

**Contents** [ [hide](#) ][1 ANALOG DEVICES LTM4601EV Evaluation Kit](#)[2 DESCRIPTION](#)[3 QUICK START PROCEDURE](#)[4 DIMENSION](#)[5 FAQ](#)[6 Documents / Resources](#)[6.1 References](#)**ANALOG DEVICES LTM4601EV Evaluation Kit****DESCRIPTION**

Demonstration circuit DC1043A-A features the LTM®4601EV and LTM4601-1EV, the

high efficiency, high density switch mode step-down power modules. The input voltage range is from 5.0V to 20V. The out-put voltage is programmable from 0.6V to 3.3V; refer to step down ratio curve in the LTM4601 datasheet. The rated load current is 20A, while de-rating is necessary for certain VIN, VOUT, and thermal conditions. 24A load current can be achieved by applying forced airflow convection or attaching heatsinks. Master module U1 provides differential remote sensing to accurately regulate output voltage independent of load current. Integrated input and output filters enable a simple PCB layout. Only bulk input and output capacitors are needed externally. The DC1043A-A has onboard 180 degree interleaving clock generator. The default clock frequency is 750 KHz. The LTM4601 allows the user to program output ramp-up and ramp-down through the TRACK/SS pin. The output can be set to coincidentally or ratiometrically track with an-other supply's output. Margining function is provided for the user who wants to stress their system by varying supply voltages during testing; refer to data-sheet for functional diagram.

If desired, slave unit U2 could be substituted by LTM4601-1EV.

**Design files for this circuit board are available. Call the LTC Factory.**

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**Table 1. Performance Summary (TA = 25°C)**

PARAMETER	CONDITION	VALUE
Minimum Input Voltage		5V
Maximum Input Voltage		20V
Output Voltage VOUT	Jumper selectable (open for 0.6V )	1.2V, 1.5V, 1.8V, 2.5V, 3.3V
Maximum Continuous Output Current	De-rating is necessary for certain VIN, VOUT, and thermal conditions	20ADC

Default Operating Frequency		750kHz
Efficiency	VIN=12V, VOUT =1.5V, IOUT =20A	83.2%, See Figure 3
Load Transient	VIN=12V, VOUT =1.5V	See Figure 4

## QUICK START PROCEDURE

Demonstration circuit DC1043A-A is easy to set up to evaluate the performance of the LTM4601EV. Please refer to Figure 1 for proper measurement equipment setup and follow the procedure below:

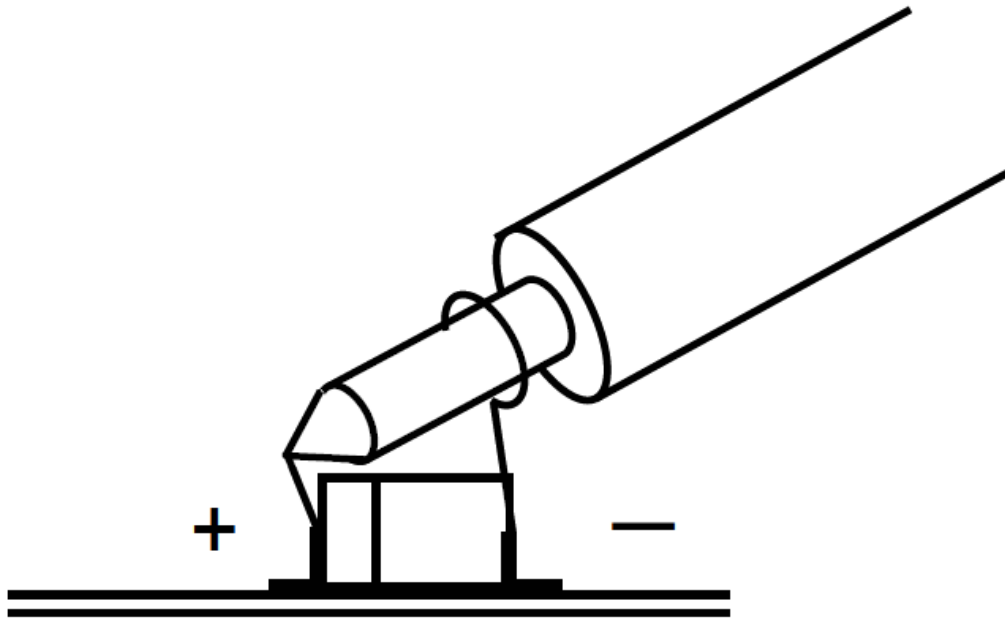
1. Place jumpers in the following positions for a typical 1.5VOUT application:

