

MAX5717 Evaluation Kit

Evaluates: MAX5717/MAX5719

General Description

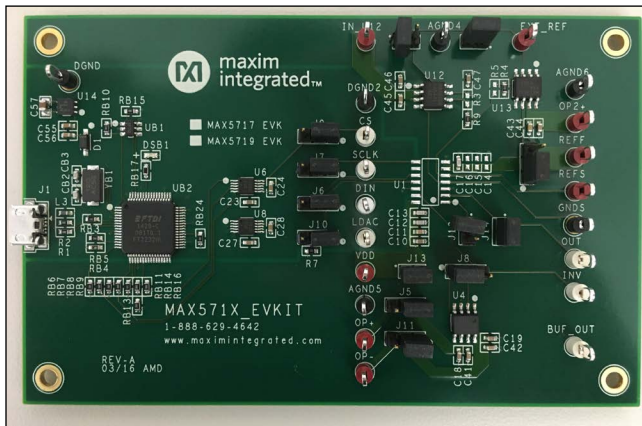
The MAX5717/MAX5719 evaluation kit (EV kit) demonstrates the MAX5717/MAX5719, 16/20-bit DAC. The EV kit includes a graphical user interface (GUI) that provides communication over SPI with an on-board master IC.

The MAX5717 EV kit comes with the MAX5717GSD+ installed and the MAX5719 comes with the MAX5719GSD+ installed.

Features

- On-Board SPI Controller
- On-Board Output Buffer (MAX9632)
- On-Board +4.096V Reference Voltage (MAX6126)
- Windows XP®, Windows® 7/8/8.1/10-Compatible Software

Board Photo



Windows is a registered trademark and registered service mark of Microsoft Corporation.

Windows XP is a registered trademark and registered service mark of Microsoft Corporation.

Quick Start

Required Equipment

- MAX5717/MAX5719 EV kit (includes micro-USB cable)
- Windows PC
- Digital Oscilloscope

Note: In the following sections, software-related items are identified by bolding. Text in bold refers to items directly from the EV kit software. Text in **bold and underlined** refers to items from the Windows operating system.

Procedure

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

- 1) Visit [HERE](#) to download the latest version of the EV kit software, *5717EVKit.ZIP*. Save the EV kit software to a temporary folder and uncompress the ZIP file.
- 2) Verify that all jumpers on the EV kit are in their default positions, as shown in [Table 1](#).
- 3) Connect a probe from the oscilloscope at the OUT test point.
- 4) Connect the USB cable from the PC to the MAX5717/MAX5719 EV kit board.
- 5) Open the EV kit GUI, *MAX5717EVKit.exe* and select **Device->MAX5717PMB** option (or MAX5719PMB).
- 6) Click the **Scan Adapters** button. Then select the option **PMODxxxxxx** (where xxxxxx is numeric) and click the **Connect** button. See [Figure 1](#) and [Figure 2](#).
- 7) Click the **Sample Once** button and verify the oscilloscope waveform form matches that of the GUI.

Ordering Information appears at end of data sheet.

Table 1. Jumper Descriptions

| JUMPER | SHUNT POSITION | DESCRIPTION |
|--------|----------------|--|
| J2 | Installed | Used for a buffered reference voltage. Connects the output voltage from the MAX6126 to the input of the MAX9632. |
| | Not installed* | Disconnects the output voltage from the MAX6126 to the input of the MAX9632. |
| J3 | Installed* | Powers the MAX6126 using USB supply. |
| | Not installed | Disconnects the USB supply from the MAX6126. User must apply 5V at the IN_U12 test point to use the MAX6126. |
| J4 | 1-2* | Connects the output voltage from the MAX6126. |
| | 2-3 | User-Supplied Voltage Reference. Connects to the MAX9632 output. User must apply voltage reference at the EXT_REF test point and 5V at the OP2+ test point to power the MAX9632 (U13). |
| J5 | 1-2* | Powers the MAX9632's V _{CC} pin using USB supply. |
| | 2-3 | User-supplied power to the MAX9632 (U4). Apply 5V to 15V at the OP+ test point. Recommended for use in bipolar mode. |
| J6 | 1-2* | DIN from on-board master. |
| | 2-3 | User-supplied DIN. Apply respective signal at DIN test point. |
| J7 | 1-2* | SCLK from on-board master. |
| | 2-3 | User-supplied SCLK. Apply respective signal at SCLK test point. |
| J8 | 1-2* | Connects the negative input to the output of the MAX9632. |
| | 2-3 | Connects the MAX5717/MAX5719's INV pin to the negative input of the MAX9632. |
| J9 | 1-2* | CS from on-board master. |
| | 2-3 | User-Supplied CS. Apply respective signal at CS test point. |
| J10 | 1-2* | LDAC from On-Board Master. |
| | 2-3 | User-Supplied LDAC. Apply respective signal at LDAC test point. |
| J11 | 1-2 | Do Not Use |
| | 2-3* | User-Supplied Power to the MAX9632 (U4). Apply -5V to -15V at the OP- test point. Recommended for use in bipolar mode. |
| J12 | Installed* | Connects the MAX5717/MAX5719's RFB pin to the MAX9632's output. |
| | Not installed | Disconnects the MAX5717/MAX5719's RFB pin to the MAX9632's output. |
| J13 | Installed* | Powers the MAX5717/MAX5719 using the USB power. |
| | Not installed | User-supplied power. Apply 5V at the V _{DD} test point. |
| J14 | Installed* | Connects the MAX5717/MAX5719's OUT pin to the MAX9632's IN+ pin. |
| | Not installed | Disconnects the MAX5717/MAX5719's OUT pin to the MAX9632's IN+ pin. |

*Default position.

General Description of Software

The main window of the MAX5717/MAX5719 EV kit software contains controls to evaluate the MAX5717 and MAX5719 ICs. Included is a waveform generator that allows the user to quickly evaluate the device.

USB2PMB Adapter

The controls within the **USB2PMB** groupbox allow the user to select the appropriate USB2PMB devices. When **Scan Adapters** button is pressed, it will update the dropdown list with all USB2PMB devices. With the EV kit connected to the PC, **PMODxxxxxx** (where xxxxxx is numeric) will appear within the dropdown list. Make the appropriate selection respective of the IC and press on the **Connect** button.

Sample

The Sample groupbox contains the sample rate and SPI SCLK options applicable to EV kit. Sample rate ranges from 5000sps to 20000sps. The SPI SCLK is selectable from 80kHz to 15MHz. Once configured, the user can either press the Sample Once or Sample Continuous button.

Transfer Function

The EV kit can work in either unipolar or bipolar mode. Please refer to Unipolar and Bipolar section of the data sheet.

Plot Configuration

The Scope display can plot the waveform generator's data in units of LSBs or voltage in a time domain. In addition, provides an FFT plot of the raw data for the MAX5717 or MAX5719.

Signal Setup

The **Signal Setup** controls are similar to a function generator and can be used to quickly evaluate the EV kit. It provides waveforms in sine, left and right sawtooth, triangle, square, and white noise. Amplitude, Offset, and Frequency can be adjusted for each waveform.

General Description of Hardware

The MAX5717/MAX5719 EV kit demonstrates the MAX5717/MAX5719, 16/20-bit DAC. The EV kit includes an on-board master IC for all SPI and I/O communication.

User-Supplied SPI

To evaluate the EV kit with a user-supplied SPI bus, place shunts on the 2-3 position of jumper J6, J7, J9, and J10. Apply the user-supplied SPI signals to the SCLK, CS, DIN, and LDAC test points. Make sure the return ground is the same as the MAX5717/MAX5719's ground.

User-Supplied V_{DD}

The MAX5717/MAX5719 is powered through USB by default. For user-supplied V_{DD}, remove the shunt of the jumper J13 and apply +5V at the V_{DD} test point.

User-Supplied Power for Voltage Reference (U12)

The voltage reference is powered through USB by default. For user-supplied power, remove the shunt of the jumper J3 and apply +5V at the IN_U12 test point.

User-Supplied Voltage Reference

The MAX9632 (U13) is an optional buffer for the reference of the MAX5717/MAX5719. Apply only +5V to the OP2+ test point when a voltage reference is applied at the EXT_REF test point.

User-Supplied Power for Buffer (U4)

The MAX9632 is an optional buffer for the output of the MAX5717/MAX5719. Place shunts on the 2-3 position of jumpers J5 and J11. Apply only +5V to +15V at the OP+ test point and -5V to -15V at the OP- test point.

Unipolar and Bipolar Output

When in unipolar output and the output buffer is in use, a shunt should be placed in the 2-3 position of jumper J5, 1-2 position of the jumper J8, 2-3 position of jumper J11, and open position of jumper 12. When in bipolar output, a shunt should be placed in the 2-3 position of jumper J5, 2-3 position of the jumper J8, 2-3 position of jumper J11, and closed position of jumper J12.

