

## OPA2810DGK Evaluation Module

The OPA2810DGKEVM is an evaluation module for the dual-channel OPA810 amplifier in the DGK (VSSOP-8) package. OPA810 is a FET-input, voltage-feedback operational amplifier with extremely low input bias current. The OPA2810DGKEVM is designed to quickly and easily demonstrate the functionality and versatility of the amplifier. The EVM is ready to connect to power, signal source, and test instruments through the use of onboard connectors. The EVM is configured for easy connection with common 50- $\Omega$  laboratory equipment at its inputs and outputs. Each amplifier is configured for single-ended input with a non-inverting signal gain of 1 V/V at the device output. The OPA2810DGKEVM has a total onboard load of 2 k $\Omega$  to each amplifier. The output resistor network converts the output to a 50- $\Omega$  impedance source. The evaluation module can be easily configured for other functions, gains, and single- or split-supply operation.

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## 1 Features

This EVM supports the following features:

- Configured for split-supply operation and easily modified for single supply
- Default gain of 1-V/V configuration can be easily reconfigured for other gains
- Designed for easy connection to standard 50-Ω input and output impedance test equipment
- Simple interface to the inputs and outputs through the SMA connectors

## 2 EVM Specifications

Table 1 lists the EVM specifications.

**Table 1. EVM Specifications**

	PARAMETER	VALUE
	Single-supply voltage range ( $V_- = \text{ground}$ )	4.75 V to 27 V
$V_{S\pm}$	Split-supply voltage range	$\pm 2.375$ V to $\pm 13.5$ V
$I_{O\pm}$	Supply current (no load)	3.5 mA per amplifier
	Input voltage	$V_{S\pm}, \text{Max}$
$I_{OUT}$	Linear output drive	$\pm 50$ mA

## 3 Power Connections

The OPA2810DGKEVM is equipped with test point connectors for easy connection of power. The positive supply input is red and is labeled V+. The negative supply input is yellow and is labeled V-. The ground is black and is labeled GND.

### 3.1 Split-Supply Operation

To operate as split supply, apply the positive-supply voltage to V+, negative-supply voltage to V-, and the ground reference from supply to GND.

### 3.2 Single-Supply Operation

To operate as single supply, connect both the V- connector and the GND connector to ground and apply the positive-supply voltage to V+. Inputs and outputs must be biased per the specifications listed in the data sheet for proper operation.

