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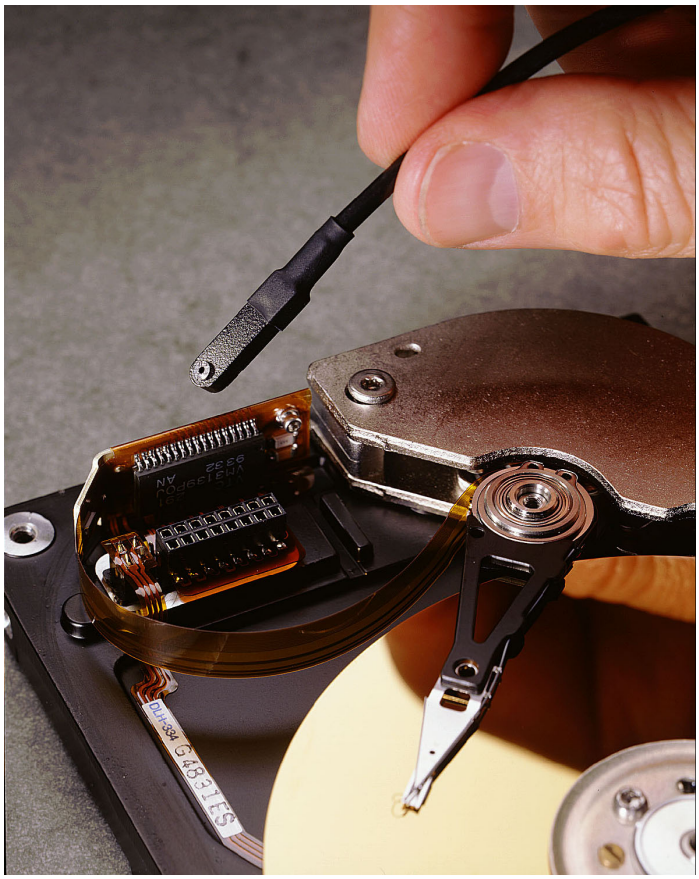
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Find the *Tektronix TCA-BNC* at our website: ***Click HERE***

AC Current Probes

CT1 • CT2 • CT6 Datasheet



CT6. Current Probe

Features & Benefits

- High Bandwidth
- Ultra-low Inductance
- Very Small Form Factor
- Characterize Current Waveforms up to <200 ps Rise Times
- Very Low Loading of Circuit Under Test
- Fits Into Dense, Closely-spaced Circuit Designs

Applications

- Data Storage Read Channel Design
- Silicon Characterization
- High-frequency Analog Design
- ESD Testing
- Signal Injection
- Differential Current Measurements
- Single-shot Low Rep-rate Pulse Measurements
- Propagation Delay Measurement

CT6 Current Probe

The CT6 is the newest addition to the Tektronix portfolio of high-frequency current probes. It is designed to meet the needs of high-speed circuit design and test applications which require ultra-high bandwidth, low inductance, and extremely small form factor. The CT6 provides up to 2 GHz bandwidth when used with high-bandwidth oscilloscopes such as the Tektronix TDS694C, TDS794D, and TDS7000 Series oscilloscopes or with other compatible 50 Ω input measuring instruments. Low inductance (<3 nH) assures that the loading effect of the CT6 on the circuit-under-test will be negligible, which is especially important for today's low-amplitude, high-speed circuit designs such as disk drive read/write preamplifiers. The probe is a closed-circuit design which will accept uninsulated wire sized up to 20 gauge. This product is exempt from CE mark by virtue of its 30 V voltage limit.

CT1/CT2 Current Probes

The CT1 and CT2 Current Probes are designed for permanent or semi-permanent in-circuit installation. Each probe consists of a current transformer and an interconnecting cable. The current transformers have a small hole through which a current carrying conductor is passed during circuit assembly.

The P6041 Probe Cable provides the connection between the CT1 and CT2 Current Transformers and a BNC oscilloscope input. A 50 Ω termination is required to terminate the cable when connected to a high-impedance (1 MΩ) oscilloscope input. One probe cable can be used to monitor several current transformers that have been wired into a circuit.

Tektronix®



CT1/CT2. Current Probes with P6041 BNC Probe Cable.

Miniature Construction

The CT1 and CT2 detachable cable design enables one or more probes to be located on circuit boards or in other limited space areas.

The CT6 offers the smallest form factor available, for measurement on ever-shrinking circuit boards and components. It is designed for temporary installation and does not incorporate removable cables, as the CT1 and CT2 do.

Extendible Probe Length

Specified rise time and bandwidth are obtained when using the probe cables provided: The P6041 cable used with the CT1 and CT2 is 42 inches nominal. If additional length is required, the cables can be extended by using high-quality 50 Ω cable and suitable interface connectors. (Also see Special Probe Cables, Optional Accessories.) Long cables may degrade high-frequency response.

High Sensitivity

The CT1 and CT6 provide an output of 5 mV for each milliamp of input current when terminated in 50 Ω. The CT2 provides 1 mV per milliamp when terminated in 50 Ω.

