

Frequency Synthesizer

DSN-2050A-119+

50Ω 1130 to 2100 MHz

The Big Deal

- Low phase noise and spurious
- Robust design and construction



CASE STYLE: KL942

Product Overview

The DSN-2050A-119+ is a Frequency Synthesizer, designed to operate from 1130 to 2100 MHz for digital TV application. The DSN-2050A-119+ is packaged in a metal case (size of 1.25" x 1.00" x 0.20") to shield against unwanted signals and noise.

Key Features

Feature	Advantages
Low phase noise and spurious: • Phase Noise: -100 dBc/Hz typ. @ 10 kHz offset • Comparison Spurious: -60 dBc typ. • Reference Spurious: -98 dBc typ.	Low phase noise and spurious improve system EVM (Error Vector Magnitude).
Robust design and construction	To enhance the robustness of DSN-2050A-119+, each internal component is secured to the substrate with chip bonder, thereby eliminating the risk of tombstoning during subsequent solder reflow operations by the customer.

50Ω 1130 to 2100 MHz

Features

- Integrated VCO + PLL
- Low phase noise and spurious
- Robust design and construction
- Low operating voltage (VCC VCO=+5V, VCC PLL=+24V)



CASE STYLE: KL942

+RoHS Compliant

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

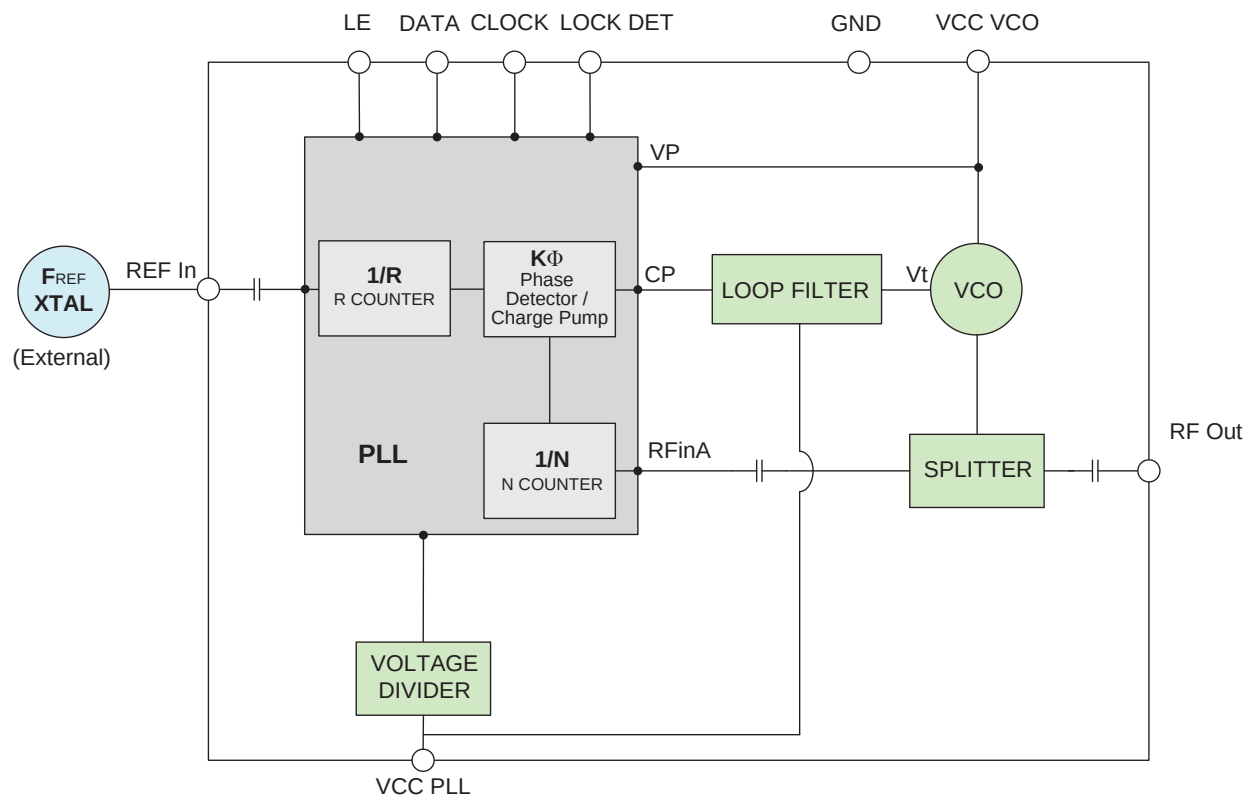
Applications

- Digital TV

General Description

The DSN-2050A-119+ is a Frequency Synthesizer, designed to operate from 1130 to 2100 MHz for digital TV application. The DSN-2050A-119+ is packaged in a metal case (size of 1.25" x 1.00" x 0.20") to shield against unwanted signals and noise. To enhance the robustness of DSN-2050A-119+, each internal component is secured to the substrate with chip bonder, thereby eliminating the risk of tombstoning during subsequent solder reflow operations by the customer.

Simplified Schematic



Electrical Specifications (over operating temperature -40°C to +85°C)

Parameters				Test Conditions				Min.	Typ.	Max.	Units																
Frequency Range				-				1130	-	2100	MHz																
Step Size				-				-	12.5	-	kHz																
Settling Time				Within ± 1 kHz				-	600	-	mSec																
Output Power				-				-2.5	+0.5	+3.5	dBm																
SSB Phase Noise				@ 100 Hz offset				-	-44	-	dBc/Hz																
				@ 1 kHz offset				-	-74	-67																	
				@ 10 kHz offset				-	-100	-93																	
				@ 100 kHz offset				-	-120	-114																	
				@ 1 MHz offset				-	-140	-130																	
Reference Spurious Suppression				Ref. Freq. 13 MHz				-	-98	-68	dBc																
Comparison Spurious Suppression				Step Size 12.5 kHz				-	-60	-																	
Non - Harmonic Spurious Suppression				-				-	-90	-																	
Harmonic Suppression				-				-	-20	-8																	
VCO Supply Voltage				+5.00				+4.75	+5.00	+5.25	V																
PLL Supply Voltage				+24.00				+23.75	+24.00	+24.25																	
VCO Supply Current				-				-	31	40	mA																
PLL Supply Current				-				-	27	35																	
Reference Input (External)		Frequency		13 (square wave)				-	13	-	MHz																
		Amplitude		1				-	1	-	V _{P-P}																
		Input impedance		-				-	100	-	KΩ																
		Phase Noise @ 1 kHz offset		-				-	-130	-	dBc/Hz																
RF Output port Impedance				-				-	50	-	Ω																
Input Logic Level		Input high voltage		-				2.5	-	-	V																
		Input low voltage		-				-	-	0.6	V																
Digital Lock Detect		Locked		-				2.6	-	3.5	V																
		Unlocked		-				-	-	0.4	V																
Frequency Synthesizer PLL				-				ADF4113																			
PLL Programming				-				3-wire serial 3V CMOS																			
Register Map ^{NOTE 1}	F_Register ^{NOTE 2}	Prescaler Value		Power-Down 2		Current Setting 2		Current Setting 1		Timer Counter Control		Fastlock Mode		Fastlock Enable		CP Three-State		PD Polarity		Muxout Control		Power-Down 1		Counter Reset		Control Bits	
		10		0		111		111		0000		0		0		0		1		001		0		0		10	
	N_Register @ 2100 MHz	Reserved		CP Gain		13-Bit B Counter										6-Bit A Counter						Control Bits					
		00		1		1010010000010										000000						01					
	R_Register	Reserved		DLY		SYNC		Lock Detect Precision		Test Mode Bits		Anti-Backlash Width		14-BIT Reference Counter, R										Control Bits			
		0		0		0		1		00		00		00010000010000										00			

Note 1: Registers Load Sequence: Initialization Register, F Register, R Register, N Register.**Note 2:** For the Initialization Register use Register F with Control Bits 11.**Absolute Maximum Ratings**

Parameters	Ratings
VCO Supply Voltage ^{NOTE 3}	5.5V
PLL Supply Voltage ^{NOTE 3}	25.0V
VCO Supply Voltage to PLL Supply Voltage	Note 3
Reference Frequency Amplitude	3.3V _{P-P}
Data, Clock, LE Levels	0Vmin, +3.3Vmax
Operating Temperature	-40°C to +85°C
Storage Temperature	-55°C to +100°C

Permanent damage may occur if any of these limits are exceeded

Note 3: Power on/off Sequence:
Power on: VCO Supply Voltage, followed by PLL Supply Voltage.
Power off: PLL Supply Voltage, followed by VCO Supply Voltage.

