TELEDYNE LECROY
Everywhereyoulook™

Power Analyzer Package

Automatically and accurately analyze the performance of switched-mode power circuits

Key Features

- **Automatic switching device measurements**
- **Color coded overlay to identify power losses**
- **Control loop and time domain response analysis**
- **Line power and harmonics tests to IEC 61000-3-2**
- **Setup tools reduce sources of measurement error**
- **Total harmonic distortion table shows frequency contribution**
- **B-H Curve shows magnetic device saturation**

Quickly Measure and Analyze Operating Characteristics of Power Conversion Circuits

Critical power switching device measurements, control loop modulation analysis, and line power harmonic testing are all simplified with a dedicated user interface and automatic measurements. Power Analyzer provides quick and easy setup of voltage and current inputs and makes measurements as simple as the push of a button. Tools are provided to help reduce sources of measurement errors, measurement parameters provide details of single cycle or average value over multiple cycles.

Automatic Switching Device Measurements

Areas of power device turn-on and turnoff transitions, and conduction are all identified with color-coded waveform overlays. Measurement parameter table automatically calculates each element of device losses and sums their total.

Control Loop Response Analysis

Modulation analysis capabilities provide insight to understand control loop response to critical events such as a power supply's soft start performance or step response to line and load changes.

Line Power and Harmonics Testing

Line power analysis tools provide insight to power consumption as well as enables quick precompliance testing to EN 61000-3-2. Decisions on power quality are aided with total harmonic distortion and analysis of contributions to distortion.

Support on Multiple Oscilloscope Platforms

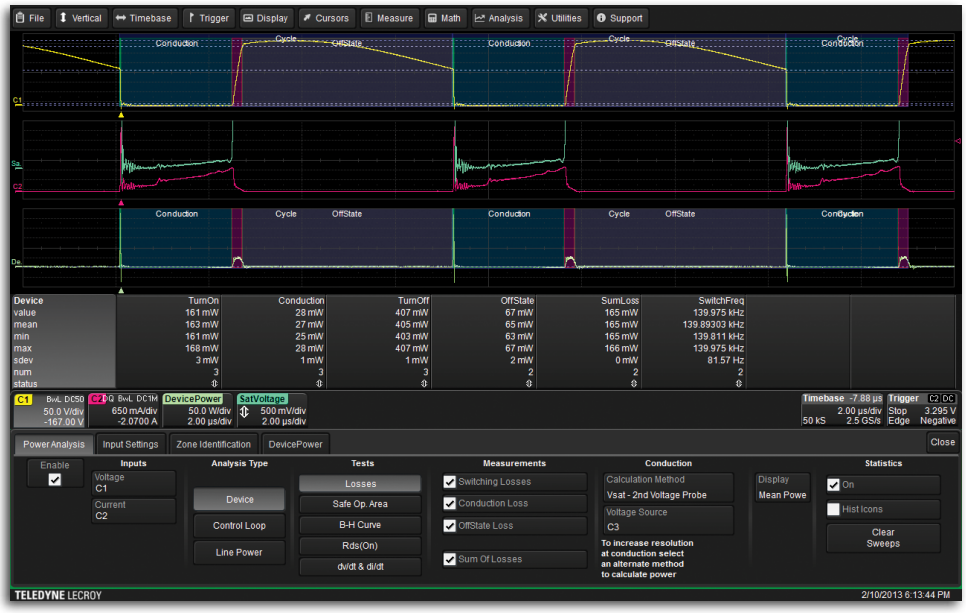
The Power Analyzer Package is available on a wide range of oscilloscope models from 200 MHz to 65 GHz.

POWER DEVICE ANALYSIS

Analyze power device performance while the device is operating in circuit. Easily make switching loss, dynamic-on resistance, dv/dt and di/dt measurements. Quickly view safe operating area and B-H hysteresis curves.

Power Device Losses

Turn-on, turn-off and conduction zones are identified with a color-coded overlay, power losses in these zones are automatically measured and displayed. Losses associated with the switching, conduction, and off-state are measured independently and displayed along with the sum of selected loss types.



Switching transitions, conduction losses and off-sate losses are color-coded and automatically calculated. Measurements are displayed as energy (joules), mean or peak power (watts). For discontinuous supplies, off-state loss provides an excellent tool to fine adjust a current probe's DC offset and improve measurement accuracy.

