

FEATURES

- Dual Measurement Channels**
- Precision Four-Quadrant-Per-Pin V/I Source**
- Programmable Current Force Ranges**
 $\pm 204.8 \mu\text{A}$ and $\pm 2.048 \text{ mA}$
- Five Current Measurement Ranges**
 204.8 nA to $\pm 2.048 \text{ mA}$
- Output Voltage Range: -4 V to +9 V**
- Power Supplies: +15 V, +5 V, and -10 V**
- 44-Lead Plastic J-Leaded Chip Carrier Package**

APPLICATIONS

- Can Be Used with the AD53032 DCL to Extend Current Force Range to 35 mA**

GENERAL DESCRIPTION

The AD53508 is a custom dual-channel parametric measurement circuit for use in semiconductor automatic test equipment. It contains programmable modes to force a pin voltage and measure its current or to integrate and hold a current value. Alternatively, a current can be forced and the compliance voltage measured.

The device provides a remote force/sense capability to ensure accuracy at the tester pin. A guard output is available to drive the shield of a force/sense pair.

Two input references per channel permit controlled switching to different voltage or current levels. The forced voltage or current levels can be switched back to the measurement system to read back the analog levels for system calibration.

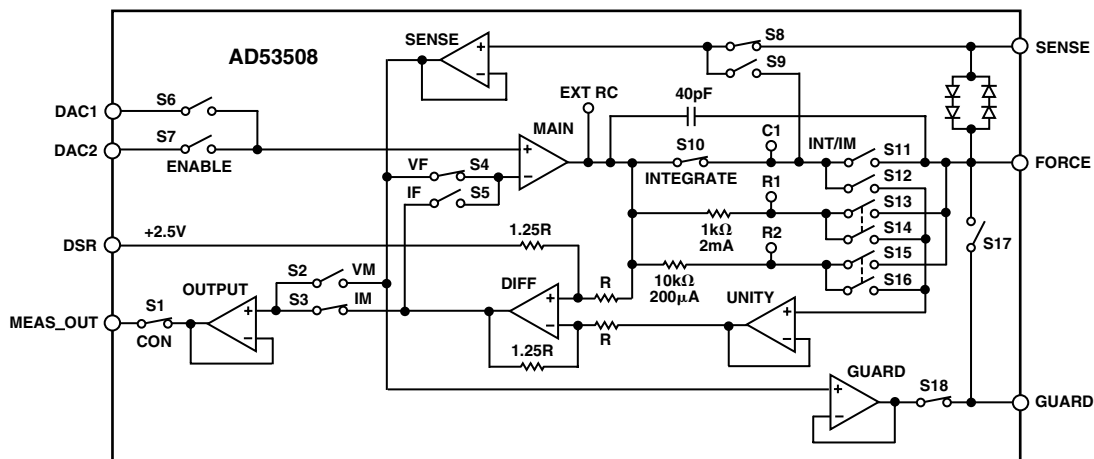
The circuit is powered by +15 V, +5 V, and -10 V supplies and dissipates 230 mW nominally.

Recommended Use of the PPMU with AD53032 DCL

The PPMU can be used with the AD53032 DCL to extend the Current Force Range beyond 2 mA VCOM can be set to the maximum spec allowance of 8 V, which would allow the maximum Current Force of IOL of 35 mA. The combination of the PPMU and the DCL would have a few benefits including:

1. Accurately measuring low currents.
2. Can take parallel measurements by using one PMU per pin.

FUNCTIONAL BLOCK DIAGRAM



REV. A

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AD53508—SPECIFICATIONS (T_A = 25°C, rated power supplies unless otherwise noted.)

