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## MAX25606 Evaluation System

Evaluates: MAX25606

### General Description

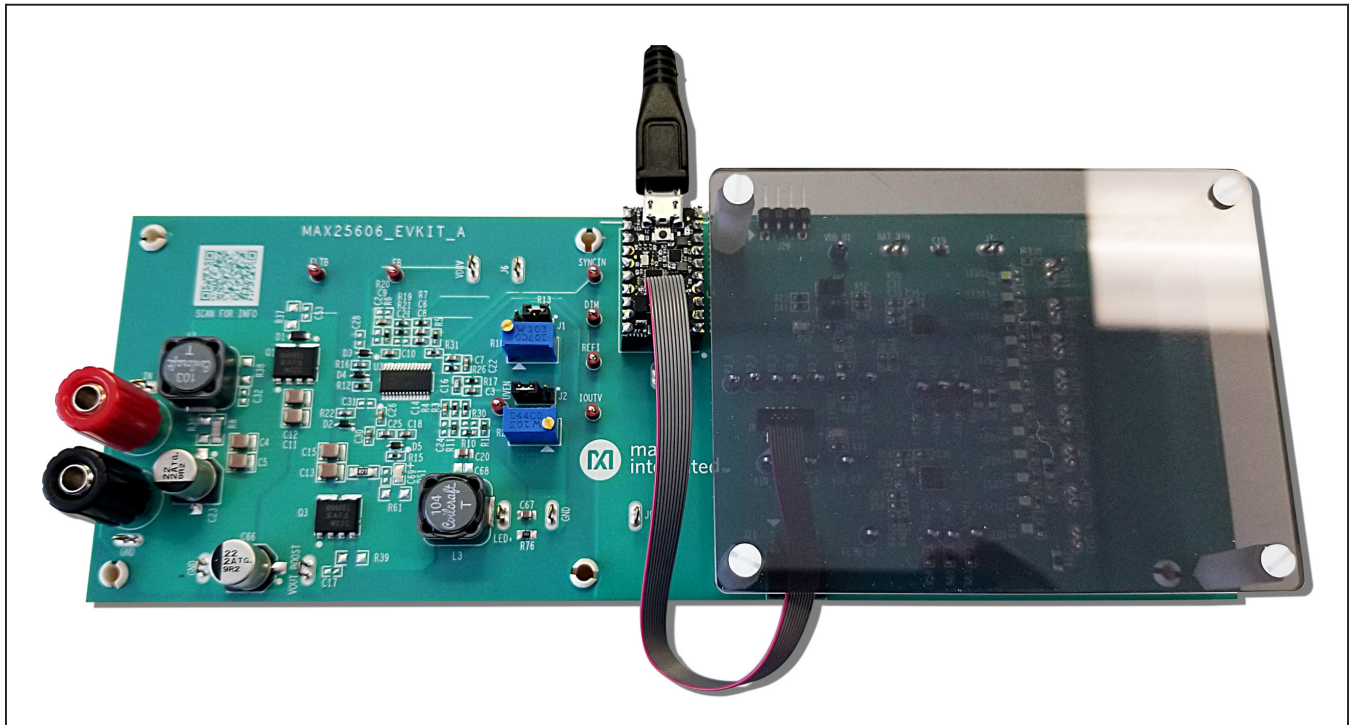
The MAX25606 evaluation System (EV system) provides a proven design to evaluate the MAX25606 six-channel LED matrix manager. The EV system includes two instances of the MAX25606 controlling twelve on-board LEDs connected in a series configuration. The MAX25601 Boost-buck LED driver is also included to drive the LEDs.

**Ordering Information** appears at end of data sheet.

### Features

- Two, Six-Channel Matrix Managers
- 12 On-Board White LEDs
- MAX25601 Boost-Buck LED Driver
- MAX32625PICO# Provides UART Communication to Control the Matrix Managers
- GUI for Easy Evaluation

### MAX25606 Evaluation System Board Photo



**Quick Start**

**Required Equipment**

- MAX25606 evaluation system
- MAX32625PICO# (included)
- A Windows® 10 computer with GUI installed
- A 12V, 3A power supply

**Procedure**

The EV system is fully assembled and tested. Follow the steps below to verify board operation. **Caution: Do not turn on the power supply until all connections are made. Additional caution should be taken; the on-board LEDs are very bright when illuminated.**

- 1) Connect the positive terminal of the +12V power supply to the BAT\_VIN pad
- 2) Connect the positive terminal of the +12V power supply to the IN test point
- 3) Connect the negative terminal of the +12V power supply to the GND test point
- 4) Connect the MAX32625PICO# to the MAX25606EV-SYS using the included ribbon cable

- 5) Connect the MAX32625PICO# to the computer with the included USB cable.
- 6) If the GUI is not installed, Install the GUI
- 7) Run the GUI

**Detailed Description**

The MAX25606 evaluation System provides a proven design to evaluate the MAX25606 six-channel LED matrix manager. The EV system includes two instances of the MAX25606 controlling twelve on-board LEDs connected in a series configuration. the MAX25601 Boost-buck LED driver is also included to drive the LEDs.