Typical Performance Data

FREQUENCY (MHz)	POWER OUTPUT (dBm)			VCO CURRENT (mA)			PLL CURENT (mA)		
	-45°C	+25°C	+85°C	-45°C	+25°C	+85°C	-45°C	+25°C	+85°C
1130	1.59	1.65	1.40	30.00	32.11	33.10	23.20	25.88	28.52
1147	1.55	1.58	1.33	30.08	32.18	33.15	23.21	25.89	28.53
1264	1.14	1.19	0.92	30.71	32.73	33.62	23.25	25.95	28.62
1381	0.95	1.00	0.72	31.30	33.25	34.08	23.29	26.00	28.69
1498	0.70	0.74	0.49	31.75	33.66	34.45	23.32	26.04	28.74
1615	0.40	0.45	0.25	32.05	33.97	34.74	23.35	26.09	28.79
1732	0.25	0.37	0.18	32.18	34.17	34.96	23.38	26.12	28.83
1849	-0.04	0.13	-0.04	32.13	34.22	35.09	23.40	26.15	28.87
1966	-0.24	-0.05	-0.17	31.82	34.06	35.02	23.43	26.19	28.92
2083	-0.55	-0.34	-0.41	31.38	33.75	34.82	23.45	26.22	28.95
2100	-0.52	-0.28	-0.39	31.30	33.68	34.77	23.44	26.22	28.96

FREQUENCY (MHz)	HARMONICS (dBc)					
	F2			F3		
	-45°C	+25°C	+85°C	-45°C	+25°C	+85°C
1130	-17.67	-19.46	-20.57	-25.55	-27.64	-29.35
1147	-17.29	-19.11	-20.24	-28.84	-30.57	-32.23
1264	-14.10	-15.95	-16.99	-31.56	-33.97	-35.36
1381	-12.67	-14.51	-15.52	-36.28	-37.56	-38.35
1498	-12.54	-14.39	-15.50	-38.88	-39.78	-40.18
1615	-14.60	-16.46	-17.75	-39.48	-38.72	-38.42
1732	-19.03	-20.91	-21.78	-36.00	-37.30	-37.63
1849	-21.96	-24.26	-24.90	-40.29	-40.18	-39.42
1966	-24.40	-26.04	-26.93	-37.09	-37.44	-38.04
2083	-29.89	-30.97	-31.35	-36.85	-39.52	-38.63
2100	-30.02	-31.08	-31.31	-39.63	-40.62	-41.64

NON-CATALOG

Frequency Synthesizer

DSN-2050A-119+

FREQUENCY (MHz)	PHASE NOISE (dBc/Hz) @OFFSETS				
	+25°C				
	100Hz	1kHz	10kHz	100kHz	1MHz
1130	-47.49	-72.05	-99.02	-119.68	-136.85
1147	-45.08	-71.77	-98.78	-119.64	-139.76
1264	-48.94	-74.26	-100.05	-120.67	-140.80
1381	-45.91	-74.78	-100.68	-121.53	-141.74
1498	-46.18	-73.91	-100.89	-121.97	-142.18
1615	-43.95	-74.51	-100.97	-122.09	-142.44
1732	-42.79	-76.45	-100.78	-121.92	-142.55
1849	-42.82	-72.97	-100.43	-121.61	-142.36
1966	-44.05	-72.86	-100.28	-121.41	-142.24
2083	-39.05	-74.41	-100.22	-121.28	-141.96
2100	-40.45	-74.83	-100.26	-121.32	-141.97

FREQUENCY (MHz)	PHASE NOISE (dBc/Hz) @OFFSETS				
	-45°C				
	100Hz	1kHz	10kHz	100kHz	1MHz
1130	-45.69	-73.61	-100.44	-121.39	-135.03
1147	-46.29	-73.50	-100.69	-121.54	-141.53
1264	-45.46	-74.01	-101.09	-122.32	-142.28
1381	-44.71	-74.48	-102.03	-122.77	-142.80
1498	-44.46	-75.15	-101.91	-123.24	-143.03
1615	-44.39	-76.16	-102.03	-123.08	-143.21
1732	-41.23	-75.81	-101.90	-122.87	-143.10
1849	-40.25	-73.99	-101.39	-122.70	-143.09
1966	-40.19	-75.22	-100.94	-122.32	-142.81
2083	-36.60	-76.31	-100.89	-122.01	-142.41
2100	-40.84	-76.57	-100.98	-122.02	-142.49

FREQUENCY (MHz)	PHASE NOISE (dBc/Hz) @OFFSETS				
	+85°C				
	100Hz	1kHz	10kHz	100kHz	1MHz
1130	-39.82	-71.93	-97.60	-118.01	-137.18
1147	-43.93	-71.80	-97.67	-118.02	-138.16
1264	-41.88	-71.87	-98.57	-119.38	-139.49
1381	-41.22	-74.30	-99.67	-120.39	-140.53
1498	-38.99	-73.74	-100.12	-120.98	-141.20
1615	-37.98	-74.11	-100.05	-121.06	-141.56
1732	-40.95	-72.98	-99.84	-120.90	-141.74
1849	-39.87	-73.45	-99.33	-120.73	-141.85
1966	-38.06	-73.06	-99.09	-120.49	-141.68
2083	-39.92	-74.11	-98.95	-120.44	-141.50
2100	-36.33	-72.41	-99.08	-120.61	-141.42



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Notes: 1. Performance and quality attributes and conditions not expressly stated in this specification sheet are intended to be excluded and do not form a part of this specification sheet. 2. Electrical specifications and performance data contained herein are based on Mini-Circuit's applicable established test performance criteria and measurement instructions. 3. The parts covered by this specification sheet 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.

COMPARISON SPURIOUS ORDER	COMPARISON SPURIOUS @Fcarrier 1130MHz+(n*Fcomparison) (dBc) note 1			COMPARISON SPURIOUS @Fcarrier 1615MHz+(n*Fcomparison) (dBc) note 1			COMPARISON SPURIOUS @Fcarrier 2100MHz+(n*Fcomparison) (dBc) note 1		
	-45°C	+25°C	+85°C	-45°C	+25°C	+85°C	-45°C	+25°C	+85°C
-5	-84.96	-85.61	-85.85	-85.35	-82.49	-86.27	-83.09	-87.03	-83.94
-4	-84.07	-85.49	-83.03	-84.90	-86.31	-86.75	-81.66	-87.38	-81.79
-3	-85.30	-83.64	-76.28	-81.87	-85.10	-86.60	-83.29	-82.87	-82.46
-2	-83.34	-84.92	-68.21	-86.66	-87.46	-83.54	-83.24	-81.15	-83.25
-1	-83.51	-81.70	-61.66	-78.97	-81.11	-67.26	-68.83	-80.53	-67.46
0 ^{note 2}	-	-	-	-	-	-	-	-	-
+1	-75.09	-83.82	-61.46	-80.72	-82.04	-67.22	-70.55	-81.00	-66.53
+2	-88.72	-84.73	-78.44	-77.16	-84.15	-85.46	-79.83	-86.30	-83.41
+3	-86.97	-86.91	-85.68	-87.50	-86.50	-83.65	-87.42	-87.06	-87.47
+4	-87.66	-82.48	-85.22	-86.21	-85.99	-85.22	-86.36	-86.87	-82.89
+5	-86.86	-83.03	-87.31	-87.34	-82.52	-86.99	-86.88	-84.25	-85.51

Note 1: Comparison frequency 12.5 kHz

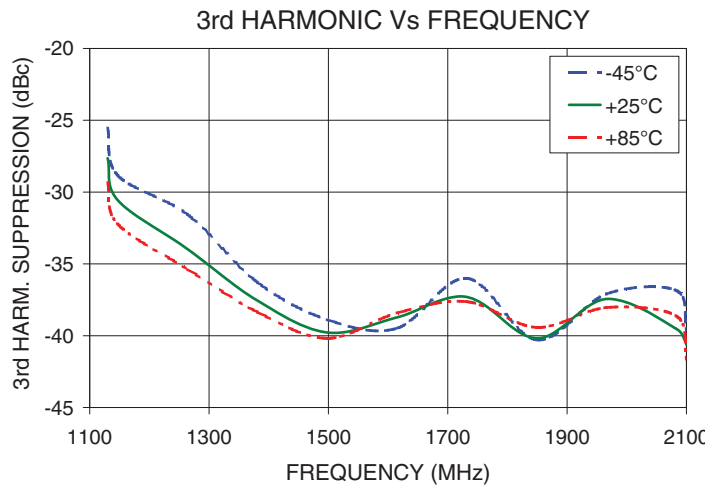
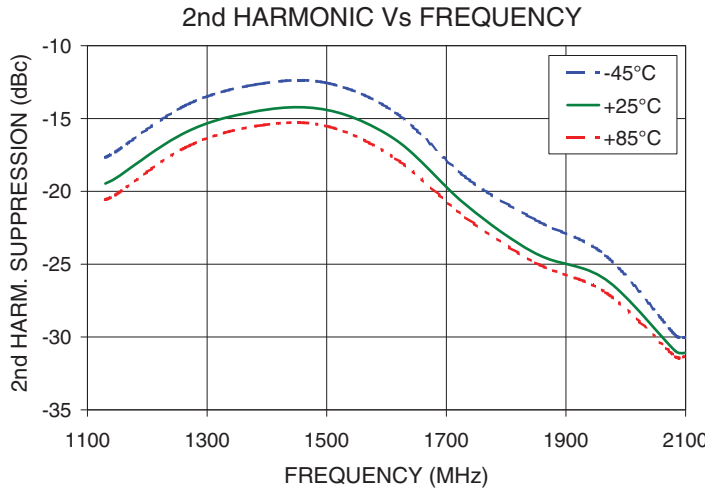
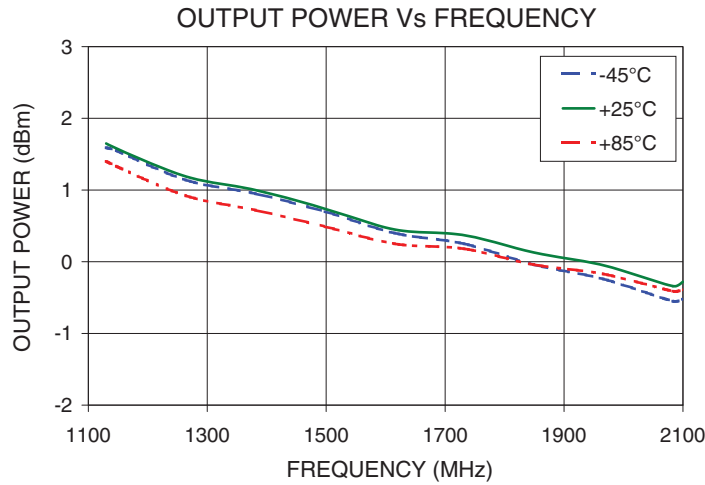
Note 2: All spurs are referenced to carrier signal (n=0).

