

NON-CATALOG

Frequency Synthesizer

KSN-2457A-1C19+

50Ω 2457.6 MHz (fixed)

The Big Deal

- Low phase noise and spurious
- Fixed frequency without external programming
- Integrated microcontroller
- Robust design and construction
- Small size 0.80" x 0.58" x 0.24"



CASE STYLE: DK1171

Product Overview

The KSN-2457A-1C19+ is a Frequency Synthesizer, designed to operate at 2457.6 MHz for CATV applications. The KSN-2457A-1C19+ is packaged in a metal case (size of 0.80" x 0.58" x 0.24") to shield against unwanted signals and noise.

Key Features

Feature	Advantages
Low phase noise and spurious: <ul style="list-style-type: none">• Phase noise: -110 dBc/Hz typ. @ 10 kHz offset• Comparison spurious: -95 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 KSN-2457A-1C19+, 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, 0.80" x 0.58" x 0.24"	The small size enables the KSN-2457A-1C19+ to be used in compact designs.

Notes

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Features

- Fixed frequency without external programming
- Integrated microcontroller
- High reliability over temperature changes
- Robust design and construction
- Low operating voltage (VCC VCO=+5V, VCC PLL=+3.3V)
- Small size 0.80" x 0.58" x 0.24"



CASE STYLE: DK1171

+RoHS Compliant

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

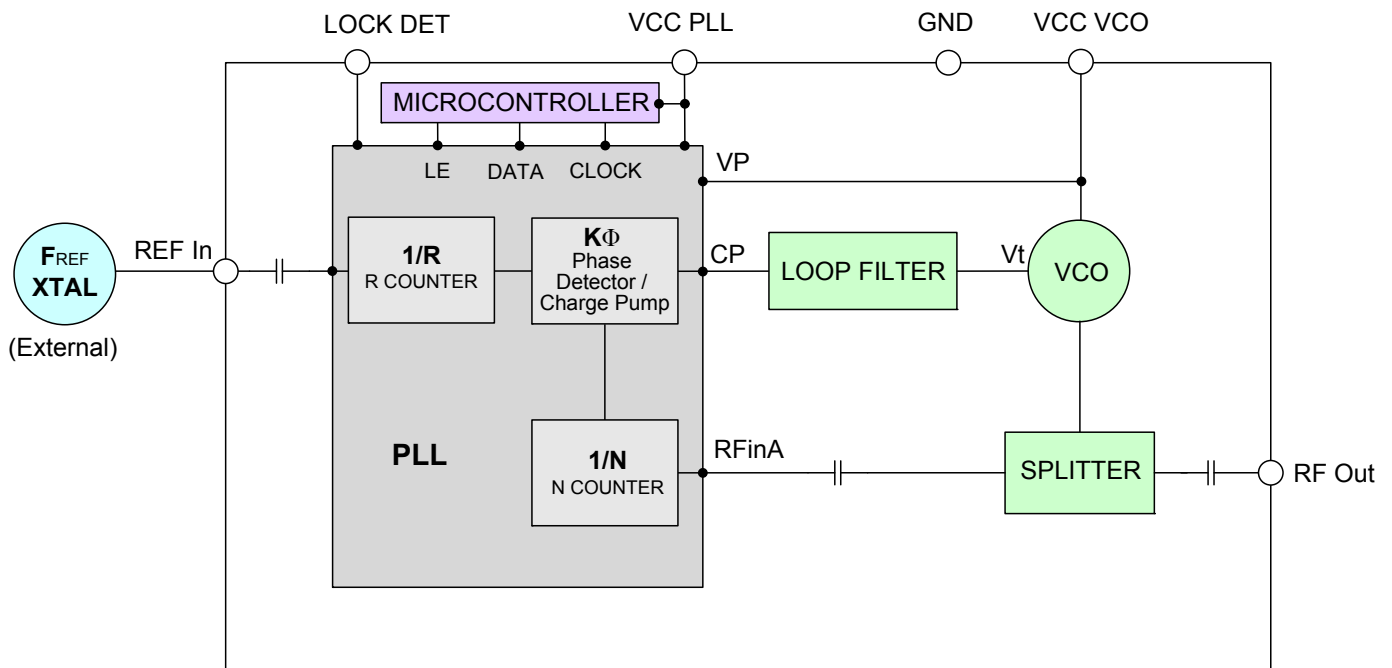
Applications

- CATV

General Description

The KSN-2457A-1C19+ is a Frequency Synthesizer, designed to operate at 2457.6 MHz for CATV applications. The KSN-2457A-1C19+ is packaged in a metal case (size of 0.80" x 0.58" x 0.24") to shield against unwanted signals and noise. To enhance the robustness of KSN-2457A-1C19+, 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



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Electrical Specifications (over operating temperature 0°C to +70°C)

Parameters	Test Conditions	Min.	Typ.	Max.	Units	
