

# SDM3055

# Digital Multimeter



Datasheet

E\_04A



**CALTRON PTE LTD**

**SIGLENT TECHNOLOGIES CO.,LTD**

# SDM3055

## SDM3055-SC

### Product Overview

The SDM3055/SDM3055-SC is a digital multimeter designed with 5 ½ digits readings resolution and dual-display, especially fitting to the needs of high-precision, multifunction and automatic measurement.

### Application fields

- Research Laboratory
- Development Laboratory
- Repair and Maintenance
- Calibration Laboratory
- Automatic Production Test
- General bench-top use

### User-Friendly Design

- 4.3" TFT-LCD, 480\*272 display
- Supports dual-display, Chinese and English Menu
- Built-in front panel accessible help system
- File management ( support for U-disc and local storage )

### Math Function

#### Basic Measurement Function

- DC Voltage: 200 mV - 1000 V
- DC Current: 200  $\mu$ A - 10 A
- AC Voltage: True-RMS, 200 mV - 750 V
- AC Current: True-RMS, 20 mA - 10 A
- 2/4-Wire Resistance: 200  $\Omega$  - 100 M $\Omega$
- Capacitance: 2 nF - 10000  $\mu$ F
- Continuity Test: Range is fixed at 2 k $\Omega$
- Diode Test: Adjustable range is 0 - 4V
- Frequency Measurement: 20 Hz - 1 MHz
- Period Measurement: 1  $\mu$ s - 0.05 s
- Temperature: Support for TC and RTD sensor

#### Math Function

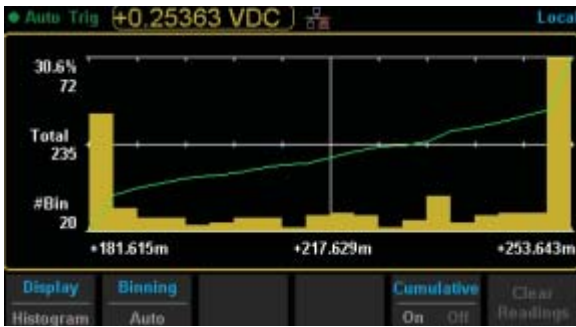
- Max, Min, Average, Standard Deviation, dBm/dB, Relative Measurement, Pass/Fail Histogram, TrendChat

### Main Features

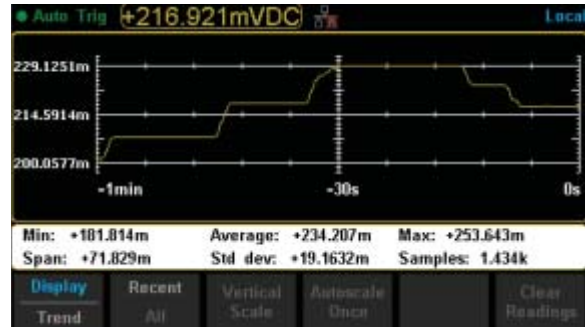
- Real 5½ digits readings resolution ( 240, 000 counts )
- Up to 150 rdgs/s measurement speed
- True-RMS AC Voltage and AC Current measuring
- 1 Gb Nand flash size, Mass storage configuration files and data files
- Built-in cold terminal compensation for thermocouple temperature measurements
- With easy, convenient and flexible PC software: EasyDMM
- standard interfaces: USB Host, LAN ( Optional Accessories USB-GPIB Adapter )
- Scanner Card SC1016 ( Only for SDM3055-SC )
- Support remote control operation via SCPI commands. Compatible with commands of main stream multimeters.