Vout Select	RUN	MARG0	MARG1
1.5V	ON	LO	LO

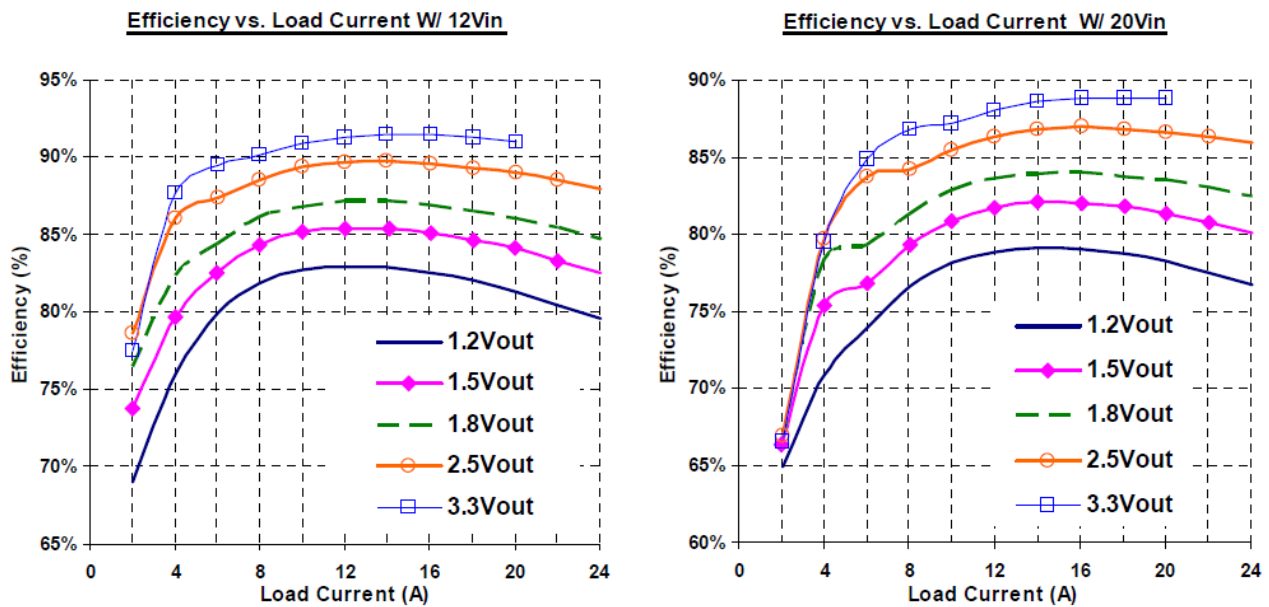
2. With power off, connect the input power supply, load and meters as shown in Figure 1. Preset the load to 0A and Vin supply to be less than 20V.
3. Turn on the power at the input. The output voltage should be  $1.5V \pm 2\%$ .
4. Once the proper output voltage is established, adjust the load within the operating range and observe the output voltage regulation, ripple voltage, efficiency and other parameters. Output ripple should be measured across the output capacitors.
5. For optional load transient test, apply adjustable pulse signal between IOSTEP CLK and GND pins. Pulse amplitude sets the current step. The pulse signal should have very small duty cycle (<15%) to limit the thermal stress on the transient load circuit. The output transient current can be monitored at BNC connector J5 (25mV/10A).
6. For Margining function test, place jumper 6. For Margining function test, place jumper

