ANALOG DEVICES

Single Channel, 18-Bit, Serial Input, Voltage Output DAC Evaluation Board
EVAL-AD5680

FEATURES

Full-featured evaluation board for AD5680
On-board reference
On-board ADC for voltage readback
Various link options
Direct hook up to USB port of PC
PC software for control of DACs
Surface-mount and through-hole area

GENERAL DESCRIPTION

This data sheet describes the evaluation board for the 18-bit AD5680 single channel DAC. The AD5680 has a maximum output voltage span of 5 V derived from an external reference voltage of 5 V. The reference voltage for this evaluation board is derived from the REF195, which has an output voltage of 5 V.

Full data on the AD5680 is found in the data sheets available from Analog Devices, Inc. and should be consulted in conjunction with this data sheet when using the evaluation board.

The evaluation board interfaces to the USB port of an IBM-compatible PC. The software available with the evaluation board allows the user to easily program the AD5680.

EVAL-AD5680

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REVISION HISTORY

11/07—Revision 0: Initial Version

OPERATING THE AD5680 EVALUATION BOARD

POWER SUPPLIES

The EVAL-AD5680 can be powered from the USB port. This is the default setup. It can also be powered by an external supply using the J6 and J7 power connectors

Both AGND and DGND inputs are provided on the board. The AGND and DGND planes are connected at one location close to the AD5680. It is recommended not to connect AGND and DGND elsewhere in the system to avoid ground loop problems.

Each supply is decoupled to the relevant ground plane with 10 µF and 0.1 µF capacitors. Each device supply pin is also decoupled with a 10 µF and 0.1 µF capacitor pair to the relevant ground plane.

FILTER

The AD5680 is suitable for closed-loop low bandwidth applications. Ideally, the system bandwidth acts as a filter on the DAC output.

A resistor capacitor network can be used to model the filter and the system bandwidth. R2 and C1 are available for this RC filter and have been left unpopulated for user flexibility.

Table 1. Link Options Setup for PC Controls

Link No.	Option
LK1	Inserted
LK2	A
LK3	Inserted
LK4	B
LK5	B
LK6	B
LK9	Inserted

LINK OPTIONS

A number of link and switch options on the evaluation board should be set for the required operating setup before using the board. The functions of these link options are described in detail in Table 2. The default setup is for control by the PC via the USB port. The default link options are listed in Table 1.

Table 2. Link Options

Link No.	Function
LK1	This link connects the V_{FB} pin to V_{OUT}.
LK2	This link selects whether the AD5680 evaluation board is controlled by the PC via the USB port or by an external source via the SMB connectors; J1, J3, J4. Position A: the evaluation board is controlled by the PC via the USB port. Position B: the evaluation board is controlled by an external source via the SMB connectors; J1, J3, J4.
LK3	This link connects external resistors and capacitor loads to the V_{OUT} pin of the AD5680. See the Filter section for more details.
LK4	This link selects the reference source. Position A: allows use of an alternative reference source. Position B: the on-board REF195 5 V reference is the reference source
LK5	This link selects the AVDD power supply source for the analog circuitry. Position A: J6 is the AVDD analog circuitry power supply source. Position B: the USB 5 V power supply is the AVDD analog circuitry power supply source.
LK6	This link selects the DVDD power supply source for the digital circuitry. Position A: J7 is the DVDD digital circuitry power supply source. Position B: the USB 5 V power supply source is the digital circuitry power supply source.
LK9	This link connects the V_{OUT} pin of the AD5680 to the V_{IN} pin of the AD7476 ADC so that the DAC output value can be monitored using the on-board ADC.

EVALUATION BOARD SOFTWARE

SOFTWARE INSTALLATION

The AD5680EB evaluation kit includes self-installing software on a CD-ROM. The software is compatible with Windows® 2000/Windows XP.

If the setup file does not run automatically when you insert the CD, run the **setup.exe** file directly from the CD.

Install the software before connecting the evaluation board to the PC's USB port to ensure that the evaluation board is correctly recognized when connected to the PC.

1. After the installation from the CD-ROM has completed, connect the AD5680 evaluation board to the PC's USB port using the cable supplied.
2. When the software detects the evaluation board, proceed through any dialog boxes that appear to finalize the installation.

SOFTWARE OPERATION

From the **Analog Devices** menu, click **Start > All Programs > Analog Devices >AD5680 >AD5680 Evaluation Software**.

