

Engineering Development Model

Frequency Synthesizer

TSN-EDR10936/2

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 : 99-01-1777

ELECTRICAL SPECIFICATIONS 50Ω, over -45°C to +85°C				
Parameter	Min.	Typ.	Max.	Units
Frequency	2250		2560	MHz
Step size		10000		kHz
Settling Time Within ±1kHz		480		μsec
Output Power	+9	+13	+17	dBm
Phase Noise				
at 100 Hz offset		-87		dBc/Hz
at 1 kHz offset		-96		dBc/Hz
at 10 KHz offset		-97		dBc/Hz
at 100 KHz offset		-120		dBc/Hz
at 1000 kHz offset		-145	-139	dBc/Hz
Integrated SSB Phase Noise		-53		dBc
Ref & Comp Spurious Suppression		104		dBc
Non-Harm. Spurious Suppression		-90		dBc
Harmonic Suppression		-30		dBc
Supply voltage	VCO	5		V
	PLL	3		V
Supply current	VCO	57	68	mA
	PLL	11	19	mA
Reference In (External)	Frequency	10		MHz
	Amplitude	1		Vp-p
	Impedance	100		kΩ
	Ph. N @ 1kHz	-145		dBc/Hz
Input Logic Levels	Logic high	1.4	3	V
	Logic Low		0.6	V
Digital Lock Detect	Locked	2.6	3	V
	Unlocked		0.4	V
Frequency Synthesizer PLL	ADF4106			

ABSOLUTE MAXIMUM RATINGS

Operating Temperature	-45°C to 85°C
Storage Temperature	-55°C to 100°C
VCO Supply Voltage	6V
PLL Supply Voltage	4V
Reference Frequency voltage	3.6Vp-p
Data, Clock & LE levels	3.3V

Power On sequence: Vcc VCO followed by Vcc PLL

Power Off sequence: Vcc PLL followed by Vcc VCO

PIN CONNECTIONS

RF OUT	13	CLOCK	2
VCC VCO	14	DATA	3
VCC PLL	15	LOAD ENABLE	4
REF IN	16	GROUND	6-12,17-22
LOCK DETECT	1		

Notes

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REV. OR
TSN-EDR10936/2
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Typical Performance Data

