

NON-CATALOG

Frequency Synthesizer

KSN-3700A+

50Ω 3700 MHz (fixed)

The Big Deal

- Low phase noise and spurious
- Robust design and construction
- Small size 0.800" x 0.584" x 0.240"



CASE STYLE: DK1171

Product Overview

The KSN-3700A+ is a Frequency Synthesizer, designed to operate 3700 MHz for Military & Avionics application. The KSN-3700A+ is packaged in a metal case (size of 0.800" x 0.584" x 0.240") to shield against unwanted signals and noise.

Key Features

Feature	Advantages
Low phase noise and spurious: <ul style="list-style-type: none">• Phase Noise: -97 dBc/Hz typ. @ 10 kHz offset• Comparison Spurious: -90 dBc typ.• Reference Spurious: -90 dBc typ.	Low phase noise and spurious improve system EVM (Error Vector Magnitude).
Robust design and construction	To enhance the robustness of KSN-3700A+, 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, 0.800" x 0.584" x 0.240"	The small size enables the KSN-3700A+ to be used in compact designs.



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50Ω 3700 MHz (fixed)

Features

- Integrated VCO + PLL
- Low phase noise and spurious
- Robust design and construction
- Low operating voltage (VCC VCO=+5V, VCC PLL=+3.3V)
- Small size 0.800" x 0.584" x 0.240"



CASE STYLE: DK1171

+ 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.