Typical Systems

The CT1, CT2, and CT6 high-frequency current transformers are dynamic (i.e., non-DC) current measuring devices. They are typically used in conjunction with compatible high-bandwidth oscilloscopes and other instruments to observe and/or record high-frequency current waveforms. The CT1, CT2, and CT6 normally operate directly into 50 Ω scopes and other measuring device inputs.

The CT1 or CT2 can be used with 1 MΩ input systems; use the P6041 probe cable and terminate the output with a 50 Ω feed-through termination (see Optional Accessories).

In all cases, the CT1, CT2, and CT6 must work into 50 Ωs to obtain specified performance and sensitivity.

Typical Measurement Applications

Differential Current Measurements

Most true-differential voltage amplifiers have a maximum bandwidth of about 100 MHz. The CT1 or CT6 can make differential current measurements to 1 GHz and 2 GHz, respectively, by passing two wires carrying opposing currents through the same core. The displayed result is the difference current. The CT2 can perform the same function to 200 MHz.

In all cases, Derating with Frequency and Amp-second Product (Current-time Product) guidelines should not be exceeded. (See Characteristics.)

Single-shot and Low Rep-rate Pulse Measurements

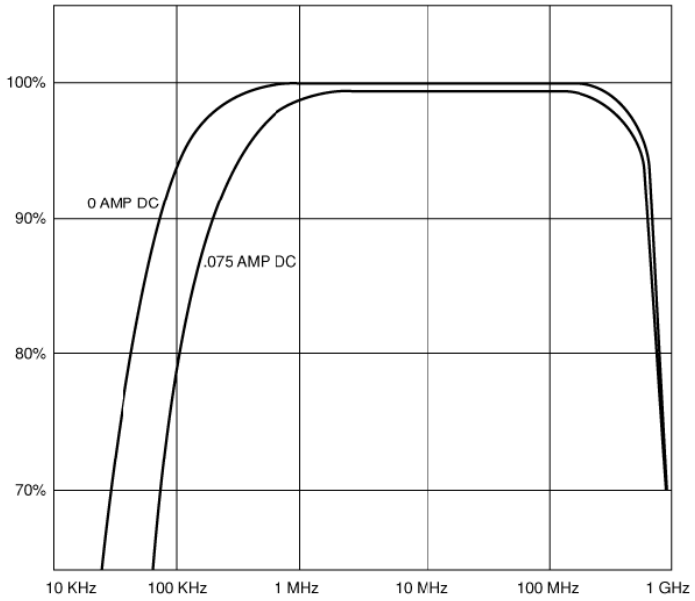
These common measurements are easy to make with the CT1, CT2, or CT6 provided that your signal fits within the Max Pulse Current and Amp-second Product (Current-time Product) guidelines for the specific current probe characteristics.

For example, the CT2 is rated at 36 A peak, with an Amp-second Product of 50×10^{-6} seconds (50 Amp-microseconds), therefore the CT2 can safely handle a 36 A peak pulse with a maximum width of 1.39 microseconds or lower amplitude pulses for longer pulse widths. The CT1, CT2, and CT6 all have low-frequency roll-off characteristics. Low-frequency "droop" will exhibit itself when the pulse width approaches the L/R time constant of the specific transformer.

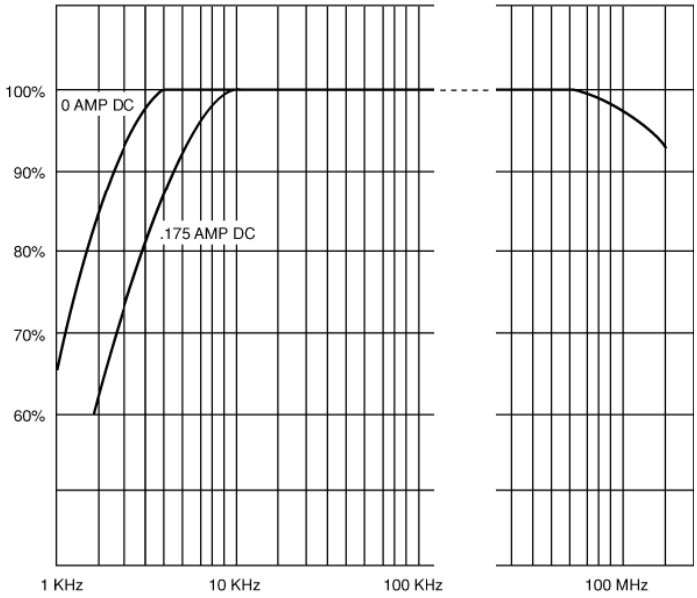
Propagation Delay Measurements

Two CT1 or CT2 Current Transformers with matching probe cables can be used to measure propagation delay (transit time) between the input and output currents of high-frequency devices. The probe outputs are connected to the inputs of dual-channel real-time or sampling scopes.