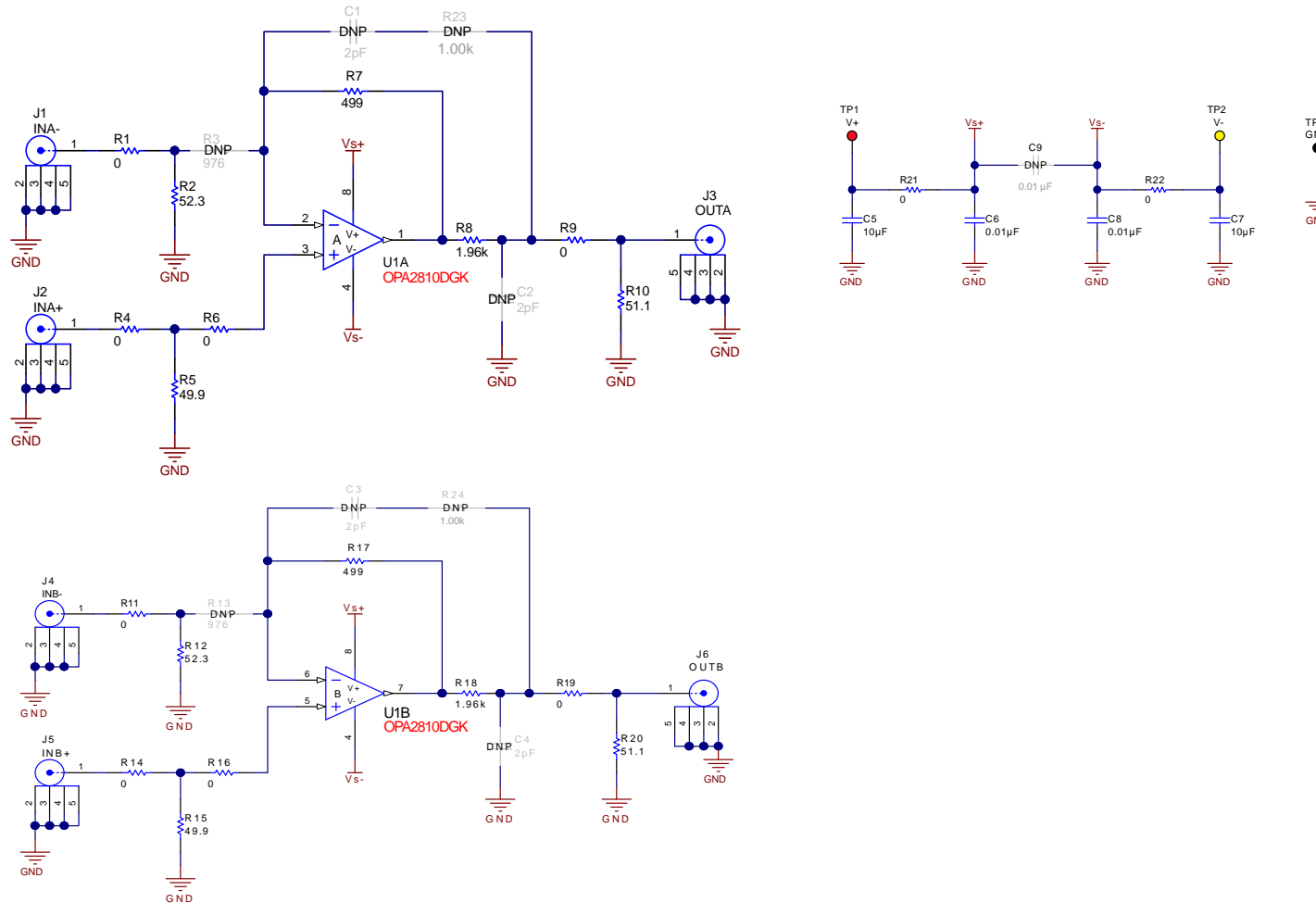
## 4 Input and Output Connections

The OPA2810DGKEVM is equipped with SMA connectors for connection of signal generators and analysis equipment. As shipped, the EVM is configured for a non-inverting gain of 1 V/V, split-supply operation, single-ended input and output with 50-Ω termination. For best results, signals must be routed to and from the EVM with cables having 50-Ω characteristic impedance. INA+ (J2) and INB+ (J5) must be used for single-ended input with 50-Ω source. OUTA (J3) and OUTB (J6) are the output connectors for amplifiers A and B respectively. A resistor network (R8, R9, and R10 for amplifier A; R18, R19, and R20 for amplifier B) at the output of the amplifiers convert the output signal to 50-Ω single-ended source, and provides a 2-kΩ load to the amplifier when terminated with 50-Ω load at J3 and J6. A 50-Ω line-impedance match at OUTA (J3) and OUTB (J6) must be preserved. This results in an output measurement loss, and the overall attenuation is approximately 38 dB. See the applications section, schematics, and layouts in the OPA2810 data sheet: [OPA2810 Dual High-Performance, Low-Power, Wide Supply Range, Rail-to-Rail Input/Output FET-Input Operational Amplifier](#), for more details on how to reconfigure the EVM.

## 5 OPA2810DGKEVM Schematic, Layout, PCB 3D render, and Bill of Materials

### 5.1 Schematic

Figure 1 illustrates the EVM schematic.



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See the OPA2810 data sheet for recommended operating conditions.

Figure 1. OPA2810DGKEVM Schematic

## 5.2 OPA2810DGKEVM Layers

Figure 2 to Figure 5 show the OPA2810DGKEVM layers.

