

# Frequency Synthesizer

KSN-327A-1C19+

50Ω     327.68 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 0.15"



CASE STYLE: DK1042

## Product Overview

The KSN-327A-1C19+ is a Frequency Synthesizer, designed to operate 327.68MHz for video domain application. The KSN-327A-1C19+ is packaged in a metal case (size of 0.80" x 0.58" x 0.15") to shield against unwanted signals and noise.

## Key Features

Feature	Advantages
Low phase noise and spurious: <ul style="list-style-type: none"><li>• Phase noise: -113 dBc/Hz typ. @ 10 kHz offset</li><li>• Comparison spurious: -85 dBc typ.</li><li>• Reference spurious: -85 dBc typ.</li></ul>	Low phase noise and spurious improve system EVM (Error Vector Magnitude).
Robust design and construction	To enhance the robustness of KSN-327A-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 0.15"	The small size enables the KSN-327A-1C19+ to be used in compact designs.



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50Ω 327.68 MHz (fixed)

### 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=+5V)
- Small size 0.80" x 0.58" x 0.15"



CASE STYLE: DK1042  
PRICE: \$29.95 ea. QTY (1-9)

+ 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.

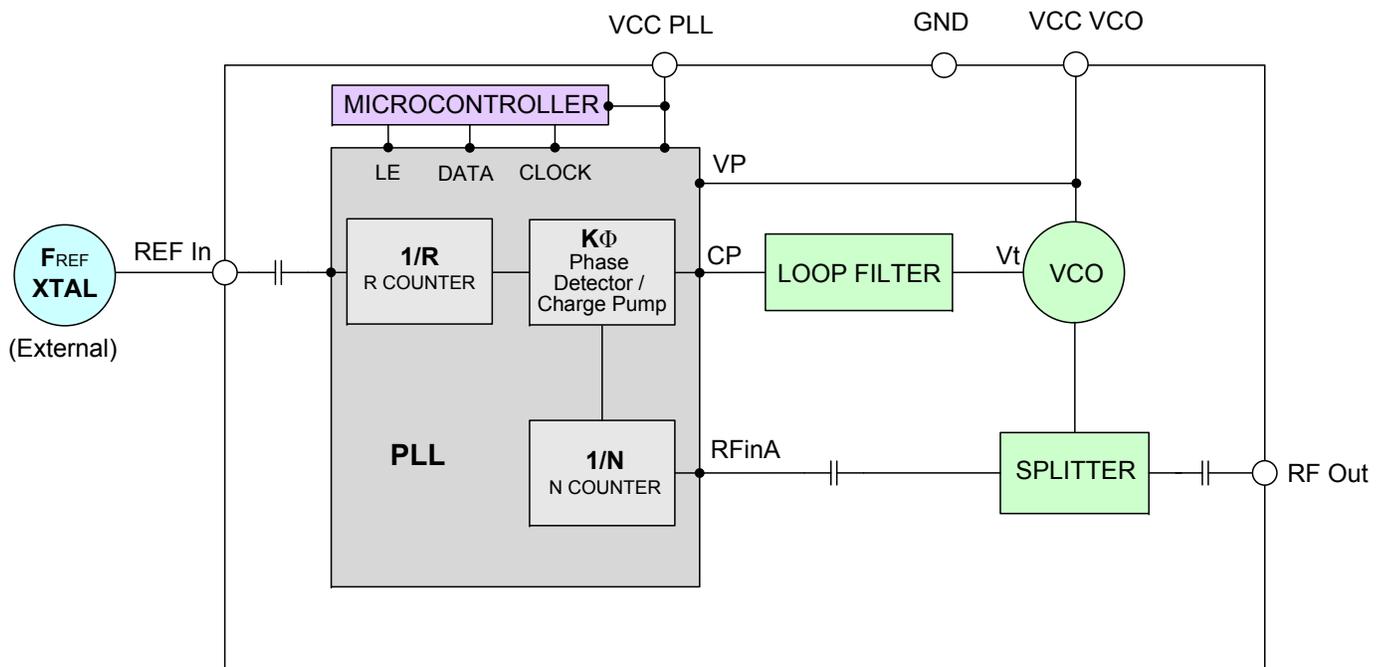
### Applications

- Video domain

### General Description

The KSN-327A-1C19+ is a Frequency Synthesizer, designed to operate 327MHz for video domain application. The KSN-327A-1C19+ is packaged in a metal case (size of 0.80" x 0.58" x 0.15") to shield against unwanted signals and noise. To enhance the robustness of KSN-327A-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)	-	327.68	-	327.68	MHz	
Step Size	-	-	10.24	-	MHz	
Settling Time (Power on to lock)	Within $\pm 1$ kHz	-	6	-	mSec	
Output Power	-	+1	+4	+7	dBm	
SSB Phase Noise	@ 100 Hz offset	-	-102	-	dBc/Hz	
	@ 1 kHz offset	-	-112	-106		
	@ 10 kHz offset	-	-113	-106		
	@ 100 kHz offset	-	-138	-132		
	@ 1 MHz offset	-	-158	-152		
