

MAX20079 Evaluation Kit

Evaluates: MAX20079

General Description

The MAX20079 evaluation kit (EV kit) provides a proven design to evaluate the MAX20079 2.1MHz/400kHz high-voltage mini-buck converter in a 20-pin Side-Wettable TQFN (SWTQFN) package. All components are rated for the automotive temperature range. Various test points and jumpers are included for evaluation.

MAX20079EVKIT# comes with MAX20079AATP/VY+ installed (5V, 2.1MHz) and can be used to evaluate any MAX20079 variant with minimal component changes.

Benefits and Features

- 3.5V to 36V Input Supply Range
- 5V or 3.3V Fixed Output Voltage, or Adjustable Between 3V and 10V
- Delivers Up to 3.5A Output Current
- Frequency Synchronization Input
- Enable Input
- Voltage-Monitoring PGOOD Output
- Proven PCB Layout
- Fully Assembled and Tested

Ordering Information appears at end of data sheet.

Quick Start

Required Equipment

- MAX20079 EV kit
- Power Supply
- Voltmeter
- Electronic Load

Procedure

The EV kit is fully assembled and tested. Follow the steps below to verify board operation:

- 1) Verify that all jumpers are in their default positions, as shown in [Table 1](#).
- 2) Connect the positive and negative terminals of the power supply to the SUP and GND test pads, respectively.
- 3) Connect the positive terminal of the voltmeter to OUT, and the negative terminal to GND2
- 4) Set the power supply to 14V and 3A current limit. Turn on the power supply.
- 5) The voltmeter should display an output voltage of 5V.
- 6) Connect an electronic load to OUT and GND2 terminals and set it to 1A.
- 7) Turn ON the electronic load and increase the current to 3.5A. The voltmeter should display the output voltage of 5V \pm 2%.

Table 1. Default Jumper Settings

| JUMPER | SHUNT POSITION | FUNCTION |
|--------|----------------|---|
| EN | Middle-ON | Buck controller enabled |
| SPS | Middle-OFF | Spread spectrum disabled |
| J1 | Installed | PGOOD is pulled up by VBIAS when OUT is in regulation |
| FSYNC | Middle-FPWM | Forced-PWM mode |

Detailed Description

The MAX20079 EV kit provides a proven layout for all variants of the MAX20079 synchronous buck regulator. The device accepts input voltages as high as 36V and delivers up to 3.5A. The EV kit can handle an input-supply transient up to 40V.

Switching Frequency/ External Synchronization

The devices can operate in two modes: forced-PWM or Skip. Skip mode has better efficiency for light-load conditions. When SYNC is pulled low, the device operates in skip mode for light loads and in PWM mode for larger loads. When SYNC is pulled high, the device is forced to operate in PWM across all load conditions.

SYNC can be used to synchronize with other supplies if a clock source is present. The device is forced to operate in PWM when SYNC is connected to a clock source.

Buck Output Monitoring (PGOOD)

The EV kits provide a power-good output test point (PGOOD) to monitor the status of the buck output (OUT). PGOOD is low impedance when the output voltage is in regulation. PGOOD is high impedance when the output voltage drops below 8% (typ) of its nominal regulated voltage.

To obtain a logic signal, pull up PGOOD to V_{BIAS} by installing shunts on jumper PU.

Evaluating Other Variants

The EV kit comes installed with the fixed-output, 5V/2.1MHz variant (MAX20079AATP/VY+). The 3.3V/2.1MHz and 400kHz variants (MAX20079BATP/VY+, MAX20079DATP/VY+, and MAX20079EATP/VY+) can be installed with minimal component changes. For the 3.3V/2.1MHz variant, install the MAX20079AATP/VY+ on the EV kit (U1), while keeping all other components the same. For 400kHz parts, a 10 μ H inductor and an effective output capacitance of 44 μ F is recommended after derating is accounted for.

Setting the Output Voltage in Buck Converters

To externally adjust the output voltage, remove R6 and install a 0 Ω resistor on R3. Place appropriate resistors in positions R4 and R5 according to the following equation:

$$R4 = R5 \left[\left(\frac{V_{OUT1}}{V_{FB}} \right) - 1 \right]$$

where $V_{FB} = 1V$ (typ) and $R5 = 50k\Omega$.