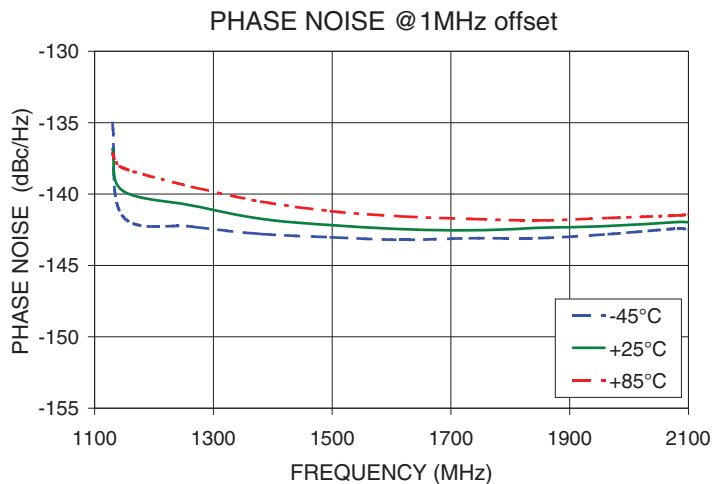
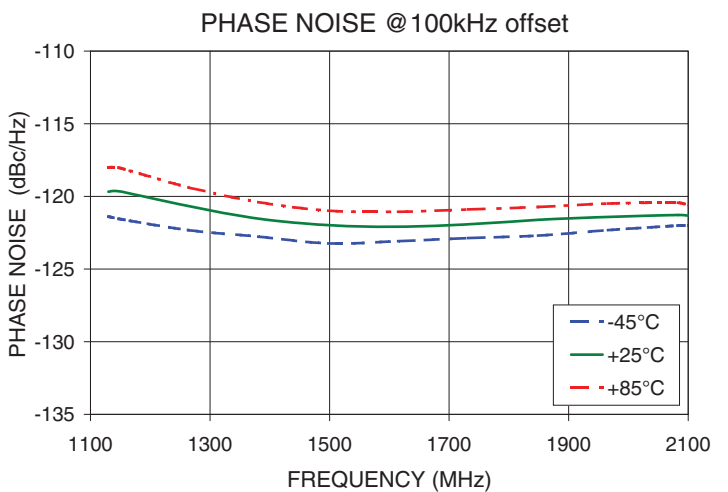
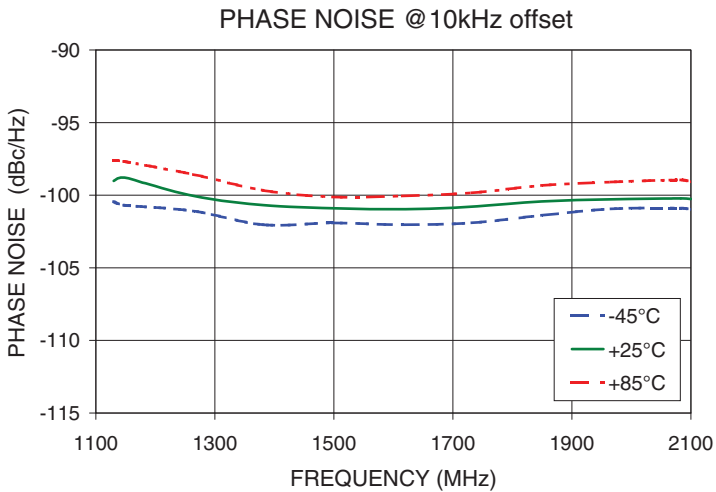
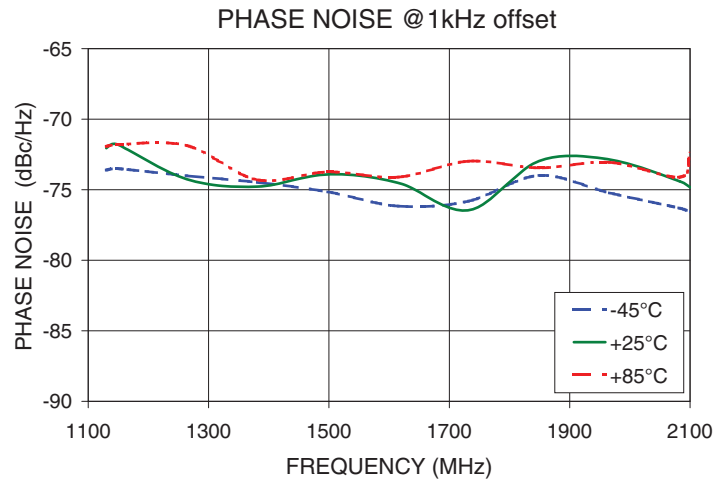
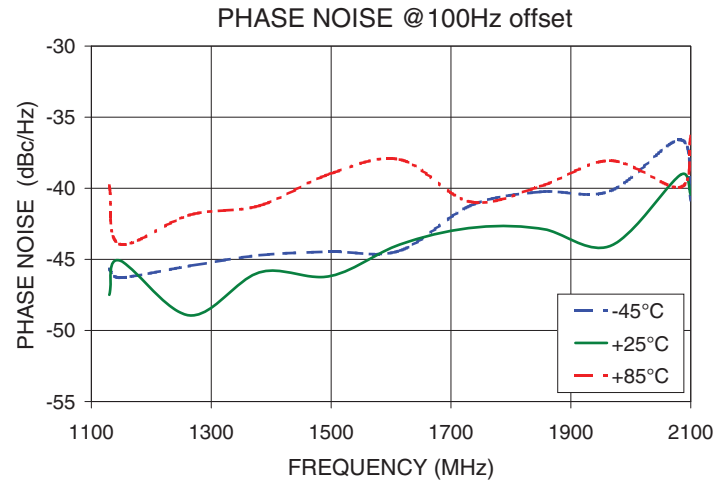
REFERENCE SPURIOUS ORDER	REFERENCE SPURIOUS @Fcarrier 1130MHz+(n*Freference) (dBc) note 3			REFERENCE SPURIOUS @Fcarrier 1615MHz+(n*Freference) (dBc) note 3			REFERENCE SPURIOUS @Fcarrier 2100MHz+(n*Freference) (dBc) note 3		
	-45°C	+25°C	+85°C	-45°C	+25°C	+85°C	-45°C	+25°C	+85°C
-5	-124.03	-125.92	-126.07	-110.36	-111.89	-112.20	-98.71	-102.14	-103.38
-4	-127.78	-126.40	-128.39	-128.34	-128.49	-126.80	-118.27	-120.22	-121.04
-3	-118.37	-118.55	-119.04	-107.82	-109.31	-110.25	-96.45	-99.22	-100.02
-2	-131.00	-129.52	-129.63	-129.13	-129.50	-128.10	-116.65	-121.85	-122.11
-1	-108.26	-108.62	-109.49	-98.23	-99.45	-100.29	-86.79	-90.78	-91.74
0 ^{note 4}	-	-	-	-	-	-	-	-	-
+1	-107.11	-107.46	-108.88	-97.04	-99.27	-100.42	-84.64	-87.90	-88.77
+2	-128.19	-130.18	-130.34	-128.03	-126.17	-127.57	-115.62	-117.62	-118.25
+3	-116.91	-116.25	-118.77	-107.22	-109.06	-110.67	-94.52	-97.52	-99.60
+4	-130.09	-129.39	-129.60	-127.30	-126.59	-127.36	-116.25	-118.50	-120.08
+5	-123.02	-123.23	-124.23	-111.04	-112.92	-113.25	-98.63	-102.00	-104.02

