

- Detects impulsive currents frequency up to 250KHz
- High induction core
- 3 Selectable current ranges: 1A, 10A, 20A
- Current monitor for Switch Mode Power Supply
- Oscilloscope matched 50 ohm input impedance
- RG 58 coaxial cable output



Current Probe

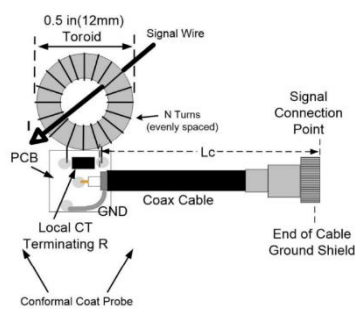


Curren Probe (detail)

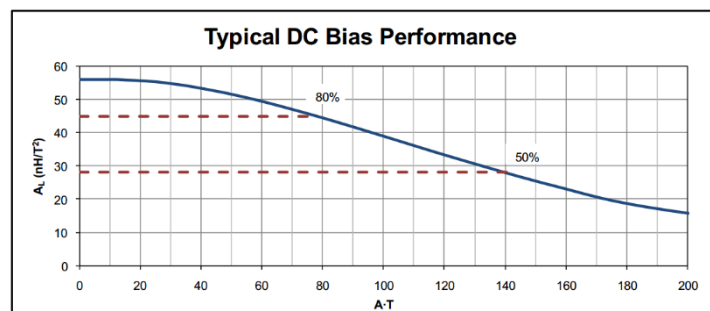
### DESCRIPTION

The current probe is an amperometric transformer. The principle of operation of this current probe, is based on electromagnetic induction produced by the conductor of which one wants to measure the current. To capture the precise manner in high-frequency current, without distortion and not introduce insertion loss, it is used as the main element of a magnetic core with the following properties:

- **Low magnetic permeability.** Is defined as the ratio between the magnetic induction produced at constant magnetic field in order to be able to realize a transducer which can also read high currents without saturating the magnetic core
- **High accuracy.** The coefficient AL of the material is temperature-stable and low tolerance, so that the secondary inductance value of measurement obtained is accurate
- **Small footprint.** In order to make it easy to move the object



Measuring principle



Magnetics Coil response

The current transduction to the secondary voltage happens thanks to a terminating resistance  $R_T$ . To limit the counter-electromotive force that is generated from the secondary to the measuring primary is necessary to make sure that the  $R_T$  terminating resistor, both high and therefore for this purpose the number of the secondary coils must be chosen according to current ranges that we wish to measure.

Depending on the current range the following turns ratios have to be used:

- Low current: Range from 0.5 A to 1 A = ratio 1: 100
- Medium current: Range from 1 A to 10 A ratio = 1:50
- High current: Range from 10 A to 20 A = ratio 1:25

The choice of the number of turns and the terminating resistor also affect probe bandwidth. The probe is terminated with an RG58 coaxial cable with a characteristic impedance of 50 ohms and must be used with the oscilloscope set with a DC 1Mega ohm input resistance.

The length of the coaxial cable does not affect the bandwidth of the probe for measuring the frequencies below 50KHz. Above 50KHz instead it is necessary to take into account the effect introduced by the low-pass connection.



## TECHNICAL DATA

PARAMETER	VALUE	UNIT
Coil Inductance	34.9	uH
Time Constant	1.3	us
Cut-off Frequency (-3dB)	256	KHz
Maximum Current	20	A

## PCB TECHNICAL DATA

PARAMETER	VALUE	UNIT
Dimensions Length x Width	38 x 18	mm
Colors	RED	
PCB thickness	1.6	mm
Layers	2	
Surface finish	HASL	
Copper Weight	1	oz
Material Details	FR4-Standard Tg 130-140C	

## BILL OF MATERIALS

- Rt: 25 ohm
- L1: Core Magnetics C055050A2 with 25/50/100 turns

In order to match a precise resistor value a series, parallel combination of multiple resistors can be used



Current probe assembly

## ASSEMBLY INFORMATION

- Wound 25\50\100 turns depending the desired ration, on the toroidal core
- Solder L1 to the Out PAD on TOP side and BOTTOM side of the PCB
- Solder Rt resistor



PCB TOP



PCB BOTTOM



**USER INFORMATION****FREQUENCY RESPONDE TEST**

For probe testing square waveforms with frequency in the range 1KHz to 300KHz has been used.



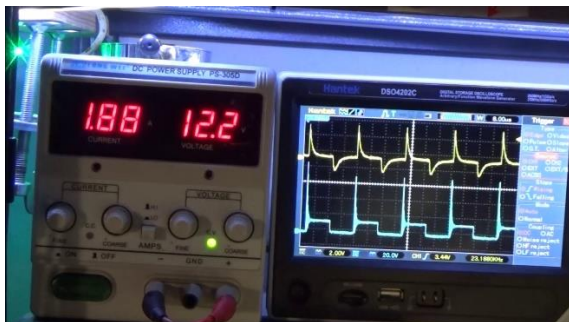
Function Generator stimulus



MOSFET voltage \ currents measurements

**FAST TRANSIENT TEST**

As an example the switching of the MOSFET (blue curve) and the relative Drain current measured by the current probe (yellow curve). In this case the measured current reaches a peak of 1.7 A (equal to 1.7 V on the oscilloscope beds). The probe is an amperometric transformer coupling is AC, and then all the DC components will be cut.



TEST with 2 A impulsive current at a frequency of 50KHz



TEST with 2A impulsive current at a frequency of 100KHz

**ORDERING INFORMATION**

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