

### FEATURES

**HIGH RESOLUTION  $\Sigma$ - $\Delta$  ADCs**  
**2 Independent ADCs (16- and 24-Bit Resolution)**  
**Factory-Calibrated (Field Calibration Not Required)**  
**Output Settles in 1 Conversion Cycle (Single Conversion Mode)**  
**Programmable Gain Front End**  
**Simultaneous Sampling and Conversion of 2 Signal Sources**  
**Separate Reference Inputs for Each Channel**  
**Simultaneous 50 Hz and 60 Hz Rejection at 20 Hz Update Rate**

### ISOURCE Select™

**24-Bit No Missing Codes—Main ADC**  
**13-Bit p-p Resolution @ 20 Hz, 20 mV Range**  
**18-Bit p-p Resolution @ 20 Hz, 2.56 V Range**

### INTERFACE

**3-Wire Serial**  
**SPI®, QSPI™, MICROWIRE™, and DSP Compatible**  
**Schmitt Trigger on SCLK**

### POWER

**Specified for Single 3 V and 5 V Operation**  
**Normal: 1.5 mA Typ @ 3 V**  
**Power-Down: 10  $\mu$ A (32 kHz Crystal Running)**

### ON-CHIP FUNCTIONS

**Rail-Rail Input Buffer and PGA**  
**4-Bit Digital I/O Port**  
**On-Chip Temperature Sensor**  
**Dual Switchable Excitation Current Sources**  
**Low-Side Power Switches**  
**Reference Detect Circuit**

### APPLICATIONS

**Sensor Measurement**  
**Temperature Measurement**  
**Pressure Measurement**  
**Weigh Scales**  
**Portable Instrumentation**  
**4 to 20 mA Transmitters**

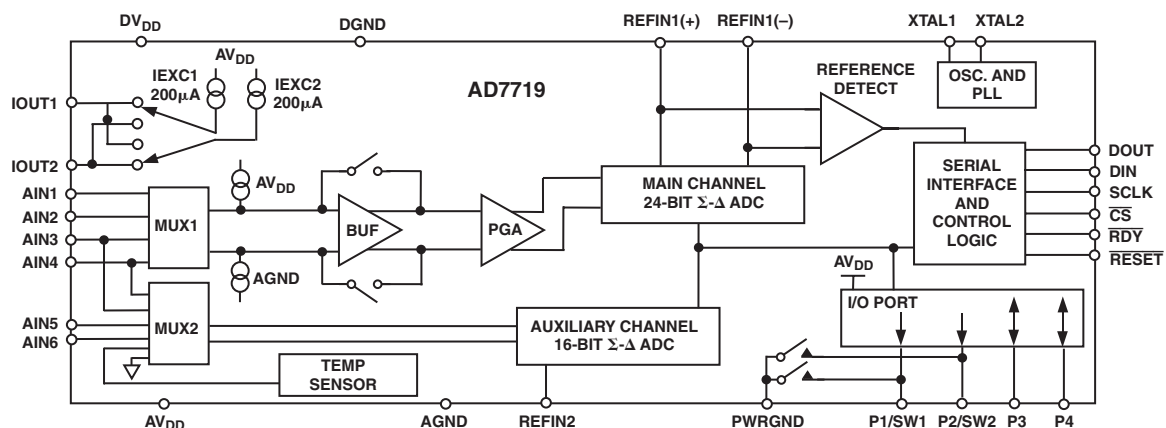
### GENERAL DESCRIPTION

The AD7719 is a complete analog front end for low frequency measurement applications. It contains two high resolution  $\Sigma$ - $\Delta$  ADCs, switchable matched excitation current sources, low-side power switches, digital I/O port, and temperature sensor. The 24-bit main channel with PGA accepts fully differential, unipolar, and bipolar input signal ranges from  $1.024 \times \text{REFIN1}/128$  to  $1.024 \times \text{REFIN1}$ . Signals can be converted directly from a transducer without the need for signal conditioning. The 16-bit auxiliary channel has an input signal range of  $\text{REFIN2}$  or  $\text{REFIN2}/2$ .

The device operates from a 32 kHz crystal with an on-chip PLL generating the required internal operating frequency. The output data rate from the part is software programmable. The peak-to-peak resolution from the part varies with the programmed gain and output data rate.

