

## BM859CFa & BM857a GENERAL SPECIFICATION

**Display:** 4-4/5 digits 50,000 counts. Selectable stable mode  
5-4/5 digits 500,000 counts for DC Voltage, & 6 digits 999,999 counts for Hz  
**Polarity:** Automatic  
**Update Rate:**  
4-4/5 digits fast mode: 5 per second nominal;  
5-4/5 digits stable mode: 1.25 per second nominal;  
42 Segments Bar graph: 60 per second max  
**Operating Temperature:** 0°C to 45°C  
**Relative Humidity:** Maximum relative humidity 80% for temperature up to 31°C decreasing linearly to 50% relative humidity at 45°C  
**Pollution degree:** 2  
**Storage Temperature:** -20°C to 60°C, < 80% R.H. (with battery removed)  
**Altitude:** Operating below 2000m  
**Temperature Coefficient:** nominal 0.1 x (specified accuracy) / °C @ (0°C - 18°C or 28°C - 45°C), or otherwise specified  
**Sensing:** AC, AC+DC True RMS  
**Safety:** Double insulation per IEC61010-1 2nd Ed., EN61010-1 2nd Ed., UL61010-1 2nd Ed. & CAN/CSA C22.2 No. 61010.1-0.92 to Category III 1000V AC & DC and Category IV 600V AC & DC  
**BM857a Terminals (to COM) Measurement Category:**  
V / A / mAµA : Category III 1000 Vac & Vdc and Category IV 600 Vac & Vdc.

## ELECTRICAL SPECIFICATIONS

Accuracy is ±(% reading digits + number of digits) or otherwise specified, at 23°C ± 5°C & less than 75% relative humidity.  
True RMS voltage & current accuracies are specified from 5% to 100% of range or otherwise specified. Maximum Crest Factor < 5:1 at full scale & < 10:1 at half scale, and with frequency components within the specified frequency bandwidth for non-sinusoidal waveforms.

### DC Voltage

RANGE	BM859CFa	BM857a
Accuracy		
500.00 mV, 5.0000V, 50.000V	0.02% + 2d	0.03% + 2d
500.00V	0.04% + 2d	0.05% + 2d
1000.0V	0.05% + 2d	0.1% + 2d

NMR: >60dB @ 50/60Hz  
CMRR: >120dB @ DC, 50/60Hz, Rs=1kΩ  
Input Impedance: 10MΩ, 30pF nominal (80pF nominal for 500mV range)

### AC & AC+DC Voltage

RANGE	BM859CFa	BM857a
Accuracy*		
20Hz - 45Hz		
500.00mV, 5.0000V, 50.000V	1.5% + 60d	Unspec'd
500.00V, 1000.0V	Unspec'd	
45Hz - 300Hz		
500.00mV	0.3% + 20d	0.8% + 60d
5.0000V, 50.000V	0.8% + 20d	
500.00V, 1000.0V	0.4% + 40d	
300Hz - 5kHz		
500.00mV	0.3% + 10d	0.8% + 40d
5.0000V, 50.000V, 500.00V	0.4% + 40d	2.0% + 60d
5kHz - 20kHz		
1000.0V	0.8% + 40d (300Hz - 1kHz)	1.0% + 40d
20kHz - 100kHz		
500.00mV	0.5% + 20d	1dB**
5.0000V, 50.000V	0.8% + 20d	2dB**
500.00V	0.5% + 20d	3dB**
1000.0V	Unspec'd	Unspec'd
20kHz - 100kHz		
500.00mV	2.5% + 40d	Unspec'd
5.0000V, 50.000V	4.0% + 40d**	
500.00V	Unspec'd	
1000.0V	Unspec'd	

\*From 5% to 10% of range:  
accuracy % of reading (or in dB) + 80d  
\*\*From 5% to 10% of range:  
accuracy % of reading (or in dB) + 180d  
\*\*\*From 10% to 15% of range:  
accuracy % of reading (or in dB) + 100d  
CMRR: >80dB @ DC to 60Hz, Rs=1kΩ  
Input Impedance: 10MΩ, 30pF nominal (80pF nominal for 500mV range)  
Residual reading less than 50 digits with test leads shorted.

A / mAµA : Category III and Category IV 600 Vac and 300 Vdc.  
**BM859CFa Terminals (to COM) Measurement Category:**  
V / A / mAµA : Category III 1000 Vac & Vdc and Category IV 600 Vac & Vdc.  
**Overload Protections:**  
**BM857a:**  
µA & mA: 1A/600V, IR 10kA or better, F fuse  
A: 10A/600V, IR 100kA or better, F fuse  
V: 1050Vrms, 1450Vpeak  
mV, Ω, & Others: 600 Vdc & Vac rms  
**BM859CFa**  
µA & mA: 0.44A/1000V, IR 10kA or better, F fuse  
A: 11A/1000V, IR 20kA or better, F fuse  
V, mV, Ω, & Others: 1050Vrms, 1450Vpeak  
**Transient protection:** 8kV (1.2/50µs surge)  
**E.M.C.:** Meets EN61326-1:2006 (EN55022, EN61000-3-2, EN61000-3-3, EN61000-4-2, EN61000-4-3, EN61000-4-4, EN61000-4-5, EN61000-4-6, EN61000-4-8, EN61000-4-11)  
In an RF field of 3V/m:  
Capacitance function is not specified  
Other function ranges:  
Total Accuracy = Specified Accuracy + 100 digits  
Performance above 3V/m is not specified  
**Power Supply:** Single Alkaline 9V battery; NEDA1604A,