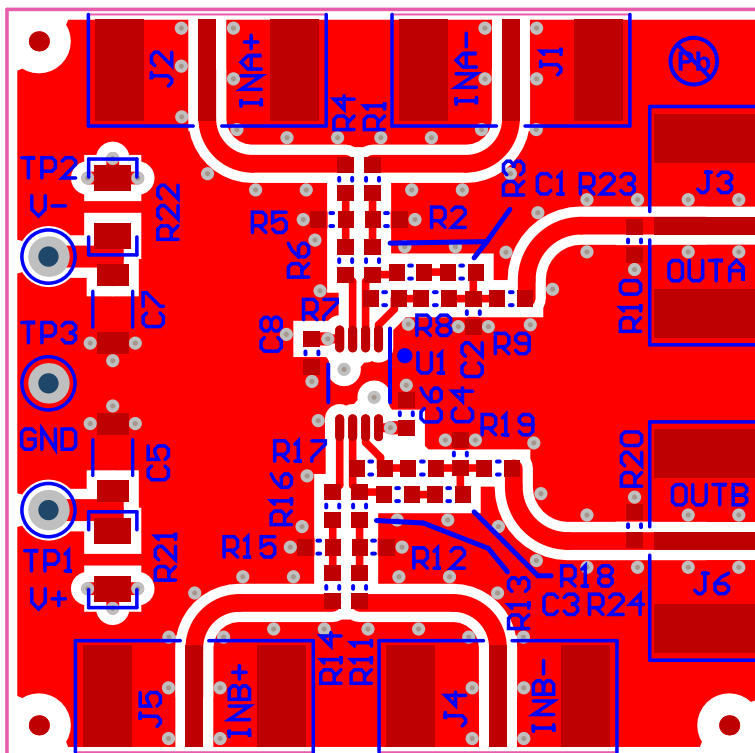


Figure 2. OPA2810DGKEVM Top Layer, Signal

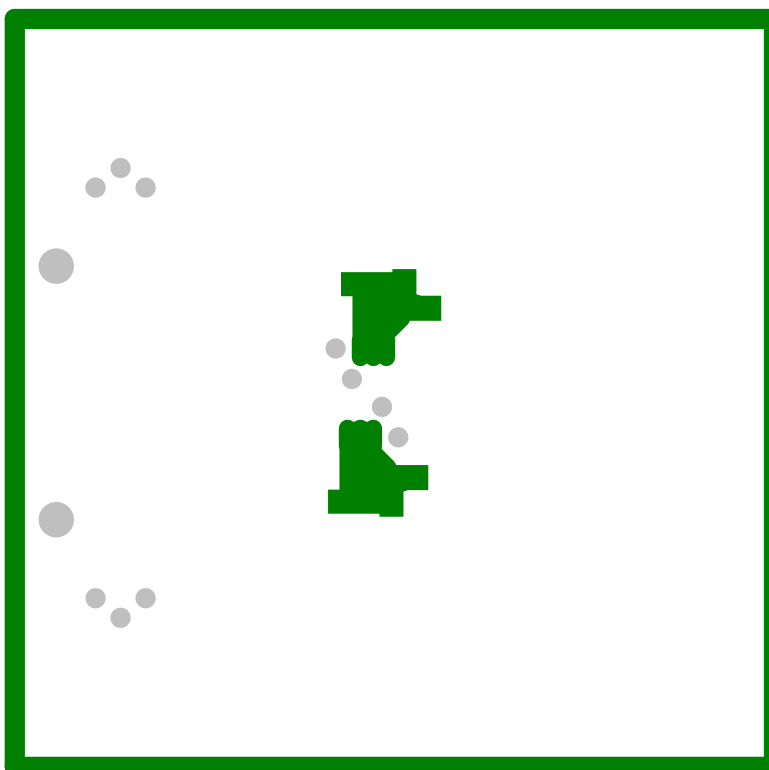


Figure 3. OPA2810DGKEVM Layer 2

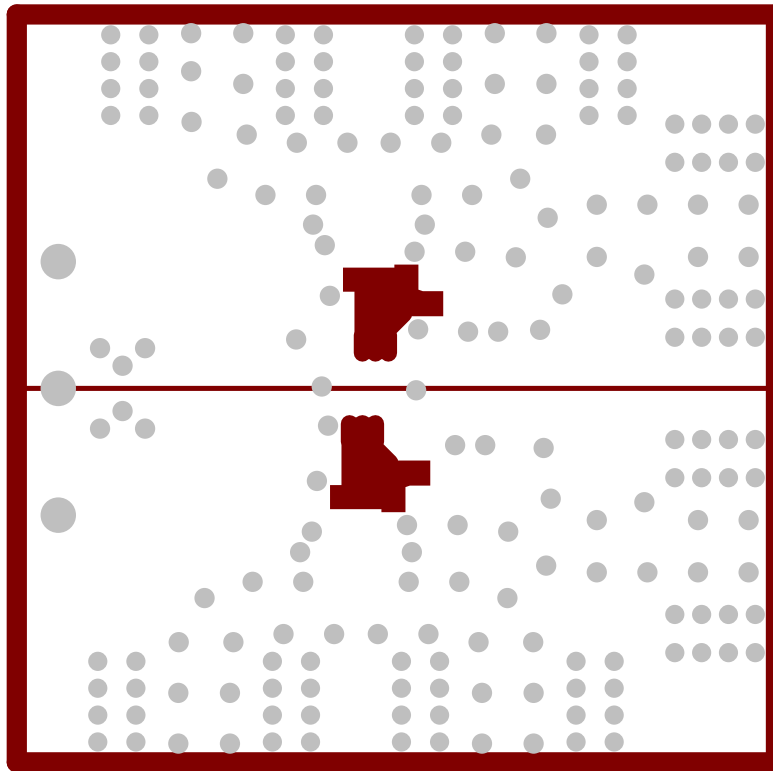