| Parameter | Condition | Min | Typ | Max | Unit ¹ |
|--|--|---------------|-----------------------|---------------------------------------|---|
| VOLTAGE FORCE/MEASURE MODE Voltage Swing, ±2 mA Range ±2 mA Drive ±100 μA Drive | | -4 -5 | | +9 +12 | V V |
| ACCURACY Gain (±0.1% Tolerance) Offset Error Gain Nonlinearity (Relative to Endpoints) Current Measure CMRR (at MEAS_OUT) | | 0.999 | | 1.001 ±15 ±0.02 ±0.31 | V/V mV % of Span mV/V |
| DRIFT Gain Error Temperature Coefficient Offset Drift | | | | ±20 ±100 | ppm (PV or MV)/°C μV/°C |
| CURRENT FORCE/MEASURE MODE RANGES 0 (High) 1 (Low) | | | ±2.0 ±200 | | mA μA |
| ACCURACY—HIGH RANGE Transconductance (±3% Tolerance) Transresistance (±3% Tolerance) Offset Error Gain Nonlinearity (Relative to Endpoints) Output Compliance Voltage-Induced Transconductance/Error | Force Mode Measure Mode Force Mode | 0.776 1.21 | 0.8 1.25 | 0.824 1.29 ±40 ±0.05 +0.4 | mA/V V/mA μA % of Span μA/V |
| DRIFT—HIGH RANGE Gain Error Temperature Coefficient Offset Drift | | | | +10/-60 ±400 | ppm (PV or MV)/°C nA/°C |
| ACCURACY—LOW RANGE Transconductance (±3% Tolerance) Transresistance (±3% Tolerance) Offset Error Gain Nonlinearity (Relative to Endpoints) Output Compliance Voltage-Induced Transconductance/Error | Force Mode Measure Mode Force Mode | 77.6 12.1 | 80 12.5 | 82.4 12.9 ±4 ±0.05 +0.04 | μA/V V/mA μA % of Span μA/V |
| DRIFT—LOW RANGE Gain Error Temperature Coefficient Offset Drift | | | | +10/-60 ±40 | ppm (PV or MV)/°C nA/°C |
| CURRENT MEASURE INTEGRATE MODE RANGES High Medium Low | | | ±20.0 ±2.0 ±200 | | μA μA nA |
| ACCURACY—HIGH RANGE Transresistance Error (±3% Tolerance) Offset Error Gain Nonlinearity (Relative to Endpoints) Output Compliance Voltage-Induced Transresistance Error | | 0.121 | 0.125 | 0.129 ±400 ±0.05 ±2.5 | V/μA nA % of Span nA/V of Output |
| DRIFT—HIGH RANGE Gain Error Temperature Coefficient Offset Drift | | | | ±20 ±2 | ppm MV/°C nA/°C |
| ACCURACY—MEDIUM RANGE Transresistance Error (±3% Tolerance) Offset Error Gain Nonlinearity (Relative to Endpoints) Output Compliance Voltage-Induced Transresistance Error | | 1.21 | 1.25 | 1.29 ±40 ±0.05 ±0.25 | V/μA nA % of Span nA/V of Output |
| DRIFT—MEDIUM RANGE Gain Error Temperature Coefficient Offset Drift | | | | ±20 ±250 | ppm MV/°C pA/°C |

| Parameter | Condition | Min | Typ | Max | Unit ¹ |
|---|------------------------------------|--------|--------|-------------|-------------------|
| ACCURACY—LOW RANGE | | | | | |
| Transresistance Error ($\pm 3\%$ Tolerance) | | 0.0121 | 0.0125 | 0.0129 | V/nA |
| Offset Error | | | | ± 4 | nA |
| Gain Nonlinearity (Relative to Endpoints) | | | | ± 0.05 | % of Span |
| Output Compliance Voltage-Induced Transresistance Error | | | | ± 0.025 | nA/V of Output |
| DRIFT—LOW RANGE | | | | | |
| Gain Error Temperature Coefficient | | | | ± 20 | ppm MV/°C |
| Offset Drift | | | | ± 70 | pA/°C |
| DISABLE MODE ² | | | | | |
| Voltage Swing, ± 2 mA Range | | | | | V |
| ± 2 mA Drive | | -4 | | +9 | V |
| ± 100 μ A Drive | | -5 | | +12 | V |
| ACCURACY | | | | | |
| Gain ($\pm 0.1\%$ Tolerance) | | 0.999 | | 1.001 | V/V |
| Offset Error | | | | ± 15 | mV |
| Gain Nonlinearity (Relative to Endpoints) | | | | ± 0.02 | % of Span |
| Current Measure CMRR (at MEAS_OUT) | | | | ± 0.31 | mV/V |
| DRIFT | | | | | |
| Gain Error Temperature Coefficient | | | | ± 20 | ppm (PV or MV)/°C |
| Offset Drift | | | | ± 100 | μ V/°C |
| OTHER SPECIFICATIONS | | | | | |
| Power Supply Rejection Ratio | $f < 40$ Hz, V_{CC} | 70 | | | dB |
| | $f < 40$ Hz, V_{EE} | 60 | | | dB |
| | $f = 40$ kHz, V_{CC} | 35 | | | dB |
| | $f = 40$ kHz, V_{EE} | 25 | | | dB |
| CURRENT MEASURE HOLD MODE LEAKAGE | $T_{AMB} = 70^\circ\text{C}$ | | | ± 1.2 | nA |
| CROSSTALK ³ | | | | ± 0.02 | % of Span |
| SETTLING TIMES TO 0.01% | | | | | |
| Voltage Force and Guard Voltage | $C_{LOAD} = 100$ pF | | | 20 | μ s |
| | $C_{LOAD} = 2000$ pF | | | 2 | ms |
| Current Force (200 μ A Range) | $Z_{LOAD} = 100$ pF 50 k Ω | | | 50 | μ s |
| MEAS_OUT Pin | $C_{LOAD} = 20$ pF | | | 2 | μ s |
| SHORT CIRCUIT CURRENT LIMIT MAGNITUDE | Any Output Except Guards | 8.5 | | 20 | mA |
| GUARD SCC LIMIT MAGNITUDE | | 2.5 | | 10 | mA |
| GUARD OFFSET (FROM SENSE INPUT PIN) | | -65 | -25 | 0 | mV |
| I_B (DAC1, DAC2) CURRENT | | | | ± 1.0 | μ A |
| DIGITAL INPUTS | | | | | |
| V_{IH} | | 2.4 | | | V |
| V_{IL} | | | | 0.8 | V |
| I_{IN} (Input leakage current) | | | | 10 | μ A |
| POWER SUPPLIES | | | | | |
| V_{CC} (Positive Analog Supply Voltage) | | 14.0 | 15.0 | 15.75 | V |
| V_{EE} (Negative Analog Supply Voltage) | | -10.5 | -10.0 | -9.0 | V |
| V_{DD} (Logic Supply Voltage) | | 4.75 | 5.0 | 5.25 | V |
| I_{CC} (Positive Analog Supply Current) | | 5 | | 15 | mA |
| I_{EE} (Negative Analog Supply Current) | | -15 | | -5 | mA |
| I_{DD} (Logic Supply Current Is 0 with Inputs at Rails, Worst Case @ 2.4 V_{IN}) | | | | 8 | mA |

