc/Hz
at 1 kHz offset		-87		dBc/Hz
at 10 kHz offset		-82		dBc/Hz
at 100 kHz offset		-109		dBc/Hz
at 1000 kHz offset		-140		dBc/Hz
Integrated SSB Phase Noise		-40		dBc
Reference Spurious Suppression		-99		dBc
Comparison Spurious Suppression		-116		dBc
Non-Harm. Spurious Suppression		-90		dBc
Harmonic Suppression		-25		dBc
Supply voltage VCO		10		V
Supply voltage PLL		19		V
Supply current VCO		50	59	mA
Supply current PLL		16	25	mA
Reference In (External)				
Frequency		10		MHz
Amplitude		1		Vp-p
Impedance		100		kΩ
Ph. N @ 1kHz		-145		dBc/Hz
Input Logic Levels	Logic high 2.4		3	V
Logic Low			0.6	
Digital Lock Detect	Locked 2.6		3	V
Unlocked			0.4	
Frequency Synthesizer PLL	ADF4113			

ABSOLUTE MAXIMUM RATINGS	
Operating Temperature	-45°C to 85°C
Storage Temperature	-55°C to 100°C
VCO Supply Voltage	11V
PLL Supply Voltage	20V
Reference Frequency voltage	5.8Vp-p
Data, Clock & LE levels	3.3V

Power On sequence: Vcc VCO followed by Vcc PLL

Power Off sequence: Vcc PLL followed by Vcc VCO

PIN CONNECTIONS			
RF OUT	5	CLOCK	11
VCC VCO	16	DATA	9
VCC PLL	18	LATCH ENABLE	12
REF IN	14	GROUND	1-4,6,8,10,13
LOCK DETECT	7		15,17,19-22

Notes

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Typical Performance Data

FREQ. (MHz)	POWER OUTPUT (dBm)			HARMONICS						VCO CURRENT (mA)			PLL CURRENT (mA)		
				(dBc)											
	-45 °C	+25°C	+85 °C	F2			F3								
-45 °C				+25°C	+85 °C	-45 °C	+25°C	+85 °C							
870	-2.71	-2.45	-2.83	-9.05	-9.66	-11.63	-26.08	-27.28	-28.20	47.43	49.41	50.78	13.94	16.78	20.03
900	-2.86	-2.52	-2.60	-9.97	-10.57	-11.78	-26.47	-27.63	-29.41	47.47	49.48	50.85	13.98	16.78	20.03
928	-2.66	-2.27	-2.21	-10.74	-11.26	-12.12	-27.39	-28.69	-31.06	47.51	49.51	50.89	13.97	16.76	20.02
986	-2.87	-2.44	-2.27	-11.50	-11.89	-12.44	-30.57	-32.41	-35.29	47.60	49.59	50.96	14.01	16.79	20.05
1102	-2.43	-1.96	-1.74	-13.67	-13.91	-14.26	-54.00	-52.64	-52.29	47.84	49.78	51.11	14.08	16.84	20.10
1160	-2.29	-1.76	-1.56	-14.94	-15.17	-15.43	-38.23	-39.84	-41.47	48.00	49.91	51.20	14.07	16.83	20.09
1276	-2.08	-1.55	-1.34	-19.00	-19.14	-19.15	-34.17	-35.73	-37.22	48.34	50.20	51.44	14.14	16.89	20.15
1334	-1.73	-1.26	-1.06	-21.96	-22.12	-22.06	-35.86	-37.27	-38.58	48.52	50.37	51.58	14.17	16.92	20.18
1392	-1.99	-1.55	-1.35	-24.90	-25.19	-25.22	-36.79	-38.12	-38.71	48.72	50.55	51.74	14.16	16.90	20.16
1450	-1.90	-1.46	-1.24	-27.58	-28.36	-28.81	-37.38	-38.25	-39.41	48.89	50.71	51.89	14.19	16.93	20.19
1508	-2.05	-1.63	-1.44	-29.95	-30.93	-31.89	-39.95	-40.56	-41.33	49.03	50.84	52.00	14.23	16.95	20.22
1566	-2.26	-1.81	-1.61	-31.91	-33.11	-34.30	-42.69	-43.66	-44.45	49.11	50.91	52.07	14.26	16.98	20.25
1624	-2.51	-2.10	-1.91	-34.72	-35.61	-36.95	-45.86	-46.13	-45.49	49.11	50.92	52.09	14.25	16.96	20.23
1740	-2.73	-2.34	-2.15	-38.75	-38.84	-39.47	-45.25	-44.72	-42.19	48.85	50.71	51.92	14.31	17.02	20.28
1798	-3.07	-2.68	-2.53	-34.19	-35.56	-36.04	-38.01	-39.71	-37.86	48.61	50.51	51.77	14.34	17.05	20.31
1914	-3.26	-2.97	-2.87	-30.32	-31.33	-32.60	-39.11	-40.13	-40.14	48.07	50.05	51.41	14.35	17.05	20.32
1972	-3.56	-3.27	-3.17	-29.59	-30.95	-32.16	-40.32	-39.07	-41.02	47.84	49.85	51.25	14.38	17.08	20.34
2000	-3.79	-3.48	-3.45	-29.58	-31.32	-32.59	-41.08	-39.97	-41.37	47.7	49.77	51.18	14.36	17.06	20.32
2030	-3.69	-3.50	-3.48	-30.40	-31.63	-32.69	-42.24	-40.97	-42.73	47.62	49.67	51.10	14.40	17.10	20.36

