NON-CATALOG

Frequency Synthesizer

SSN-3600A-119+

50Ω 3400 to 3600 MHz

The Big Deal

- Fractional N synthesizer
- · Low phase noise and spurious
- Robust design and construction
- Very small size 0.60" x 0.60" x 0.138"



CASE STYLE: KJ1367

Product Overview

The SSN-3600A-119+ is a Frequency Synthesizer, designed to operate from 3400 to 3600 MHz for WiMAX application. The SSN-3600A-119+ is packaged in a metal case (size of $0.60" \times 0.60" \times 0.138"$) to shield against unwanted signals and noise.

Key Features

Feature	Advantages
Low phase noise and spurious: • Phase Noise: -93 dBc/Hz typ. @ 10 kHz offset • Step Size Spurious: -83 dBc typ. • Comparison Spurious: -98 dBc typ. • Reference Spurious: -95 dBc typ.	Low phase noise and spurious improve system EVM (Error Vector Magnitude).
Robust design and construction	To enhance the robustness of SSN-3600A-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.
Small size, 0.60" x 0.60" x 0.138"	The small size enables the SSN-3600A-119+ to be used in compact designs.



3400 to 3600 MHz 50Ω

Features

- Fractional N synthesizer
- Integrated VCO + PLL
- Low phase noise and spurious
- Robust design and construction
- Low operating voltage (VCC VCO=+4.85V, VCC PLL=+3.2V)
- Small size 0.60" x 0.60" x 0.138"

Applications

WiMAX



SSN-3600A-119+

CASE STYLE: KJ1367

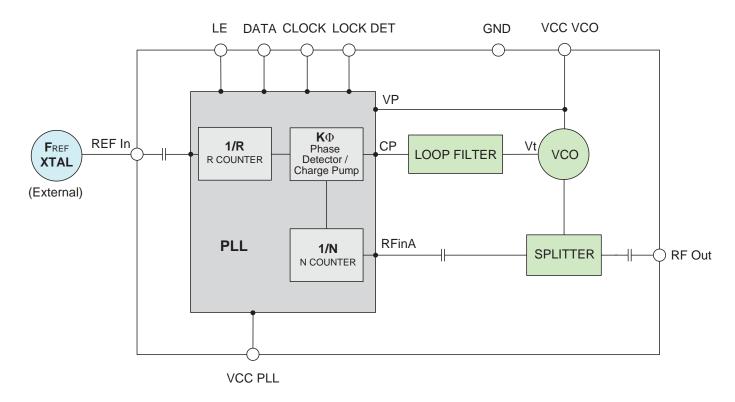
+ RoHS compliant in accordance with EU Directive (2002/95/EC)

The +Suffix has been added in order to identify RoHS Compliance. See our web site for RoHS Compliance methodologies and qualifications

General Description

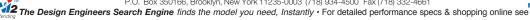
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Simplified Schematic





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SSN-3600A-119+

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

Parameters	Test Conditions	Min.	,,				
Frequency Range	- 3400		-	3600	MHz		
Step Size	-	-	125	-	kHz		
Comparison Frequency	-	-	26	-	MHz		
Settling Time		Within ± 1 kHz	-	30	50	mSec	
Output Power		-	+1.0	+4.6	+7.0	dBm	
		@ 100 Hz offset	-	-78	-		
		@ 1 kHz offset	-	-91	-84	1	
SSB Phase Noise		@ 10 kHz offset	-	-93	-88	dBc/Hz	
		@ 100 kHz offset	-	-116	-112		
		@ 1 MHz offset	-	-137	-133		
Integrated SSB Phase Noise		@ 1kHz to 10MHz	-	-49	-45	dBc	
Step Size Spurious Suppression		Step Size 125 kHz	-	-77	-62		
0.5 Step Size Spurious Suppre		0.5 Step Size 62.5 kHz	-	-69	-54		
Reference Spurious Suppress		Ref. Freq. 52 MHz	-	-85	-77	dBc	
Comparison Spurious Suppres		Comp. Freq. 26 MHz	-	-85	-77	u d d d	
Non - Harmonic Spurious Sup	pression	-	-	-90	-		
Harmonic Suppression		-	-	-32	-20		
VCO Supply Voltage		+4.85	+4.75	+4.85	+5.25	V	
PLL Supply Voltage		+3.20	+3.10	+3.20	+3.30	V	
VCO Supply Current		-	-	41	47	mA	
PLL Supply Current		-	- 16 22		111/2		
	Frequency	52 (square wave)	-	52	-	MHz	
Reference Input	Amplitude	1	-	1	-	V _{P-P}	
(External)	Input impedance	-	-	100	-	ΚΩ	
	Phase Noise @ 1 kHz offset	-	-	-135	-	dBc/Hz	
RF Output port Impedance		-	-	50	-	Ω	
Input Logic Level	Input high voltage	-	2.65	-	-	V	
Imput Logic Level	Input low voltage	-	-	-	0.60	V	
Digital Lock Detect	Locked	-	2.70	-	3.30	V	
Unlocked		-	-	-	0.40	V	
Frequency Synthesizer PLL	-	ADF4153	ADF4153				
PLL Programming		-	3-wire seria	3-wire serial 3.2V CMOS			
Register Map @ 3600 MHz	R0_Register	-	(MSB) 1000	(MSB) 1000101000000110000000 (LSB)			
	R1_Register	-	(MSB) 101001000001101000001 (LSB)				
	R2_Register	-	(MSB) 1111100010 (LSB)				
	R3_Register	-	(MSB) 111	1000111 (LSI	В)		

Absolute Maximum Ratings

Parameters	Ratings
VCO Supply Voltage	5.8V
PLL Supply Voltage	4.0V
VCO Supply Voltage to PLL Supply Voltage	-0.3V to +5.8V
Reference Frequency Voltage	-0.3Vmin, VCC PLL +0.3Vmax
Data, Clock, LE Levels	-0.3Vmin, VCC PLL +0.3Vmax
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



