SDM3045X Digital Multimeter

Data Sheet

EN_04A

SIGLENT TECHNOLOGIES CO.,LTD

SDM3045X

Product Overview

SDM3045X is a 4½ digit digital (60000 count) multimeter incorporating a dual-display and is especially well suited for the needs of high-precision, multifunction and automatic measurement

Main Function

Basic Measurement Function

- DC Voltage: 600 mV - 1000 V
- DC Current: 600 μA - 10 A
- AC Voltage: True-RMS, 600 mV - 750 V
- AC Current: True-RMS, 60 mA - 10 A
- 2/4-Wire Resistance: 600 Ω - 100 MΩ
- Capacitance: 2 nF - 10000 μF
- Continuity Test: Range is fixed at 2 kΩ
- Diode Test: Adjustable range is 0-4 V.
- Frequency Measurement: 20 Hz - 500 KHz
- Period Measurement: 2 μs - 0.05 s
- Temperature: Support for TC and RTD sensor
- Max, Min, Average, Standard Deviation, dBm/dB, Relative Measurement, Pass/ Fail Histogram, Trend Chart

User-friendly Design

4.3” TFT-LCD, 480*272

Support dual display, Chinese and English Menu

Built-in front panel accessible help system

File management (support for U-disc and local storage)

Application fields

- Research Laboratory
- Development Laboratory
- Detection and Maintenance
- Calibration Laboratory
- Automatic Production Test

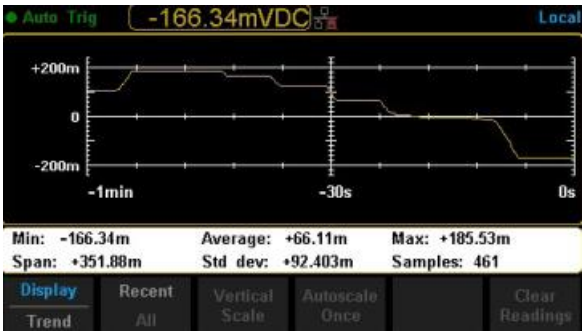
Main Features

- Real 4½ digit (66000 count) readings resolution
- Up to 150 rdgs/s measurement speed
- True-RMS AC Voltage and AC Current measuring
- 1 Gb NAND flash size, Mass storage configuration files and data files
- Built-in cold terminal compensation for thermocouple
- With easy, convenient and flexible PC software: EasyDMM
- Standard interface: USB Device, USB Host, LAN (Optioanal Accessories: USB-GPIB Adapter)
- USB & LAN remote interfaces support common SCPI command set. Compatible with other popular DMMs on the market.