## Special Features

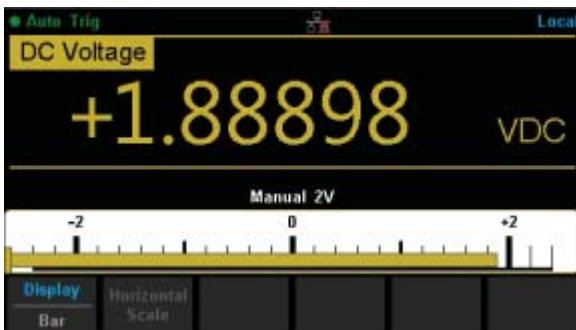
### Histogram



### Trend Chart



### Bar Chart



### Statistics



### Dual Display



### Hold Measurement



### dBm Hold Measurement



### Interface



## Specifications

### DC Characteristics

Accuracy± (% of Reading + % of Range)<sup>[1]</sup>

Function	Range <sup>[2]</sup>	Test current or Load voltage	1 Year 23 °C± 5 °C	Temperature coefficient 0 °C~ 18 °C 28 °C~ 50 °C
DC Voltage	200 mV		0.015 + 0.004	0.0015 + 0.0005
	2 V		0.015 + 0.003	0.0010 + 0.0005
	20 V		0.015 + 0.004	0.0020 + 0.0005
	200 V		0.015 + 0.003	0.0015 + 0.0005
	1000 V <sup>[4]</sup>		0.015 + 0.003	0.0015 + 0.0005
DC Current	200 μA	< 8 mV	0.055 + 0.005	0.003 + 0.001
	2 mA	< 80 mV	0.055 + 0.005	0.002 + 0.001
	20 mA	< 0.05 V	0.095 + 0.020	0.008 + 0.001
	200 mA	< 0.5 V	0.070 + 0.008	0.005 + 0.001
	2 A	< 0.1 V	0.170 + 0.020	0.013 + 0.001
	10 A <sup>[5]</sup>	< 0.3 V	0.250 + 0.010	0.008 + 0.001
Resistance <sup>[3]</sup>	200 Ω	1 mA	0.030 + 0.005	0.0030 + 0.0006
	2 KΩ	1 mA	0.020 + 0.003	0.0030 + 0.0005
	20 KΩ	100 μA	0.020 + 0.003	0.0030 + 0.0005
	200 KΩ	10 μA	0.020 + 0.010	0.0030 + 0.0005
	2 MΩ	1 μA	0.040 + 0.004	0.0040 + 0.0005
	10 MΩ	200 nA	0.250 + 0.003	0.0100 + 0.0005
	100 MΩ	200 nA    10 MΩ	1.75 + 0.004	0.2000 + 0.0005
Diode Test	2.0 V <sup>[6]</sup>	1 mA	0.05 + 0.01	0.0050 + 0.0005
	4V	100 μA	0.05 + 0.01	0.0050 + 0.0005
Continuity Test	2000 Ω	1 mA	0.05 + 0.01	0.0050 + 0.0005

Remarks:

[1] Specifications are for 0.5 Hour warm-up, "Slow" measurement rate and calibration temperature 18 °C~ 28 °C.

[2] 20% 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 for 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