Frequency Range (fixed)	-	2457.6	-	2457.6	MHz	
Step size	-	-	10.24	-	MHz	
Settling Time (Power on to lock)	Within ± 1 kHz	-	40	-	mSec	
Output Power	-	+1	+4.5	+7	dBm	
SSB Phase Noise	@ 100 Hz offset	-	-85	-	dBc/Hz	
	@ 1 kHz offset	-	-90	-86		
	@ 10 kHz offset	-	-110	-105		
	@ 100 kHz offset	-	-134	-128		
	@ 1 MHz offset	-	-154	-149		
Integrated SSB Phase Noise	@100 Hz to 1 MHz	-	-55	-44	dBc	
Reference Spurious Suppression	Ref. Freq. 10.24 MHz	-	-95	-73		
Comparison Spurious Suppression	Step Size 10.24 MHz	-	-95	-73		
Non - Harmonic Spurious Suppression	-	-	-90	-		
Harmonic Suppression	-	-	-36	-25		
VCO Supply Voltage	-	+4.75	+5.00	+5.25	V	
PLL Supply Voltage	-	+3.15	+3.30	+3.45		
VCO Supply Current	-	-	47	55	mA	
PLL Supply Current	-	-	11	20		
Reference Input (External)	Frequency	(square wave)	-	10.24	-	MHz
	Amplitude	-	-	1	-	V _{p-p}
	Input impedance	-	-	100	-	K Ω
	Phase Noise @ 1 kHz offset	-	-	-145	-	dBc/Hz
RF Output port Impedance	-	-	50	-	Ω	
Digital Lock Detect	Locked	-	2.75	-	3.45	V
	Unlocked	-	-	-	0.40	V

Absolute Maximum Ratings

Parameters	Ratings
VCO Supply Voltage ^{NOTE 1}	5.8V
PLL Supply Voltage ^{NOTE 1}	3.6V
VCO Supply Voltage to PLL Supply Voltage ^{NOTE 1}	-0.3V to +5.8V
Reference Frequency Amplitude	3.6V _{p-p}
Data, Clock, LE Levels	N.A
Operating Temperature	-40°C to +85°C
Storage Temperature	-55°C to +100°C

Note 1: Power on/off Sequence:
Power on: VCO Supply Voltage,
followed by PLL Supply Voltage.
Power off: PLL Supply Voltage,
followed by VCO Supply Voltage.

Permanent damage may occur if any of these limits are exceeded

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Typical Performance Data

FREQUENCY (MHz)	POWER OUTPUT (dBm)			VCO CURRENT (mA)			PLL CURRENT (mA)		
	-5°C	+25°C	+75°C	-5°C	+25°C	+75°C	-5°C	+25°C	+75°C
	2457.6	4.50	4.76	4.18	46.61	47.15	48.21	9.95	10.18

FREQUENCY (MHz)	HARMONICS (dBc)					
	F2			F3		
	-5°C	+25°C	+75°C	-5°C	+25°C	+75°C
2457.6	-28.51	-35.78	-48.32	-32.70	-32.10	-31.16

