DPM 3AS-BL
3½ Digit Backlit LCD Voltmeter Module

PRODUCT DESCRIPTION

The DPM 3AS-BL features a 200mV d.c. measurement range with auto-zero and auto-polarity. Decimal points are user selectable. The DPM 3AS-BL features a negative rail generator which enables the meter to measure a signal referenced to its own power supply GND. LED backlighting ensures excellent readability under low light conditions. The design of the panel meter’s housing allows the module to be easily snapped into a panel. The module’s low cost means it will suit high and low volume applications. The DPM 3AS-BL is intended to replace the DPM 3, DPM 3S, DPM 3-BL and DPM 3S-BL in many applications, usually requiring only minor circuit modifications.

FEATURES

• 11mm (0.43”) Digit Height
• 200mV d.c. Full Scale Reading
• 3.0 to 7.5V or 6.0 to 15.0V Operation
• Auto-zero and Auto-polarity
• Programmable Decimal Points
• LED Backlighting

TYPICAL APPLICATIONS

• Precision Instrumentation Systems
• Power Supply Monitoring
• Hand held instruments
• Panel-Mount Indication
• Low Power Voltage Measurement

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ORDERING INFORMATION

<table>
<thead>
<tr>
<th>Stock Number</th>
<th>Standard Meter</th>
</tr>
</thead>
<tbody>
<tr>
<td>DPM 3AS-BL</td>
<td></td>
</tr>
</tbody>
</table>

ELECTRICAL SPECIFICATIONS

<table>
<thead>
<tr>
<th>Specification</th>
<th>Min.</th>
<th>Typ.</th>
<th>Max.</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accuracy (overall error) *</td>
<td>0.1</td>
<td>±1</td>
<td>%</td>
<td>(±1 count)</td>
</tr>
<tr>
<td>Linearity</td>
<td></td>
<td></td>
<td></td>
<td>count</td>
</tr>
<tr>
<td>Sample rate</td>
<td>2.5</td>
<td></td>
<td></td>
<td>samples/sec</td>
</tr>
<tr>
<td>Operating temperature range</td>
<td>0</td>
<td>50</td>
<td></td>
<td>°C</td>
</tr>
<tr>
<td>Temperature stability</td>
<td>250</td>
<td></td>
<td></td>
<td>ppm/°C</td>
</tr>
<tr>
<td>Meter supply voltage</td>
<td>V+ to GND configuration</td>
<td>3.0</td>
<td>5.0</td>
<td>7.5</td>
</tr>
<tr>
<td></td>
<td>V+ to V- configuration</td>
<td>6.0</td>
<td>9.0</td>
<td>15.0**</td>
</tr>
<tr>
<td>Meter supply current</td>
<td>V+ to GND configuration</td>
<td>350</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>V+ to V- configuration</td>
<td>175</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Backlight supply voltage</td>
<td>4.75</td>
<td>5.0</td>
<td>***</td>
<td>V d.c.</td>
</tr>
<tr>
<td>Backlight supply current @ 3V d.c.</td>
<td>40</td>
<td>60</td>
<td></td>
<td>mA</td>
</tr>
<tr>
<td>Input leakage current (Vin = 0V)</td>
<td>1</td>
<td>10</td>
<td></td>
<td>pA</td>
</tr>
</tbody>
</table>

* To ensure maximum accuracy, re-calibrate periodically.
** Operation of the meter beyond the maximum supply voltage rating may cause permanent damage to the meter.
*** An external series resistor is required above 5V, see Applications.

Unless otherwise noted, specifications apply at T = 25°C, Vin = 5V d.c. (f = 48kHz) and are tested with the module configured for fully floating input mode.

SAFETY

To comply with the Low Voltage Directive (LVD 93/68/EEC), input voltages to the module’s pins must not exceed 60Vdc. The user must ensure that the incorporation of the panel meter into the user’s equipment conforms to the relevant sections of BS EN 61010 (Safety Requirements for Electrical Equipment for Measuring, Control and Laboratory Use).