FREQ. (MHz)	PHASE NOISE (dBc/Hz)														
	@ OFFSETS														
	-45 °C					+25 °C					+85 °C				
	100Hz	1kHz	10kHz	100kHz	1MHz	100Hz	1kHz	10kHz	100kHz	1MHz	100Hz	1kHz	10kHz	100kHz	1MHz
870	-86.20	-89.90	-81.12	-105.44	-137.32	-87.98	-91.39	-80.66	-104.78	-136.01	-85.46	-89.96	-80.39	-103.91	-133.02
900	-86.44	-90.14	-81.40	-106.43	-136.92	-87.49	-89.64	-80.53	-105.49	-136.81	-87.55	-89.92	-80.16	-104.78	-134.18
928	-85.16	-88.83	-81.92	-106.75	-136.56	-83.22	-89.46	-80.59	-106.05	-136.93	-85.73	-89.49	-80.35	-105.29	-134.64
986	-85.59	-88.27	-82.38	-107.34	-138.57	-84.79	-89.65	-81.15	-106.32	-137.22	-84.80	-89.16	-80.45	-105.63	-135.42
1102	-83.82	-86.40	-82.80	-107.88	-139.09	-85.27	-87.65	-81.55	-106.92	-138.17	-86.10	-88.01	-81.22	-105.84	-136.06
1160	-83.30	-88.27	-83.28	-107.89	-137.90	-83.34	-87.00	-81.42	-106.92	-138.28	-82.86	-86.23	-81.06	-105.81	-136.48
1276	-82.43	-86.53	-82.19	-108.09	-139.57	-83.34	-87.23	-81.40	-107.19	-139.25	-83.00	-88.05	-80.77	-106.04	-136.84
1334	-82.94	-88.28	-82.50	-108.38	-139.86	-83.80	-88.57	-81.69	-107.59	-138.60	-83.80	-88.51	-81.31	-106.51	-137.74
1392	-82.19	-84.95	-83.10	-108.98	-139.25	-81.23	-88.48	-82.19	-108.15	-140.33	-82.66	-87.19	-81.60	-106.99	-138.74
1450	-83.85	-86.16	-83.09	-109.47	-139.35	-82.16	-86.84	-82.27	-108.72	-139.48	-83.60	-88.24	-81.33	-107.70	-139.39
1508	-82.67	-86.17	-83.59	-110.20	-140.04	-82.12	-87.41	-82.86	-109.53	-141.11	-82.46	-87.18	-82.07	-108.32	-140.24
1566	-82.16	-85.44	-84.19	-110.87	-141.44	-82.33	-88.57	-83.58	-110.08	-141.56	-80.08	-88.17	-82.85	-109.12	-140.72
1624	-80.09	-85.06	-83.34	-111.34	-141.79	-82.53	-87.61	-82.8	-110.63	-140.88	-83.70	-86.83	-82.75	-109.64	-141.14
1740	-80.35	-86.76	-83.52	-112.19	-142.40	-86.47	-88.32	-82.85	-111.45	-141.85	-83.15	-87.28	-82.64	-110.59	-141.56
1798	-80.02	-85.17	-83.47	-112.65	-141.36	-80.95	-86.69	-82.96	-111.72	-142.48	-80.39	-87.14	-83.33	-110.88	-141.51
1914	-80.46	-85.19	-82.39	-113.07	-141.84	-80.47	-85.41	-82.34	-112.41	-141.81	-80.97	-85.24	-82.30	-111.53	-141.50
1972	-76.97	-85.06	-83.00	-113.40	-141.26	-79.79	-85.09	-83.08	-112.70	-141.80	-79.27	-86.81	-82.73	-111.87	-141.14
2000	-80.14	-84.84	-82.92	-113.73	-142.52	-79.59	-85.33	-82.88	-112.95	-141.69	-78.98	-84.10	-83.17	-112.12	-141.06
2030	-78.43	-84.37	-83.28	-113.84	-141.33	-81.02	-84.66	-83.15	-113.25	-141.35	-82.23	-87.82	-83.17	-112.43	-141.00

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Typical Performance Data

COMPARISON SPURIOUS ORDER	COMPARISON SPURIOUS @Fcarrier 900 MHz± (n*Fcomparison) (dBc) NOTE 1			COMPARISON SPURIOUS @Fcarrier 1450 MHz± (n*Fcomparison) (dBc) NOTE 1			COMPARISON SPURIOUS @Fcarrier 2000 MHz± (n*Fcomparison) (dBc) NOTE 1		
	-45 °C	+25°C	+85 °C	-45 °C	+25°C	+85 °C	-45 °C	+25°C	+85 °C
-5	-108.44	-114.89	-116.58	-112.67	-106.42	-113.65	-107.03	-113.17	-113.46
-4	-103.66	-112.49	-116.75	-104.21	-103.09	-110.56	-103.05	-111.93	-112.23
-3	-96.14	-105.90	-113.68	-94.91	-99.88	-105.71	-98.19	-106.99	-109.79
-2	-87.06	-96.39	-108.25	-86.39	-94.91	-100.26	-91.49	-100.21	-106.20
-1	-84.24	-88.99	-96.87	-83.14	-91.61	-91.78	-84.44	-89.44	-94.46
0 ^{note 2}	-	-	-	-	-	-	-	-	-
+1	-83.59	-87.63	-95.96	-81.53	-89.18	-89.67	-83.76	-88.08	-93.00
+2	-86.19	-95.51	-105.46	-85.47	-93.70	-98.65	-89.18	-97.25	-102.21
+3	-94.95	-105.57	-112.94	-93.39	-98.81	-104.04	-95.44	-103.87	-106.90
+4	-101.28	-112.08	-114.90	-101.89	-102.72	-108.63	-100.76	-109.03	-110.12
+5	-105.10	-113.94	-117.03	-109.39	-105.66	-112.82	-104.07	-109.30	-111.92

Note 1: Comparison frequency 250 kHz

Note 2: All spurs are referenced to carrier signal (n=0).

