Engineering Development Model

Frequency Synthesizer

TSN-EDR11165

Important Note

This model has been designed, built and tested in our engineering department. Performance data represents model capability.
At present it is a non-catalog model. On request, we can supply a final specification sheet, part number and price/delivery information.

Please click "Back", and then click "Contact Us" for Applications support.

CASE STYLE : 99-01-1895

ELECTRICAL SPECIFICATIONS, 50Ω, over -45°C to +85°C					
Parameter		**Min.**	**Typ.**	**Max.**	**Units**
Frequency		374		374	MHz
Step size			2000		kHz
Settling Time	Within ±1kHz		1.5		msec
Output Power		+4	+7	+11	dBm
Phase Noise					
	at 100 Hz offset		-101		dBc/Hz
	at 1 kHz offset		-106	-100	dBc/Hz
	at 10 KHz offset		-117	-111	dBc/Hz
	at 100 KHz offset		-142	-136	dBc/Hz
	at 1000 kHz offset		-161	-156	dBc/Hz
Integrated SSB Phase Noise			-67		dBc
Reference Spurious Suppression			-98		dBc
Comparison Spurious Suppression			-36		dBc
Non-Harm. Spurious Suppression			-90		dBc
Harmonic Suppression			-28	-21	dBc
Supply voltage	VCO		5		V
	PLL		5		V
Supply current	VCO		43	51	mA
	PLL		10	18	mA
Reference In (External)	Frequency		10		MHz
	Amplitude		1		Vp-p
	Impedance		100		kΩ
	Ph. N @ 1kHz		-145		dBc/Hz
Digital Lock Detect	Locked	4.6		5	V
	Unlocked			0.4	
Frequency Synthesizer PLL		Self-programmed (internal microcontroller)			

ABSOLUTE MAXIMUM RATINGS	
Operating Temperature	-45°C to 85°C
Storage Temperature	-55°C to 100°C
VCO Supply Voltage	6V
PLL Supply Voltage	6V
Reference Frequency voltage	5.8Vp-p

Power On sequence: Vcc VCO followed by Vcc PLL
Power Off sequence: Vcc PLL followed by Vcc VCO

PIN CONNECTIONS			
RF OUT	11	**REF IN**	1
VCC VCO	9	**LOCK DETECT**	16
VCC PLL	15	**GROUND**	2-8,10,12-14

Frequency Synthesizer TSN-EDR11165

Typical Performance Data

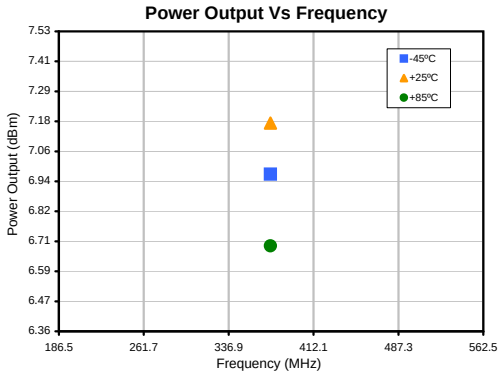
FREQ. (MHz)	POWER OUTPUT (dBm)			HARMONICS (dBc)						VCO CURRENT (mA)			PLL CURRENT (mA)		
				F2			F3								
	-45°C	+25°C	+85°C	-45°C	+25°C	+85°C	-45°C	+25°C	+85°C	-45°C	+25°C	+85°C	-45°C	+25°C	+85°C
374	6.97	7.17	6.69	-22.97	-28.07	-38.58	-47.05	-46.00	-47.38	41.25	42.45	42.78	11.13	10.34	11.75