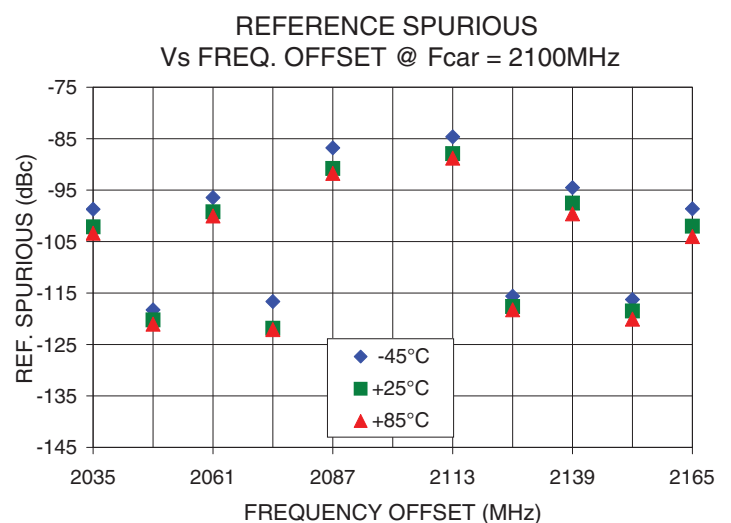
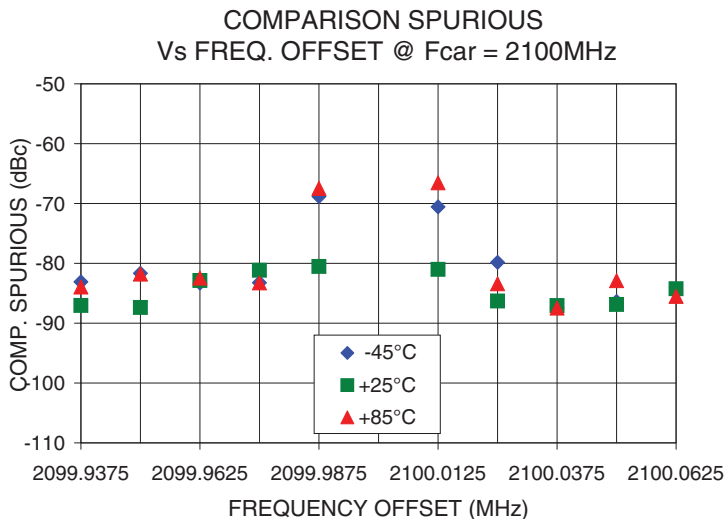
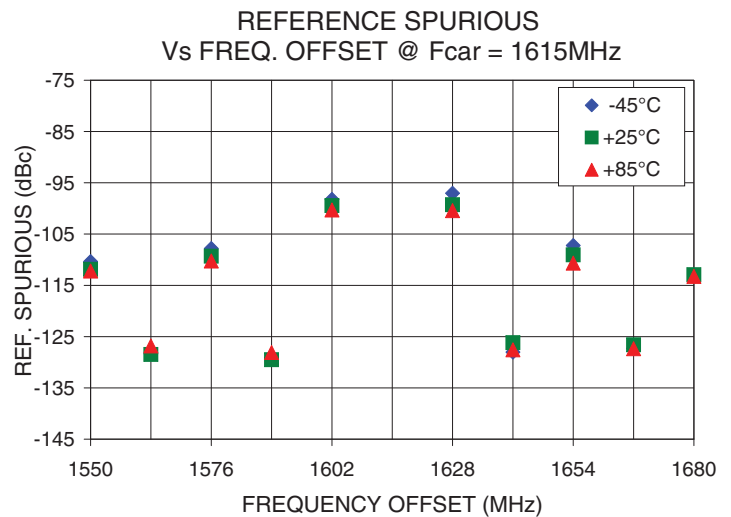
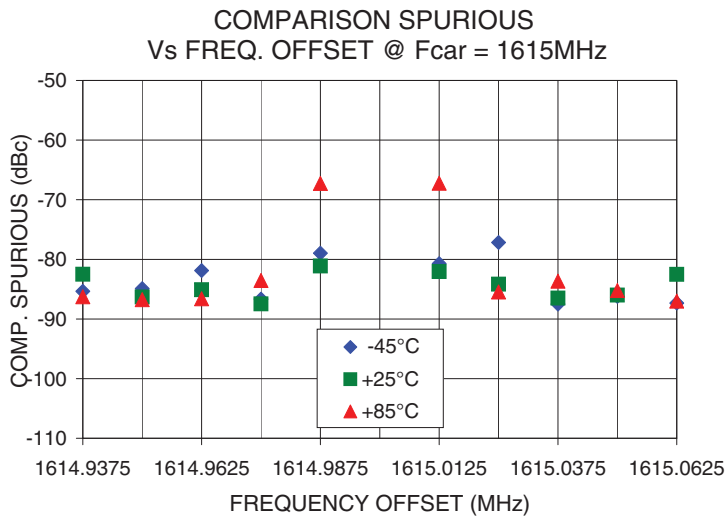
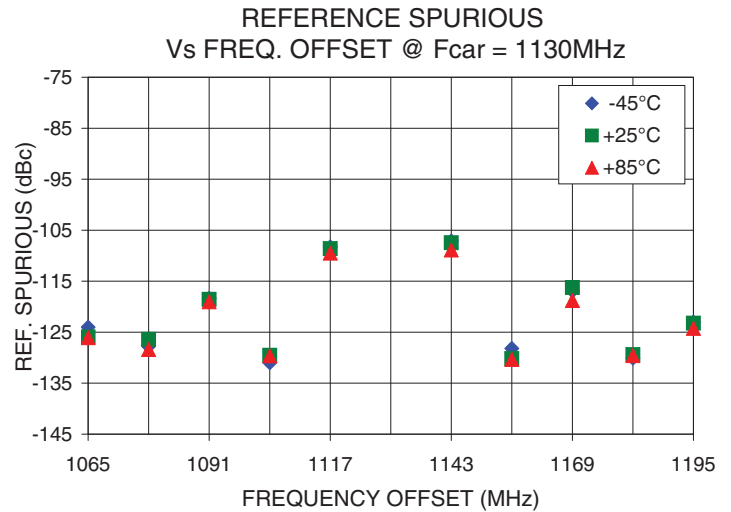
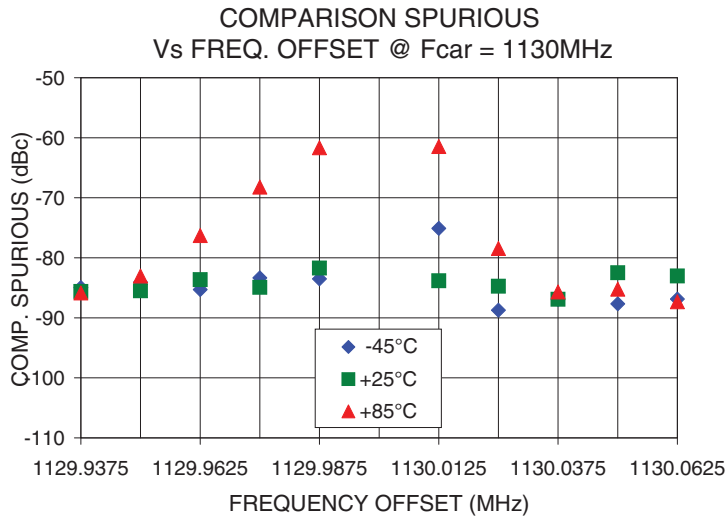
Note 3: Reference frequency 13 MHz

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

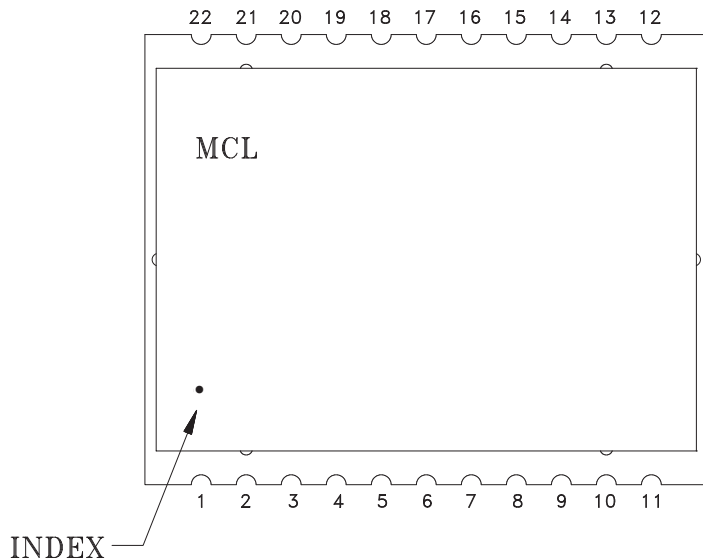
Typical Performance Curves







Pin Configuration

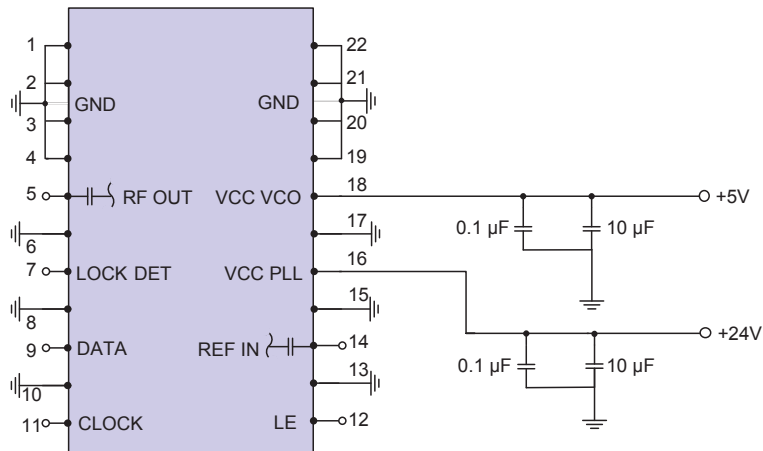


Pin Connection

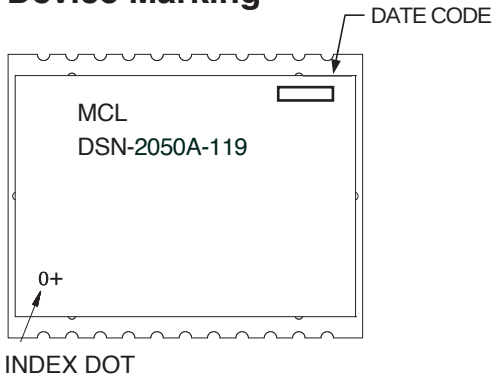
Pin Number	Function	Pin Number	Function
1	GND	12	LE
2	GND	13	GND
3	GND	14	REF IN
4	GND	15	GND
5	RF OUT	16	VCC PLL
6	GND	17	GND
7	LOCK DET	18	VCC VCO
8	GND	19	GND
9	DATA	20	GND
10	GND	21	GND
11	CLOCK	22	GND

Recommended Application Circuit

Note: REF IN and RF OUT ports are internally AC coupled.



Device Marking



Additional Detailed Technical Information

Additional information is available on our web site. To access this information enter the model number on our web site home page.