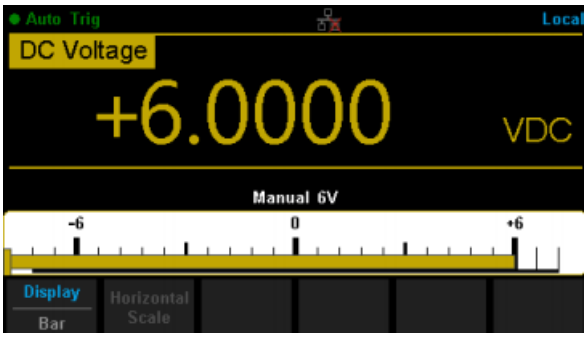
Special Features

Histogram

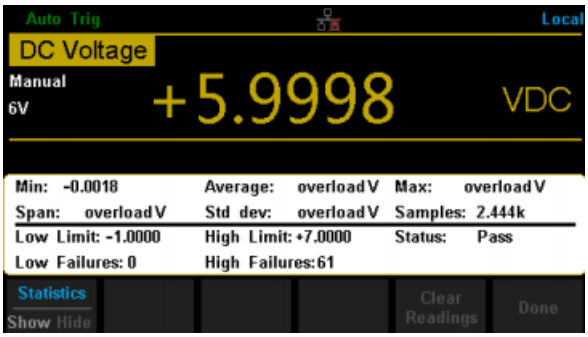
Trend Chart



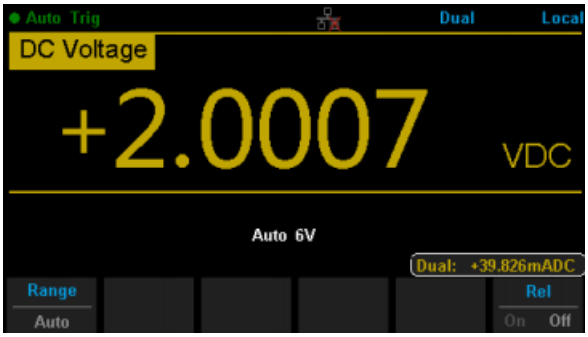
Bar Chart



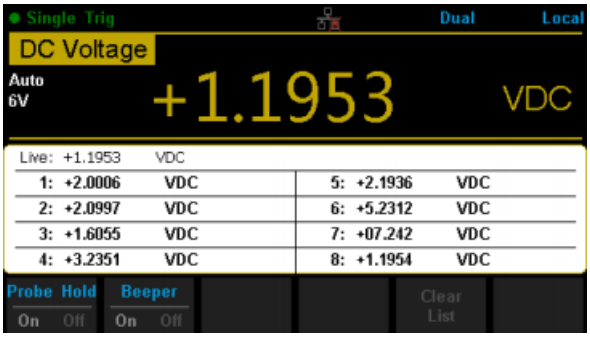
Statistics



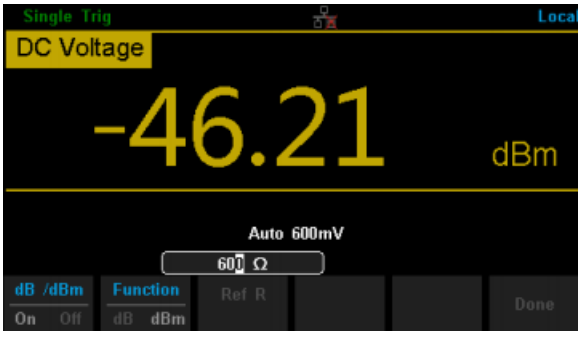
Dual Display



Hold Measurement



dBm Hold Measurement



Interface

Specifications

DC Characteristics Accuracy± (% of Reading + count)[1]

Function	Range[2]	Test current or Load voltage	Resolution	Accuracy (one year; 23℃ ± 5℃)
DC Voltage	600 mV		0.01 mV	0.06 + 8
	6 V		0.0001 V	0.06 + 8
	60 V		0.001 V	0.06 + 8
	600 V		0.01 V	0.06 + 8
	1000 V		0.1 V	0.06 + 8
DC Current	600 μA	< 33 mV	0.01 μA	0.25 + 4
	6 mA	< 330 mV	0.0001 mA	0.25 + 4
	60 mA	< 0.05 V	0.001 mA	0.25 + 4
	600 mA	< 0.5 V	0.01 mA	0.25 + 4
	6 A	< 0.33 V	0.0001 A	0.25 + 4
	10 A[4]	< 0.6 V	0.001 A	0.25 + 4
Resistance[3]	600 Ω	1 mA	0.01 Ω	0.08 + 6
	6 KΩ	1 00 μA	0.0001 KΩ	0.04 + 6
	60 KΩ	10 μA	0.001 KΩ	0.04 + 6
	600 KΩ	1 μA	0.01 KΩ	0.08 + 6
	6 MΩ	200 nA	0.0001 MΩ	0.12 + 3
	60 MΩ	200 nA || 10 MΩ	0.001 MΩ	0.85 + 3
	100 MΩ	200 nA || 10 MΩ	0.01 MΩ	1.75 + 3
Diode Test[5]	0-2 V	1 mA	0.0001 V	0.05 + 3
	2-4 V	1 mA	0.0001 V	0.35 + 3
Continuity Test	2000 Ω	1 mA	0.1 Ω	0.05 + 3

Remarks:

[1] Specifications are for 0.5 Hour warm-up, “Slow” measurement rate and calibration temperature 18℃ - 28℃.

[2] 10% over range on all ranges except for DCV 1000 V, ACV 750 V, DCI 10 A and ACI 10 A.

[3] Specifications are for 4-wire measure or 2-wire measure under “REF” operation. ± 0.2 Ω of extra errors will be generated if perform 2-wire measure without “REF” operation.

[4] 30 seconds OFF after 30 seconds ON is recommend foe the continuous current that higher than DC 7 A or AC RMS 7 A.

[5] Accuracy specifications are only for voltage measuring at input terminal. The typical value of current under measure is 1 mA. Voltage drop at diode junction may vary with current supply. Adjustable voltage range: 0 - 4 V.

