Single-Channel, 12- and 16-Bit Programmable Current Output and Voltage Output Digital-to-Analog Converter for 4-mA to 20-mA Current Loop Applications

Check for Samples: DAC7760, DAC8760

FEATURES

- **Output Current: 4 mA to 20 mA; 0 mA to 20 mA; 0 mA to 24 mA**
- **Voltage Output:**
  - **0 V to 5 V; 0 V to 10 V; ±5 V; ±10 V**
  - **0 V to 5.5 V; 0 V to 11 V; ±5.5 V; ±11 V (10% Overrange)**
- **±0.1% FSR Total Unadjusted Error (TUE) Max**
- **DNL: ±1 LSB Max**
- **Simultaneous Voltage and Current Output**
- **Internal 5-V Reference (10 ppm/°C, max)**
- **Internal 4.5-V Power-Supply Generator**
- **HART® Compatible Input**
- **Reliability Features:**
  - **CRC and Frame Error Check**
  - **Watchdog Timer**
  - **Thermal Alarm**
  - **Open, Compliance Alarm, Short Current Limit**
  - **On-Chip Fault Alarm**
- **Wide Temperature Range: –40°C to +125°C**
- **6-mm × 6-mm QFN-40 and TSSOP-24 Packages**

APPLICATIONS

- **4-mA to 20-mA Current Loops**
- **Analog Output Modules**
- **Programmable Logic Controllers (PLCs)**
- **Sensors and Transducers**

DESCRIPTION

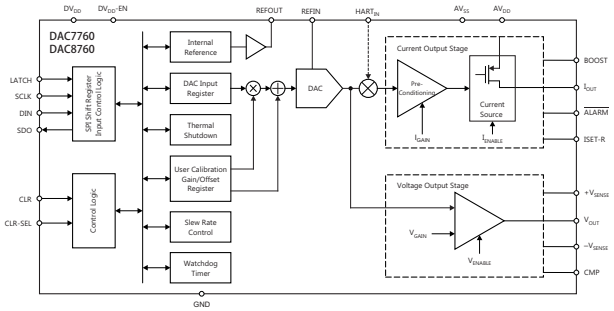
The DAC7760 and DAC8760 are low-cost, precision, fully-integrated, 12-bit and 16-bit digital-to-analog converters (DACs) designed to meet the requirements of industrial process control applications. The output can be programmed as a current output with a range of 4 mA to 20 mA, 0 mA to 20 mA, or 0 mA to 24 mA; or the output can be programmed as a voltage output with a range of 0 V to 5 V, 0 V to 10 V, ±5 V, or ±10 V, with a 10% overrange.

A user calibration can be performed on the zero and gain registers to calibrate the device in the end system. The output slew rate is also programmable via register. These devices include a power-on-reset function to ensure that the device powers up in a known state (both I_{OUT} and V_{OUT} are disabled and in a Hi-Z state). The CLR and CLR-SEL pins set the voltage outputs to zero-scale or midscale and the current output to the low end of the range if output is enabled. These devices are implemented with a HART signal interface to superimpose an external HART signal on the current output and can operate with either a single +10-V to +36-V supply, or dual supplies of up to ±18 V. All versions are available in both 6-mm × 6-mm QFN-40 and TSSOP-24 packages.

RELATED DEVICES

RESOLUTION (Bits)	CURRENT AND VOLTAGE OUTPUT	CURRENT OUTPUT
12	DAC7760	DAC7750
16	DAC8760	DAC8750

PRODUCT PREVIEW



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PRODUCT PREVIEW information concerns products in the formative or design phase of development. Characteristic data and other specifications are design goals. Texas Instruments reserves the right to change or discontinue these products without notice.