Case Style: KL942

Tape & Reel: TR-F97

Suggested Layout for PCB Design: PL-387

Evaluation Board: TB-553-1+

Environment Ratings: ENV65T2

Synthesizer evaluation software to set PLL registers manually is available at
http://www.minicircuits.com/support/software_download.html

Frequency Synthesizer

DSN-2050A-119+

Typical Performance Data

FREQ. (MHz)	POWER OUTPUT (dBm)			HARMONICS						VCO CURRENT (mA)			PLL CURENT (mA)		
				(dBc)											
	-45°C	+25°C	+85°C	-45°C	+25°C	+85°C	-45°C	+25°C	+85°C	-45°C	+25°C	+85°C	-45°C	+25°C	+85°C
1130.0	1.59	1.65	1.40	-17.67	-19.46	-20.57	-25.55	-27.64	-29.35	30.00	32.11	33.10	23.20	25.88	28.52
1147.0	1.55	1.58	1.33	-17.29	-19.11	-20.24	-28.84	-30.57	-32.23	30.08	32.18	33.15	23.21	25.89	28.53
1264.0	1.14	1.19	0.92	-14.10	-15.95	-16.99	-31.56	-33.97	-35.36	30.71	32.73	33.62	23.25	25.95	28.62
1381.0	0.95	1.00	0.72	-12.67	-14.51	-15.52	-36.28	-37.56	-38.35	31.30	33.25	34.08	23.29	26.00	28.69
1498.0	0.70	0.74	0.49	-12.54	-14.39	-15.50	-38.88	-39.78	-40.18	31.75	33.66	34.45	23.32	26.04	28.74
1615.0	0.40	0.45	0.25	-14.60	-16.46	-17.75	-39.48	-38.72	-38.42	32.05	33.97	34.74	23.35	26.09	28.79
1732.0	0.25	0.37	0.18	-19.03	-20.91	-21.78	-36.00	-37.30	-37.63	32.18	34.17	34.96	23.37	26.12	28.83
1849.0	-0.04	0.13	-0.04	-21.96	-24.26	-24.90	-40.29	-40.18	-39.42	32.13	34.22	35.09	23.40	26.15	28.87
1966.0	-0.24	-0.05	-0.17	-24.40	-26.04	-26.93	-37.09	-37.44	-38.04	31.82	34.06	35.02	23.43	26.19	28.91
2083.0	-0.55	-0.34	-0.41	-29.89	-30.97	-31.35	-36.85	-39.52	-38.63	31.38	33.75	34.82	23.45	26.22	28.95
2100.0	-0.52	-0.28	-0.39	-30.02	-31.08	-31.31	-39.63	-40.62	-41.64	31.30	33.68	34.77	23.44	26.22	28.96

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
1130.0	-45.69	-73.61	-100.44	-121.39	-135.03	-47.49	-72.05	-99.02	-119.68	-136.85	-39.82	-71.93	-97.60	-118.01	-137.18
1147.0	-46.29	-73.50	-100.69	-121.54	-141.53	-45.08	-71.77	-98.78	-119.64	-139.76	-43.93	-71.80	-97.67	-118.02	-138.16
1264.0	-45.46	-74.01	-101.09	-122.32	-142.28	-48.94	-74.26	-100.05	-120.67	-140.80	-41.88	-71.87	-98.57	-119.38	-139.49
1381.0	-44.71	-74.48	-102.03	-122.77	-142.80	-45.91	-74.78	-100.68	-121.53	-141.74	-41.22	-74.30	-99.67	-120.39	-140.53
1498.0	-44.46	-75.15	-101.91	-123.24	-143.03	-46.18	-73.91	-100.89	-121.97	-142.18	-38.99	-73.74	-100.12	-120.98	-141.20
1615.0	-44.39	-76.16	-102.03	-123.08	-143.21	-43.95	-74.51	-100.97	-122.09	-142.44	-37.98	-74.11	-100.05	-121.06	-141.56
1732.0	-41.23	-75.81	-101.90	-122.87	-143.10	-42.79	-76.45	-100.78	-121.92	-142.55	-40.95	-72.98	-99.84	-120.90	-141.74
1849.0	-40.25	-73.99	-101.39	-122.70	-143.09	-42.82	-72.97	-100.43	-121.61	-142.36	-39.87	-73.45	-99.33	-120.73	-141.85
1966.0	-40.19	-75.22	-100.94	-122.32	-142.81	-44.05	-72.86	-100.28	-121.41	-142.24	-38.06	-73.06	-99.09	-120.49	-141.68
2083.0	-36.60	-76.31	-100.89	-122.01	-142.41	-39.05	-74.41	-100.22	-121.28	-141.96	-39.92	-74.11	-98.95	-120.44	-141.50
2100.0	-40.84	-76.57	-100.98	-122.02	-142.49	-40.45	-74.83	-100.26	-121.32	-141.97	-36.33	-72.41	-99.08	-120.61	-141.42

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Typical Performance Data

COMPARISON SPURIOUS ORDER	COMPARISON SPURIOUS @Fcarrier 1130MHz± (n*Fcomparison) (dBc) NOTE 1			COMPARISON SPURIOUS @Fcarrier 1615MHz± (n*Fcomparison) (dBc) NOTE 1			COMPARISON SPURIOUS @Fcarrier 2100MHz± (n*Fcomparison) (dBc) NOTE 1		
	-45°C	+25°C	+85°C	-45°C	+25°C	+85°C	-45°C	+25°C	+85°C
-5	-84.96	-85.61	-85.85	-85.35	-82.49	-86.27	-83.09	-87.03	-83.94
-4	-84.07	-85.49	-83.03	-84.90	-86.31	-86.75	-81.66	-87.38	-81.79
-3	-85.30	-83.64	-76.28	-81.87	-85.10	-86.60	-83.29	-82.87	-82.46
-2	-83.34	-84.92	-68.21	-86.66	-87.46	-83.54	-83.24	-81.15	-83.25
-1	-83.51	-81.70	-61.66	-78.97	-81.11	-67.26	-68.83	-80.53	-67.46
0 ^{note 2}	-	-	-	-	-	-	-	-	-
+1	-75.09	-83.82	-61.46	-80.72	-82.04	-67.22	-70.55	-81.00	-66.53
+2	-88.72	-84.73	-78.44	-77.16	-84.15	-85.46	-79.83	-86.30	-83.41
+3	-86.97	-86.91	-85.68	-87.50	-86.50	-83.65	-87.42	-87.06	-87.47
+4	-87.66	-82.48	-85.22	-86.21	-85.99	-85.22	-86.36	-86.87	-82.89
+5	-86.86	-83.03	-87.31	-87.34	-82.52	-86.99	-86.88	-84.25	-85.51

Note 1: Comparison frequency 12.5 kHz

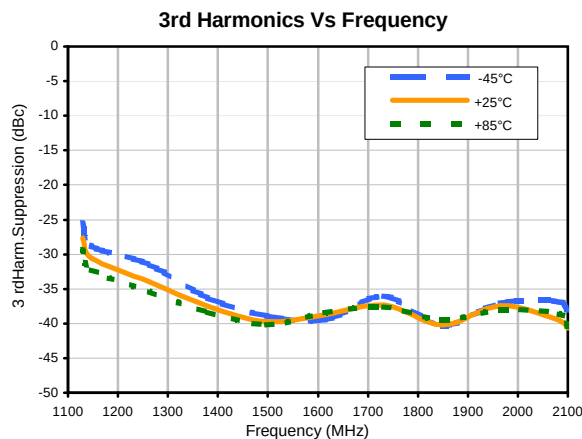
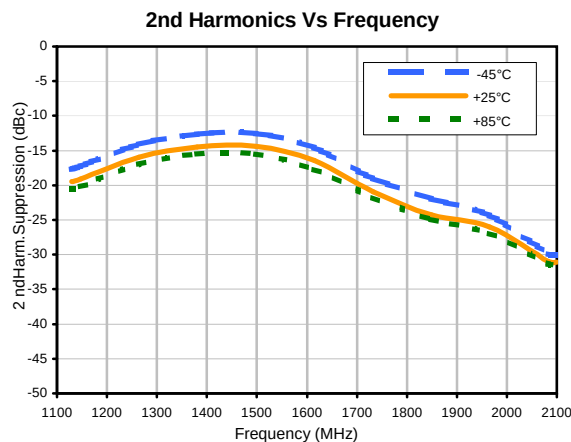
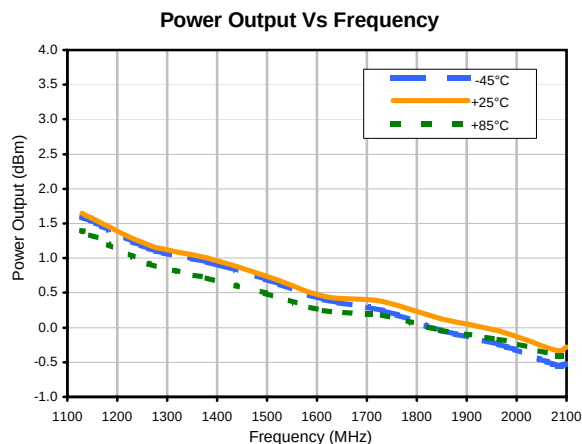
Note 2: All spurs are referenced to carrier signal (n=0).