FREQ. (MHz)	POWER OUTPUT (dBm)			HARMONICS						VCO CURRENT (mA)			PLL CURRENT (mA)		
				(dBc)											
	-45 °C	+25°C	+85 °C	F2			F3								
-45 °C				+25°C	+85 °C	-45 °C	+25°C	+85 °C							
2240	13.12	13.07	12.96	-27.10	-28.32	-30.07	-26.99	-27.94	-30.72	57.39	58.51	59.21	9.41	10.60	12.19
2250	13.13	13.04	12.96	-29.83	-26.14	-27.96	-27.58	-27.44	-29.62	57.33	58.45	59.15	9.43	10.63	12.22
2260	13.21	13.14	13.05	-29.03	-28.46	-29.59	-29.80	-30.25	-32.36	57.23	58.38	59.07	9.51	10.73	12.31
2280	13.38	13.27	13.16	-26.59	-27.46	-29.63	-31.10	-29.16	-31.08	57.10	58.22	58.92	9.57	10.80	12.39
2300	13.49	13.39	13.26	-29.22	-29.67	-30.68	-27.91	-27.67	-30.36	56.86	57.99	58.73	9.64	10.87	12.46
2320	13.50	13.41	13.27	-25.19	-26.88	-28.43	-27.30	-27.53	-30.46	56.74	57.87	58.61	9.46	10.68	12.25
2340	13.47	13.32	13.17	-28.95	-29.84	-31.11	-29.92	-29.46	-33.27	56.59	57.73	58.49	9.56	10.79	12.37
2360	13.51	13.34	13.15	-27.11	-26.94	-28.84	-31.40	-32.84	-35.62	56.27	57.43	58.23	9.63	10.86	12.44
2380	13.41	13.26	13.05	-28.19	-28.98	-30.51	-32.08	-33.79	-37.73	56.09	57.23	58.10	9.69	10.92	12.51
2400	13.32	13.18	12.96	-27.88	-28.47	-29.59	-36.68	-36.96	-39.11	55.98	57.18	58.07	9.53	10.76	12.34
2420	13.38	13.22	12.94	-28.83	-27.48	-29.87	-41.43	-39.60	-38.57	55.69	56.91	57.94	9.31	10.67	12.40
2440	13.56	13.36	12.97	-29.47	-30.72	-32.99	-42.59	-40.32	-38.72	55.27	56.59	57.84	9.38	10.73	12.46
2460	13.66	13.46	13.00	-28.20	-28.62	-31.14	-39.25	-38.85	-37.60	55.08	56.46	57.84	9.44	10.79	12.53
2480	13.70	13.53	13.09	-30.08	-31.57	-34.28	-38.28	-39.48	-38.90	55.03	56.44	57.85	9.50	10.85	12.60
2500	13.69	13.5	13.03	-29.51	-29.91	-33.1	-40.94	-41.75	-40.93	54.91	56.38	57.86	9.56	10.92	12.66
2520	13.56	13.3	12.71	-29.94	-30.92	-34.07	-39.37	-41.23	-41.85	54.75	56.3	57.91	9.62	10.98	12.72
2540	13.45	13.16	12.48	-31.43	-32.57	-36.23	-43.83	-44.10	-42.92	54.81	56.37	58.00	9.67	11.03	12.78
2560	13.41	13.12	12.47	-31.62	-31.56	-35.68	-45.70	-44.20	-42.54	54.92	56.45	58.05	9.29	10.63	12.36
2580	13.44	13.12	12.50	-31.45	-33.44	-37.65	-46.00	-45.14	-43.10	54.94	56.50	58.12	9.39	10.74	12.47

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
2240	-88.50	-95.71	-98.74	-122.70	-147.41	-84.47	-97.24	-97.90	-122.75	-146.59	-87.36	-97.35	-97.66	-121.81	-145.23
2250	-87.15	-95.23	-98.51	-121.55	-146.98	-91.03	-98.03	-98.06	-122.25	-146.42	-88.03	-97.09	-97.29	-121.46	-145.41
2260	-87.16	-97.04	-98.82	-121.07	-146.78	-87.56	-96.84	-98.00	-122.02	-146.39	-87.55	-97.12	-96.89	-121.24	-144.80
2280	-87.55	-97.87	-98.64	-120.40	-146.54	-88.02	-96.16	-97.69	-121.68	-146.32	-86.49	-98.10	-97.08	-120.98	-144.76
2300	-87.92	-95.91	-98.53	-119.87	-146.37	-88.75	-98.14	-96.82	-120.90	-145.78	-90.04	-96.92	-96.70	-120.34	-144.34
2320	-86.43	-95.88	-99.05	-119.40	-146.40	-87.72	-96.49	-97.00	-120.85	-146.06	-87.40	-95.39	-96.15	-120.09	-144.13
2340	-86.42	-97.46	-98.19	-119.22	-145.62	-88.26	-95.96	-96.59	-120.38	-144.87	-88.51	-97.50	-96.08	-119.40	-143.74
2360	-88.52	-95.80	-97.79	-119.40	-146.17	-85.87	-96.64	-95.99	-120.34	-145.16	-85.91	-96.37	-96.02	-118.95	-143.47
2380	-88.14	-95.01	-97.02	-119.62	-146.15	-90.94	-95.44	-95.79	-120.05	-145.12	-85.53	-97.10	-96.36	-118.61	-142.95
2400	-85.03	-93.24	-96.34	-119.62	-146.07	-85.69	-96.77	-95.92	-120.01	-145.04	-86.61	-98.85	-96.02	-118.14	-142.76
2420	-86.89	-94.97	-98.03	-118.27	-145.72	-86.94	-98.68	-97.68	-118.66	-144.37	-88.60	-98.91	-96.73	-117.26	-142.27
2440	-87.55	-98.24	-97.91	-118.01	-145.59	-88.45	-97.54	-97.74	-118.36	-144.07	-84.55	-98.21	-96.66	-117.30	-142.02
2460	-89.86	-95.92	-97.47	-117.89	-145.21	-87.39	-97.48	-97.33	-118.48	-144.06	-88.15	-96.12	-97.08	-117.39	-142.06
2480	-88.87	-96.16	-97.01	-118.24	-145.19	-85.35	-95.94	-96.94	-118.53	-143.78	-85.47	-96.66	-96.97	-117.15	-141.77
2500	-86.74	-95.49	-97.00	-118.62	-145.26	-87.59	-96.48	-97.17	-118.65	-143.87	-91.57	-98.38	-96.99	-117.04	-141.68
2520	-85.77	-97.33	-97.25	-119.01	-145.59	-87.26	-97.71	-97.60	-118.91	-144.08	-87.74	-96.24	-97.84	-117.50	-142.12
2540	-82.87	-95.48	-97.51	-119.29	-145.31	-87.08	-97.81	-97.74	-119.18	-143.87	-86.87	-99.36	-97.07	-118.22	-142.04
2560	-86.41	-94.59	-97.08	-119.87	-145.01	-86.30	-96.69	-97.12	-119.65	-143.91	-86.66	-95.40	-95.92	-119.39	-142.11
2580	-85.59	-95.15	-97.49	-119.74	-144.39	-86.36	-95.93	-96.00	-120.78	-143.77	-87.08	-95.88	-96.30	-119.41	-141.90