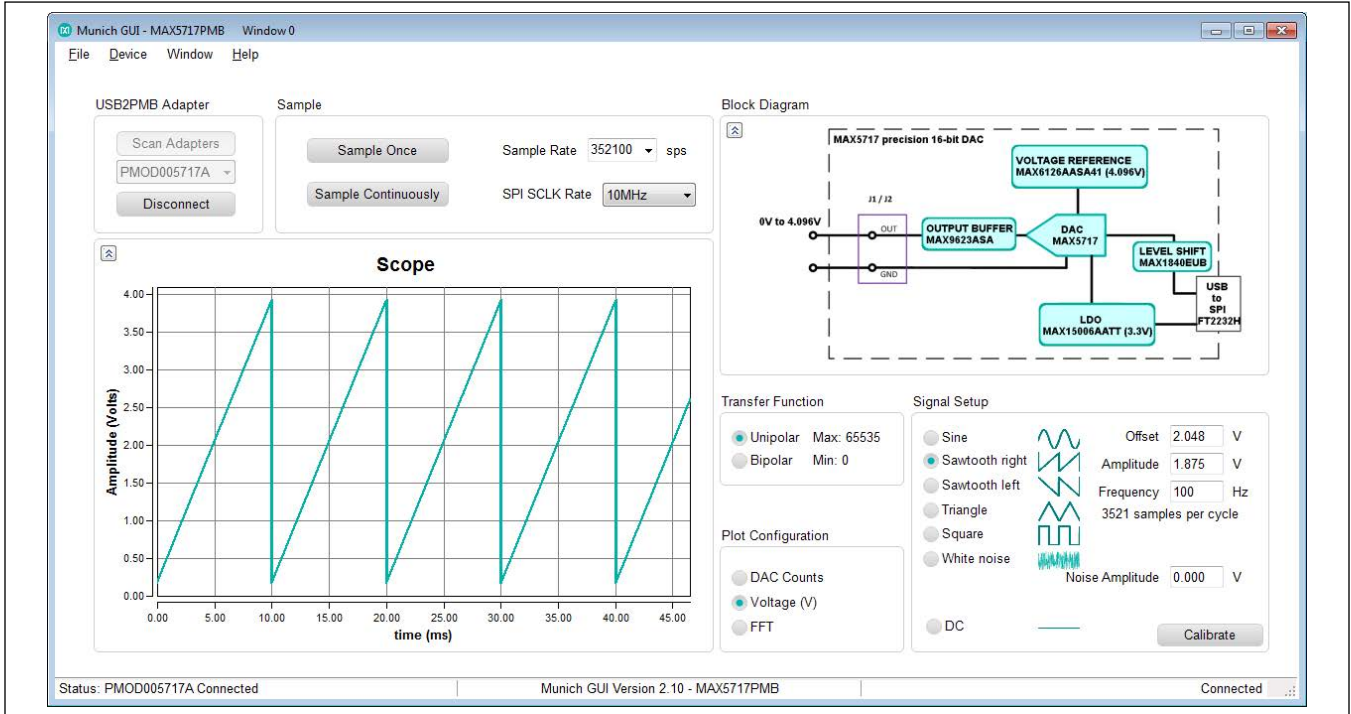


Figure 1. MAX5717 EV Kit Main Window

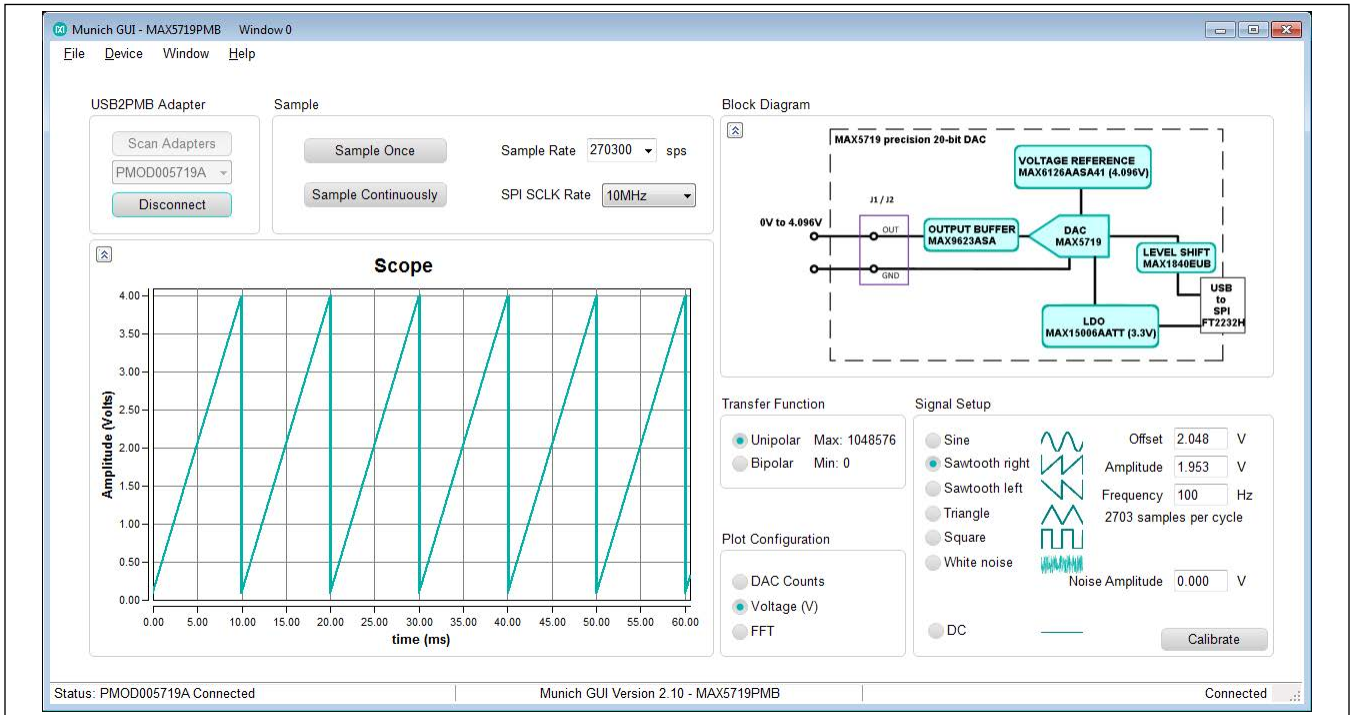


Figure 2. MAX5719 EV Kit Main Window

Component Information, PCB Layout, and Schematics

See the following links for component information, PCB layout diagrams, and schematic.

- [MAX5717/MAX5719 EV BOM](#)
- [MAX5717/MAX5719 EV PCB Layout](#)
- [MAX5717/MAX5719 EV Schematic](#)

Ordering Information

| Part | TYPE |
|---------------|--------|
| MAX5717EVKIT# | EV KIT |
| MAX5719EVKIT# | EV KIT |

#Denotes RoHS compliant.

Revision History

| REVISION NUMBER | REVISION DATE | DESCRIPTION | PAGES CHANGED |
|-----------------|---------------|-----------------|---------------|
| 0 | 6/16 | Initial Release | — |

For pricing, delivery, and ordering information, please contact Maxim Direct at 1-888-629-4642, or visit Maxim Integrated's website at www.maximintegrated.com.

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| TITLE: Bill of Materials | | | | | | |
|--------------------------|-----|---|---|----------------------------------|--------|---|
| DATE: 03/03/2016 | | | | | | |
| DESIGN: max571x_evkit_a | | | | | | |
| VARIANT:dni | | | | | | |
| ITEM | QTY | REF DES | MFG PART # | MANUFACTURER | VALUE | DESCRIPTION |
| 1 | 3 | AGND4-AGND6 | 5011 | ? | 5011 | TEST POINT; PIN DIA=0.125IN; TOTAL LENGTH=0.445IN; BOARD HOLE=0.063IN; BLACK; PHOSPHOR BRONZE WIRE SILVER PLATE FINISH; RECOMMENDED FOR BOARD THICKNESS=0.062IN |
| 2 | 7 | CS, DIN, INV, OUT, LDAC, SCLK, BUF_OUT | 5012 | ? | 5012 | TEST POINT; PIN DIA=0.125IN; TOTAL LENGTH=0.445IN; BOARD HOLE=0.063IN; WHITE; PHOSPHOR BRONZE WIRE SILVER PLATE FINISH; RECOMMENDED FOR BOARD THICKNESS=0.062IN |
| 3 | 10 | C1, C3, C5-C7, C21, C22, C29, C30, C56 | C0603C104K3 RAC; GRM188R71E 104KA01; C1608X7R1E1 04K | KEMET/MURATA/T DK | 0.1UF | CAPACITOR; SMT; 0603; CERAMIC; 0.1uF; 25V; 10%; X7R; -55degC to + 125degC; +/-15% from -55degC to +125degC; NOT RECOMMENDED FOR NEW DESIGN USE - 20-000u1-01 |
| 4 | 3 | C2, C4, C20 | GRM21BR61E 475KA | MURATA | 4.7UF | CAPACITOR; SMT (0805); CERAMIC CHIP; 4.7UF; 25V; TOL=10%; MODEL=X5R; TG=-55 DEGC TO +125 DEGC; TC=+/- |
| 5 | 7 | C10, C18, C19, C44- C47 | C0603C104K4 RAC; GCM188R71C 104KA37; C1608X7R1C1 04K; GRM188R71C 104K; C0603X7R160- 104KNE | KEMET/MURATA/T DK/VENKEL LTD. | 0.1UF | CAPACITOR; SMT (0603); CERAMIC CHIP; 0.1UF; 16V; TOL=10%; TG=-55 DEGC TO +125 DEGC; TC=X7R; NOT RECOMMENDED FOR NEW DESIGN USE 20-000u1-01 |
| 6 | 1 | C11 | C0603C103K5 RAC; GRM188R71H 103K;C0603X7 R500-103KNE | KEMET/MURATA/V ENKEL LTD. | 0.01UF | CAPACITOR; SMT; 0603; CERAMIC; 0.01uF; 50V; 10%; X7R; -55degC to + 125degC; USE 20-00u01-M8 FOR NEW DESIGN |
| 7 | 1 | C12 | C0603C102K5 RAC; GRM188R71H 102KA01; C0603X7R500- 102KNE | KEMET/MURATA/V ENKEL | 1000PF | CAPACITOR; SMT; 0603; CERAMIC; 1000pF; 50V; 10%; X7R; -55degC to + 125degC; +/-15% from -55degC to +125degC, USE 20-1000p-E4 FOR NEW DESIGN |