NOTES

¹PV = Programmed Value, MV = Measured Value, FSR = Full-Scale Range = span.

²Output connected: DAC2 and 2 mA range selected, unconditionally.

³ $f < 40$ Hz, both channels in current force mode; other channel output voltage swinging rail to rail.

Specifications subject to change without notice.

AD53508

ABSOLUTE MAXIMUM RATINGS*

(T_A = 25°C unless otherwise noted)

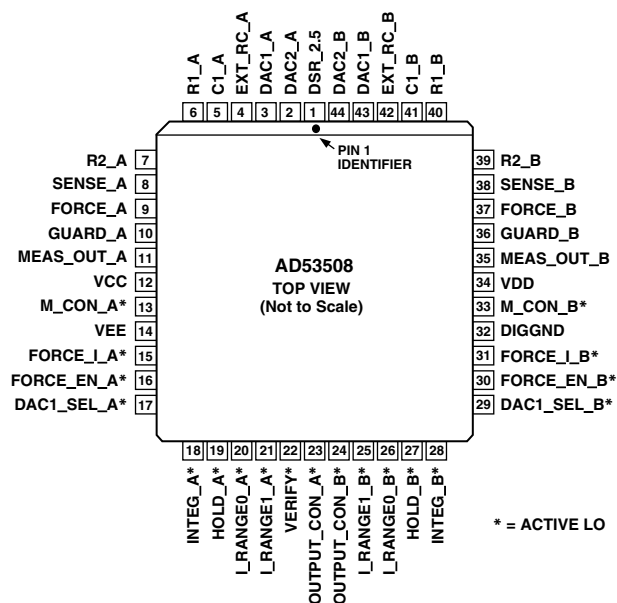
| | Min | Max | Unit | Condition |
|-----------------------------|---------|---------|------|-----------------------|
| VDD to VEE | -0.3 | +26.4 | V | T _A ≤ 75°C |
| VCC to VEE | -0.3 | +26.4 | V | |
| VDD to DGND | -0.3 | +6 | V | |
| Digital Inputs to DGND | -0.3 | VCC+0.3 | V | |
| Power Dissipation | | 700 | mW | |
| Operating Temperature Range | 25 | 70 | °C | |
| Storage Temperature | -60 | +125 | °C | |
| Lead Temperature | | 300 | °C | |
| Force/Sense Outputs | VEE-0.8 | VCC+0.8 | V | |
| | | | | |

*Stresses above those listed under Absolute Maximum Ratings may cause permanent damage to the device. These are stress ratings only; functional operation of the device at these or any other conditions above those indicated in the operational sections of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

ORDERING GUIDE

| Model | Temperature Range | Package Description | Package Option |
|-----------|-------------------|-----------------------------|----------------|
| AD53508JP | 25°C to 70°C | Plastic Leaded Chip Carrier | P-44A |

