

# LMK1C1104DQF Low-Additive, Phase-Noise LVCMOS Clock Buffer Evaluation Board



## ABSTRACT

The LMK1C1104DQF is a high-performance, low additive jitter LVCMOS clock buffer with one LVCMOS input, four LVCMOS outputs, and a global output enable pin.

This evaluation module (EVM) is designed to demonstrate the electrical performance of the LMK1C1104DQF. Throughout this document, the acronym EVM and the phrases evaluation module and evaluation board are synonymous with the LMK1C1104DFNEVM.

The EVM is equipped with 50-Ω SMA connectors and impedance-controlled 50-Ω microstrip transmission lines for best performance.

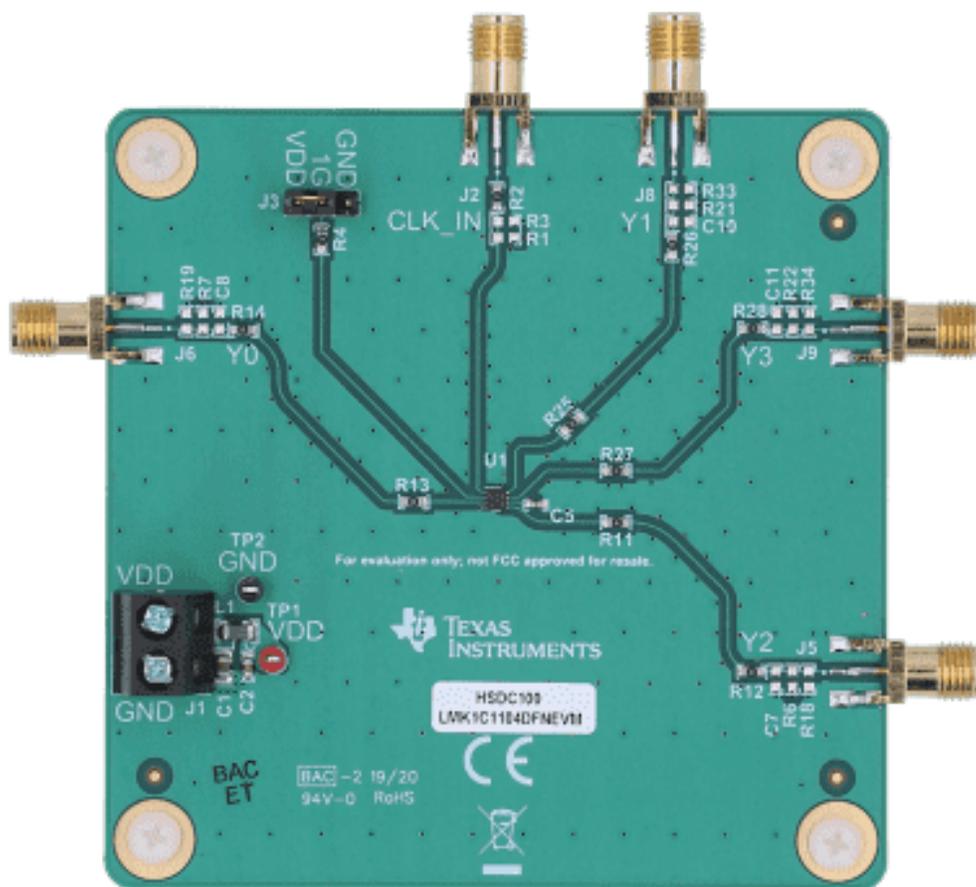


Figure 1-1. LMK1C1104DFNEVM

## Table of Contents

<b>1 Features</b> .....	2
<b>2 Signal Path and Control Circuitry</b> .....	2
<b>3 Getting Started</b> .....	2
<b>4 Power-Supply Connections</b> .....	3
<b>5 Enabling/Disabling the Outputs</b> .....	3
<b>6 Output Clock</b> .....	4
<b>7 Bill of Materials</b> .....	4
7.1 REACH Compliance.....	4
<b>8 Schematic</b> .....	5

### Trademarks

All trademarks are the property of their respective owners.

