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BumbleBee®

High Voltage Differential Probe

Features:

- 1000 V CAT III
- 400 MHz Bandwidth
- < 1 % deviation within specified operating temperatures (-10 to +50° C)
- High CMRR
- 4 Mode Attenuation
- Useable with any 50 Ω Measuring Instrument



BumbleBee® is a 400 MHz, 1 kV CAT III high-voltage, differential probe that can be used with any oscilloscope or device providing 50 Ω termination. The probe is very effective in power device evaluation such as measurements in IGBT circuits used in design of motor drives, switching power supplies and frequency converters. BumbleBee® is also very effective in fast transient measurements with bandwidths up to 400 MHz.

It provides a 4 Mode Attenuation which allows higher resolution measurements. The probe provides overload indicators for each input channel as well as for the differential output. That makes it easy to observe, that the differential probe is working in the specified range. The probe also provides an active offset correction in a range of ± 3 V, related to the output voltage, with a resolution of 15 Bit.

The newly designed input leads are less sensitive to changes of position or twisting.

Utilizing lowest ppm components available, the probe offers exceptional stability.

Especially long term measurements profit from such low drifts at varying temperatures. Another feature is the probe channel identifier, providing a channel indicator LED.

This datasheet supersedes all previously published material. Specifications that are not marked as guaranteed are published as general information to the user. The specifications stated are achieved with a PMK Power Supply and can vary, if BumbleBee® is powered by another source.

The instrument should have warmed up for at least 20 minutes and the environmental conditions must not exceed the specified limits of the probe. We recommend a calibration period of 1 year or less. Note that specifications are subject to change without notice.

Electrical Specifications (4)

Attenuation Ratio (switchable)	50:1	100:1	250:1	500:1
Bandwidth (-3dB) (1)				
Input Voltage 50V (Small Signal)	300 MHz	300 MHz	400 MHz	400 MHz
Input Voltage 500 V (Large Signal)	n.a	n.a	300 MHz	300 MHz
Input Voltage 1000 V (Large Signal)	n.a	n.a	n.a	300 MHz
Risetime (10 %- 90%) (1)				
Input Voltage 50V (Small Signal)	1.2 ns	1.2 ns	875 ps	875 ps
Input Voltage 500 V (Large Signal)	n.a	n.a	1.2 ns	1.2 ns
Input Voltage 1000 V (Large Signal)	n.a	n.a	n.a	1.2 ns
Typical Noise (rms) (2) (referred to input)	27 mV	54 mV	38 mV	75 mV
Typical Propagation Delay	10 ns			
Max. Input Voltage	1000 V CAT III			
Pollution Degree	2			
Max. Differential Input Voltage (incl. AC peak)	±150 V DC	± 300 V DC	± 750 V DC	±1500 V DC
Common Mode Voltage	± 1000 V			
DC Gain Accuracy	± 0.7 %	± 0.7 %	± 0.35 %	± 0.35 %
Offset Range	± 3 V referred to output			
Offset Resolution	15 Bit / minimum step < 100 µV			
Offset Drift	150 µV / °C	150 µV / °C	40 µV / °C	40 µV / °C
Input Impedance				
Each Input to Ground	5 MΩ 4 pF			
Differential Input Impedance	10 MΩ 2 pF			
Input Coupling of the measuring instrument (3)	50 Ω			
Typical CMRR (4)	DC	> 80 dB		
	100 kHz	> 70 dB		
	1 MHz	> 62 dB		
	3.2 MHz	> 50 dB		

(1) Large Signal Bandwidth or Rise Time

(2) Broadband Noise, Bandwidth 30 MHz

(3) Must be met to achieve best performances and avoid damage to the probe

(4) Only valid with PS-02 or PS-03 Power Supply

Power Supply

Model	Description	Order Number
PS-02	2 Channel Power Supply	889-09V-PS2
PS-03	4 Channel Power Supply	889-09V-PS3

Mechanical Specifications

Weight (Probe only)	370 g
Cable Length	2 m
Input Leads Length	25 cm
Input Connectors	2 x 4 mm (male)
Output Connector	BNC (male)

Environmental Specifications

<i>Altitude</i>	operating up to 3000 m	non- operating up to 15000 m
<i>Temperature Range</i>	0 °C to +50 °C	-20 °C to +70 °C
<i>Maximum Relative Humidity</i> (Entire Probe Assembly)	85% RH for temperatures of 0° to +50 °C	85% RH for Temperatures of 0° to +70 °C
<i>Temperature Range</i>	-40 °C to +85 °C	
<i>Maximum Relative Humidity</i> (Input Leads only)	85% RH for Temperatures of -40 °C to 85 °C	



Keyboard Layout - BumbleBee

WEEE/ RoHS Directives

PMK electronic products are classified within the WEEE/ RoHS* category list as monitoring and control equipment (category 9). Category 9 products are exempt from the restrictions under the scope of the RoHS directive.

Your help and efforts are required to protect and keep clean our environment. Therefore return this electronic product at the end of its life either to the Service Department of PMK Mess- und Kommunikationstechnik GmbH or take care of separate WEEE collection and professional WEEE treatment yourself. Do not dispose as unsorted municipal waste.

* EC Directives:

- | | | |
|---------------------------|---|---|
| WEEE Directive 2002/96/EC | – | Waste Electrical and Electronic Equipment |
| RoHS Directive 2002/95/EC | – | Restriction of the use of certain Hazardous Substances in Electrical and Electronic Equipment |

Safety Information

To avoid personal injury and to prevent fire or damage to this product or products connected to it, review and comply with the safety informations stated in the manual before using this product. Be aware that if you use this probe assembly in a manner not specified the protection this product provides may be impaired.

Only Qualified Personnel should use this Probe Assembly.