PIN CONFIGURATION



PIN FUNCTION DESCRIPTIONS

| Pin | Name | Description |
|-----|---------------|--------------------------------------|
| 1 | DSR_2.5 | 2.5 V Reference Input |
| 2 | DAC2_A | First of Two Switchable Inputs |
| 3 | DAC1_A | Second of Two Switchable Inputs |
| 4 | EXT_RC_A | External R _S and C Common |
| 5 | C1_A | External Capacitor |
| 6 | R1_A | External Resistor |
| 7 | R2_A | External Resistor |
| 8 | SENSE_A | Sense Input |
| 9 | FORCE_A | Force Output |
| 10 | GUARD_A | Guard Drive Output |
| 11 | MEAS_OUT_A | Measurement Output |
| 12 | VCC | +15 V Analog Supply |
| 13 | M_CON_A* | Connect Measure Output to Bus |
| 14 | VEE | -10 V Analog Supply |
| 15 | FORCE_I_A* | Force V (When Hi) or I (When Lo) |
| 16 | FORCE_EN_A* | Control Input |
| 17 | DAC1_SEL_A* | Select DAC1 (When Lo) or DAC2 |
| 18 | INTEG_A* | Control Input |
| 19 | HOLD_A* | Control Input |
| 20 | I_RANGE0_A* | Select 2 mA Range (Active Lo) |
| 21 | I_RANGE1_A* | Select 200 µA Range (Active Lo) |
| 22 | VERIFY* | Measure Forced Voltage or Current |
| 23 | OUTPUT_CON_A* | Connect Pin Drive (Active Lo) |
| 24 | OUTPUT_CON_B* | Connect Pin Drive (Active Lo) |
| 25 | I_RANGE1_B* | Select 200 µA Range (Active Lo) |
| 26 | I_RANGE0_B* | Select 2 mA Range (Active Lo) |
| 27 | HOLD_B* | Control Input |
| 28 | INTEG_B* | Control Input |
| 29 | DAC1_SEL_B* | Select DAC1 (When Lo) or DAC2 |
| 30 | FORCE_EN_B* | Control Input |
| 31 | FORCE_I_B* | Force V (When Hi) or I (When Lo) |
| 32 | DIGGND | Digital Ground |
| 33 | M_CON_B* | Connect Measure Output to Bus |
| 34 | VDD | +5 V Digital Supply |
| 35 | MEAS_OUT_B | Measurement Output |
| 36 | GUARD_B | Guard Drive Output |
| 37 | FORCE_B | Force Output |
| 38 | SENSE_B | Sense Input |
| 39 | R2_B | External Resistor |
| 40 | R1_B | External Resistor |
| 41 | C1_B | External Capacitor |
| 42 | EXT_RC_B | External R _S and C Common |
| 43 | DAC1_B | Second of Two Switchable Inputs |
| 44 | DAC2_B | First of Two Switchable Inputs |

* = Active Lo

CAUTION

ESD (electrostatic discharge) sensitive device. Electrostatic charges as high as 4000 V readily accumulate on the human body and test equipment and can discharge without detection. Although the AD53508 features proprietary ESD protection circuitry, permanent damage may occur on devices subjected to high-energy electrostatic discharges. Therefore, proper ESD precautions are recommended to avoid performance degradation or loss of functionality.



Table I. Data Table

| Data Latch Bits | | | S4 | S5 | S6 | S7 | S9 | S17 | S8 | S10 | S13, S14 | S15, S16 | S11 | S12 | S18 |
|--------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-------------|-------------|-----|-----|-----|
| S1 | S2 | S3 | | | | | | | | | | | | | |
| Voltage Force/Current Measure | | | | | | | | | | | | | | | |
| <i>Range 0</i> | | | | | | | | | | | | | | | |
| On | Off | On | On | Off | On | Off | Off | Off | On | On | On | Off | Off | Off | On |
| <i>Range 1</i> | | | | | | | | | | | | | | | |
| On | Off | On | On | Off | On | Off | Off | Off | On | On | Off | On | Off | Off | On |
| <i>Integrate Range</i> | | | | | | | | | | | | | | | |
| On | Off | On | On | Off | On | Off | Off | Off | On | On | Off | Off | On | On | On |
| <i>Integrate</i> | | | | | | | | | | | | | | | |
| On | Off | On | On | Off | On | Off | Off | Off | On | Off | Off | Off | On | On | On |
| <i>Hold/Measure</i> | | | | | | | | | | | | | | | |
| On | Off | On | On | Off | On | Off | On | On | Off | Off | Off | Off | Off | On | On |
| Current Force/Voltage Measure | | | | | | | | | | | | | | | |
| <i>Range 0</i> | | | | | | | | | | | | | | | |
| On | On | Off | Off | On | On | Off | Off | Off | On | On | On | Off | Off | Off | On |
| <i>Range 1</i> | | | | | | | | | | | | | | | |
| On | On | Off | Off | On | On | Off | Off | Off | On | On | Off | On | Off | Off | On |
| Disable Mode: Output Connected | | | | | | | | | | | | | | | |
| X | X | X | On | Off | Off | On | Off | Off | On | X | On | Off | Off | Off | On |
| Verify/Voltage Force | | | | | | | | | | | | | | | |
| On | On | Off | On | Off | On | Off | Off | Off | On | On | On | Off | Off | Off | On |
| Verify/Current Force | | | | | | | | | | | | | | | |
| On | Off | On | Off | On | On | Off | Off | Off | On | On | On | Off | Off | Off | On |
| Disconnect | | | | | | | | | | | | | | | |
| X | X | X | On | Off | X | X | On | Off | Off | On | Off | Off | Off | On | Off |
| DAC2 Select: Enabled | | | | | | | | | | | | | | | |
| X | X | X | X | X | Off | On | X | X | X | X | X | X | X | X | X |