| | | | | | | |
|----|---|-----------------------------|--|------------------------------------|-----------------|--|
| 8 | 2 | C13, C17 | C0603C0G500-181JNE; GRM1885C1H181J | VENKEL LTD./MURATA | 180PF | CAPACITOR; SMT (0603); CERAMIC CHIP; 180PF; 50V; TOL=5%; MODEL=; TG=-55 DEGC TO +125 DEGC; TC=COG |
| 9 | 7 | C23, C24, C27, C28, C41-C43 | C0603X5R160-105KNP; EMK107BJ105KA; C1608X5R1C105K; GRM188R61C105K | VENKEL LTD./TAIYO YUDEN/TDK/MURATA | 1UF | CAPACITOR; SMT; 0603; CERAMIC; 1uF; 16V; 10%; X5R; -55degC to + 85degC; 0 +/-15% degC MAX.USE 20-0001u-63 FOR NEW DESIGN |
| 10 | 1 | C55 | C0603C105K4RAC; GRM188R71C105KA12; C1608X7R1C105K; EMK107B7105KA | KEMET/MURATA/TDK/TAIYO YUDEN | 1UF | CAPACITOR; SMT (0603); CERAMIC CHIP; 1UF; 16V; TOL=10%; MODEL=; TG=-55 DEGC TO +125 DEGC; TC=X7R |
| 11 | 1 | C57 | TMK212BBJ106KG-T; CL21A106KAFN3N | TAIYO YUDEN | 10UF | CAPACITOR; SMT (0805); CERAMIC CHIP; 10UF; 25V; TOL=10%; MODEL=; TG=-55 DEGC TO +85 DEGC; TC=X5R |
| 12 | 2 | CB2, CB3 | C0603C0G500-180JNE; C1608C0G1H180J; GRM1885C1H180J | VENKEL LTD./TDK/MURATA | 18PF | CAPACITOR; SMT (0603); CERAMIC CHIP; 18PF; 50V; TOL=5%; MODEL=; TG=-55 DEGC TO +125 DEGC; TC=COG |
| 13 | 1 | D1 | MBR0520L | FAIRCHILD SEMICONDUCTOR | MBR0520L | DIODE, SCHOTTKY, SOD-123, PIV=20V, Vf=0.385V@If=0.5A, If(ave)=0.5A |
| 14 | 2 | DGND, GNDS | 5011 | KEYSTONE | N/A | TEST POINT; PIN DIA=0.125IN; TOTAL LENGTH=0.445IN; BOARD HOLE=0.063IN; BLACK; PHOSPHOR BRONZE WIRE SILVER PLATE FINISH; RECOMMENDED FOR BOARD THICKNESS=0.062IN; NOT FOR COLD TEST |
| 15 | 1 | DGND2 | 5011 | ? | 5011 | TEST POINT; PIN DIA=0.125IN; TOTAL LENGTH=0.445IN; BOARD HOLE=0.063IN; BLACK; PHOSPHOR BRONZE WIRE SILVER PLATE FINISH; RECOMMENDED FOR BOARD THICKNESS=0.062IN |
| 16 | 1 | DSB1 | LG L29K-G2J1-24 | OSRAM | LG L29K-G2J1-24 | DIODE; LED; SMT (0603); Vf=1.7V; If(test)=0.002A; -40 DEGC TO +100 DEGC |
| 17 | 3 | OP2+, IN_U12, EXT_REF | 5010 | KEYSTONE | N/A | TESTPOINT WITH 1.80MM HOLE DIA, RED, MULTIPURPOSE; NOT FOR COLD TEST |
| 18 | 1 | J1 | 10118192-0001LF | FCI CONNECT | 10118192-0001LF | CONNECTOR; FEMALE; SMT; MICRO USB B TYPE RECEPTACLE; RIGHT ANGLE; 5PINS |
| 19 | 5 | J2, J3, J12-J14 | PEC02SAAN | SULLINS | PEC02SA | CONNECTOR; MALE; THROUGH HOLE; BREAKAWAY; STRAIGHT; 2PINS |
| 20 | 8 | J4-J11 | PEC03SAAN | SULLINS | PEC03SA | CONNECTOR; MALE; THROUGH HOLE; BREAKAWAY; STRAIGHT; 3PINS |

| | | | | | | |
|----|----|--|---|---|-------------------|---|
| 21 | 1 | L3 | MPZ1608S601 A | TDK | 600 | INDUCTOR; SMT (0603); FERRITE-BEAD; 600; TOL=+/-25%; 1A; -55 DEGC TO +125 DEGC |
| 22 | 5 | OP+, OP-, VDD, REFF, REFS | 5010 | ? | 5010 | TESTPOINT WITH 1.80MM HOLE DIA, RED, MULTIPURPOSE |
| 23 | 6 | R1, R2, RB7, RB9, RB14, RB16 | ERJ- 3EKF28R0V | PANASONIC | 28 | RESISTOR; 0603; 28 OHM; 1%; 100PPM; 0.10W; THICK FILM |
| 24 | 2 | R4, R9 | RC1608J000CS ; CR0603-J/- 000ELF;RC060 3JR-070RL | SAMSUNG ELECTRONICS/BOU RNS/YAGEO PH | 0 | RESISTOR; 0603; 0 OHM; 5%; JUMPER; 0.10W; THICK FILM |
| 25 | 1 | R7 | CRCW060310 K0JN; ERJ- 3GEYJ103V | VISHAY DALE; PANASONIC | 10K | RESISTOR; 0603; 10K OHM; 5%; 200PPM; 0.10W; THICK FILM |
| 26 | 1 | RB3 | CRCW060312 K0FK | VISHAY DALE | 12K | RESISTOR, 0603, 12K OHM, 1%, 100PPM, 0.10W, THICK FILM |
| 27 | 1 | RB4 | CRCW060315 K0FK | VISHAY DALE | 15K | RESISTOR, 0603, 15K OHM,1%, 100PPM, 0.10W, THICK FILM |
| 28 | 7 | RB5, RB6, RB8, RB11, RB13, RB15, RB24 | CRCW060310 K0FK; 9C06031A100 2FK; ERJ- 3EKF1002 | VISHAY DALE/YAGEO PHICOMP/PANASO NIC | 10K | RESISTOR; 0603; 10K; 1%; 100PPM; 0.10W; THICK FILM |
| 29 | 1 | RB10 | CRCW06032K 20FK | VISHAY DALE | 2.2K | RESISTOR, 0603, 2.2K OHM, 1%, 100PPM, 0.10W, THICK FILM |
| 30 | 1 | RB17 | CRCW06034K 70FK | VISHAY DALE | 4.7K | RESISTOR; 0603; 4.7K; 1%; 100PPM; 0.10W; THICK FILM |
| 31 | 1 | U1 | MAX5719 | MAXIM | MAX5719 | EVKIT PART - IC; MAX5719; NSOIC14 150MIL; PKG. DWG. NO.: 21-0041 |
| 32 | 2 | U4, U13 | MAX9632ASA + | MAXIM | MAX9632 ASA+ | IC; OPAMP; PRECISION, LOW-NOISE, WIDE-BAND AMPLIFIER; NSOIC8 150MIL; -40 DEGC TO +125 DEGC |
| 33 | 2 | U6, U8 | MAX1840EUB | MAXIM | MAX1840 EUB | IC; TRANS; LOW-VOLTAGE SIM/SMART CARD LEVEL TRANSLATOR; UMAX10 |
| 34 | 1 | U12 | MAX6126AAS A41+ | MAXIM | MAX6126 AASA41 | IC; VREF; ULTRA-HIGH PRECISION; ULTRA-LOW NOISE; SERIES VOLTAGE REFERENCE; NSOIC8 150MIL; -40 DEGC TO +125 DEGC |
| 35 | 1 | U14 | MAX15006AA TT+ | MAXIM | MAX1500 6AATT+ | IC; VREG; ULTRA-LOW QUIESCENT-CURRENT LINEAR REGULATOR; TDFN6-EP 3X3 |
| 36 | 1 | UB1 | 93LC66BT- I/OT | MICROCHIP | 93LC66BT- I/OT | IC; EPROM; 4K MICROWIRE SERIAL EEPROM; SOT23-6 |
| 37 | 1 | UB2 | FT2232HL | FUTURE TECHNOLOGY DEVICES INTL LTD. | FT2232HL | IC; MMRY; DUAL HIGH SPEED USB TO MULTIPURPOSE UART/FIFO; LQFP64 |
| 38 | 13 | XJU1-XJU13 | STC02SYAN | SULLINS ELECTRONICS CORP. | STC02SYA N | TEST POINT; JUMPER; STR; TOTAL LENGTH=0.256IN; BLACK; INSULATION=PBT CONTACT=PHOSPHOR BRONZE; COPPER PLATED TIN OVERALL |

| | | | | | | |
|-------|-----|-----|----------------------|---------|-------|--|
| 39 | 1 | YB1 | ABM7-12.000MHZ-D2Y-T | ABRACON | 12MHZ | CRYSTAL; SMT ; 18PF; 12MHZ; +/-20PPM; +/-30PPM |
| 40 | 1 | | MAX | MAXIM | PCB | PCB: MAX |
| TOTAL | 117 | | | | | |

