

GENERAL PURPOSE DETECTORS



FEATURES:

- Full waveguide bandwidth
- High sensitivity
- No tuning required
- Zero bias

APPLICATIONS:

- Instrumentation
- Power monitoring

DESCRIPTION

Millitech series DET detectors, utilizing Schottky barrier zero-bias diodes, provide a very economical solution for power detection over the 18 to 325 GHz range. Both excellent sensitivity and full waveguide bandwidths are achieved simultaneously without external DC bias or adjustments. Positive or negative output voltage polarity is available for use with various scalar analyzers. These detectors have a flat frequency response, as their sensitivity shows minor variation over the entire waveguide band.

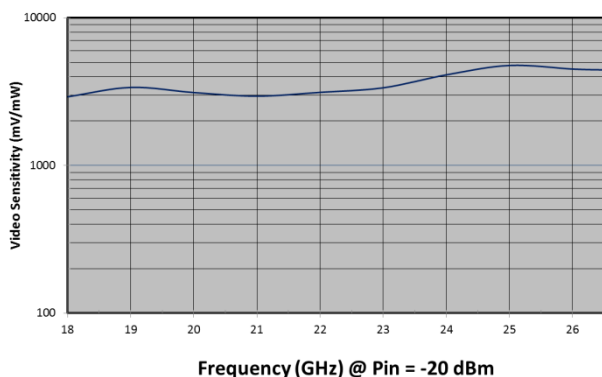
Series DET detector response is linear for power levels below -10 dBm. These units are rugged, thermally stable, and small. For applications requiring higher responsivity (mV/mW), models are available with an external amplifier. For the higher frequency bands (WR-06, 05, 04, and 03), a high sensitivity design is available using a low capacitance diode.

The amplifier responds to amplitude-modulated (AM) input signals up to 50 kHz. This detector/amplifier combination can provide an output voltage of up to 10 volts. For low input VSWR (1.25:1), a fullband isolator, series FBI, can be added at the input of these detectors.

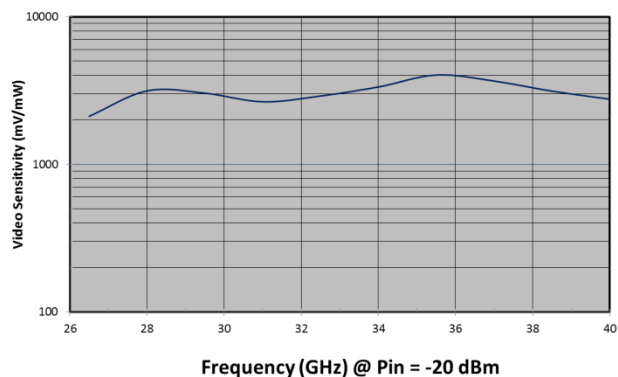
Series DET detectors are directly compatible with typical scalar analyzers including models manufactured by Agilent and Anritsu. Designs with custom electrical or mechanical specifications are also available.

TYPICAL PERFORMANCE

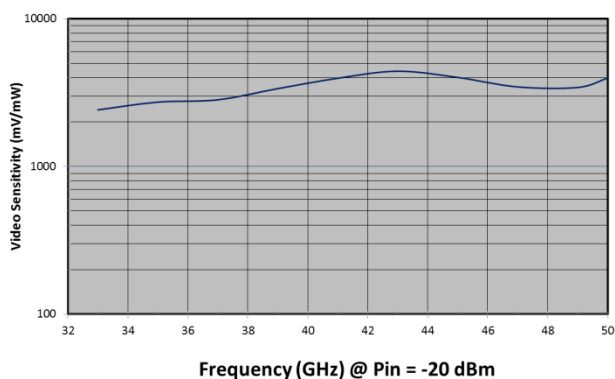
DET-42
(@ 1 MΩ load impedance)