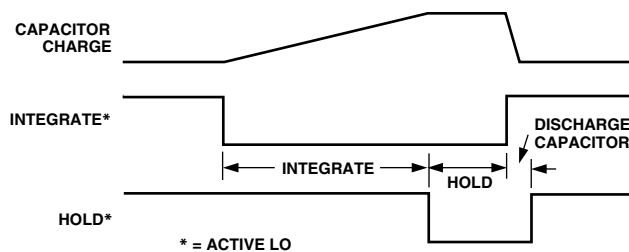


Figure 1. Integrate/Current Measure Timing Diagram

Table II. Truth Table

| * = Active LO | FV/MI 2 mA | | FV/MI 200 mA | | FV/MI Integrate DAC1 | | | FV/MI Integrate DAC 2 | | | FI/MV 2 mA | | FI/MV 200 μA | | FV/Verify | | FI/Verify | | Disconnect | Disable | |
|---------------|------------|------|--------------|------|----------------------|-----------|------|-----------------------|-----------|------|------------|------|--------------|------|-----------|------|-----------|------|------------|------------------|----|
| Control Input | DAC1 | DAC2 | DAC1 | DAC2 | Voltage Settle | Integrate | Hold | Voltage Settle | Integrate | Hold | DAC1 | DAC2 | DAC1 | DAC2 | DAC1 | DAC2 | DAC1 | DAC2 | | Output Connected | |
| M_CON* | LO | LO | LO | LO | LO | LO | LO | LO | LO | LO | LO | LO | LO | LO | LO | LO | LO | LO | LO | X | X |
| VERIFY* | HI | HI | HI | HI | HI | HI | HI | HI | HI | HI | HI | HI | HI | HI | LO | LO | LO | LO | LO | X | X |
| FORCE_I* | HI | HI | HI | HI | HI | HI | HI | HI | HI | HI | LO | LO | LO | LO | HI | HI | LO | LO | X | X | X |
| FORCE_EN* | LO | LO | LO | LO | LO | LO | LO | LO | LO | LO | LO | LO | LO | LO | LO | LO | LO | LO | LO | X | HI |
| DAC1_SEL* | LO | HI | LO | HI | LO | LO | LO | HI | HI | HI | LO | HI | LO | HI | LO | HI | LO | HI | X | X | X |
| INTEG* | HI | HI | HI | HI | HI | LO | LO | HI | LO | LO | HI | HI | HI | HI | HI | HI | HI | HI | X | X | X |
| HOLD* | HI | HI | HI | HI | HI | HI | LO | HI | HI | LO | HI | HI | HI | HI | HI | HI | HI | HI | X | X | X |
| I_RANGE0* | LO | LO | HI | HI | HI | HI | HI | HI | HI | HI | LO | LO | HI | HI | X | X | X | X | X | X | X |
| I_RANGE1* | HI | HI | LO | LO | HI | HI | HI | HI | HI | HI | HI | HI | LO | LO | X | X | X | X | X | X | X |
| OUTPUT_CON* | LO | LO | LO | LO | LO | LO | LO | LO | LO | LO | LO | LO | LO | LO | LO | LO | LO | LO | LO | HI | LO |

AD53508

PPMU APPLICATION NOTES

The PPMU can be used in two modes: 1. VOLTAGE FORCE with CURRENT MEASURE or VERIFY CURRENT FORCE; 2. CURRENT FORCE with VOLTAGE MEASURE or VERIFY VOLTAGE FORCE. In both modes the following setup is recommended:

1. The value of the external integrate capacitor (EXT_RC to C1) is 10 nF.
2. MEAS_OUT pin is loaded with 1 MΩ to ground.
3. $V_{CC} = 15.0\text{ V}$, $V_{DD} = 4.5\text{ V}$, $DIGGND = 0.0\text{ V}$, $V_{EE} = -10\text{ V}$, $DSR = 2.5\text{ V}$ unless otherwise stated.
4. A 10 Ω resistor in series with the FORCE pin.
5. A 1 kΩ resistor in series with the SENSE pin.

IN VOLTAGE FORCE WITH CURRENT MEASURE OR VERIFY CURRENT FORCE

To measure the leakage in the current measure and hold mode, the PPMU has to be into the Force Voltage/Measure Current Integrate mode.