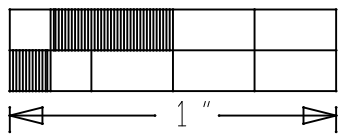
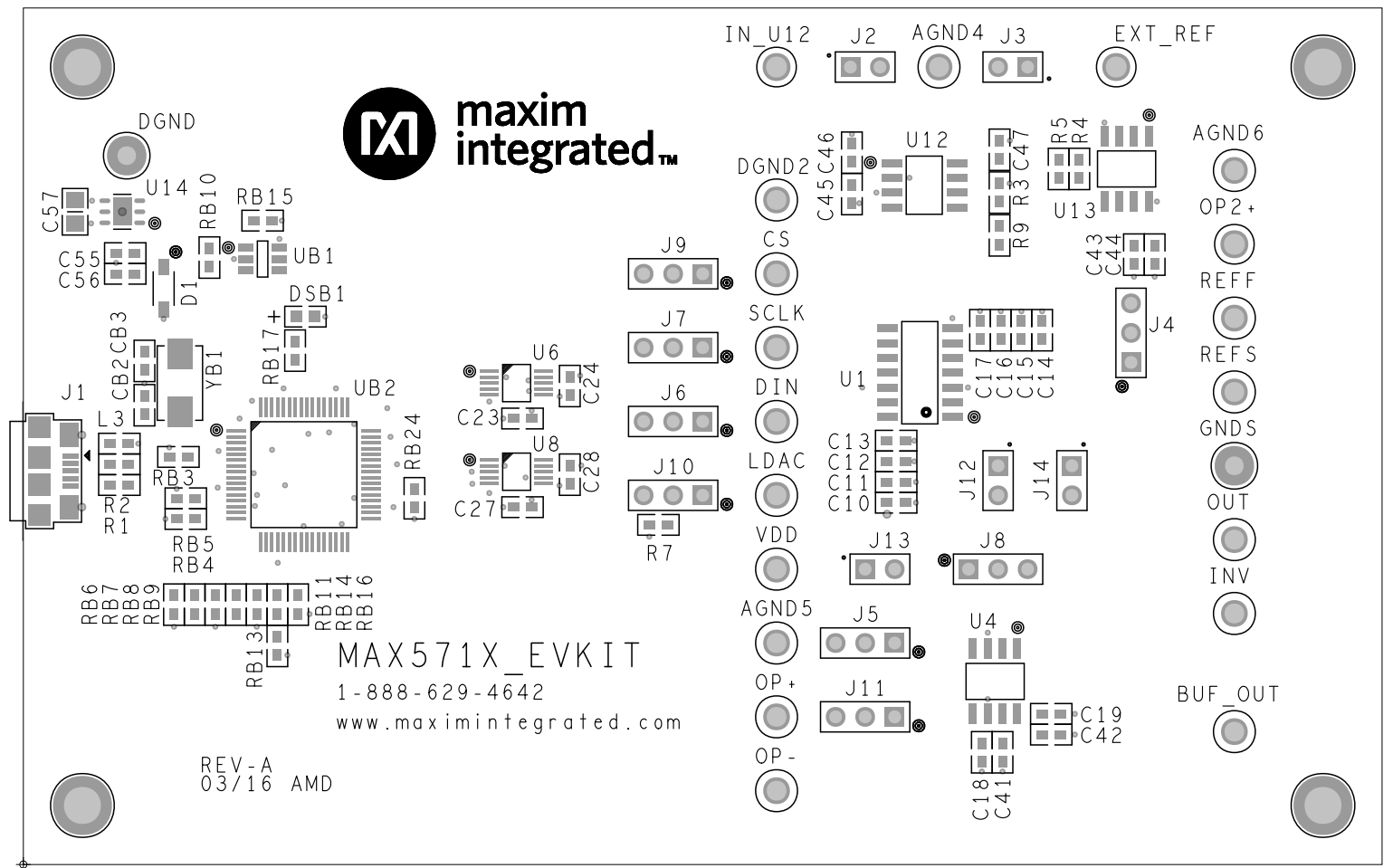
DO NOT PURCHASE(DNP)

| ITEM | QTY | REF DES | MFG PART # | MANUFACTURER | VALUE | DESCRIPTION |
|-------|-----|---------|------------|--------------|-------|--|
| 1 | 3 | C14-C16 | N/A | N/A | OPEN | PACKAGE OUTLINE 0603 NON-POLAR CAPACITOR - EVKIT |
| 2 | 2 | R3, R5 | N/A | N/A | OPEN | PACKAGE OUTLINE 0603 RESISTOR - EVKIT |
| 3 | 1 | R6 | N/A | N/A | SHORT | PACKAGE OUTLINE 0805 RESISTOR - EVKIT |
| TOTAL | 6 | | | | | |

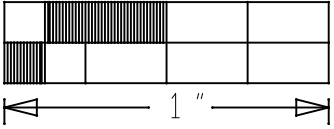
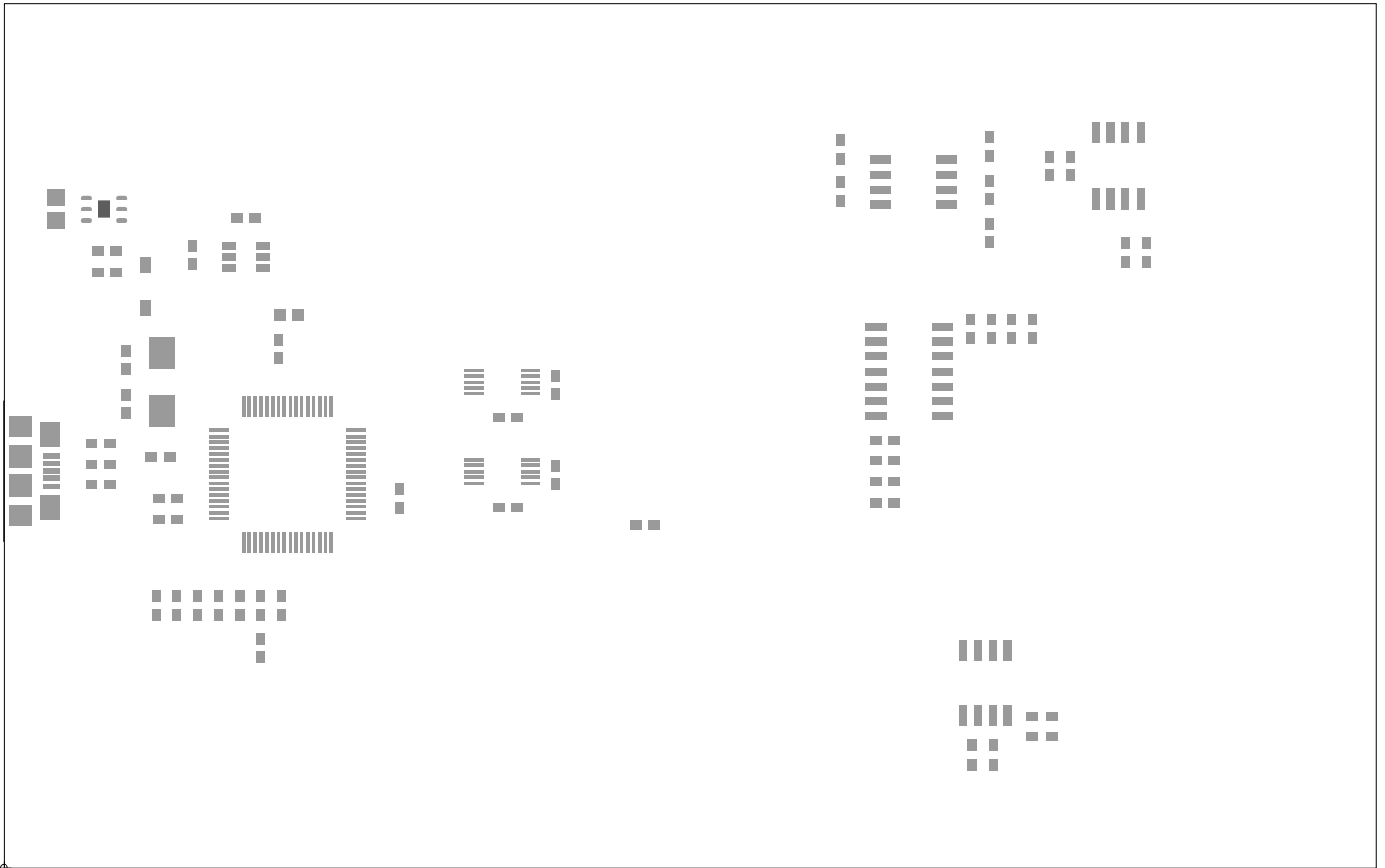
PACKOUT (These are purchased parts but not assembled on PCB and will be shipped with PCB)

| ITEM | QTY | REF DES | MFG PART # | MANUFACTURER | VALUE | DESCRIPTION |
|------|-----|---------|---------------|--------------|---|--|
| 1 | 1 | PACKOUT | 88-00711-SML | N/A | ? | BOX;SMALL BROWN 9 3/16X7X1 1/4 - PACKOUT |
| 2 | 1 | PACKOUT | 87-02162-00 | N/A | ? | ESD BAG;BAG;STATIC SHIELD ZIP 4inX6in;W/ESD LOGO - PACKOUT |
| 3 | 1 | PACKOUT | 85-MAXKIT-PNK | N/A | ? | PINK FOAM;FOAM;ANTI-STATIC PE 12inX12inX5MM - PACKOUT |
| 4 | 1 | PACKOUT | EVINSERT | N/A | ? | WEB INSTRUCTIONS FOR MAXIM DATA SHEET |
| 5 | 1 | PACKOUT | 85-84003-006 | N/A | ? | LABEL(EV KIT BOX) - PACKOUT |
| 6 | 1 | X1 | AK67421-1-R | ASSMANN | OR; MALE; USB; USB2.0 MICRO CONNECT ION CABLE; USB B MICRO MALE TO USB A | |