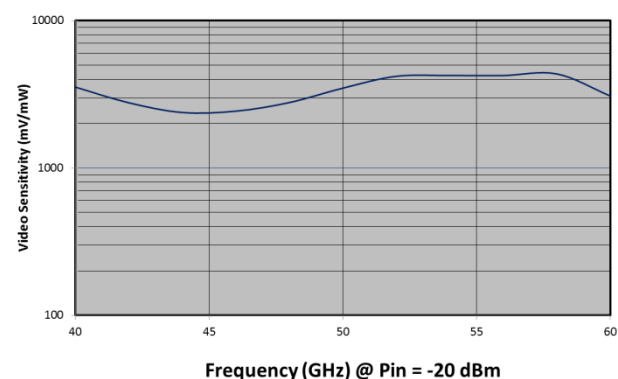
DET-28
(@ 1 MΩ load impedance)



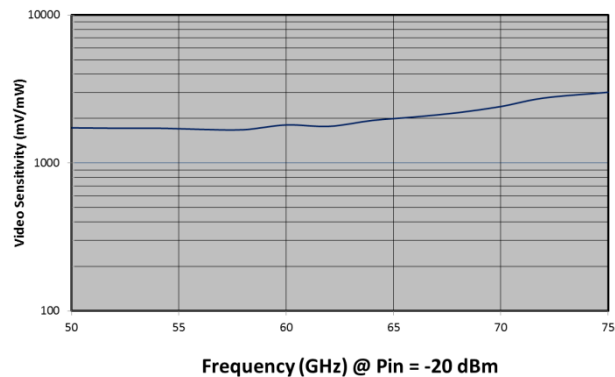
DET-22
(@ 1 MΩ load impedance)



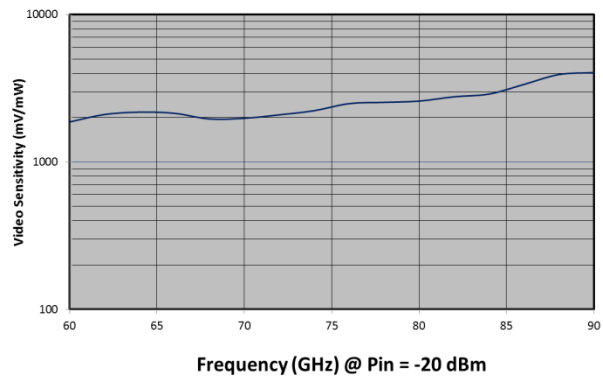
DET-19
(@ 1 MΩ load impedance)



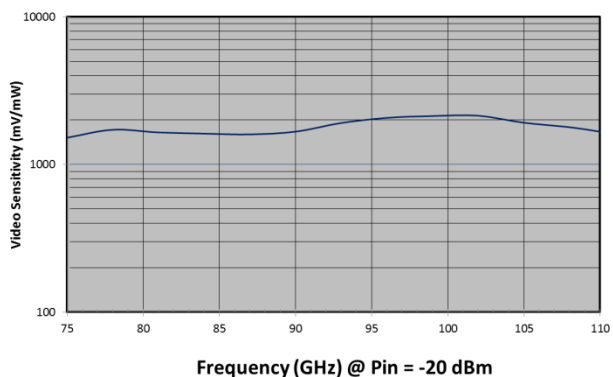
DET-15
(@ 1 MΩ load impedance)



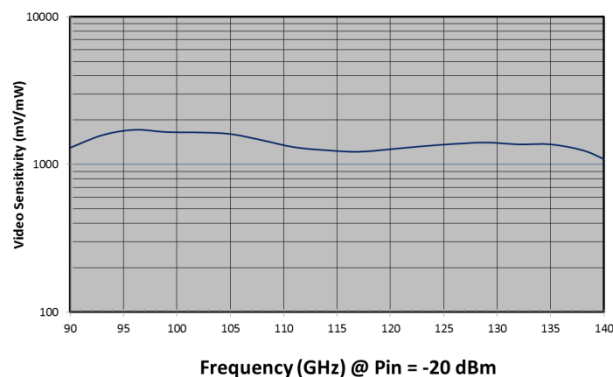
DET-12
(@ 1 MΩ load impedance)