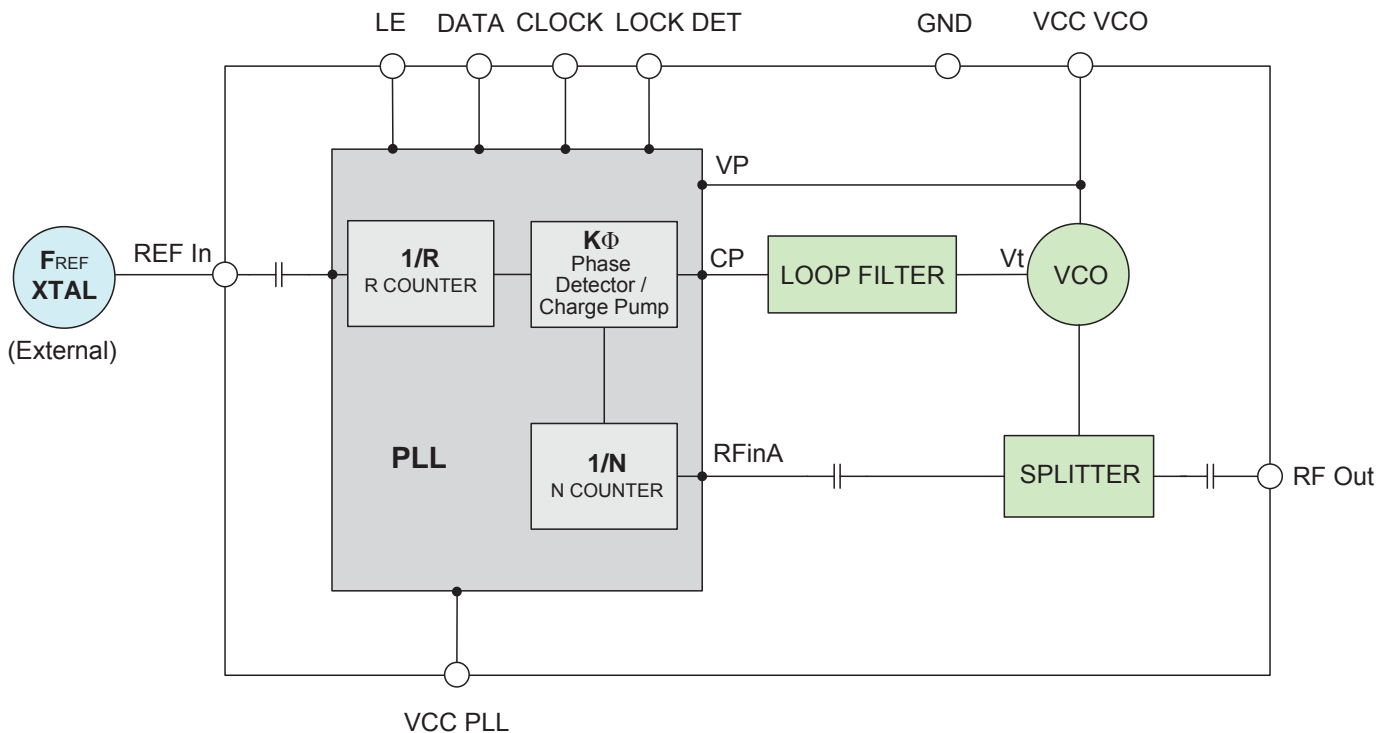
Applications

- Military & Avionics

General Description

The KSN-3700A+ is a Frequency Synthesizer, designed to operate 3700 MHz for Military & Avionics application. The KSN-3700A+ is packaged in a metal case (size of 0.800" x 0.584" x 0.240") to shield against unwanted signals and noise. To enhance the robustness of KSN-3700A+, 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 -20°C to +85°C)*

Parameters	Test Conditions	Min.	Typ.	Max.	Units	
Frequency Range	-	3700	-	3700	MHz	
Step Size	-	-	20	-	MHz	
Settling Time	Within ± 1 kHz	-	0.3	0.6	mSec	
Output Power	-	+1	+6	+9	dBm	
SSB Phase Noise	@ 100 Hz offset	-	-82	-	dBc/Hz	
	@ 1 kHz offset	-	-96	-88		
	@ 10 kHz offset	-	-97	-90		
	@ 100 kHz offset	-	-120	-115		
	@ 1 MHz offset	-	-143	-138		
Reference & Comparison Spurious Suppression	Ref. & Comp. Freq. 20 MHz	-	-90	-70	dBc	
Non - Harmonic Spurious Suppression	-	-	-90	-		
Harmonic Suppression	-	-	-33	-20		
VCO Supply Voltage	+5.00	+4.75	+5.00	+5.25	V	
PLL Supply Voltage	+3.30	+3.15	+3.30	+3.45		
VCO Supply Current	-	-	56	62	mA	
PLL Supply Current	-	-	13	20		
Reference Input (External)	Frequency	20 (square wave)	-	20	-	MHz
	Amplitude	1	-	1	-	V _{P-P}
	Input impedance	-	-	100	-	KΩ
	Phase Noise @ 1 kHz offset	-	-	-145	-	dBc/Hz
RF Output port Impedance	-	-	50	-	Ω	
Input Logic Level	Input high voltage	-	2.80	-	-	V
	Input low voltage	-	-	-	0.60	V
Digital Lock Detect	Locked	-	2.75	-	3.85	V
	Unlocked	-	-	-	0.40	V
Frequency Synthesizer PLL	-	ADF4106				
PLL Programming	-	3-wire serial 3.3V CMOS				
Register Map @ 3700 MHz	F_Register	-	(MSB) 01011111100000010010011 (LSB)			
	N_Register	-	(MSB) 00000000000101100100101 (LSB)			
	R_Register	-	(MSB) 0001000000000000000100 (LSB)			

Absolute Maximum Ratings

Parameters	Ratings
VCO Supply Voltage	5.8V
PLL Supply Voltage	3.6V
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)		
	-25°C	+25°C	+85°C	-25°C	+25°C	+85°C	-25°C	+25°C	+85°C
	3700	6.96	6.14	3.31	54.57	55.65	57.05	11.60	12.72

FREQUENCY (MHz)	HARMONICS (dBc)					
	F2			F3		
	-25°C	+25°C	+85°C	-25°C	+25°C	+85°C
3700	-33.32	-33.76	-31.70	-36.40	-36.96	-48.74

FREQUENCY	@TEMP.	PHASE NOISE (dBc/Hz)				
		@OFFSETS				
		100Hz	1kHz	10kHz	100kHz	1MHz
3700	-25°C	-84.73	-96.02	-96.25	-120.01	-142.50
	+25°C	-82.41	-97.10	-97.10	-120.39	-143.16
	+85°C	-81.39	-97.22	-98.37	-119.57	-142.26