Integrated SSB Phase Noise	@ 100 Hz to 1 MHz	-	-69	-63	dBc	
Reference Spurious Suppression	Ref. Freq. 10.24 MHz	-	-85	-70	dBc	
Comparison Spurious Suppression	Step Size 10.24 MHz	-	-85	-70		
Non - Harmonic Spurious Suppression	-	-	-90	-		
Harmonic Suppression	-	-	-27	-21	dBc	
VCO Supply Voltage	+5.00	+4.75	+5.00	+5.25	V	
PLL Supply Voltage	+5.00	+4.75	+5.00	+5.25		
VCO Supply Current	-	-	45	55	mA	
PLL Supply Current	-	-	17	25		
Reference Input (External)	Frequency	10.24 (square wave)	-	10.24	MHz	
	Amplitude	1	-	1	V <sub>p-p</sub>	
	Input impedance	-	-	100	K $\Omega$	
	Phase Noise @ 1 kHz offset	-	-	-135	dBc/Hz	
RF Output port Impedance	-	-	50	-	$\Omega$	
Digital Lock Detect	Locked	-	2.9	-	3.7	V
	Unlocked	-	-	-	0.4	V

**Absolute Maximum Ratings**

Parameters	Ratings
VCO Supply Voltage	5.5V
PLL Supply Voltage	5.5V
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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Typical Performance Data

FREQUENCY (MHz)	POWER OUTPUT (dBm)			VCO CURRENT (mA)			PLL CURENT (mA)		
	-5°C	+25°C	+75°C	-5°C	+25°C	+75°C	-5°C	+25°C	+75°C
	327.68	3.94	3.80	3.25	44.08	45.47	47.19	17.12	17.88

FREQUENCY (MHz)	HARMONICS (dBc)					
	F2			F3		
	-5°C	+25°C	+75°C	-5°C	+25°C	+75°C
327.68	-26.71	-27.97	-29.92	-37.02	-37.54	-38.99

FREQUENCY	@TEMP.	PHASE NOISE (dBc/Hz)				
		@OFFSETS				
		100Hz	1kHz	10kHz	100kHz	1MHz
327.68	-5°C	-106.00	-111.60	-112.37	-135.84	-156.48
	+25°C	-102.43	-112.52	-113.61	-138.62	-158.88
	+75°C	-99.65	-113.46	-113.18	-137.27	-157.93

REFERENCE & COMPARISON SPURIOUS ORDER	REFERENCE & COMPARISON SPURIOUS @Fcarrier 327.68MHz+(n*Fcomp. or Fref.) (dBc) note 1		
	-5°C	+25°C	+75°C
	n		
-5	-76.82	-80.96	-87.12
-4	-78.45	-83.11	-87.91
-3	-77.88	-83.82	-89.85
-2	-77.61	-84.11	-86.39
-1	-79.80	-86.61	-89.20
0 <sup>note 2</sup>	-	-	-
+1	-79.25	-84.14	-93.77
+2	-82.27	-90.53	-87.37
+3	-84.02	-98.95	-85.22
+4	-88.82	-87.63	-85.66
+5	-86.38	-88.81	-87.77