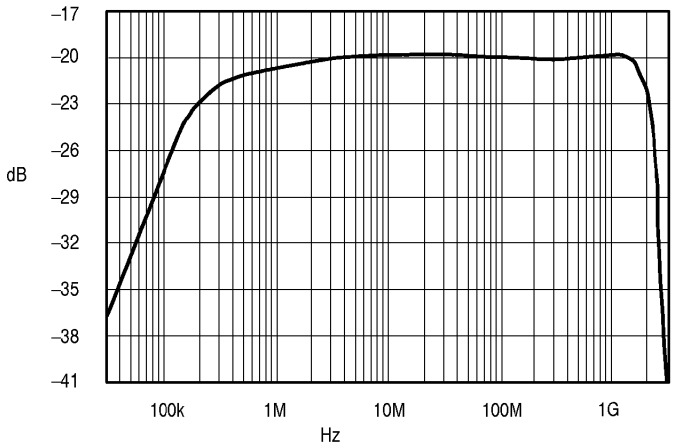
Verification of any Probe/Cable/Scope System mismatch can be obtained by passing the same signal current through both probes and observing total system delay difference, if any.



CT1 Typical Frequency Response.



CT2 Typical Frequency Response.



CT6 Typical Frequency Response.

Characteristics

CT1, CT2, and CT6 Characteristics

Characteristic	CT1	CT2	CT6
Bandwidth (typical)	25 kHz to 1 GHz	1.2 kHz to 200 MHz	250 kHz to 2 GHz
Rise Time	350 ps	500 ps	200 ps
Sensitivity (into 50 Ω)	5 mV/mA	1 mV/mA	5 mV/mA
Accuracy	±3%	±3%	±3%
Magnetizing Inductance	6 µH	7 µH	1 µH
Leakage Inductance	2.4 nH	1 nH	1.5 nH
Insertion Impedance:			
at 10 MHz	<1 Ω	0.1 Ω	1.1 Ω
at 100 MHz	2 Ω	0.5 Ω	1.3 Ω
at 1 GHz			11.9 Ω
Max. Bare Wire Size	#14 wire	#16 wire	#20 wire
	1.78 mm (0.070 in.)	1.32 mm (0.052 in.)	0.8 mm (0.032 in.)
Max. Bare Wire Voltage:			
RMS	175 V_{RMS} CAT I	175 V_{RMS} CAT I	30 V_{RMS} CAT I
Peak	1000 V*1	1000 V*1	30 V
DC	175 V	175 V	30 V
Max. Peak Pulse Current	12 A	36 A	6 A
Max. Continuous Current (RMS)	450 mA	2.5 A	120 mA
Amp-second Product	1 × 10^{-6} A*Sec	50 × 10^{-6} A*Sec	0.25 × 10^{-6} A*Sec
L/R Time Constant (droop)	>6.35 µs	>160 µs	0.4 µs
Propagation Delay	5.4 ns	6.1 ns	5.2 ns
Safety	UL3111-2-032, CSA1010.2.032, EN61010-2-032, IEC61010-2-032	UL3111-2-032, CSA1010.2.032, EN61010-2-032, IEC61010-2-032	NA

*1 (<3.25% Duty Factor).

Ordering Information

CT1
High-frequency Current Probe.
Includes: Manual and P6041 Interconnect Cable.

CT2
High-frequency Current Probe.
Includes: Manual and P6041 Interconnect Cable.

CT6
High-frequency Current Probe.

Service
Opt. C3 – Calibration Service 3 Years
Opt. C5 – Calibration Service 5 Years
Opt. D1 – Calibration Data Report (CT6 only)
Opt. D3 – Calibration Data Report 3 Years (with Opt. C3)
Opt. D5 – Calibration Data Report 5 Years (with Opt. C5)
Opt. R3 – Repair Service 3 Years
Opt. R5 – Repair Service 5 Years
Opt. SILV400 – Standard Warranty Extended to 5 Years (CT6 Only).

CT1 or CT2 Recommended Accessories
Feed-through 50 Ω Termination – Order 011-0049-02.

CT6 Standard Accessories
SMA to BNC Adapter – Order 015-0572-xx.
User Manual – Order 071-0453-xx.
Color Cable Marker Bands –
Probe Holder – Order 015-0682-xx.
Certificate of Traceable Calibration –
Warranty – One Year.

Tektronix is registered to ISO 9001 and ISO 14001 by SRI Quality System Registrar.

CE

Contact Tektronix:

ASEAN / Australasia (65) 6356 3900
Austria 00800 2255 4835*
Balkans, Israel, South Africa and other ISE Countries +41 52 675 3777
Belgium 00800 2255 4835*
Brazil +55 (11) 3759 7627
Canada 1 800 833 9200
Central East Europe and the Baltics +41 52 675 3777
Central Europe & Greece +41 52 675 3777
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Finland +41 52 675 3777
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Japan 81 (3) 6714 3010
Luxembourg +41 52 675 3777
Mexico, Central/South America & Caribbean 52 (55) 56 04 50 90
Middle East, Asia, and North Africa +41 52 675 3777
The Netherlands 00800 2255 4835*
Norway 800 16098
People's Republic of China 400 820 5835
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* European toll-free number. If not accessible, call: +41 52 675 3777

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