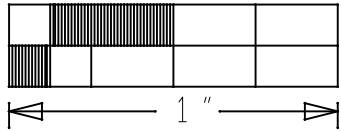
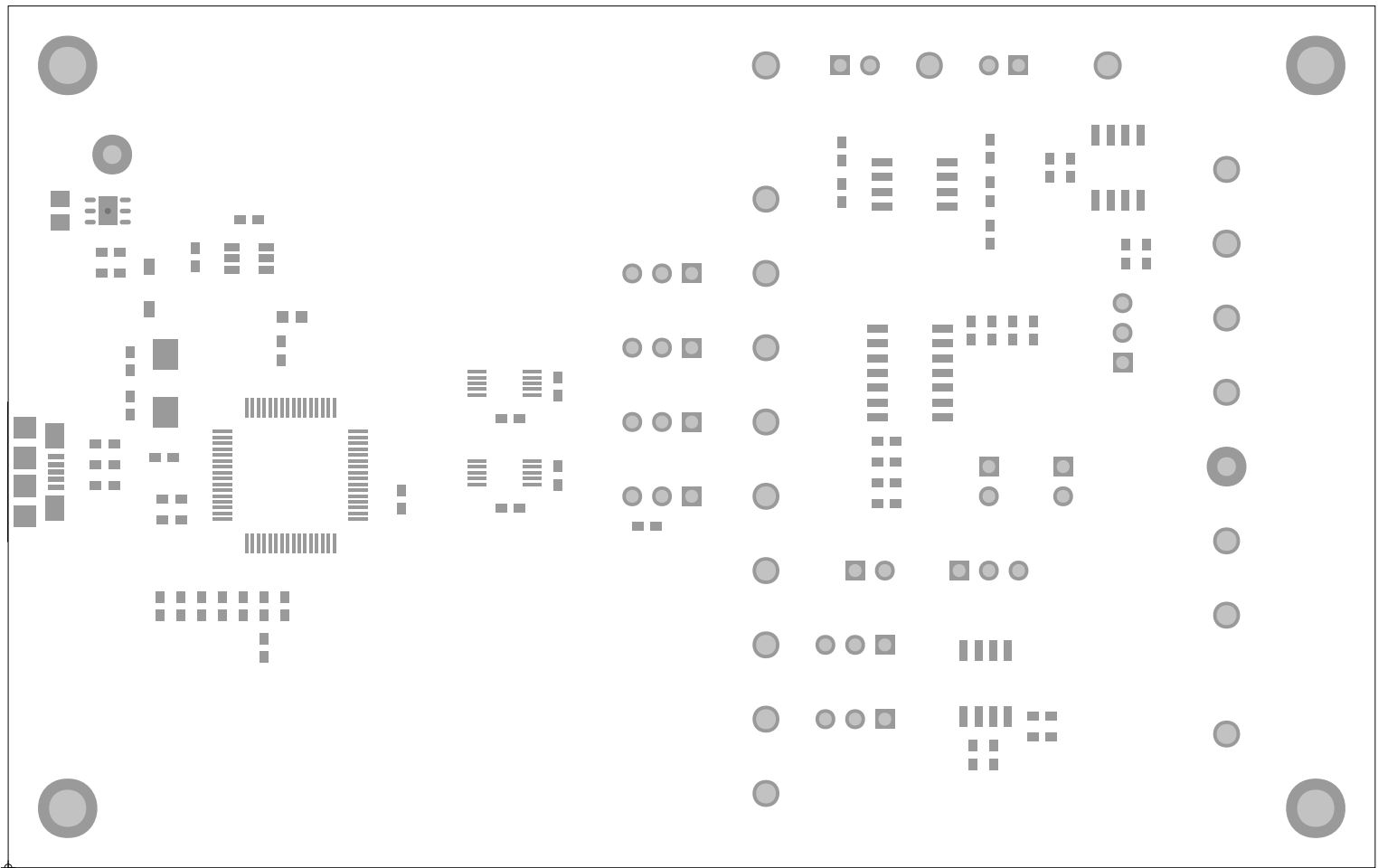
TOTAL 6



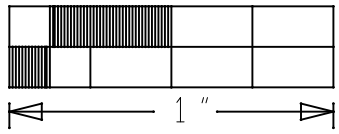
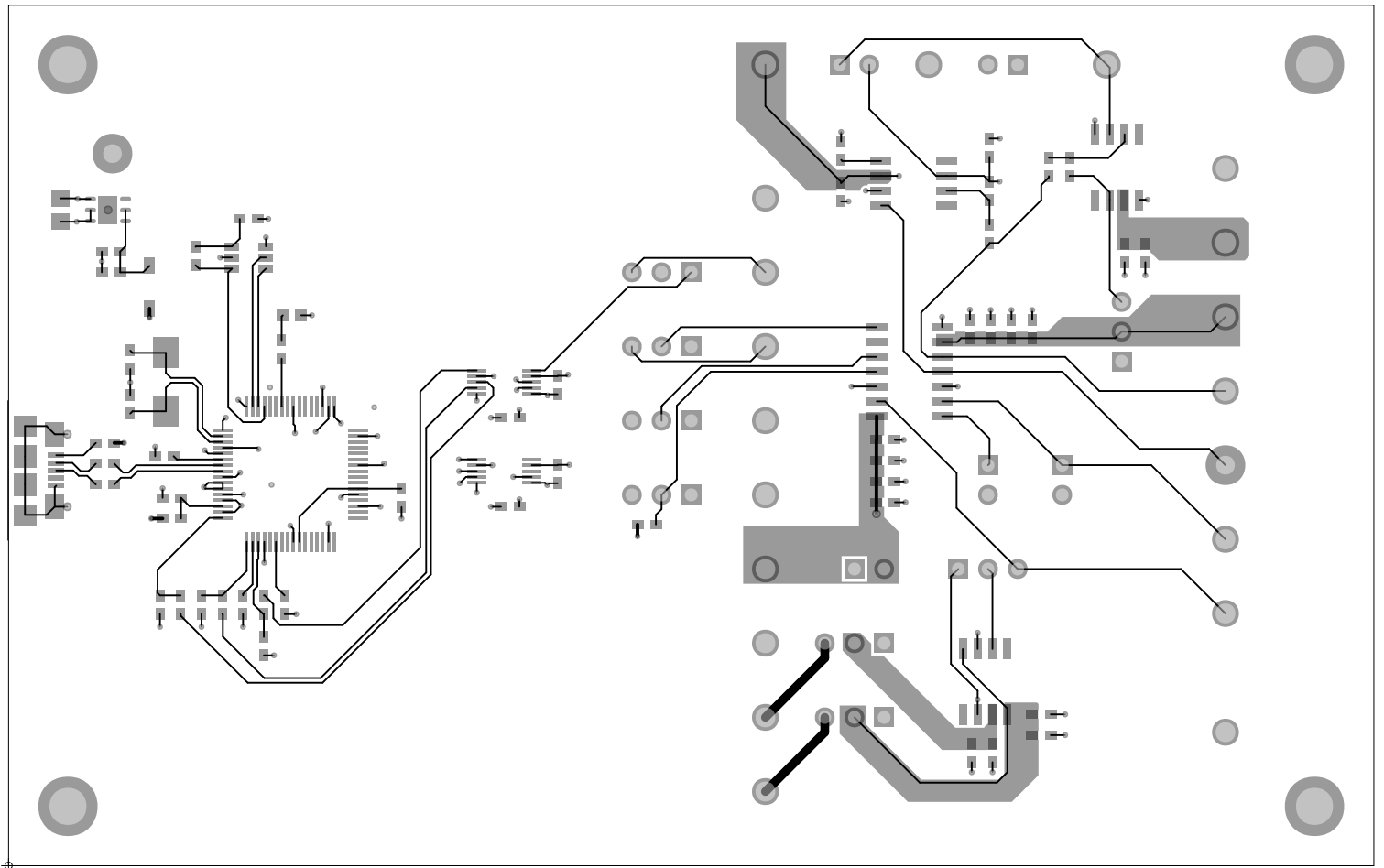
TOP SILKSCREEN



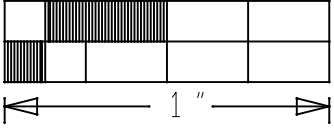
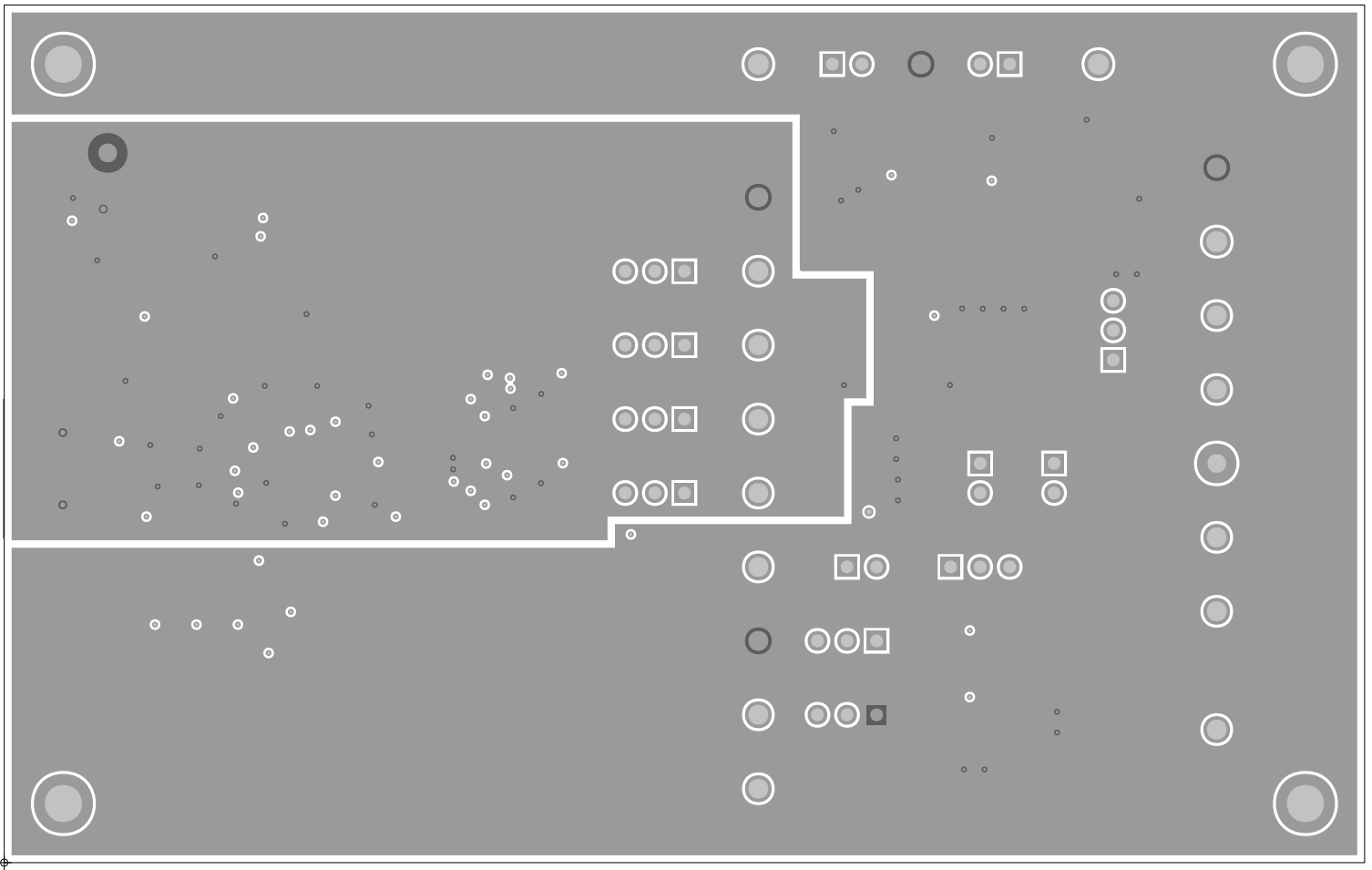
TOP PASTE