AC Characteristics Accuracy± (% of Reading + count)[1]

Function	Range[2]	Test current or Load voltage	Resolution	Accuracy (one year; 23℃ ±5℃)
True-RMS AC Voltage [3]	600 mV	20 Hz – 45 Hz	0.01 mV	2.0 + 20
		45 Hz – 100 Hz	0.01 mV	1.0 + 10
		100 Hz – 20 KHz	0.01 mV	1.0 + 20
		20 KHz – 50 KHz	0.01 mV	2.0 + 40
		50 KHz – 100 KHz	0.01 mV	3.0 + 10
	6 V	20 Hz – 45 Hz	0.0001 V	2.0 + 20
		45 Hz – 100 Hz	0.0001 V	0.6 + 10
		100 Hz – 20 KHz	0.0001 V	0.8 + 20
		20 KHz – 50 KHz	0.0001 V	2.0 + 40
		50 KHz – 100 KHz	0.0001 V	3.0 + 40
	60 V	20 Hz – 45 Hz	0.001 V	2.0 + 20
		45 Hz – 100 Hz	0.001 V	0.6 + 10
		100 Hz – 20 KHz	0.001 V	0.8 + 20
		20 KHz – 50 KHz	0.001 V	2.0 + 40
		50 KHz – 100 KHz	0.001 V	3.0 + 40
	600 V	20 Hz – 45 Hz	0.01 V	2.0 + 20
		45 Hz – 100 Hz	0.01 V	0.6 + 10
		100 Hz – 20 KHz	0.01 V	0.8 + 20
		20 KHz – 50 KHz	0.01 V	2.0 + 40
		50 KHz – 100 KHz	0.01 V	3.0 + 40
	750 V	20 Hz – 45 Hz	0.01 V	2.0 + 20
		45 Hz – 100 Hz[4]	0.01 V	0.6 + 10
		100 Hz – 20 KHz	0.01 V	0.8 + 20
		20 KHz – 50 KHz	0.01 V	2.0 + 40
		50 KHz – 100 KHz	0.01 V	3.0 + 40
True-RMS AC Current [5]	60 mA	20 Hz – 45 Hz	0.001 mA	2.0 + 20
		45 Hz – 2 KHz	0.001 mA	0.5 + 20
		2 KHz – 10 KHz	0.001 mA	2.5 + 30
	600 mA	20 Hz – 45 Hz	0.01 mA	2.0 + 20
		45 Hz – 2 KHz	0.01 mA	0.5 + 20
		2 KHz – 10 KHz	0.01 mA	2.5 + 30
	6 A	20 Hz – 45 Hz	0.0001 A	2.0 + 20
		45 Hz – 2 KHz	0.0001 A	0.5 + 20
		2 KHz – 10 KHz	0.0001 A	2.5 + 20
	10 A[6]	20 Hz – 45 Hz	0.001 A	1.5 + 45
		45 Hz – 2 KHz	0.001 A	0.5 + 35
		2 KHz – 10 KHz	0.001 A	2.5 + 25

Additional wave crest factor error (not Sine) [7]	
Wave crest coefficient	Error (% Range)
1-2	0.05
2-3	0.3

Remarks:

[1] Specifications are for 0.5 Hour warm-up, “Slow” measurement rate and calibration temperature 18℃ - 28℃.

[2] 10% over range on all ranges except for DCV 1000 V, ACV 750 V, DCI 10 A and ACI 10 A.

[3] Specifications are for amplitude of sine wave input > 5% of range. For inputs from 1% to 5% of range and <50 kHz, add 0.1% of range extra error. For 50 kHz to 100 kHz, add 0.1% of range extra error.

[4] Plus 0.025 V of error per 1 V after the first ± 400 VAC.

[5] Specifications are for sine wave input > 5% of range. 0.1% errors will be added when the range of input sine wave is 1% to 5%.

[6] 30 seconds OFF after 30 seconds ON is recommend for the continuous current that higher than DC 7 A or AC RMS 7 A.

[7] For inputs Frequency Range < 100 Hz

Frequency and Period Characteristic Accuracy± (% of Reading + count)[1]

Function	Range	Frequency Range	Resolution	Accuracy (one year; 23℃ ± 5℃)
Frequency / Period	600 mV to 750 V[2]	20 Hz – 2 KHz		0.01 + 3
		2 KHz – 20 KHz		0.01 + 2
		20 KHz – 200 KHz		0.01 + 2
		200 KHz – 500 KHz		0.01 + 2

Remarks:

[1] Specifications are for 0.5 Hour warm-up.