The part operates from a single 3 V or 5 V supply. When operating from 3 V supplies, the power dissipation for the part is 4.5 mW with both ADCs enabled and 2.85 mW with only the main ADC enabled in unbuffered mode. The AD7719 is housed in 28-lead SOIC and TSSOP packages.

### FUNCTIONAL BLOCK DIAGRAM



REV. A

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# AD7719—SPECIFICATIONS<sup>1</sup> (AV<sub>DD</sub> = 2.7 V to 3.6 V or 4.75 V to 5.25 V, DV<sub>DD</sub> = 2.7 V to 3.6 V or 4.75 V to 5.25 V, REFIN(+) = 2.5 V; REFIN(-) = AGND; AGND = DGND = 0 V; XTAL1/XTAL2 = 32.768 kHz Crystal; all specifications T<sub>MIN</sub> to T<sub>MAX</sub>, unless otherwise noted.)

| Parameter   | AD7719B  | Unit   | Test Conditions   |
|---|--|--|---|
| ADC CHANNEL SPECIFICATION<br>Output Update Rate   | 5.4<br>105   | Hz min<br>Hz max   | Both Channels Synchronized<br>0.732 ms Increments   |
| MAIN CHANNEL<br>No Missing Codes <sup>2</sup><br>Resolution<br>Output Noise and Update Rates<br>Integral Nonlinearity<br>Offset Error <sup>3</sup><br>Offset Error Drift vs. Temperature <sup>4</sup><br>Full-Scale Error <sup>5, 6, 7</sup><br>Gain Drift vs. Temperature <sup>4</sup><br>Power Supply Rejection (PSR)   | 24<br>13<br>18<br>See Tables II to V<br>±10<br>±3<br>±10<br>±10<br>±0.5<br>80  | Bits min<br>Bits p-p<br>Bits p-p<br>ppm of FSR max<br>μV typ<br>nV/°C typ<br>μV typ<br>ppm/°C typ<br>dB min  | 20 Hz Update Rate<br>±20 mV Range, 20 Hz Update Rate<br>±2.56 V Range, 20 Hz Update Rate<br>Typically 2 ppm. $FSR = \frac{2 \times 1.024 \text{ REFIN1}}{\text{Gain}}$<br>At the Calibrated Conditions<br>Input Range = ±2.56 V, 100 dB typ.<br>110 dB typ on ±20 mV Range  |
| ANALOG INPUTS<br>Differential Input Voltage Ranges<br>ADC Range Matching<br>Absolute AIN Voltage Limits<br>Analog Input Current <sup>2</sup><br>DC Input Current<br>DC Input Current Drift<br>Absolute AIN Voltage Limits<br>Analog Input Current<br>DC Input Current<br>DC Input Current Drift<br>Normal-Mode Rejection <sup>2, 8</sup><br>@ 50 Hz<br>@ 60 Hz<br>Common-Mode Rejection<br>@ DC<br>@ 50 Hz <sup>2</sup><br>@ 60 Hz <sup>2</sup> | ±1.024 × REFIN1/GAIN<br>±2<br>AGND + 100 mV<br>AV <sub>DD</sub> - 100 mV<br>±1<br>±5<br>AGND - 30 mV<br>AV <sub>DD</sub> + 30 mV<br>±125<br>±2<br>100<br>100<br>90<br>100<br>100 | V nom<br>μV typ<br>V min<br>V max<br>nA max<br>pA /°C typ<br>V min<br>V max<br>nA/V typ<br>pA/V/°C typ<br>dB min<br>dB min<br>dB min<br>dB min<br>dB min | REFIN1 = REFIN1(+) - REFIN1(-)<br>GAIN = 1 to 128.<br>Input Voltage = 19 mV on All Ranges<br>$\overline{\text{BUF}} = 0$ ; Buffered Mode of Operation<br>$\overline{\text{BUF}} = 0$<br>$\overline{\text{BUF}} = 1$ ; Unbuffered mode of operation.<br>$\overline{\text{BUF}} = 1$ . Unbuffered Mode of Operation.<br>Input Current Varies with Input Voltage<br>50 Hz ± 1 Hz, 16.65 Hz Update Rate, SF = 82<br>60 Hz ± 1 Hz, 20 Hz Update Rate, SF = 68<br>Input Range = ±2.56 V, AIN = 1 V.<br>100 dB typ. 110 dB typ on ±20 mV Range<br>50 Hz ± 1 Hz, Range = ±2.56 V, AIN = 1 V<br>60 Hz ± 1 Hz, Range = ±2.56 V, AIN = 1 V |
| REFERENCE INPUT (REFIN1)<br>REFIN1 Voltage<br>REFIN1 Voltage Range <sup>2</sup><br>REFIN1 Common-Mode Range<br>Reference DC Input Current<br>Reference DC Input Current Drift<br>Normal-Mode Rejection <sup>2, 8</sup><br>@ 50 Hz<br>@ 60 Hz<br>Common-Mode Rejection<br>@ DC<br>@ 50 Hz<br>@ 60 Hz<br>Reference Detect Levels  | 2.5<br>1<br>AV <sub>DD</sub><br>AGND - 30 mV<br>AV <sub>DD</sub> + 30 mV<br>0.5<br>±0.01<br>100<br>100<br>110<br>110<br>110<br>0.3<br>0.65                                       | V nom<br>V min<br>V max<br>V min<br>V max<br>μA/V typ<br>nA/V/°C typ<br>dB min<br>dB min<br>dB typ<br>dB typ<br>dB typ<br>V min<br>V max                 | REFIN1 = REFIN1(+) - REFIN1(-)<br>50 Hz ± 1 Hz, SF = 82<br>60 Hz ± 1 Hz, SF = 68<br>Input Range = ±2.56 V, AIN = 1 V<br>50 Hz ± 1 Hz, Range = 2.56 V, AIN = 1 V<br>60 Hz ± 1 Hz, Range = 2.56 V, AIN = 1 V<br>NOXREF Bit Active if VREF < 0.3 V<br>NOXREF Bit Inactive if VREF > 0.65 V   |
| AUXILIARY CHANNEL<br>No Missing Codes <sup>2</sup><br>Resolution<br>Output Noise and Update Rates<br>Integral Nonlinearity  | 16<br>16<br>See Tables VI and VIII<br>±15  | Bits min<br>Bits p-p<br>ppm of FSR max   | ±2.5 V Range, 20 Hz Update Rate   |