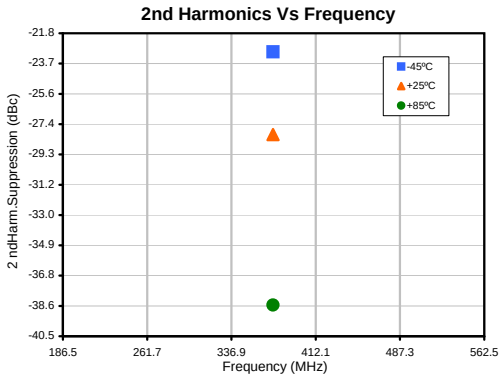
FREQ. (MHz)	PHASE NOISE (dBc/Hz) @ OFFSETS														
	-45°C					+25°C					+85°C				
	100Hz	1kHz	10kHz	100kHz	1MHz	100Hz	1kHz	10kHz	100kHz	1MHz	100Hz	1kHz	10kHz	100kHz	1MHz
374	-100.44	-104.26	-118.44	-144.03	-163.65	-101.99	-105.45	-117.09	-141.08	-160.76	-101.50	-104.64	-114.15	-137.85	-157.61

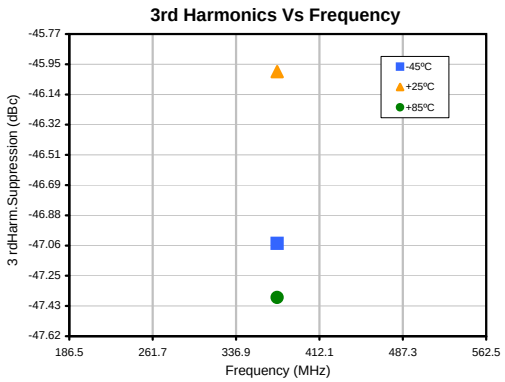
REFERENCE & COMPARISON SPURIOUS ORDER	COMPARISON SPURIOUS @Fcarrier 374MHz± (n*Fcomparison) (dBc) NOTE 1			REFERENCE SPURIOUS @Fcarrier 374 MHz± (n*Fcomparison) (dBc) NOTE 2		
n	-45°C	+25°C	+85°C	-45°C	+25°C	+85°C
-5	-112.39	-104.52	-110.91	-100.92	-105.69	-105.04
-4	-116.83	-101.41	-104.01	-100.63	-107.32	-107.35
-3	-102.82	-94.42	-94.76	-103.75	-111.97	-114.57
-2	-101.17	-92.55	-91.1	-112.31	-105.9	-116.73
-1	-100.66	-88.65	-89.04	-112.55	-104.61	-110.62
0 note 3	-	-	-	-	-	-
+1	-95.02	-88.08	-88.02	-112.06	-105.43	-105.77
+2	-99.49	-91.87	-90.11	-105.54	-103.34	-109.98
+3	-102.21	-93.88	-93.63	-99.92	-102.6	-106.31
+4	-114.28	-100.36	-101.11	-99.05	-100.88	-107.17
+5	-112.31	-105.77	-105.43	-100.31	-101.63	-105.61

Note 1: Reference frequency 10 MHz.
Note 2: Comparison frequency 2 MHz.
Note 3: All spurs are referenced to carrier signal (n=0).