REFERENCE SPURIOUS ORDER	REFERENCE SPURIOUS @Fcarrier 900 MHz± (n*Freference) (dBc) NOTE 3			REFERENCE SPURIOUS @Fcarrier 1450 MHz± (n*Freference) (dBc) NOTE 3			REFERENCE SPURIOUS @Fcarrier 2000 MHz± (n*Freference) (dBc) NOTE 3		
	-45 °C	+25°C	+85 °C	-45 °C	+25°C	+85 °C	-45 °C	+25°C	+85 °C
-5	-111.86	-115.32	-113.69	-115.92	-122.15	-119.79	-115.49	-115.56	-116.20
-4	-117.83	-121.27	-121.02	-128.38	-128.47	-123.65	-118.84	-115.24	-114.61
-3	-117.88	-120.03	-119.40	-124.06	-124.52	-127.80	-116.18	-114.92	-117.03
-2	-111.37	-118.74	-118.25	-115.77	-114.44	-116.28	-101.45	-100.38	-103.08
-1	-110.71	-112.09	-114.03	-108.96	-114.94	-119.12	-104.45	-103.67	-101.10
0 ^{note 4}	-	-	-	-	-	-	-	-	-
+1	-108.48	-114.40	-110.54	-119.18	-112.92	-106.63	-102.66	-99.30	-98.11
+2	-119.66	-126.07	-120.86	-126.27	-125.75	-119.22	-98.35	-99.12	-101.15
+3	-125.02	-123.47	-124.63	-126.17	-124.06	-128.07	-117.32	-114.66	-114.54
+4	-118.01	-126.49	-121.23	-124.69	-123.86	-124.57	-117.16	-117.87	-117.23
+5	-116.99	-114.79	-116.19	-122.18	-118.55	-118.60	-115.24	-116.69	-117.50

Note 3: Reference frequency 10 MHz

Note 4: All spurs are referenced to carrier signal (n=0).

Notes

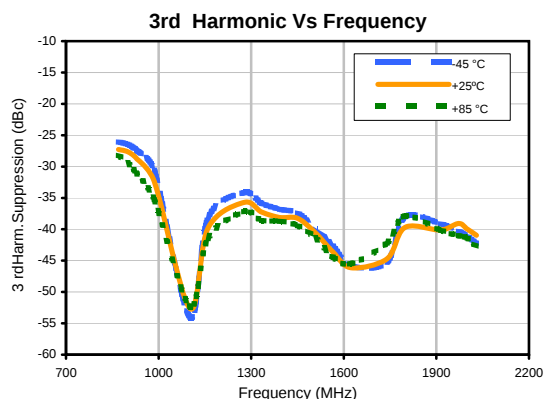
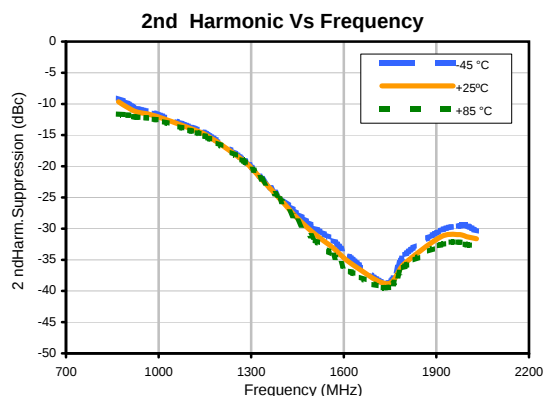
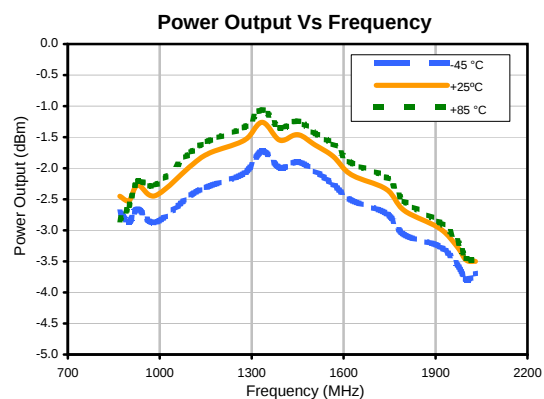
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Frequency Synthesizer

