

RF PULSE CURRENT MONITORING PROBE

1 Introduction

The TBPCP2-3070 is a RF pulse current monitoring probe, expanding the Tekbox product range of affordable test equipment.

The probe has a very flat response from 30 Hz to 70 MHz and is characterized over the frequency range from 1 Hz to 200 MHz. The TBPCP2-3070 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 used for measurements in the frequency domain.



Picture 1: TBPCP2-3070RF current monitoring probe

The aperture of the RF current monitoring probe is 25 mm. Its transfer impedance measured in a $50\Omega + 50\Omega$ loop test fixture is -26 dB Ohm with a 3dB bandwidth from 30Hz to 70 MHz.

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2 Specification

Characterized frequency range: 1 Hz to 200 MHz
3 dB bandwidth: 30 Hz to 70 MHz (measured in a 50 + 50 Ohm loop)
Transfer impedance into 50 Ohm load: -26 dB Ohm; 0.05 V/A
Transfer impedance into high Z: 0.1 V/A
Probe port impedance: 50 Ohm
Droop rate: < 20% / ms
Rise time: < 5 ns
Max. primary RMS AC current with respect to internal resistor dissipation ratings: 40A
Max. primary single pulse current with respect to internal resistor pulse current ratings:
200A @ 100ms pulse width; 400A @ 1ms pulse width
Max. current time product: 0.01 Ampere seconds
Max. RMS AC current, linear: 4 A
Max. core temperature: 80 °C
Aperture diameter: 5.5 mm
Outside diameter: 27 mm
Length including SMA connector: 40mm
Height: 19 mm
Weight: 60 g
Connector type: SMA female

3 Transfer impedance

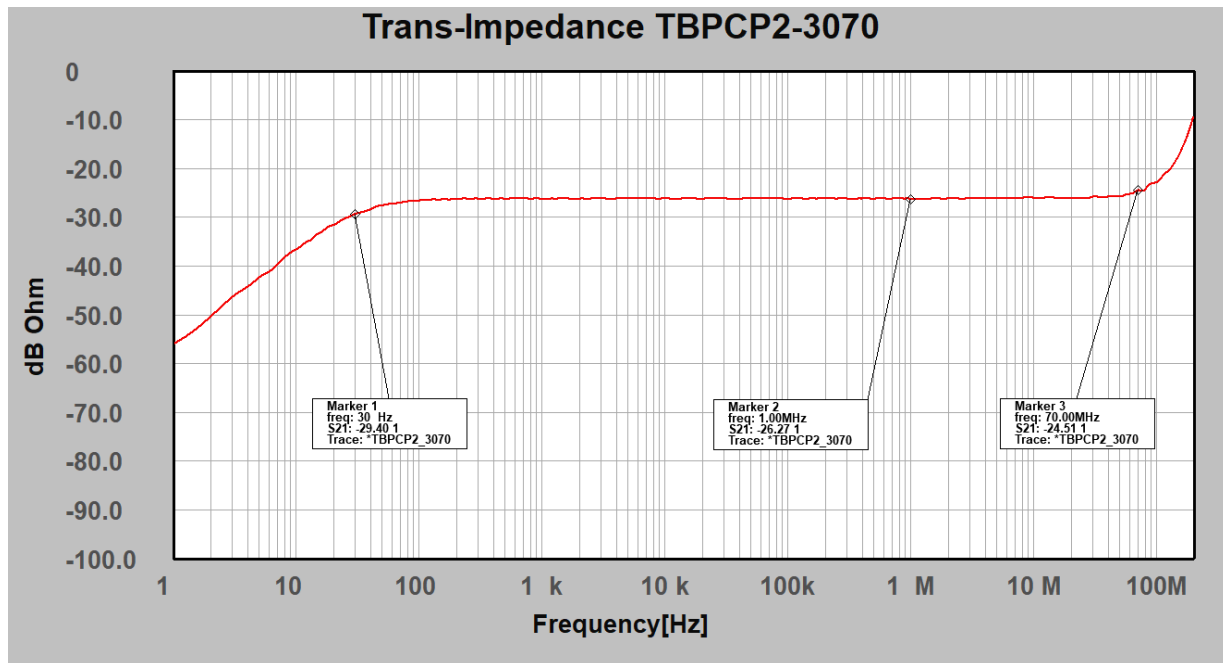


Figure 1: typical transfer impedance, 1 Hz – 200 MHz

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4 Typical transfer impedance table

The table below shows typical transfer impedance data of a TBPCP2-3070 pulse current probe. Each current probe is delivered with its corresponding measurement protocol. The transimpedance is given for a 50 Ohm load.

