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## REVISION HISTORY

**4/2018—Rev. 0 to Rev. A**

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Changes to Ordering Guide ... 9

**9/2010—Revision 0: Initial Version**

# SPECIFICATIONS

## ELECTRICAL SPECIFICATIONS

$V_S$ = 6.0 V, $T_A$ = 25°C, unless otherwise noted.

**Table 1.**

| Parameter | Symbol | Conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| OUTPUT VOLTAGE<br>T Grade | $V_{OUT}$ | $I_{OUT}$ = 0 mA | <br>4.990 | <br>5.000 | <br>5.010 | <br>V |
| INITIAL ACCURACY<br>T Grade | | $I_{OUT}$ = 0 mA | <br>−10 | | <br>+10<br>0.20 | <br>mV<br>% |
| LINE REGULATION<br>T Grade | $\Delta V_{OUT}/\Delta V_{IN}$ | 6.0 V to 15 V, $I_{OUT}$ = 0 mA | | <br>40 | <br>150 | <br>ppm/V |
| LOAD REGULATION<br>T Grade | $\Delta V_{OUT}/\Delta I_{LOAD}$ | $V_S$ = 6.0 V, $I_{OUT}$ = 0 mA to 5 mA | | <br>30 | <br>150 | <br>ppm/mA |
| LONG-TERM STABILITY | $\Delta V_{OUT}$ | After 1000 hours of operation @ 125°C | | 50 | | ppm |
| VOLTAGE NOISE | $e_{N\,p-p}$ | f = 0.1 Hz to 10 Hz | | 15 | | µV p-p |
| VOLTAGE NOISE DENSITY | $e_N$ | f = 1 kHz | | 640 | | nV/√Hz |

$V_S$ = 6.0 V, $T_A$ = −25°C to +85°C, unless otherwise noted.

**Table 2.**

| Parameter | Symbol | Conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| TEMPERATURE COEFFICIENT<br>T Grade | $TCV_{OUT}$ | $I_{OUT}$ = 0 mA | | <br>10 | <br>25 | <br>ppm/°C |
| LINE REGULATION<br>T Grade | $\Delta V_{OUT}/\Delta V_{IN}$ | 6.0 V to 15 V, $I_{OUT}$ = 0 mA | | <br>50 | <br>200 | <br>ppm/V |
| LOAD REGULATION<br>T Grade | $\Delta V_{OUT}/\Delta I_{LOAD}$ | $V_S$ = 6.0 V, $I_{OUT}$ = 0 mA to 5 mA | | <br>30 | <br>200 | <br>ppm/mA |

$V_S$ = 6.0 V, $T_A$ = −55°C to +125°C, unless otherwise noted.

**Table 3.**

| Parameter | Symbol | Conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| TEMPERATURE COEFFICIENT | $TCV_{OUT}$ | $I_{OUT}$ = 0 mA | | | | |
| T Grade | | | | 10 | 30 | ppm/°C |
| LINE REGULATION | $\Delta V_{OUT}/\Delta V_{IN}$ | 6.0 V to 15 V, $I_{OUT}$ = 0 mA | | | | |
| T Grade | | | | 70 | 250 | ppm/V |
| LOAD REGULATION | $\Delta V_{OUT}/\Delta I_{LOAD}$ | $V_S$ = 6.0 V, 0 mA to 5 mA | | | | |
| T Grade | | | | 30 | 300 | ppm/mA |
| SUPPLY CURRENT | $I_S$ | @ 25°C | | 11 | 15 | µA |
| | | | | 15 | 20 | µA |
| THERMAL HYSTERESIS | $V_{OUT-HYS}$ | | | | | |
| T Grade | | | | 157 | | ppm |

# ABSOLUTE MAXIMUM RATINGS

**Table 4.**

| Parameter | Rating |
|---|---|
| Supply Voltage | 18 V |
| Output Short-Circuit Duration to GND | Indefinite |
| Storage Temperature Range | −65°C to +150°C |
| Operating Temperature Range | −55°C to +125°C |
| Junction Temperature Range | −65°C to +150°C |
| Lead Temperature (Soldering, 60 sec) | 300°C |

Stresses at or above those listed under Absolute Maximum Ratings may cause permanent damage to the product. This is a stress rating only; functional operation of the product at these or any other conditions above those indicated in the operational section of this specification is not implied. Operation beyond the maximum operating conditions for extended periods may affect product reliability.