Ordering Information

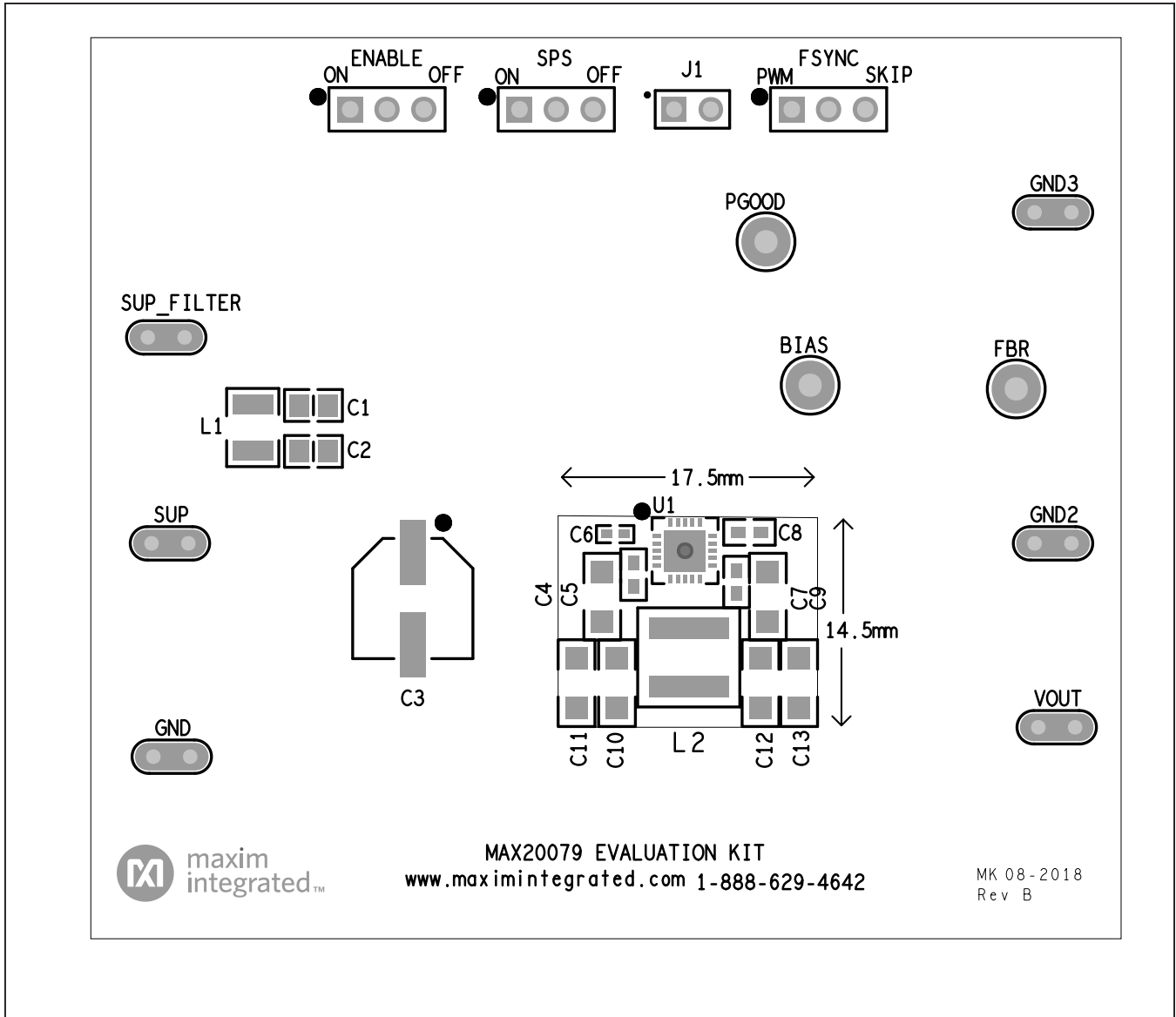
| PART | TYPE |
|----------------|--------------------------|
| MAX20079EVKIT# | 5V output, 2.1MHz EV kit |