1. The FORCE_A (Force Output) pin has to be programmed to 9 V.
2. The PPMU has to be programmed to INTEGRATE mode.
3. The PPMU has to be programmed to HOLD mode.
4. Sample MEAS_OUT.
5. Wait 100 ms.
6. Sample MEAS_OUT again.
7. The difference between 2 and 4 must be less than 15 mV.

The linearity tests for forcing voltage are as follows (at the FORCE pin):

1. The four ranges of CURRENT MEASURE ranges (200 nA, 20 μA, 200 μA, and 2 mA) correspond to F1, F2, F3, and F4.
2. The endpoints of the linearity curve are determined by -full scale (or LOW), and the +full scale (or HIGH) readings at the same FORCE pin current.
3. Using these endpoints, gain nonlinearity is computed and tested at the 1/4 scale, 1/2 scale, and 3/4 scale points.

4. Computations for F1 are:

$$F1 \times 0.25 = \text{LOW} + 1 \times (\text{HIGH} - \text{LOW})/4$$

$$F1 \times 0.50 = \text{LOW} + 2 \times (\text{HIGH} - \text{LOW})/4$$

$$F1 \times 0.75 = \text{LOW} + 3 \times (\text{HIGH} - \text{LOW})/4$$

Where LOW = -Full Scale and HIGH = +Full Scale.

The linearity tests for measuring current are as follows (at the MEAS_OUT pin):

1. The voltage is constant for these measurements.
2. The four ranges (M1, M2, M3, M4) correspond to CURRENT MEASURE ranges (200 nA, 20 μA, 200 μA, and 2 mA respectively).
3. The endpoints of the linearity curve are determined by the -full scale (or LOW), and the +full scale (or HIGH) readings at the same FORCE pin voltage.
4. Using these endpoints, gain nonlinearity is computed and tested at the 1/4 scale, 1/2 scale, and 3/4 scale points.

5. Computations for M1 are:

$$M1 \times 0.25 = \text{LOW} + 1 \times (\text{HIGH} - \text{LOW})/4$$

$$M1 \times 0.50 = \text{LOW} + 2 \times (\text{HIGH} - \text{LOW})/4$$

$$M1 \times 0.75 = \text{LOW} + 3 \times (\text{HIGH} - \text{LOW})/4$$

Where LOW = -Full Scale, and HIGH = +Full Scale.

The M_CON pin can be used for disconnecting the MEAS_OUT pin by:

1. Raising M_CON to 2.4 V.
2. Measuring MEAS_OUT (which is loaded with 100 kΩ).
3. MEAS_OUT should ideally be 0 V.

The OUTPUT_CON pin can be used for disconnecting the DUT by:

1. Disabling the SENSE pin (OUTPUT_CON = 2.4 V).
2. Loading FORCE_OUT with 2 kΩ to ground.
3. Programming the DAC1 input to +FS (+9 V) and measuring the FORCE_OUT voltage (FV1).
4. Programming the DAC1 input to -FS (-4 V) and measuring the FORCE_OUT voltage (FV2).
5. $FV1 - FV2 < 1.3\text{ mV}$.
6. A change of 1.3 mV implies a switch off-resistance of 20 MΩ.

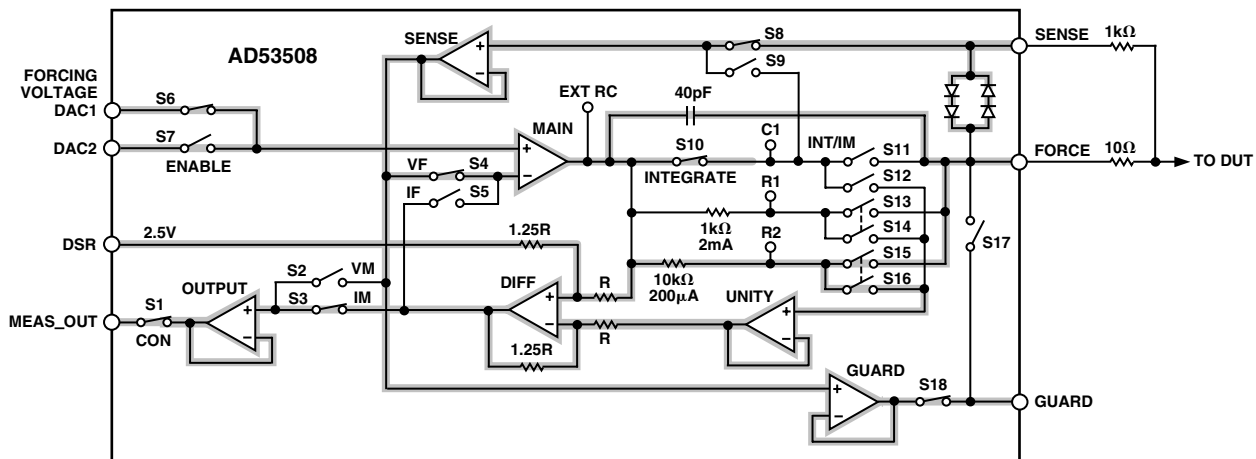


Figure 2. Guarded Voltage Force/Current Measure, $I_{\text{RANGE } 1}: I \leq 2\text{ mA}$