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Typical Performance Data

COMPARISON SPURIOUS ORDER	Comparison & Reference SPURIOUS @Fcarrier 2250 MHz± (n*Fcomparison) (dBc) NOTE 1			Comparison & Reference SPURIOUS @Fcarrier 2410 MHz± (n*Fcomparison) (dBc) NOTE 1			Comparison & Reference SPURIOUS @Fcarrier 2560 MHz± (n*Fcomparison) (dBc) NOTE 1		
	-45 °C	+25°C	+85 °C	-45 °C	+25°C	+85 °C	-45 °C	+25°C	+85 °C
-5	-99.02	-105.81	-104.11	-99.76	-102.60	-102.38	-99.57	-105.94	-102.69
-4	-97.19	-108.44	-104.85	-98.31	-104.16	-104.89	-102.52	-115.01	-104.51
-3	-96.69	-111.58	-105.01	-97.94	-104.19	-104.79	-105.49	-114.85	-103.38
-2	-94.27	-114.39	-110.27	-101.18	-100.37	-105.09	-103.73	-107.33	-104.93
-1	-90.51	-104.61	-102.55	-100.74	-91.57	-105.98	-105.79	-99.40	-111.51
0 ^{note 2}	-	-	-	-	-	-	-	-	-
+1	-91.24	-106.62	-102.88	-97.53	-92.12	-99.05	-100.50	-114.20	-101.71
+2	-99.03	-103.59	-111.68	-98.23	-100.63	-99.37	-101.34	-103.45	-105.32
+3	-98.35	-101.52	-106.12	-97.51	-108.78	-101.52	-102.30	-104.85	-104.37
+4	-96.11	-101.28	-103.46	-96.85	-106.61	-100.50	-101.99	-102.53	-102.61
+5	-94.82	-100.22	-101.63	-96.16	-105.75	-101.23	-101.10	-101.16	-104.27