REFERENCE & COMPARISON SPURIOUS ORDER n	REFERENCE & COMPARISON SPURIOUS @Fcarrier 3700MHz+(n*Freference) (dBc) note 1		
	-25°C	+25°C	+85°C
	-5	-102.39	-99.16
-4	-102.35	-100.10	-98.06
-3	-104.48	-101.26	-102.22
-2	-101.71	-103.35	-100.62
-1	-95.39	-89.11	-86.96
0 ^{note 2}	-	-	-
+1	-96.15	-88.74	-90.22
+2	-100.34	-97.75	-100.32
+3	-101.83	-98.78	-100.41
+4	-103.48	-100.10	-101.05
+5	-105.39	-113.23	-98.82

Note 1: Reference frequency = Comparison frequency = 20 MHz

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



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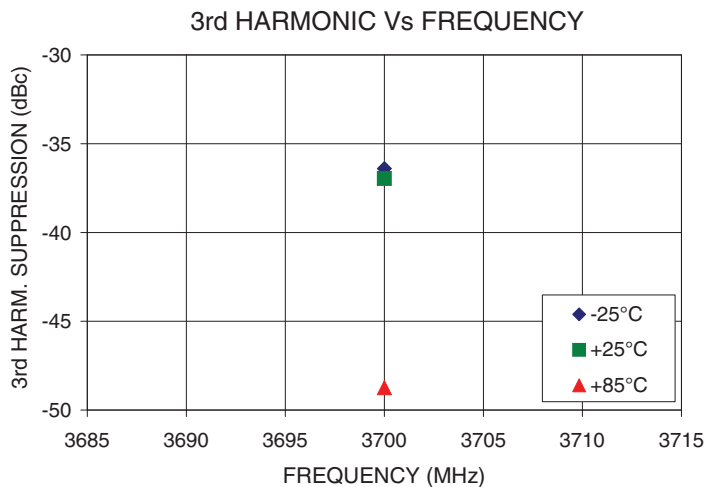
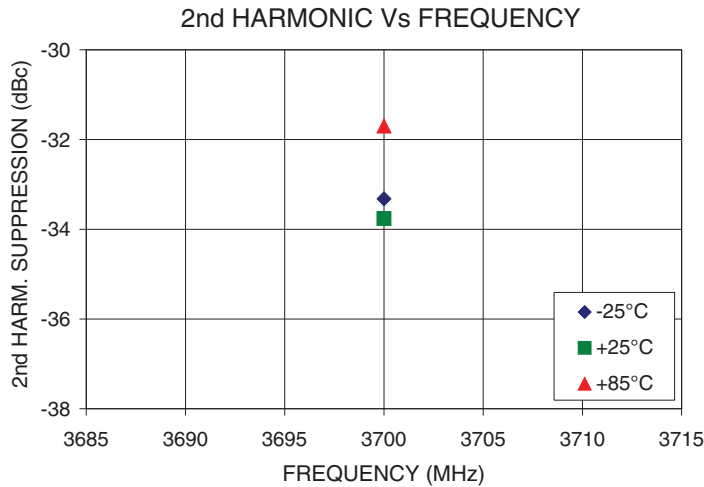
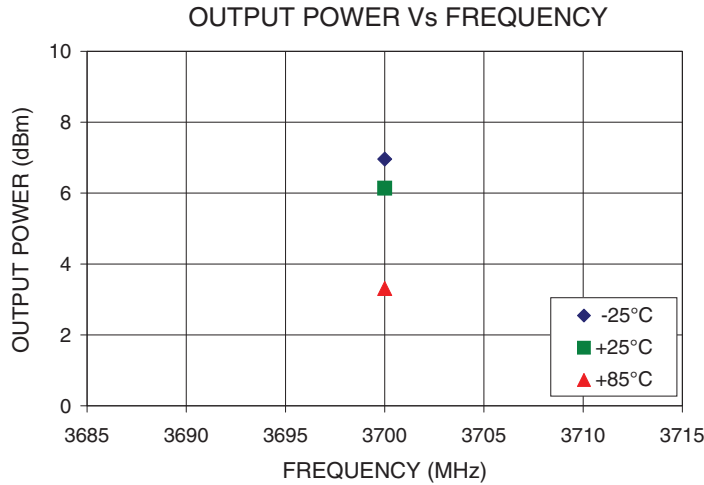