IN CURRENT FORCE WITH VOLTAGE MEASURE OR VERIFY CURRENT FORCE

The linearity tests for forcing current at the FORCE pin:

1. The FORCE pin is loaded with a voltage source.
2. The two ranges of CURRENT FORCE ranges (2 mA and 200 μ A) correspond to F1 and F2. The endpoints of the linearity curve are determined by full scale (or LOW), and the full scale (or HIGH) readings at the same FORCE pin voltage.
3. Using these endpoints, gain nonlinearity is computed and tested at the 1/4 scale, 1/2 scale, and 3/4 scale points.
4. Computations for F1 are:
 $F1 \times 0.25 = LOW + 1 \times (HIGH - LOW)/4$
 $F1 \times 0.50 = LOW + 2 \times (HIGH - LOW)/4$
 $F1 \times 0.75 = LOW + 3 \times (HIGH - LOW)/4$

Where LOW = -Full Scale and HIGH = +Full Scale.

The linearity test for measuring voltage is as follows (at the MEAS_OUT pin):

1. The endpoints of the linearity curve are determined by the -full scale (or LOW), and the +full scale (or HIGH) readings.
 2. Using these endpoints, gain nonlinearity is computed and tested at the 1/4 scale, 1/2 scale, and 3/4 scale points.
 3. Computations for M1 are:
 $M1 \times 0.25 = LOW + 1 \times (HIGH - LOW)/4$
 $M1 \times 0.50 = LOW + 2 \times (HIGH - LOW)/4$
 $M1 \times 0.75 = LOW + 3 \times (HIGH - LOW)/4$
- Where LOW = -Full Scale, and HIGH = +Full Scale.

CURRENT FORCE WITH VOLTAGE MEASURE (2 mA RANGE)

1. DAC1 = 5 V.
2. FORCE pin loaded with 9 V source.
3. Measure current at FORCE.
4. Measure voltage at MEAS_OUT.
5. $V_{CC} = 15$ V.
6. Measure current at FORCE and compare to 3.

7. Measure voltage at MEAS_OUT and compare to 4.
8. $V_{CC} = 15$ V.
9. DAC1 = 0 V.
10. FORCE pin loaded with -4 V source.
11. Measure current at FORCE.
12. Measure voltage at MEAS_OUT.
13. $V_{EE} = -9.5$ V.
14. Measure current at FORCE and compare to 11.
15. Measure voltage at MEAS_OUT and compare to 12.
16. $V_{EE} = -10$ V.

VOLTAGE FORCE WITH CURRENT MEASURE (2 mA RANGE)

1. DAC1 = 9 V.
2. FORCE pin loaded with 2 mA current source.
3. Measure voltage at FORCE.
4. Measure current at MEAS_OUT.
5. $V_{CC} = 14.25$ V.
6. Measure voltage at FORCE and compare to 3:
Limit = ± 237 μ V.
7. Measure current at MEAS_OUT and compare to 4:
Limit = ± 237 μ V.
8. $V_{CC} = 15$ V.
9. DAC1 = -4 V.
10. FORCE pin loaded with 2 mA current sink.
11. Measure voltage at FORCE.
12. Measure current at MEAS_OUT.
13. $V_{EE} = -9.5$ V.
14. Measure voltage at FORCE and compare to 11:
Limit = ± 474 μ V.
15. Measure current at MEAS_OUT and compare to 12.
16. $V_{EE} = -10$ V.

