

MAX25206 Evaluation Kit

Evaluates: MAX25206/8

General Description

The MAX25206 evaluation kit (EV kit) provides a proven design to evaluate the MAX25206/8 automotive 2.2MHz synchronous step-down controllers with 7 μ A I_Q. The EV kit PCB comes with a MAX25206 IC installed, as well as various test points and jumpers for evaluation. The EV kit output voltage is fixed and is easily configured with minimum component changes. The default EV kit is designed to deliver up to 7A with input voltages from +3.5V to +60V (MAX25206) and +70V (MAX25208), but can be configured to deliver up to 20A. Output voltage quality can be monitored by observing the PGOOD signal.

Benefits and Features

- +3.5V to +60V (MAX25206) and +70V (MAX25208) Input Supply Range
- Output Voltage: 5V or 3.3V Fixed or Adjustable between 0.7V to 20V
- Delivers up to 20A Output Current
- Frequency Synchronization Input
- Frequency Synchronization Output
- Spread-Spectrum Control
- Enable Input
- Voltage-Monitoring PGOOD Output
- Proven PCB Layout
- Fully Assembled and Tested

Quick Start

Required Equipment

- MAX25206 EV Kit
- 3.5V to 60V, 7A power supply (power supply should be capable of providing 7A at 3.5V input)
- 1 Digital multimeter (DMM)
- 1 Oscilloscope
- Electronic load capable of sinking 7A

Procedure

The MAX25206 EV kit is fully assembled and tested. Follow the steps below to verify board operation:

- 1) Verify that all jumpers are in their default configurations according to [Table 1](#).
- 2) Connect the positive and negative terminals of the power supply to SUP and GND1 test pads, respectively.
- 3) Set the power-supply voltage to 14V and current limit to 10A.
- 4) Turn on the power supply.
- 5) Verify that OUT is approximately 5V using a digital multimeter.
- 6) Verify that the switching frequency is approximately 2.2MHz by monitoring inductor switching voltage with oscilloscope.

[Ordering Information](#) appears at end of data sheet.

Additional Evaluation

- 7) Connect the positive and negative terminals of an electronic load to OUT and GND, respectively.
- 8) Set the electronic load to the desired current at or below 7A or use an equivalent resistive load with an appropriate power rating.
- 9) Turn on the electronic load.
- 10) Verify that the voltage across V_{OUT} and GND pads is $5V \pm 1\%$.

Detailed Description of Hardware

External Synchronization Input

The device can operate in two modes: forced PWM or skip mode. Skip mode has better efficiency for light-load conditions. When SYNC is pulled low, the device operates in skip mode for light loads and 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 Kit provides a power-good output test point (PGOOD) to monitor the status of the buck output (OUT). PGOOD is pulled low when the output voltage is out of regulation.

Evaluating MAX25206/8

The device is available in fixed +5V and +3.3V outputs. The EV kit comes installed with the +5V output version. To externally configure the output voltage, remove R1 and place appropriate resistors in positions R17 & R19. To optimize efficiency, refer to the MAX25206/7/8 IC datasheet.

Table 1. Default Jumper Settings

JUMPER	DEFAULT SHUNT POSITION	FUNCTIONS
ENABLE	1&2	Buck enabled
SPS	2&3	No spread spectrum
SYNC	1&2	FPWM mode
ENBK	2&3	Pulled to ground