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FREQUENCY	POWER OUTPUT			vc	VCO CURRENT			PLL CURENT		
(MHz)		(dBm)			(mA)		(mA)			
	-45°C	+25°C	+85°C	-45°C	+25°C	+85°C	-45°C	+25°C	+85°C	
3400	4.63	4.55	4.29	39.70	41.76	43.24	15.09	15.76	18.00	
3404	4.62	4.53	4.27	39.69	41.77	43.24	14.84	15.53	17.73	
3428	4.70	4.62	4.34	39.65	41.79	43.24	14.97	15.68	17.87	
3452	4.66	4.55	4.28	39.67	41.77	43.24	15.10	15.82	18.01	
3476	4.60	4.48	4.20	39.70	41.77	43.24	15.12	15.86	18.04	
3500	4.57	4.46	4.16	39.67	41.78	43.31	15.18	15.93	18.11	
3524	4.57	4.41	4.10	39.68	41.78	43.32	15.26	16.01	18.19	
3548	4.64	4.48	4.16	39.68	41.76	43.21	15.27	16.04	18.21	
3572	4.52	4.37	4.09	39.67	41.77	43.23	15.18	15.94	18.11	
3596	4.50	4.33	4.02	39.68	41.76	43.22	15.10	15.85	18.02	
3600	4.50	4.34	4.03	39.68	41.76	43.22	15.28	16.05	18.21	

FREQUENCY		HARMONICS (dBc)						
(MHz)		F2		F3				
	-45°C	+25°C	+85°C	-45°C	+25°C	+85°C		
3400	-37.87	-29.31	-31.25	-39.59	-37.05	-39.20		
3404	-40.54	-30.46	-30.68	-40.32	-37.40	-40.71		
3428	-39.97	-30.03	-33.24	-40.10	-35.88	-37.52		
3452	-38.74	-31.85	-37.56	-37.65	-35.50	-36.88		
3476	-38.54	-34.40	-37.09	-35.79	-33.40	-37.63		
3500	-35.55	-35.09	-37.40	-34.68	-32.86	-37.51		
3524	-33.94	-37.99	-38.85	-36.21	-33.76	-37.34		
3548	-29.98	-46.13	-45.32	-35.77	-32.44	-37.59		
3572	-29.77	-48.31	-47.28	-35.78	-32.54	-39.56		
3596	-26.98	-47.78	-42.30	-38.67	-33.04	-39.29		
3600	-27.32	-47.00	-43.49	-39.59	-33.13	-41.60		







FREQUENCY	PHASE NOISE (dBc/Hz) @OFFSETS								
(MHz)			+25°C						
	100Hz	1kHz	10kHz	100kHz	1MHz				
3400	-82.26	-93.24	-93.91	-115.93	-136.89				
3404	-80.31	-91.87	-94.65	-116.03	-136.93				
3428	-80.46	-91.94	-94.25	-116.24	-137.08				
3452	-80.83	-92.76	-93.63	-116.31	-137.05				
3476	-81.05	-92.92	-94.17	-116.35	-137.13				
3500	-81.09	-93.52	-93.59	-116.38	-137.19				
3524	-80.32	-93.53	-93.73	-116.46	-137.15				
3548	-81.43	-93.32	-93.50	-116.57	-137.31				
3572	-81.67	-92.29	-93.31	-116.54	-137.25				
3596	-78.86	-93.19	-92.96	-116.56	-137.20				
3600	-80.37	-92.30	-93.06	-116.54	-137.19				

FREQUENCY	PH	IASE NOIS	E (dBc/Hz) @OFFSE	TS	
(MHz)	-45°C					
	100Hz	1kHz	10kHz	100kHz	1MHz	
3400	-80.54	-92.01	-94.48	-115.92	-137.15	
3404	-78.40	-90.77	-94.37	-115.88	-137.13	
3428	-76.34	-91.04	-94.06	-116.25	-137.41	
3452	-77.97	-91.54	-93.36	-116.28	-137.46	
3476	-77.09	-90.52	-92.60	-116.39	-137.60	
3500	-79.53	-90.65	-93.41	-116.60	-137.66	
3524	-77.96	-91.45	-93.59	-116.70	-137.63	
3548	-77.62	-90.64	-93.29	-116.81	-137.85	
3572	-78.57	-89.13	-92.54	-116.72	-137.90	
3596	-76.57	-90.96	-92.62	-116.78	-137.79	
3600	-76.15	-90.17	-92.77	-116.73	-137.56	

FREQUENCY	PHASE NOISE (dBc/Hz) @OFFSETS								
(MHz)	+85°C								
	100Hz	1kHz	10kHz	100kHz	1MHz				
3400	-79.69	-94.18	-94.62	-115.68	-136.51				
3404	-76.75	-93.81	-94.36	-115.67	-136.46				
3428	-80.89	-93.73	-94.09	-115.70	-136.61				
3452	-80.59	-93.18	-94.21	-115.67	-136.54				
3476	-79.51	-93.32	-93.52	-115.70	-136.61				
3500	-78.78	-92.32	-93.49	-115.89	-136.59				
3524	-78.37	-92.23	-93.35	-115.74	-136.45				
3548	-79.21	-92.93	-93.59	-116.09	-136.86				
3572	-79.50	-92.84	-93.31	-115.98	-136.76				
3596	-80.07	-92.07	-92.80	-116.18	-136.71				
3600	-79.61	-93.17	-92.73	-116.11	-136.69				







COMPARISON SPURIOUS ORDER	COMPARISON SPURIOUS @Fcarrier 3400MHz+(n*Fcomparison) (dBc) note 1			@Fcarrier arison) 350MHz+(n*Fcomparison)			COMPARISON SPURIOUS @Fcarrier 3600MHz+(n*Fcomparison) (dBc) note 1		
n	-45°C	+25°C	+85°C	-45°C	+25°C	+85°C	-45°C	+25°C	+85°C
-5	-106.01	-107.05	-108.60	-108.93	-105.63	-112.68	-112.21	-103.99	-109.13
-4	-94.66	-95.09	-93.24	-96.76	-96.78	-95.26	-98.27	-96.84	-97.31
-3	-103.97	-102.12	-107.41	-105.35	-105.02	-105.49	-107.54	-110.41	-108.17
-2	-85.64	-84.90	-83.54	-88.32	-86.38	-85.66	-88.42	-87.14	-88.33
-1	-102.85	-97.64	-103.37	-100.26	-98.70	-100.50	-103.10	-104.15	-102.83
o ^{note 2}	-	-	-	-	-	-	-	-	-
+1	-101.69	-95.77	-98.54	-99.05	-96.10	-98.36	-97.94	-97.62	-99.92
+2	-87.02	-87.23	-85.10	-89.57	-88.89	-85.12	-92.57	-89.63	-89.87
+3	-107.28	-107.67	-107.69	-104.33	-107.36	-104.84	-109.08	-118.36	-108.02
+4	-94.89	-94.68	-94.24	-95.72	-94.63	-93.51	-95.56	-94.08	-93.79
+5	-110.15	-112.69	-105.36	-115.76	-104.54	-107.57	-107.80	-104.51	-103.31