# AD7719

| Parameter   | AD7719B                                  | Unit           | Test Conditions   |
|---|--|----------------|---|
| <b>AUXILIARY CHANNEL (continued)</b>                |  |                |   |
| Offset Error <sup>3</sup>                           | ±3                                       | μV typ         | Selected Channel = AIN5/AIN6<br><br>AIN = 1 V Input Range = ±2.5 V, Typically 80 dB                               |
| Offset Error Drift vs. Temperature <sup>4</sup>     | ±10                                      | nV/°C typ      |   |
| Full-Scale Error <sup>6, 7</sup>                    | ±0.75                                    | LSB typ        |   |
| Gain Drift vs. Temperature <sup>4</sup>             | 0.5                                      | ppm/°C typ     |   |
| Negative Full-Scale Error                           | ±1                                       | LSB typ        |   |
| Power Supply Rejection (PSR)                        | 70                                       | dB min         |   |
| <b>ANALOG INPUTS</b>                                |  |                |   |
| Differential Input Voltage Ranges                   | ±REFIN2<br>±REFIN2/2                     | V nom<br>V nom | ARN = 1<br>ARN = 0  |
| Absolute AIN Voltage Limits                         | AGND – 30 mV<br>AV <sub>DD</sub> + 30 mV | V min<br>V max | Unbuffered Input  |
| Analog Input Current                                |  |                | Input Current Varies with Input Voltage   |
| DC Input Current                                    | ±125                                     | nA/V typ       |   |
| DC Input Current Drift                              | ±2                                       | pA/V/°C typ    |   |
| Normal-Mode Rejection <sup>2, 8</sup>               |  |                |   |
| @ 50 Hz   | 100                                      | dB min         | 50 Hz ±1 Hz, SF = 82  |
| @ 60 Hz   | 100                                      | dB min         | 60 Hz ±1 Hz, SF = 68  |
| Common-Mode Rejection                               |  |                | Input Range = ±2.5 V, AIN = 1 V<br>50 Hz ±1 Hz, Range = 2.5 V, AIN = 1 V<br>60 Hz ±1 Hz, Range = 2.5 V, AIN = 1 V |
| @ DC  | 85                                       | dB min         |   |
| @ 50 Hz <sup>2</sup>                                | 90                                       | dB min         |   |
| @ 60 Hz <sup>2</sup>                                | 90                                       | dB min         |   |
| <b>REFERENCE INPUT (REFIN2)</b>                     |  |                |   |
| REFIN2 Voltage                                      | 2.5                                      | V nom          | With Respect to AGND  |
| REFIN2 Range <sup>2</sup>                           | 1<br>AV <sub>DD</sub>                    | V min<br>V max |   |
| Reference DC Input Current <sup>2</sup>             | 0.2                                      | μA/V typ       |   |
| Reference DC Input Current Drift                    | 0.003                                    | nA/V/°C typ    |   |
| <b>EXCITATION CURRENT SOURCES (IEXC1 and IEXC2)</b> |  |                |   |
| Output Current                                      | 200                                      | μA nom         | Matching between IEXC1 and IEXC2<br>No Load   |
| Initial Tolerance at 25°C                           | ±10                                      | % typ          |   |
| Drift   | 200                                      | ppm/°C typ     |   |
| Initial Current Matching at 25°C                    | ±1                                       | % typ          |   |
| Drift Matching                                      | 20                                       | ppm/°C typ     | AV <sub>DD</sub> = 5 V ± 5%. Typically 1.25 μA/V  |
| Line Regulation (AV <sub>DD</sub> )                 | 2.1                                      | μA/V max       |   |
| Load Regulation                                     | 300                                      | nA/V typ       |   |
| Output Compliance                                   | AV <sub>DD</sub> – 0.6<br>AGND – 30 mV   | V max<br>V min |   |
|   |  |                |   |
| <b>LOW-SIDE POWER SWITCHES (SW1, SW2)</b>           |  |                |   |
| R <sub>ON</sub>                                     | 5<br>7                                   | Ω max<br>Ω max | AV <sub>DD</sub> = 5 V. Typically 3 Ω<br>AV <sub>DD</sub> = 3 V. Typically 4.5 Ω<br>Continuous Current per Switch |
| Allowable Current <sup>2</sup>                      | 20                                       | mA max         |   |
| <b>TEMPERATURE SENSOR</b>                           |  |                |   |
| Accuracy  | See TPC 5                                | °C typ         |   |
| <b>TRANSDUCER BURNOUT</b>                           |  |                |   |
| AIN(+) Current                                      | –100                                     | nA typ         |   |
| AIN(–) Current                                      | 100                                      | nA typ         |   |
| Initial Tolerance @ 25°C                            | ±15                                      | % typ          |   |
| Drift   | 0.03                                     | %/°C typ       |   |
| <b>SYSTEM CALIBRATION<sup>2, 9</sup></b>            |  |                |   |
| Full-Scale Calibration Limit                        | 1.05 × FS <sup>10</sup>                  | V max          |   |
| Zero-Scale Calibration Limit                        | –1.05 × FS                               | V min          |   |
| Input Span  | 0.8 × FS                                 | V min          |   |
|   | 2.1 × FS                                 | V max          |   |