REFERENCE SPURIOUS ORDER	REFERENCE SPURIOUS @Fcarrier 1130MHz± (n*Reference) (dBc) NOTE 3			REFERENCE SPURIOUS @Fcarrier 1615MHz± (n*Reference) (dBc) NOTE 3			REFERENCE SPURIOUS @Fcarrier 2100MHz± (n*Reference) (dBc) NOTE 3		
	-45°C	+25°C	+85°C	-45°C	+25°C	+85°C	-45°C	+25°C	+85°C
-5	-124.03	-125.92	-126.07	-110.36	-111.89	-112.20	-98.71	-102.14	-103.38
-4	-127.78	-126.40	-128.39	-128.34	-128.49	-126.80	-118.27	-120.22	-121.04
-3	-118.37	-118.55	-119.04	-107.82	-109.31	-110.25	-96.45	-99.22	-100.02
-2	-131.00	-129.52	-129.63	-129.13	-129.50	-128.10	-116.65	-121.85	-122.11
-1	-108.26	-108.62	-109.49	-98.23	-99.45	-100.29	-86.79	-90.78	-91.74
0 ^{note 4}	-	-	-	-	-	-	-	-	-
+1	-107.11	-107.46	-108.88	-97.04	-99.27	-100.42	-84.64	-87.90	-88.77
+2	-128.19	-130.18	-130.34	-128.03	-126.17	-127.57	-115.62	-117.62	-118.25
+3	-116.91	-116.25	-118.77	-107.22	-109.06	-110.67	-94.52	-97.52	-99.60
+4	-130.09	-129.39	-129.60	-127.30	-126.59	-127.36	-116.25	-118.50	-120.08
+5	-123.02	-123.23	-124.23	-111.04	-112.92	-113.25	-98.63	-102.00	-104.02

Note 3: Reference frequency 13 MHz

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

Typical Performance Data

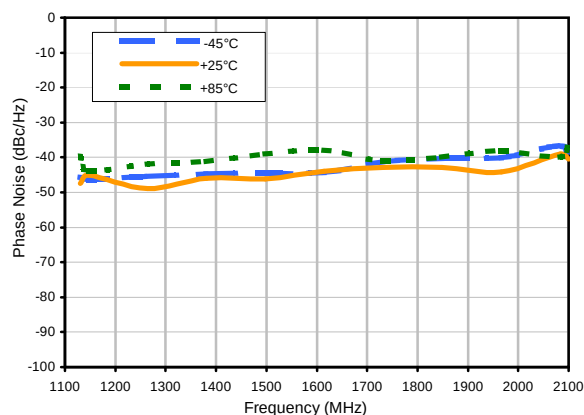


Frequency Synthesizer

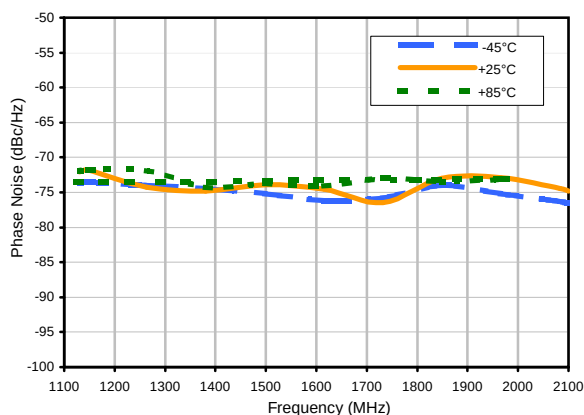
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Typical Performance Data

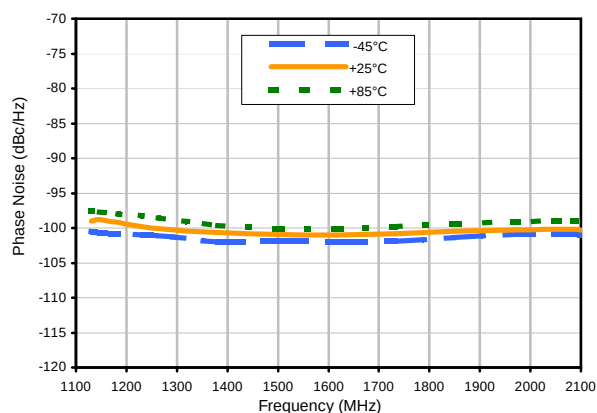
Phase Noise @ 100 Hz offset



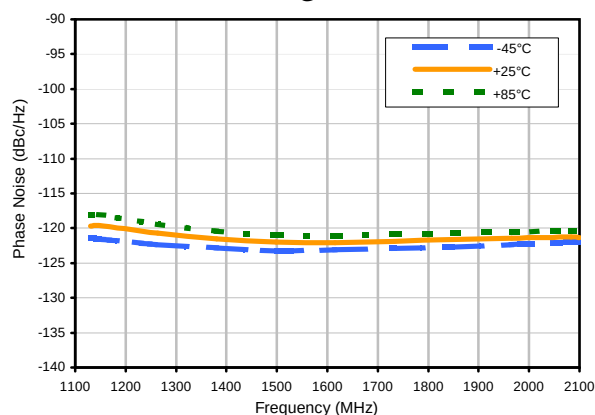
Phase Noise @ 1 kHz offset



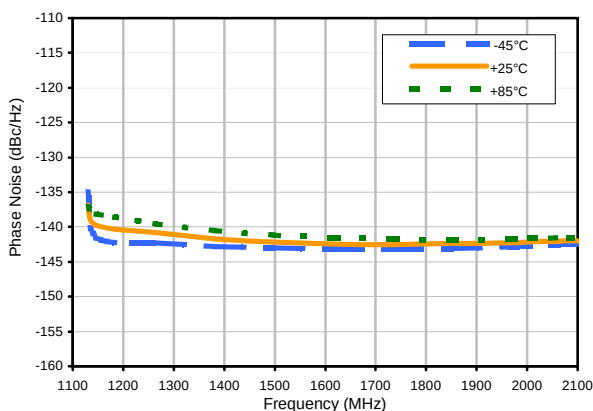
Phase Noise @ 10 kHz offset



Phase Noise @ 100 kHz offset



Phase Noise @ 1 MHz offset



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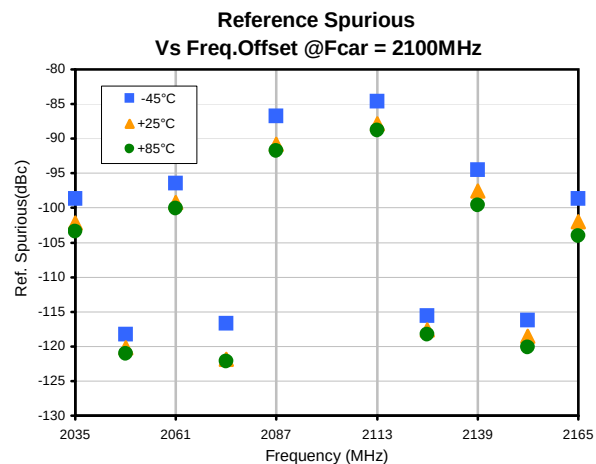
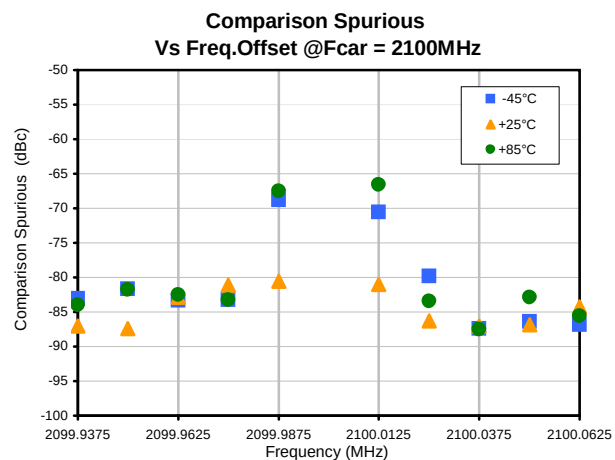
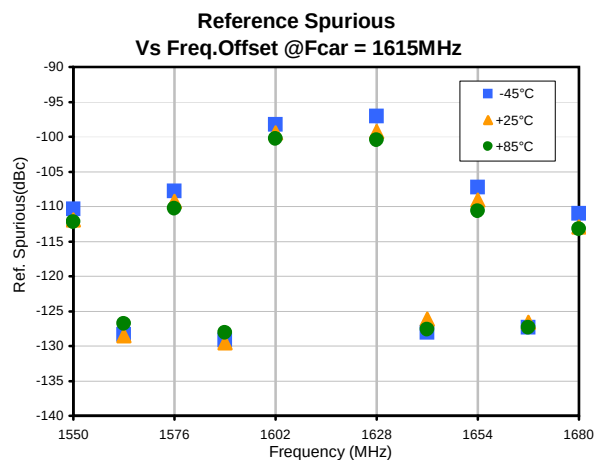
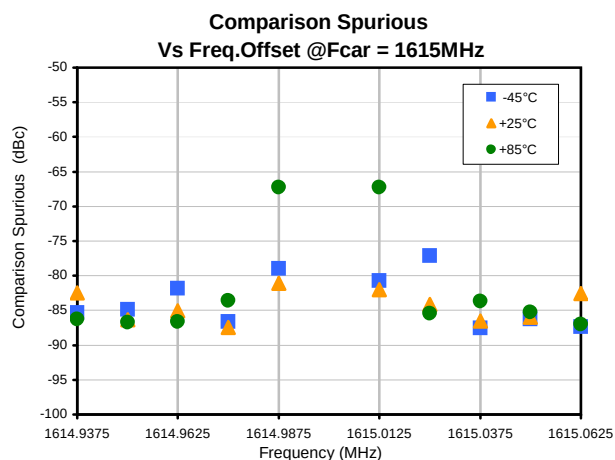
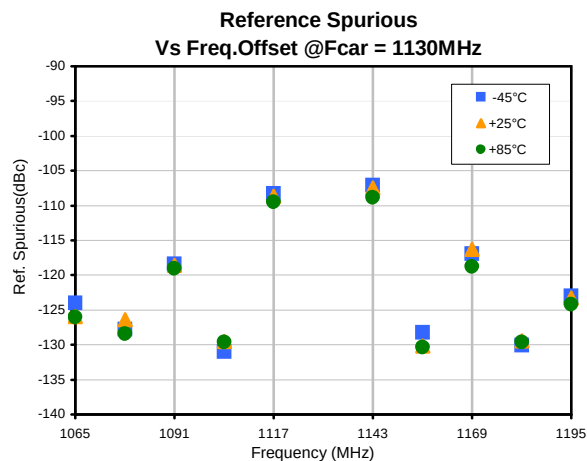
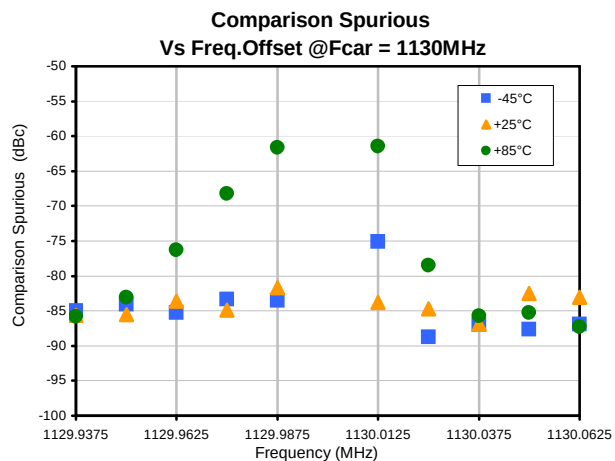
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Frequency Synthesizer