Ordering Information

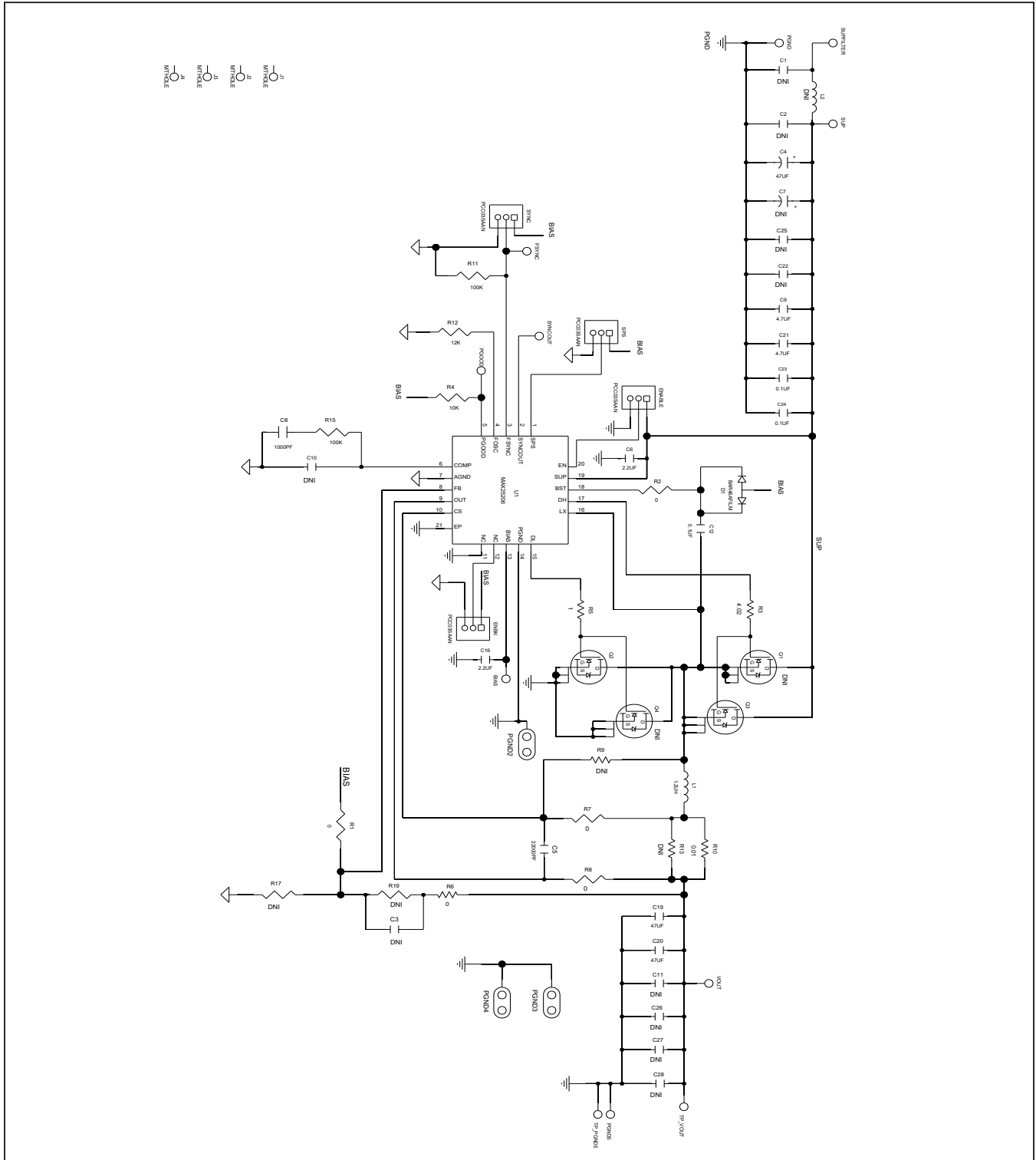
PART	TYPE
MAX25206EVKIT#	EV Kit

#Denotes RoHS compliant.