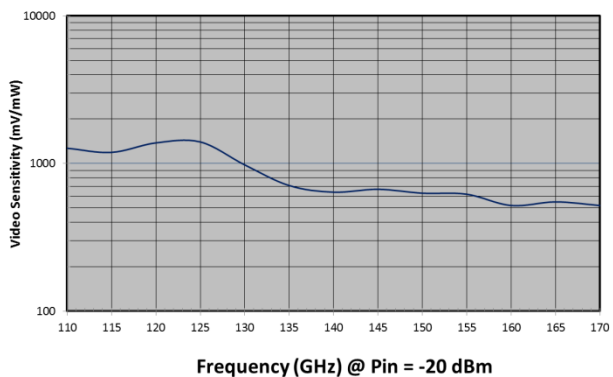
DET-10
(@ 1 MΩ load impedance)



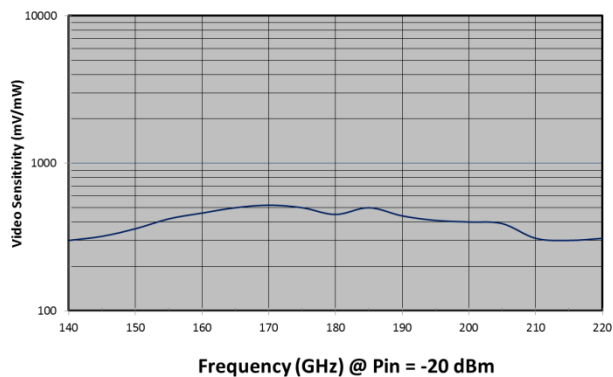
DET-08
(@ 1 MΩ load impedance)



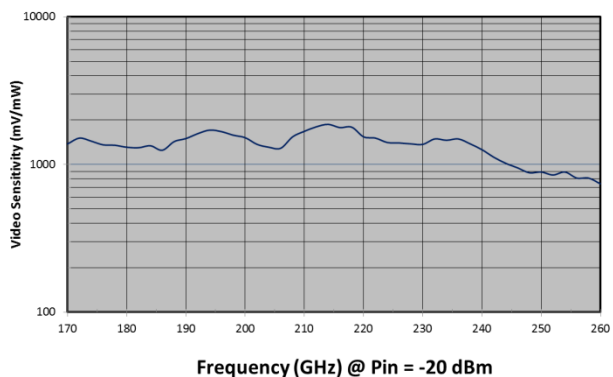
DET-06
(@ 1 MΩ load impedance)



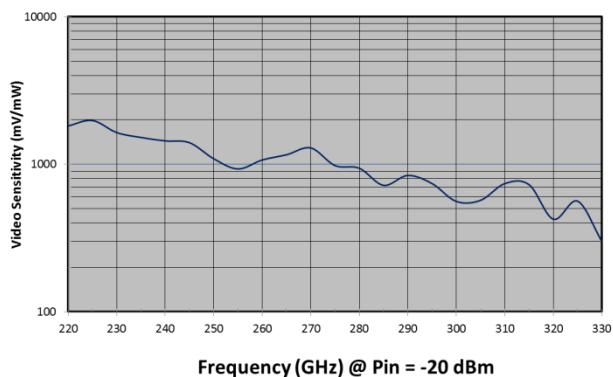
DET-05
(@ 1 MΩ load impedance)

