



ABSTRACT

The OPA2863DGKEVM is an evaluation module for the dual-channel OPA2863 amplifier in the DGK (VSSOP-8) package. The OPA2863 is a low-power, unity-gain stable, rail-to-rail input/output, voltage-feedback operational amplifier designed to operate over a power-supply range of 2.7 V to 12.6 V. The OPA2863DGKEVM 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-Ω laboratory equipment at its inputs and outputs. Each amplifier is configured for single-ended inputs with a non-inverting signal gain of 1 V/V at the device output. The OPA2863DGKEVM has a total onboard load of 2 kΩ to each amplifier. The output resistor network converts the output to a 50-Ω impedance source. The evaluation module can be easily configured for other functions, gains, and single- or split-supply operation.

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Trademarks

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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 2-1 lists the EVM specifications.

Table 2-1. EVM Specifications

Parameter	Value
Single-supply voltage range (V_- = ground)	2.7 V to 12.6 V
$V_{S\pm}$ Split-supply voltage range	± 1.35 V to ± 6.3 V
$I_{Q\pm}$ Supply current (no load)	720 μ A per amplifier
Input voltage	$V_{S\pm}$, Max
I_{OUT} Linear output drive	± 30 mA

3 Power Connections

The OPA2863DGKEVM 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

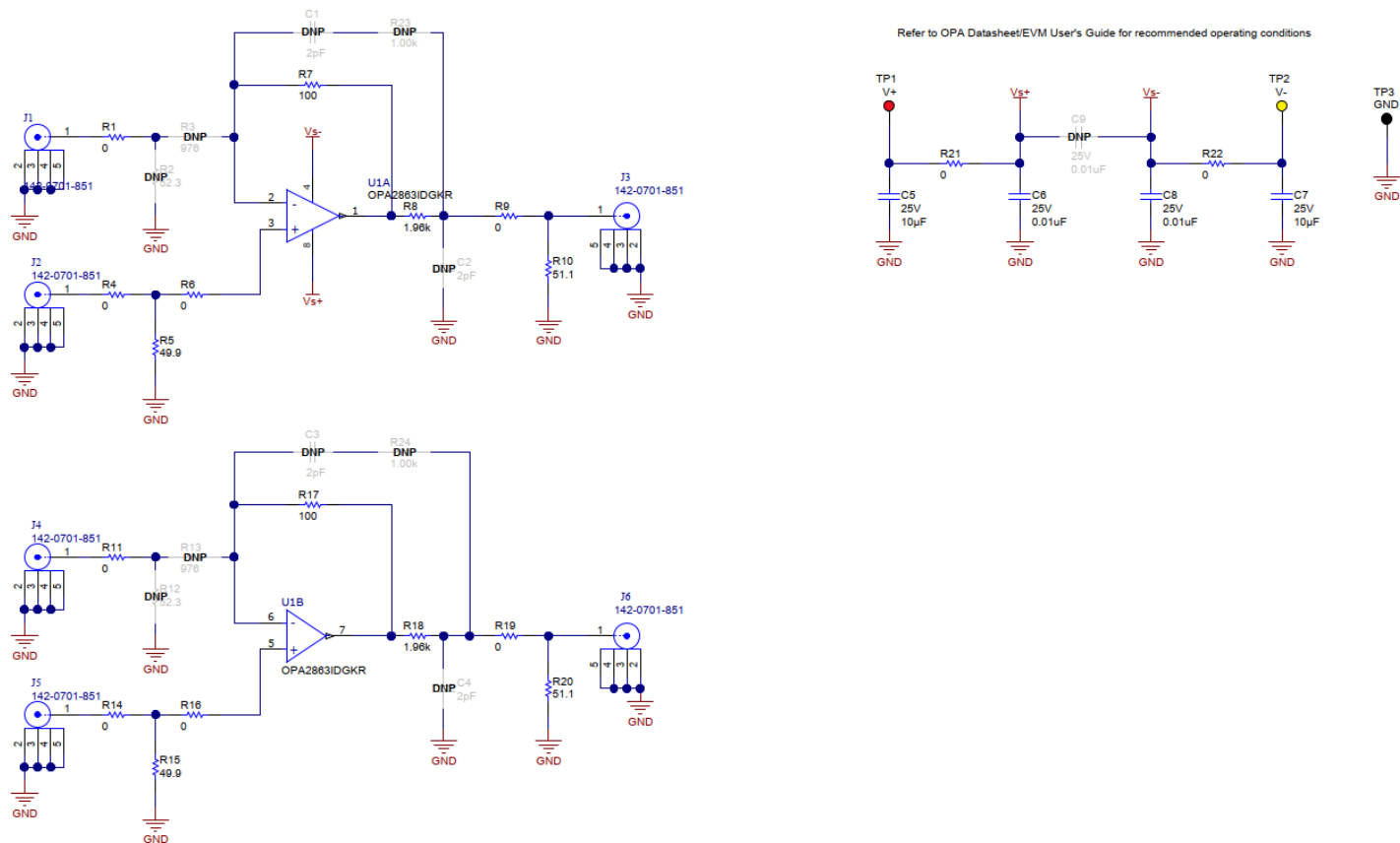
The OPA2863DGKEVM is equipped with SMA connectors for connection of signal generators and analysis equipment. As shipped, the EVM is configured for a non-inverting gain of 1 V/V, split-supply operation, single-ended input and output with 50-Ω termination. For best results, signals must be routed to and 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 [OPAx863 Low-Power, 100-MHz, Rail-to-Rail Input and Output, Voltage-Feedback Amplifier Data Sheet](#), for more details on how to reconfigure the EVM.