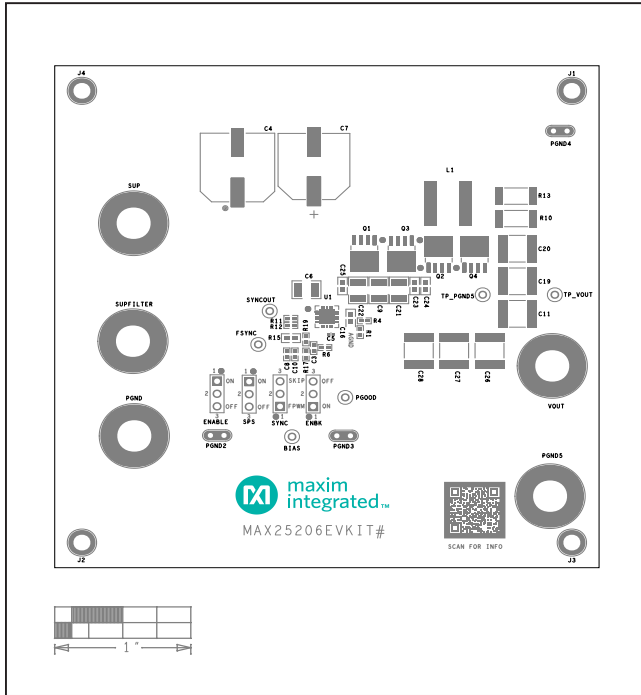
MAX25206 EV Kit Bill of Materials

MAX25206EVKIT# Default: 5Vout, 2.2MHz, 7A			
REFERENCE DESIGNATOR	QTY	DESCRIPTION	MFG PART #
C4	1	47µF ±20% 100V Aluminum-Electrolytic Capacitor (CASE H13)	EEV-TG2A470Q
C5	1	22000PF ±5% 50V Ceramic Capacitor (0402)	GCM155R71H223JA55
C6	1	2.2µF ±10% 100V X7R Ceramic Capacitor (1210)	GRM32ER72A225KA35;CGA6N3X7R2A225K230AB;CC1210KX7R0BB225;HMK325B7225KM
C8	1	1000pF ±10% 50V X7R Ceramic Capacitor (0402)	GCM155R71H102KA37
C9, C21	2	4.7µF ±10% 100V X7R Ceramic Capacitor (1210)	CNA6P1X7R2A475K250AE
C12, C23, C24	3	0.1µF ±10% 100V X7R Ceramic Capacitor (0603)	CC0603KRX7R0BB104;GRM188R72A104KA35;GCJ188R72A104KA01;HMK107B7104KA;06031C104 KAT2A
C16	1	2.2µF ±10% 10V X7R Ceramic Capacitor (0603)	GRM188R71A225KE15;CL10B225KP8N3N;C1608X7R1A225K080AC
C19, C20	2	47µF ±20% 25V X7R Ceramic Capacitor (2220)	CGA9N3X7R1E476M230KB
L1	1	1.2µH ±20% 26.3A Composite Inductor	XAL1060-122ME
Q2, Q3	2	N-Channel 80V Surface Mount SO-8L (6.15mmx5.13mm)	SQJA84EP-T1 GE3
R1, R2, R6-R8	5	0Ω Resistor (0402)	CRCW04020000Z0EDHP; RCS04020000Z0
R3	1	4.02Ω Resistor (0402)	CRCW04024R02FKED
R4	1	10kΩ Resistor (0402)	CRCW040210K0FK;RC0402FR-0710KL
R5	1	1Ω Resistor (0402)	CRCW04021R00FK
R10	1	0.01Ω Resistor (2512)	PMR100HZPFU10L0
R11	1	100kΩ Resistor (0402)	TNPW0402100KBE
R12	1	12kΩ Resistor (0402)	ERJ-2RKF1202
R15	1	100kΩ Resistor (0603)	RCS0603100KFKEA
U1	1	VERSATILE AUTOMOTIVE 60V 2.2MHZ BUCK CONTROLLER	MAX25206
D1	1	Schottky Diode SMT 100V (SOT23-3)	BAR46AFILM
Alternate Configuration #1: 16Vout, 440kHz, 7A			
REFERENCE DESIGNATOR	QTY	DESCRIPTION	MFG PART #
C4	1	47µF ±20% 100V Aluminum-Electrolytic Capacitor (CASE H13)	EEV-TG2A470Q
C5	1	22000PF ±5% 50V Ceramic Capacitor (0402)	GCM155R71H223JA55
C6	1	2.2µF ±10% 100V X7R Ceramic Capacitor (1210)	GRM32ER72A225KA35;CGA6N3X7R2A225K230AB;CC1210KX7R0BB225;HMK325B7225KM
C8	1	1800pF ±5% 50V X7R Ceramic Capacitor (0402)	GRM155R71H182JA01
C9, C21	2	4.7µF ±10% 100V X7R Ceramic Capacitor (1210)	CNA6P1X7R2A475K250AE
C12, C23, C24	3	0.1µF ±10% 100V X7R Ceramic Capacitor (0603)	CC0603KRX7R0BB104;GRM188R72A104KA35;GCJ188R72A104KA01;HMK107B7104KA;06031C104 KAT2A
C16	1	2.2µF ±10% 10V X7R Ceramic Capacitor (0603)	GRM188R71A225KE15;CL10B225KP8N3N;C1608X7R1A225K080AC
