MODEL HX3100

8MHz to 1GHz Phase Detector

ULTRA LOW PHASE NOISE

- **Operation from 8MHz to 1.2GHz**
- **Phase Noise of -175 dBc/Hz**
- **LO Power +13dBm**
- **Proprietary IF Circuitry**
- **High Carrier Suppression**

SUMMARY

The Holzworth HX3100 Phase Detector was designed with for making phase noise measurements and to be used in analog phase locked loops where performance is a priority. The HX3100 uses a proprietary IF circuit that maintains optimal signal to noise ratio, improving the performance over standard phase detectors typically by 3dB to 6dB.

The HX3100 Phase Detector helps to take the guess work out of phase noise measurements with fully characterized and guaranteed performance. Holzworth products are 100% final performance tested for phase noise verification[1].

SPECIFICATIONS [2]

PARAMETER	MIN	TYP	MAX	UNITS	COMMENTS
LO/RF Frequency Range	8 M		1.2 G	Hz	50 ohms
IF Frequency Range	DC		1M	Hz	50 ohms or High Impedance
LO Power	+10	+13	+ 16	dBm	
RF Power			+ 16	dB	Not to exceed LO Power Level
Phase Noise 100MHz, 10kHz Offset 100MHz, 1Hz intercept		 -175 -144	 -170 -140	 dBc/Hz dBc/Hz	
Phase Detector Constant (K_D) RF = +14dBm, LO = +14dBm		 0.43		 V/rad	 IF into 500 ohms
LO/RF Rejection		60		dB	
LO / RF / IF Connectors	SMA Jack (female)				
Housing Dimensions (LxWxH)	1.75” x 1.5” x 0.5” (44.5mm x 38.1mm x 12.7mm)				

[1] Final performance verification at LO=100MHz, LO_{PWR}=+14dBm, RF_{PWR}=+14dBm

[2] Specifications are subject to change per the discretion of Holzworth Instrumentation, Inc.

RoHS Compliant

HX3100 PERFORMANCE DATA

The data provided here demonstrates typical performance of the HX3100 Phase Detector under ambient laboratory conditions.

Figures 1 through 7 display the phase noise performance at adjusted RF power levels with both the carrier and LO held constant at 100MHz and +14dBm, respectively. Figure 8 shows the phase noise floor versus RF input power (Note: At RF Input levels below -5dBm, the phase noise floor is reduced by 1dB for each dB of RF power reduction). Figures 9 and 10 demonstrate the phase detector constant (K_D) versus RF power in linear and dB scales, respectively.

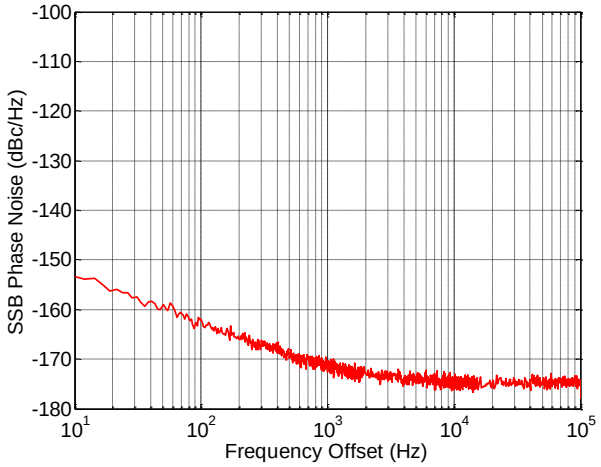


Figure 1: SSB Phase Noise at RF = +14dBm
(Carrier = 100MHz, LO = 14dBm)

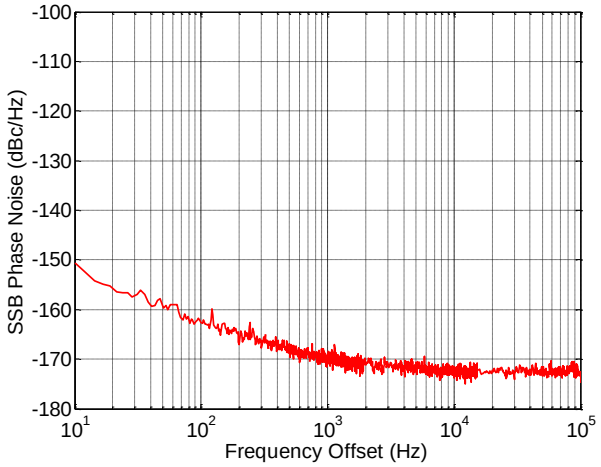


Figure 2: SSB Phase Noise at RF = +10dBm
(Carrier = 100MHz, LO = 14dBm)