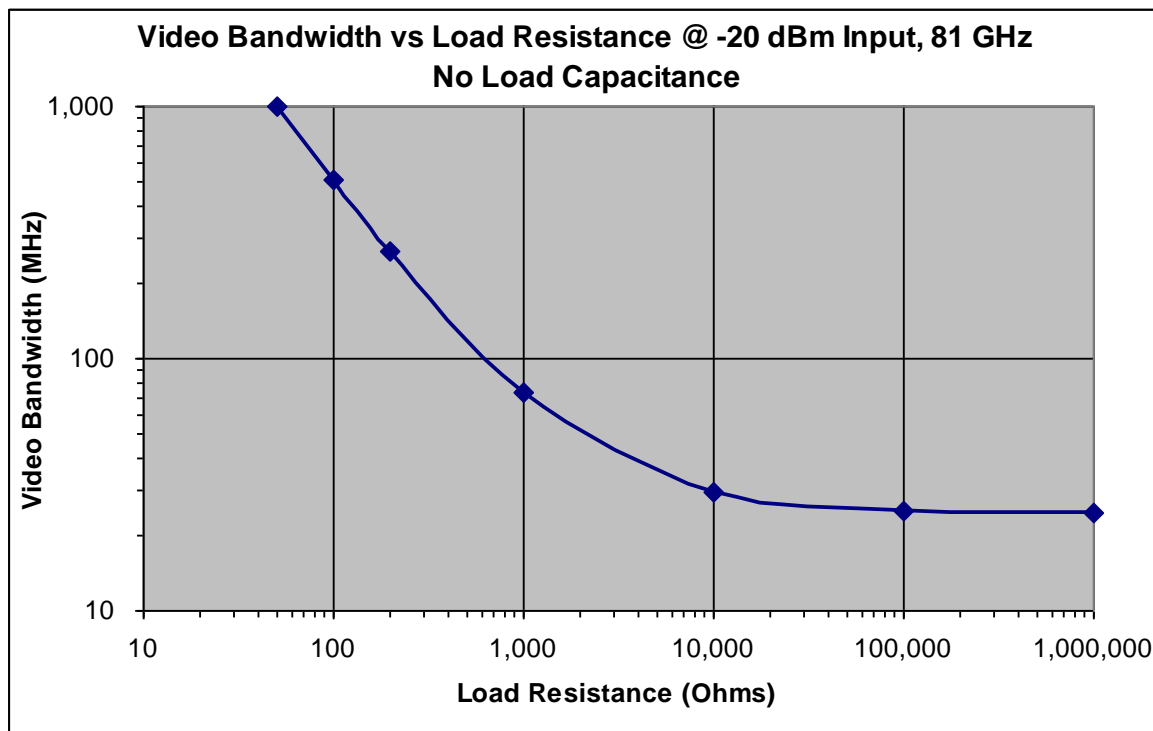
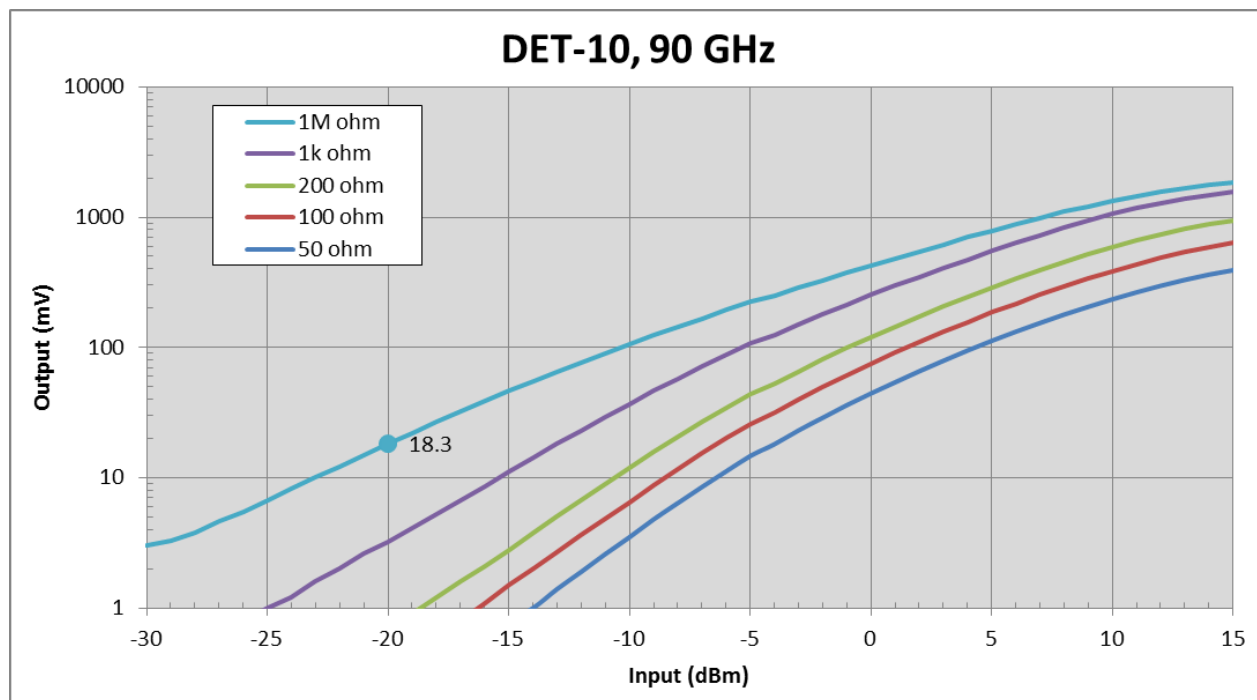