C19, C20	2	47µF ±20% 25V X7R Ceramic Capacitor (2220)	CGA9N3X7R1E476M230KB
L1	1	10µH ±20% 15.5A Composite Inductor	XAL1010-103ME
Q2, Q3	2	N-Channel 80V Surface Mount SO-8L (6.15mmx5.13mm)	SQJA84EP-T1 GE3
R2, R6-R8	4	0Ω Resistor (0402)	CRCW04020000Z0EDHP; RCS04020000Z0
R3	1	4.02Ω Resistor (0402)	CRCW04024R02FKED
R4, R17	2	10kΩ Resistor (0402)	CRCW040210K0FK;RC0402FR-0710KL
R5	1	1Ω Resistor (0402)	CRCW04021R00FK
R10	1	0.01Ω Resistor (2512)	PMR100HZPFU10L0
R11	1	100kΩ Resistor (0402)	TNPW0402100KBE
R12	1	66.5kΩ Resistor (0402)	ERJ-2RKF6652
R15	1	120kΩ Resistor (0603)	CRCW0603120KFKEA
R19	1	220kΩ Resistor (0402)	ERJ-2RKF2203
U1	1	VERSATILE AUTOMOTIVE 60V 2.2MHZ BUCK CONTROLLER	MAX25206
D1	1		DO NOT INSTALL
Alternate Configuration #2: 14Vout, 440kHz, 20A			
REFERENCE DESIGNATOR	QTY	DESCRIPTION	MFG PART #
C4	1	47µF ±20% 100V Aluminum-Electrolytic Capacitor (CASE H13)	EEV-TG2A470Q
C5	1	22000PF ±5% 50V Ceramic Capacitor (0402)	GCM155R71H223JA55
C6	1	2.2µF ±10% 100V X7R Ceramic Capacitor (1210)	GRM32ER72A225KA35;CGA6N3X7R2A225K230AB;CC1210KX7R0BB225;HMK325B7225KM
C7	1	240µF ±20% 63V Aluminum-Electrolytic Capacitor (CASE KE0)	EMHS630ARA241MKE0S
C8	1	1800pF ±5% 50V X7R Ceramic Capacitor (0402)	GRM155R71H182JA01
C9, C21	2	4.7µF ±10% 100V X7R Ceramic Capacitor (1210)	CNA6P1X7R2A475K250AE
C10	1	8.2pF ±0.25% 50V X7R Ceramic Capacitor (0402)	GRM155R71H182JA01
C11, C19, C20, C26-28	6	47µF ±20% 25V X7R Ceramic Capacitor (2220)	CGA9N3X7R1E476M230KB
C12, C23, C24	3	0.1µF ±10% 100V X7R Ceramic Capacitor (0603)	CC0603KRX7R0BB104;GRM188R72A104KA35;GCJ188R72A104KA01;HMK107B7104KA;06031C104 KAT2A
C16	1	2.2µF ±10% 10V X7R Ceramic Capacitor (0603)	GRM188R71A225KE15;CL10B225KP8N3N;C1608X7R1A225K080AC
L1	1	2µH ±20% 26.3A Composite Inductor	XAL1580-202ME
Q1-Q4	4	N-Channel 80V Surface Mount SO-8L (6.15mmx5.13mm)	SQJA84EP-T1 GE3
R2, R6-R8	4	0Ω Resistor (0402)	CRCW04020000Z0EDHP; RCS04020000Z0
R3	1	2Ω Resistor (0402)	CRCW04022R0FK;CRCW04022R00FK
R4, R17	2	10kΩ Resistor (0402)	CRCW040210K0FK;RC0402FR-0710KL
R5	1	0.51Ω Resistor (0402)	ERJ-2BQFR51
R10, R13	2	0.006Ω Resistor (2512)	PMR100HZPFU6L00
R11	1	100kΩ Resistor (0402)	TNPW0402100KBE
R12	1	66.5kΩ Resistor (0402)	ERJ-2RKF6652
R15	1	113kΩ Resistor (0603)	ERJ-3EKF1133
R19	1	191kΩ Resistor (0402)	CRCW0402191KFK
U1	1	VERSATILE AUTOMOTIVE 60V 2.2MHZ BUCK CONTROLLER	MAX25206