FREQUENCY	@TEMP.	PHASE NOISE (dBc/Hz)				
		@OFFSETS				
		100Hz	1kHz	10kHz	100kHz	1MHz
2457.6	-5°C	-83.86	-92.84	-109.28	-134.78	-155.12
	+25°C	-86.44	-91.88	-109.11	-134.30	-153.75
	+75°C	-83.37	-90.44	-108.56	-132.80	-153.24

REFERENCE & COMPARISON SPURIOUS ORDER n	REFERENCE & COMPARISON SPURIOUS @Fcarrier 2457.6MHz+(n*Fref or Fcomp) (dBc) note 1		
	-5°C	+25°C	+75°C
	-5	-103.83	-102.62
-4	-102.82	-101.42	-117.14
-3	-106.95	-102.13	-118.48
-2	-106.97	-100.95	-116.65
-1	-105.63	-105.55	-108.58
0 ^{note 2}	-	-	-
+1	-95.62	-98.87	-105.56
+2	-99.30	-100.27	-108.17
+3	-104.35	-102.31	-107.55
+4	-103.36	-100.76	-109.62
+5	-103.20	-101.83	-109.43

Note 1: Comparison frequency = Reference frequency = 10.24MHz

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

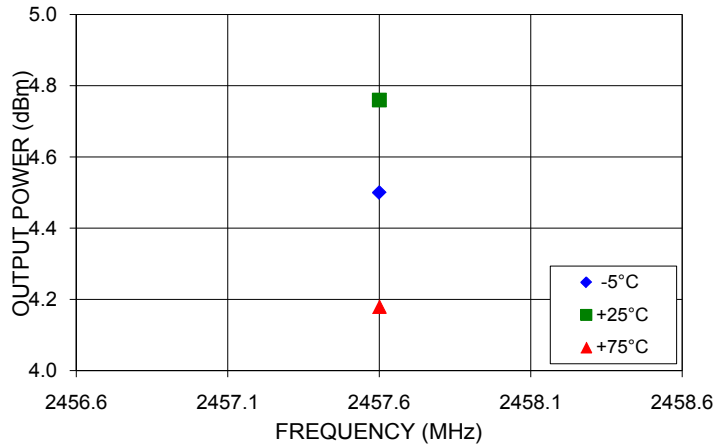
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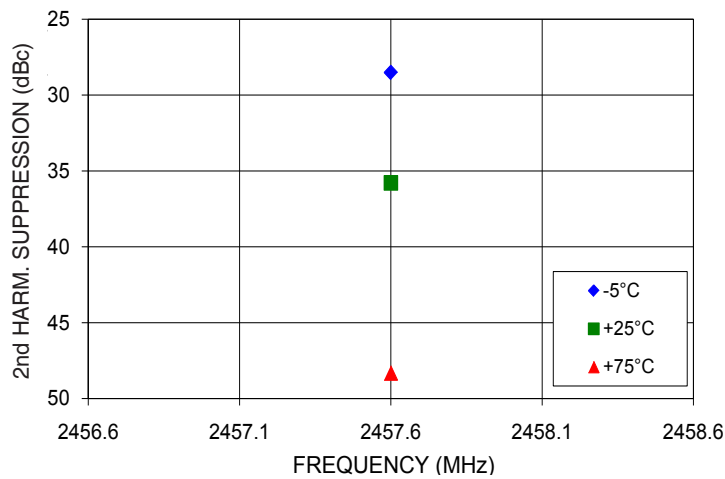