High Sensitivity DET-04
(@ 1 MΩ load impedance)



High Sensitivity DET-03
(@ 1 MΩ load impedance)





ELECTRICAL SPECIFICATIONS FOR STANDARD DETECTORS

Model Number	DET-42	DET-28	DET-22	DET-19	DET-15	DET-12	DET-10	DET-08	DET-06	DET-05
Frequency Band and Range (GHz)	K 18-26.5	Ka 26.5-40	Q 33-50	U 40-60	V 50-75	E 60-90	W 75-110	F 90-140	D 110-170	G 140-220
Video voltage (mV at -20 dBm input) (typ)	35	32	34	35	24	27	19	15	9	5
Video sensitivity (mV/mW) (min into 1 MΩ)	2000	1600	1800	2000	1350	1350	1150	550	300 ^{*2}	220
Flatness (dB) typ	+/-1.5	+/-1.5	+/-1.5	+/-1.5	+/-1.5	+/-2.0	+/-1.5	+/-2.5	+/-3.0	+/-2.5
TSS at 1 kHz (BW 40 Hz, dBm) (typ) ^{*1}	-55	-55	-50	-50	-50	-45	-45	-40	-40	-40

Video Bandwidth = 10 MHz typ into 1 MΩ load, 1 GHz typ into a 50Ω load.

CW maximum operating RF input power = +16 dBm, Absolute maximum operating RF input power = +20 dBm

Temperature variation (%deviation from 25°C/°C) = 0.41% typ.

*1- TSS is defined as the signal level at which the video output is 8 dB greater than the noise level. Detectors are not tested for TSS.

*2 – Min of 450 for 110-160 GHz

ELECTRICAL SPECIFICATIONS FOR HIGH SENSITIVITY DETECTORS

Model Number	DET-06	DET-05	DET-04	DET-03
Frequency Band and Range (GHz)	D 110-170	G 140-220	170-260	220-325
Video voltage (mV at -20 dBm input) (typ)	14	13	12	6
Video sensitivity (mV/mW) (min into 1 MΩ)	700	650	600	200
Flatness (dB) typ	+/-2.0	+/-2.0	+/-2.0	+/-3.0

Video Bandwidth = 10 MHz typ into 1 MΩ load, 1 GHz typ into a 50Ω load.