Note 1: Comparison frequency 26 MHz

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

REFERENCE SPURIOUS ORDER	REFERENCE SPURIOUS @Fcarrier 3400MHz+(n*Freference) (dBc) note 3		er @Fcarrier eference) 3500MHz+(n*Freference)			REFERENCE SPURIOUS @Fcarrier 3600MHz+(n*Freference) (dBc) note 3			
n	-45°C	+25°C	+85°C	-45°C	+25°C	+85°C	-45°C	+25°C	+85°C
-5	-85.46	-88.22	-90.30	-89.16	-91.87	-95.63	-91.29	-94.61	-97.51
-4	-91.26	-90.78	-90.58	-93.94	-93.27	-92.65	-95.46	-96.18	-94.77
-3	-100.31	-100.10	-96.51	-101.62	-106.05	-97.93	-102.93	-107.82	-100.60
-2	-94.64	-95.09	-92.95	-96.70	-96.69	-95.12	-98.17	-96.77	-97.14
-1	-85.43	-84.91	-83.66	-88.26	-86.30	-85.78	-88.40	-87.11	-88.44
o ^{note 4}	-	-	-	-	-	-	-	-	-
+1	-87.08	-87.36	-85.16	-89.61	-88.90	-85.19	-92.59	-89.59	-90.08
+2	-94.57	-94.53	-94.49	-95.71	-94.76	-93.64	-95.48	-94.15	-94.11
+3	-104.96	-103.68	-102.49	-105.50	-109.92	-102.74	-104.69	-111.13	-103.89
+4	-92.27	-92.83	-93.79	-95.14	-97.06	-95.82	-96.63	-98.12	-98.74
+5	-87.88	-91.24	-93.90	-91.90	-95.04	-97.63	-93.36	-95.79	-98.97

Note 3: Reference frequency 52 MHz

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







STEP SIZE SPURIOUS ORDER	0.5 STEP SIZE & STEP SIZE SPURIOUS @Fcarrier 3400MHz+(n*Fstep size) (dBc) note 5		SPU	0.5 STEP SIZE & STEP SIZE SPURIOUS @Fcarrier 3500MHz+(n*Fstep size) (dBc) note 5			0.5 STEP SIZE & STEP SIZE SPURIOUS @Fcarrier 3600MHz+(n*Fstep size) (dBc) note 5		
n	-45°C	+25°C	+85°C	-45°C	+25°C	+85°C	-45°C	+25°C	+85°C
-5.0	-109.06	-107.76	-111.71	-113.06	-111.89	-112.16	-112.21	-111.14	-108.24
-4.5	-111.94	-107.81	-109.94	-108.57	-111.02	-106.18	-107.98	-110.64	-100.31
-4.0	-109.47	-106.29	-106.94	-107.64	-106.39	-107.02	-107.54	-107.99	-104.60
-3.5	-106.84	-104.88	-105.17	-106.99	-105.76	-107.78	-107.63	-105.89	-105.29
-3.0	-102.79	-106.56	-104.86	-107.89	-106.33	-104.96	-106.15	-102.79	-105.81
-2.5	-97.58	-100.97	-102.63	-101.58	-102.89	-102.86	-101.46	-103.44	-100.60
-2.0	-87.50	-88.36	-93.26	-95.60	-95.89	-99.11	-100.63	-100.10	-99.03
-1.5	-88.80	-94.46	-92.97	-92.59	-91.71	-95.57	-91.66	-90.64	-94.93
-1.0	-82.52	-79.33	-78.53	-84.73	-85.02	-86.24	-87.68	-88.25	-86.67
-0.5	-64.84	-70.04	-78.46	-73.06	-75.99	-80.47	-74.83	-79.73	-84.52
o ^{note 6}	-	-	-	-	-	-	-	-	-
+0.5	-66.26	-69.51	-78.46	-71.67	-75.06	-80.21	-72.88	-87.01	-82.73
+1.0	-83.37	-78.66	-77.99	-86.60	-82.35	-85.98	-87.59	-88.00	-82.75
+1.5	-89.25	-93.67	-90.19	-91.89	-95.64	-90.78	-95.76	-94.02	-98.68
+2.0	-87.68	-89.64	-96.63	-100.40	-98.78	-94.10	-103.10	-102.14	-103.00
+2.5	-96.57	-96.78	-103.24	-99.80	-103.42	-100.01	-103.91	-104.82	-100.37
+3.0	-104.65	-105.19	-104.37	-107.84	-105.07	-105.46	-108.87	-108.65	-104.79
+3.5	-104.55	-104.85	-103.13	-107.43	-109.08	-107.34	-109.22	-109.91	-105.47
+4.0	-106.81	-107.15	-109.25	-110.97	-105.89	-110.82	-109.65	-109.27	-107.19
+4.5	-109.70	-104.78	-111.35	-108.63	-109.79	-107.34	-105.46	-111.31	-102.44
+5.0	-108.66	-106.69	-113.23	-107.42	-112.64	-113.07	-114.55	-114.96	-109.89

Note 5: Step size 125 kHz

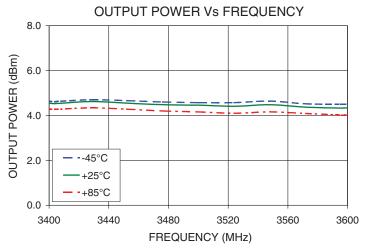
Note 6: All spurs are referenced to carrier signal (n=0).