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Typical Performance Data



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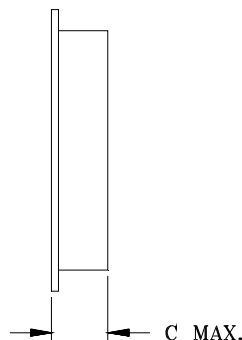
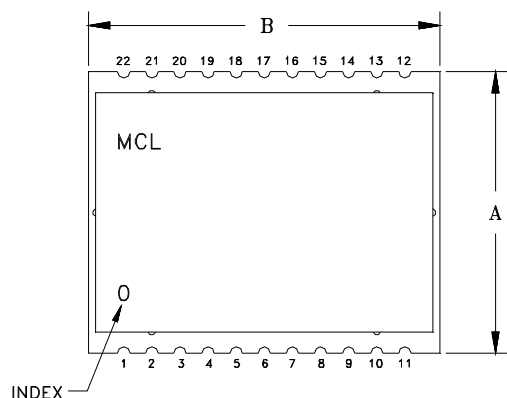


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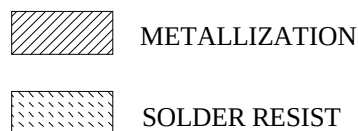
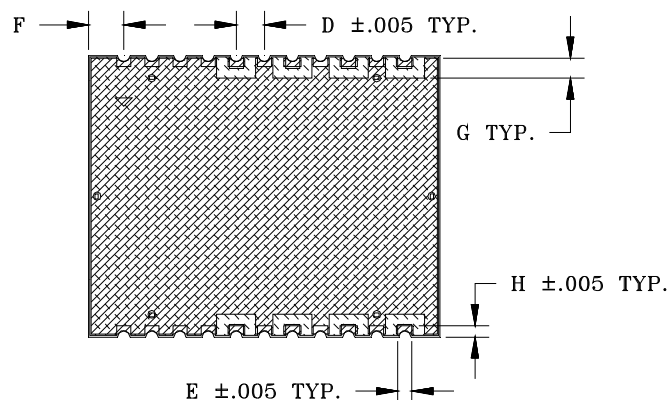
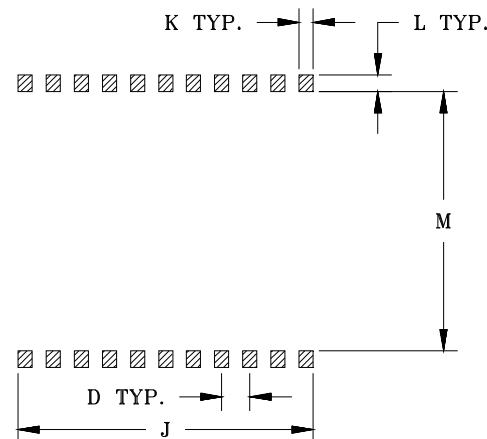


Outline Dimensions

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>

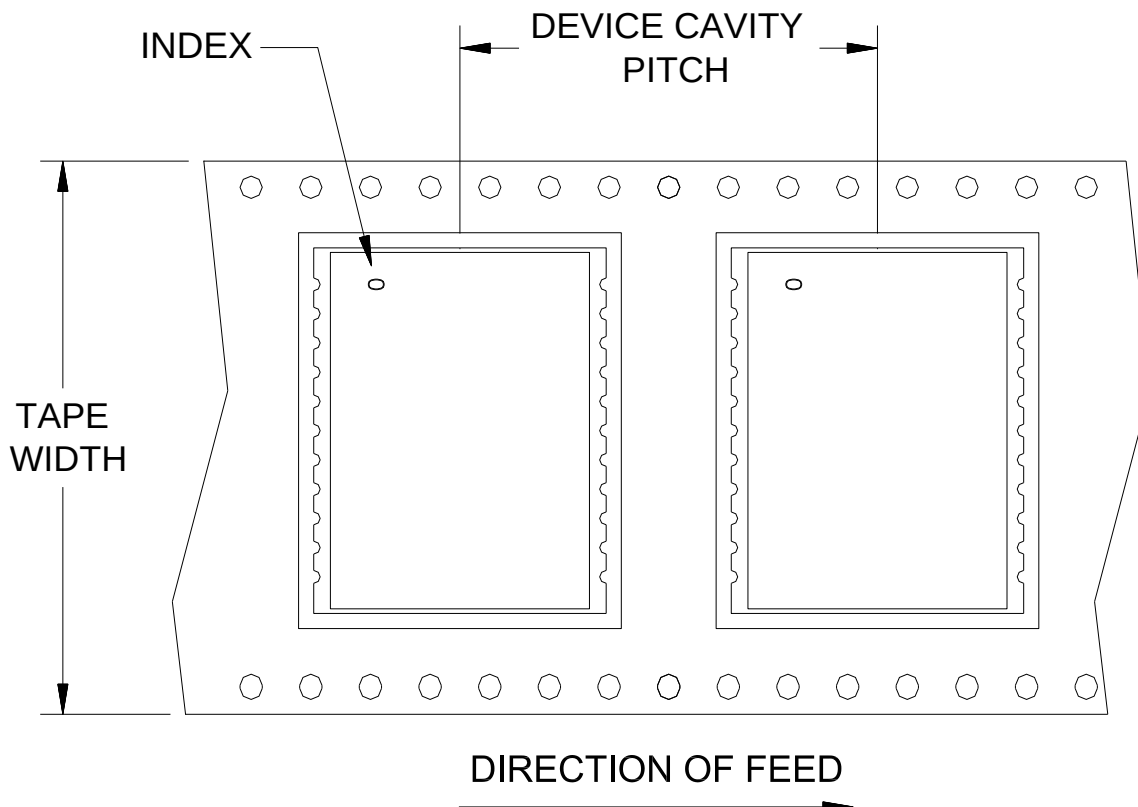
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Tape & Reel Packaging TR-F97

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.

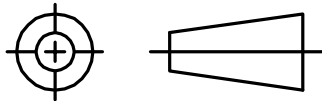
Mini-Circuits carrier tape materials provide protection from ESD (Electro-Static Discharge) during handling and transportation. Tapes are static dissipative and comply with industry standards EIA-481/EIA-541.

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



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THIRD ANGLE PROJECTION



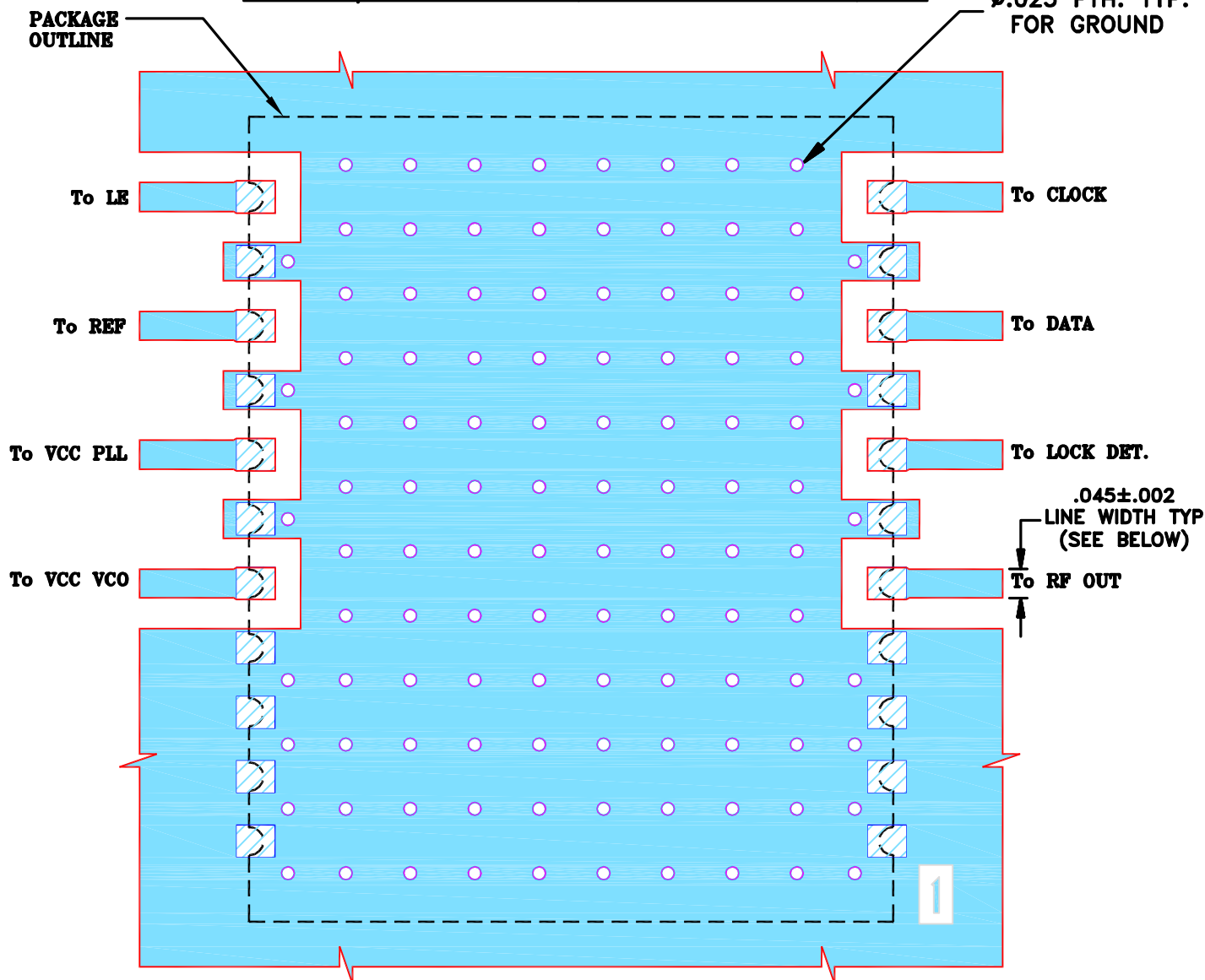
REVISIONS

REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
OR	M139010	NEW RELEASE	10/12	DK	HH
OR	R84924	NEW RELEASE	10/12	DK	HH

SUGGESTED MOUNTING CONFIGURATION

FOR KL942/KL1294 CASE STYLE. 22SY02 PIN CONNECTION. 50 Ω.