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Typical Performance Curves



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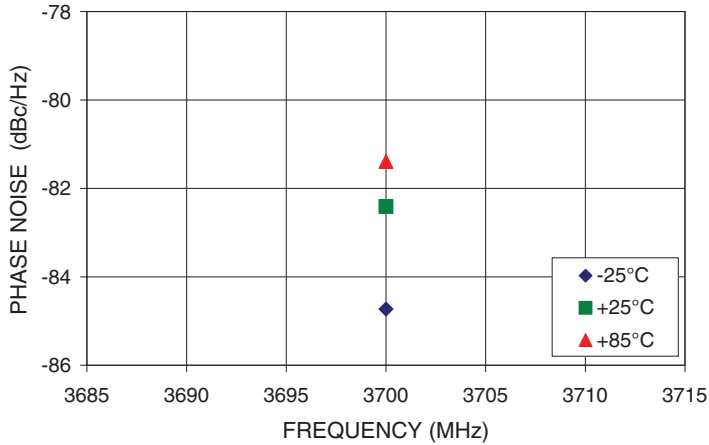
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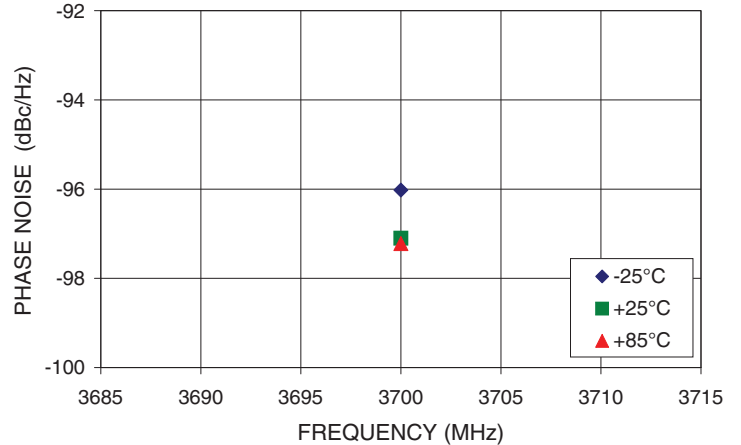
Frequency Synthesizer