Typical Performance Curves

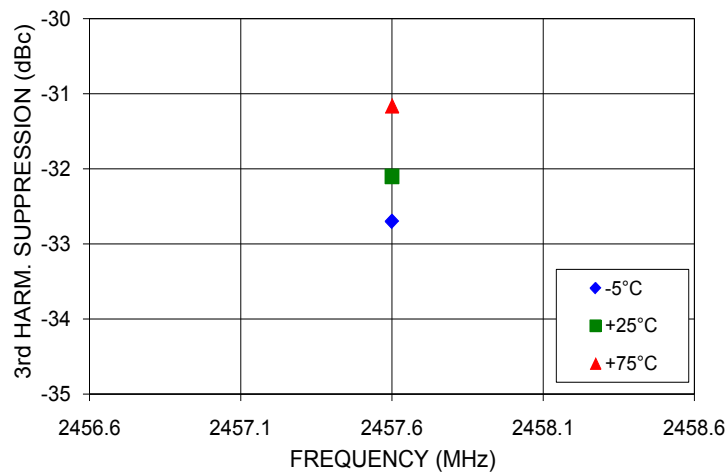
OUTPUT POWER Vs FREQUENCY



2nd HARMONIC Vs FREQUENCY



3rd HARMONIC Vs FREQUENCY



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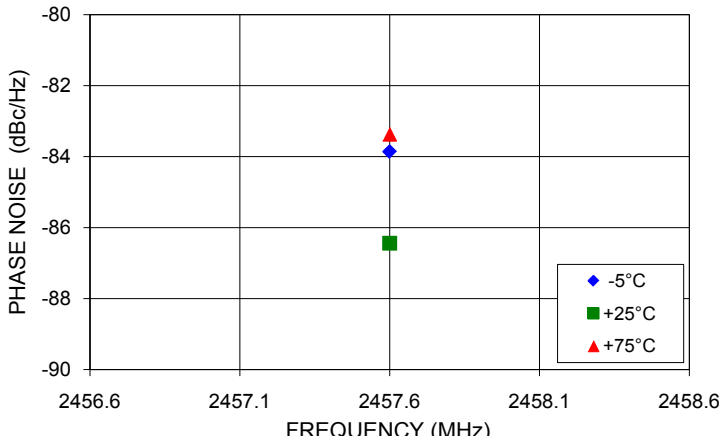


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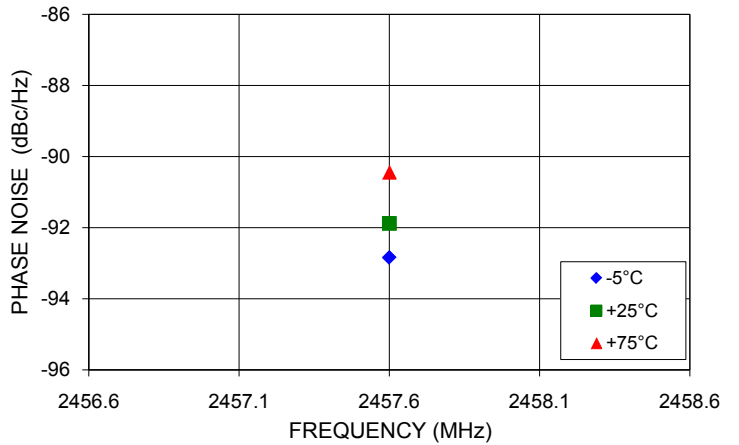
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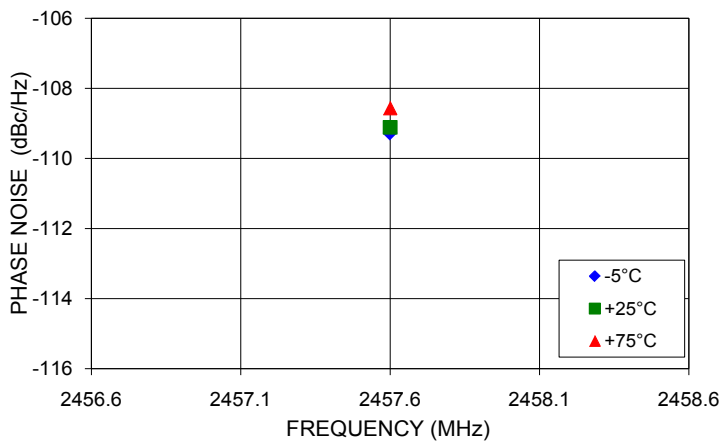
PHASE NOISE @100Hz offset