#Denotes RoHS Compliant

MAX20079 EV Kit Bill of Materials

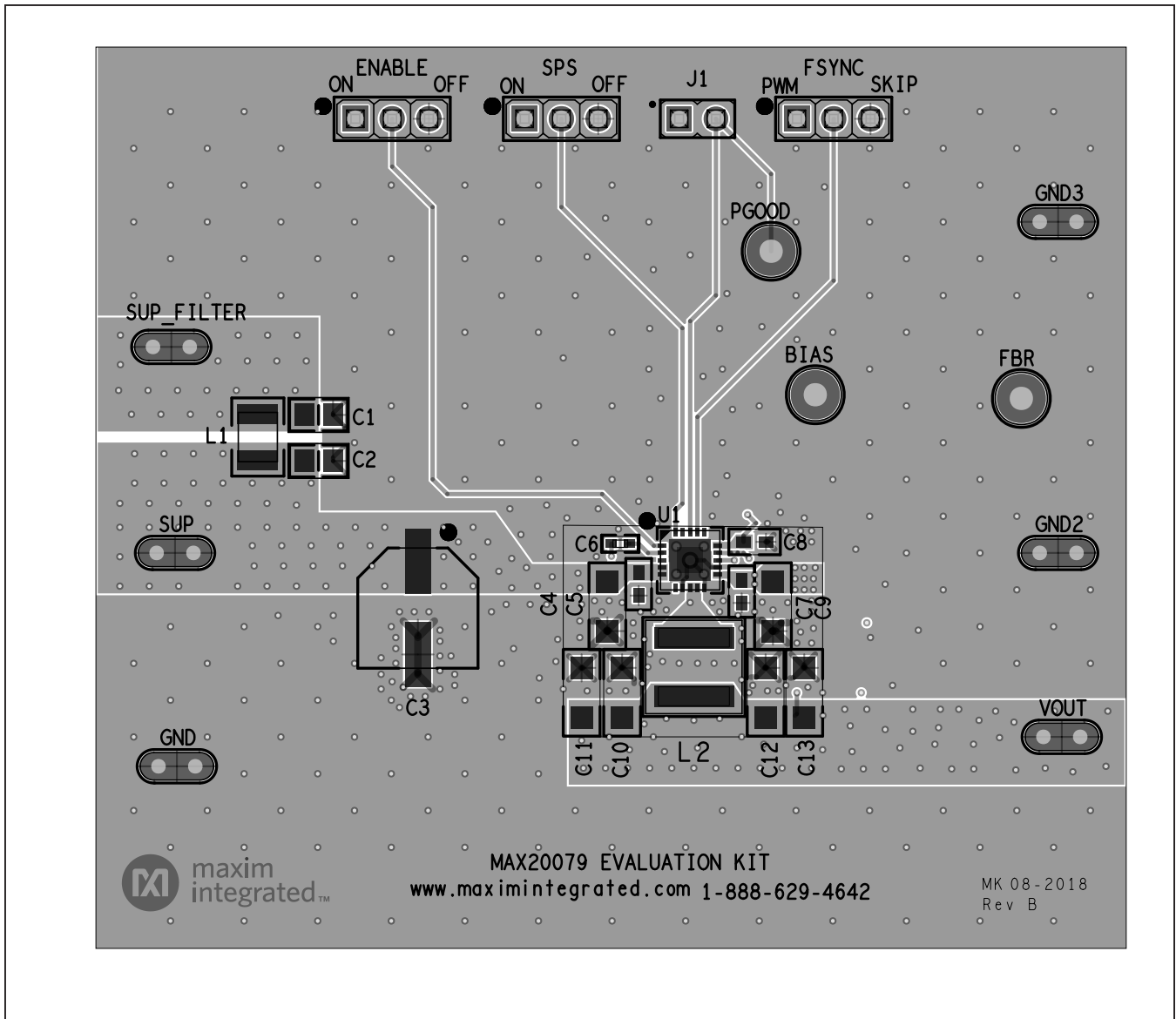
| PART | QTY | DESCRIPTION |
|--|-----|---|
| C4, C9 | 2 | 4.7uF ±10%, 50V X7R ceramic capacitors (1206) TDK CGA5L3X7R1H475K160AE |
| C3 | 1 | 47uF, 50V aluminum electrolytic capacitor (8.3mm x 8.3mm) Panasonic EEE-FK1H470P |
| C10, C11, C12, C13 | 4 | 10uF ±10%, 25V X7R ceramic capacitor (1206) TDK CGA5L1X7R1E106M160AC |
| C8 | 1 | 1uF ±10%, 35V X7R ceramic capacitor (0603) TDK CGA3E1X7R1V105K080AC |
| C6 | 1 | 0.1uF ±10% 50V X7R ceramic capacitor (0402) TDK CGA2B3X7R1H104K |
| C5, C7 | 2 | 0.1uF ±10% 50V X7R ceramic capacitor (0603) TDK CGA3E2X7R1H104M080AE |
| C1, C2 | 2 | 1uF ±10% 50V X7R ceramic capacitor (0805) TDK CGA4J3X7R1H105M125AB |
| L2 | 1 | 2.2uH Power Inductor Coilcraft XAL6030-222 |
| L1 | 1 | 2A Ferrite Bead (1210) Taiyo Yuden FBMH3225HM102NT |
| R2, R6 | 2 | 0Ω resistor (0402) Panasonic Electronic Components P0.0JCT-ND |
| R1 | 1 | 10kΩ ±5% resistor (0603) Panasonic Electronic Components ERA-2AED103X |
| U1 | 1 | Automotive Mini-Buck (20-pin SW-TQFN) Maxim MAX20079AATP/VY+ |
| J1 | 1 | 2-pin headers (0.1" spacing) Sullins PEC02SAAN |
| EN, SPS, FSYNC | 3 | 3-pin headers (0.1" spacing) Sullins PEC03SAAN |
| SUP_FILTER, SUP, VOUT, GND, GND2, GND3 | 6 | 5020, Keystone |
| PGOOD, BIAS, FBR | 3 | 5012, Keystone |
| - | 4 | Shunt Jumper (0.1" spacing, Black) |
| - | 1 | PCB: MAX20079 EVALUATION KIT |