CW maximum operating RF input power = +8 dBm, Absolute maximum operating RF input power = +12 dBm

Temperature variation (%deviation from 25°C/°C) = 0.41% typ.

MECHANICAL SPECIFICATIONS FOR STANDARD DETECTORS

Model Number ^{*1}	DET-42	DET-28	DET-15	DET-12	DET-10	DET-08	DET-05
A (in/mm)	1.37/34.92	1.25/31.75	1.05/26.67	0.92/23.37	1.05/26.67	0.92/23.37	0.92/23.37
B (in/mm)	1.00/25.40	0.87/22.10	0.68/17.27	0.55/13.97	0.68/17.27	0.55/13.97	0.55/13.97
C (in/mm)	0.17/4.32	0.14/3.55	0.074/1.88	0.06/1.52	0.05/1.27	0.04/1.02	0.026/0.66
D (in/mm)	0.42/10.67	0.28/7.11	0.148/3.76	0.12/3.05	0.10/2.54	0.08/2.03	0.051/1.30
E (in/mm)	0.16/4.06	0.16/4.06	0.16/4.06	0.16/4.06	0.16/4.06	0.16/4.06	0.16/4.06
F (in/mm)	0.37/9.40	0.39/9.91	0.36/9.14	0.36/9.14	0.36/9.14	0.36/9.14	0.36/9.14
G (in/mm)	0.95/24.13	0.82/20.83	0.75/19.05	0.75/19.05	0.75/19.05	0.75/19.05	0.75/19.05
H (in/mm)	0.87/22.10	0.75/19.05	0.75/19.05	0.75/19.05	0.75/19.05	0.75/19.05	0.75/19.05
I (in/mm)	0.76/19.30	0.62/15.75	0.50/12.70	0.49/12.45	0.51/12.95	0.43/10.92	0.45/11.51
Flange MIL-DTL-3922	/54-001	/54-003 ^{*2}	/67C-008	/67C-009	/67C-010	/67C-M08 ^{*3}	/67C-M05 ^{*3}

*1 – Please contact Millitech for details. Refer to Figure 1 for outline information for these models only.

*2 – With #4-40 threaded holes.

*3 – Flange Pattern Compatible with MIL-DTL-3922/67C. Refer to IS000131.

MECHANICAL SPECIFICATIONS FOR HIGH SENSITIVITY DETECTORS

Model Number ^{*1}	DET-06	DET-05	DET-04	DET-03
A (in/mm)	0.92/23.37	0.92/23.37	0.92/23.37	0.92/23.37
B (in/mm)	0.55/13.97	0.55/13.97	0.55/13.97	0.55/13.97
C (in/mm)	0.0325/0.83	0.0255/0.65	0.0215/0.546	0.017/0.43
D (in/mm)	0.065/1.65	0.051/1.30	0.043/1.09	0.034/0.86
E (in/mm)	0.16/4.06	0.16/4.06	0.16/4.06	0.16/4.06
F (in/mm)	0.36/9.14	0.36/9.14	0.36/9.14	0.36/9.14
G (in/mm)	0.75/19.05	0.75/19.05	0.75/19.05	0.75/19.05
H (in/mm)	0.75/19.05	0.75/19.05	0.75/19.05	0.75/19.05
I (in/mm)	0.45/11.35	0.46/11.58	0.45/11.51	0.46/11.58
Flange MIL-DTL-3922	/67C-M06 ^{*3}	/67C-M05 ^{*3}	/67C-M04 ^{*3}	/67C-M03 ^{*3}

*1 – Please contact Millitech for details. Refer to Figure 1 for outline information for these models only.

*3 – Flange Pattern Compatible with MIL-DTL-3922/67C. Refer to IS000131.