| Parameter  | AD7719B                 | Unit                   | Test Conditions  |
|--|-------------------------|------------------------|--|
| <b>LOGIC INPUTS</b>                                  |                         |                        |  |
| All Inputs Except SCLK and XTAL1 <sup>2</sup>        |                         |                        |  |
| $V_{INL}$ , Input Low Voltage                        | 0.8<br>0.4              | V max<br>V max         | DV <sub>DD</sub> = 5 V<br>DV <sub>DD</sub> = 3 V   |
| $V_{INH}$ , Input High Voltage                       | 2.0                     | V min                  | DV <sub>DD</sub> = 3 V or 5 V  |
| SCLK Only (Schmitt-Triggered Input) <sup>2</sup>     |                         |                        |  |
| $V_{T(+)}$   | 1.4/2                   | V min/V max            | DV <sub>DD</sub> = 5 V   |
| $V_{T(-)}$   | 0.8/1.4                 | V min/V max            | DV <sub>DD</sub> = 5 V   |
| $V_{T(+)} - V_{T(-)}$                                | 0.3/0.85                | V min/V max            | DV <sub>DD</sub> = 5 V   |
| $V_{T(+)}$   | 0.95/2                  | V min/V max            | DV <sub>DD</sub> = 3 V   |
| $V_{T(-)}$   | 0.4/1.1                 | V min/V max            | DV <sub>DD</sub> = 3 V   |
| $V_{T(+)} - V_{T(-)}$                                | 0.3/0.85                | V min/V max            | DV <sub>DD</sub> = 3 V   |
| XTAL1 Only <sup>2</sup>                              |                         |                        |  |
| $V_{INL}$ , Input Low Voltage                        | 0.8                     | V max                  | DV <sub>DD</sub> = 5 V   |
| $V_{INH}$ , Input High Voltage                       | 3.5                     | V min                  | DV <sub>DD</sub> = 5 V   |
| $V_{INL}$ , Input Low Voltage                        | 0.4                     | V max                  | DV <sub>DD</sub> = 3 V   |
| $V_{INH}$ , Input High Voltage                       | 2.5                     | V min                  | DV <sub>DD</sub> = 3 V   |
| Input Currents                                       | ±10<br>-70              | µA max<br>µA max       | V <sub>IN</sub> = DV <sub>DD</sub><br>V <sub>IN</sub> = DGND, Typically -40 µA at 5 V<br>and -20 µA at 3 V                                       |
| Input Capacitance <sup>2</sup>                       | 10                      | pF typ                 | All Digital Inputs   |
| <b>LOGIC OUTPUTS (Excluding XTAL2)</b>               |                         |                        |  |
| $V_{OH}$ , Output High Voltage <sup>2</sup>          | DV <sub>DD</sub> - 0.6  | V min                  | DV <sub>DD</sub> = 3 V, I <sub>SOURCE</sub> = 100 µA   |
| $V_{OL}$ , Output Low Voltage <sup>2</sup>           | 0.4                     | V max                  | DV <sub>DD</sub> = 3 V, I <sub>SINK</sub> = 100 µA   |
| $V_{OH}$ , Output High Voltage <sup>2</sup>          | 4                       | V min                  | DV <sub>DD</sub> = 5 V, I <sub>SOURCE</sub> = 200 µA   |
| $V_{OL}$ , Output Low Voltage <sup>2</sup>           | 0.4                     | V max                  | DV <sub>DD</sub> = 5 V, I <sub>SINK</sub> = 1.6 mA   |
| Floating-State Leakage Current                       | ±10                     | µA max                 |  |
