

## RF PULSE CURRENT MONITORING PROBE

### 1 Introduction

The TBPCP4-50H50 is an RF pulse current monitoring probe, expanding the Tekbox product range of affordable test equipment.

The probe has a 3 dB bandwidth from 50 Hz to 50 MHz and is characterized over the frequency range from 0.1 Hz to 100 MHz. The TBPCP4-50H50 is typically used for surge or RF pulse current monitoring applications in the time domain, in contrary to RF current monitoring probes designed for EMC applications, which are typically used for measurements in the frequency domain.



*Picture 1: TBPCP4-50H50 current monitoring probe*

The aperture of the RF current monitoring probe is 46 mm.

The transfer-impedance is -20 dB $\Omega$  / 0.1 V/A when terminated with 50 Ohm and 0.2 V/A with a high impedance load. The typical 3dB bandwidth is 50 Hz to 50 MHz.

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### 2 Specification

Characterized frequency range: 1 Hz to 100 MHz  
 3 dB bandwidth: 50 Hz to 50 MHz (measured in a 50 + 50 Ohm loop)  
 Transfer impedance into 50  $\Omega$  load: -12 dB $\Omega$ ; 0.25 V/A  
 Transfer impedance into high Z: 0.5 V/A  
 Probe port impedance: 50  $\Omega$   
 Droop rate: 7 %/ms  
 Rise time: < 10 ns  
 Max. RMS AC current: 20A  
 Max. pulse current: 2500A  
 Current time product: 0.1 Ampere seconds  
 Max. core temperature: 80 °C  
 Aperture diameter: 46 mm  
 Outside diameter: 124 mm  
 Height: 37 mm  
 Weight: 1050 g  
 Connector type: N female; comes supplied with a coaxial adapter to BNC-female

### 3 Transfer impedance

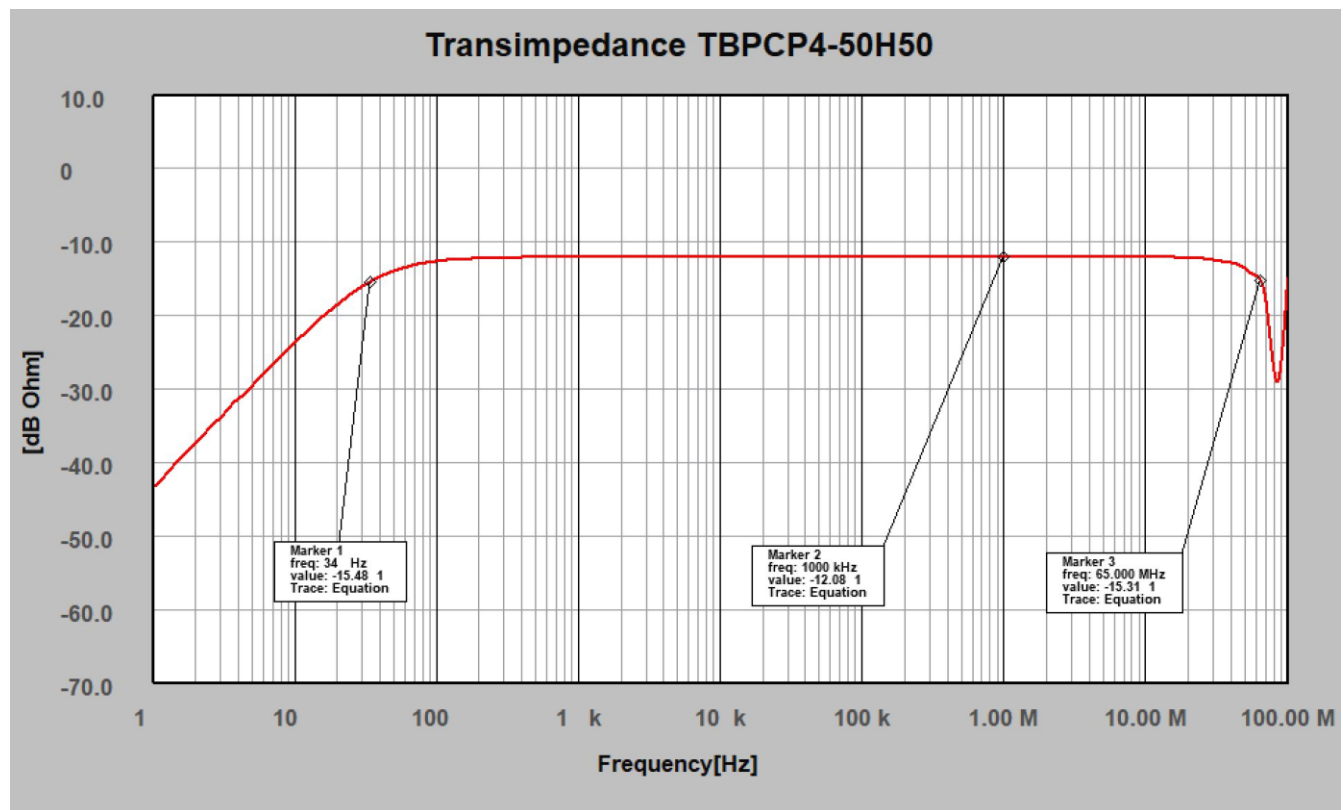


Figure1: typical transfer impedance, 1 Hz – 100 MHz

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### 4 Transfer impedance table

The table below shows typical transfer impedance data of a TBPCP4-50H50 pulse current probe. Each current probe is delivered with its corresponding measurement protocol. The transimpedance in dBΩ is measured with a 50 Ohm load.