∅.025 PTH. TYP.
FOR GROUND



NOTES:

- 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.
- 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

DIMENSIONS ARE IN INCHES

DRAWN

DK

11 OCT 12

TOLERANCES ON:

CHECKED

HH

16 OCT 12

2 PL DECIMALS ±

APPROVED

YB

16 OCT 12

3 PL DECIMALS ± .005

ANGLES ±

FRACTIONS ±

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



Mini-Circuits®

13 Neptune Avenue
Brooklyn NY 11235

PL, 22SY02, KL942/KL1294, DSN
TB-553+ (50 Ω)

SIZE
A

CODE IDENT
15542

DRAWING NO:

98-PL-387

REV:

OR

FILE: 98PL387

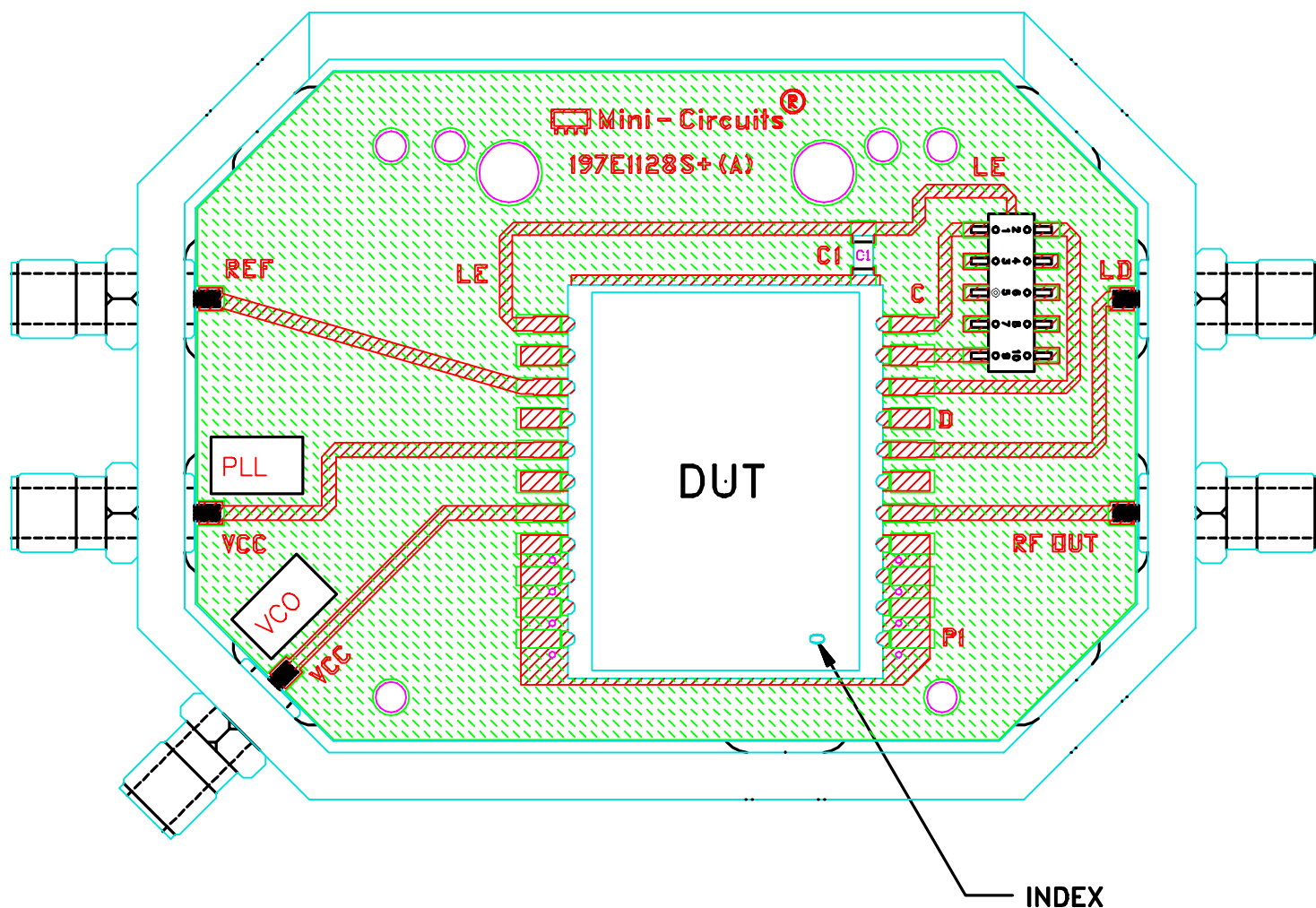
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SHEET:

1 OF 1

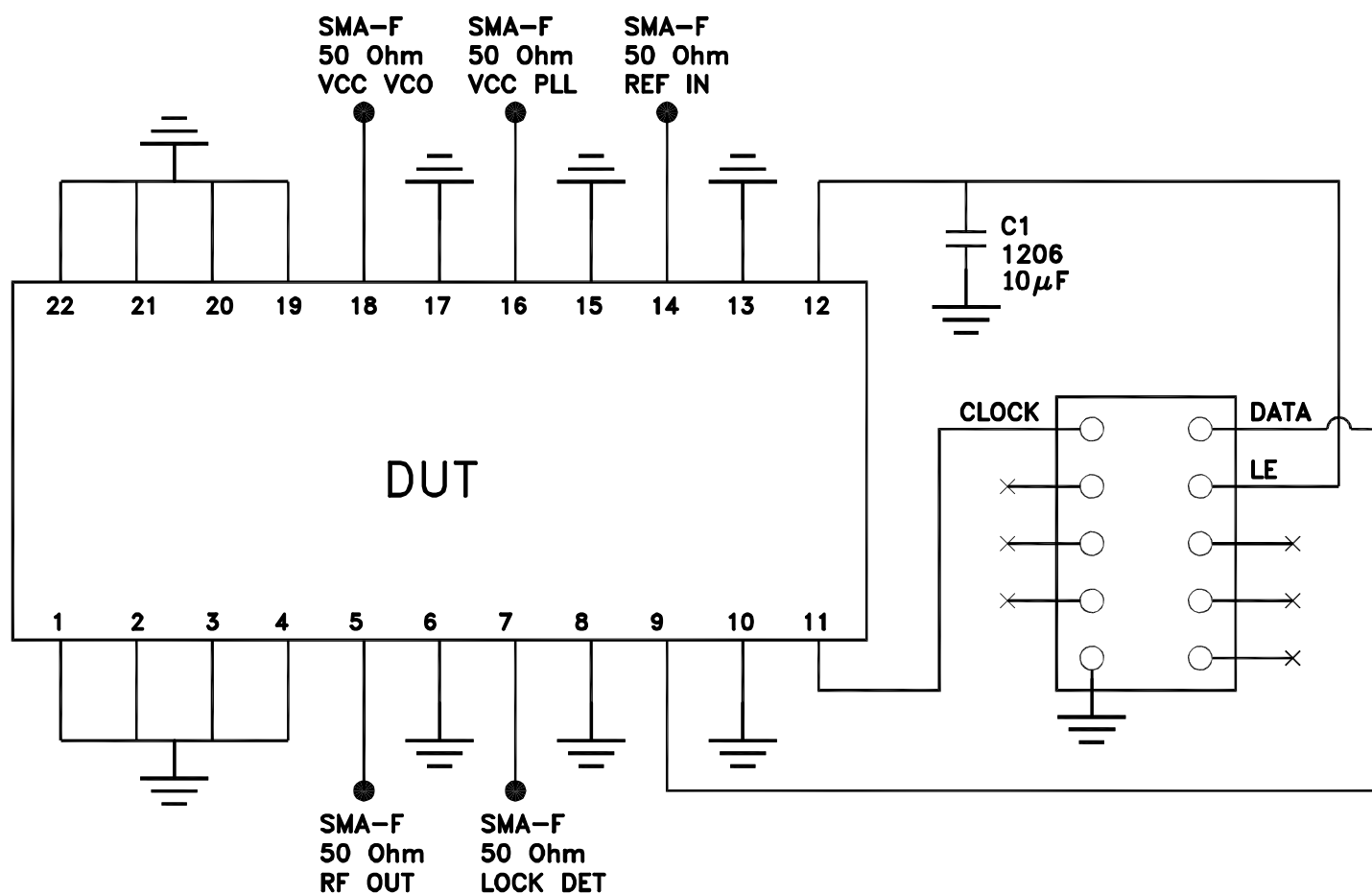
Evaluation Board and Circuit



TB-553-1+

NOTES:

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



TB-553-1+ 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	-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 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