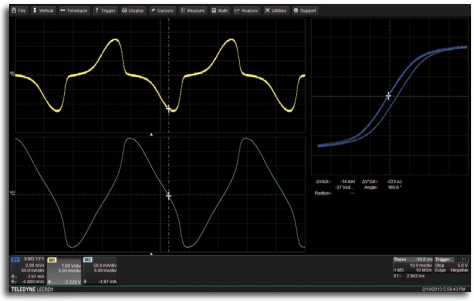
Safe Operating Area

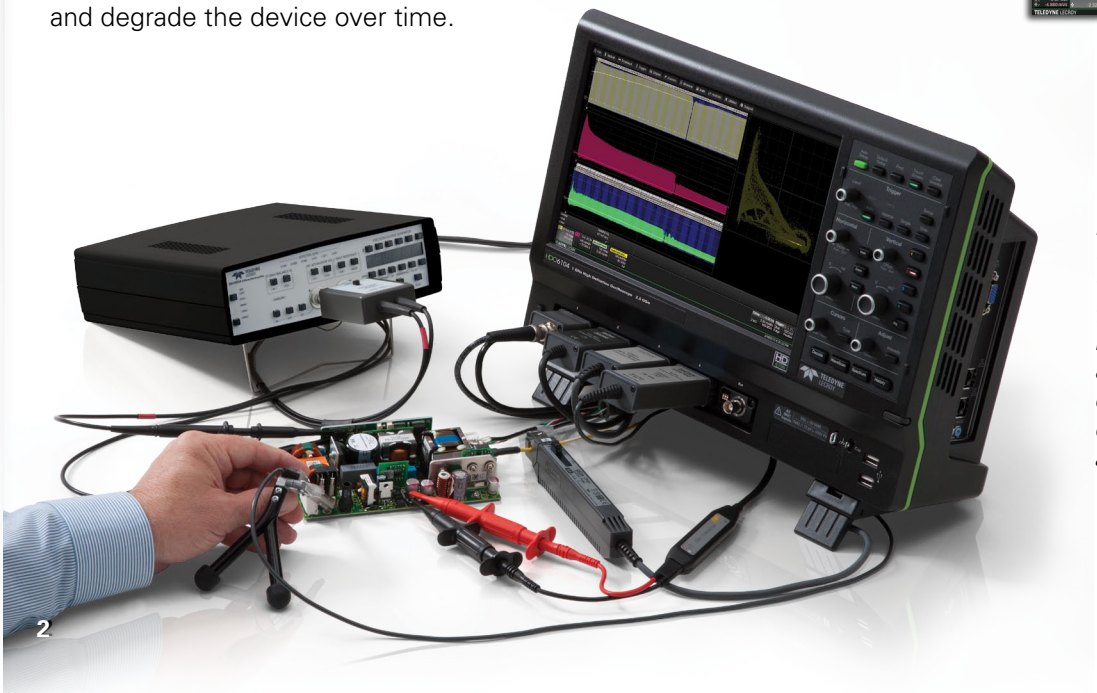
Gain insight to circuit performance by seeing SOA plots to look for violations in the first cycles after an event or over long time periods. Finding SOA violations that occur for only a few cycles after an event, such as short circuit or startup, can be problematic. These violations often go undetected, and degrade the device over time.

Using the long record length and fast processing of Power Analyzer, SOA display on very long records, confirm turn-off voltage and current limits are not exceeded.

B-H Hysteresis Curve

View the behavior of a magnetic device while it operates in circuit. Dynamic circuit changes show resulting magnetic saturation and operating region.