**AC Characteristics**

 Accuracy± (% of Reading + % of Range) <sup>[1]</sup>

Function	Range <sup>[2]</sup>	Frequency Range	1 Year 23 °C± 5 °C	Temperature coefficient 0 °C~ 18 °C 28 °C~ 50 °C
True-RMS AC Voltage <sup>[3]</sup>	200 mV	20 Hz – 45 Hz	1.5 + 0.10	0.01 + 0.005
		45 Hz – 20 KHz	0.2 + 0.05	0.01 + 0.005
		20 KHz – 50 KHz	1.0 + 0.05	0.01 + 0.005
		50 KHz –100 KHz	3.0 + 0.05	0.05 + 0.010
	2 V	20 Hz – 45 Hz	1.5 + 0.10	0.01 + 0.005
		45 Hz – 20 KHz	0.2 + 0.05	0.01 + 0.005
		20 KHz – 50 KHz	1.0 + 0.05	0.01 + 0.005
		50 KHz –100 KHz	3.0 + 0.05	0.05 + 0.010
	20 V	20 Hz – 45 Hz	1.5 + 0.10	0.01 + 0.005
		45 Hz – 20 KHz	0.2 + 0.05	0.01 + 0.005
		20 KHz – 50 KHz	1.0 + 0.05	0.01 + 0.005
		50 KHz –100 KHz	3.0 + 0.05	0.05 + 0.010
	200 V	20 Hz – 45 Hz	1.5 + 0.10	0.01 + 0.005
		45 Hz – 20 KHz	0.2 + 0.05	0.01 + 0.005
		20 KHz – 50 KHz	1.0 + 0.05	0.01 + 0.005
		50 KHz –100 KHz	3.0 + 0.05	0.05 + 0.010
	750 V	20 Hz – 45 Hz	1.5 + 0.10	0.01 + 0.005
		45 Hz – 20 KHz	0.2 + 0.05	0.01 + 0.005
		20 KHz – 50 KHz	1.0 + 0.05	0.01 + 0.005
		50 KHz –100 KHz	3.0 + 0.05	0.05 + 0.010
True-RMS AC Current <sup>[4]</sup>	20 mA	20 Hz – 45 Hz	1.5 + 0.10	0.015 + 0.015
		45 Hz – 2 KHz	0.50 + 0.10	0.015 + 0.006
		2 KHz – 10 KHz	2.50 + 0.20	0.015 + 0.006
	200 mA	20 Hz – 45 Hz	1.5 + 0.10	0.015 + 0.005
		45 Hz – 2 KHz	0.50 + 0.10	0.015 + 0.005
		2 KHz – 10 KHz	2.50 + 0.20	0.015 + 0.005
	2 A	20 Hz – 45 Hz	1.5 + 0.20	0.015 + 0.005
		45 Hz – 2 KHz	0.50 + 0.20	0.015 + 0.005
		2 KHz – 10 KHz	2.50 + 0.20	0.015 + 0.005
	10 A <sup>[5]</sup>	20 Hz – 45 Hz	1.5 + 0.15	0.015 + 0.005
		45 Hz – 2 KHz	0.50 + 0.15	0.015 + 0.005
		2 KHz – 10 KHz	2.50 + 0.20	0.015 + 0.005

Additional wave crest factor error ( not Sine ) [6]	
Wave crest coefficient	Error (% Range)
1 - 2	0.05
2 - 3	0.2

Remarks:

- [1] Specifications are for 0.5 Hour warm-up, "Slow" measurement rate and calibration temperature 18 °C~28 °C.
- [2] 20% 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] 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% .
- [5] 30 seconds OFF after 30 seconds ON is recommend for the continuous current that higher than DC 7 A or AC RMS 7 A.
- [6] For frequency < 100Hz



### Frequency and Period Characteristic

Accuracy± (% of Reading + % of Range) <sup>[1]</sup>

Function	Range	Frequency Range	1 Year 23 °C±5 °C	Temperature coefficient 0 °C~ 18 °C 28 °C~ 50 °C
Frequency /Period	200 mV ~750 V <sup>[2]</sup>	20 Hz – 2 KHz	0.01+0.003	0.002+0.001
		2 KHz – 20 KHz	0.01+0.003	0.002+0.001
		20 KHz – 200 KHz	0.01+0.003	0.002+0.001
		200 KHz –1 MHz	0.01+0.006	0.002+0.002

Remarks:

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

[2] Except for special marks, the AC input voltage is 15% to 120% of range when < 100 kHz and 30% to 120% of range when > 100 kHz. 750V range is limited to 750 Vrms. The accuracy is 10 times % of reading when the measurement range of AC voltage is in 200 mV range

### Capacitance Characteristic

Accuracy± (% of Reading + % of Range)<sup>[1]</sup>

Function	Range <sup>[2]</sup>	Max Testing Current	1 Year 23 °C±5 °C	Temperature coefficient 0 °C~ 18 °C 28 °C~ 50 °C
Capacitance	2 nF	200 nA	3 + 1.0	0.08 + 0.002
	20 nF	200 nA	1 + 0.5	0.02 + 0.001
	200 nF	2 µA	1 + 0.5	0.02 + 0.001
	2 µF	10 µA	1 + 0.5	0.02 + 0.001
	200 µF	100 µA	1 + 0.5	0.02 + 0.001
	10000 µF	1 mA	2 + 0.5	0.02 + 0.001

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 120% on 2 nF range and ranges from 10% to 120% on other ranges.