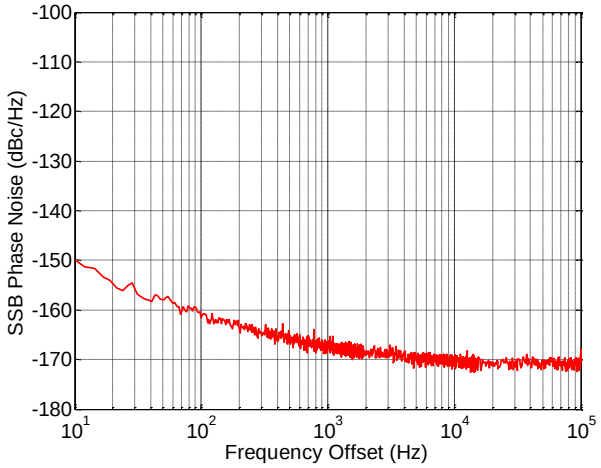


Figure 3: SSB Phase Noise at RF = +7dBm
(Carrier = 100MHz, LO = 14dBm)

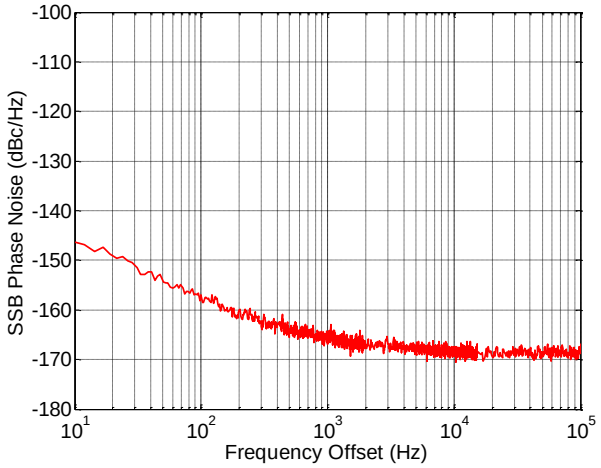


Figure 4: SSB Phase Noise at RF = +4dBm
(Carrier = 100MHz, LO = 14dBm)

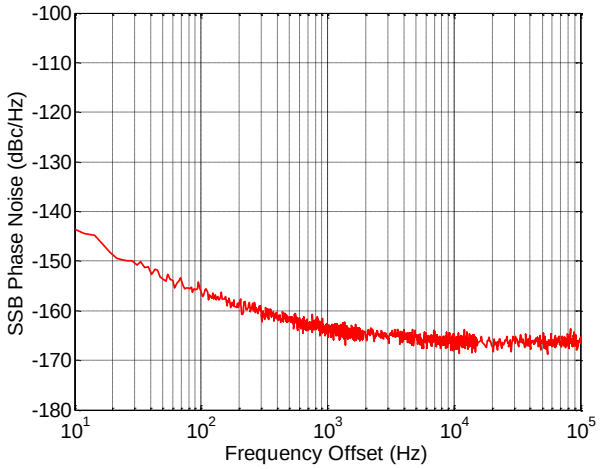


Figure 5: SSB Phase Noise at RF = +1dBm
(Carrier = 100MHz, LO = 14dBm)

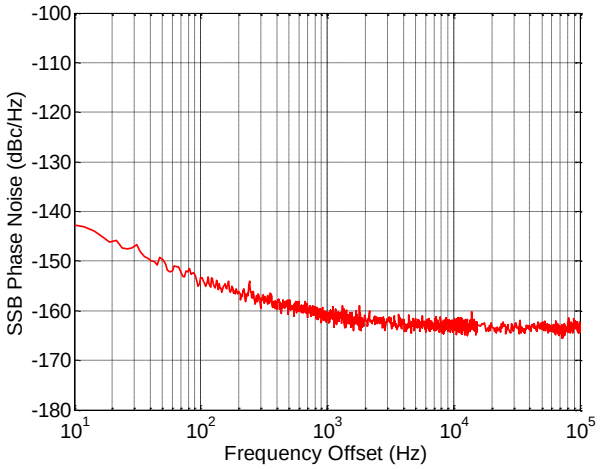


Figure 6: SSB Phase Noise at RF = -2dBm
(Carrier = 100MHz, LO = 14dBm)