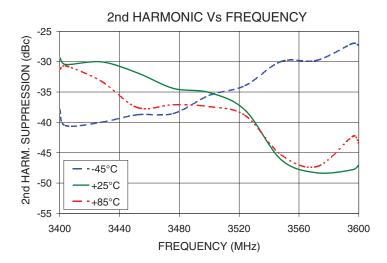


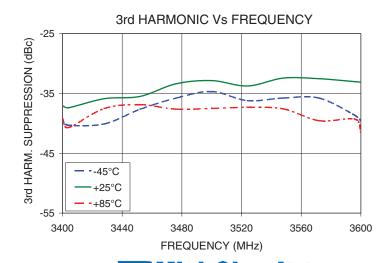




Typical Performance Curves





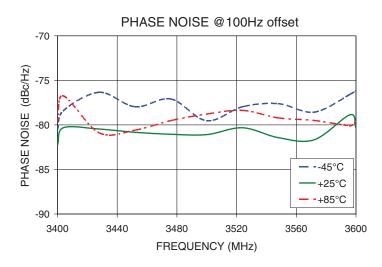


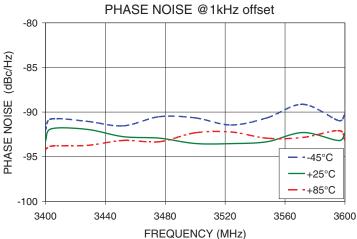
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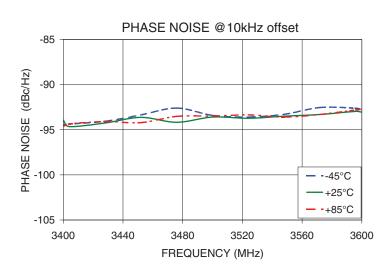
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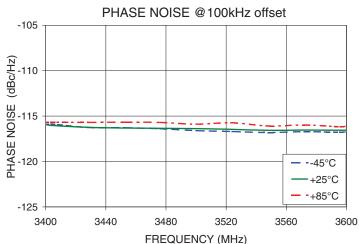
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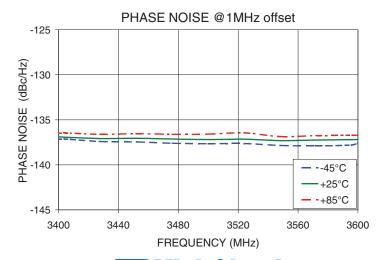












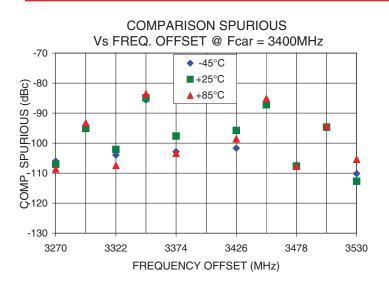
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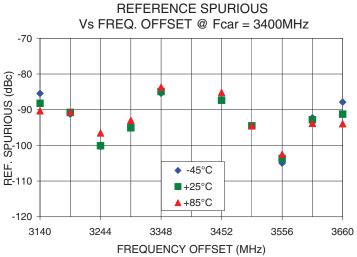
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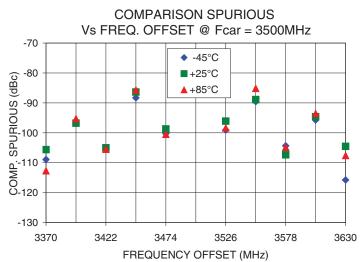
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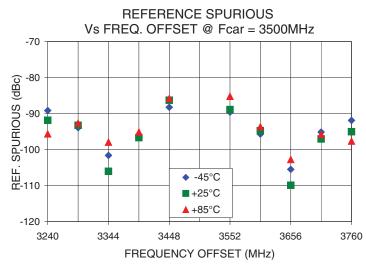
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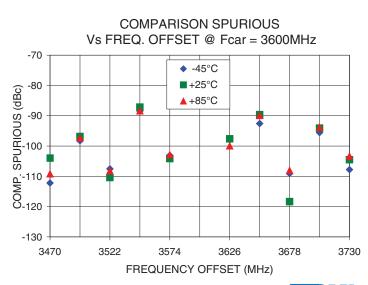


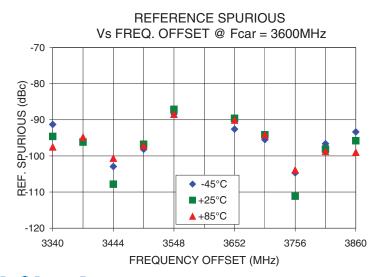






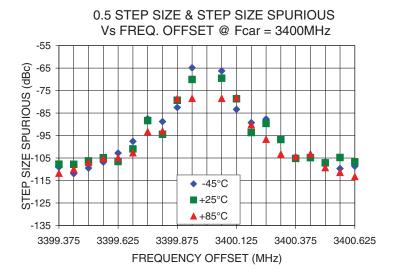


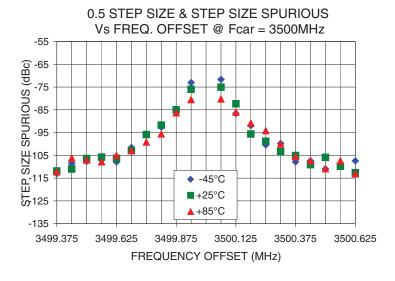


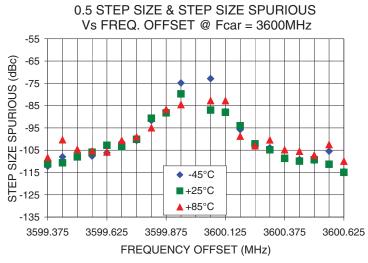


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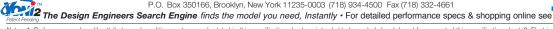






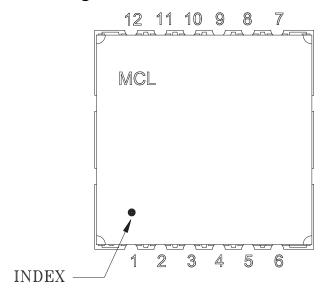
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Pin Configuration

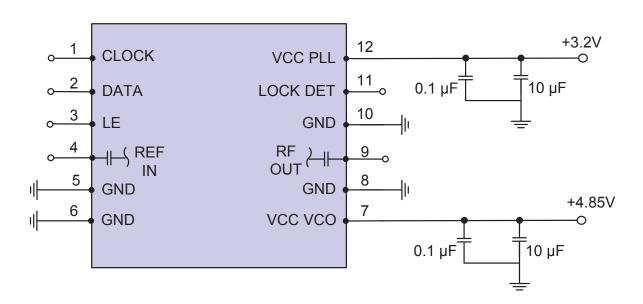


Pin Connection

Pin Number	Function
1	CLOCK
2	DATA
3	ENABLED
4	REF IN
5	GND
6	GND
7	VCC VCO
8	GND
9	RF OUT
10	GND
11	LOCK DET
12	VCC PLL

Recommended Application Circuit

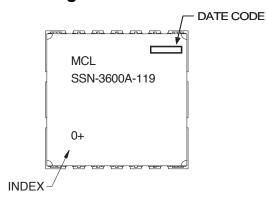
Note: REF IN and RF OUT ports are internally AC coupled.