OUTLINE DRAWING

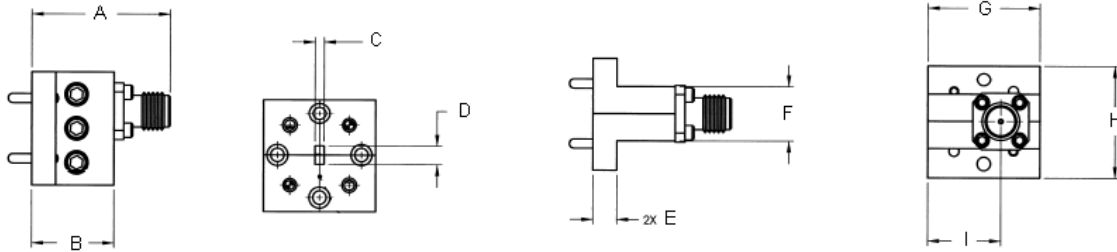


Figure 1

MECHANICAL SPECIFICATIONS (CONT.)

Model Number ^{*4}	DET-22	DET-19
a (in/mm)	0.22/5.59	0.19/4.83
b (in/mm)	1.12/28.45	1.12/28.45
c (in/mm)	0.50/12.70	0.50/12.70
d (in/mm)	0.11/2.79	0.09/2.29
e (in/mm)	0.03/0.76	0.03/0.76
f (in/mm)	0.75/19.05	0.75/19.05
g (in/mm)	0.37/9.40	0.37/9.40
h (in/mm)	0.16/4.06	0.16/4.06
i (in/mm)	0.40/10.16	0.40/10.16
j (in/mm)	0.22/5.59	0.19/4.83
Flange MIL-DTL-3922	/67B-006	/67B-007

*4 - Please contact Millitech for details. Refer to Figure 2 for outline information for these models only.