### dBm

At 600Ω, -11.76dBm to 54.25dBm  
Accuracy: ± 0.25dB + 2d (@40Hz - 20kHz)  
Input Impedance: 10MΩ, 30pF nominal  
Selectable reference impedance of 4, 8, 16, 32, 50, 75, 93, 110, 125, 135, 150, 200, 250, 300, 500, 600, 800, 900, 1000, 1200Ω

### Ohms

RANGE	BM859CFa	BM857a
Accuracy		
500.00Ω	0.07% + 10d	0.1% + 8d
5.0000kΩ	0.07% + 2d	
50.000kΩ		
5.0000MΩ	0.2% + 6d	0.4% + 6d
50.000MΩ	2.0% + 6d	2.0% + 6d

Open Circuit Voltage: < 1.3VDC (< 3VDC for 500Ω range)

### → Audible Continuity Tester

Audible threshold: between 20kΩ and 200kΩ Response time < 100µs

### → Diode Tester

Range	Accuracy	Test Current (Typical)	Open Circuit Voltage
5.0000V	1% + 1d	0.4mA	< 3.5 VDC

### → Capacitance

RANGE	Accuracy*
50.00nF	0.8% + 3d
500.0nF	0.8% + 3d
5.000µF	1.5% + 3d
50.00µF	2.5% + 3d
500.0µF**	3.5% + 5d
9999µF**	5.0% + 5d

\*Accuracies with film capacitor or better  
\*\*In manual-ranging mode, measurements not specified below 50.0µF and 540µF for 500.0µF and 9999µF ranges respectively

### DC Loop Current %4-20mA

4mA = 0% (zero)  
20mA = 100% (span)  
Resolution: 0.01%  
Accuracy: ± 25d

### Crest mode (Instantaneous Peak Hold)

Accuracy: Specified accuracy ± 100 digits for changes > 0.8ms in duration

### DC Current

RANGE	Accuracy	Burden Voltage
500.00µA	0.15% + 20d	0.15mV/µA
5000.0µA	0.1% + 20d	0.15mV/µA
50.000mA	0.15% + 20d	3.3mV/mA
500.00mA	0.1% + 30d	3.3mV/mA
5.0000A	0.5% + 20d	45mV/A
10.000A*	0.5% + 20d	45mV/A

\*10A continuous, >10A to 15A (to 20A for BM859CFa) for 30 second max with 5 minutes cool down interval

### JIS6AM6 or IEC6LF22

**Power Consumption:** 6mA typical  
**Low Battery:** Below approx. 7V  
**APO Timing:** Idle for 17 minutes  
**APO Consumption:** 55µA typical for BM857a; 30µA typical for BM859CFa  
**Dimension:** L186mm X W87mm X H35.5mm; L198mm X W97mm X H55mm with holster  
**Weight:** 390 gm; 500 gm with holster  
**Accessories:** Test leads (pair), holster, battery installed, user's manual, Bkp60 banana plug K-type thermocouple x 1 (BM859a only)  
**Optional Accessories:** BRUA-85Xa PC interface kit (BC-85Xa RS232 optical adapter cable + Bs85X software CD + BUA-2303 USB-to-Serial adaptor), Bkb32 banana pins to K-type socket plug adaptor  
**Special Features:** Record MAX, MIN, MAX-MIN readings. Crest (Instantaneous Peak hold) MAX, MIN, MAX-MIN readings. Relative zero mode. 500,000 counts high resolution stable reading mode. Backlighted display. dBm readings. T1-T2 differential temperature readings (BM859CFa only). %4-20mA loop current readings. High noise rejection filtered Line Level Frequency mode. Data Hold. Audible & visible input warning.

### AC & AC+DC Current

RANGE	BM859CFa	BM857a	Burden Voltage
Accuracy			
50Hz - 60Hz			
500.00µA	0.5% + 50d	1.0% + 40d	0.15mV/µA
5000.0µA			0.15mV/µA
50.000mA			3.3mV/mA
500.00mA			3.3mV/mA
5.0000A			45mV/A
10.000A*			45mV/A
40Hz - 1kHz			
500.00µA	0.7% + 50d	1.0% + 40d	0.15mV/µA
5000.0µA			0.15mV/µA
50.000mA			3.3mV/mA
500.00mA			3.3mV/mA
5.0000A			45mV/A
10.000A*			45mV/A
1kHz - 10kHz			
500.00µA	2.0% + 50d	Unspec'd	0.15mV/µA
5000.0µA			0.15mV/µA
50.000mA			3.3mV/mA
500.00mA			3.3mV/mA
5.0000A	Unspec'd	Unspec'd	45mV/A
10.000A*			45mV/A

\*10A continuous, >10A to 15A (to 20A for BM859CFa) for 30 second max with 5 minutes cool down interval

### T1-T2 Dual Temperature (BM859CFa only)

RANGE	Accuracy
-50.0°C to 1000.0°C	0.3% + 1°C
-58.0°F to 1832.0°F	0.3% + 2°F

Thermocouple range & accuracy not included

### ~ Hz Line Level Frequency

Function RANGE	Sensitivity (Sine RMS)	Range
500mV	100mV	10Hz - 200kHz
5V	1V	10Hz - 200kHz
50V	10V	10Hz - 100kHz
500V	100V	10Hz - 100kHz
1000V	900V	10Hz - 10kHz

Accuracy: 0.02% + 4d

### Hz Logic Level Frequency

RANGE	Accuracy
5.0000Hz - 2.00000MHz	0.002% + 4d

Sensitivity: 2.5Vp square wave

### %Duty Cycle

RANGE	Accuracy
0.1% - 99.99%	3d/kHz + 2d

Input Frequency:  
5Hz - 500 kHz, 5V Logic Family

### BRYMEN TECHNOLOGY CORPORATION

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