5 OPA2863DGKEVM Schematic, Layout, PCB 3D Render, and Bill of Materials

This section contains the EVM schematic, layout images, PCB 3D render images, and the bill of materials.

5.1 Schematic

Figure 5-1 illustrates the EVM schematic.



See the OPA2863 data sheet for recommended operating conditions.

Figure 5-1. OPA2863DGKEVM Schematic

5.2 OPA2863DGKEVM Layers

Figure 5-2 to Figure 5-5 show the OPA2863DGKEVM layers.

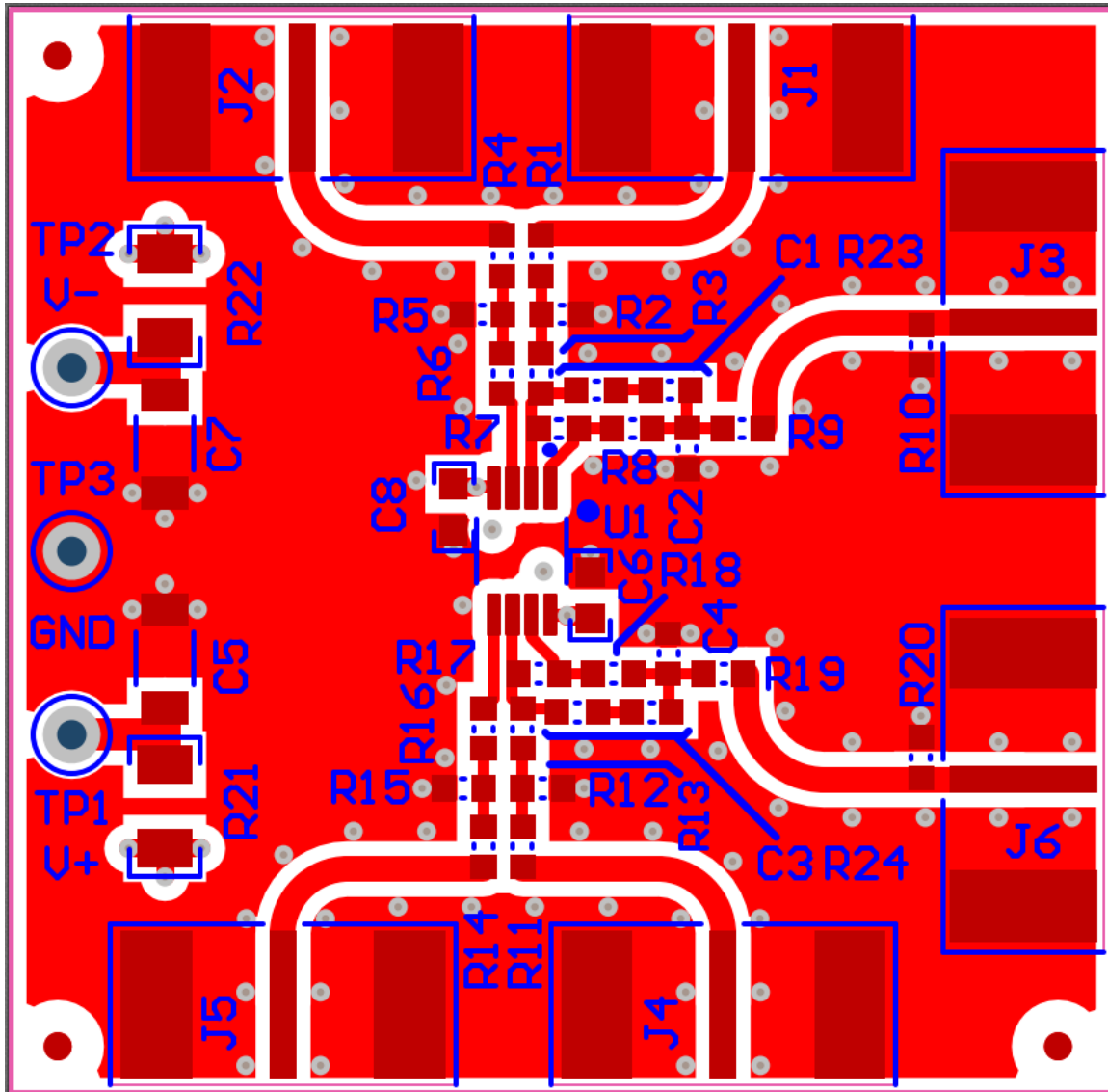


Figure 5-2. OPA2863DGKEVM Top Layer, Signal

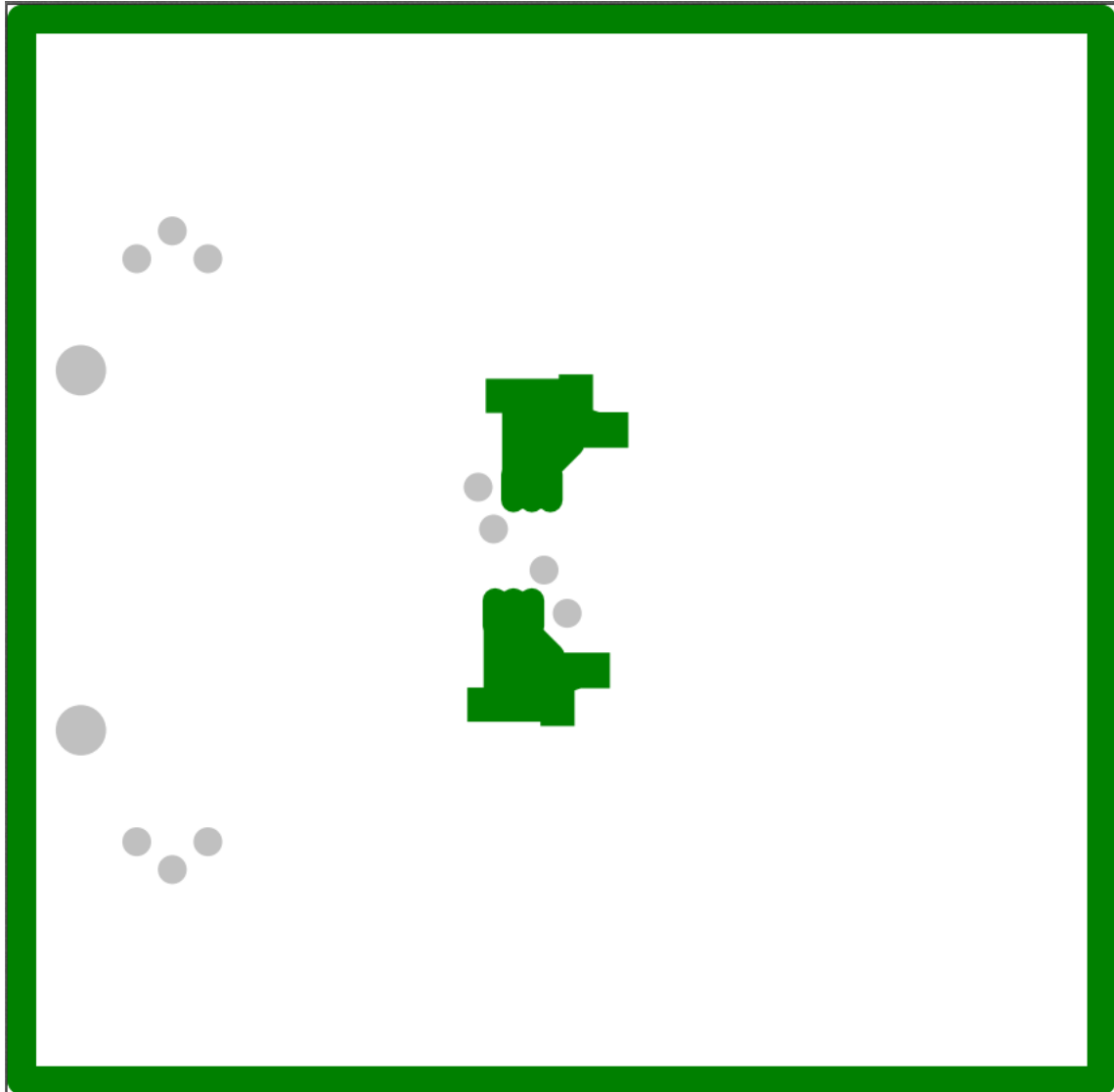


Figure 5-3. OPA2863DGKEVM Layer 2

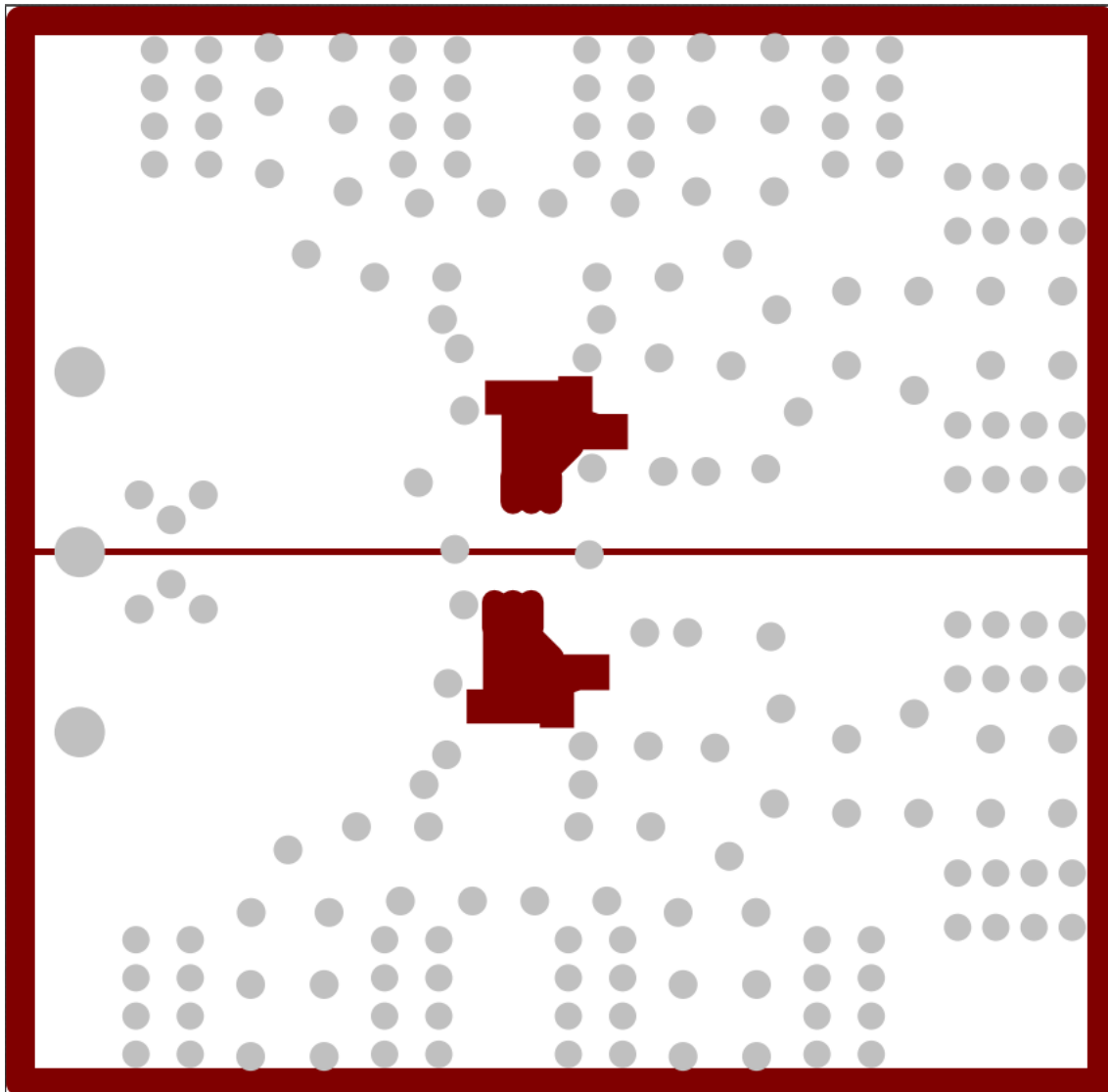