Note 1: Comparison frequency = Reference frequency= 10.24MHz

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



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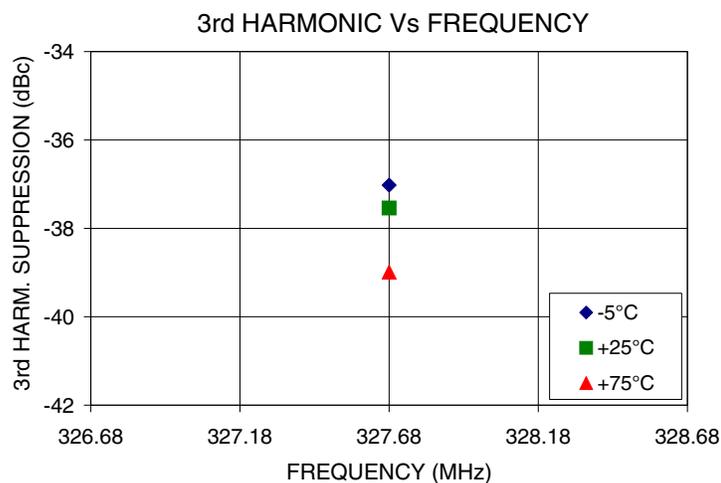
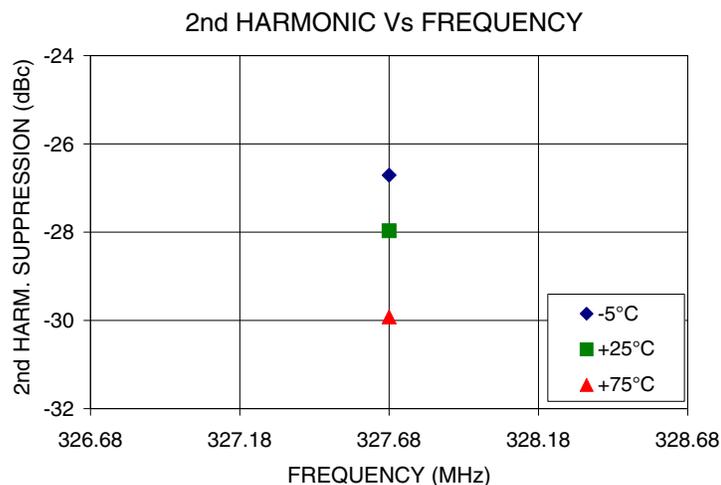
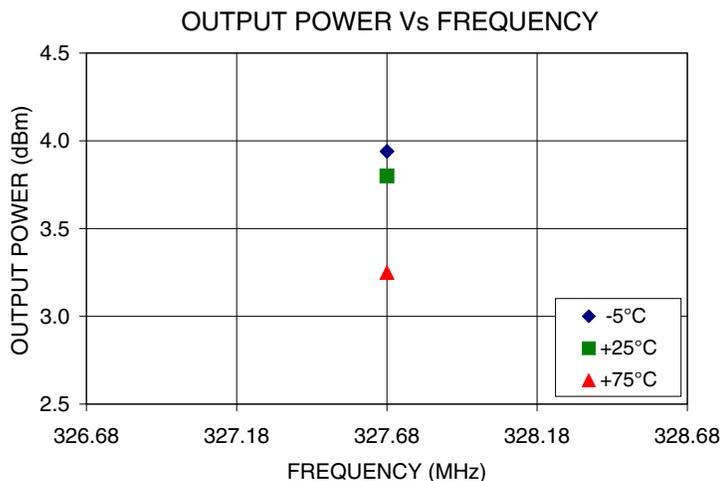


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Typical Performance Curves



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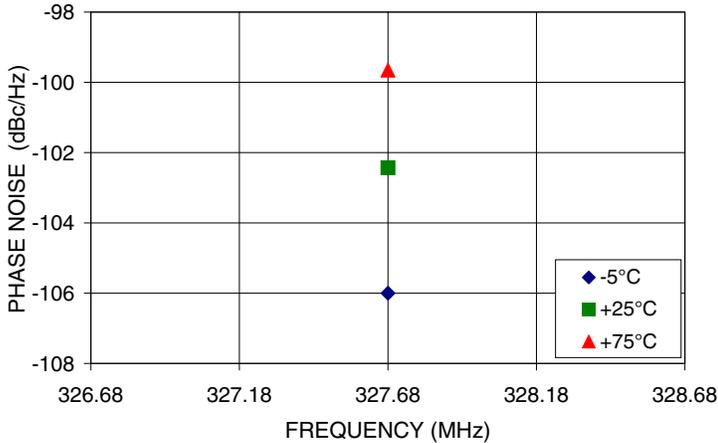


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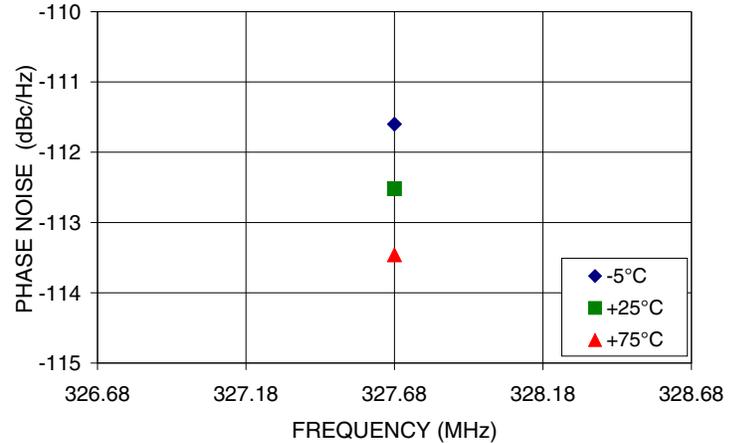