Logarithmic to linear conversion:

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

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

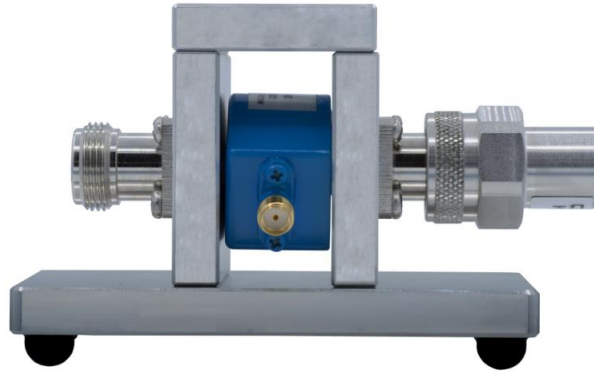
Frequency	transfer impedance [dBΩ] 50 Ohm load	transfer impedance [V/A] 50 Ohm load	transfer impedance [V/A] high Z load
1 Hz	-56,04	0,00	0,00
2,5 Hz	-48,22	0,00	0,01
5 Hz	-42,36	0,01	0,02
7.5 Hz	-39,03	0,01	0,02
10 Hz	-36,61	0,01	0,03
12.5 Hz	-34,96	0,02	0,04
15 Hz	-33,47	0,02	0,04
17.5 Hz	-32,30	0,02	0,05
20 Hz	-31,65	0,03	0,05
25 Hz	-30,28	0,03	0,06
50 Hz	-27,61	0,04	0,08
75 Hz	-26,91	0,05	0,09
100 Hz	-26,63	0,05	0,09
1 kHz	-26,27	0,05	0,10
10 kHz	-26,19	0,05	0,10
100 kHz	-26,29	0,05	0,10
1 MHz	-26,27	0,05	0,10
10 MHz	-26,05	0,05	0,10
25 MHz	-26,13	0,05	0,10
50 MHz	-25,81	0,05	0,10
60 MHz	-25,29	0,05	0,11
70 MHz	-24,51	0,06	0,12
80 MHz	-24,36	0,06	0,12
90 MHz	-23,17	0,07	0,14
100 MHz	-22,83	0,07	0,14
110 MHz	-21,78	0,08	0,16
120 MHz	-20,81	0,09	0,18
130 MHz	-19,94	0,10	0,20
140 MHz	-18,77	0,12	0,23
150 MHz	-17,38	0,14	0,27
160 MHz	-15,91	0,16	0,32
170 MHz	-14,40	0,19	0,38
180 MHz	-12,78	0,23	0,46
190 MHz	-10,89	0,29	0,57
200 MHz	-8,81	0,36	0,73

Table1: Transfer impedance: 1 Hz to 200 MHz, typical data

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5 Accessory

Tekbox supplies a calibrator suitable for the TBPCP2-3070 current probe:



Picture 2: TBPCP2-CAL

6 Ordering Information

Part Number	Description
TBPCP2-3070	Pulse Current Probe 30Hz – 70 MHz
TBPCP2-CAL	Calibration fixture for TBPCP2-3070 current probe

7 History

Version	Date	Author	Changes
V 1.0	9.11.2022	Mayerhofer	Creation of the preliminary document
V 1.1	19.03.2023	Mayerhofer	Chapter 5 updated

www.tekbox.com

TekBox Digital Solutions Vietnam Pte. Ltd.

Factory 4, F5, Lot I-3B-1, Saigon Hi-Tech Park, Tan Phu Ward, District 9, Ho Chi Minh City, Vietnam