Figure 5-4. OPA2863DGKEVM Layer 3

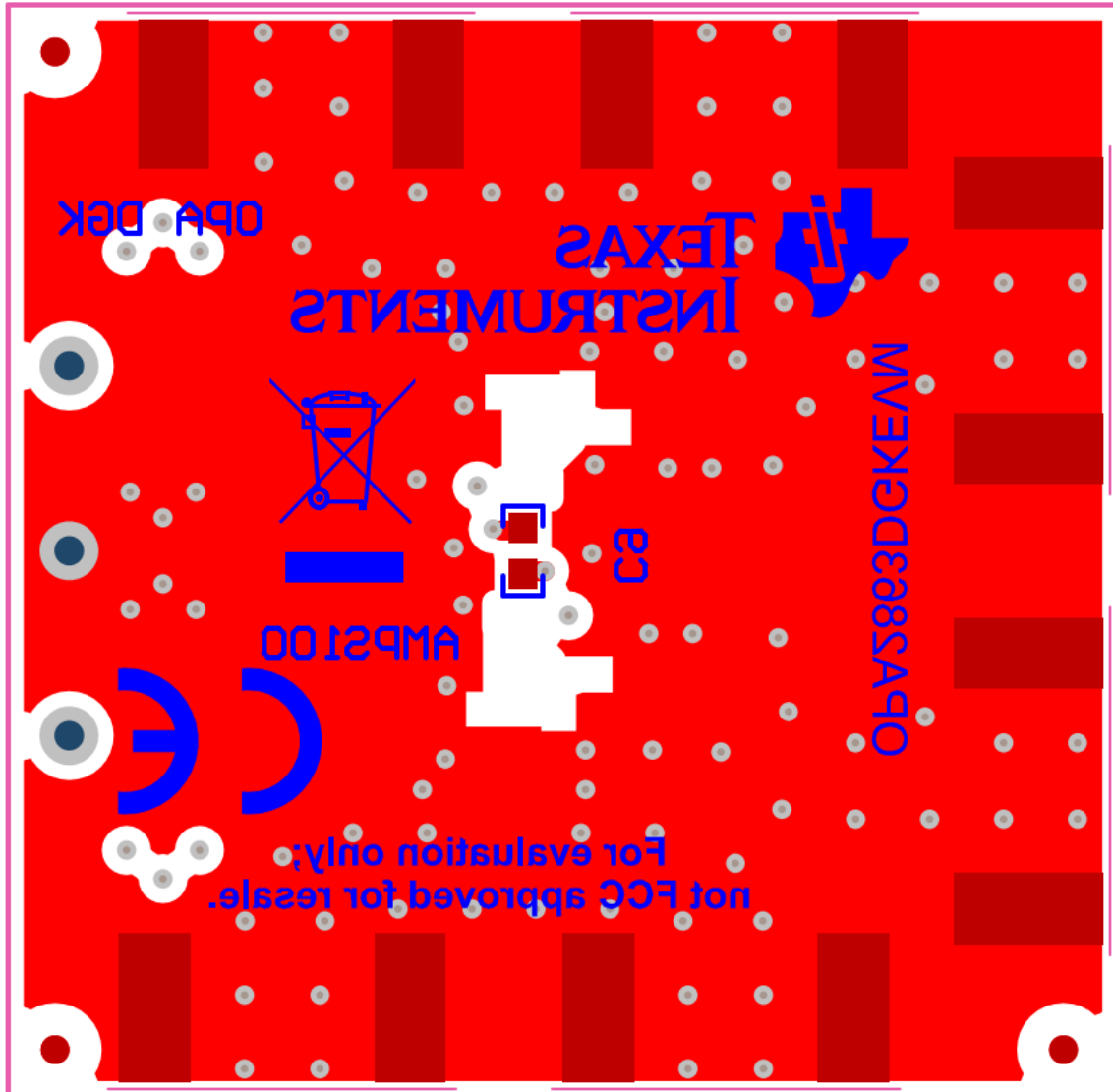


Figure 5-5. OPA2863DGKEVM Bottom Layer

5.3 PCB 3D render

Figure 5-6 and Figure 5-7 show the 3D renders of the PCB.