Figure 4. OPA2810DGKEVM Layer 3

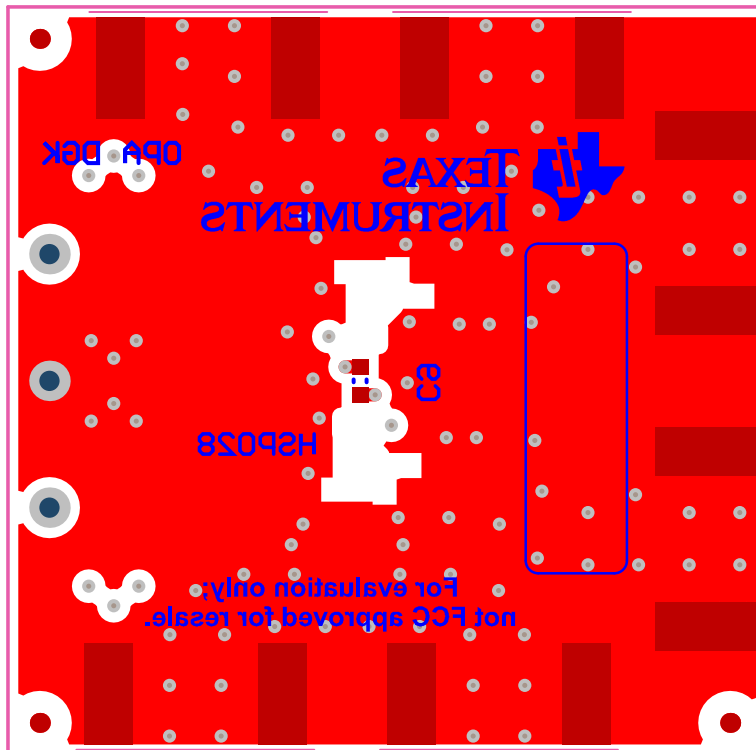


Figure 5. OPA2810DGKEVM Bottom Layer

### 5.3 PCB 3D render

Figure 6 and Figure 7 show the 3D renders of the PCB.