**Analog Dimming Control (ICTRL)**

When a shunt is installed across pins 2-3 of J2, the LED current is set by the R1/R2 resistor divider. The LED current is linearly proportional to the voltage on the ICTRL input. An ICTRL voltage of 200mV or less corresponds to  $I_{LED} = 0A$ . An ICTRL voltage of 1.3V or more corresponds to  $I_{LED} = 0.8A$ . between 200mV and 1.3V, the LED current is linearly adjusted between 0A and 0.8A respectively.

To set the LED current with an external reference, remove the shunt installed across J2, and instead apply a voltage across the ICTRL test point and the SGND pad.

**Table 1. MAX25606 EV System Jumper Descriptions**

JUMPER	SHUNT POSITION	DESCRIPTION
J1	1-2*	Connects $V_{CC}$ to the DIM pin. 100% PWM dimming is enabled in this configuration.
	2-3	Connects DIM to a voltage-divider from $V_{CC}$ to ground. When DIM is above 3V, the buck regulator is fully on at 100% dim duty cycle. When DIM is between 0.2V and 3V, the buck regulator operates at a duty cycle proportional to the DIM voltage, at a frequency of 200Hz. When DIM is below 0.2V, the buck regulator is disabled.
	Open	Disconnects DIM from the voltage divider. Allows DIM to be driven by an external voltage source or PWM signal to drive the DIM pin.
J2	1-2	Connects $V_{CC}$ to the REF1 pin. LED current is at the maximum value of 0.74A in this configuration.
	2-3*	Connects REF1 to a voltage-divider from $V_{CC}$ to ground. Adjusting R2 allows programming the LED current from 0 to 0.8A.
	open	Disconnects the REF1 pin of the device from the external voltage-divider on the $V_{CC}$ pin. Allows REF1 to be driven by an external voltage to set the LED current level.
J3	1-2*	Pullup resistor from UART_TX to 1.8V $V_{DD}$ .
	open	Pullup resistor to VDD not installed. In this case an external pullup should be added.
J4	1-2*	Pullup resistor from UART_RX to 1.8V $V_{DD}$ .
	Open	Pullup resistor to VDD not installed. In this case an external pullup should be added.

\*Default position.

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### Pulse-Dimming Input (PWMDIM)

Typically for matrix manager applications, the LED driver PWM dimming is not used. Therefore the default J1 position across pins 1-2 is sufficient. The matrix managers implement any desired PWM dimming on a per LED basis through the UART interface.

### Graphical User Interface (GUI)

The EV system includes a GUI to facilitate evaluation of the MAX25606 Matrix manager device. Once the board is powered up and the PICO board is connected to the EV kit, click **Connect**. The Device 0 and Device 1 field

should populate with the appropriate device IDs of the MAX25606 devices.

### Dimming

Individual channel PWM dimming can be controlled on the individual tab. The SW\_GO\_EN bit must be set to 1 before any switch programming can occur.

### Register Map

The full register map is available on the Register tab. This tab also supports **Read** and **Write** commands for each register.