For older PCs, click **Start > Programs > Analog Devices > AD5680 > AD5680 Evaluation Software**.
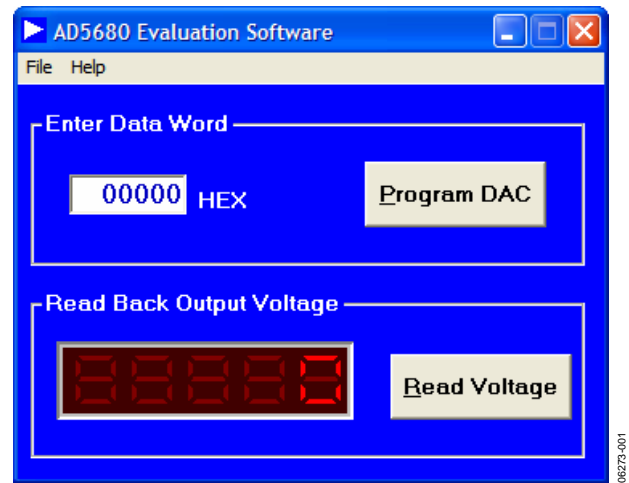
The main window opens, as shown in Figure 1.

Figure 1. Main Window

To program the DAC, under **Enter Data Word** type in the data word in hexadecimal format, and click **Program DAC**.

To read back the output voltage using the on-board ADC, click **Read Voltage**.