MAX20079 EV Kit PCB Layout Diagrams



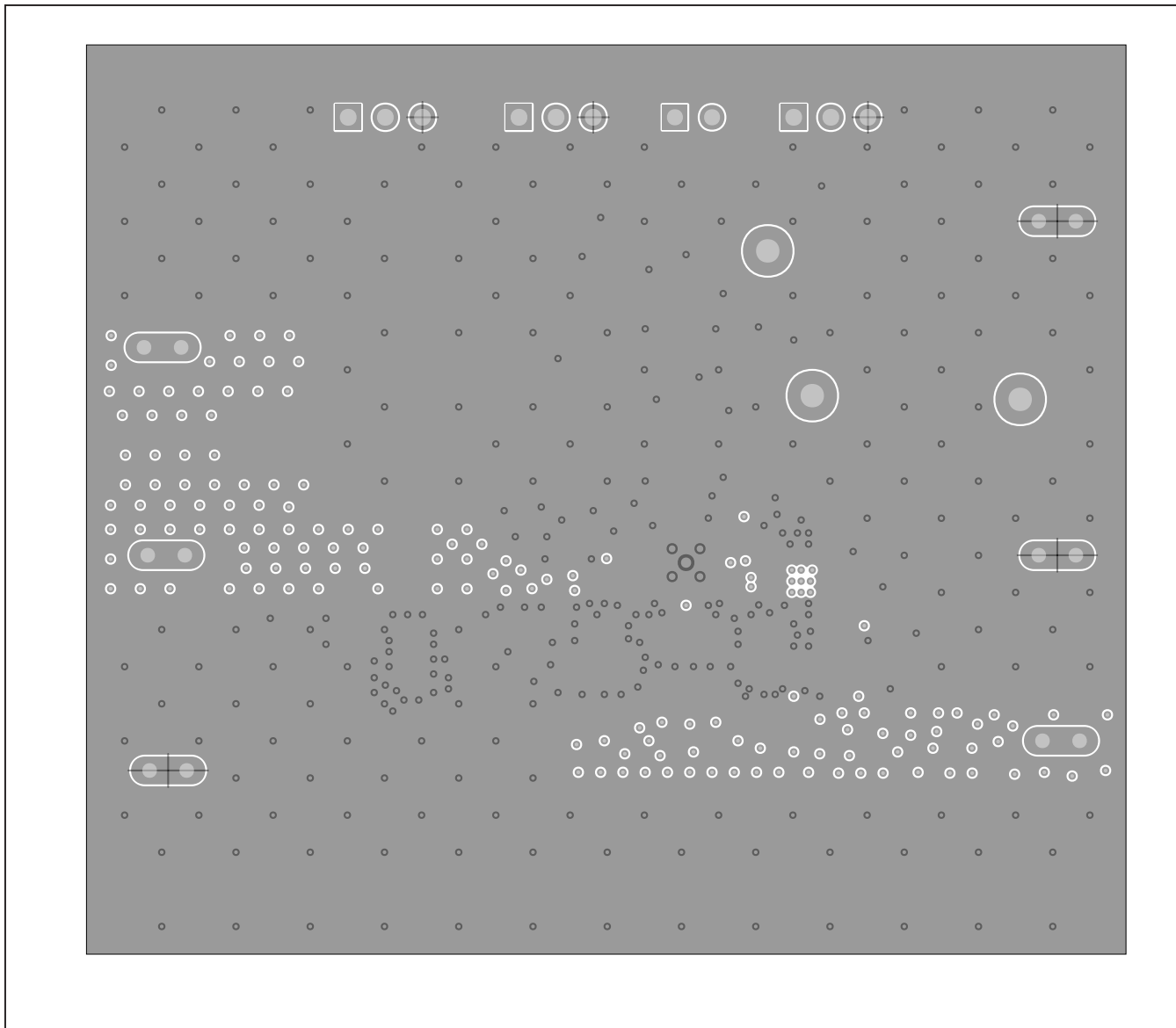
MAX20079 EVKIT Component Placement Guide Top Silk

MAX20079 EV Kit PCB Layout Diagrams (continued)