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: KJ1367

Tape & Reel: TR-F95

Suggested Layout for PCB Design: PL-317

Evaluation Board: TB-552+

Environment Ratings: ENV03T2





FREQ.	POV	VER OUT	PUT			HARM	ONICS			VC	O CURRE	NT	ı	LL CURE	ΝT
(MHz)		(dBm)				(d	Bc)			(mA)			(mA)		
(IVITIZ)					F2			F3							
	-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
3400	4.63	4.55	4.29	-37.87	-29.31	-31.25	-39.59	-37.05	-39.20	39.70	41.76	43.24	15.09	15.76	18.00
3404	4.62	4.53	4.27	-40.54	-30.46	-30.68	-40.32	-37.40	-40.71	39.69	41.77	43.24	14.84	15.53	17.73
3428	4.70	4.62	4.34	-39.97	-30.03	-33.24	-40.10	-35.88	-37.52	39.65	41.79	43.24	14.97	15.68	17.87
3452	4.66	4.55	4.28	-38.74	-31.85	-37.56	-37.65	-35.50	-36.88	39.67	41.77	43.24	15.10	15.82	18.01
3476	4.60	4.48	4.20	-38.54	-34.40	-37.09	-35.79	-33.40	-37.63	39.70	41.77	43.24	15.12	15.86	18.04
3500	4.57	4.46	4.16	-35.55	-35.09	-37.40	-34.68	-32.86	-37.51	39.67	41.78	43.31	15.18	15.93	18.11
3524	4.57	4.41	4.10	-33.94	-37.99	-38.85	-36.21	-33.76	-37.34	39.68	41.78	43.32	15.26	16.01	18.19
3548	4.64	4.48	4.16	-29.98	-46.13	-45.32	-35.77	-32.44	-37.59	39.68	41.76	43.21	15.27	16.04	18.21
3572	4.52	4.37	4.09	-29.77	-48.31	-47.28	-35.78	-32.54	-39.56	39.67	41.77	43.23	15.18	15.94	18.11
3596	4.50	4.33	4.02	-26.98	-47.78	-42.30	-38.67	-33.04	-39.29	39.68	41.76	43.22	15.10	15.85	18.02
3600	4.50	4.34	4.03	-27.32	-47.00	-43.49	-39.59	-33.13	-41.60	39.68	41.76	43.22	15.28	16.05	18.21

FREQ.							PHAS	SE NOISE	(dBc/Hz)							
(MHz)								@ OFFSI	ETS							
(IVITIZ)			-45°C			+25°C						+85°C				
	100Hz	1kHz	10kHz	100kHz	1MHz	100Hz	1kHz	10kHz	100kHz	1MHz	100Hz	1kHz	10kHz	100kHz	1MHz	
3400	-80.54	-92.01	-94.48	-115.92	-137.15	-82.26	-93.24	-93.91	-115.93	-136.89	-79.69	-94.18	-94.62	-115.68	-136.51	
3404	-78.40	-90.77	-94.37	-115.88	-137.13	-80.31	-91.87	-94.65	-116.03	-136.93	-76.75	-93.81	-94.36	-115.67	-136.46	
3428	-76.34	-91.04	-94.06	-116.25	-137.41	-80.46	-91.94	-94.25	-116.24	-137.08	-80.89	-93.73	-94.09	-115.70	-136.61	
3452	-77.97	-91.54	-93.36	-116.28	-137.46	-80.83	-92.76	-93.63	-116.31	-137.05	-80.59	-93.18	-94.21	-115.67	-136.54	
3476	-77.09	-90.52	-92.60	-116.39	-137.60	-81.05	-92.92	-94.17	-116.35	-137.13	-79.51	-93.32	-93.52	-115.70	-136.61	
3500	-79.53	-90.65	-93.41	-116.60	-137.66	-81.09	-93.52	-93.59	-116.38	-137.19	-78.78	-92.32	-93.49	-115.89	-136.59	
3524	-77.96	-91.45	-93.59	-116.70	-137.63	-80.32	-93.53	-93.73	-116.46	-137.15	-78.37	-92.23	-93.35	-115.74	-136.45	
3548	-77.62	-90.64	-93.29	-116.81	-137.85	-81.43	-93.32	-93.50	-116.57	-137.31	-79.21	-92.93	-93.59	-116.09	-136.86	
3572	-78.57	-89.13	-92.54	-116.72	-137.90	-81.67	-92.29	-93.31	-116.54	-137.25	-79.50	-92.84	-93.31	-115.98	-136.76	
3596	-76.57	-90.96	-92.62	-116.78	-137.79	-78.86	-93.19	-92.96	-116.56	-137.20	-80.07	-92.07	-92.80	-116.18	-136.71	
3600	-76.15	-90.17	-92.77	-116.73	-137.56	-80.37	-92.30	-93.06	-116.54	-137.19	-79.61	-93.17	-92.73	-116.11	-136.69	

Typical Performance Data

	COMP	ARISON SPUR	RIOUS	COMP	PARISON SPU	RIOUS	COMP	ARISON SPU	RIOUS	
COMPARISON	@F	carrier 3400M	Hz±	@F	carrier 3500M	Hz±	@Fcarrier 3600MHz±			
SPURIOUS ORDER	(1	n*Fcompariso	n)	(1	n*Fcompariso	n)	(1	n*Fcompariso	n)	
		(dBc) NOTE 1			(dBc) NOTE 1			(dBc) NOTE 1		
n	-45°C	+25°C	+85°C	-45°C	+25°C	+85°C	-45°C	+25°C	+85°C	
-5	-106.01	-107.05	-108.60	-108.93	-105.63	-112.68	-112.21	-103.99	-109.13	
-4	-94.66	-95.09	-93.24	-96.76	-96.78	-95.26	-98.27	-96.84	-97.31	
-3	-103.97	-102.12	-107.41	-105.35	-105.02	-105.49	-107.54	-110.41	-108.17	
-2	-85.64	-84.90	-83.54	-88.32	-86.38	-85.66	-88.42	-87.14	-88.33	
-1	-102.85	-97.64	-103.37	-100.26	-98.70	-100.50	-103.10	-104.15	-102.83	
0 ^{note 2}	-	-	-	-	-	-	-	-	-	
+1	-101.69	-95.77	-98.54	-99.05	-96.10	-98.36	-97.94	-97.62	-99.92	
+2	-87.02	-87.23	-85.10	-89.57	-88.89	-85.12	-92.57	-89.63	-89.87	
+3	-107.28	-107.67	-107.69	-104.33	-107.36	-104.84	-109.08	-118.36	-108.02	
+4	-94.89	-94.68	-94.24	-95.72	-94.63	-93.51	-95.56	-94.08	-93.79	
+5	-110.15	-112.69	-105.36	-115.76	-104.54	-107.57	-107.80	-104.51	-103.31	