Transimpedance [V/A] =  $10^{(dB\Omega/20)}$  @ 50 Ohm

Transimpedance [V/A] =  $2 \cdot 10^{(dB\Omega/20)}$  @ High Z

| Frequency | transfer impedance [dBΩ]<br>50 Ohm load | transfer impedance [V/A] 50 Ohm<br>load | transfer impedance [V/A] high Z<br>load |
|-----------|-----------------------------------------|-----------------------------------------|-----------------------------------------|
| 1 Hz      | -43,48                                  | 0,007                                   | 0,013                                   |
| 2,5 Hz    | -35,36                                  | 0,017                                   | 0,034                                   |
| 5 Hz      | -29,68                                  | 0,033                                   | 0,066                                   |
| 7,5 Hz    | -26,15                                  | 0,049                                   | 0,098                                   |
| 10 Hz     | -23,74                                  | 0,065                                   | 0,130                                   |
| 25 Hz     | -17,13                                  | 0,139                                   | 0,278                                   |
| 50 Hz     | -14,02                                  | 0,199                                   | 0,398                                   |
| 75 Hz     | -13,05                                  | 0,222                                   | 0,445                                   |
| 100 Hz    | -12,67                                  | 0,233                                   | 0,465                                   |
| 250 Hz    | -12,25                                  | 0,24                                    | 0,49                                    |
| 500 Hz    | -12,04                                  | 0,25                                    | 0,50                                    |
| 750 Hz    | -12,05                                  | 0,25                                    | 0,50                                    |
| 1 kHz     | -12,02                                  | 0,25                                    | 0,50                                    |
| 5 kHz     | -12,01                                  | 0,25                                    | 0,50                                    |
| 10 kHz    | -12,01                                  | 0,25                                    | 0,50                                    |
| 50 kHz    | -12,04                                  | 0,25                                    | 0,50                                    |
| 100 kHz   | -12,04                                  | 0,25                                    | 0,50                                    |
| 500 kHz   | -12,05                                  | 0,25                                    | 0,50                                    |
| 1 MHz     | -12,08                                  | 0,25                                    | 0,50                                    |
| 5 MHz     | -12,06                                  | 0,25                                    | 0,50                                    |
| 10 MHz    | -12,04                                  | 0,25                                    | 0,50                                    |
| 15 MHz    | -12,09                                  | 0,25                                    | 0,50                                    |
| 20 MHz    | -12,27                                  | 0,24                                    | 0,49                                    |
| 25 MHz    | -12,30                                  | 0,24                                    | 0,49                                    |
| 30 MHz    | -12,49                                  | 0,24                                    | 0,47                                    |
| 40 MHz    | -12,89                                  | 0,23                                    | 0,45                                    |
| 50 MHz    | -13,67                                  | 0,21                                    | 0,41                                    |
| 60 MHz    | -14,67                                  | 0,18                                    | 0,37                                    |
| 65 MHz    | -15,31                                  | 0,172                                   | 0,343                                   |
| 70 MHz    | -17,80                                  | 0,129                                   | 0,258                                   |
| 75 MHz    | -22,61                                  | 0,074                                   | 0,148                                   |
| 80 MHz    | -27,31                                  | 0,043                                   | 0,086                                   |
| 85 MHz    | -29,08                                  | 0,035                                   | 0,070                                   |
| 90 MHz    | -26,75                                  | 0,046                                   | 0,092                                   |
| 95 MHz    | -21,58                                  | 0,083                                   | 0,167                                   |
| 100 MHz   | -14,98                                  | 0,178                                   | 0,356                                   |

Table1: Transfer impedance: 1 Hz to 100 MHz, typical data

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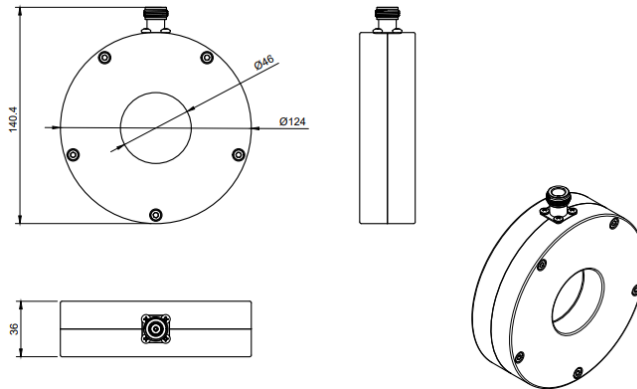
## 5 Calibration fixture

Tekbox supplies a calibrator suitable for the TBPCP4-50H50 current probe:



Picture 1: TBPCP4-CAL RF current probe calibration fixture

## 6 Dimensions



## 7 Ordering Information

| Part Number  | Description                                                     |
|--------------|-----------------------------------------------------------------|
| TBPCP4-50H50 | Pulse Current Probe 50Hz – 50 MHz, N-male to BNC-Female adapter |
| TBCP4-CAL    | Calibration fixture for TBPCP3 series pulse current probes      |

## 8 History

| Version | Date      | Author     | Changes               |
|---------|-----------|------------|-----------------------|
| V 1.0   | 7.7.2025  | Mayerhofer | Creation              |
| V 1.1   | 26.9.2025 | Mayerhofer | Correction, chapter 1 |

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