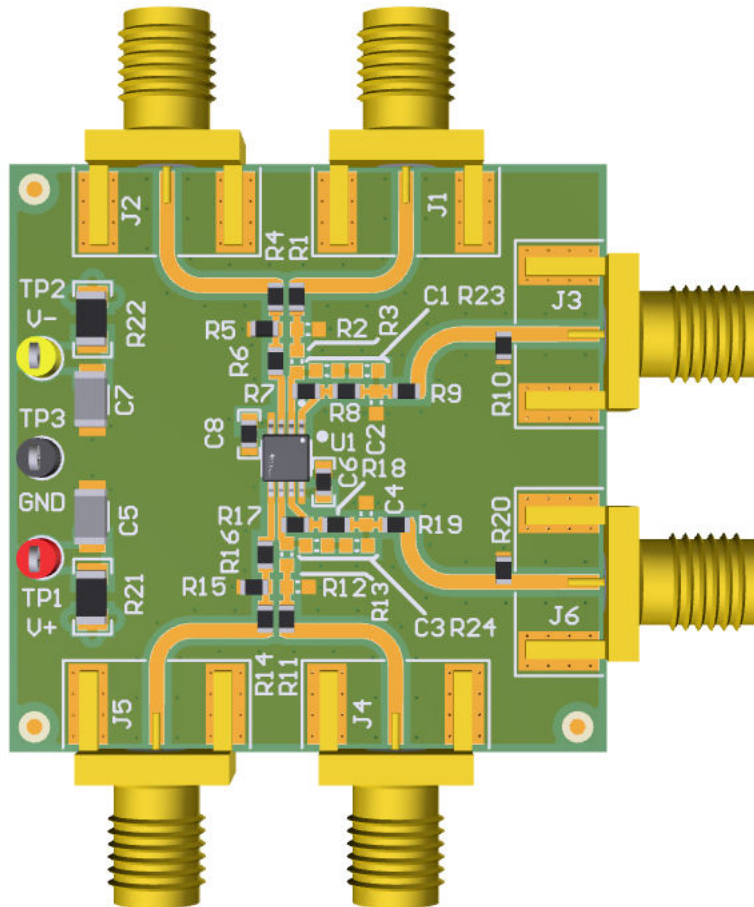


Figure 5-6. OPA2863DGKEVM 3D Render - Top

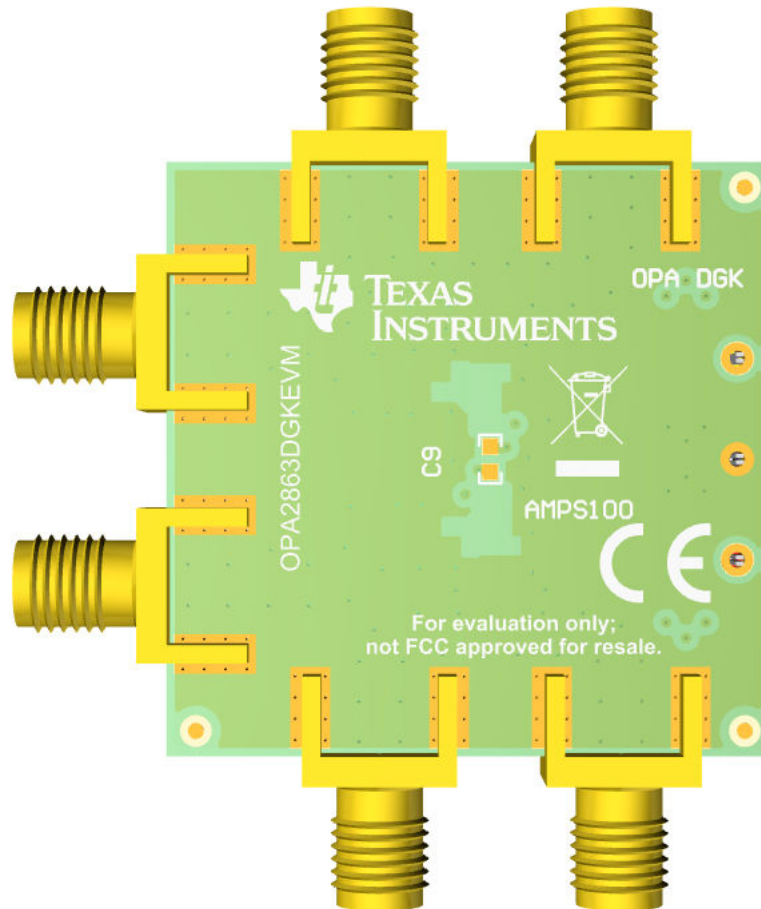


Figure 5-7. OPA2863DGKEVM 3D Render - Bottom

5.4 Bill of Materials

Table 5-1 lists the EVM bill of materials.

Table 5-1. OPA2863DGKEVM Bill of Materials

Item	Part Reference	QTY	Part Number	Manufacturer	Description
1	C5, C7	2	C1206C106J3RACAUTO	Kemet	CAP, CERM, 10 μ F, 25 V, \pm 5%, X7R, 1206
2	C6, C8	2	C0603H103J3GACTU	Kemet	CAP, CERM, 0.01 μ F, 25 V, \pm 5%, C0G/NP0, 0603
3	J1, J2, J3, J4, J5, J6	6	142-0701-851	Cinch Connectivity	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	RES, 52.3, 1%, 0.1 W, 0603
6	R5, R15	2	RC0603FR-0749R9L	Yageo	RES, 49.9, 1%, 0.1 W, 0603
7	R7, R17	2	RG1608P-101-B-T5	Susumu Co Ltd	RES, 100, 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	OPA2863DGK	Texas Instruments	OPA2863DGK, DGK (VSSOP-8)

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CAUTION

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

FCC Interference Statement for Class A EVM devices

NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

FCC Interference Statement for Class B EVM devices

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

3.2 Canada

3.2.1 For EVMs issued with an Industry Canada Certificate of Conformance to RSS-210 or RSS-247

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This device complies with Industry Canada license-exempt RSSs. Operation is subject to the following two conditions:

(1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Concernant les EVMs avec appareils radio:

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes: (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Concerning EVMs Including Detachable Antennas:

Under Industry Canada regulations, this radio transmitter may only operate using an antenna of a type and maximum (or lesser) gain approved for the transmitter by Industry Canada. To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that necessary for successful communication. This radio transmitter has been approved by Industry Canada to operate with the antenna types listed in the user guide with the maximum permissible gain and required antenna impedance for each antenna type indicated. Antenna types not included in this list, having a gain greater than the maximum gain indicated for that type, are strictly prohibited for use with this device.

Concernant les EVMs avec antennes détachables

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http://www.tij.co.jp/lstds/ti_ja/general/eStore/notice_01.page

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2. Use EVMs only after User obtains the license of Test Radio Station as provided in Radio Law of Japan with respect to EVMs, or
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