[2] Except for special marks, the AC input voltage is 5% to 110% of range when <100 kHz and 10% to 110% of range when >100 kHz. 750 V range is limited to 750 Vrms.The accuracy is 10 times % of Reading when the measurement range of AC voltage is in 600 mV range.

Capacitance Characteristic Accuracy± (% of Reading + count)[1]

Function	Range[2]	Max Testing Current	Resolution	Accuracy (one year; 23℃ ± 5℃)
Capacitance	2 nF	10 μA	0.001 nF	3 + 10
	20 nF	10 μA	0.01 nF	1 + 10
	200 nF	100 μA	0.1 nF	1 + 9
	2 μF	100 μA	0.001 μF	1 + 10
	20 μF	1 mA	0.01 μF	1 + 10
	200 μF	1 mA	0.1 μF	1 + 9
	10000 μF	1 mA	1 μF	2 + 50

Remarks:

[1] Specifications are for 0.5 Hour warm-up and “REF” operation. Using of non-film capacitor may generate additional errors.

[2] Specifications are for from 1% to 110% on 2 nF range and ranges from 10% to 110% on other ranges.

Temperature Characteristic Accuracy± (Reading)[1]

Function	Probe Type	Probe Model	Working Temperature Range[5]	Accuracy (one year; 23℃ ± 5℃)	Temperature coefficient 0℃ - 18℃ 28℃ - 50℃
Temperature	RTD[2]	α=0.00385	-200℃ - 660℃	0.16℃	0.09℃
	TC[3][4]	B	1100℃ - 1820℃	0.76℃	0.14℃
		E	-150℃ - 1000℃	0.5℃	0.02℃
		J	-150℃ - 1200℃	0.5℃	0.02℃
		K	-100℃ - 1370℃	0.5℃	0.03℃
		N	-100℃ - 1300℃	0.5℃	0.04℃
		R	300℃ - 1760℃	0.5℃	0.09℃
		S	400℃ - 1760℃	0.6℃	0.11℃
		T	-100℃ - 400℃	0.5℃	0.03℃

Remarks:
[1] Specifications are for 0.5 Hour warm-up, not include probe error.
[2] Specifications are for 4-wire measure or 2-wire measure under “REF” operation.
[3] Relative to cold junction temperature, accuracy is based on ITS-90. Built-in cold junction temperature refers to the temperature inside the banana jack and its accuracy is ± 3.5 ℃
[4] During calibration and verification, "Ref Temp – Ext" is preferred for measurement.
[5] The temperature measurement function can also be applied outside the optimum range, but the measurement accuracy has certain errors.

Measuring Method and other Characteristics

DC Voltage	
Input Resistance	600 mV 10 MΩ or 10 GΩ selectable 6 V, 60 V, 600 V and 1000 V Range 10 MΩ ± 2%
Input Bias Current	<90 pA, 25°C
Input Protection	1000 V on all ranges
CMRR	120 dB (For the 1 KΩ unbalanced resistance in LO lead , max ± 500 VDC)
NMRR	60 dB at “slow” measurement rate
Resistance	
Testing Method	4-wire resistance or 2-wire resistance selectable
Input Protection	1000 V on all ranges
DC Current	
Shunt Resistor	600 μA sampling voltage < 33 mV

	6 mA sampling voltage < 0.33 V
	1Ω for 60 mA, 600 mA 1 Ω
	0.01 Ω for 6 A, 10 A
Input Protection	Rear panel : accessible 10 A, 250 V fast-melt fuse
	Internal : 12 A, 250 V slow-melt fuse
Continuity / Diode Test	
Measurement Method	1 mA ± 5% constant-current source or open-circuit voltage
Beeper	yes
Continuity Threshold	Adjustable
Input Protection	1000 V
True - RMS AC Voltage	
Measurement Method	AC Coupled true RMS measure – up to 1000 V DC bias are permitted on every range
Wave Crest Factor	≤3 at full scale
Input Impedance	1 MΩ ± 2% in parallel with <100 pF on all ranges
AC Filter Bandwidth	20 Hz - 100 KHz
CMRR	60 dB (For the 1 KΩ imbalance resistance among Lo lead and <60 Hz , Max ± 500 VDC)
True - RMS AC Current	
Measurement Method	DC Coupled to the fuse and shunt; AC Coupled the True-RMS measurement (measures the AC components only)
Wave Crest Factor	≤3 at full scale
Max Input	<10 A (include DC component)
Shunt Resistor	1 Ω for 60 mA, 600 mA 1 Ω; 0.01 Ω for 6 A, 10 A
Input Protection	Rear panel : accessible 10 A, 250 V fast-melt fuse
	Internal : 12 A, 250 V slow-melt fuse
Frequency / Period	
Measurement Method	Reciprocal-counting technique, AC Coupled input, AC voltage or AC current measurement function
Measure Attentions	Errors are leaded into all frequency counters when measuring low voltage or low frequency signal.
Capacitance Measuring	
Measurement Method	Measure the rate of change of voltage generated during the current flowing the capacitance
Connection Type	2-wire
Input Protection	1000 V on all ranges
Temperature Measuring	