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Notes

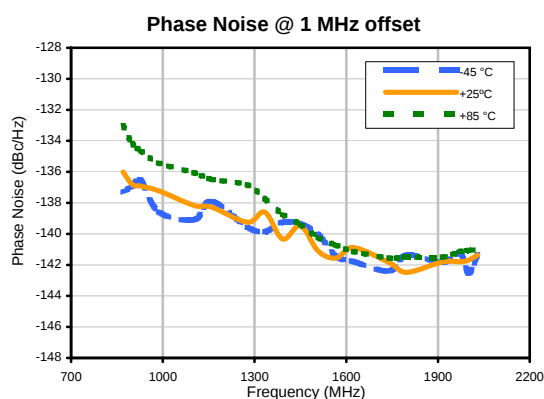
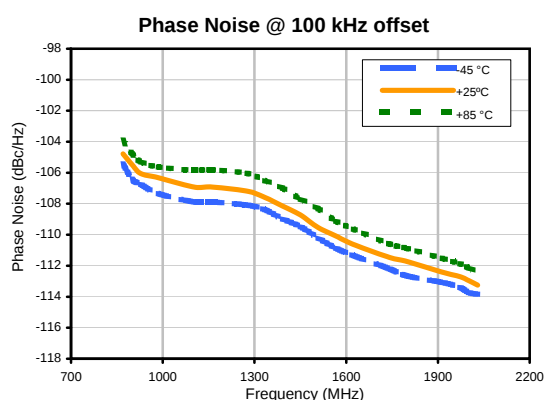
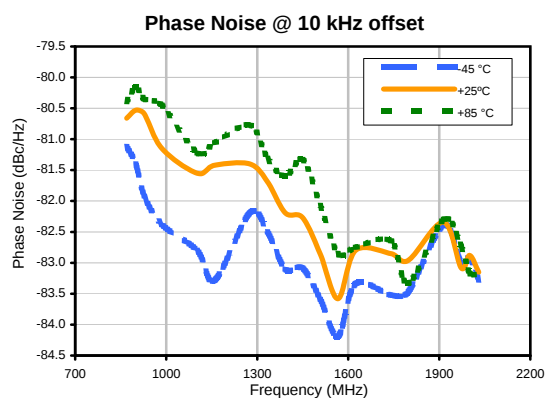
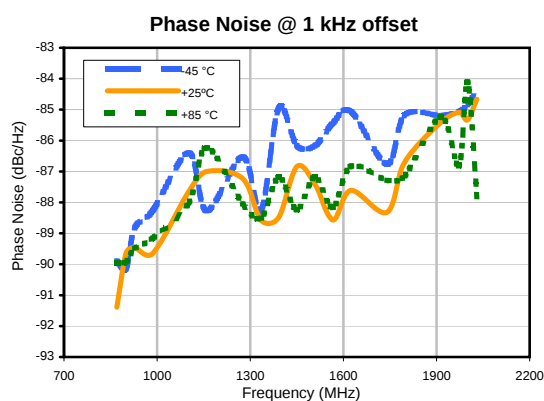
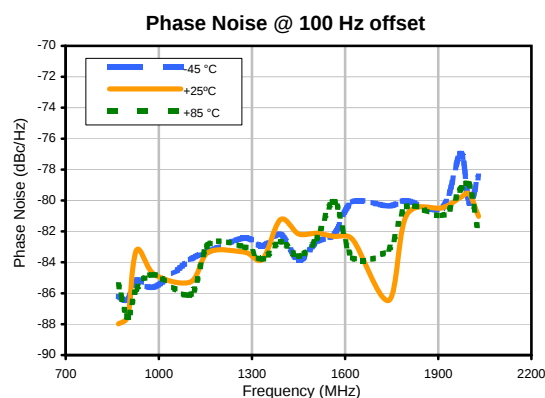
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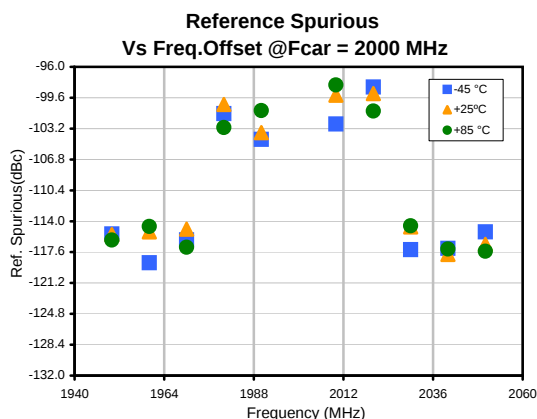
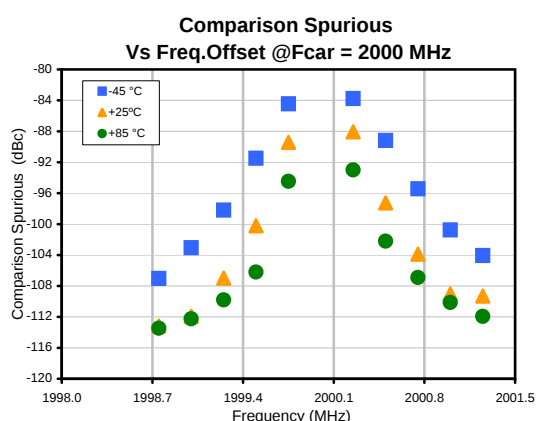
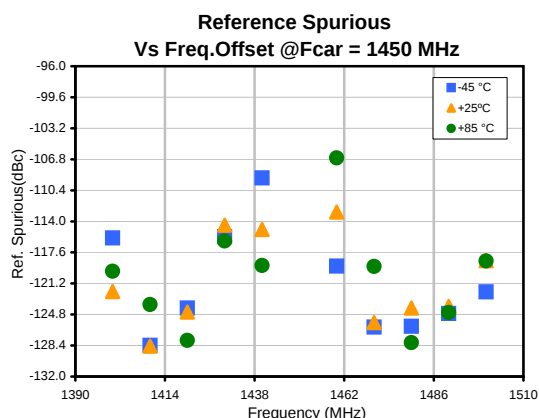