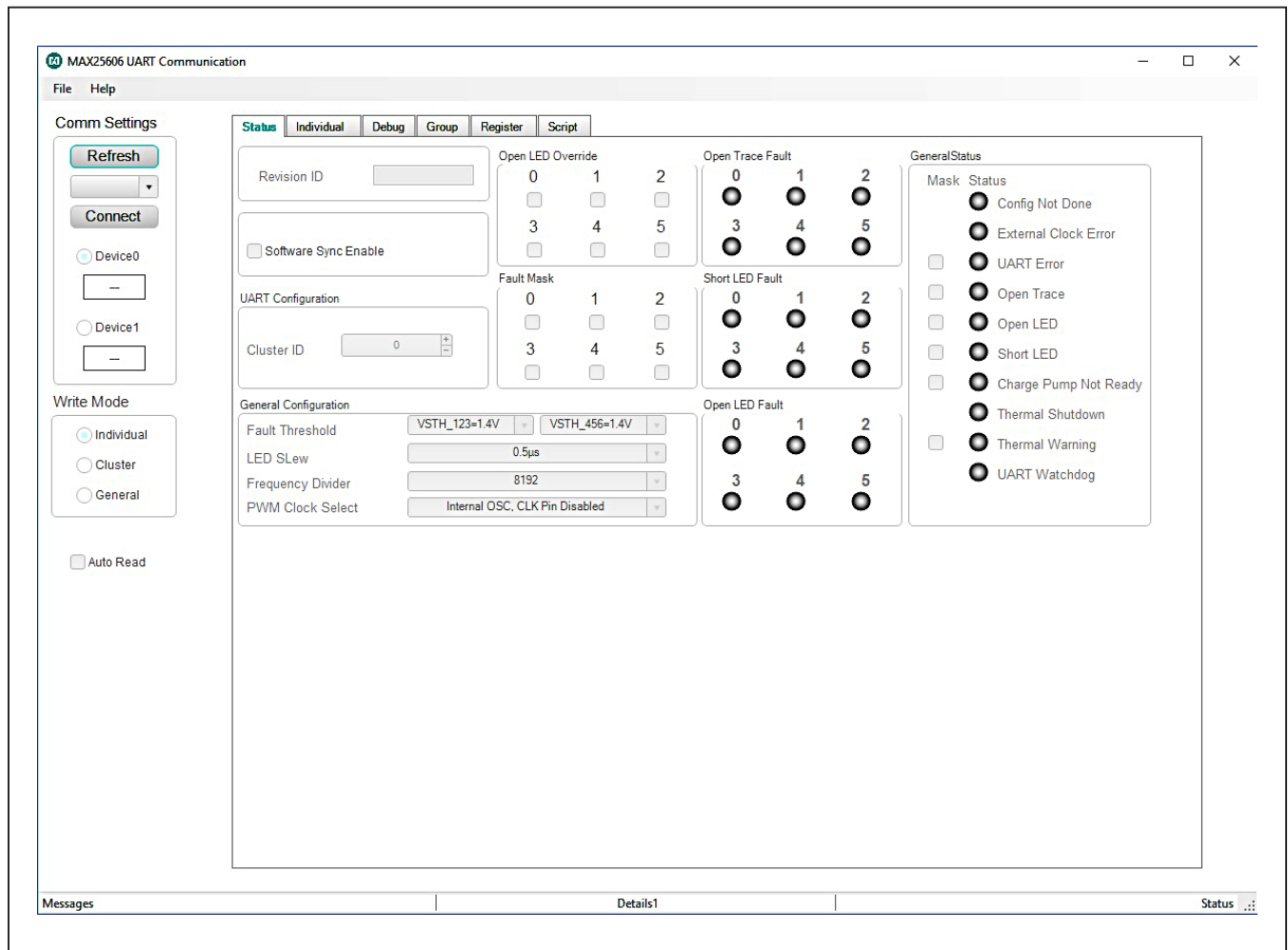


Figure 1. MAX25606 EV system Graphical User Interface

### Scripting

The EV system GUI features the ability to run scripts that contain UART write commands and delay commands. Lighting animations can now be easily created and tested. Click the **Load Script** button to open a file navigator and select the desired **.json** file. The name of the script file will be populated in the **Script Name** field. Click **Run Script** and the commands in the script file begin executing in sequence until the script is complete.