Note 1: Comparison & Reference frequency 10 MHz

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

Notes

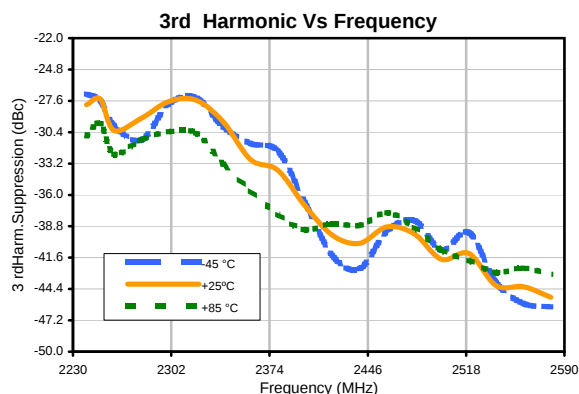
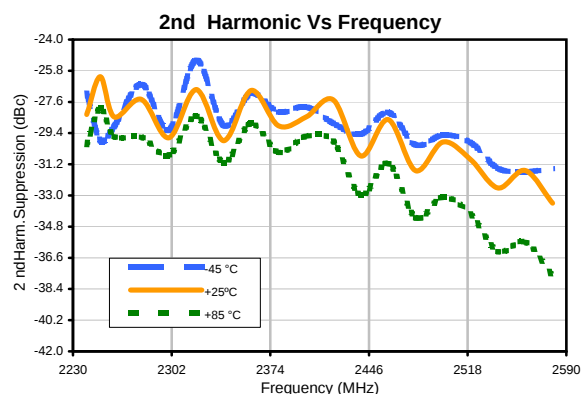
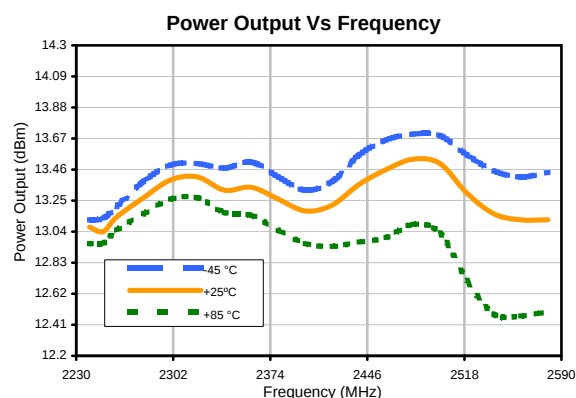
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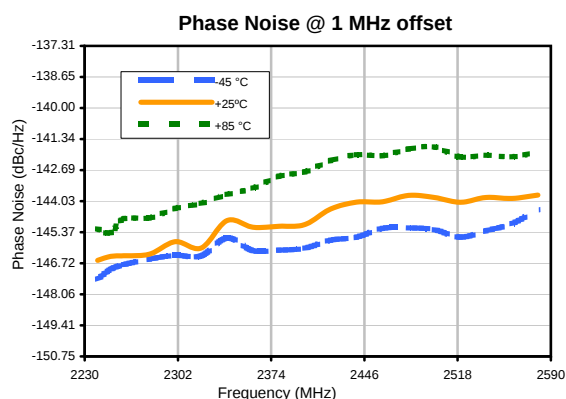
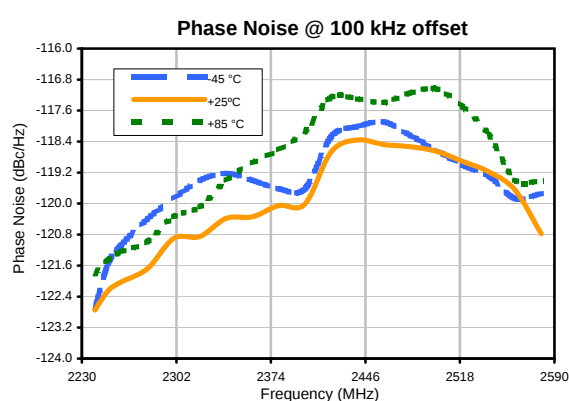
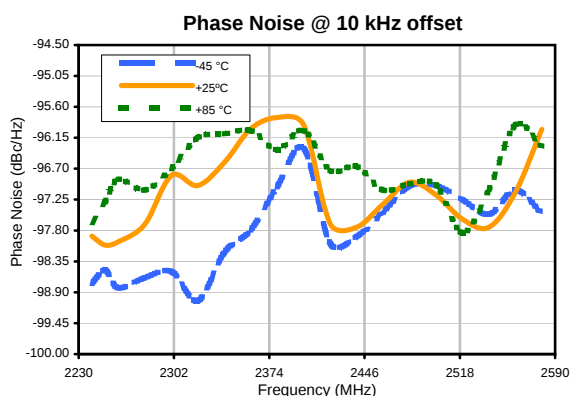
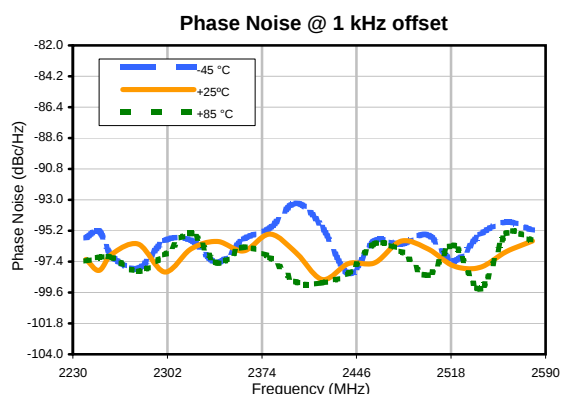
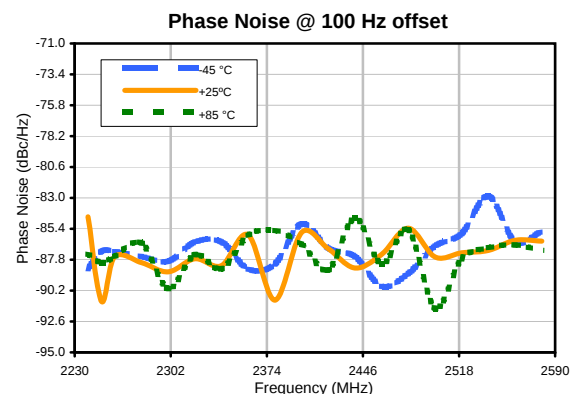
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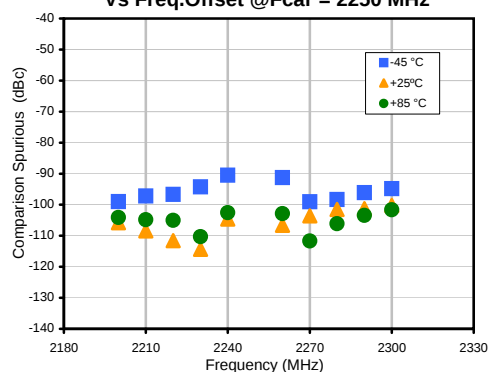