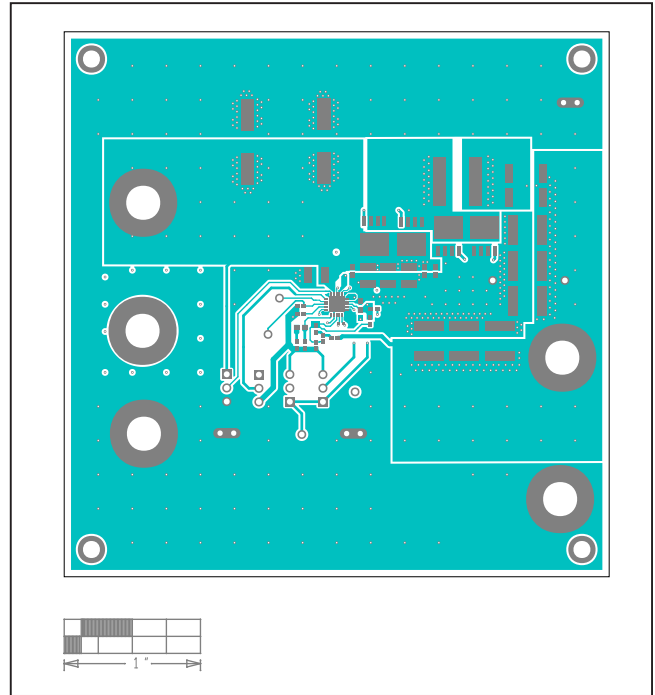
MAX25206 EV Kit Schematic



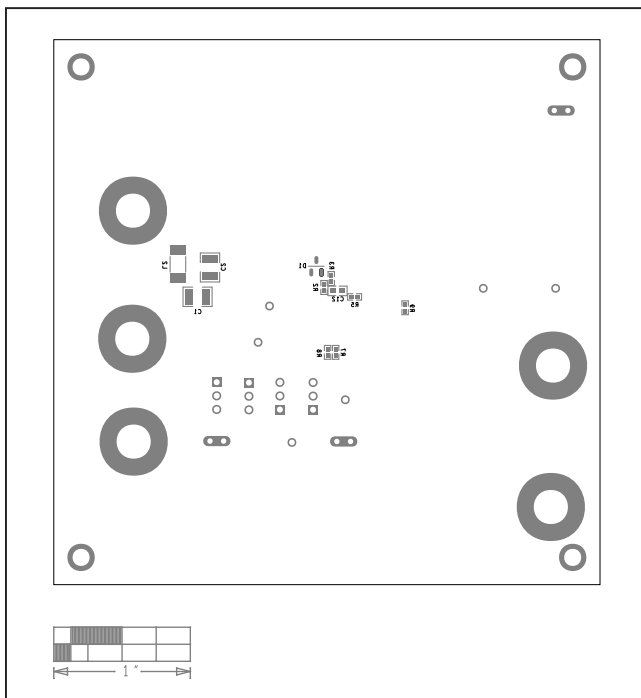
MAX25206 EV Kit PCB Layout



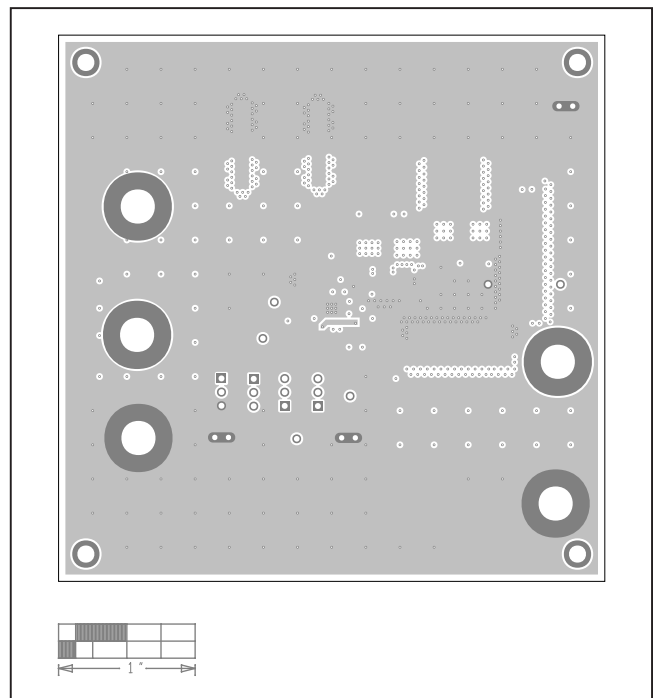
MAX25206/8 EVKit PCB Layout – Silkscreen Top