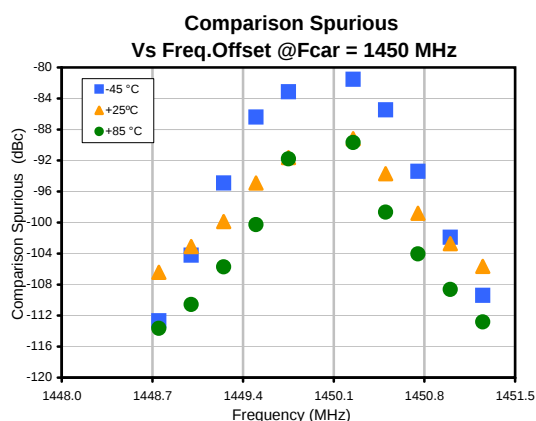
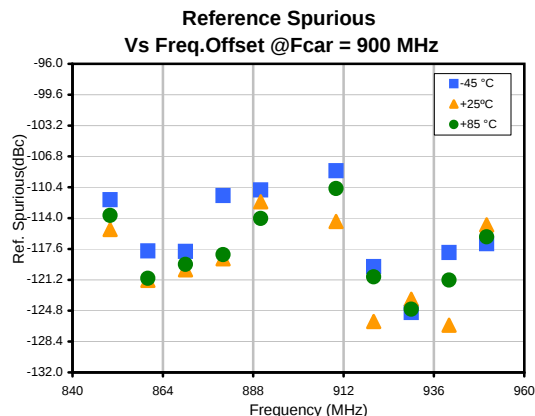
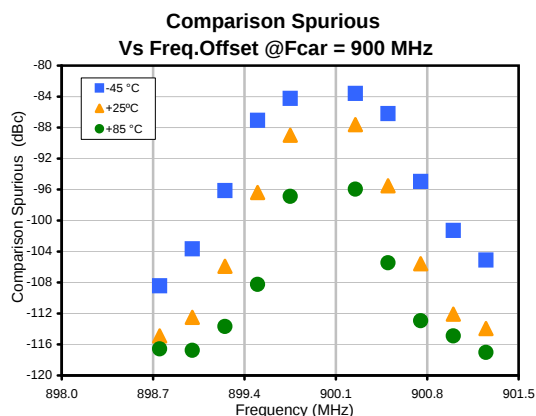
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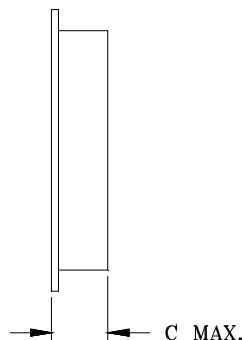
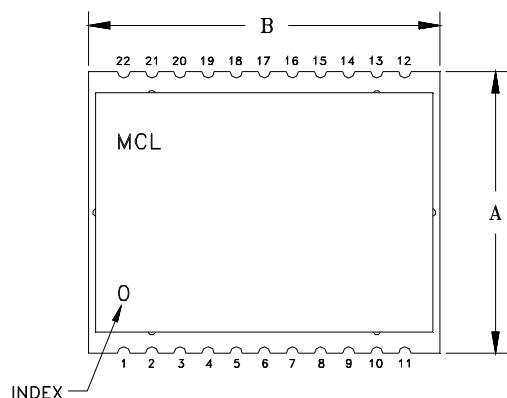
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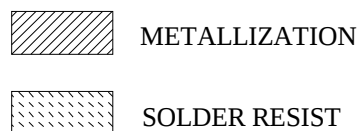
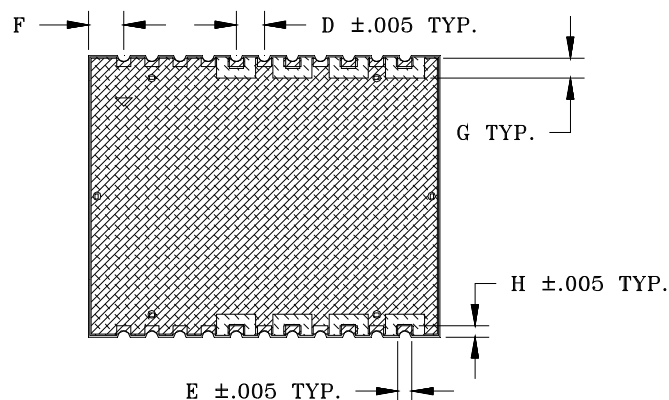
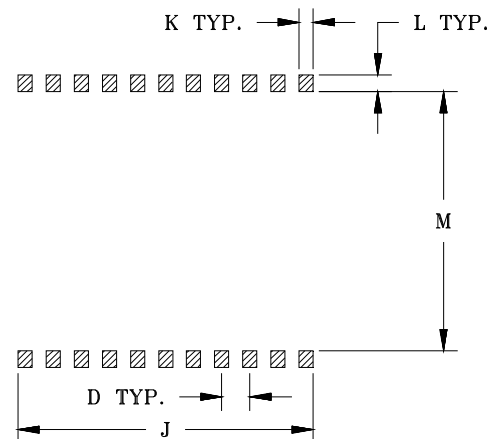