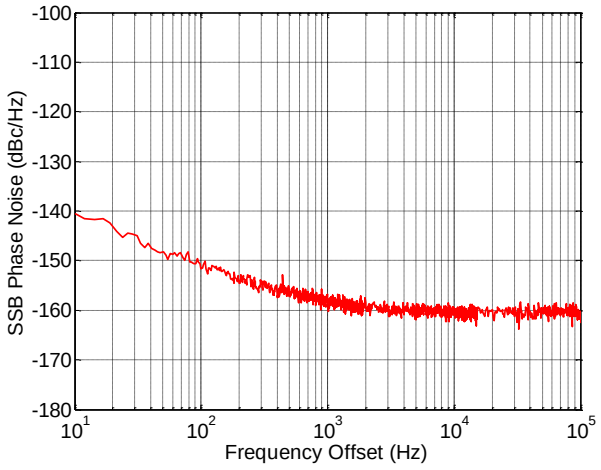


Figure 7: SSB Phase Noise at RF = -5dBm
(Carrier = 100MHz, LO = 14dBm)

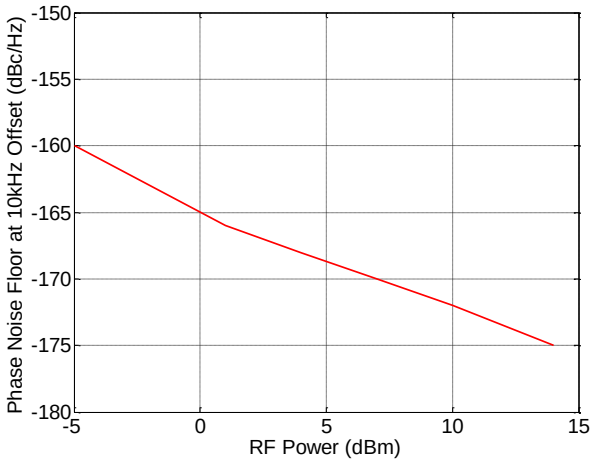


Figure 8: Phase Noise Floor vs. RF P_{IN}
(10kHz offset, Carrier = 100MHz, LO = 14dBm)

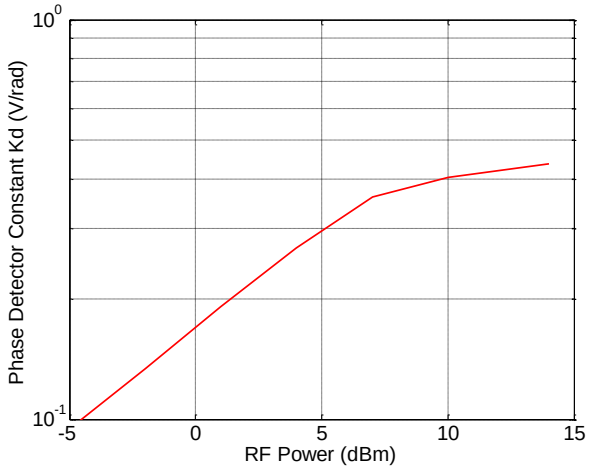


Figure 9: K_D (V/rad) vs. RF Power
(K_D = Phase Detector Constant)