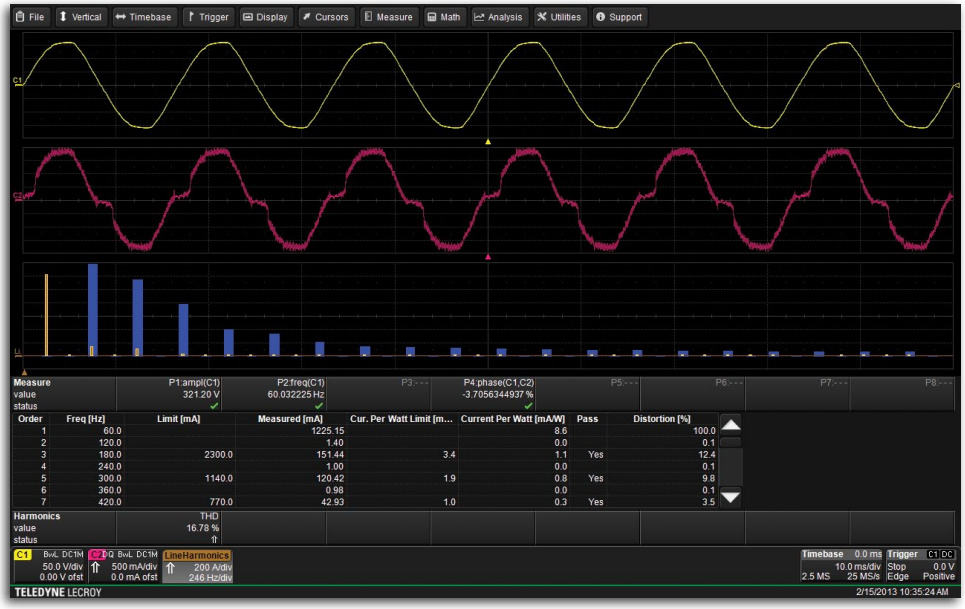
Teledyne LeCroy's HDO4000 and HDO6000 High Definition Oscilloscopes with 12-bit HD4096 technology are the ideal oscilloscope for power measurement. With 16x more resolution than a traditional 8-bit oscilloscope signal details of the saturation voltage are now clearly visible and conduction losses are more accurate.

MODULATION AND LINE HARMONIC ANALYSIS

Triggered by the step change in load current (red trace), the gate-drive modulated signal (yellow traces) is captured, the closed-loop, time-domain response of the feedback loop (blue trace) is displayed, confirming loop performance.

Control Loop Analysis

View time domain display which graphically presents the modulated parameter in a time vs. parameter value graphical plot. A controller's output pulse widths, duty cycles or frequencies, are individually plotted and time correlated with the controller's output. Integrated with the oscilloscope's triggering capabilities, this analysis is a convenient tool for intuitively viewing the time domain, closed-loop response of the entire control loop, including any time constants added by the pulse width modulator.



Both tabular and graphical displays provide conducted emissions for Class A, B, C, or D equipment as compared to standard templates of the EN 61000-3-2. The blue mask shows the test limits for compliance at each current harmonic.

Line Power Analysis

Easily measure an off-line power supply's incoming RMS line voltage, RMS current consumption (in watts and VA), Power Factor, Apparent Power, Real Power and Crest Factor. Line current harmonic measurements are made and compared to standard templates for EN 61000-3-2 Class A, B, C, or D equipment. Results can be displayed graphically to see mask violations or in a table with test results. Total harmonic distortion measurements are provided with details of which frequencies are contributing to the distortion.

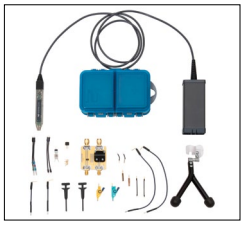
OSCILLOSCOPE PROBES AND ACCESSORIES

Teledyne LeCroy offers a complete set of probes and accessories to make accurate power measurements. The 100 MHz DA1855A Differential Amplifier provides CMRR of 100,000:1. Differential probes maintain isolation and high CMRR. Current probes are available with bandwidths up to 100 MHz and currents up to 500 A_{rms}. The deskew device ensures waveforms are time aligned to reduce measurement error.