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www.lascarelectronics.com
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**DIMENSIONS**

All dimensions in mm (inches)

- Panel cut-out: 38.0 x 18.0 (1.50 x 0.71)
- Panel thickness: 1.0 - 2.5 (0.04 - 0.10)

**Panel Fitting**

1. Panel
2. Module

**Functional Block Diagram**

- Vref
- CAL
- COM
- REF HI
- REF LO
- INHI
- INLO

**Pin Configuration** (rear view)

- A/D
- INH
- REF
- XDP
- BAT
- GND
- TEST
- V+
- L+
- L-
**PIN FUNCTIONS**

1. **V-** Negative power supply to the meter (6.0 to 15.0V meter power supply applications only).
2. **INLO** Negative measuring input.
3. **INHI** Positive measuring input.
4. **COM** Ground for the analogue section of the A/D converter. It is actively held at 3.05V (nom.) below V+ and must not be allowed to sink excessive current (>100μA) by, for instance, connecting to a higher voltage.
5. **REF LO** Negative input for reference voltage.
6. **REF HI** Positive input for reference voltage.
7. **GND** 0V power supply to the meter (3.0 to 7.5V meter power supply applications only).
8. **V+** Positive power supply to the meter.
9. **TEST** Connect to V+ to test the LCD. Do not connect to V+ for more than a few seconds as this may damage the LCD.
10. **XDP** Inversion of LCD drive voltage.
11. **BAT** Low Battery annunciator drive pin. See application on the right.

**Note:**
A negative supply is generated internally and mirrors the positive supply. For example: if V+ is +5V, then the internally generated V- is -5V. When measuring with the input referenced to the same supply rail as that of the panel meter, then the limitations on the input range are (V- + 1.5V) to (V+ - 1.5V).

**Solder Links:**
- **LREF** Normally Closed. Enables the internal voltage reference circuit. Cut this link when using an external voltage reference.
- **BAT** Normally Open. Enables the Low Battery warning annunciator. Cut this link and add a low battery detection circuit to enable the Low Battery warning annunciator via Pin 11 (BAT).
- **DP1** Normally Open. Close this solder link to enable decimal point DP1.
- **DP2** Normally Open. Close this solder link to enable decimal point DP2.
- **DP3** Normally Open. Close this solder link to enable decimal point DP3.
SCALING

Two external resistors Ra and Rb may be used to alter the full scale reading (FSR) of the meter - see table. The meter will have to be re-calibrated by adjusting the calibration potentiometer on the rear of the module.

<table>
<thead>
<tr>
<th>Voltage (Vin)</th>
<th>FSR</th>
<th>Ra</th>
<th>Rb</th>
</tr>
</thead>
<tbody>
<tr>
<td>2V</td>
<td>910k</td>
<td>10k</td>
<td></td>
</tr>
<tr>
<td>200V</td>
<td>1M</td>
<td>1k</td>
<td></td>
</tr>
<tr>
<td>2000V*</td>
<td>1M</td>
<td>100k</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Current (in)</th>
<th>FSR</th>
<th>Ra</th>
<th>Rb</th>
</tr>
</thead>
<tbody>
<tr>
<td>200μA</td>
<td>0R</td>
<td>1k</td>
<td></td>
</tr>
<tr>
<td>2mA</td>
<td>0R</td>
<td>100k</td>
<td></td>
</tr>
<tr>
<td>20mA</td>
<td>0R</td>
<td>10R</td>
<td></td>
</tr>
<tr>
<td>200mA</td>
<td>0R</td>
<td>1k</td>
<td></td>
</tr>
</tbody>
</table>

*Ensure that Ra is rated for high voltage use.

APPLIcATIONS

Do not connect more than one meter to the same power supply if the meters cannot use the same signal ground. Taking any input beyond the power supply rails will damage the meter.

**5V supply operation (3.0 to 7.5V Meter Power Supply)**

Measuring a single ended input voltage referenced to supply, i.e. the input voltage and the meter's power supply share the same 0V rail. Ensure solder link LREF is closed.

Measuring an input voltage referenced to a floating supply, i.e. the input voltage and the meter's power supply are isolated from each other. Ensure solder link LREF is closed.

Measuring a current from a circuit which is floating with respect to the DPM's supply, i.e. the current and the meter's power supply are isolated from each other. Ensure solder link LREF is closed.

**9V supply operation (6.0 to 15.0V Meter Power Supply)**

Measuring a single ended input voltage referenced to supply, i.e. the input voltage and the meter's power supply share the same 0V rail. Ensure solder link LREF is closed.

Measuring an input voltage referenced to a floating supply, i.e. the input voltage and the meter's power supply are isolated from each other. Ensure solder link LREF is closed.

Measuring a current from a circuit which is floating with respect to the DPM's supply, i.e. the current and the meter's power supply are isolated from each other. Ensure solder link LREF is closed.