### Temperature Characteristic

Accuracy± (Reading)<sup>[1]</sup>

Function	Probe Type	Probe Model	Working Temperature Range <sup>[5]</sup>	1Year 23°C±5°C	Temperature coefficient 0 °C~18 °C 28 °C~50 °C
Temperature	RTD <sup>[2]</sup>	α = 0.00385	-200 °C ~ 660 °C	0.16 °C	0.08 + 0.002
	TC <sup>[3] [4]</sup>	B	1100 °C ~ 1820 °C	0.76 °C	0.14 °C
		E	-150 °C ~ 1000 °C	0.5 °C	0.02 °C
		J	-150 °C ~ 1200 °C	0.5 °C	0.02 °C

	K	-100 °C ~ 1372 °C	0.5 °C	0.03 °C
	N	-100 °C ~ 1300 °C	0.5 °C	0.04 °C
	R	300 °C ~ 1768 °C	0.5 °C	0.09 °C
	S	400 °C ~ 1768 °C	0.6 °C	0.11 °C
	T	-100 °C ~ 400 °C	0.5 °C	0.03 °C

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  $\pm 3.5$  °C

[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	200 mV and 2 V Range	10 M $\Omega$ or >10 G $\Omega$ selectable
	20 V, 200 V and 1000 V Range	10 M $\Omega$ $\pm$ 2%
Input Bias Current	< 90 pA, 25 °C	
Input Protection	1000 V on all ranges	
CMRR	120 dB ( For the 1 K $\Omega$ unbalanced resistance in LO lead, max $\pm$ 500 VDC )	
NMRR	60 dB at “ slow ” measurement rate	
	20 dB are added if open the “AC” filter	
Resistance		
Testing Method	4-wire resistance or 2-wire resistance selectable	
Input Protection	1000 V on all ranges	
DC Current		
Shunt Resistor	200 $\mu$ A sampling voltage < 8 mV	
	2 mA sampling voltage < 8 mV	
	1 $\Omega$ for 20 mA, 200 mA 1 $\Omega$	
	0.01 $\Omega$ for 2 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 $\pm$ 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)	
<b>True-RMS AC Current</b>		
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 20 mA, 200 mA 1 Ω; 0.01 Ω for 2 A, 10 A	
Input Protection	Rear panel : accessible 10 A, 250 V fast-melt fuse Internal :12 A, 250 V slow-melt fuse	
<b>Frequency/Period</b>		
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.	
<b>Capacitance Measuring</b>		
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	
<b>Temperature Measuring</b>		
Measurement Method	Support for TC and RTD types of sensor	
Measurement considerations	The built-in cold junction temperature tracks the temperature inside the banana jack. The change of the temperature in banana jack may cause additional error. When using the built-in cold junction compensation, connect the sensor terminal of the thermocouple to the banana jack and allow it warm up for more than 3 minutes to minimize the error.	
<b>Trigger and Memory</b>		
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

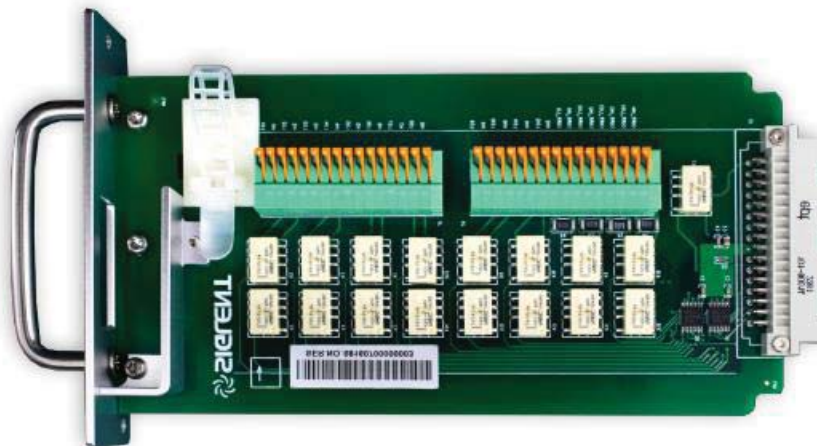
	Output Polarity	Positive and negative optional
	Output Impedance	200 Ω, typical
<b>History Records</b>		
Volatile Memory	10 K reading of history records	
Nonvolatile Memory	1 Gb Nand Flash, Mass storage configuration files and data files, Support U-disk external storage	
<b>Math Functions</b>		
Min / Max / Average, dBm, dB, Pass / Fail, Relative, Standard deviation, Hold, histogram, Trend chart, Bar chart		

