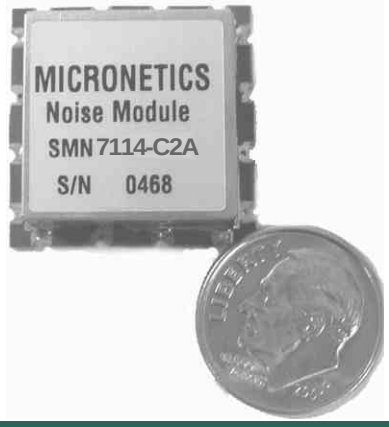
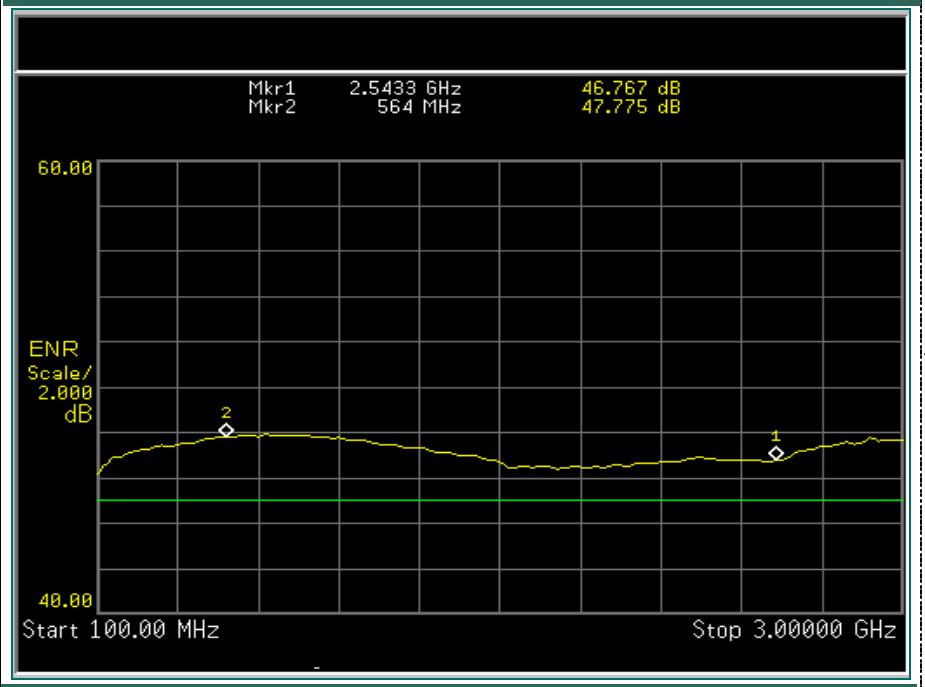
SMN7114

Surface Mount Amplified Noise Source

100 MHz to 3.0 GHz



SMN7114 Typical Data



Application Note

Using noise for built-in test: There are two primary uses for employing a noise signal for built-in test.

1. Noise Temperature (noise figure) or sensitivity testing: This test uses the noise source to supply a known excess noise ratio (ENR) to a device under test for a Y-factor measurement. By taking two receiver readings, one with the noise on and one with it off, Y-factor can be determined. By knowing the ENR and Y-factor, one can calculate noise temperature (figure) or sensitivity.
2. Frequency Response: The noise source being broadband can be used as a replacement of a swept source to calculate frequency response of a receiver or other device. By putting in a known spectral signal at the input and taking a reading at the output, one can determine the gain or loss over frequency of the entire system. Noise sources are inherently extremely stable devices. In addition, the circuitry is much simpler than a swept source which increases reliability and lowers cost.

For more information on using noise for built-in-test, read the Feb 2004 Microwave Journal article authored by Patrick Robbins of Micronetics.
http://www.micronetics.com/articles/microwave_journal_02-04.pdf

Description

The SMN7114 noise module is designed for a wide range of circuit boards. It features high ENR output for uses from built-in-test to jamming. All biasing circuitry is built-in making it easy to design into your system. It features a built-in voltage regulator for highly stable output even if your DC supply lines are not.

Suitable for High Volume Products:

The SMN7114 noise source being surface mount, having a small footprint and available on tape and reel make them ideal for production manufacturing. Traditionally packaged microwave noise sources have been large and costly rendering them unsuitable for all but large expensive systems. The benefits of having built-in test and calibration can now be brought to mass produced products so they too can realize the benefits of an onboard noise source.

Specifications

• Frequency:	100 MHz to 3.0 GHz
• ENR:	45 dB min
• Flatness:	2.5 dB max
• Impedance:	50 ohms
• VSWR:	On-state 1.5:1 (max) Off-state 1.8:1 (max)
• Bias:	+8 to +18 Vdc @ 90 mA max
• Operating Temp:	-40 to +85 °C
• Storage Temp:	-54 to +125 °C
• ENR vs Temp:	0.04 dB / deg C
• Shutdown Input:	(TTL Compatible)
	Logic "0" = Noise Off
	Logic "1" (open) = Noise On

MICRONETICS
NOISE PRODUCTS

SMN7114

SURFACE MOUNT AMPLIFIED NOISE SOURCE

100 MHZ - 3.0 GHZ

USEFUL NOISE EQUATIONS

Calculating Y-Factor: $Y_{Fact} = N_2 / N_1$ Where N_2 is measured power output with noise source on and N_1 is the measured power output with noise source off.

Calculating noise figure from ENR and Y-Factor: NF(dB) = ENR (dB) - 10 log10 (Y_{Fact} -1)

Converting ENR to noise spectral density (N_0): 0 dB ENR = -174 dBm/Hz

Calculating noise power in a given bandwidth (BW) from noise spectral density:
Power (dBm) = N_0 + 10log(BW)

HOW TO ORDER

Model # S M N 7 1 1 4- C 2 A

Indicate Bulk or Tape and Reel when ordering

PACKAGE OUTLINE DRAWING