| Floating-State Output Capacitance                    | ±10                     | pF typ                 |  |
| Data Output Coding                                   | Binary<br>Offset Binary |                        | Unipolar Mode<br>Bipolar Mode  |
| <b>I/O PORT<sup>11</sup></b>                         |                         |                        |  |
| $V_{INL}$ , Input Low Voltage <sup>2</sup>           | 0.8<br>0.4              | V max<br>V max         | I/O Port Voltages Are with Respect to<br>AV <sub>DD</sub> and AGND<br>AV <sub>DD</sub> = 5 V<br>AV <sub>DD</sub> = 3 V                           |
| $V_{INH}$ , Input High Voltage <sup>2</sup>          | 2.0                     | V min                  | AV <sub>DD</sub> = 3 V or 5 V  |
| Input Currents                                       | ±10<br>-70              | µA max<br>µA max       | V <sub>IN</sub> = AV <sub>DD</sub><br>V <sub>IN</sub> = AGND, Typically -40 µA at AV <sub>DD</sub> = 5 V<br>and -20 µA at AV <sub>DD</sub> = 3 V |
| Input Capacitance                                    | 10                      | pF typ                 | All Digital Inputs   |
| $V_{OH}$ , Output High Voltage <sup>2</sup>          | AV <sub>DD</sub> - 0.6  | V min                  | AV <sub>DD</sub> = 3 V, I <sub>SOURCE</sub> = 100 µA   |
| $V_{OL}$ , Output Low Voltage <sup>2</sup>           | 0.4                     | V max                  | AV <sub>DD</sub> = 3 V, I <sub>SINK</sub> = 100 µA   |
| $V_{OH}$ , Output High Voltage <sup>2</sup>          | 4                       | V min                  | AV <sub>DD</sub> = 5 V, I <sub>SOURCE</sub> = 200 µA   |
| $V_{OL}$ , Output Low Voltage <sup>2</sup>           | 0.4                     | V max                  | AV <sub>DD</sub> = 5 V, I <sub>SINK</sub> = 1.6 mA   |
| Floating-State Output Leakage Current                | ±10                     | µA max                 |  |
| Floating-State Output Capacitance                    | ±10                     | pF typ                 |  |
| <b>START-UP TIME</b>                                 |                         |                        |  |
| From Power-On  | 300                     | ms typ                 |  |
| From Idle Mode                                       | 1                       | ms typ                 |  |
| From Power-Down Mode                                 | 1<br>300                | ms typ<br>ms typ       | Osc. Active in Power-Down<br>Osc. Powered Down   |
| <b>POWER REQUIREMENTS</b>                            |                         |                        |  |
| Power Supply Voltages                                |                         |                        |  |
| AV <sub>DD</sub> - AGND                              | 2.7/3.6<br>4.75/5.25    | V min/max<br>V min/max | AV <sub>DD</sub> = 3 V nom<br>AV <sub>DD</sub> = 5 V nom   |
| DV <sub>DD</sub> - DGND                              | 2.7/3.6<br>4.75/5.25    | V min/max<br>V min     | DV <sub>DD</sub> = 3 V nom<br>DV <sub>DD</sub> = 5 V nom   |
| Power Supply Currents                                |                         |                        |  |
| DI <sub>DD</sub> Current (Normal Mode) <sup>12</sup> | 0.6<br>0.75             | mA max<br>mA max       | DV <sub>DD</sub> = 3 V, 0.5 mA typ<br>DV <sub>DD</sub> = 5 V, 0.6 mA typ   |