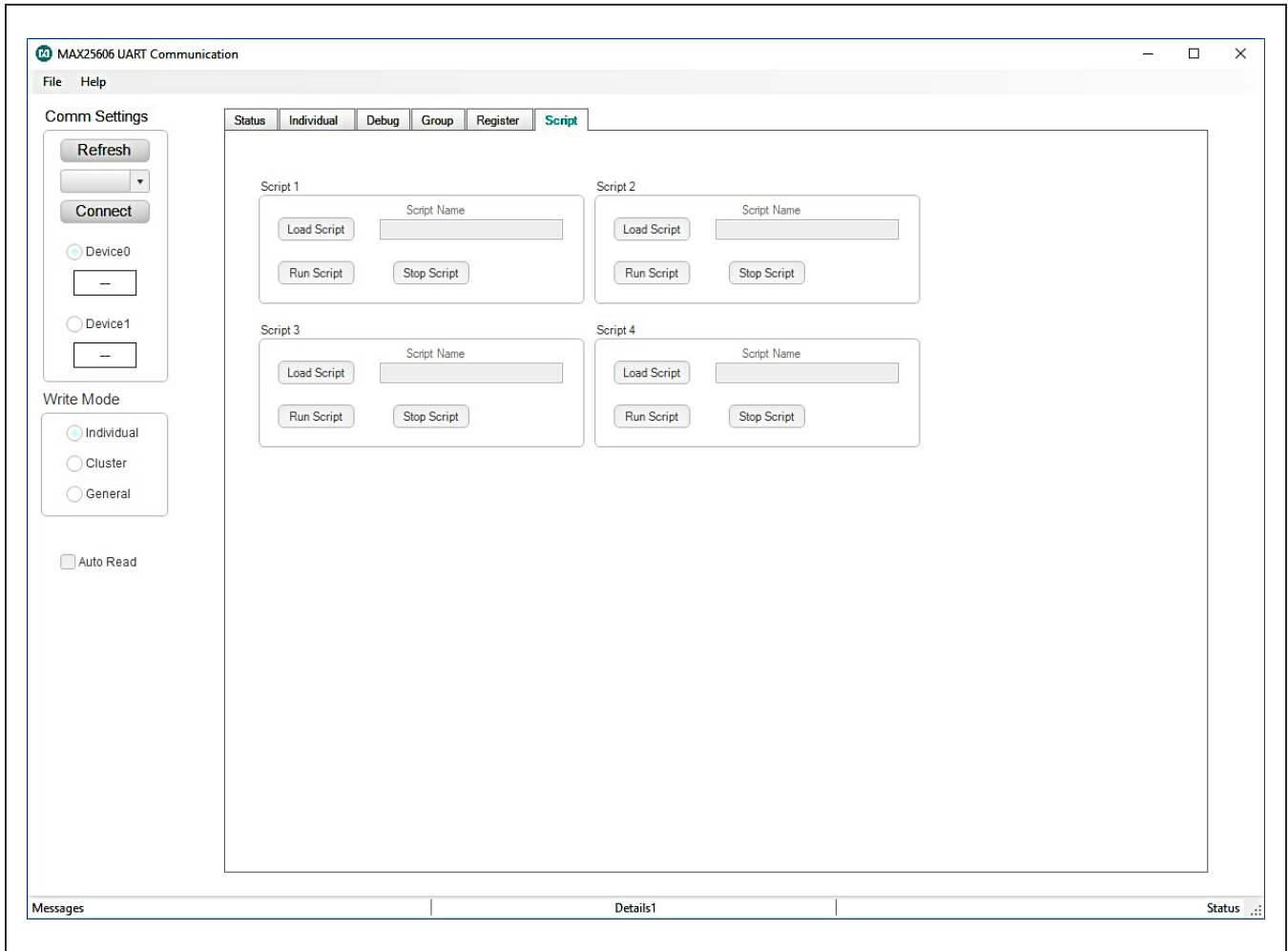


Figure 2. MAX25606 EV system Graphical User Interface (Scripting Tab)

### Ordering Information

PART	TYPE
MAX25606EVSYS#	EV System

#Denotes RoHS compliant

## MAX25606 EV System Bill of Materials

QTY	REF DES	MFG PART #	MANUFACTURER	VALUE	DESCRIPTION
18	A0_U1, A0_U2, A1_U1, A1_U2, A2_U1, A2_U2, AIN_1, AIN_3, EXTCLK, FLTBU1, FLTBU2, P3_2, P3_3, P3_7, RX_2, TX_2, VDD_U1, VDD_U2	5122	KEystone	N/A	TEST POINT; PIN DIA=0.125IN; TOTAL LENGTH=0.35IN; BOARD HOLE=0.063IN; BLUE; PHOSPHOR BRONZE WIRE SILVER PLATE FINISH; RECOMMENDED FOR BOARD THICKNESS=0.062IN; NOT FOR COLD TEST
20	BAT_VIN, GND1, GND3, GND4, IN, J5-J7, J9-J11, LED+, LED1_K, LED6_A, LED7_K, LED9_A, LED10_K, LED12_A, VDRV, VOUT_BOOST	9020 BUSS	WEICO WIRE	MAXIMPAD	EVK KIT PARTS; MAXIM PAD; WIRE; NATURAL; SOLID; WEICO WIRE; SOFT DRAWN BUS TYPE-S; 20AWG
9	C3, C7, C8, C10, C18, C35-C38	GCJ188R71H104KA12; GCM188R71H104K; CGA3E2X7R1H104K080AA; CGA3E2X7R1H104K080AD; CL10B104KB8WPN	MURATA; MURATA; TDK;TDK; SAMSUNG	0.1UF	CAP; SMT (0603); 0.1UF; 10%; 50V; X7R; CERAMIC
6	C4, C5, C11-C13, C15	CGA6M3X7S2A475K200AE; CGA6M3X7S2A475K200AB; GCM32DC72A475KE02	TDK;TDK; MURATA	4.7UF	CAP; SMT (1210); 4.7UF; 10%; 100V; X7S; CERAMIC
1	C6	C1608X5R1E475K080AC; GRM188R61E475KE11	TDK; MURATA	4.7UF	CAP; SMT (0603); 4.7UF; 10%; 25V; X5R; CERAMIC
5	C9, C39-C42	C0603X7R500103JNP; C0603C103J5RAC	VENKEL LTD; KEMET	0.01UF	CAP; SMT (0603); 0.01UF; 5%; 50V; X7R; CERAMIC