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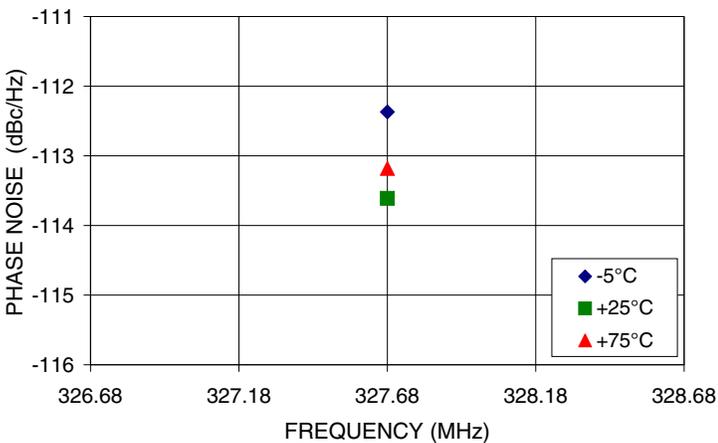
PHASE NOISE @100 Hz offset



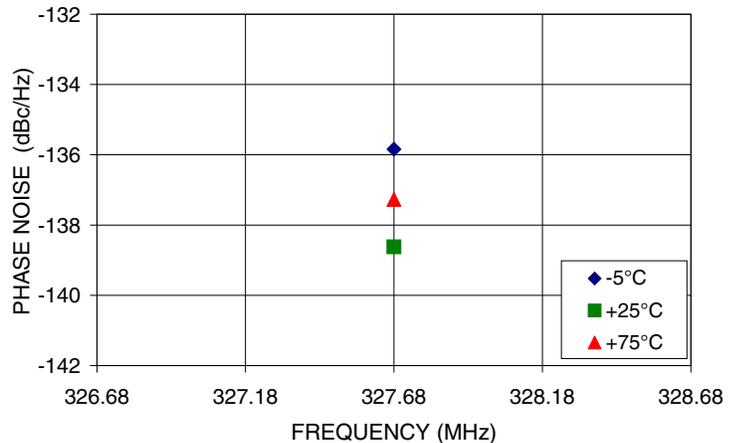
PHASE NOISE @1 kHz offset



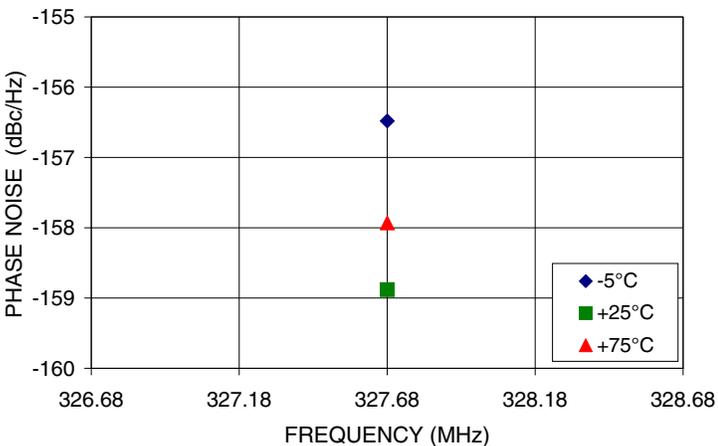
PHASE NOISE @10 kHz offset



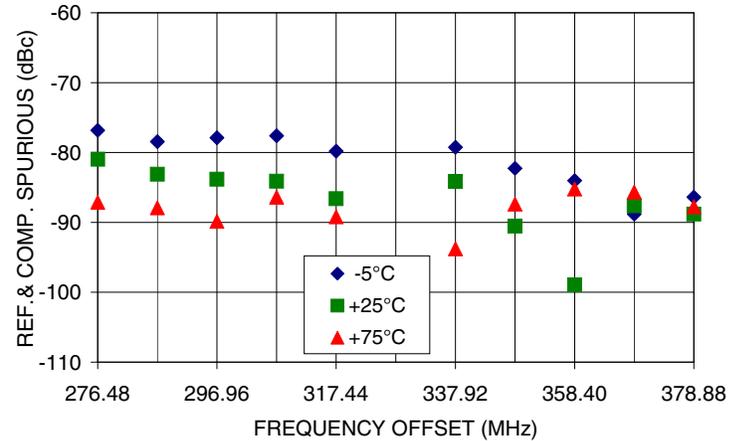
PHASE NOISE @100 kHz offset



PHASE NOISE @1 MHz offset



REFERENCE & COMPARISON SPURIOUS Vs FREQ. OFFSET @ Fcar = 327.68 MHz



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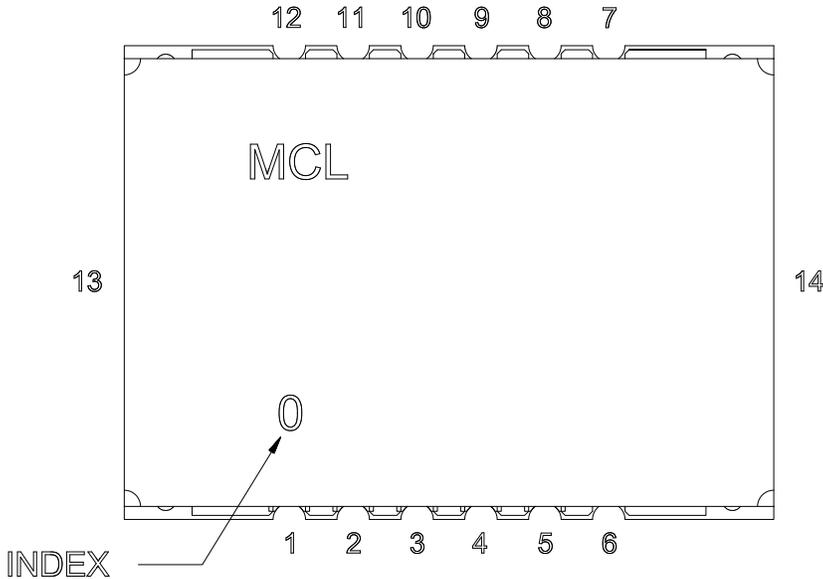


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Pin Configuration