# AD7719

| Parameter   | AD7719B | Unit   | Test Conditions   |
|---|---------|--------|---|
| Power Supply Currents (Continued)                 |         |        |   |
| AI <sub>DD</sub> Current (Main ADC)               | 1.1     | mA max | AV <sub>DD</sub> = 3 V or 5 V, Buffered Mode, 0.85 mA typ   |
|   | 0.55    | mA max | AV <sub>DD</sub> = 3 V or 5 V, Unbuffered Mode, 0.45 mA typ |
| AI <sub>DD</sub> Current (Aux ADC)                | 0.3     | mA max | AV <sub>DD</sub> = 3 V or 5 V, 0.25 mA typ                  |
| AI <sub>DD</sub> Current (Main and Aux ADC)       | 1.25    | mA max | AV <sub>DD</sub> = 3 V or 5 V, Main ADC Buffered, 1 mA typ  |
| DI <sub>DD</sub> (ADC Disable Mode) <sup>13</sup> | 0.35    | mA max | DV <sub>DD</sub> = 3 V, 0.25 mA typ                         |
|   | 0.4     | mA max | DV <sub>DD</sub> = 5 V, 0.3 mA typ                          |
| AI <sub>DD</sub> (ADC Disable Mode)               | 0.15    | mA max | AV <sub>DD</sub> = 3 V or 5 V                               |
| DI <sub>DD</sub> (Power-Down Mode)                | 10      | μA max | DV <sub>DD</sub> = 3 V, 32.768 kHz Osc. Running             |
|   | 2       | μA max | DV <sub>DD</sub> = 3 V, Oscillator Powered Down             |
|   | 30      | μA max | DV <sub>DD</sub> = 5 V, 32.768 kHz Osc. Running             |
|   | 8       | μA max | DV <sub>DD</sub> = 5 V, Oscillator Powered Down             |
| AI <sub>DD</sub> (Power-Down Mode)                | 1       | μA max | AV <sub>DD</sub> = 3 V or 5 V                               |

## NOTES

<sup>1</sup>Temperature range -40°C to +85°C.

<sup>2</sup>Guaranteed by design and/or characterization data on production release.

<sup>3</sup>System zero calibration will remove this error.

<sup>4</sup>A calibration at any temperature will remove this drift error.