KSN-3700A+

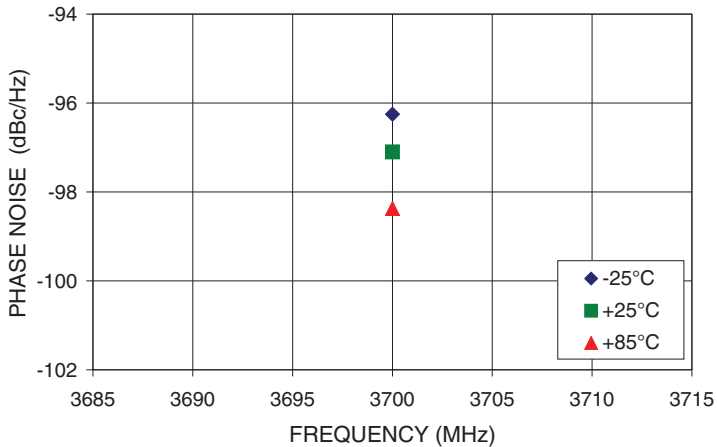
PHASE NOISE @ 100Hz offset



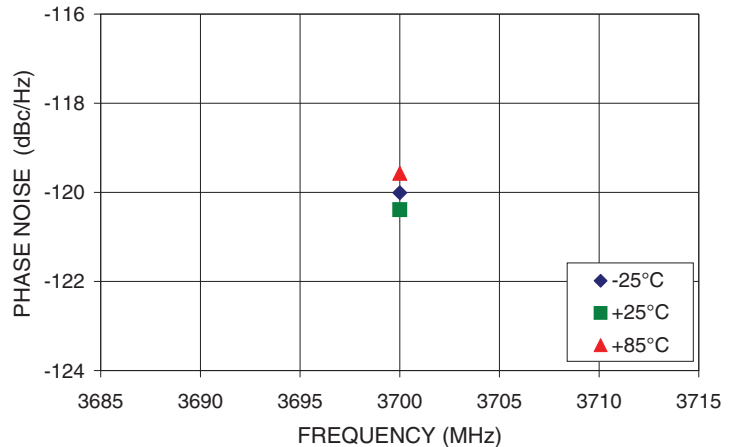
PHASE NOISE @ 1kHz offset



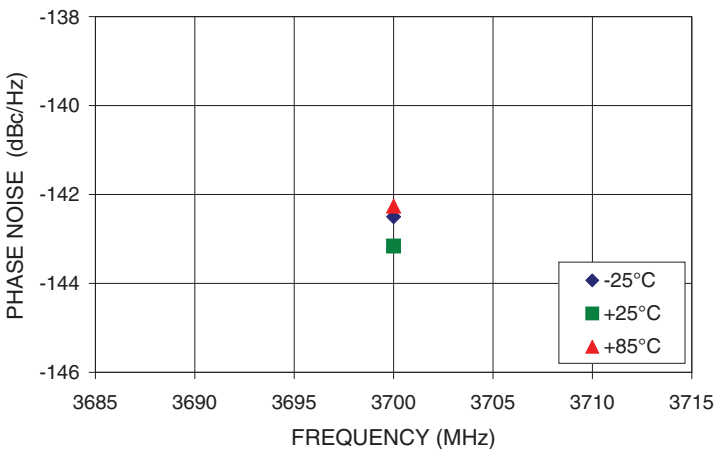
PHASE NOISE @ 10kHz offset



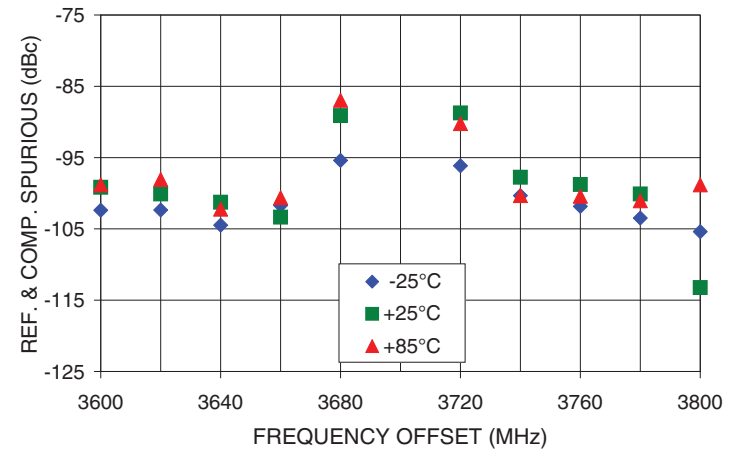
PHASE NOISE @ 100kHz offset



PHASE NOISE @ 1MHz offset



REFERENCE & COMPARISON SPURIOUS Vs FREQ. OFFSET @ Fcar = 3700MHz



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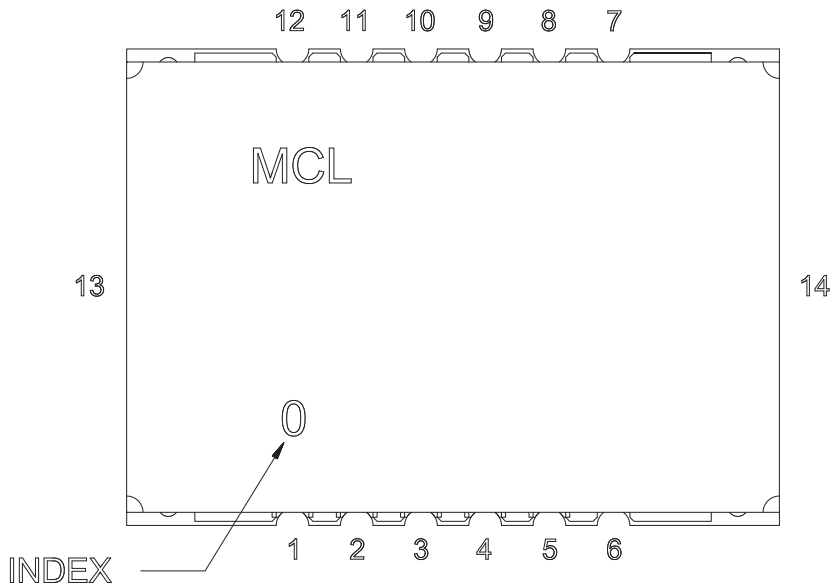


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Pin Configuration

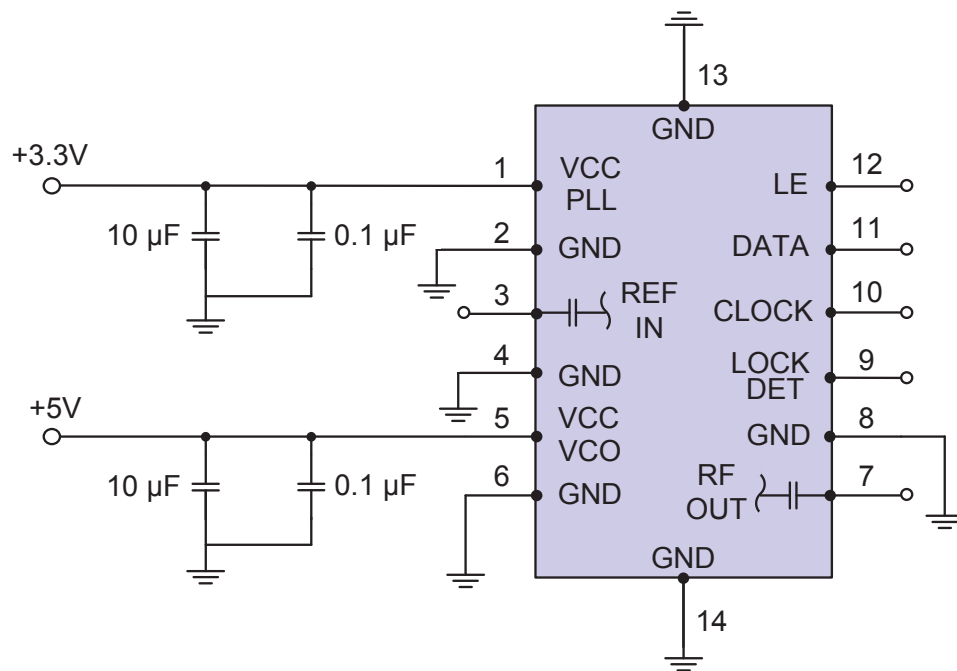


Pin Connection

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	CLOCK
11	DATA
12	LE
13	GND
14	GND

Recommended Application Circuit

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



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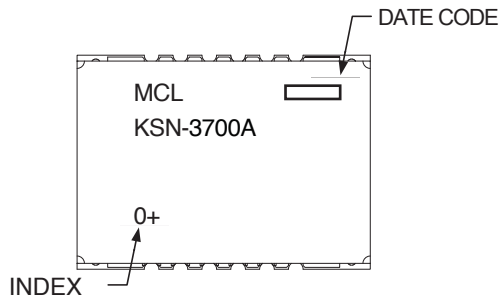


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Device Marking



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: DK1171

Tape & Reel: TR-F28

Suggested Layout for PCB Design: PL-249

Evaluation Board: TB-567-1+

Environment Ratings: ENV03T2



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