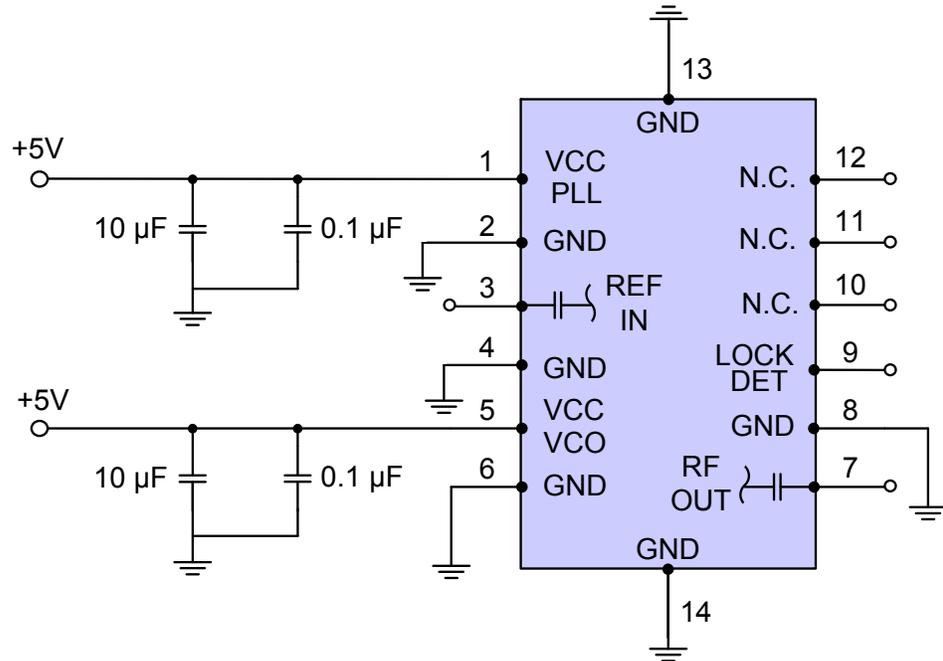


Pin Connection

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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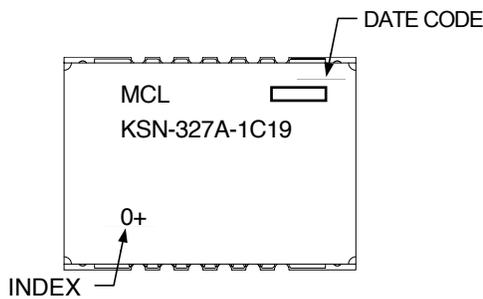


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## Device Marking



### 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:** DK1042

**Tape & Reel:** TR-F28

**Suggested Layout for PCB Design:** PL-249

**Evaluation Board:** TB-567+F

**Environment Ratings:** ENV03T2



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