## MAX25606 EV System Bill of Materials (continued)

QTY	REF DES	MFG PART #	MANUFACTURER	VALUE	DESCRIPTION
2	C14, C27	CGA3E2X7R2A103K; C0603C103K1RA; GRM188R72A103KA01; C1608X7R2A103K080AA	TDK;KEMET; MURATA;TDK	0.01UF	CAP; SMT (0603); 0.01UF; 10%; 100V; X7R; CERAMIC; NOTE: NOT RECOMMENDED FOR NEW DESIGN. USE 20-00u01-M8
1	C16	06035A471JAT2A	AVX	470PF	CAP; SMT (0603); 470PF; 5%; 50V; COG; CERAMIC
1	C19	GRM21BR71H105KA12; CL21B105KBFNNN; C2012X7R1H105K085AC; UMK212B7105KG	MURATA; SAMSUNG ELECTRONICS; TDK	1UF	CAP; SMT (0805); 1UF; 10%; 50V; X7R; CERAMIC
2	C20, C67	C0805C104K1RAC; C2012X7R2A104K125AA; GRM21BR72A104KAC4; CGA4J2X7R2A104K125AA; GCD21BR72A104KA01	KEMET; TDK; MURATA; TDK; MURATA	0.1UF	CAP; SMT (0805); 0.1UF; 10%; 100V; X7R; CERAMIC
1	C22	C0603C223K5RAC; GRM188R71H223K; C1608X7R1H223K080AA; GCJ188R71H223KA01	KEMET; MURATA; TDK; MURATA	0.022UF	CAP; SMT (0603); 0.022UF; 10%; 50V; X7R; CERAMIC
2	C23, C66	EEE-TG2A220UP	PANASONIC	22UF	CAP; SMT (CASE_F); 22UF; 20%; 100V; ALUMINUM- ELECTROLYTIC
1	C25	C1608X5R1A106K080AC	TDK	10UF	CAP; SMT (0603); 10UF; 10%; 10V; X5R; CERAMIC
1	C26	C0603C222K1RAC	KEMET	2200PF	CAP; SMT (0603); 2200PF; 10%; 100V; X7R; CERAMIC
1	C30	C1608X7S2A104K080AB	TDK	0.1UF	CAP; SMT (0603); 0.1UF; 10%; 100V; X7S; CERAMIC
2	C33, C34	C1608X5R1E225K; TMK107ABJ225KA; TMK107BJ225KA; GRM188R61E225KA12	TDK;TAIYO YUDEN;TAIYO YUDEN;MURATA	2.2UF	CAP; SMT (0603); 2.2UF; 10%; 25V; X5R; CERAMIC
1	C64	UMK107BJ105KA; C1608X5R1H105K080AB; CL10A105KB8NNN; GRM188R61H105KAAL	TAIYO YUDEN; TDK; SAMSUNG; MURATA	1UF	CAP; SMT (0603); 1UF; 10%; 50V; X5R; CERAMIC
1	D1	DFLS1100-7	DIODES INCORPORATED	DFLS1100-7	DIODE; SCHOTTKY; SMT; PIV=100V; IF=1A
4	D2, D4, D6, D7	1N4148WS-7-F	DIODES INCORPORATED	1N4148WS-7-F	DIODE; SWT; SMT (SOD-323); PIV=75V; IF=0.3A

## MAX25606 EV System Bill of Materials (continued)

QTY	REF DES	MFG PART #	MANUFACTURER	VALUE	DESCRIPTION
2	D3, D5	BAT46WJ	NXP	BAT46WJ,115	DIODE; SCH; SMT (SOD-323F); PIV=100V; IF=0.25A
7	DIM, FB, FLTB, IOUTV, REFI, SYNCIN, UVEN	5000	KEYSTONE	N/A	TEST POINT; PIN DIA=0.1IN; TOTAL LENGTH=0.3IN; BOARD HOLE=0.04IN; RED; PHOSPHOR BRONZE WIRE SILVER PLATE FINISH; RECOMMENDED FOR BOARD THICKNESS=0.062IN; NOT FOR COLD TEST
3	DS1-DS3	SML-LXT0805GW	LUMEX OPTO COMPONENTS INC.	SML-LXT0805GW-TR	DIODE; LIGHT EMITTING GREEN; SMT (0805); IF(PEAK)=0.15A; I(STEADY)=0.025A; PD=0.105W; VF=2.0V
2	J1, J2	PCC03SAAN	SULLINS	PCC03SAAN	CONNECTOR; MALE; THROUGH HOLE; BREAKAWAY; STRAIGHT THROUGH; 3PINS; -65 DEGC TO +125 DEGC
2	J3, J4	PCC02SAAN	SULLINS	PCC02SAAN	CONNECTOR; MALE; THROUGH HOLE; BREAKAWAY; STRAIGHT THROUGH; 2PINS; -65 DEGC TO +125 DEGC
1	J8	FTSH-105-01-L-DV-K	SAMTEC	FTSH-105-01-L-DV-K	CONNECTOR; MALE; SMT; 0.05 (1.27MM) SMT MICRO HEADER; STRAIGHT; 10PINS
1	J20	PEC04SBAN	SULLINS ELECTRONICS CORP.	PEC04SBAN	CONNECTOR; MALE; THROUGH HOLE; 0.100INCH CONTACT CENTERS; MALE BREAKAWAY HEADERS; RIGHT ANGLE; NO MOUNTING; 4PINS
1	J21	SMH-104-02-G-S	SAMTEC	SMH-104-02-G-S	CONNECTOR; FEMALE; SMT; SMH SERIES; SMT HORIZONTAL SOCKET; RIGHT ANGLE; 4PINS
1	L1	MSS1278-103ML	COILCRAFT	10UH	INDUCTOR; SMT; FERRITE CORE; 10UH; TOL=+/-20%; 5.7A