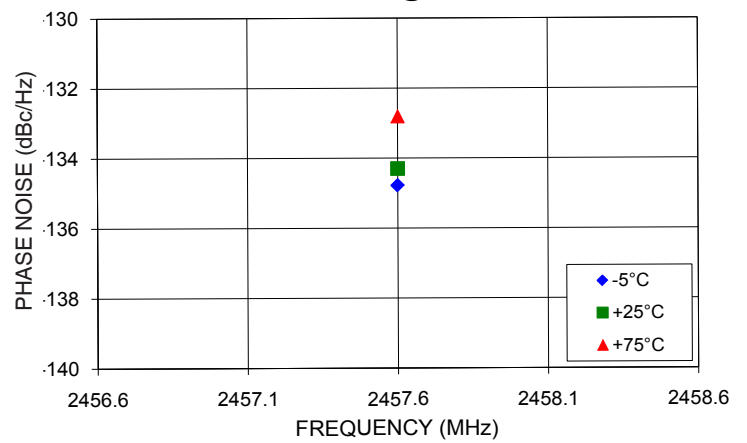
PHASE NOISE @1kHz offset



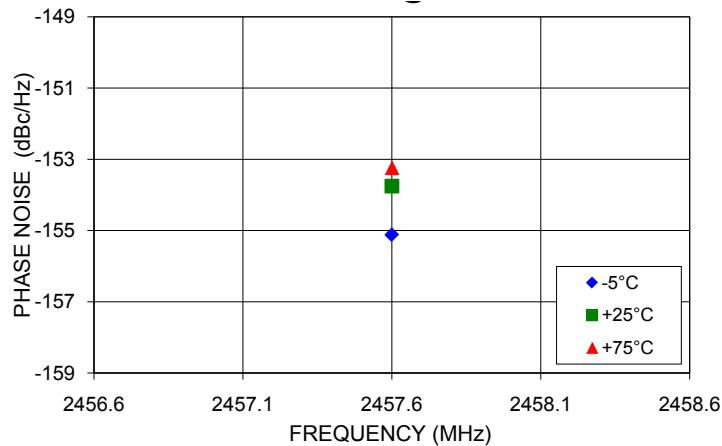
PHASE NOISE @10kHz offset



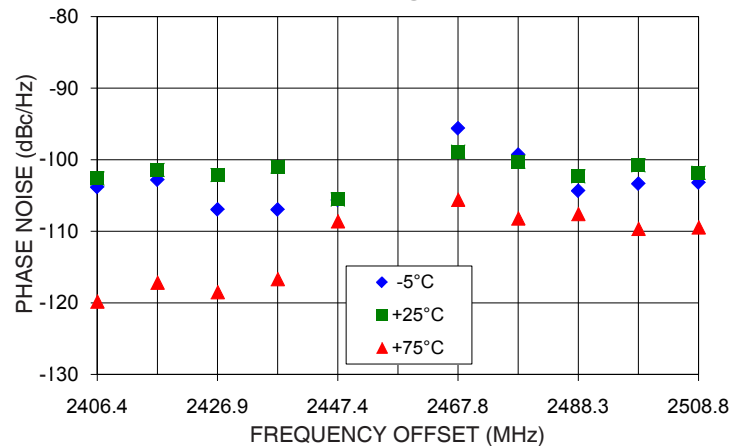
PHASE NOISE @100kHz offset



PHASE NOISE @1MHz offset



REFERENCE & COMPARISON SPURIOUS
Vs FREQ. OFFSET @ Fcar = 2457.6MHz



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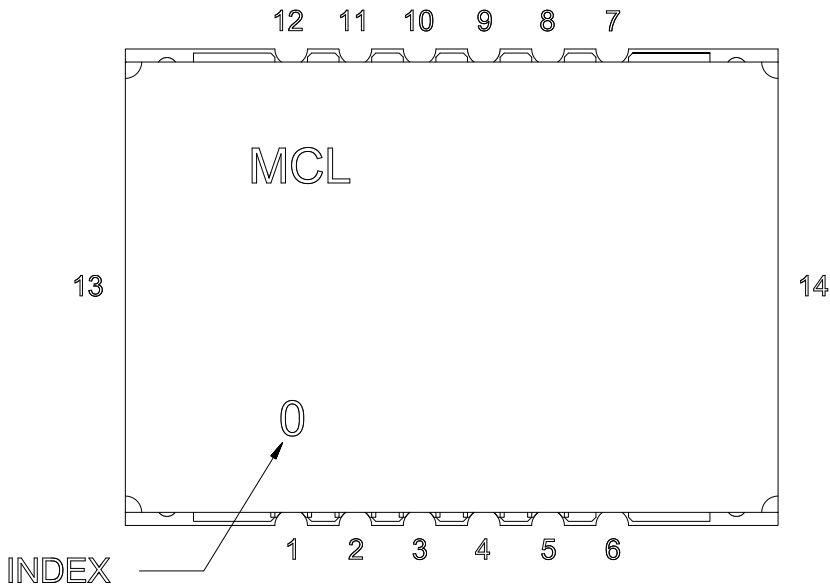


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Pin Configuration

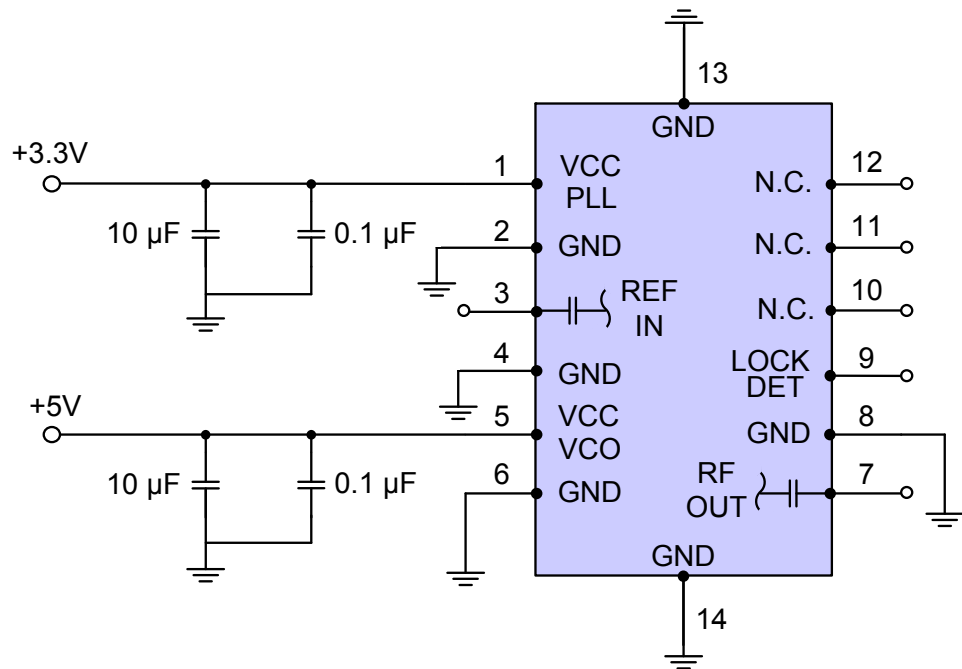


Pin Connection

Pin Number	Function
1	VCC PLL
2	GND
3	REF IN
4	GND
5	VCC VCO
6	GND
7	RF OUT
8	GND
9	LOCK DET
10	NOT CONNECTED
11	NOT CONNECTED
12	NOT CONNECTED
13	GND
14	GND

Recommended Application Circuit

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

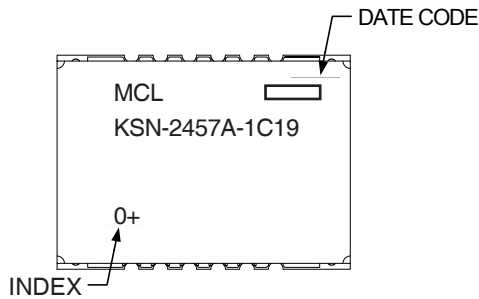


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Device Marking



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: DK1171

Tape & Reel: TR-F28

Suggested Layout for PCB Design: PL-249

Evaluation Board: TB-567-1+F

Environment Ratings: ENV65T2

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

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