Note 1: Comparison frequency 26 MHz

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

REFERENCE SPURIOUS ORDER	@F	RENCE SPUR carrier 3400M (n*Freference (dBc) NOTE 3	Hz±	@F	RENCE SPUR carrier 3500M (n*Freference (dBc) NOTE 3	Hz±)	REFERENCE SPURIOUS @Fcarrier 3600MHz± (n*Freference) (dBc) NOTE 3			
n	-45°C	+25°C	+85°C	-45°C	+25°C	+85°C	-45°C	+25°C	+85°C	
-5	-85.46	-88.22	-90.30	-89.16	-91.87	-95.63	-91.29	-94.61	-97.51	
-4	-91.26	-90.78	-90.58	-93.94	-93.27	-92.65	-95.46	-96.18	-94.77	
-3	-100.31	-100.10	-96.51	-101.62	-106.05	-97.93	-102.93	-107.82	-100.60	
-2	-94.64	-95.09	-92.95	-96.70	-96.69	-95.12	-98.17	-96.77	-97.14	
-1	-85.43	-84.91	-83.66	-88.26	-86.30	-85.78	-88.40	-87.11	-88.44	
O ^{note 4}	-	-	-	-	-	-	-	-	-	
+1	-87.08	-87.36	-85.16	-89.61	-88.90	-85.19	-92.59	-89.59	-90.08	
+2	-94.57	-94.53	-94.49	-95.71	-94.76	-93.64	-95.48	-94.15	-94.11	
+3	-104.96	-103.68	-102.49	-105.50	-109.92	-102.74	-104.69	-111.13	-103.89	
+4	-92.27	-92.83	-93.79	-95.14	-97.06	-95.82	-96.63	-98.12	-98.74	
+5	-87.88	-91.24	-93.90	-91.90	-95.04	-97.63	-93.36	-95.79	-98.97	

Note 3: Reference frequency 52 MHz

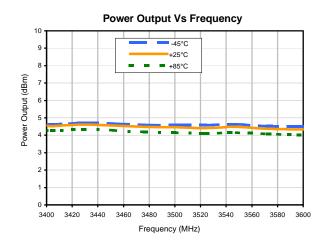
Note 4: All spurs are referenced to carrier signal (n=0).

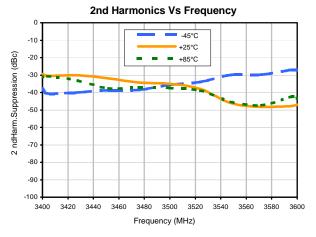
Typical Performance Data

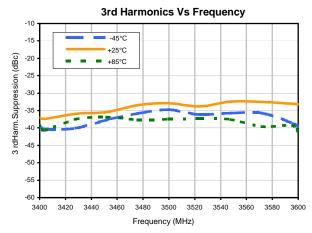
STEP SIZE	0.5 STEP SIZ	ZE & STEP SIZ	E SPURIOUS	0.5 STEP SIZ	ZE & STEP SIZ	E SPURIOUS	0.5 STEP SI	ZE & STEP SIZ	E SPURIOUS		
SPURIOUS	@	Fcarrier 3400 N	1Hz	@	Fcarrier 3500 N	ИHz	@	Fcarrier 3600 N	lHz		
ORDER		(n*Fstep size)			(n*Fstep size))	(n*Fstep size)				
OKBEK		(dBc) NOTE 5			(dBc) NOTE 5		(dBc) NOTE 5				
n	-45°C	+25°C	+85°C	-45°C	+25°C	+85°C	-45°C	+25°C	+85°C		
-5.0	-109.06	-107.76	-111.71	-113.06	-111.89	-112.16	-112.21	-111.14	-108.24		
-4.5	-111.94	-107.81	-109.94	-108.57	-111.02	-106.18	-107.98	-110.64	-100.31		
-4.0	-109.47	-106.29	-106.94	-107.64	-106.39	-107.02	-107.54	-107.99	-104.60		
-3.5	-106.84	-104.88	-105.17	-106.99	-105.76	-107.78	-107.63	-105.89	-105.29		
-3.0	-102.79	-106.56	-104.86	-107.89	-106.33	-104.96	-106.15	-102.79	-105.81		
-2.5	-97.58	-100.97	-102.63	-101.58	-102.89	-102.86	-101.46	-103.44	-100.60		
-2.0	-87.50	-88.36	-93.26	-95.60	-95.89	-99.11	-100.63	-100.10	-99.03		
-1.5	-88.80	-94.46	-92.97	-92.59	-91.71	-95.57	-91.66	-90.64	-94.93		
-1.0	-82.52	-79.33	-78.53	-84.73	-85.02	-86.24	-87.68	-88.25	-86.67		
-0.5	-64.84	-70.04	-78.46	-73.06	-75.99	-80.47	-74.83	-79.73	-84.52		
O ^{NOTE 6}	-	-	-	-	-	-	-	-	-		
+0.5	-66.26	-69.51	-78.46	-71.67	-75.06	-80.21	-72.88	-87.01	-82.73		
+1.0	-83.37	-78.66	-77.99	-86.60	-82.35	-85.98	-87.59	-88.00	-82.75		
+1.5	-89.25	-93.67	-90.19	-91.89	-95.64	-90.78	-95.76	-94.02	-98.68		
+2.0	-87.68	-89.64	-96.63	-100.40	-98.78	-94.10	-103.10	-102.14	-103.00		
+2.5	-96.57	-96.78	-103.24	-99.80	-103.42	-100.01	-103.91	-104.82	-100.37		
+3.0	-104.65	-105.19	-104.37	-107.84	-105.07	-105.46	-108.87	-108.65	-104.79		
+3.5	-104.55	-104.85	-103.13	-107.43	-109.08	-107.34	-109.22	-109.91	-105.47		
+4.0	-106.81	-107.15	-109.25	-110.97	-105.89	-110.82	-109.65	-109.27	-107.19		
+4.5	-109.70	-104.78	-111.35	-108.63	-109.79	-107.34	-105.46	-111.31	-102.44		
+5.0	-108.66	-106.69	-113.23	-107.42	-112.64	-113.07	-114.55	-114.96	-109.89		

Note 5: Step size 125 kHz

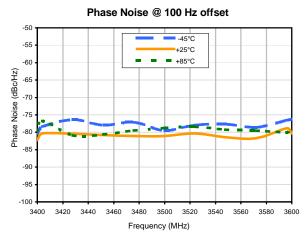
Note 6: All spurs are referenced to carrier signal (n=0).