### 1 Features

- Easy-to-use evaluation board to fan out up to four LVCMOS clocks with low phase noise/jitter
- Output enable pin configurable through jumper
- Board powered from a single 3.3-V / 2.5-V / 1.8-V supply
- Clock output traces are length matched

### 2 Signal Path and Control Circuitry

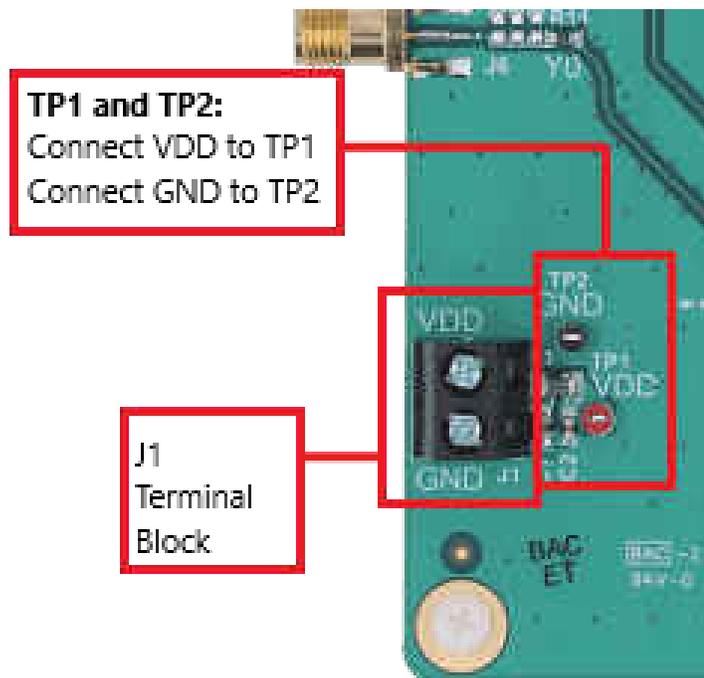
The LMK1C1104DFNEVM supports single-ended inputs up to 250 MHz. For more information about the LMK1C1104DQF, see the LMK1C1104 product data sheet available for download from the TI Web site ([www.ti.com](http://www.ti.com)).

### 3 Getting Started

The LMK1C1104DFNEVM has self-explanatory labeling and uses similar naming conventions as the LMK1C1104 product data sheet. In this user's guide, all words in **boldface** reflect the actual labeling on the EVM.

## 4 Power-Supply Connections

Connect the power-supply source and ground to the terminal block labeled **J1** as shown in [Figure 4-1](#). Alternatively, connect the power-supply source to **TP1**, and connect the ground of the power-supply **TP2**. Decoupling capacitors and a ferrite bead isolate the EVM power from the LMK1C1104DQF device power pins.



**Figure 4-1. Power Supply Connection Locations**

The LMK1C1104DFNEVM operates from a single 3.3-V / 2.5-V / 1.8-V supply.

## 5 Enabling/Disabling the Outputs

The enable pin, 1G, of the LMK1C1104DQF can be controlled using jumper **J3**. Pull 1G to VDD by shunting pins 2 and 3 of J3 to enable the outputs as shown in [Figure 5-1](#). Leave 1G floating or pull to GND to disable the outputs.



**Figure 5-1. J3 Jumper Location**

By default, a shunt is placed on pins 2 and 3 to enable the outputs.

## 6 Output Clock

The LMK1C1104DQF fans out four LVCMOS outputs. The outputs can be loaded using the pullup and pulldown footprints. No resistor has been soldered in those footprints.

The EVM board supports up to eight clock outputs for pin-compatible WSON packaged devices in the industry standard footprint. The LMK1C1104DQF uses four of the 8 outputs shown in [Figure 1-1](#). These outputs are Y0, Y1, Y2, and Y3.