Outline Dimensions

KL942



Suggested PCB Land Pattern



CASE#	A	B	C	D	E	F	G	H	J	K	L	M	WT. GRAM
KL942	1.000 (25.40)	1.250 (31.75)	.200 (5.08)	.100 (2.54)	.050 (1.27)	.125 (3.18)	.080 (2.03)	.040 (1.02)	1.05 (26.67)	.050 (1.27)	.060 (1.52)	.920 (23.37)	5.8

Dimensions are in inches (mm). Tolerances: 2PL. +/- .03; 3PL. +/- .015

Notes:

1. Case material: Nickel-Silver alloy.
2. Base: Printed wiring laminate.
3. Termination finish:

For RoHS Case Styles: 2-5 μ inch (.05-.13 microns) Gold over 120-240 μ inch (3.05-6.10 microns) Nickel plate.
All models, (+) suffix.



INTERNET <http://www.minicircuits.com>

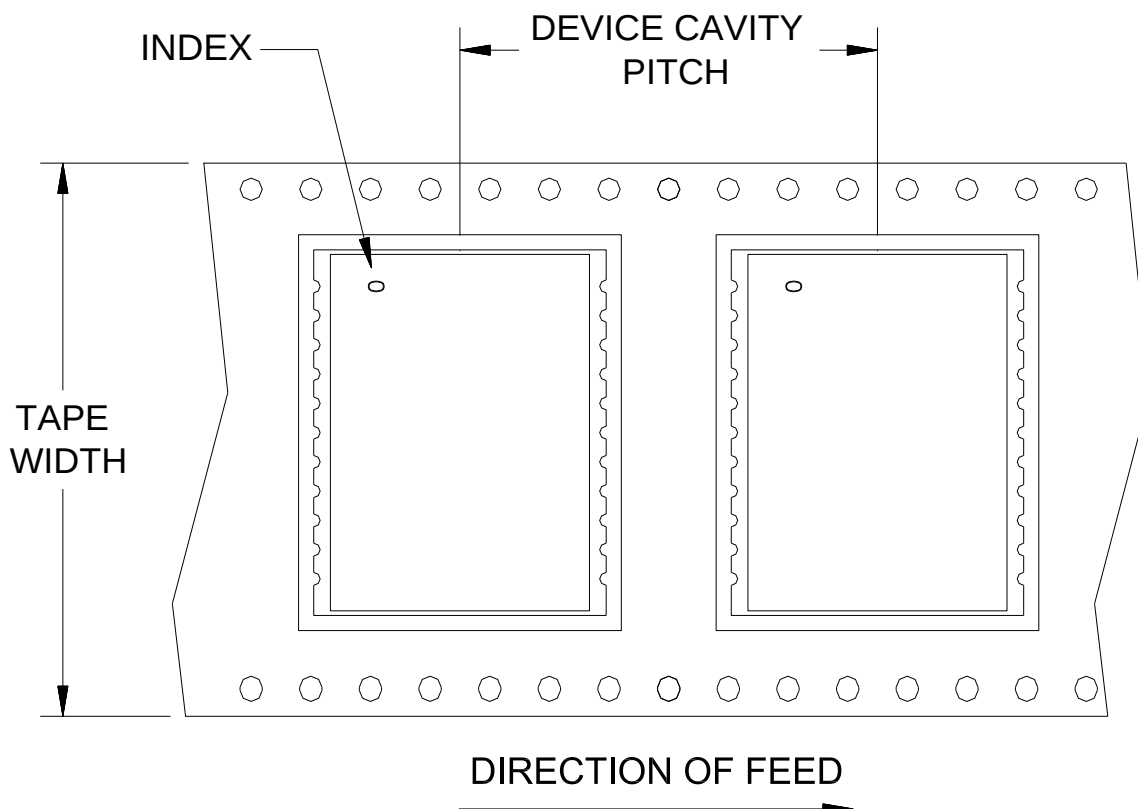
P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661

Distribution Centers NORTH AMERICA 800-654-7949 • 417-335-5935 • Fax 417-335-5945 • EUROPE 44-1252-832600 • Fax 44-1252-837010

Mini-Circuits ISO 9001 & ISO 14001 Certified

Tape & Reel Packaging TR-F97

DEVICE ORIENTATION IN T&R



Tape Width, mm	Device Cavity Pitch, mm	Reel Size, inches	Devices per Reel	
44	32	13	Small quantity standards (see note)	20
				50
				100
			Standard	200

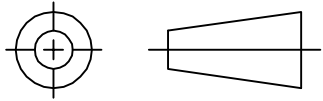
Note: Please consult individual model data sheet to determine device per reel availability.

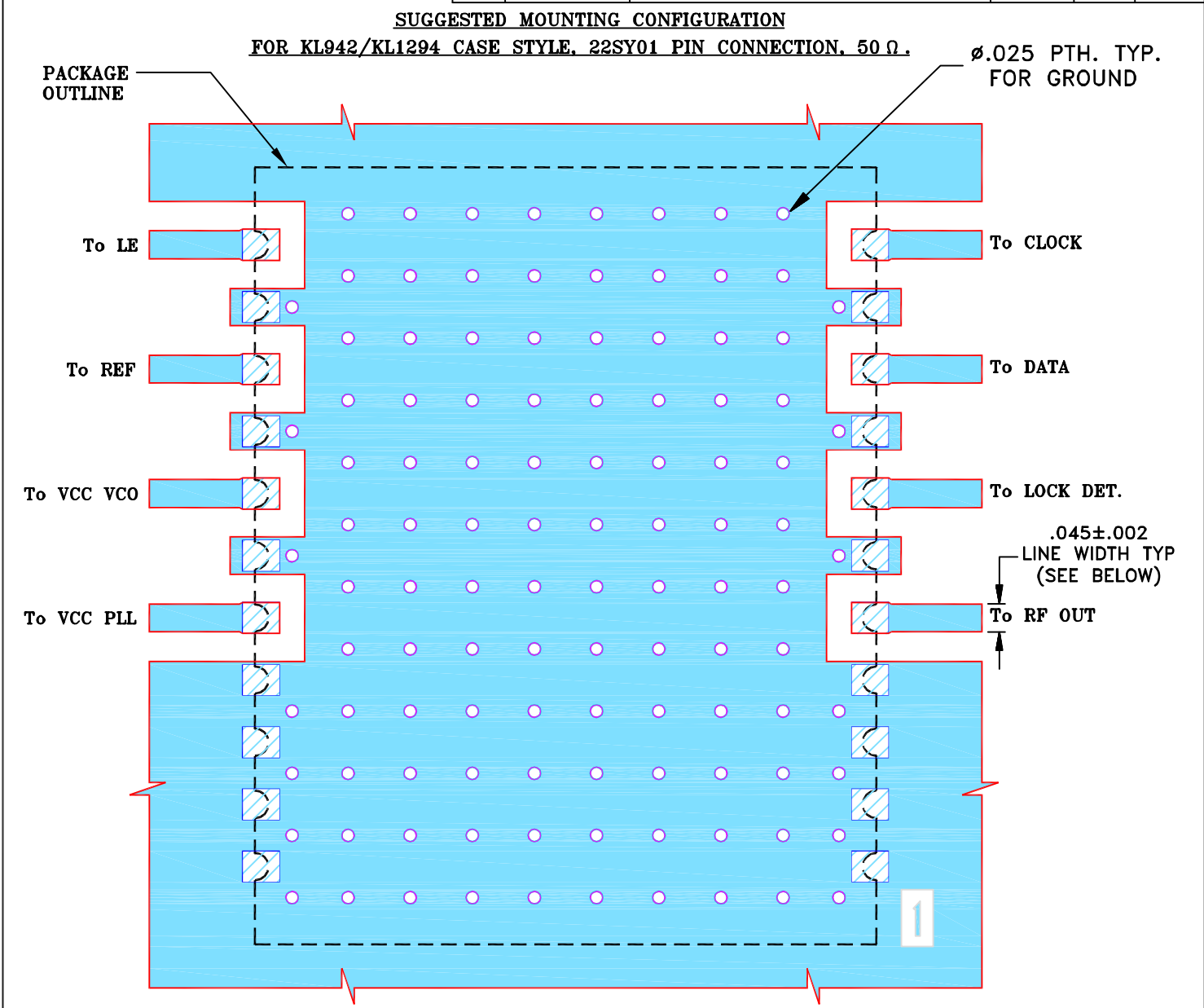
Mini-Circuits carrier tape materials provide protection from ESD (Electro-Static Discharge) during handling and transportation. Tapes are static dissipative and comply with industry standards EIA-481/EIA-541.