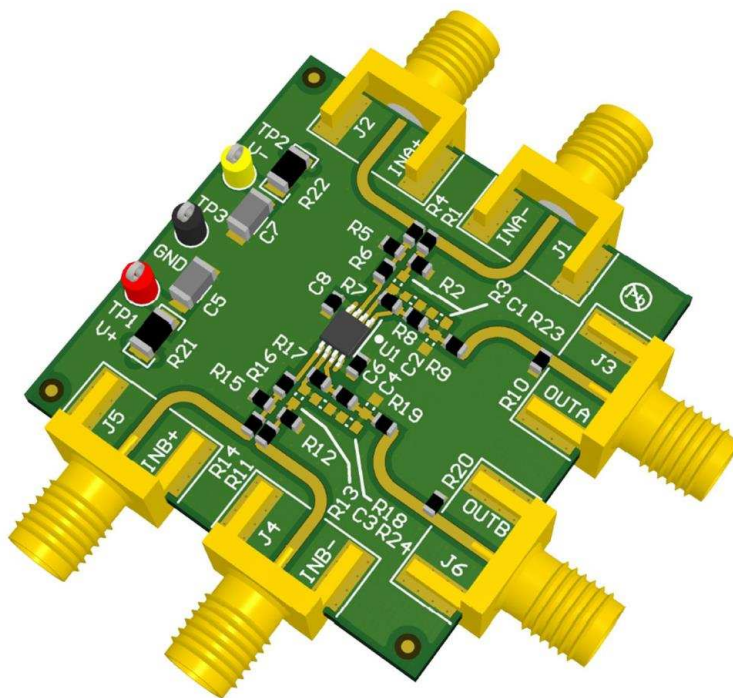


Figure 6. OPA2810DGKEVM 3D Render - Top



Figure 7. OPA2810DGKEVM 3D Render - Bottom

## 5.4 Bill of Materials

Table 2 lists the EVM bill of materials.

**Table 2. OPA2810DGKEVM Bill of Materials**

ITEM	PART REFERENCE	QUANTITY	PART NUMBER	MANUFACTURER	DESCRIPTION
1	C5, C7	2	C3216X6S1V106K160AC	TDK	CAP, CERM, 10 $\mu$ F, 35 V, +/- 10%, X6S, 1206
2	C6, C8	2	06031C103JAT2A	AVX	CAP, CERM, 0.01 $\mu$ F, 100 V, +/- 5%, X7R, 0603
3	J1, J2, J3, J4, J5, J6	6	142-0701-851	Emerson Network Power	Connector, End launch SMA, 50 ohm, SMT
4	R1, R4, R6, R9, R11, R14, R16, R19	8	CRCW06030000Z0EA	Vishay-Dale	RES, 0, 5%, 0.1 W, 0603
5	R2, R12	2	RC0603FR-0752R3L	Yageo America	RES, 52.3, 1%, 0.1 W, 0603
6	R5, R15	2	RC0603FR-0749R9L	Yageo America	RES, 49.9, 1%, 0.1 W, 0603
7	R7, R17	2	RG1608P-4990-B-T5	Susumu Co Ltd	RES, 499, 0.1%, 0.1 W, 0603
8	R8, R18	2	CRCW06031K96FKEA	Vishay-Dale	RES, 1.96 k, 1%, 0.1 W, 0603
9	R10, R20	2	CRCW060351R1FKEA	Vishay-Dale	RES, 51.1, 1%, 0.1 W, 0603
10	R21, R22	2	RC1206JR-070RL	Yageo America	RES, 0, 5%, 0.25 W, 1206
11	TP1	1	5000	Keystone	Test Point, Miniature, Red, TH
12	TP2	1	5004	Keystone	Test Point, Miniature, Yellow, TH
13	TP3	1	5001	Keystone	Test Point, Miniature, Black, TH
14	U1	1	OPA2810DGK	Texas Instruments	OPA2810DGK, DGK0008A (VSSOP-8)

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