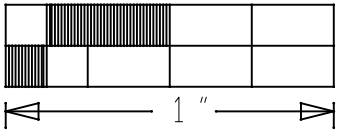
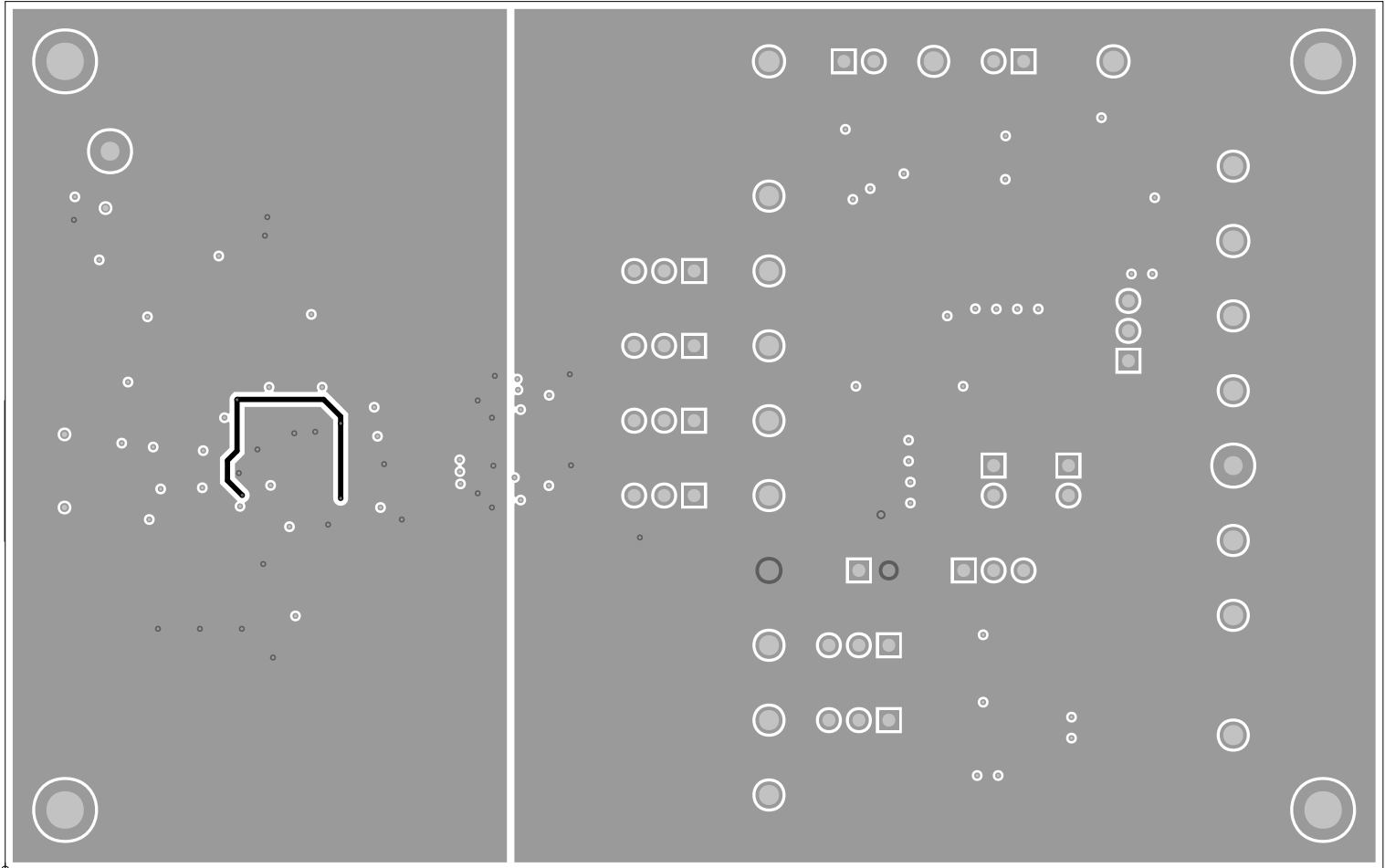
TOP MASK



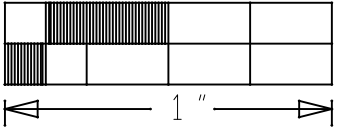
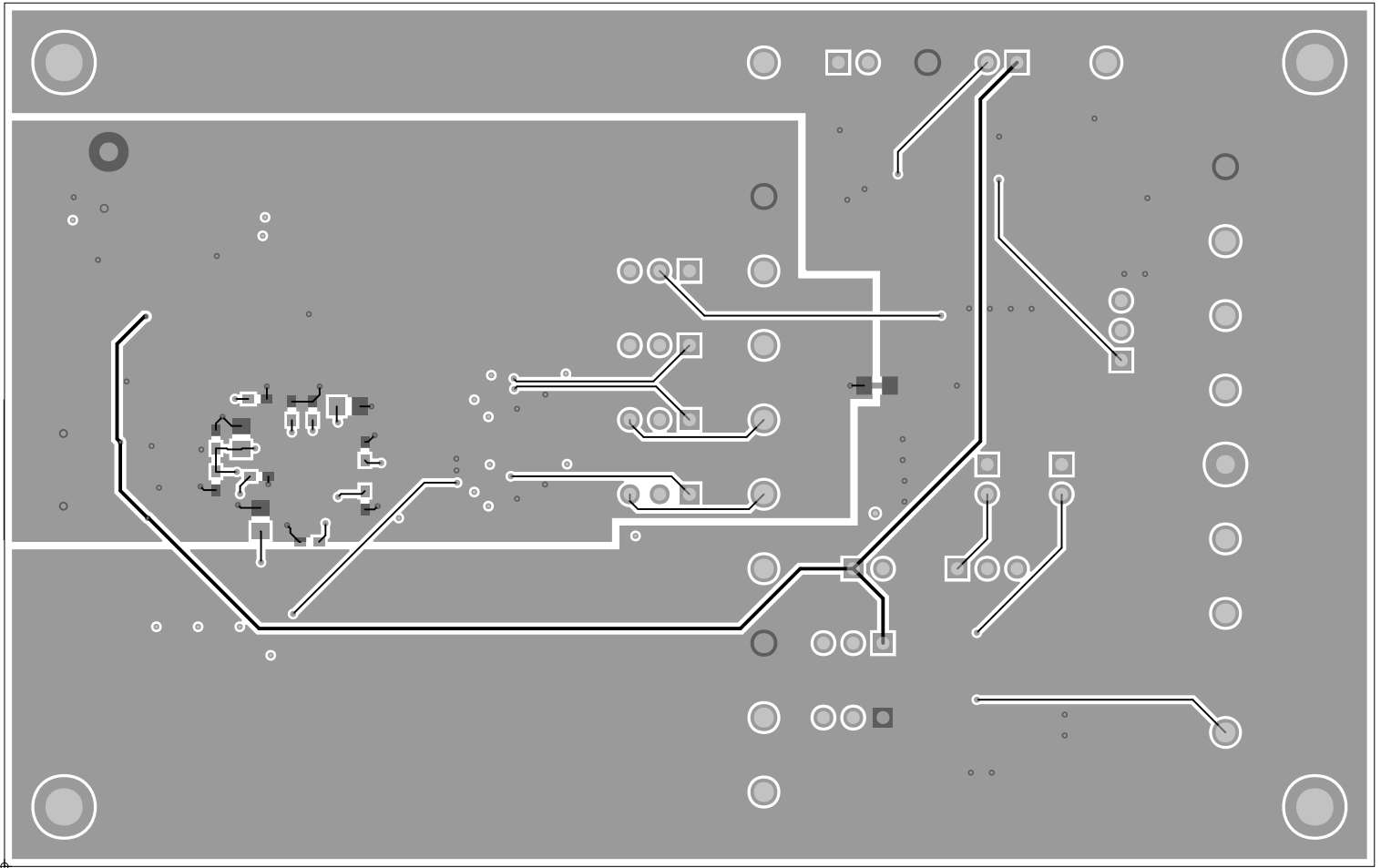
TOP