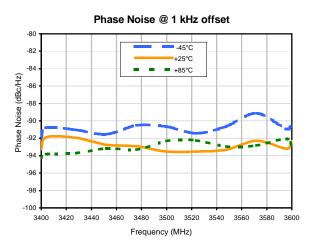


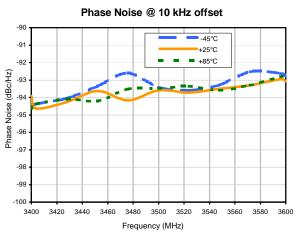


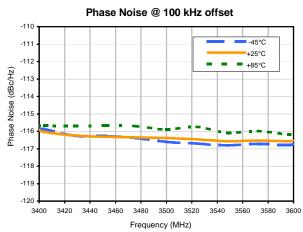


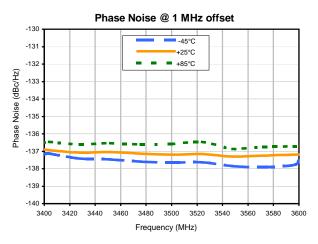




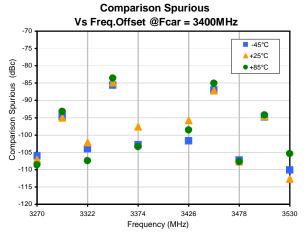


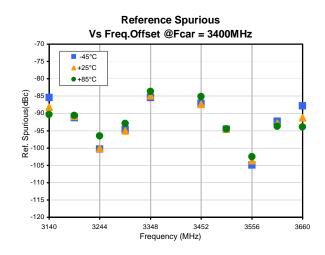


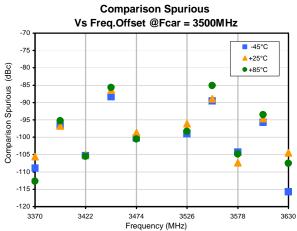


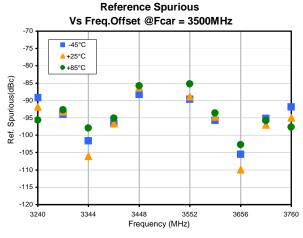


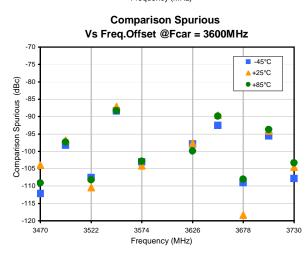


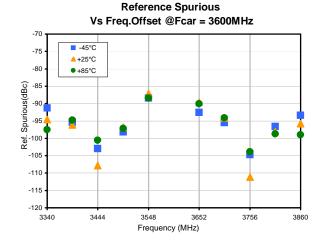






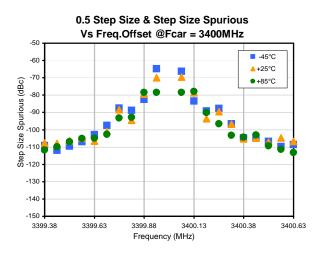


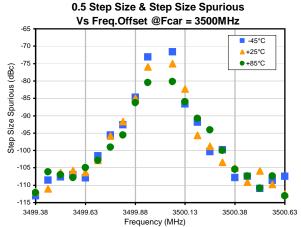


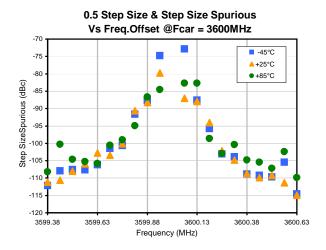


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REV. X1 SSN-3600A-119+ 100121 Page 3 of 4







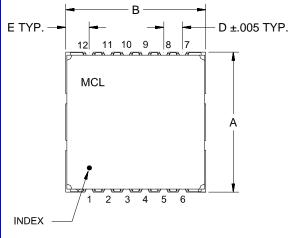


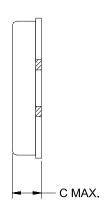
Case Style



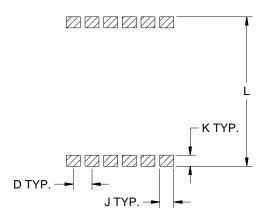
Outline Dimensions

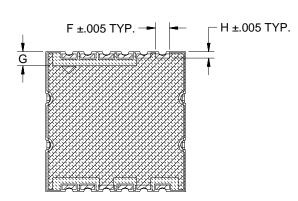
KJ1367





PCB Land Pattern







METALLIZATION



SOLDER RESIST

CASE#	A	В	С	D	Е	F	G	Н	J	K	L	WT.GRAM
KJ1367	.600 (15.24)	.600 (15.24)	.138 (3.51)	.080 (2.03)	.100 (2.54)	.060 (1.52)	.060 (1.52)	.028 (0.71)	.060 (1.52)	.047 (1.19)	.640 (16.26)	2.0

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.





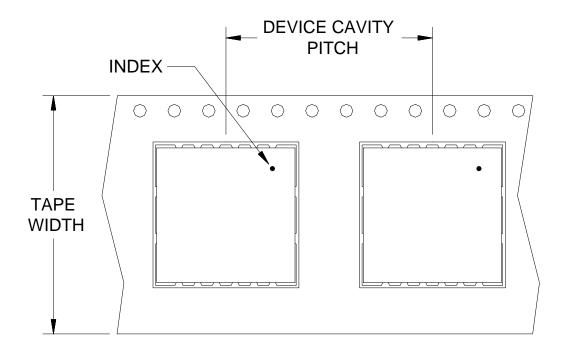
P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661 For detailed performance specs & shopping online see Mini-Circuits web site

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

RF/IF MICROWAVE COMPONENTS

Tape & Reel Packaging TR-F95

DEVICE ORIENTATION IN T&R



DIRECTION OF FEED

Tape Width, mm	Device Cavity Pitch, mm	Reel Size, inches	Devices 1	per Reel
			Small	20
			quantity	50
24	24	13	standards	100
			(see note)	200
			Standard	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