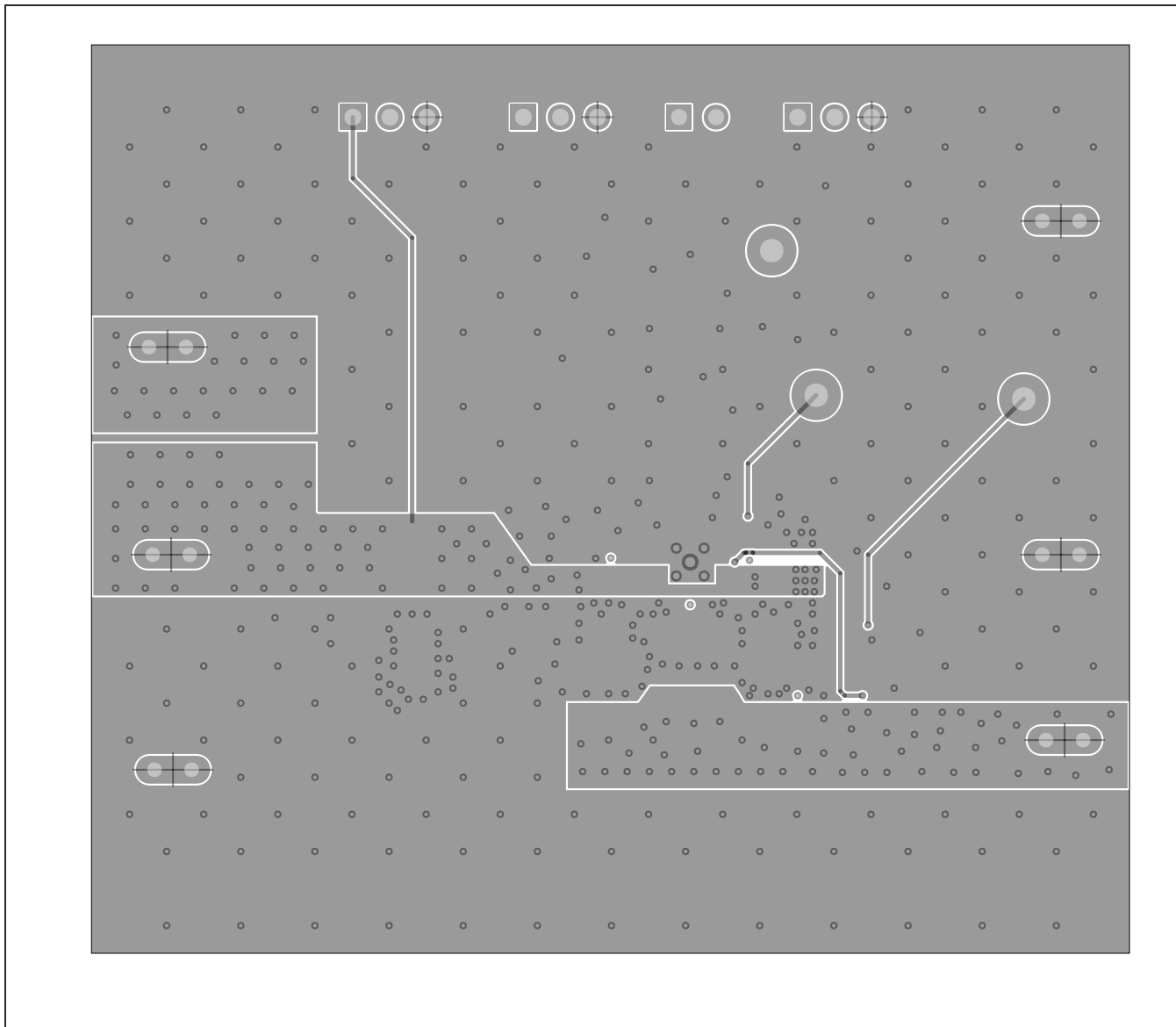
MAX20079 EVKIT Component Placement Guide Top Layer

MAX20079 EV Kit PCB Layout Diagrams (continued)