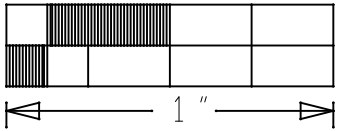
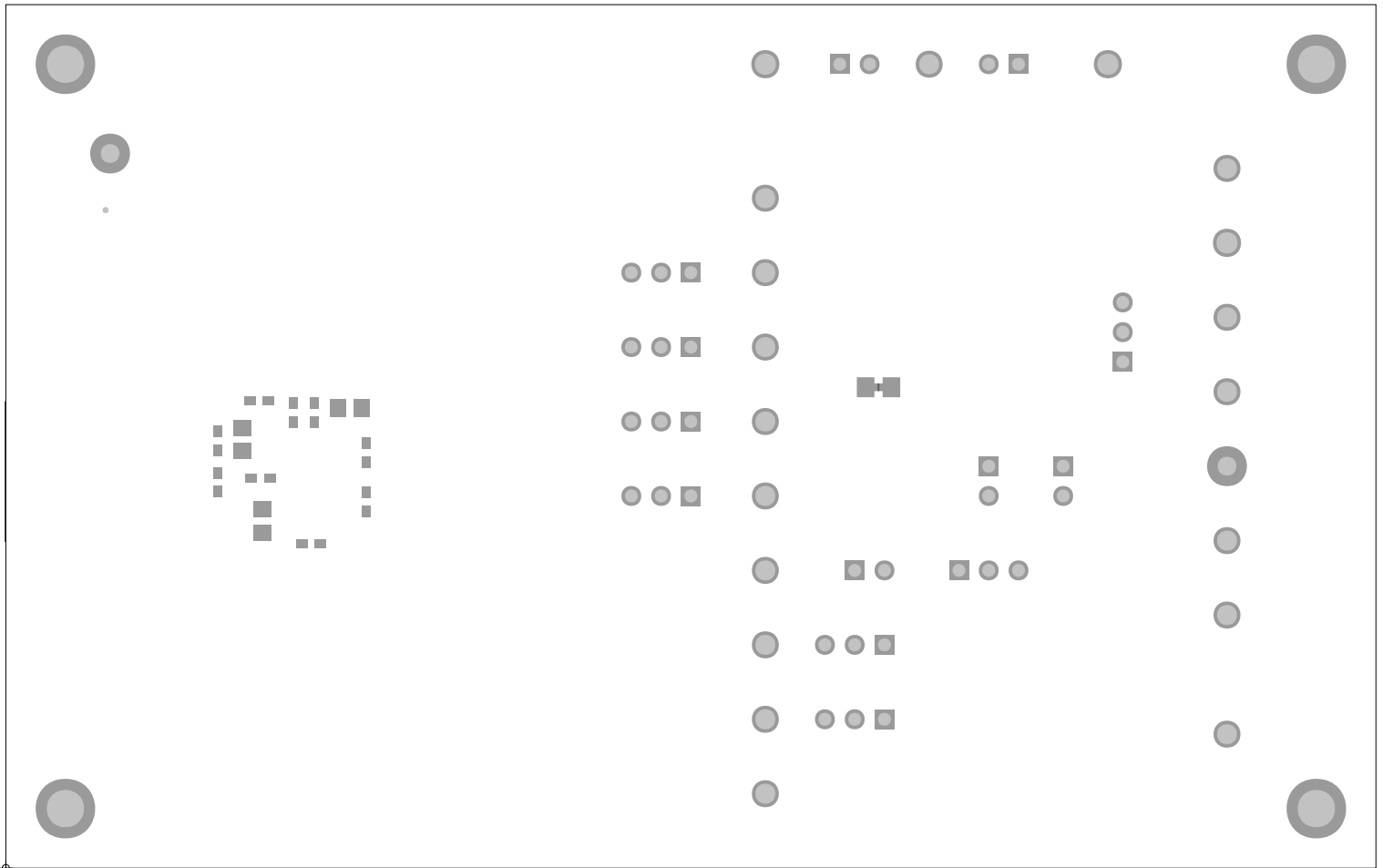
LAYER 2



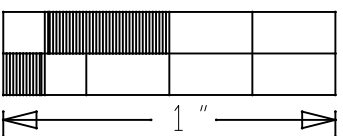
LAYER 3



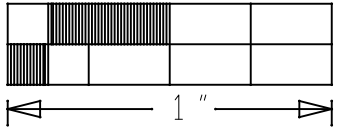
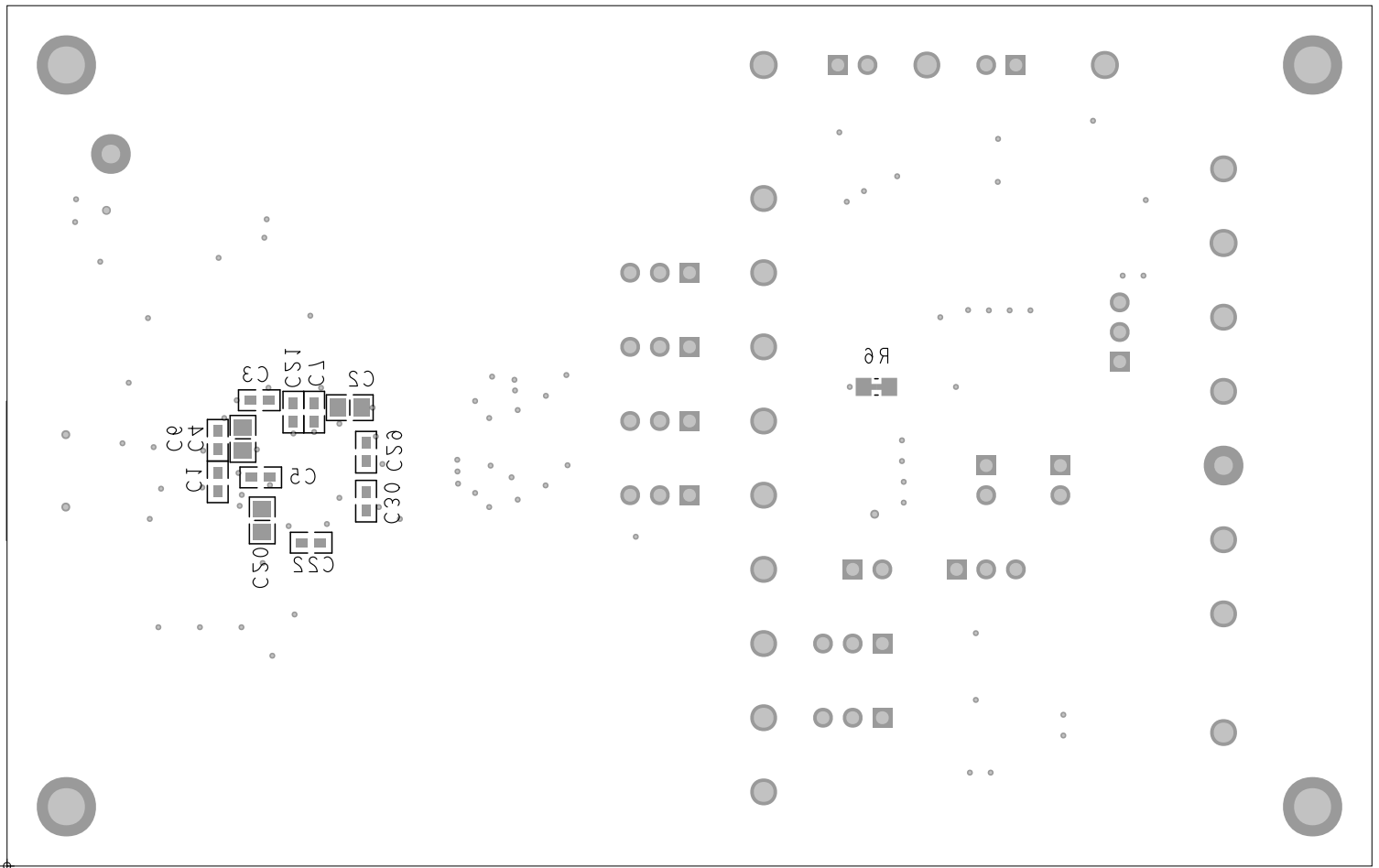
BOTTOM