The DAC output voltage for the AD5680 is given by

$$V_{OUT} = V_{REF} \times \left(\frac{D}{262144} \right)$$
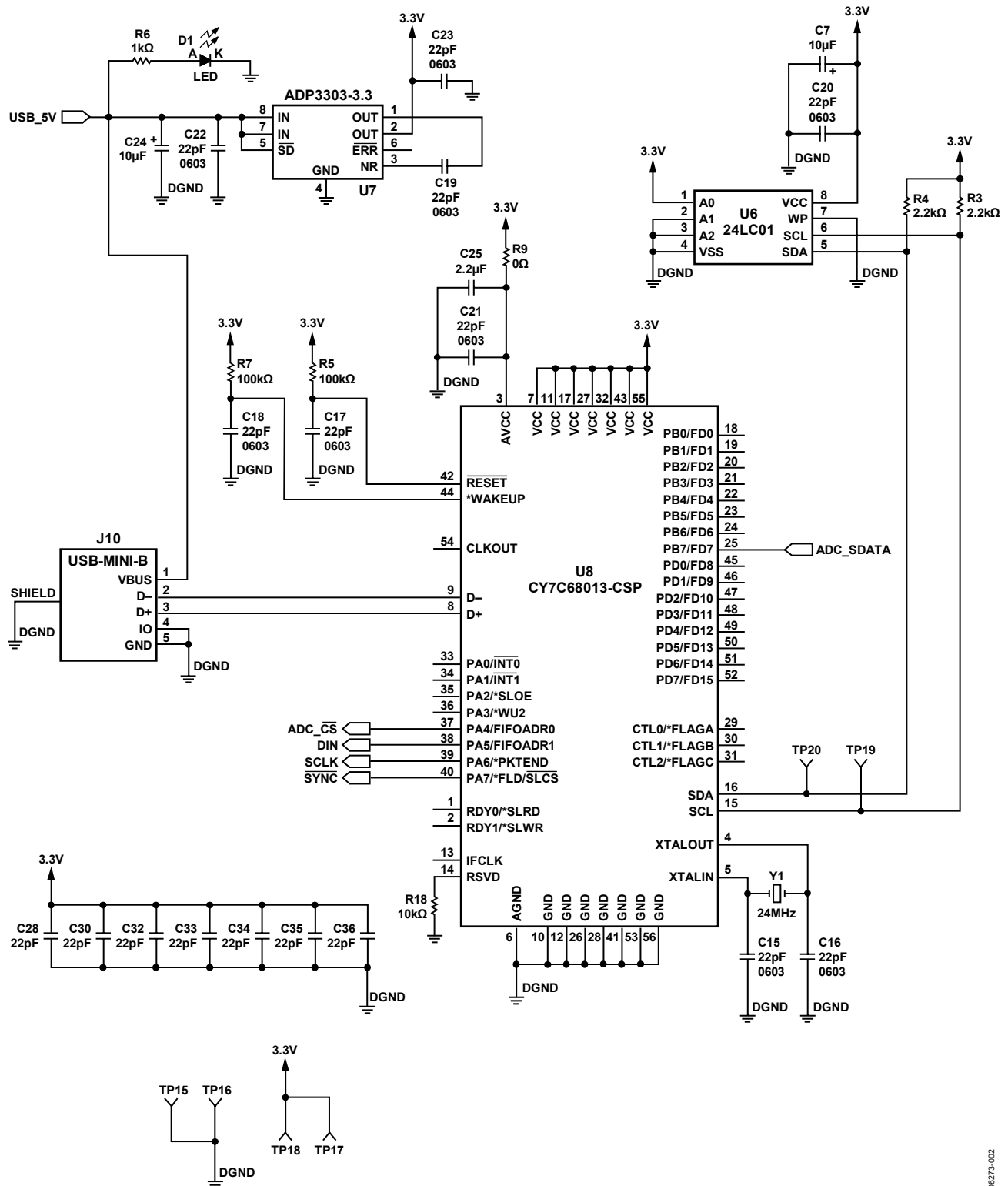
EVALUATION BOARD SCHEMATICS
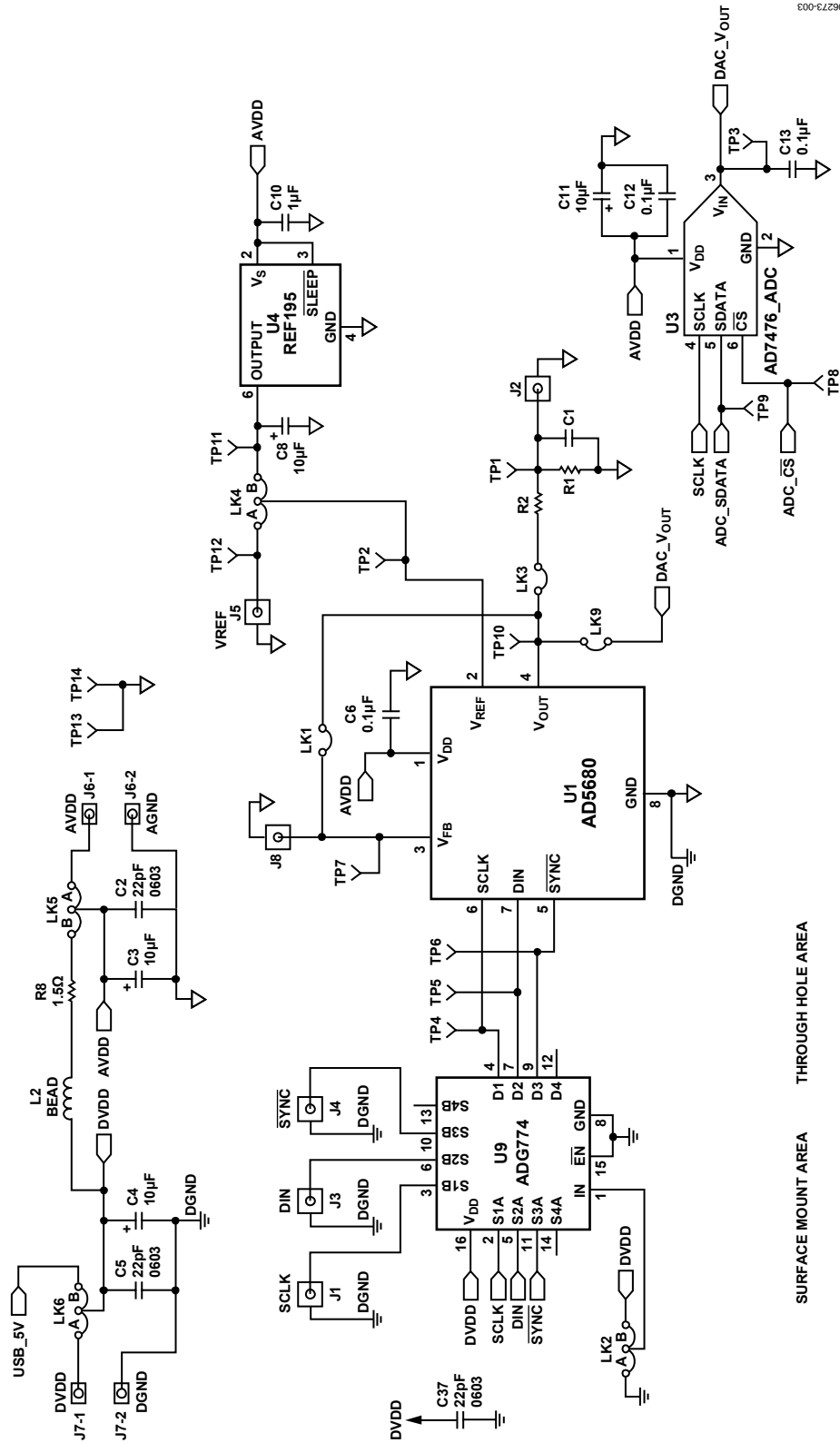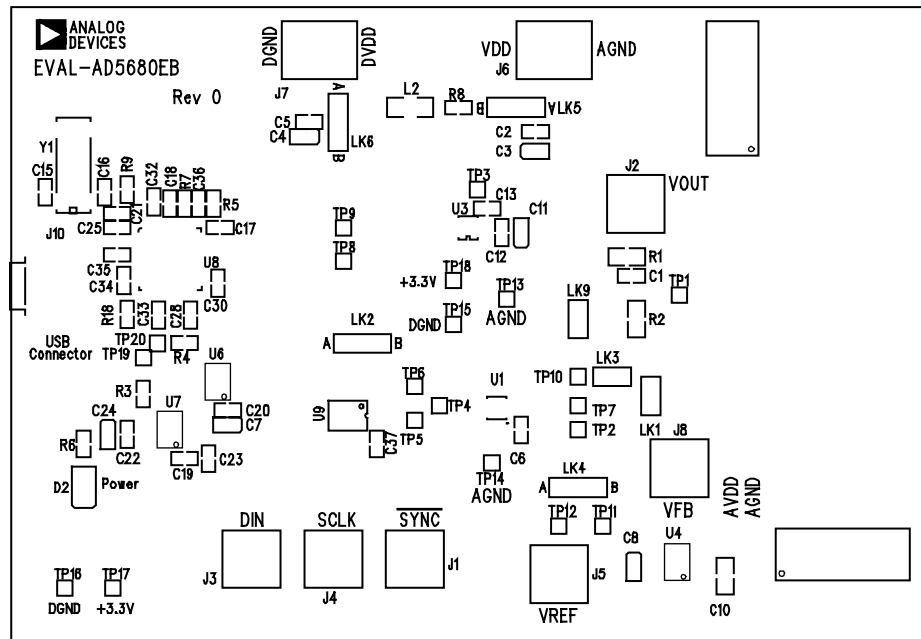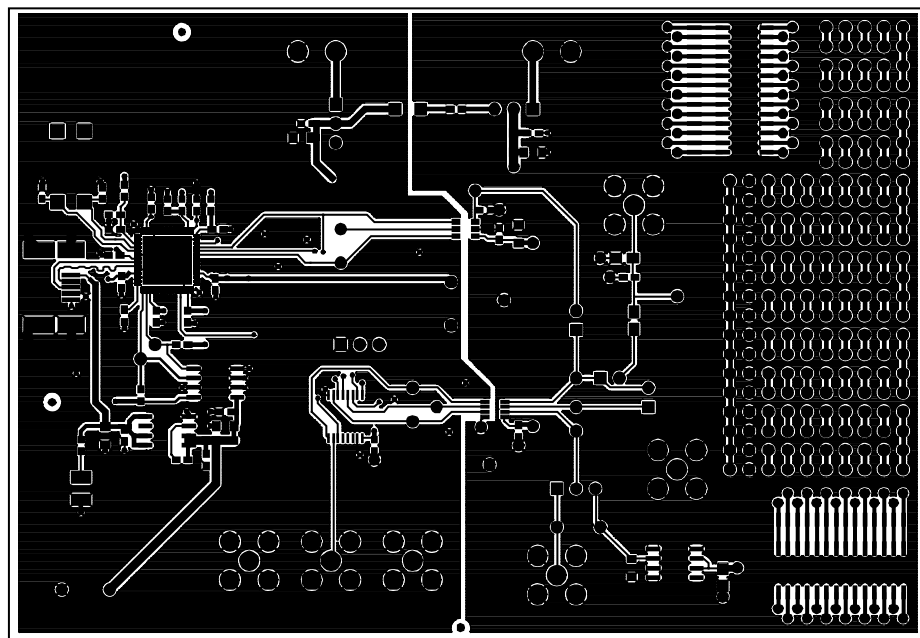

