

MAGNETIC FIELD (\dot{B}) & SURFACE CURRENT (\dot{J}) SENSOR

MODEL B-S25

DESCRIPTION

The PRODYN Model B-S25 is a half loop high frequency sensor which can be used as a B-dot sensor or can be used to measure the time rate-of-change of surface current density since the magnetic field over a conductive sheet is related to surface current density. When mounted to a conducting surface the B-S25 produces a voltage output in response to a time variant B field. The loop area is encapsulated to provide breakdown resistance and protection from the environment.

The equation pertinent to this sensor when used as a B-dot sensor is provided on the Model B-24 data sheet. The equation relating to surface current density measurements is:

$$V_o = A_{eq}\mu_0 \frac{dJ_s}{dt} \sin \theta = \text{sensor output (in volts)}$$

where

- A_{eq} = sensor equivalent area (m^2)
- μ_0 = permeability of free space ($4\pi \times 10^{-7}$ H/m)
- J_s = surface current density (Amps/m)
- $\sin\theta$ = angle between axis and J_s vector

ELECTRICAL SPECIFICATIONS

Equivalent Area (A_{eq} , Differential)	$4.5 \times 10^{-6} m^2$
Frequency Response (3dB point).	$>11GHz$
Risetime (t_r 10-90)	$\sim .032$ NS
Maximum Output (peak)	$\pm 500V$ RMS
Output Connector.	SMA (Male)

PHYSICAL SPECIFICATIONS