## General Specifications

<b>Power Supply</b>	
AC 100 V ~ 120 V	50/60 Hz
AC 200 V ~ 240 V	50/60 Hz
Consumption	20 VA max
<b>Mechanism</b>	
Dimension	282 mm × 260 mm × 105 mm
Weight	3.33 Kg
<b>Other Characteristics</b>	
Display Screen	4.3" TFT-LCD with resolution 480 * 272
Operation Environment	Full accuracy from 0 °C to 50 °C, 80% RH and 40 °C, non condensing
	Storage Temperature: -20 °C - 70 °C
	Shock and Vibration: conforming to MIL-T-28800E, 5 level ( only for sine )
	Height above sea level: up to 3000 meters
Safety	Conforming to IEC61010-1:2001. Measure CAT I 1000 V/CAT II 600V Class of pollution: 2
Remote Interface	USB-GPIB, 10/100 Mbit LAN, USB2.0 Full Speed Device&Host
Programing Language	Standard SCPI, compatible with commands of main stream multimeters
Warm Up Time	30 minutes

## Scanner card SC1016 ( Only for SDM3055-SC )

The SIGLENT Scanner Card SC1016 is a multiplexer that provides multi-point measurement capabilities to the SDM3055-SC. The scanner features 12 multi-purpose + 4 current channels and supports the following measurement functions: DCV, ACV, DCI, ACI, 2WR, 4WR, CAP, FREQ, DIODE, CONT and TEMP ( RTD and Thermocouple ). It provides a convenient and versatile solution for test applications that require multiple measurement points or signals and is an ideal tool for R&D burn-in and production testing.



### Specifications

To achieve the best performance from the product, please read this guide carefully

Max AC Voltage	125 rms or 175 V peak, 100kHz, 0.3 A switched, 125VA ( resistive load )
Contact Life	> 100000 operations, at 1 A 30VDC ( at 0.5Hz ) > 100000 operation, at 0.3 A 125VDC ( at 0.5Hz )
Contact Resistance	75 mΩ (maximum at 6 VDC, 1A)
Channel to channel switching time	280ms (typical)
Maximum switching voltage	250 VAC, 220 VDC
Maximum switching power	62.5 VA / 30W
Insulation Resistance	Minimum 1 GΩ
Connect Type	Clamp terminal, # 24 AWG wire size

Remark: To avoid electrical shock and personal injury, please don't use the product to measure signals that published specification

## Channel Capabilities

Item	No. of wires	No. of channels
DCV \ ACV <sup>[1]</sup>	2 wires ( H, L )	12 ( CH1 ~ CH12 )
DCI \ ACI <sup>[2]</sup>	2 wires ( H, L )	4 ( CH13 ~ CH16 ) ( 2A Range )
2 W Resistance	2 wires ( H, L )	12 ( CH1 ~ CH12 )
Capacitance	2 wires ( H, L )	12 ( CH1 ~ CH12 )
Diode / Continuity	2 wires ( H, L )	12 ( CH1 ~ CH12 )
Period / Frequency	2 wires ( H, L )	12 ( CH1 ~ CH12 )
Temp ( Thermocouple )	2 wires ( H, L )	12 ( CH1 ~ CH12 )
Temp ( RTD )	2 wires ( H, L )	12 ( CH1 ~ CH12 )

Remark: [1] Voltage range: < 125 VAC, 100 V DC

[2] For continuous current < 2.2 A, Accuracy  $\pm$  ( % 3 ( reading ) + 0.02% ( range ) ).

## Product Model and Distinction

Model	SDM3055	SDM3055-SC
Scanner card SC1016	×	√

## Ordering 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	USB-GPIB adapter



## 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.

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