MARG1	MARG0	Vout
LO	LO	0

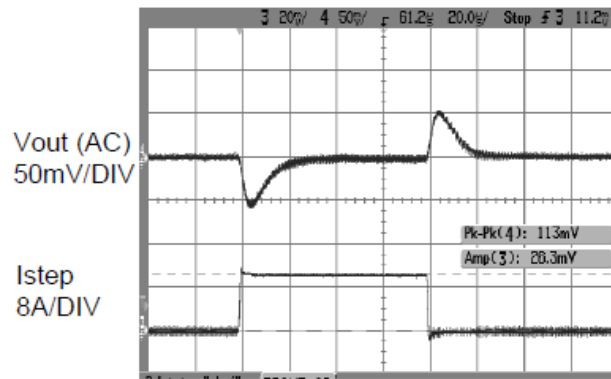




**Figure 2. Scope Probe Placements for Measuring Input or Output Ripple.**



**Figure 3. Measured Supply Efficiency with Different VIN and VOUT**



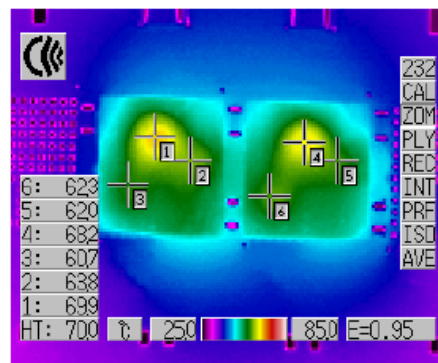
Vin = 12V

Vout = 1.5V

5A to 15A LOAD STEP (50%)

Cout = 2 X 22uF ceramic, 4X100uF ceramic; C12 = 47pF

Figure 4. Measured Load Transient Response (5-15A Step)