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PACKAGING INFORMATION

Orderable Device	Status (1)	Package Type	Package Drawing	Pins	Package Qty	Eco Plan (2)	Lead/Ball Finish	MSL Peak Temp (3)	Op Temp (°C)	Device Marking (4/5)	Samples
DAC8760IPWP	PREVIEW	HTSSOP	PWP	24	60	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-3-260C-168 HR	-40 to 125	DAC8760	
DAC8760IPWPR	PREVIEW	HTSSOP	PWP	24	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-3-260C-168 HR	-40 to 125	DAC8760	
DAC8760IRHAR	PREVIEW	VQFN	RHA	40	2500	Green (RoHS & no Sb/Br)	CU NIPDAUAG	Level-3-260C-168 HR	-40 to 125	DAC8760	
DAC8760IRHAT	PREVIEW	VQFN	RHA	40	250	Green (RoHS & no Sb/Br)	CU NIPDAUAG	Level-3-260C-168 HR	-40 to 125	DAC8760	

(1) The marketing status values are defined as follows:
ACTIVE: Product device recommended for new designs.
LIFEBUY: TI has announced that the device will be discontinued, and a lifetime-buy period is in effect.
NRND: Not recommended for new designs. Device is in production to support existing customers, but TI does not recommend using this part in a new design.
PREVIEW: Device has been announced but is not in production. Samples may or may not be available.
OBSOLETE: TI has discontinued the production of the device.

(2) Eco Plan - The planned eco-friendly classification: Pb-Free (RoHS), Pb-Free (RoHS Exempt), or Green (RoHS & no Sb/Br) - please check http://www.ti.com/productcontent for the latest availability information and additional product content details.
TBD: The Pb-Free/Green conversion plan has not been defined.
Pb-Free (RoHS): TI's terms "Lead-Free" or "Pb-Free" mean semiconductor products that are compatible with the current RoHS requirements for all 6 substances, including the requirement that lead not exceed 0.1% by weight in homogeneous materials. Where designed to be soldered at high temperatures, TI Pb-Free products are suitable for use in specified lead-free processes.
Pb-Free (RoHS Exempt): This component has a RoHS exemption for either 1) lead-based flip-chip solder bumps used between the die and package, or 2) lead-based die adhesive used between the die and leadframe. The component is otherwise considered Pb-Free (RoHS compatible) as defined above.
Green (RoHS & no Sb/Br): TI defines "Green" to mean Pb-Free (RoHS compatible), and free of Bromine (Br) and Antimony (Sb) based flame retardants (Br or Sb do not exceed 0.1% by weight in homogeneous material)

(3) MSL, Peak Temp. -- The Moisture Sensitivity Level rating according to the JEDEC industry standard classifications, and peak solder temperature.

(4) There may be additional marking, which relates to the logo, the lot trace code information, or the environmental category on the device.