<sup>5</sup>The main ADC is factory-calibrated with AV<sub>DD</sub> = DV<sub>DD</sub> = 4 V, T<sub>A</sub> = 25°C, REFIN1(+) - REFIN1(-) = 2.5 V. If the user power supplies or temperature conditions are significantly different from these, internal full-scale calibration will restore this error to the published specification. System calibration can be used to reduce this error to the order of the noise. Full-scale error applies to both positive and negative full scale.

<sup>6</sup>A system full-scale calibration will remove this error.

<sup>7</sup>A typical gain error of ±10 μV results following a user self-calibration.

<sup>8</sup>Simultaneous 50 Hz and 60 Hz rejection is achieved using 19.8 Hz (SF = 69) update rate. Normal mode rejection in this case is 60 dB min.

<sup>9</sup>After a calibration if the analog input exceeds positive full scale, the converter will output all 1s. If the analog input is less than negative full scale, the device will output all 0s.

<sup>10</sup>FS = Full-Scale Input. FS = 1.024 × REFIN1/Gain on the main ADC, where REFIN1 = REFIN1(+) - REFIN1(-). FS = REFIN2 on the aux ADC when ARN = 1 in the aux ADC control register (AD1CON) and REFIN2/2 on the aux ADC when ARN = 0.

<sup>11</sup>Input and output levels on the I/O Port are with respect to AV<sub>DD</sub> and AGND.

<sup>12</sup>Normal mode refers to the case where both main and aux ADCs are running.

<sup>13</sup>ADC disable is entered by setting both the AD0EN and AD1EN bits in the main and aux ADC control registers to a 0 and setting the mode bits (MD2, MD1, MD0) in the mode register to non-0.

Specifications subject to change without notice.

## ABSOLUTE MAXIMUM RATINGS<sup>1</sup>

(T<sub>A</sub> = 25°C, unless otherwise noted.)

|                                      |                                   |
|--------------------------------------|-----------------------------------|
| AV <sub>DD</sub> to AGND             | -0.3 V to +7 V                    |
| AV <sub>DD</sub> to DGND             | -0.3 V to +7 V                    |
| DV <sub>DD</sub> to AGND             | -0.3 V to +7 V                    |
| DV <sub>DD</sub> to DGND             | -0.3 V to +7 V                    |
| AGND to DGND <sup>2</sup>            | -20 mV to +20 mV                  |
| PWRGND to AGND                       | -20 mV to +20 mV                  |
| AV <sub>DD</sub> to DV <sub>DD</sub> | -5 V to +5 V                      |
| Analog Input Voltage to AGND         | -0.3 V to AV <sub>DD</sub> +0.3 V |
| Reference Input Voltage to AGND      | -0.3 V to AV <sub>DD</sub> +0.3 V |
| Total AIN/REFIN Current (Indefinite) | 30 mA                             |
| Digital Input Voltage to DGND        | -0.3 V to DV <sub>DD</sub> +0.3 V |
| Digital Output Voltage to DGND       | -0.3 V to DV <sub>DD</sub> +0.3 V |
| Operating Temperature Range          | -40°C to +85°C                    |
| Storage Temperature Range            | -65°C to +150°C                   |

|                                   |          |
|-----------------------------------|----------|
| Junction Temperature              | 150°C    |
| SOIC Package                      |          |
| θ <sub>JA</sub> Thermal Impedance | 71.4°C/W |
| θ <sub>JC</sub> Thermal Impedance | 23°C/W   |
| TSSOP Package                     |          |
| θ <sub>JA</sub> Thermal Impedance | 97.9°C/W |
| θ <sub>JC</sub> Thermal Impedance | 14°C/W   |
| Lead Temperature, Soldering       |          |
| Vapor Phase (60 sec)              | 215°C    |
| Infrared (15 sec)                 | 220°C    |

## NOTES

<sup>1</sup>Stresses above those listed under Absolute Maximum Ratings may cause permanent damage to the device. This is a stress rating only; functional operation of the device at these or any other conditions above those listed in the operational sections of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

<sup>2</sup>AGND and DGND are connected internally within the AD7719.

## ORDERING GUIDE

| Model         | Temperature Range | Package Description | Package Option |
|---------------|-------------------|---------------------|----------------|
| AD7719BR      | -40°C to +85°C    | SOIC                | R-28           |
| AD7719BRU     | -40°C to +85°C    | TSSOP               | RU-28          |
| EVAL-AD7719EB |                   | Evaluation Board    |                |