Vo = 1.5V@20A

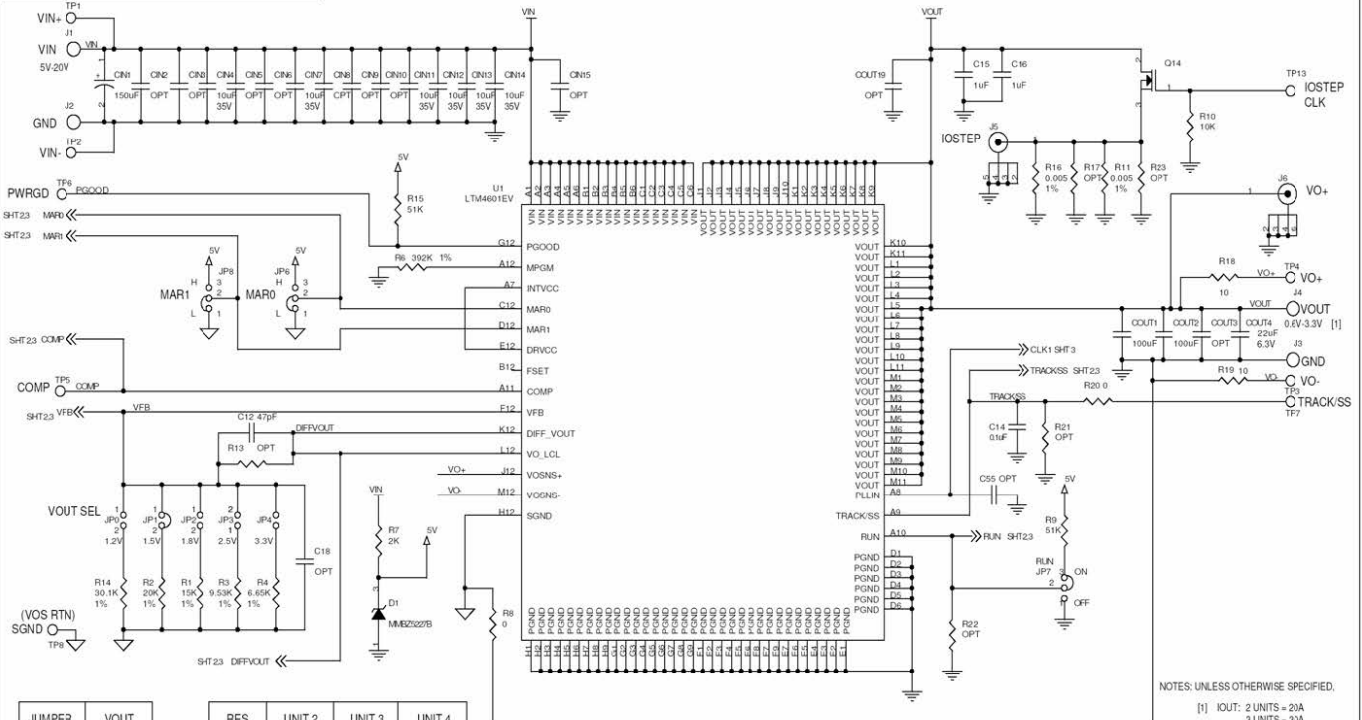
Vin = 20V

Figure 5. Measured Thermal Performance

**DIMENSION**



This circuit is proprietary to Linear Technology and supplied for use with Linear Technology parts.  
**Customer Notice:** Linear Technology has made a best effort to design a circuit that meets customer-supplied specifications; however, it remains the customer's responsibility to verify proper and reliable operation in the actual application. Component substitution and printed circuit board layout may significantly affect circuit performance or reliability. Contact Linear Applications Engineering for assistance.

REVISION HISTORY				
ECO	REV	DESCRIPTION	DATE	APPROVED
	1	PROTO	12/29/05	
	2	Change: Correction, Modifications 05/29/06 more chgs	04/04/06	
	3	Change: D1, R7, R8, 10455/06: More Changes	10/25/06	



JUMPER	VOUT
JP0	1.2V
JP1	1.5V
JP2	1.8V
JP3	2.5V
JP4	3.3V

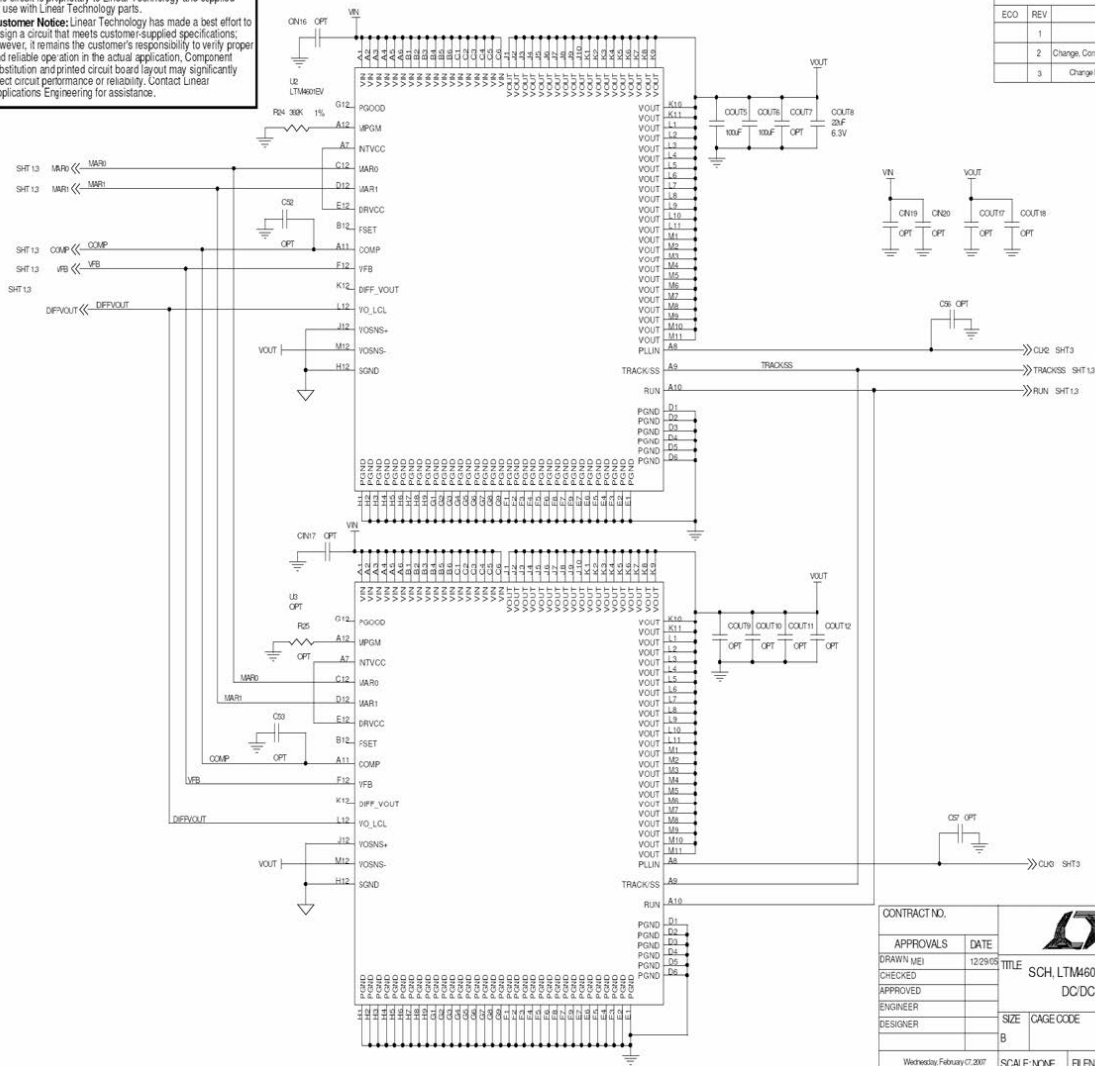
RES	UNIT 2	UNIT 3	UNIT 4
R14	30.1K	20K	15K
R2	20K	13.3K	10K
R1	15K	10K	7.5K
R3	9.53K	6.34K	4.75K
R4	6.65K	4.42K	3.32K

UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCE ON ANGLE: . . . 2 PLACES - . . . 3 PLACES - . . . INTERPRET DIM AND TOL PER ASME Y14.5M-1994	CONTRACT NO.		 <b>LINEAR</b> TECHNOLOGY		1030 McCarty Blvd Milpitas, CA 95035 Phone: (408) 432-1900 Fax: (408) 432-3507			
	APPROVALS						DATE	
	DRAWN (MEI)						12/29/05	
	THIRD ANGLE PROJECTION							
	CHECKED		TITLE SCH. LTM4601EV HIGH EFFICIENCY POLYPHASE DC/DC MICRO MODULE					
	APPROVED							
	ENGINEER							
	DESIGNER							
DO NOT SCALE DRAWING	Wednesday, February 07, 2007		SIZE		CAGE CODE			
			Custom		DWG NO			
					DC1043A-A			
					REV 3			
		SCALE: NONE		FILENAME: 1043A-3.DSN		SHEET 1 OF 3		

NOTES: UNLESS OTHERWISE SPECIFIED,  
 [1] IOUT: 2 UNITS = 20A  
 3 UNITS = 33A  
 4 UNITS = 43A

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REVISION HISTORY				
ECO	REV	DESCRIPTION	DATE	APPROVED
	1	PROTO	12/29/05	
	2	Change: Correction, Modifications 05/09/06 more chips.	04/04/06	
	3	Change D1, R7, R26, 10/05/06, 10/06/06	10/05/06	



CONTRACT NO.		APPROVALS		DATE	
DRAWN: MEI		CHECKED		12/29/05	
APPROVED		ENGINEER			
DESIGNER		SCALE: NONE		FILENAME: 1043A-3.DSN	
Wednesday, February 17, 2007		DWG NO: DC1043A-A		REV: 3	
SCALE: NONE		FILENAME: 1043A-3.DSN		SHEET: 2 OF 3	