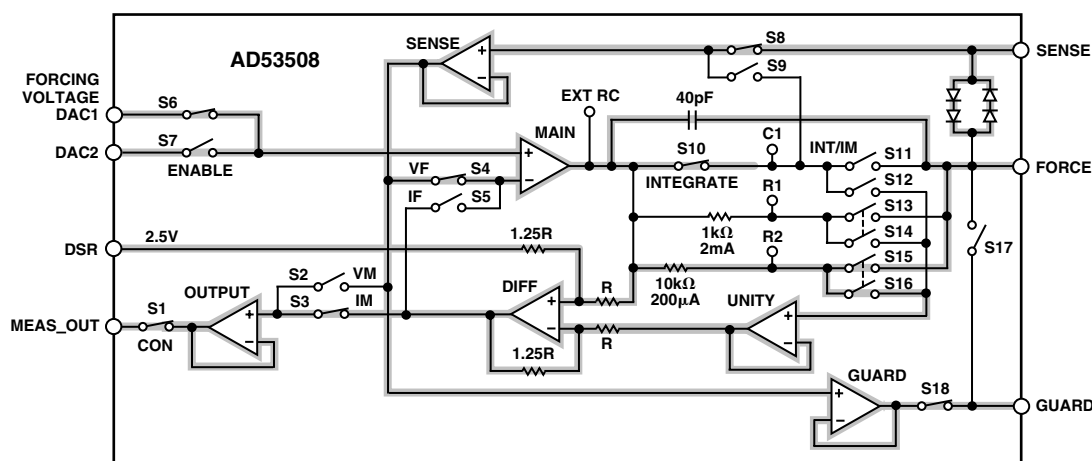


Figure 3. Guarded Current Force/Voltage Measure, $I_{RANGE 1}: I \leq 2$ mA

AD53508

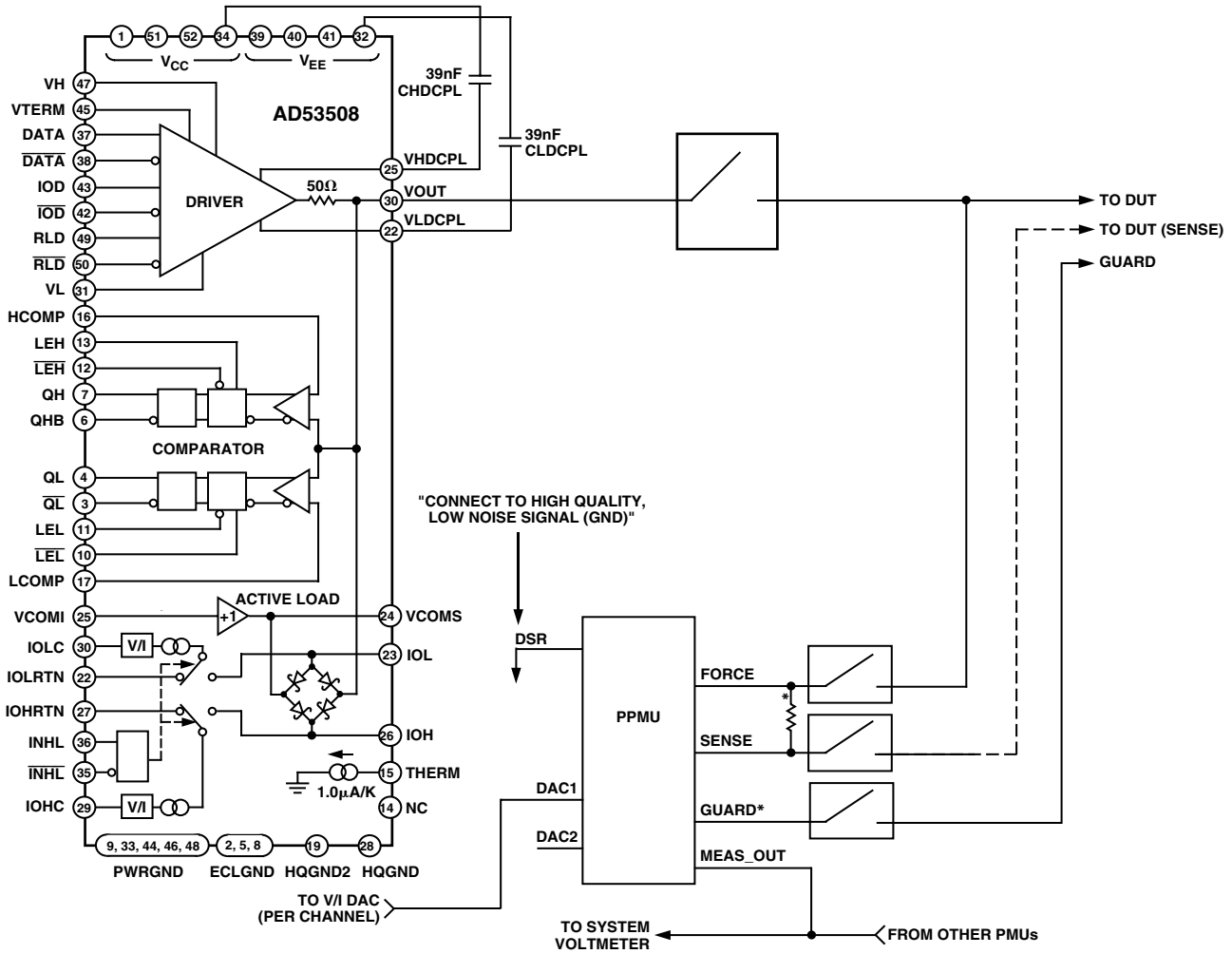


Figure 4. Recommended Use of the PPMU with a DCL

OUTLINE DIMENSIONS

Dimensions shown in inches and (mm).

44-Lead Plastic Leaded Chip Carrier (PLCC) (P-44A)