MAX25206/8 EVKit PCB Layout – Art Film – Top

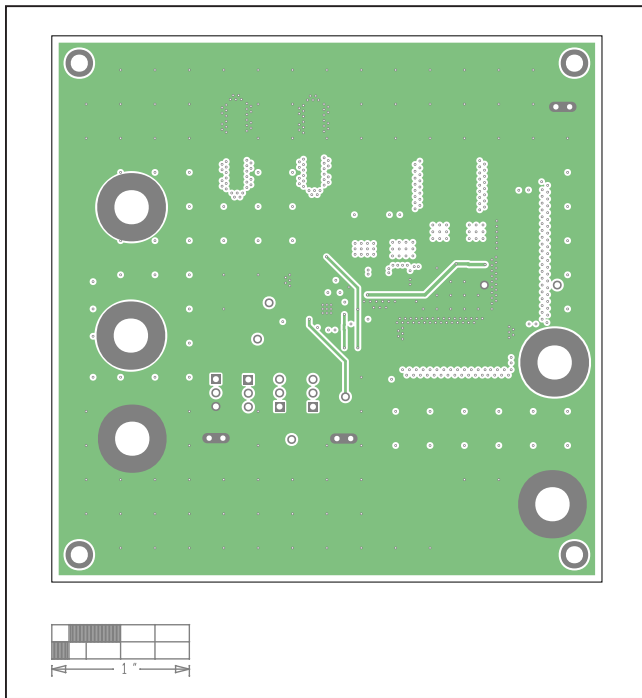


MAX25206/8 EVKit PCB Layout – Silkscreen Bottom

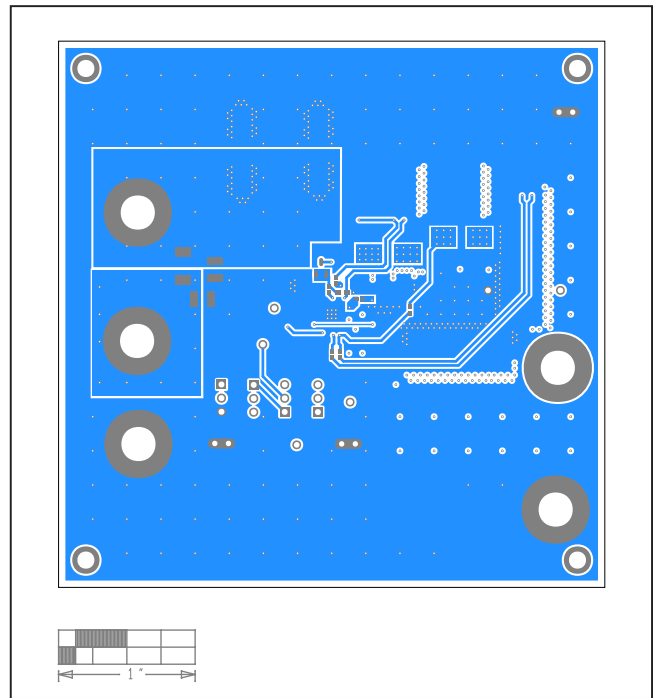


MAX25206/8 EVKit PCB Layout – Internal2

MAX25206 EV Kit PCB Layout (continued)



MAX25206/8 EVKit PCB Layout – Internal3



MAX25206/8 EVKit PCB Layout – Art Film – Bottom

Revision History

REVISION NUMBER	REVISION DATE	DESCRIPTION	PAGES CHANGED
0	12/19	Initial release	—
1	6/20	Removed references to MAX25207	1–7
2	1/21	Updated <i>Bill of Materials</i>	3

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