DA1855A Differential Amplifier

ADP305 High Voltage Differential Probe

Current Probes



ZD Series Active Differential Probes

Ordering Information

Power Analyzer Software Options

Product Description	Product Code
Power Analyzer Software Option for HDO4000	HDO4K-PWR
Power Analyzer Software Option for HDO6000	HDO6K-PWR
Power Analyzer Software Option for WaveSurfer Xs	WSXs-PWR
Power Analyzer Software Option for WaveRunner 6 Zi	WR6Zi-PWR
Power Analyzer Software Option for WavePro 7 Zi/Zi-A	WPZi-PWR
Power Analyzer Software Option for WaveMaster 8 Zi-A	WM8Zi-PWR
Power Analyzer Software Option for LabMaster 9 Zi-A	LM9Zi-PWR
Power Analyzer Software Option for LabMaster 10 Zi	LM10Zi-PWR

Differential Amplifiers and Accessories

1 Ch, 100 MHz Differential Amplifier with Precision Voltage Source	DA1855A
2 Ch, 100 MHz Differential Amplifier with Precision Voltage Source	DA1855A-PR2
100 or ÷10 Selectable, 250 MHz Passive Differential Probe Pair	DXC100A*
÷1, 50 MHz Passive Differential Probe Pair	DXC200*
÷100, 250 MHz 2.5kv, High Voltage Probe Pair (requires DA101 for full performance)	DXC-5100*
÷10, 1 MΩ External Passive Attenuator (recommended with DXC5100)	DA101*
2 Ch, DA1855A with Rackmount	DA1855A-PR2-RM

** For use with DA1855A Differential Amplifiers.*

Current Probes

30 A; 100 MHz Current Probe – AC/DC; 30 A_{rms}; 50 A_{peak} Pulse	CP031
30 A; 50 MHz Current Probe – AC/DC; 30 A_{rms}; 50 A_{peak} Pulse	CP030
150 A; 10 MHz Current Probe – AC/DC; 150 A_{rms}; 500 A_{peak} Pulse	CP150
500 A; 2 MHz Current Probe – AC/DC; 500 A_{rms}; 700 A_{peak} Pulse	CP500
30 A; 50 MHz Current Probe – AC/DC; 30 A_{rms}; 50 A_{peak} Pulse	AP015
Deskew Calibration Source (for CP030, CP031, AP015)	DCS015

High Voltage Differential Probes

1,400 V, 100 MHz Differential Probe	ADP305
1,400 V, 20 MHz Differential Probe	ADP300
700 V, 15 MHz Differential Probe (÷10, ÷100)	AP031

High Frequency Differential Probes

200 MHz, 3.5 pF, 1 MΩ Active Differential Probe ±20 V differential mode range, ±60 V common mode range	ZD200
500 MHz, 1.0 pF, 1 MΩ Active Differential Probe ±8 V (16 V_{p-p}) differential mode range, ±10 V common mode range	ZD500
1 GHz, 1.0 pF, 1 MΩ Active Differential Probe ±8 V (16 V_{p-p}) differential mode range, ±10 V common mode range	ZD1000
1.5 GHz, 1.0 pF, 1 MΩ Active Differential Probe ±8 V (16 V_{p-p}) differential mode range, ±10 V common mode range	ZD1500

High Voltage Passive Probes

÷1000; 100 MHz; 50 MΩ High-Voltage Probe 20 kV (40 kV Peak) max. Voltage DC and Peak AC	PPE20KV
÷100; 400 MHz; 50 MΩ High-Voltage Probe 2 kV max. Voltage DC and Peak AC	PPE2KV
÷100; 400 MHz; 50 MΩ High-Voltage Probe 4 kV max. Voltage DC and Peak AC	PPE4KV
÷100; 400 MHz; 50 MΩ High-Voltage Probe 5 kV max. Voltage DC and Peak AC	PPE5KV
÷1000; 400 MHz; 50 MΩ High-Voltage Probe 6 kV max. Voltage DC and Peak AC	PPE6KV
÷10/÷100; 200/300 MHz; 5 MΩ/50 MΩ High-Voltage Probe 600 V/1.2 kV max. Voltage DC and Peak AC	PPE1.2KV

Transmission Line Probes

7.5 GHz Low Capacitance Passive Probe (÷10, 1 kΩ; ÷20, 500 Ω)	PP066

Customer Service

Teledyne LeCroy oscilloscopes and probes are designed, built, and tested to ensure high reliability. In the unlikely event you experience difficulties, our digital oscilloscopes are fully warranted for three years and our probes are warranted for one year. This warranty includes:

- No charge for return shipping
- Long-term 7-year support
- Upgrade to latest software at no charge

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**Local sales offices are located throughout the world.
Visit our website to find the most convenient location.**