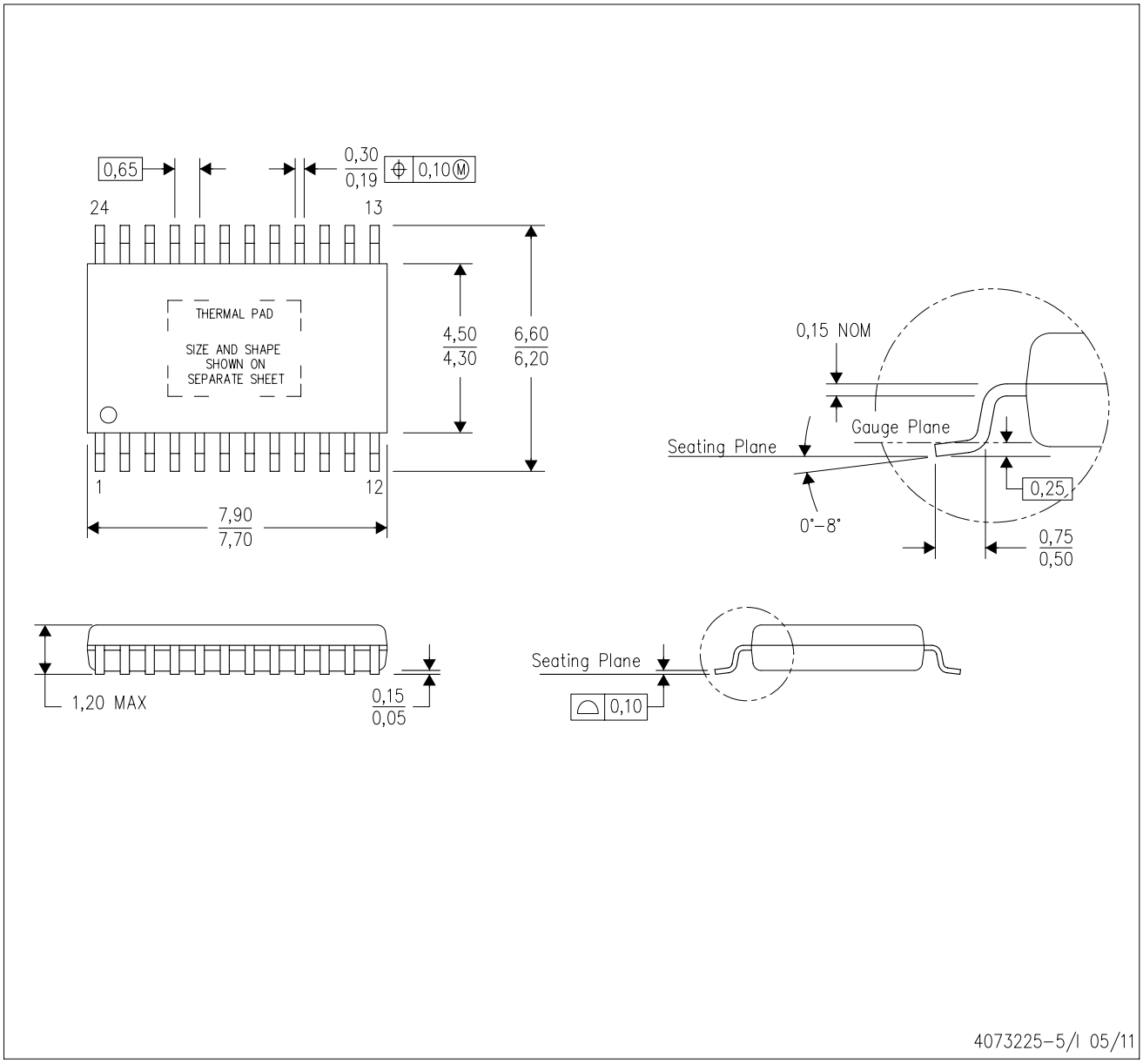
(5) Multiple Device Markings will be inside parentheses. Only one Device Marking contained in parentheses and separated by a "~" will appear on a device. If a line is indented then it is a continuation of the previous line and the two combined represent the entire Device Marking for that device.