Figure 2. Schematic of Controller Circuitry
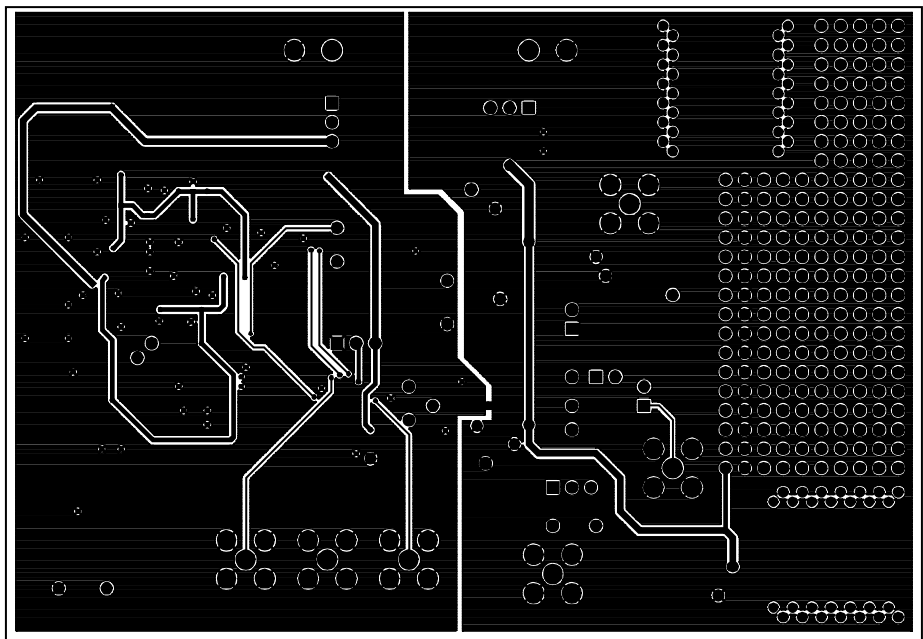
Figure 3. Schematic of AD5680 Circuitry