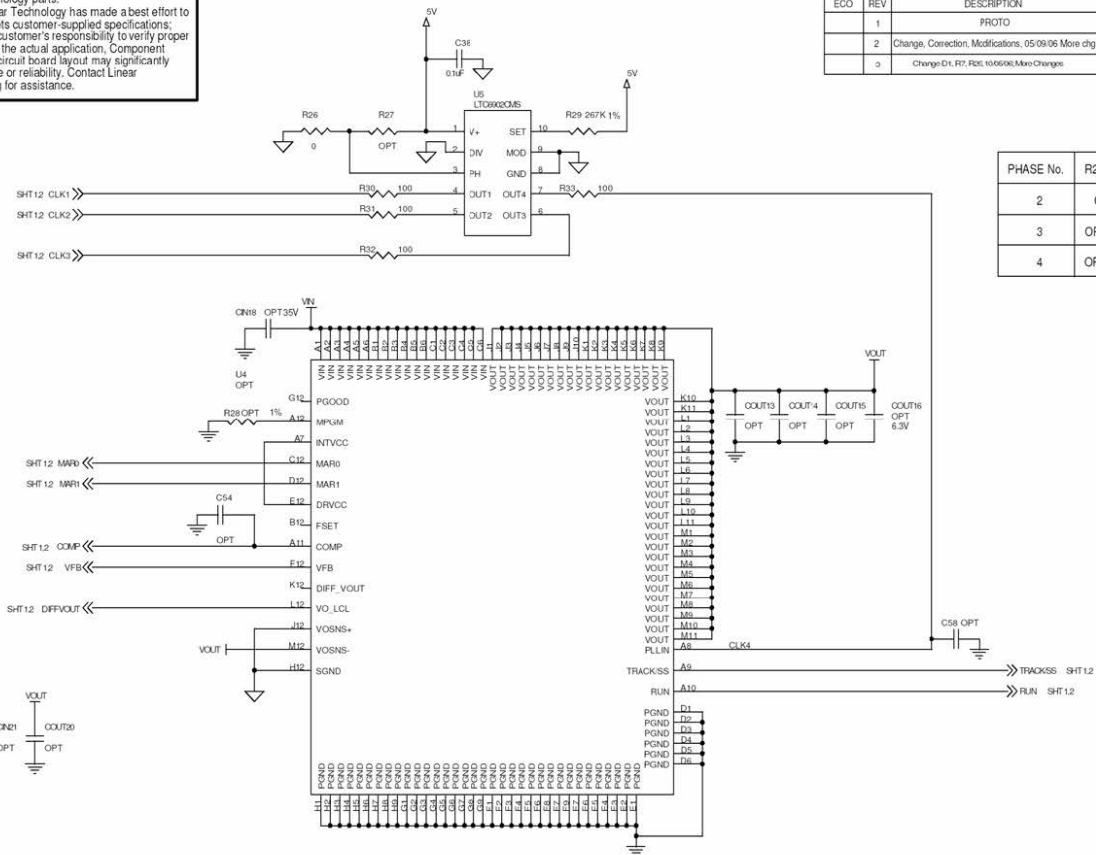
16201 McCarthy Blvd.  
 Milpitas, CA 95035  
 Phone: (408) 433-1000  
 Fax: (408) 433-1007

TITLE: SCH. LTM4601EV HIGH EFFICIENCY POLYPHASE DC/DC MICRO MODULE



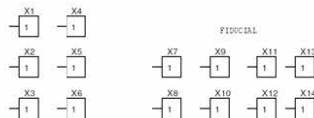
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REVISION HISTORY				
ECO	REV	DESCRIPTION	DATE	APPROVED
	1	PROTO	12/29/05	
	2	Change, Correction, Modifications, 05/09/06 Move chgs.	04/04/06	
	3	Change D-1, R17, R23, 10.0k to 10k	10/05/06	



PHASE No.	R26	R27	R29
2	0	OPT	267K
3	OPT	OPT	88.7K
4	OPT	0	66.5K

USED IN PCB MANUFACTURING



CONTRACT NO.		DATE		TITLE	
APPROVALS		12/29/05		SCH, LTM4601EV HIGH EFFICIENCY POLYPHASE	
DRAWN MEI				DC/DC MICRO MODULE	
CHECKED					
APPROVED					
ENGINEER					
DESIGNER					
CUSTOMER		CAGE CODE		DWG NO	
				DC1043A-A	
				REV	
				3	
Wednesday, February 07, 2007		SCALE: NONE		FILENAME: 1043A-3.DSN	
				SHEET 3 OF 3	

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## FAQ

- Q: Can I substitute slave unit U2 with LTM4601-1EV?**

A: Yes, if desired, slave unit U2 could be substituted by LTM4601-1EV.

- Q: Are design files available for this circuit board?**

A: Yes, design files for this circuit board are available. Please contact the LTC Factory for more information.

## Documents / Resources

<p>ANALOG DEVICES LTM4601EV Evaluation Kit [pdf] User Guide</p> <p>DC1043A-A, DC1043A-C, LTM4601EV Evaluation Kit, LTM4601EV, Evaluation Kit</p>	<p><a href="#">ANALOG DEVICES LTM4601EV Evaluation Kit [pdf] User Guide</a></p> <p>DC1043A-A, DC1043A-C, LTM4601EV Evaluation Kit, LTM4601EV, Evaluation Kit</p>
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## References

- [User Manual](#)

◆ Analog Devices, DC1043A-A, DC1043A-C, Evaluation Kit, LTM4601EV, LTM4601EV Evaluation

■ Analog Devices   Kit

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