Frequency Synthesizer

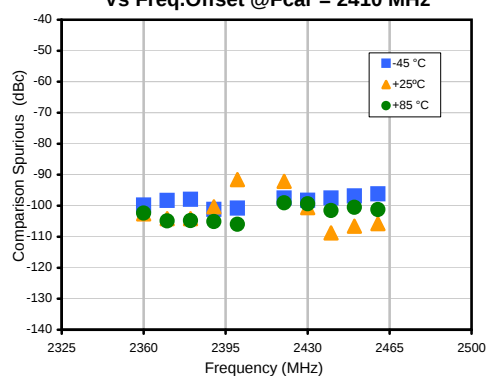
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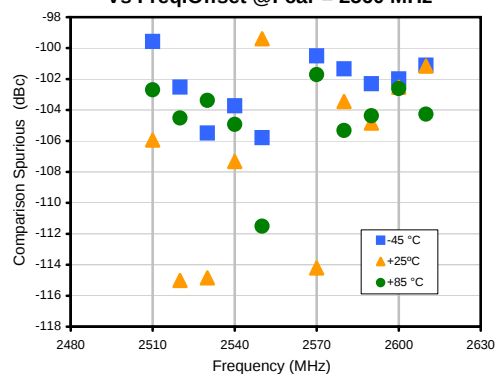
Comparison & Reference Spurious
Vs Freq.Offset @Fcar = 2250 MHz



Comparison & Reference Spurious
Vs Freq.Offset @Fcar = 2410 MHz



Comparison & Reference Spurious
Vs Freq.Offset @Fcar = 2560 MHz



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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