

KRYTAR MICROWAVE DETECTORS

10 MHz – 40 GHz

TESTING AND TERM DEFINITION



Krytar manufactures microwave detectors using zero bias silicon schottky diodes and planar doped detector diodes. Testing and Term definition for performance of the two types are identical.

OPERATING FREQUENCY

Krytar tests operation performance of detectors using an Automatic Network Analyzer which currently has the ability to measure performance of Krytar Detectors to 40 GHz. Krytar offers two types of Detectors. 200 Series Zero Bias Schottky Detectors have a video bypass capacitance of 30 pF and operate from 10 MHz to 40 GHz. 300 Series Zero Bias Schottky Detectors have a video bypass capacitance of 3.0 pF and operate from 100 MHz to 40 GHz. 700 Series Planar Doped Barrier Detectors have a Video Bypass Capacitance of 3 pF and operate from 100 MHz to 40 GHz. 600 Series Planar Doped Barrier Detectors have a video bypass capacitance of 30 pF and operate from 10 MHz to 40 GHz. Note that a Video Bypass Capacitance of 3.0 pF will yield a risetime of less than 20 nanoseconds. 30 pF Video Bypass Capacitance will yield a longer risetime. (See Krytar Applications Idea #4 for additional details).

TANGENTIAL SENSIVITY.

Krytar manufactures detectors from schottky diodes which typically have a tangential sensitivity (TSS) of -57 dBm usually measured using an amplifier with a video bandwidth of 1.0 KHz and a Noise Figure of 3 dB. The amplifier presents an Impedance of 100 K ohms or more to the diode. TSS of a detector using these diodes produces an RF signal level that yields an 8 dB video output voltage to noise ratio. Krytar Detectors use additional circuitry to provide state-of-the-art flat frequency response and very low VSWR. This drops the TSS of the Krytar Detector to approximately -46 dBm. Generally, Krytar detectors are comfortably used to detect signals of -40 dBm to $+20$ dBm.

July 2009



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SQUARE LAW

The term “Square Law” indicates that the output voltage from the detector is proportional to input power. Krytar Detectors provide square law output from TSS to approximately -15 dBm input.

LOW LEVEL SENSIVITY

Low level sensitivity of a Krytar Detector is measured using an input power level of -20 dBm. DC voltage output from the detector is measured into an open circuit. The measurement is made at a frequency of 2.0 GHz. Minimum low level sensitivity specification for Zero Bias Schottky Detectors is 0.5 millivolts per microwatt ($0.5\text{mV}/\mu\text{W}$) and 0.4 millivolts per microwatt ($0.4\text{mV}/\mu\text{W}$) for Planar Doped Barrier Detectors.

FREQUENCY RESPONSE

Frequency Response of a Krytar Detector is the deviation in output voltage (measured in dB) as a function of frequency into an open circuit impedance with a constant input power of -16 dBm.

MAXIMUM VSWR

VSWR is the ratio of maximum voltage to minimum voltage in standing wave pattern. VSWR can cover the range from 1 to infinity. Krytar uses special matching circuits to assure the State-Of-The-Art VSWR flatness as a function of operating frequency.

MAXIMUM INPUT POWER

Maximum Input Power is the power level (dBm) that may be applied to the input of the detector and still perform to all specifications. Maximum input power is measured at 25 degrees C. Maximum power input to Krytar Zero Bias Schottky Detectors is $+20$ dBm but may survive up to 1 watt for less than 1 minute. Maximum Power Input for Planar Doped Detectors is $+23$ dBm. These detectors may also survive up to 1 watt for less than 1 minute.

OUTPUT POLARITY

DC output voltage polarity is negative. In special cases, Krytar may be able to supply positive output polarity.

OUTPUT CAPACITANCE

Krytar offers Detectors with a choice of either 30 pF or 3 pF output capacitance. An output capacitance of 3.0 pF yields a risetime of less than 20 ns with an operating frequency of 100 MHz to 40 GHz. An output capacitance of 30 pF is available with an operating frequency of 10 MHz to 40 GHz, but risetime will be longer than the 3.0 pF unit. (See Krytar Applications Idea #4 for a complete discussion).

May 2011



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