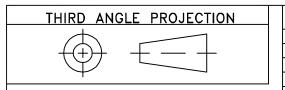


INTERNET http://www.minicircuits.com

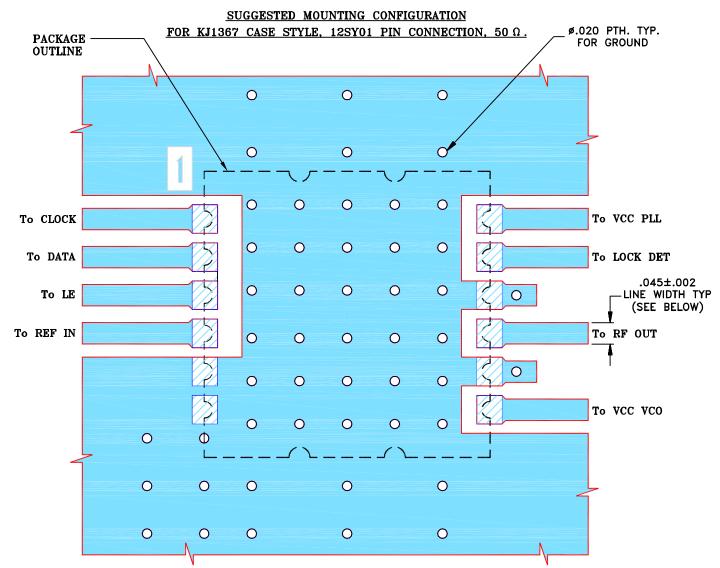
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		REVISIONS			
REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
OR	M124738	NEW RELEASE	04/10	DK	HH
OR	R77823	NEW RELEASE	04/10	DK	HH



NOTES:

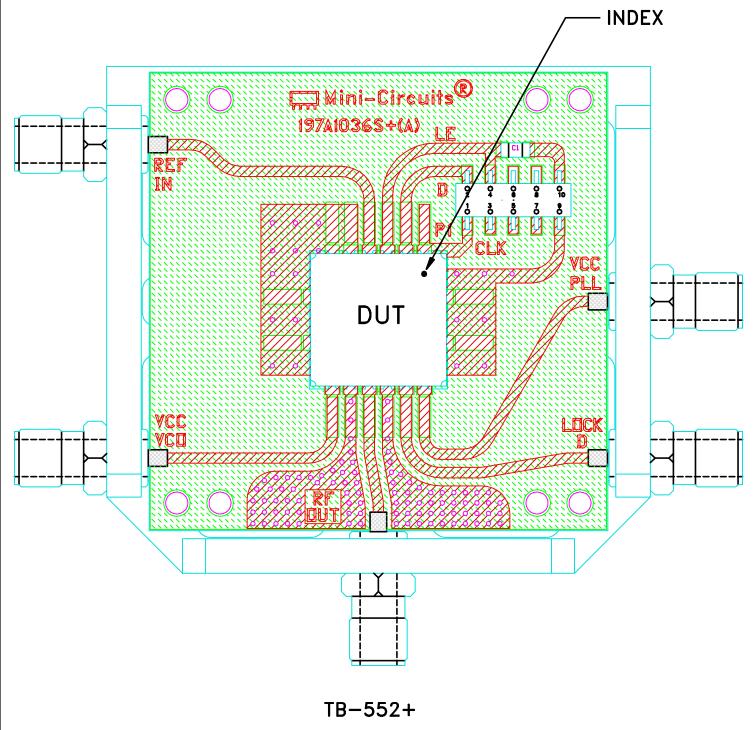
- 1. TRACE WIDTH IS SHOWN FOR RO4350B WITH DIELECTRIC THICKNESS. .020"±.0015". COPPER: 1/2 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH MAY NEED TO BE MODIFIED.
- 2. BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.

DENOTES PCB COPPER LAYOUT WITH SMOBC (SOLDER MASK OVER BARE COPPER)

DENOTES COPPER LAND PATTERN FREE OF SOLDERMASK

UNLESS OTHERWISE SPECIFIED		INITIALS	DATE]		. ~.		(R)			
DIMENSIONS ARE IN INCHES	DRAWN	DK (RAVON)	06 APR 10		Mini	ı – C 1 :	rcu	its	13 Neptur	ne Aver	ue
TOLERANCES ON: 2 PL DECIMALS ±	CHECKED	DH (RAVON)	07 APR 10						Brooklyn	NI IIZ	30
3 PL DECIMALS ± .005 ANGLES ±	APPROVED	HH (RAVON)	07 APR 10		PL, 13	OCVA1	I Z I 1	267	CCI	NT.	
FRACTIONS ±					•		•	•	, 991	1	
THIS DOCUMENT AND ITS CONTENTS A	Circuits ®	TY OF MINI_CIRCUIT	\$		Τ	B-55	2+ (50Ω)		
EXCEPT FOR USE EXPRESSLY GRANTED AND THE UNITED STATES GOVERNMENT	, IN WRITING, T	TO ITS VENDORS, VE	NDEE	SIZE	CODE IDENT	DRAWING NO				REV:	
DESIGN, USE , MANUFACTURING AND I THESE CONTENTS SHALL NOT BE USED	REPRODUCTION F	RIGHTS THERETO. OR DISCLOSED TO A	NY OUTSIDE	A	15542	5	8-PL	-317		0	$R \mid$
PARTY, IN WHOLE OR IN PART, WITHO	UT WRITTEN PER	RMISSION OF MINI-C	RCUITS.	FILE: C	98PL317	SCALE:	<i>5</i> . 1	SHEET:	1	ΛE	1
	ASHEETA1.D	WG REV:A DA	TE:01/12/95	· · · · · · · · · ·	10LT211		5:1		1	Uľ	1

Evaluation Board and Circuit

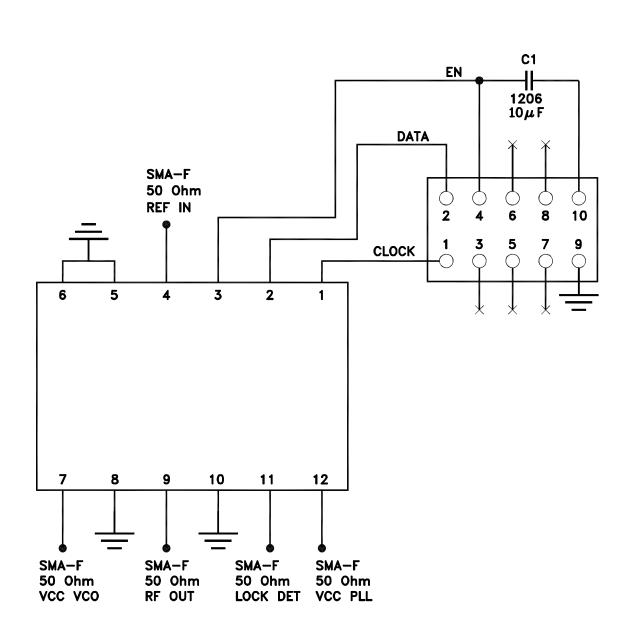


NOTES:

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

DWG NO: WTB-552+
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TB-552+ Schematic Diagram

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REV: OR SHEET:2/2



Environmental Specifications

ENV65T2

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

ENV65T2 Rev: OR

04/25/12

M136912 File: ENV65T2.pdf

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