Typical Performance Data

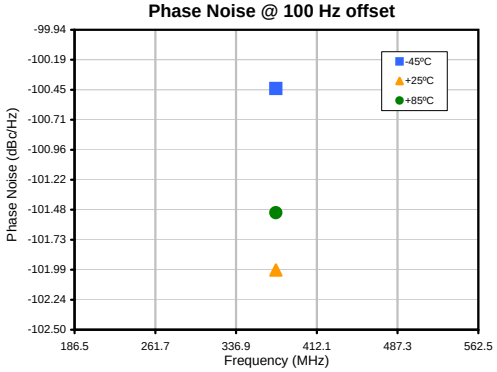




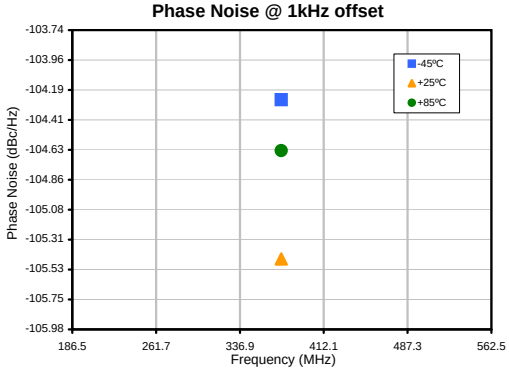


Typical Performance Data

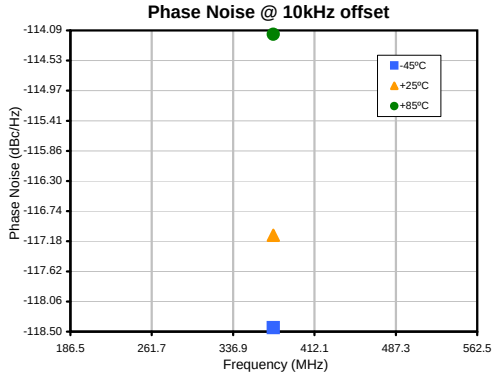
Phase Noise @ 100 Hz offset



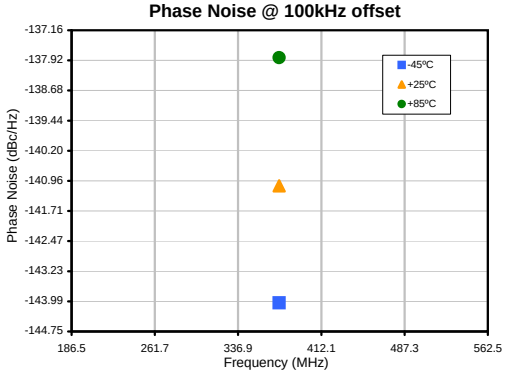
Phase Noise @ 1kHz offset



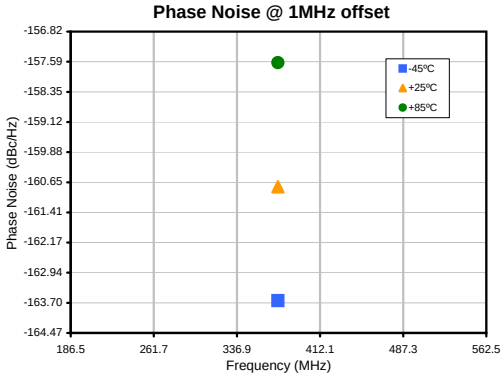
Phase Noise @ 10kHz offset



Phase Noise @ 100kHz offset

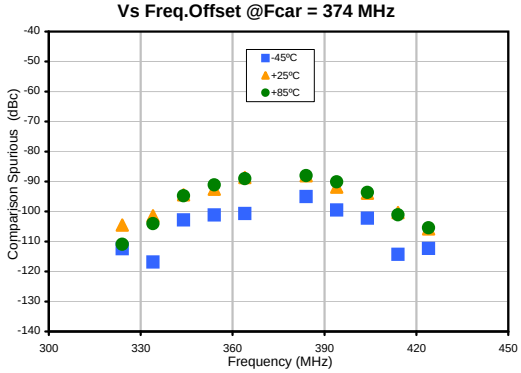


Phase Noise @ 1MHz offset

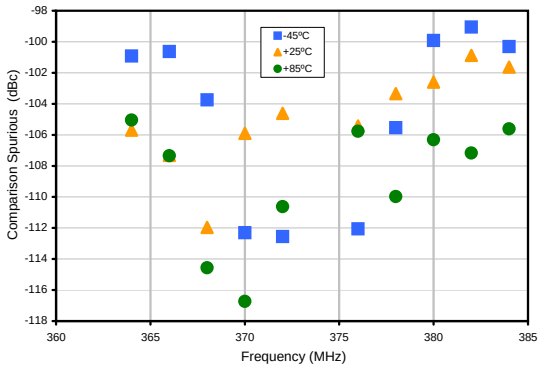


Typical Performance Data

Reference Spurious
Vs Freq.Offset @Fcar = 374 MHz



Comparison Spurious
Vs Freq.Offset @Fcar = 374 MHz



Mini-Circuits

Environmental Specifications ENV65T1

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	-45° 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