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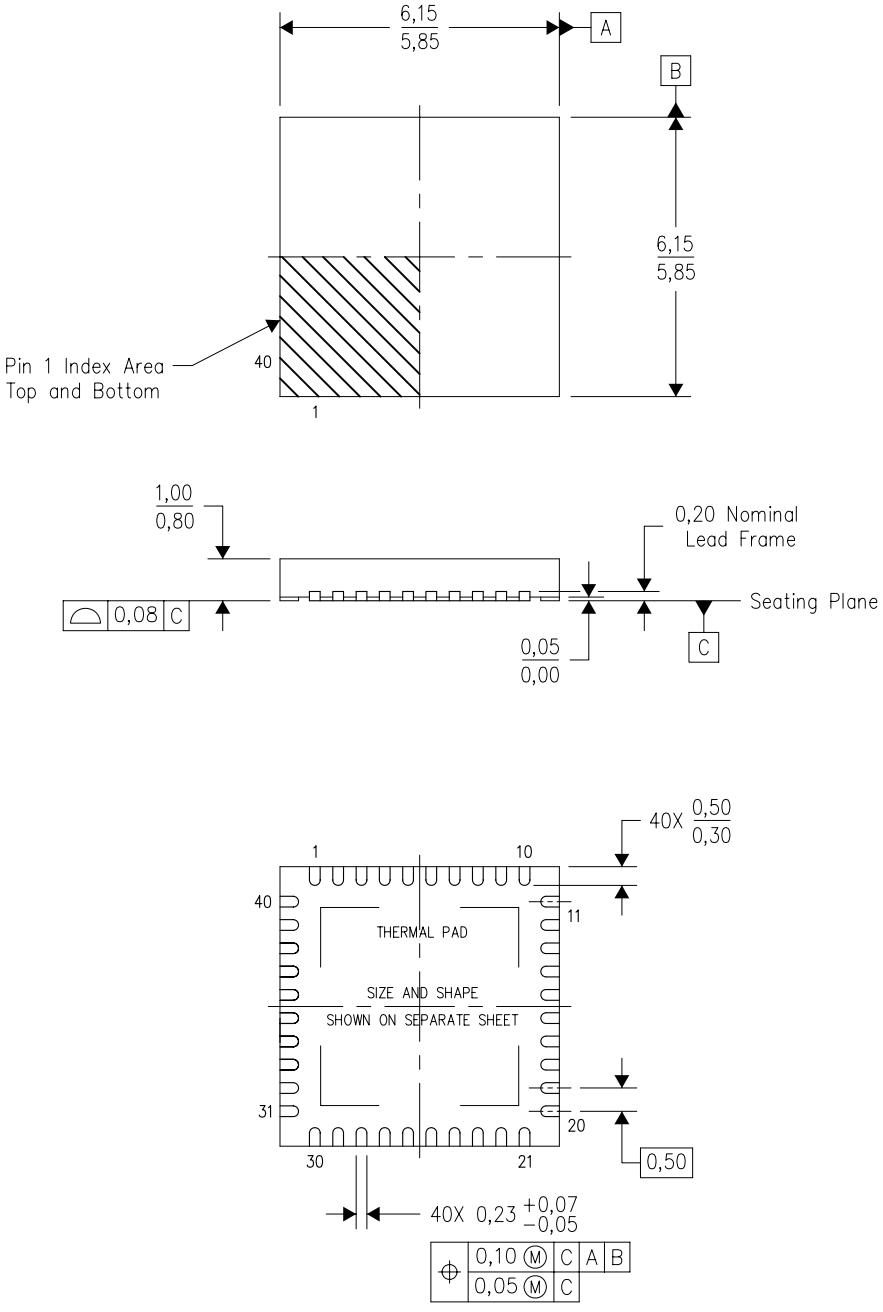
PWP (R–PDSO–G24) PowerPAD™ PLASTIC SMALL OUTLINE



NOTES:
A. All linear dimensions are in millimeters.
B. This drawing is subject to change without notice.
C. Body dimensions do not include mold flash or protrusions. Mold flash and protrusion shall not exceed 0.15 per side.
D. This package is designed to be soldered to a thermal pad on the board. Refer to Technical Brief, PowerPad Thermally Enhanced Package, Texas Instruments Literature No. SLMA002 for information regarding recommended board layout. This document is available at www.ti.com <http://www.ti.com>.
E. See the additional figure in the Product Data Sheet for details regarding the exposed thermal pad features and dimensions.
E. Falls within JEDEC MO–153

PowerPAD is a trademark of Texas Instruments.

RHA (S–PVQFN–N40) PLASTIC QUAD FLATPACK NO–LEAD



Bottom View

4204276/E 06/11

NOTES:
A. All linear dimensions are in millimeters. Dimensioning and tolerancing per ASME Y14.5M–1994.
B. This drawing is subject to change without notice.
C. QFN (Quad Flatpack No–Lead) Package configuration.
D. The package thermal pad must be soldered to the board for thermal and mechanical performance.
E. See the additional figure in the Product Data Sheet for details regarding the exposed thermal pad features and dimensions.
F. Package complies to JEDEC MO–220 variation VJJD–2.

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