**MAX25606 EV System Bill of Materials (continued)**

QTY	REF DES	MFG PART #	MANUFACTURER	VALUE	DESCRIPTION
1	L3	MSS1278-104ML	COILCRAFT	100UH	INDUCTOR; SMT; FERRITE CORE; 100UH; TOL=+/-20%; 1.5A
12	LED1-LED12	KW CELNM1.TG-Z5NF6-EBVFFCBB46-15B3	OSRAM	KW CELNM1.TG-Z5NF6-EBVFFCBB46-15B3	DIODE; LED; WHITE; SMT; VF=3V; IF=1A;NOTE:SPECIAL ORDER ONLY;PURCHASE DIRECT FROM THE MANUFACTURER
6	MH1-MH6	9032	KEYSTONE	9032	MACHINE FABRICATED; ROUND-THRU HOLE SPACER; NO THREAD; M3.5; 5/8IN; NYLON
2	Q1, Q3	SQJQ960EL-T1_GE3	VISHAY	SQJQ960EL-T1_GE3	TRAN; NCH; POWERPAK8X8L; PD-(71W); I-(63A); V-(60V)
2	R1, R11	CRCW060324K9FK;ERJ-3EKF2492	VISHAY DALE;PANASONIC	24.9K	RES; SMT (0603); 24.9K; 1%; +/-100PPM/DEGC; 0.1000W
2	R2, R18	3296W-1-103LF	BOURNS	10K	RESISTOR; THROUGH-HOLE-RADIAL LEAD; 3296 SERIES; 10K OHM; 10%; 100PPM; 0.5W; SQUARE TRIMMING POTENTIOMETER; 25 TURNS; MOLDER CERAMIC OVER METAL FILM
1	R3	ERJ-3EKF6492	PANASONIC	64.9K	RES; SMT (0603); 64.9K; 1%; +/-100PPM/DEGC; 0.1000W
1	R4	ERJ-3EKF1242	PANASONIC	12.4K	RES; SMT (0603); 12.4K; 1%; +/-100PPM/DEGC; 0.1000W
3	R5, R17, R32	CRCW0603100KFK; RC0603FR-07100KL; RC0603FR-13100KL; ERJ-3EKF1003; AC0603FR-07100KL	VISHAY DALE; YAGEO; YAGEO; PANASONIC	100K	RES; SMT (0603); 100K; 1%; +/-100PPM/DEGC; 0.1000W
1	R6	CRCW060330K0FK	VISHAY DALE	30K	RES; SMT (0603); 30K; 1%; +/-100PPM/DEGC; 0.1000W
2	R7, R35	ERJ-P03F10R0V	PANASONIC	10	RES; SMT (0603); 10; 1%; +/-200PPM/DEGC; 0.2000W
1	R8	CSR1206-0R007F1	RIEDON INC.	0.007	RES; SMT (1206); 0.007; 1%; +/-50PPM/DEGC; 1W
1	R9	ERJ-8BQFR27	PANASONIC	0.27	RESISTOR; 1206; 0.27 OHM; 1%; 250PPM; 0.5W; THICK FILM



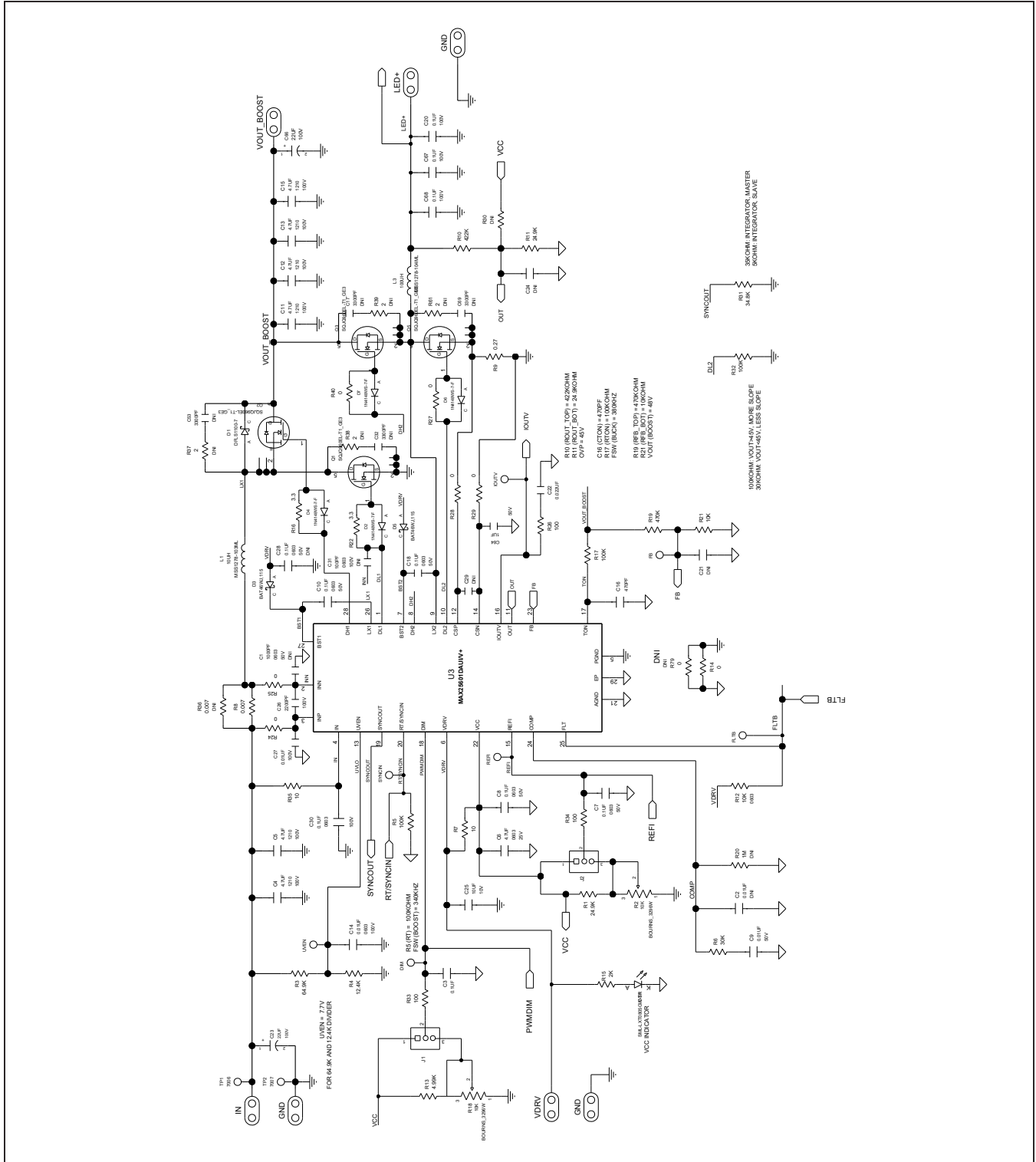
## MAX25606 EV System Bill of Materials (continued)