## 7 Bill of Materials

### 7.1 REACH Compliance

In compliance with the Article 33 provision of the EU REACH regulation we are notifying you that this EVM includes component(s) containing at least one Substance of Very High Concern (SVHC) above 0.1%. These uses from Texas Instruments do not exceed 1 ton per year. The SVHC's are:

**Table 7-1. REACH SVHC**

COMPONENT MANUFACTURER	COMPONENT TYPE	COMPONENT PART NUMBER	SVHC SUBSTANCE	SVHC CAS (WHEN AVAILABLE)
Molex	5.08 Pitch Eurostyle Vertical Fixed Mount PCB Terminal Block, 2 Circuits	039544-3002	Lead	7439-92-1

**Table 7-2. Bill of Materials**

DESIGNATOR	QTY	VALUE	PACKAGE REFERENCE	PART NUMBER	MANUFACTURER
C1	1	10uF	0805	C0805C106K8PACTU	Kemet
C2	1	1uF	0603	C0603X105J8RAC7867	Kemet
C3, C4, C5	3	0.1uF	0402	C0402C104K8RACAUTO	Kemet
H1, H2, H3, H4	4	4-40/0.25"	Screw	NY PMS 440 0025 PH	B&F Fastener Supply
H5, H6, H7, H8	4	0.5"	Standoff	1902C	Keystone
J1	1	Terminal Block	TH	039544-3002	Molex
J2, J4, J5, J8, J9	5	CON-SMA-EDGE-S	RF SMA EDGE	CON-SMA-EDGE-S	RF Solutions Ltd.
J3	1	1x3	0.1 in.	PBC03SAAN	Sullins Connector Solutions
L1	1	50Ω	1206	BLM31SN500SZ1L	MuRata
R2, R4, R9, R10, R11, R12, R25, R26, R27, R28	10	0Ω	0603	RC0603JR-070RL	Yageo
SH1	1	1x2	Shunt	SNT-100-BK-G	Samtec
TP1	1	Red Test Point	TH	5000	Keystone
TP2	1	Black Test Point	TH	5001	Keystone
U1	1	LMK1C1104DQF	8-WSON	LMK1C1104DQF	Texas Instruments
C6, C7, C10, C11	4	5pF	0603	GRM1885C2A5R0CA01D	MuRata
R1, R3, R5, R6, R17, R18, R21, R22, R33, R34	10	100Ω	0603	CRCW0603100RFKEA	Vishay-Dale