Figure 4. Component Placement Drawing

Figure 5. Component Side PCB Drawing

Figure 6. Solder Side PCB Drawing

ORDERING INFORMATION

COMPONENT LISTING

Table 3. Component Listing

Qty	Reference Designator	Description	Supplier/Part Number[1]
1	U1	AD5680BRJ-1 (8-lead SOT-23 package)	Analog Devices, Inc.
1	U3	AD7476ART (ADC)	Analog Devices, Inc.
1	U4	REF195	Analog Devices, Inc.
1	U6	24LC01	FEC 9758070
1	U7	ADP3303AR-3.3	Analog Devices, Inc.
1	U8	CY7C68013-CSP	CY7C68013-56LFC
1	U9	ADG774BRQ	Analog Devices, Inc.
1	Y1	24 MHz crystal	FEC 950-9658
1	C1	C1 (not inserted)	
6	C3, C4, C7, C8, C11, C24	10 µF tantalum cap (TAJ-A package)	FEC 197-130
4	C6, C12, C13	0.1 µF multilayer ceramic cap	FEC 1216538
1	C10	1 µF (0805 package)	FEC 318-8899
19	C2, C5, C15 to C23, C28, C30, C32 to C37	22 pF (0603 package)	FEC 722-005
1	C25	2.2 µF (0603 package)	Digikey 490-1552-1-ND
1	D1	LED	FEC 5790852
1	J10	USB-Mini-B	FEC 476-8309
6	J1 to J5, J8	Gold 50 Ω SMB jack	FEC 1206013
1	L2	Ferrite Bead	FEC 9526862
2	J6, J7	Power connectors	FEC 151-789
3	LK1, LK3, LK9	Header (2 × 1 pin)	FEC 1022247 & 150-411
4	LK2, LK4 to LK6	Header (3 × 1 pin)	FEC 1022249 & 150-411
1	R1	R1 (not inserted)	
1	R2	R2 (not inserted)	
1	R9	0 Ω (0805 package)	FEC 9331662
2	R3, R4	2.2 kΩ (0603 package)	FEC 9330810
2	R5, R7	100 kΩ (0603 package)	FEC 933-0402
1	R6	1 kΩ (0603 package)	FEC 933-0380
1	R8	1.5 Ω	FEC 9330640
1	R18	10 kΩ (0603 package)	FEC 933-0399
19	TP1 to TP20	Testpoint	FEC 8731128

[1] FEC = Farnell Electronics Components.

ORDERING GUIDE

Model	Package Description
EVAL-AD5680EBZ	AD5680 Evaluation Board Kit

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.

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