OUTLINE DRAWING

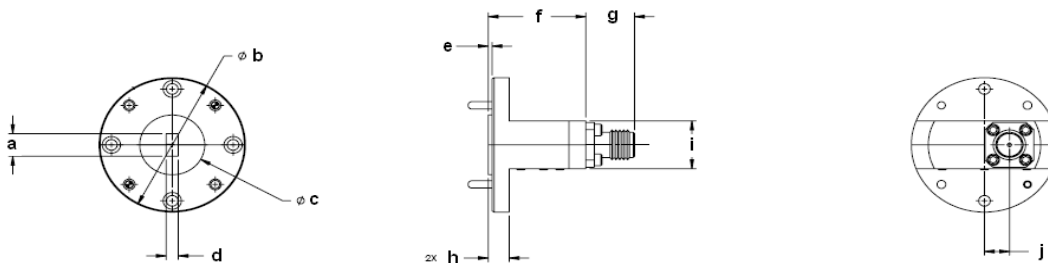


Figure 2

OUTLINE DRAWING: DET-06 STANDARD ONLY

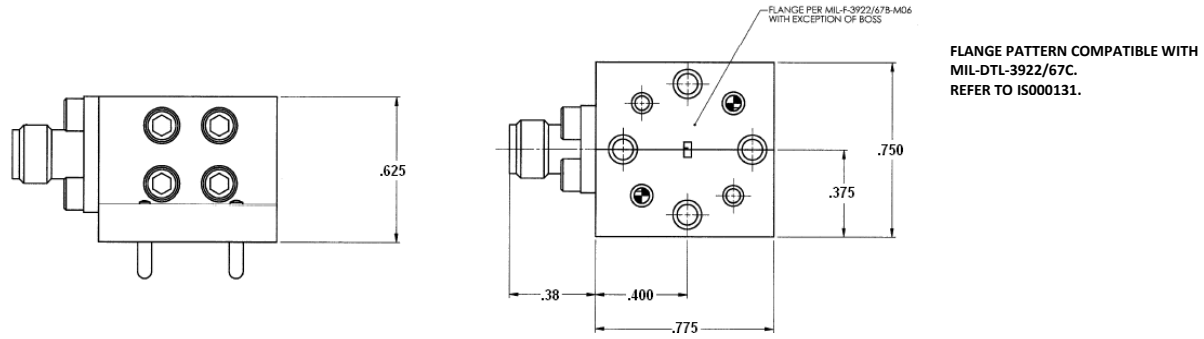


Figure 3

ADDITIONAL DRAWINGS: VIDEO AMPLIFIER

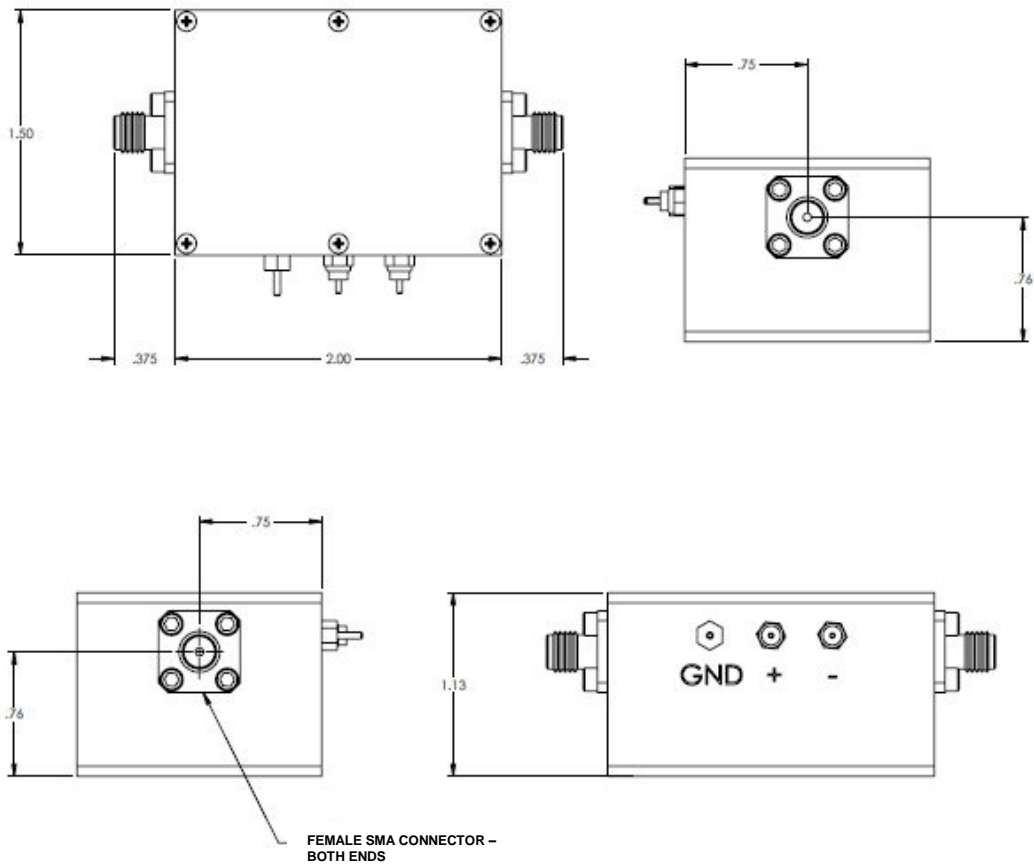


Figure 4

HOW TO ORDER

Specify Model Number DET-XX-YBCDE
XX = Waveguide Band WR – number
Y = Flange Type A – Precision Anti-Cocking; (WR-08 to WR-03 only) R – round (WR-22 to WR-10 only) S – square (WR-42 and WR-28 only)
B = Polarity P – positive N – negative
C = Tested Bandwidth F – fullband at -20 dBm (standard) N – narrowband (please specify)
D = Amplifier Options A – video amplifier (50 kHz bandwidth) W – without amplifier
E = Special Options 0 – standard sensitivity H – high sensitivity (WR-06, 05, 04, and 03 only) N – nonstandard (please specify)