## 8 Schematic

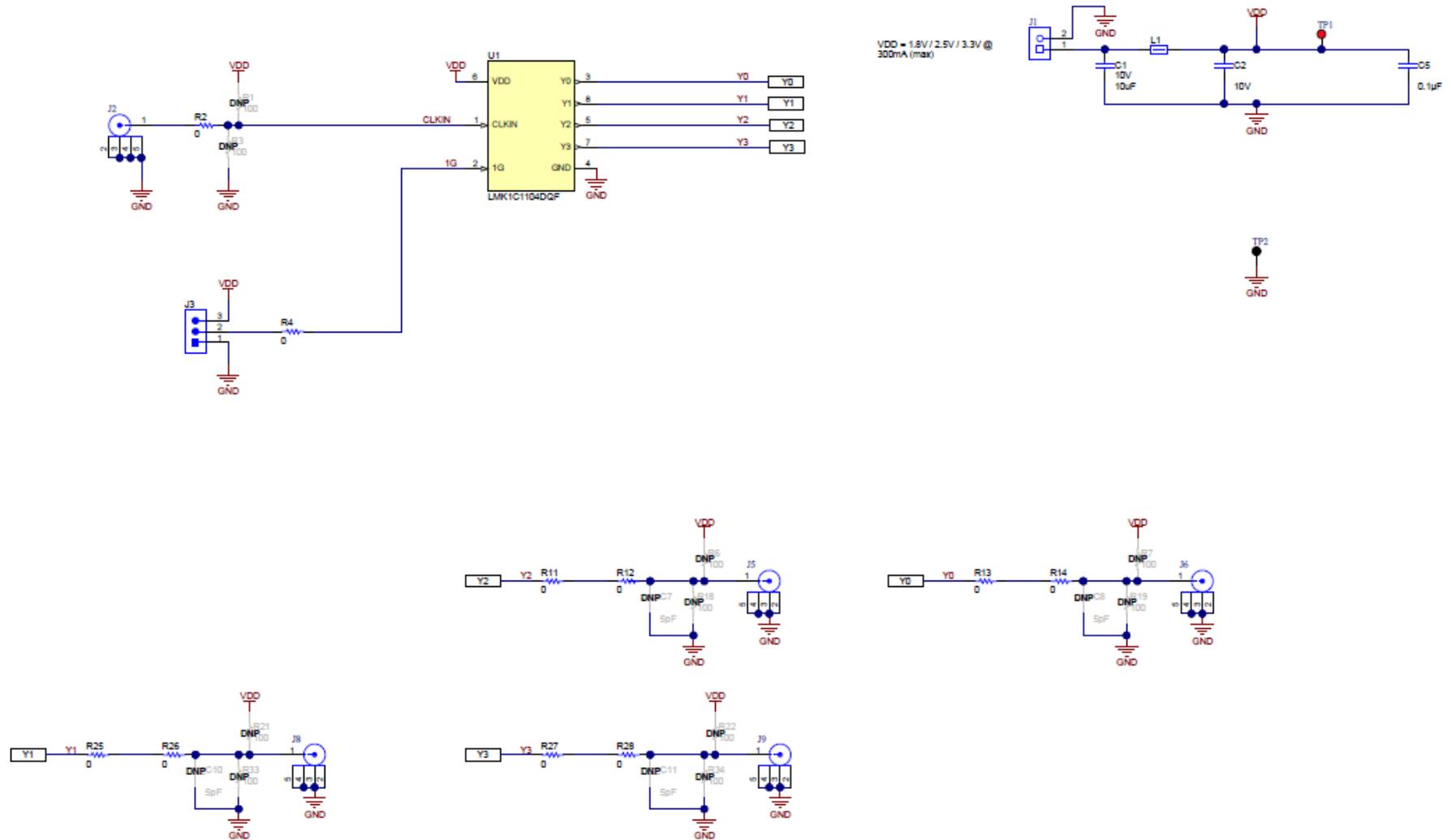


Figure 8-1. LMK1C1104DFNEVM Schematic

## IMPORTANT NOTICE AND DISCLAIMER

TI PROVIDES TECHNICAL AND RELIABILITY DATA (INCLUDING DATA SHEETS), DESIGN RESOURCES (INCLUDING REFERENCE DESIGNS), APPLICATION OR OTHER DESIGN ADVICE, WEB TOOLS, SAFETY INFORMATION, AND OTHER RESOURCES "AS IS" AND WITH ALL FAULTS, AND DISCLAIMS ALL WARRANTIES, EXPRESS AND IMPLIED, INCLUDING WITHOUT LIMITATION ANY IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR NON-INFRINGEMENT OF THIRD PARTY INTELLECTUAL PROPERTY RIGHTS.

These resources are intended for skilled developers designing with TI products. You are solely responsible for (1) selecting the appropriate TI products for your application, (2) designing, validating and testing your application, and (3) ensuring your application meets applicable standards, and any other safety, security, regulatory or other requirements.

These resources are subject to change without notice. TI grants you permission to use these resources only for development of an application that uses the TI products described in the resource. Other reproduction and display of these resources is prohibited. No license is granted to any other TI intellectual property right or to any third party intellectual property right. TI disclaims responsibility for, and you will fully indemnify TI and its representatives against, any claims, damages, costs, losses, and liabilities arising out of your use of these resources.

TI's products are provided subject to [TI's Terms of Sale](#) or other applicable terms available either on [ti.com](http://ti.com) or provided in conjunction with such TI products. TI's provision of these resources does not expand or otherwise alter TI's applicable warranties or warranty disclaimers for TI products.

TI objects to and rejects any additional or different terms you may have proposed.

Mailing Address: Texas Instruments, Post Office Box 655303, Dallas, Texas 75265  
Copyright © 2022, Texas Instruments Incorporated