QTY	REF DES	MFG PART #	MANUFACTURER	VALUE	DESCRIPTION
1	R10	CRCW0603422KFK	VISHAY DALE	422K	RES; SMT (0603); 422K; 1%; +/-100PPM/DEGC; 0.1000W
6	R12, R21, R23, R41, R46, R48	CRCW060310K0FK;ERJ-3EKF1002;AC0603FR-0710KL;RMCF0603FT10K0	VISHAY DALE; PANASONIC; YAGEO	10K	RES; SMT (0603); 10K; 1%; +/-100PPM/DEGC; 0.1000W
1	R13	CRCW06034K99FK; ERJ-3EKF4991	VISHAY DALE; PANASONIC	4.99K	RES; SMT (0603); 4.99K; 1%; +/-100PPM/DEGC; 0.1000W
5	R14, R27-R29, R40	RC1608J000CS; CR0603-J/-000ELF; RC0603JR-070RL	SAMSUNG ELECTRONICS; BOURNS; YAGEO PH	0	RES; SMT (0603); 0; 5%; JUMPER; 0.1000W
1	R15	CRCW06032K0FK;ERJ-3EKF2001;RC0603FR-072KL;CRCW06032K00FK	VISHAY; PANASONIC; YAGEO; VISHAY	2K	RES; SMT (0603); 2K; 1%; +/-100PPM/DEGC; 0.1000W
2	R16, R22	ERJ-3RQF3R3	PANASONIC	3.3	RES; SMT (0603); 3.3; 1%; +/-100PPM/DEGC; 0.1000W
1	R19	CRCW0603470KFK	VISHAY DALE	470K	RES; SMT (0603); 470K; 1%; +/-100PPM/DEGC; 0.1000W
2	R24, R25	CRCW06030000Z0	VISHAY DALE	0	RES; SMT (0603); 0; JUMPER; JUMPER; 0.1000W
3	R26, R33, R34	CRCW0603100RFK; ERJ-3EKF1000; RC0603FR-07100RL	VISHAY DALE; PANASONIC	100	RES; SMT (0603); 100; 1%; +/-100PPM/DEGC; 0.1000W
1	R31	ERJ-3EKF3482; RC0603FR-0734K8L	PANASONIC; YAGEO	34.8K	RES; SMT (0603); 34.8K; 1%; +/-100PPM/DEGC; 0.1000W
7	R42, R43, R57, R59, R60, R62, R63	CRCW060395R3FK	VISHAY DALE	95.3	RES; SMT (0603); 95.3; 1%; +/-100PPM/DEGC; 0.1000W
2	R44, R58	CRCW0603909RFK	VISHAY DALE	909	RES; SMT (0603); 909; 1%; +/-100PPM/DEGC; 0.1000W
10	R45, R47, R49-R56	CRCW06030000ZS; MCR03EZPJ000; ERJ-3GEY0R00; CR0603AJ/-000ELF	VISHAY; ROHM SEMICONDUCTOR; PANASONIC; BOURNS	0	RES; SMT (0603); 0; JUMPER; JUMPER; 0.1000W
12	R64-R69, R70-R75	MCR03EZPFX2002; ERJ-3EKF2002; CR0603-FX-2002ELF; CRCW060320K0FK	ROHM;PANASONIC; BOURNS;VISHAY DALE	20K	RES;SMT(0603);20K;1%;+/-100PPM/DEGC;0.1000W