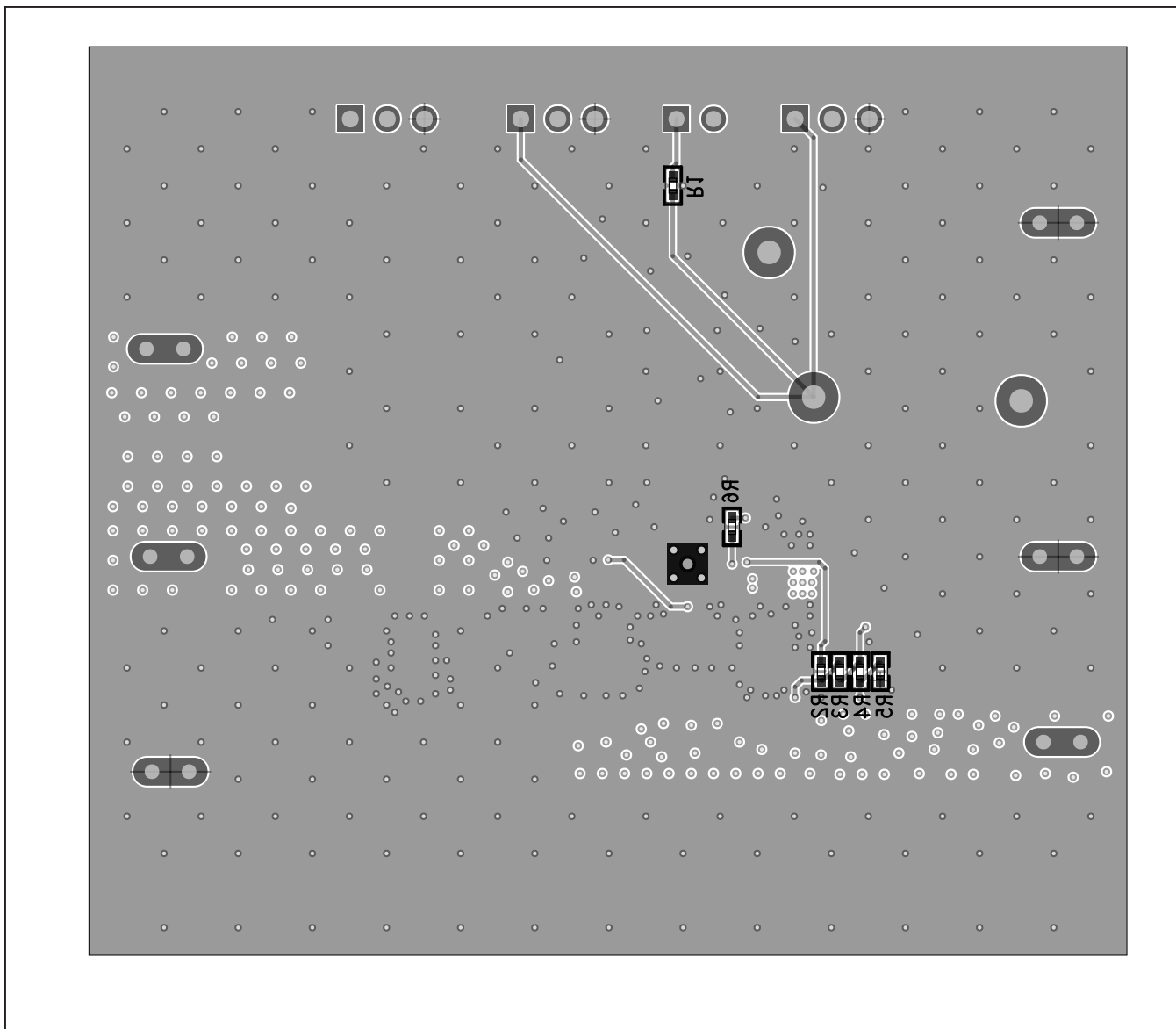
MAX20079 EVKIT Layout Internal 2

MAX20079 EV Kit PCB Layout Diagrams (continued)



MAX20079 EVKIT PCB Layout Internal 3

MAX20079 EV Kit PCB Layout Diagrams (continued)



MAX20079 EVKIT Component Placement Guide Bottom

Revision History

| REVISION NUMBER | REVISION DATE | DESCRIPTION | PAGES CHANGED |
|-----------------|---------------|-----------------|---------------|
| 0 | 10/18 | Initial release | — |

For pricing, delivery, and ordering information, please visit Maxim Integrated's online storefront at <https://www.maximintegrated.com/en/storefront/storefront.html>.

Maxim Integrated cannot assume responsibility for use of any circuitry other than circuitry entirely embodied in a Maxim Integrated product. No circuit patent licenses are implied. Maxim Integrated reserves the right to change the circuitry and specifications without notice at any time.



Компания «ЭлектроПласт» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

Наши преимущества:

- Оперативные поставки широкого спектра электронных компонентов отечественного и импортного производства напрямую от производителей и с крупнейших мировых складов;
- Поставка более 17-ти миллионов наименований электронных компонентов;
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- Лицензия ФСБ на осуществление работ с использованием сведений, составляющих государственную тайну;
- Поставка специализированных компонентов (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Aeroflex, Peregrine, Syfer, Eurofarad, Texas Instrument, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits, General Dynamics и др.);

Помимо этого, одним из направлений компании «ЭлектроПласт» является направление «Источники питания». Мы предлагаем Вам помощь Конструкторского отдела:

- Подбор оптимального решения, техническое обоснование при выборе компонента;
- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



Как с нами связаться

Телефон: 8 (812) 309 58 32 (многоканальный)

Факс: 8 (812) 320-02-42

Электронная почта: org@eplast1.ru

Адрес: 198099, г. Санкт-Петербург, ул. Калинина, дом 2, корпус 4, литера А.