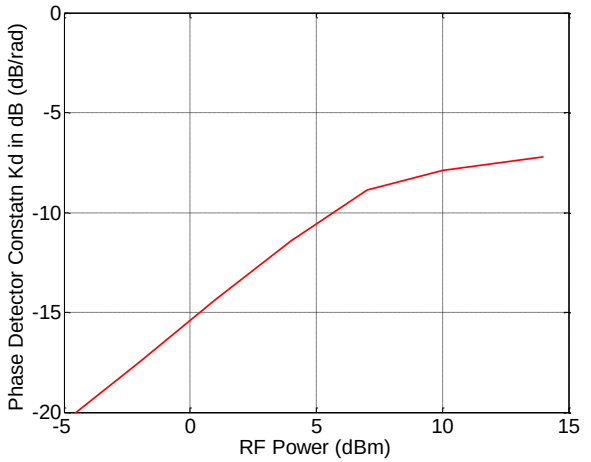
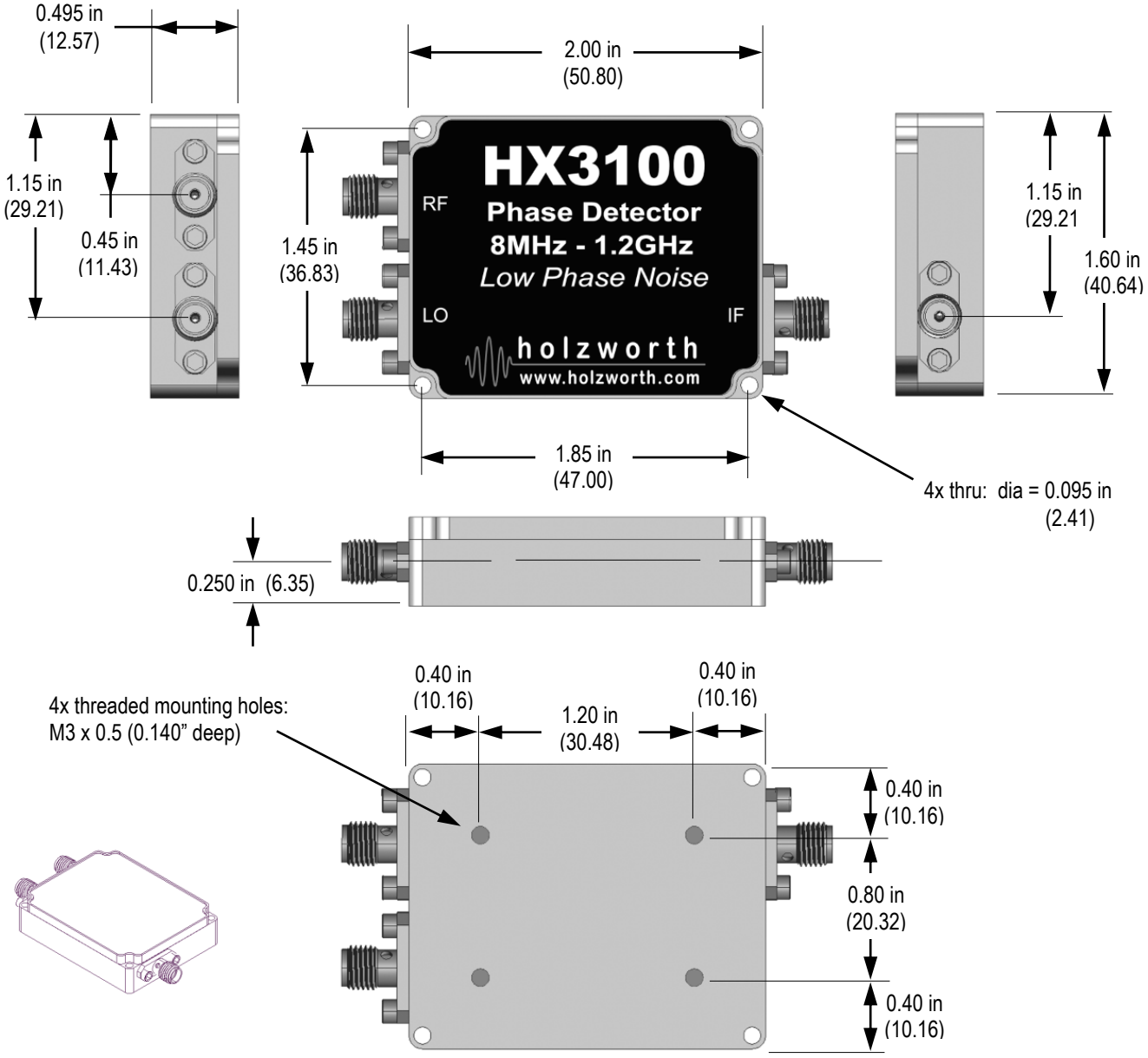


Figure 10: K_D (dBm) vs. RF Power
(K_D = Phase Detector Constant)

MECHANICAL

The HX3100 Phase Detector comes in a compact, shielded housing complete with mounting holes for ease of system integration into various applications. Mechanical dimensions are listed in both inches and (mm). Tolerances are to within ±0.010 inches.



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WARRANTY

All Holzworth phase detectors come with a 90 day 100% product warranty covering manufacturing defects. All product repairs and maintenance must be performed by Holzworth Instrumentation. Holzworth reserves the right to invalidate the warranty for any product that has been tampered with or used improperly. Refer to Holzworth Terms & Conditions of Sales for more details.