## THERMAL RESISTANCE

$\theta_{JA}$ is specified for worst-case conditions; that is, $\theta_{JA}$ is specified for the device in socket testing. In practice, $\theta_{JA}$ is specified for the device soldered in a circuit board.

**Table 5. Thermal Resistance**

| Package Type | $\theta_{JA}$ | $\theta_{JC}$ | Unit |
|---|---|---|---|
| 8-Lead TSSOP (RU-8) | 240 | 43 | °C/W |

## ESD CAUTION

**ESD (electrostatic discharge) sensitive device.** Charged devices and circuit boards can discharge without detection. Although this product features patented or proprietary protection circuitry, damage may occur on devices subjected to high energy ESD. Therefore, proper ESD precautions should be taken to avoid performance degradation or loss of functionality.

# TYPICAL PERFORMANCE CHARACTERISTICS

$T_A$ = 25°C, unless otherwise noted.

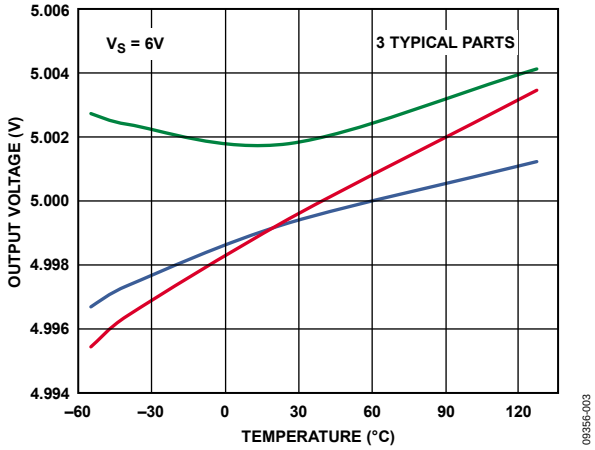


Figure 2. $V_{OUT}$ vs. Temperature

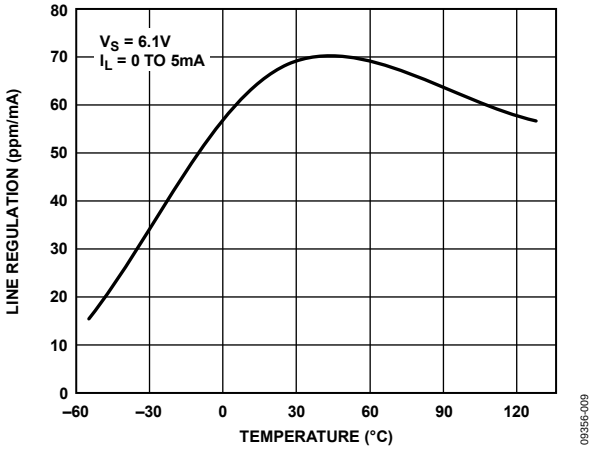


Figure 5. Load Regulation vs. Temperature

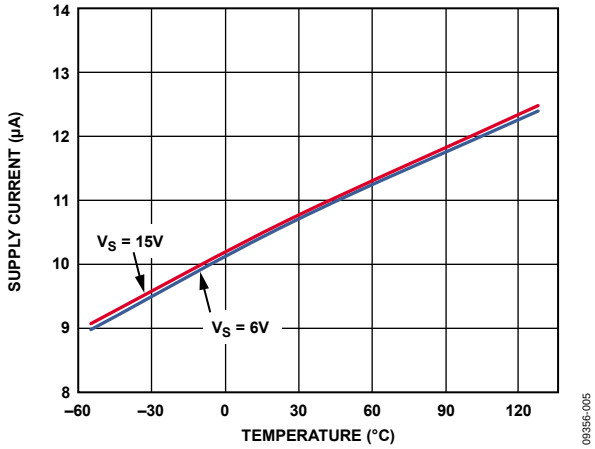


Figure 3. Supply Current vs. Temperature

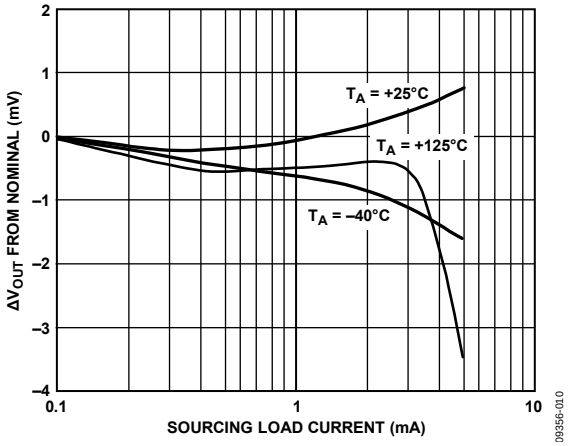


Figure 6. $\Delta V_{OUT}$ from Nominal vs. Load Current

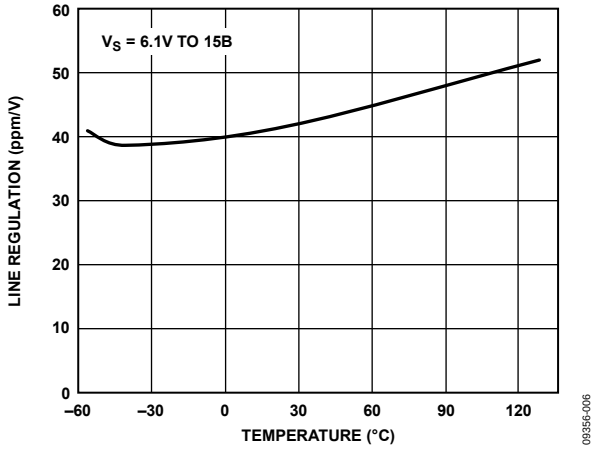


Figure 4. Line Regulation vs. Temperature

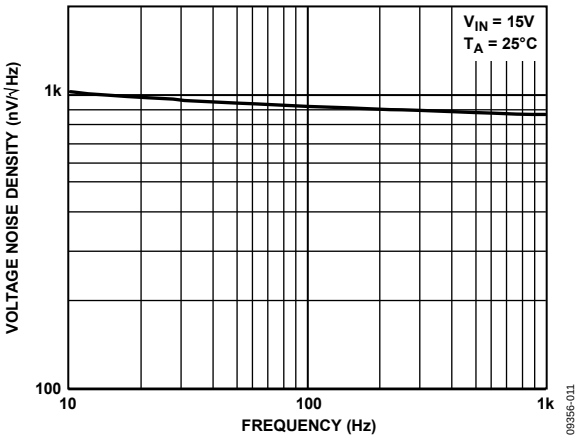


Figure 7. Voltage Noise Density vs. Frequency

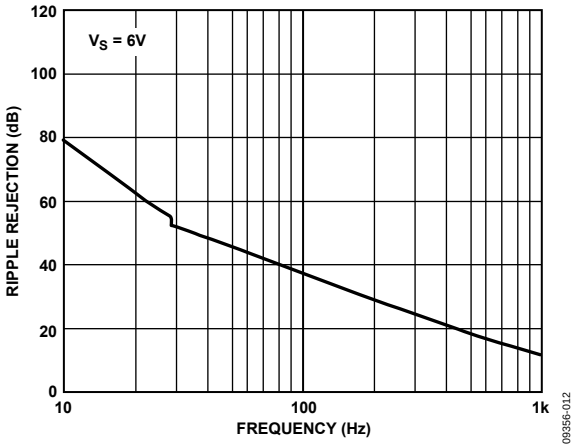


*Figure 8. Ripple Rejection vs. Frequency*