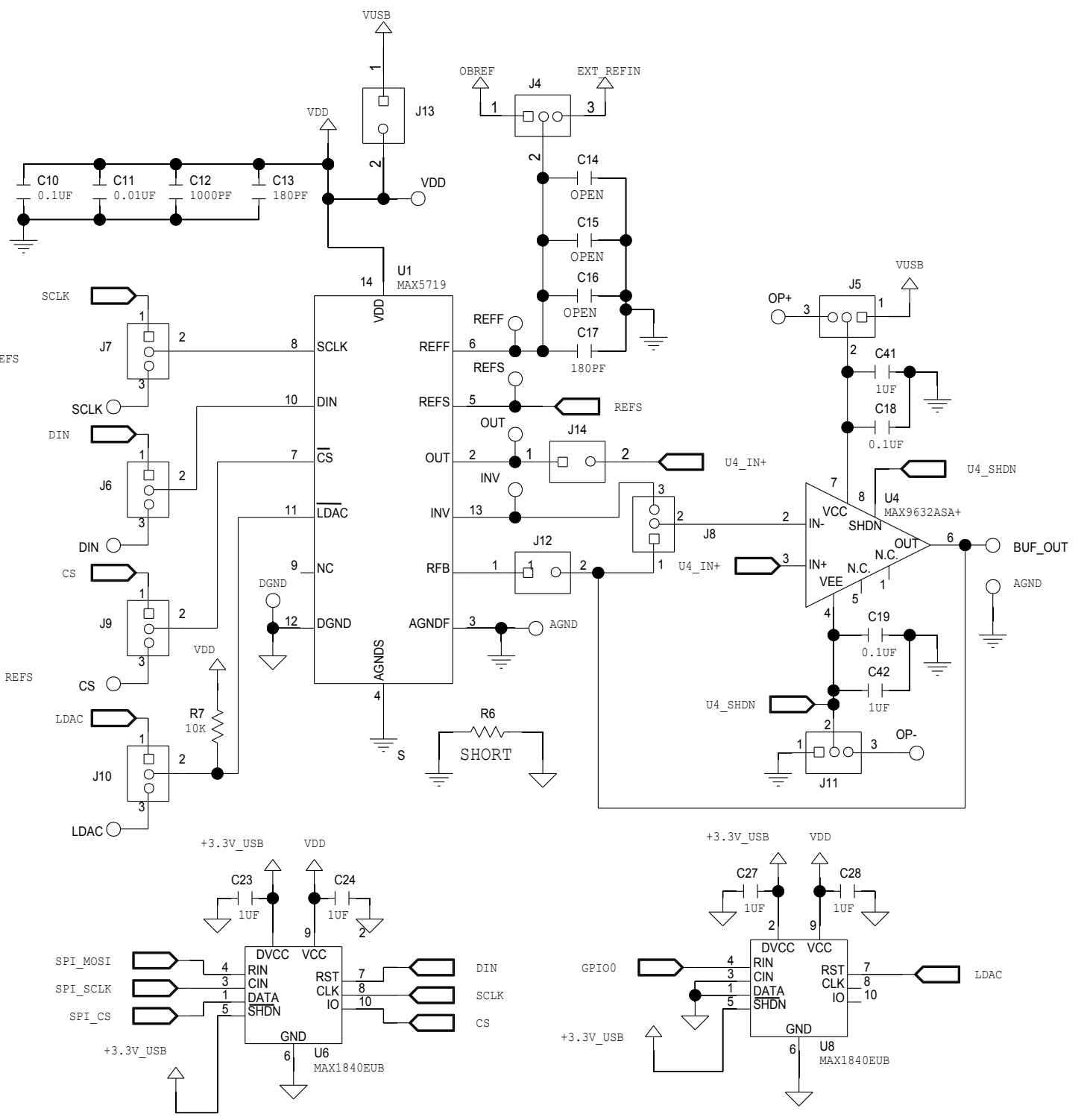
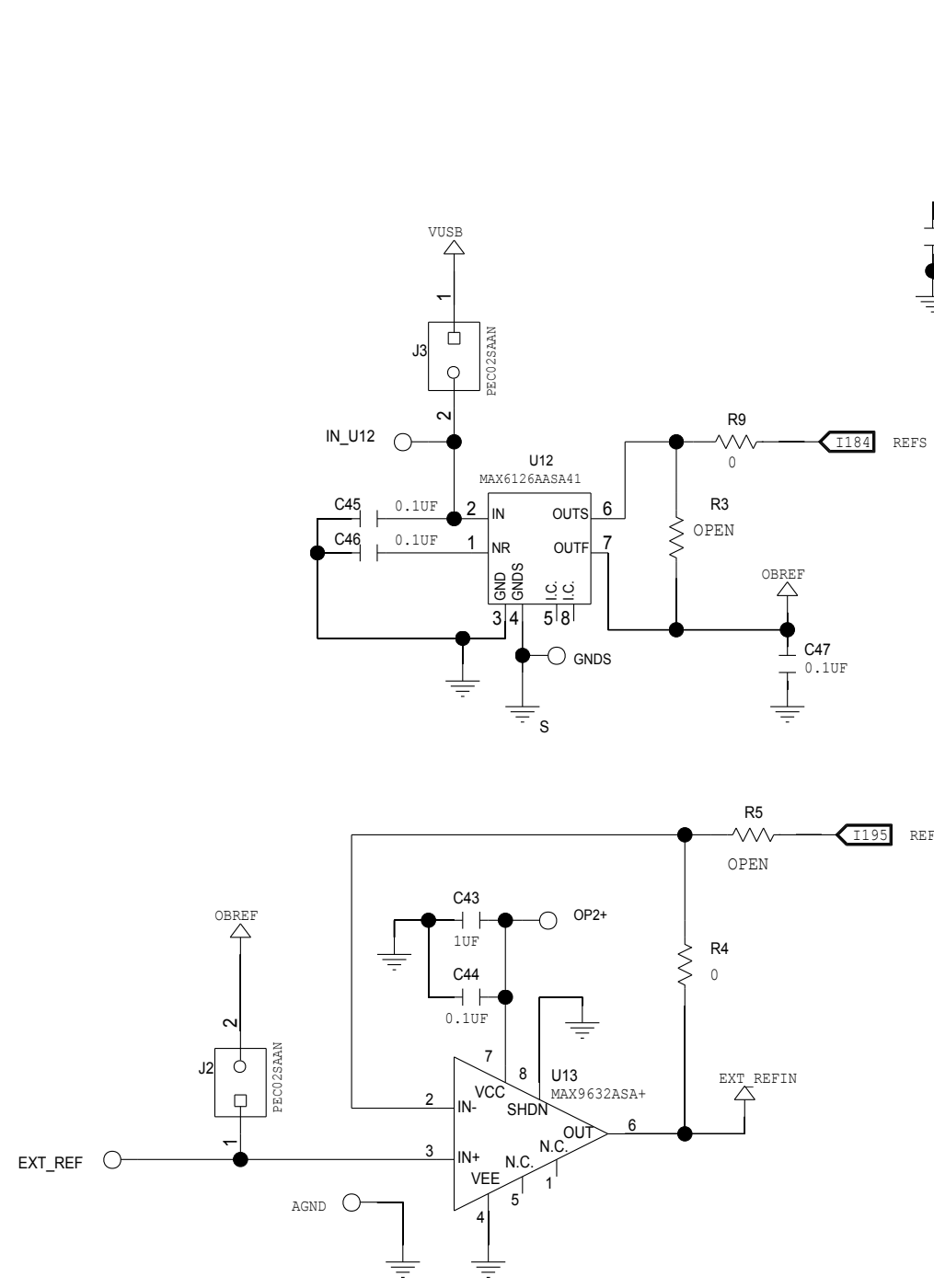
BOTTOM MASK

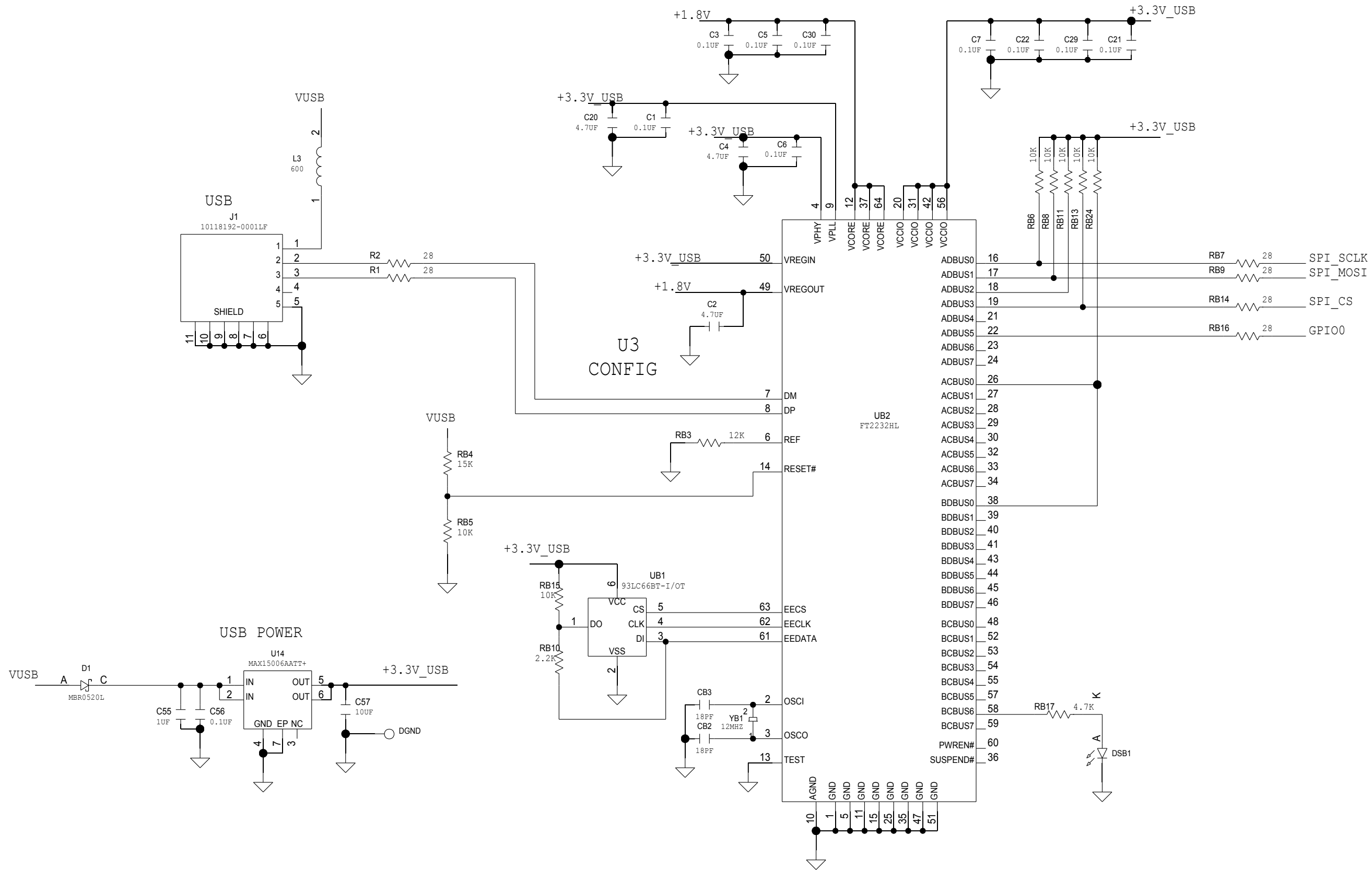


BOTTOM PASTE



BOTTOM SILKSCREEN





Данный компонент на территории Российской Федерации

Вы можете приобрести в компании MosChip.

Для оперативного оформления запроса Вам необходимо перейти по данной ссылке:

<http://moschip.ru/get-element>

Вы можете разместить у нас заказ для любого Вашего проекта, будь то серийное производство или разработка единичного прибора.

В нашем ассортименте представлены ведущие мировые производители активных и пассивных электронных компонентов.

Нашей специализацией является поставка электронной компонентной базы двойного назначения, продукции таких производителей как XILINX, Intel (ex.ALTERA), Vicor, Microchip, Texas Instruments, Analog Devices, Mini-Circuits, Amphenol, Glenair.

Сотрудничество с глобальными дистрибьюторами электронных компонентов, предоставляет возможность заказывать и получать с международных складов практически любой перечень компонентов в оптимальные для Вас сроки.

На всех этапах разработки и производства наши партнеры могут получить квалифицированную поддержку опытных инженеров.

Система менеджмента качества компании отвечает требованиям в соответствии с ГОСТ Р ИСО 9001, ГОСТ РВ 0015-002 и ЭС РД 009

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