Measurement Method	Support for TC and RTD types of sensor	
Trigger and Memory		
Samples /Trigger	1 - 10000	
Trigger Delay	6 ms - 10000 ms optional	
External Trigger Input	Input Level	TTL compatible (High level when left input terminal is hanging in the air)
	Trigger Condition	Rising and Falling selectable
	Input Impedance	≥20 KΩ//400 pF, DC-coupled
	Min Pulse	500 us
VMC	Level	TTL compatible
	Output Polarity	Positive and negative optional
	Output Impedance	200 Ω, typical
History Records		
Volatile Memory	10 K reading of history records	
Nonvolatile Memory	1 Gb Nand Flash, Mass storage configuration files and data files, Support U-disk external storage	
Math Functions		
Min / Max / Average, dBm, dB, Pass / Fail, Relative, Standard deviation, Hold, histogram, Trend chart, Bar chart		

General Specifications

Power Supply	
AC 100 V - 120 V	45 Hz - 66 Hz
AC 200 V - 240 V	45 Hz - 66 Hz
Consumption	20VA max
Mechanism	
Dimension	293.75 mm×260.27 mm×107.21 mm
Weight	3.76 Kg
Other Characteristics	
Display Screen	4.3” TFT-LCD with resolution 480*272
Operation Environment	Full accuracy from 0℃ to 50℃, 80% RH and 40℃, non condensing
	Storage Temperature: -20℃ - 70℃
	Shock and Vibration: conforming to MIL-T-28800E, 5 level (only foe sine)
	Height above sea level: up to 3000 meters
Electromagnetic Compatibility	Conforming to EMC (2004/108/EC) and EN 61326-1:2013
Safety	Conforming to EN61010-1:2010 and low voltage instructions (2006/95/EC)
Remote Interface	10/100 Mbit LAN, USB2.0 Full Speed Device and Host
Programmer Language	Standard SCPI, compatible with commands of main stream multimeters
Warm Up Time	30 minutes

Purchase Information

Standard Accessories	
Power Cord	1
USB Cable	1
Quick Start	1
Calibration Certificate	1
Test Leads and Alligator Clips	2
Optional Accessories	
USB-GPIB adapter	USB-GPIB

About SIGLENT

SIGLENT is an international high-tech company, concentrating on R&D, sales, production and services of electronic test & measurement instruments.

SIGLENT first began developing digital oscilloscopes independently in 2002. After more than a decade of continuous development, SIGLENT has extended its product line to include digital oscilloscopes, isolated handheld oscilloscopes, function/arbitrary waveform generators, RF/MW signal generators, spectrum analyzers, vector network analyzers, digital multimeters, DC power supplies, electronic loads and other general purpose test instrumentation. Since its first oscilloscope was launched in 2005, SIGLENT has become the fastest growing manufacturer of digital oscilloscopes. We firmly believe that today SIGLENT is the best value in electronic test & measurement.

Headquarters:
SIGLENT Technologies Co., Ltd
Add: Bldg No.4 & No.5, Antongda Industrial Zone, 3rd Liuxian Road, Bao'an District, Shenzhen, 518101, China
Tel: + 86 755 3688 7876
Fax: + 86 755 3359 1582
Email: sales@siglent.com
Website: int.siglent.com

North America:
SIGLENT Technologies America, Inc
6557 Cochran Rd Solon, Ohio 44139
Tel: 440-398-5800
Toll Free: 877-515-5551
Fax: 440-399-1211
Email: info@siglentna.com
Website: www.siglentna.com

Europe:
SIGLENT Technologies Germany GmbH
Add: Staetzlinger Str. 70
86165 Augsburg, Germany
Tel: +49(0)-821-666 0 111 0
Fax: +49(0)-821-666 0 111 22
Email: info-eu@siglent.com
Website: www.siglenteu.com

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