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



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THIRD ANGLE PROJECTION		REVISIONS					
		REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
		OR	M124738	NEW RELEASE	04/10	DK	HH
		OR	R77823	NEW RELEASE	04/10	DK	HH



NOTES:

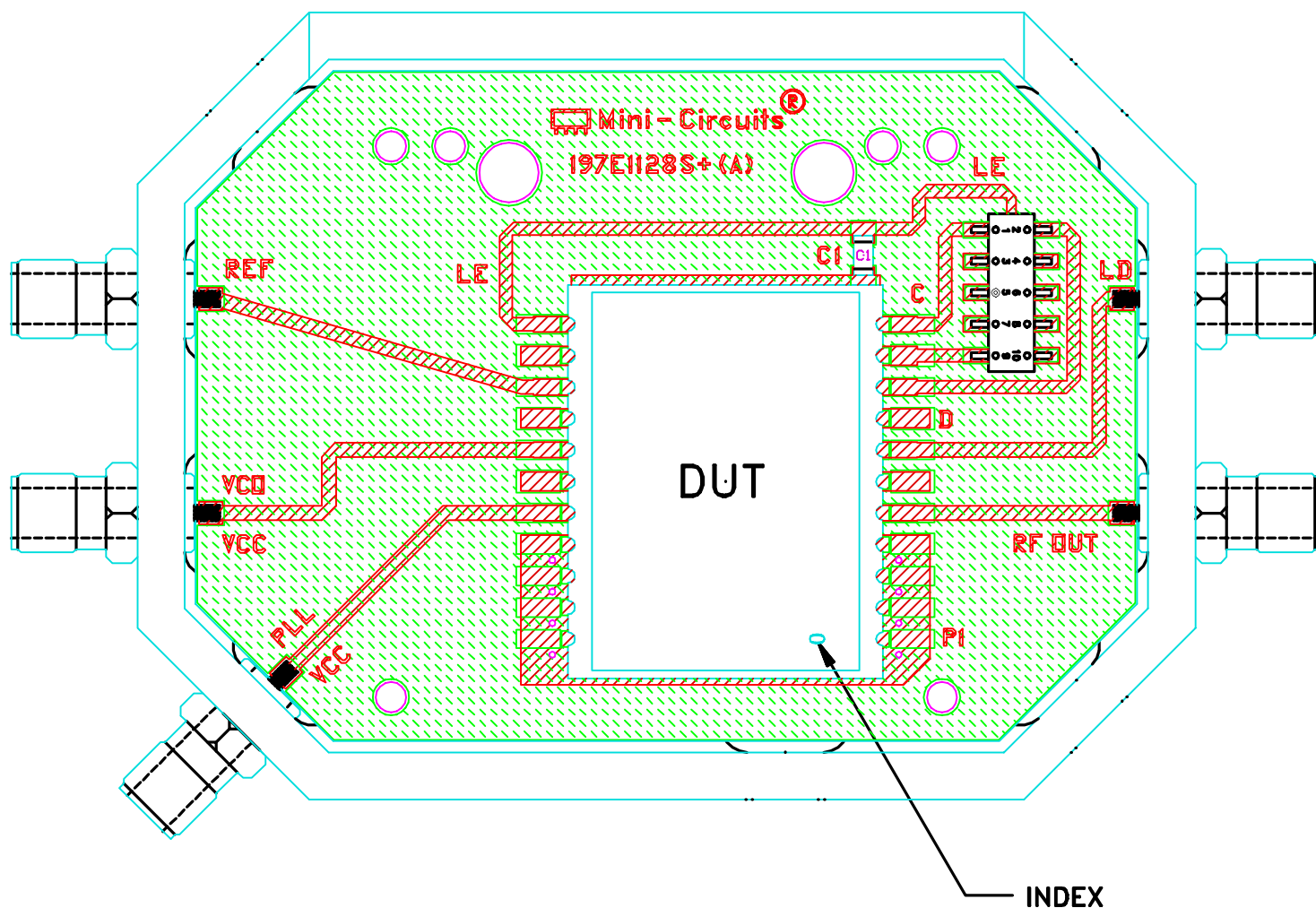
1. TRACE WIDTH IS SHOWN FOR R04350B WITH DIELECTRIC THICKNESS. .020"±.0015". COPPER: 1/2 OZ. EACH SIDE.
FOR OTHER MATERIALS TRACE WIDTH MAY NEED TO BE MODIFIED.

2. BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.

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

UNLESS OTHERWISE SPECIFIED	INITIALS		DATE	 Mini-Circuits® 13 Neptune Avenue Brooklyn NY 11235								
DIMENSIONS ARE IN INCHES	DRAWN	DK (RAVON)	06 APR 10									
TOLERANCES ON:	CHECKED	DH (RAVON)	07 APR 10									
2 PL DECIMALS ±	APPROVED	HH (RAVON)	07 APR 10									
3 PL DECIMALS ± .005				PL, 22SY01, KL942/KL1294, DSN TB-553+ (50 Ω)								
ANGLES ±												
FRACTIONS ±				<table> <tr> <td>SIZE</td> <td>CODE IDENT</td> <td>DRAWING NO:</td> <td>REV:</td> </tr> <tr> <td>A</td> <td>15542</td> <td>98-PL-318</td> <td>OR</td> </tr> </table>	SIZE	CODE IDENT	DRAWING NO:	REV:	A	15542	98-PL-318	OR
SIZE	CODE IDENT	DRAWING NO:	REV:									
A	15542	98-PL-318	OR									
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FILE:	98PL318	SCALE:	4:1	SHEET:	1 OF 1							
ASHEETA1.DWG REV:A DATE:01/12/95												

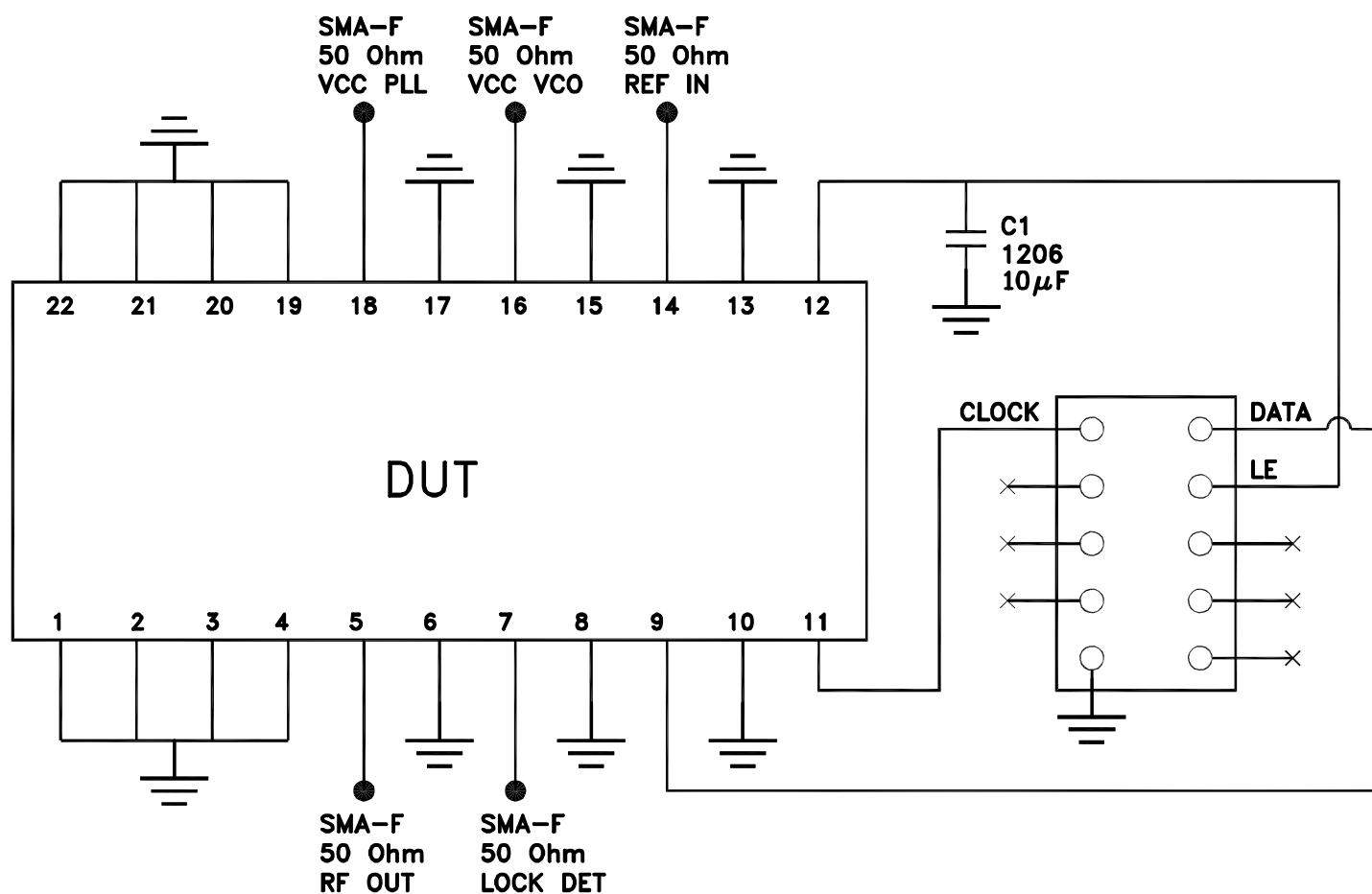
Evaluation Board and Circuit



TB-553+

NOTES:

1. SMA FEMALE CONNECTORS.
2. PCB MATERIAL: RO4350B OR EQUIVALENT, DIALECTRIC CONSTANT=3.5, DIALECTRIC THICKNESS=.020 INCH.



TB-553+ Schematic Diagram



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	-45° 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 Eutectic Process: 225°C peak Pb-Free Process, 245°C peak	J-STD-020, Table 4-1, 4-2 and 5-2, Figure 5-1
Solderability	10X Magnification	J-STD-002, Para 4.2.5, Test S, 95% Coverage
Vibration (High Frequency)	20g peak, 20-2000 Hz, 4 times in each of three axes (total 12)	MIL-STD-883, Method 2007.3, Condition A
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