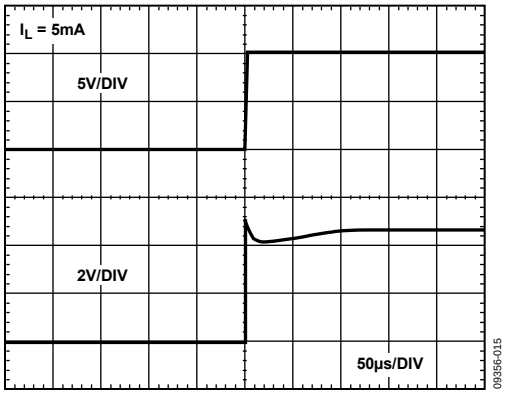


*Figure 11. Turn-On Time*

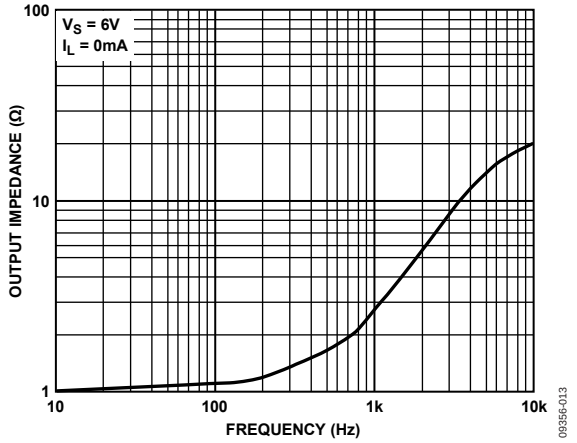


*Figure 9. Output Impedance vs. Frequency*

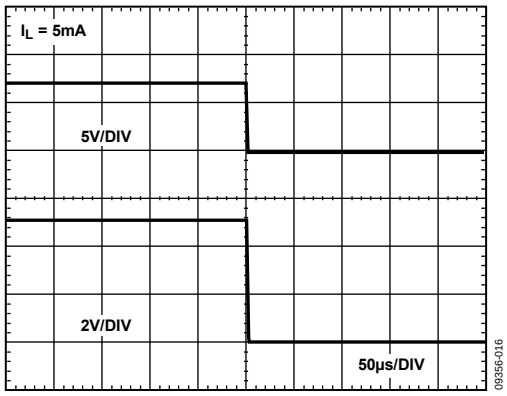


*Figure 12. Turn-Off Time*

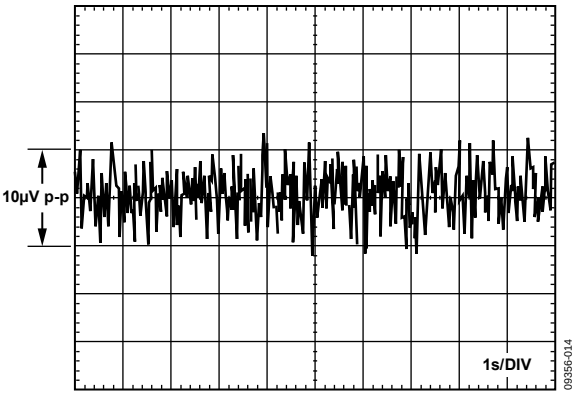


*Figure 10. 0.1 Hz to 10 Hz Noise*

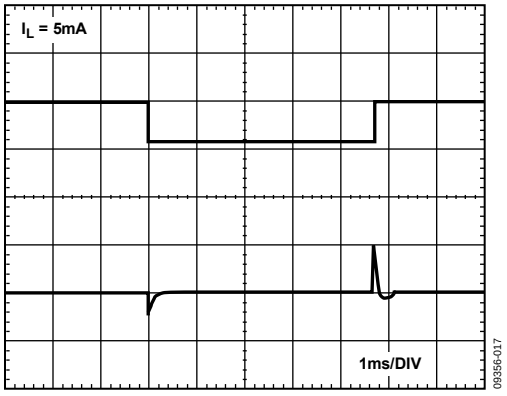


*Figure 13. Load Transient Response*

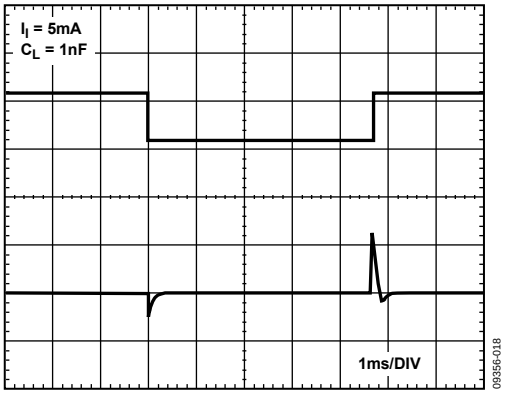


Figure 14. Load Transient Response

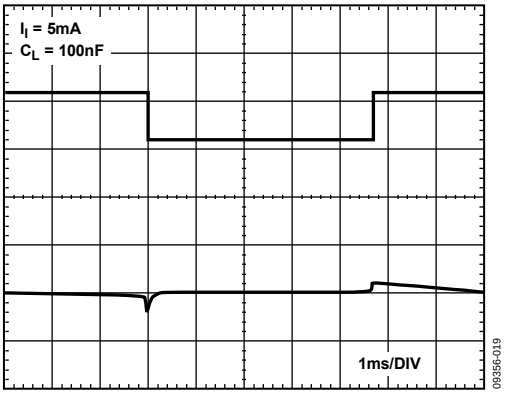


Figure 15. Load Transient Response

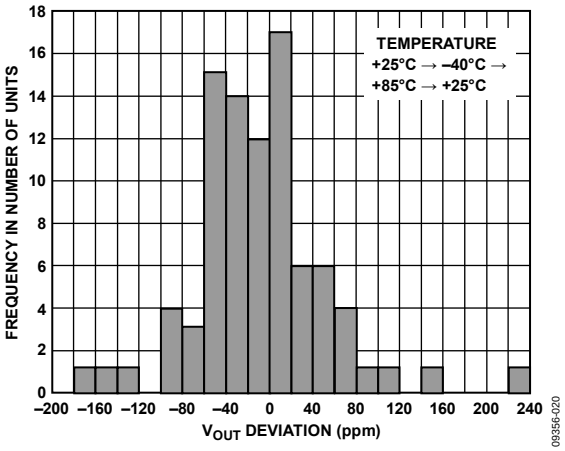


Figure 16. Typical Hysteresis for the ADR29x Product

# OUTLINE DIMENSIONS

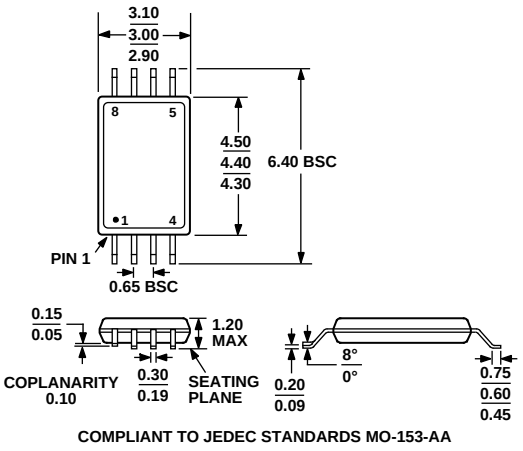


*Figure 17. 8-Lead Thin Shrink Small Outline Package [TSSOP]*
*(RU-8)*
*Dimensions shown in millimeters*

## ORDERING GUIDE

| Model[1] | Output Voltage (V) | Initial Accuracy (%) | Temperature Coefficient (ppm/°C max) | Temperature Range | Package Description | Package Option | Ordering Quantity |
|---|---|---|---|---|---|---|---|
| ADR293TRU-EP | 5.00 | 0.20 | 30 | −55°C to +125°C | 8-Lead TSSOP | RU-8 | 96 |
| ADR293TRU-EP-R7 | 5.00 | 0.20 | 30 | −55°C to +125°C | 8-Lead TSSOP | RU-8 | 1,000 |
| ADR293TRUZ-EP | 5.00 | 0.20 | 30 | −55°C to +125°C | 8-Lead TSSOP | RU-8 | 96 |
| ADR293TRUZ-EP-R7 | 5.00 | 0.20 | 30 | −55°C to +125°C | 8-Lead TSSOP | RU-8 | 1,000 |

[1] Z = RoHS Compliant Part.

## NOTES

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