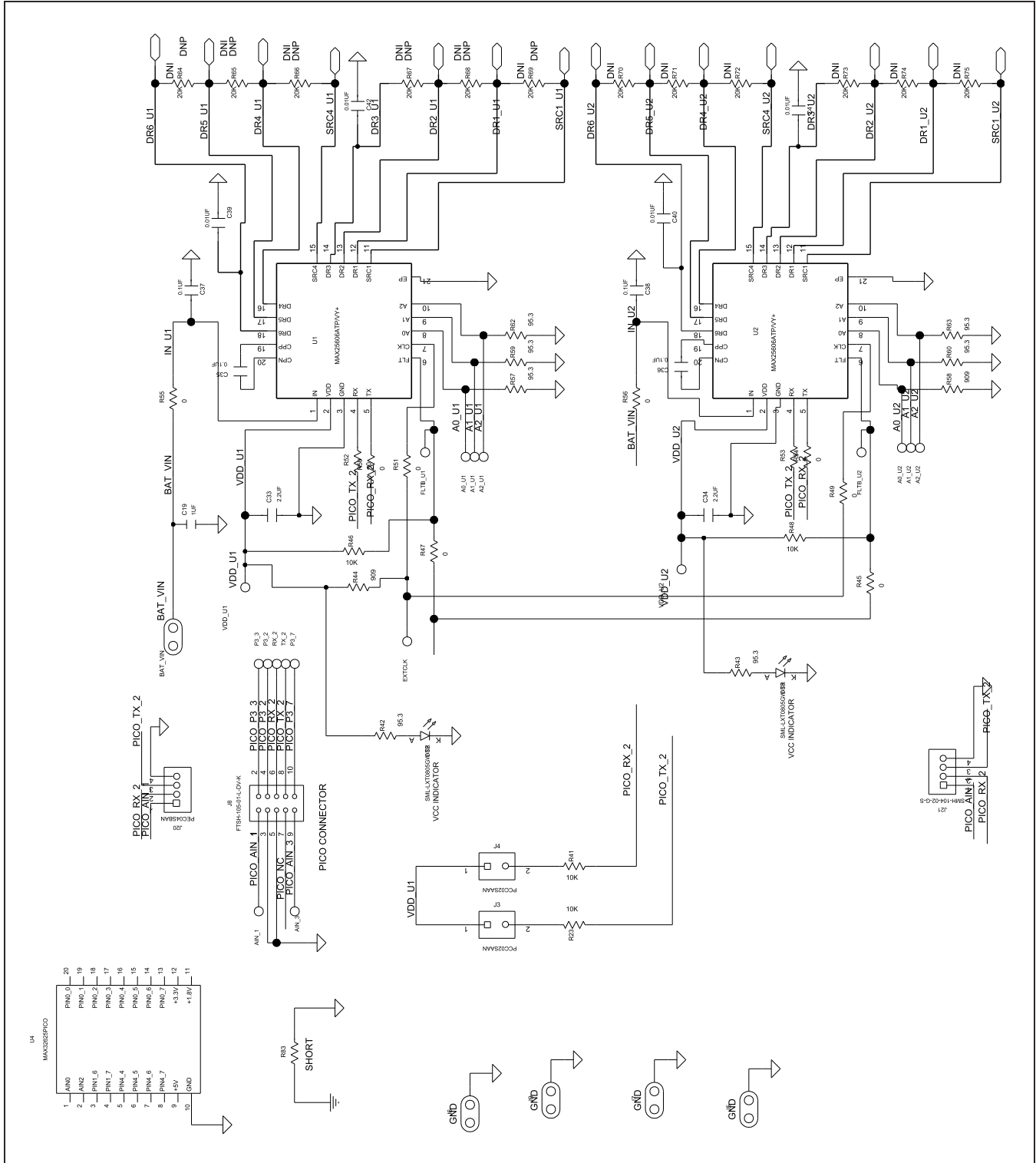
## MAX25606 EV System Bill of Materials (continued)

QTY	REF DES	MFG PART #	MANUFACTURER	VALUE	DESCRIPTION
5	R76-R78, R81, R82	CRCW08050000ZS; RC2012J000	DIGI-KEY	0	RES; SMT (0805); 0; JUMPER; JUMPER; 0.1250W
1	R80	CRCW080510M0FK	VISHAY DALE	10M	RES; SMT (0805); 10M; 1%; +/- 100PPM/DEGC; 0.1250W
3	SU1, SU2, SU5	S1100-B;SX1100-B; STC02SYAN	KYCON; KYCON; SULLINS ELECTRONICS CORP.	SX1100-B	TEST POINT; JUMPER; STR; TOTAL LENGTH=0.24IN; BLACK; INSULATION=PBT;PHOSPHOR BRONZE CONTACT=GOLD PLATED
1	TP1	7006	KEYSTONE	7006	CONNECTOR; PANELMOUNT; BINDING POST; STRAIGHT THROUGH; 1PIN; RED
1	TP2	7007	KEYSTONE	7007	CONNECTOR; PANELMOUNT; BINDING POST; STRAIGHT THROUGH; 1PIN; BLACK
2	U1, U2	MAX25606ATP/VY+	MAXIM	MAX25606ATP/VY+	EVKIT PART - IC; MAX25606ATP/VY+; 6 SWITCH MATRIX MANAGER; PACKAGE CODE: T2044Y+3C; PACKAGE OUTLINE NUMBER: 21-100068; LAND PATTERN NUMBER: 90-0037
1	U3	MAX25601DAUI/V+	MAXIM	MAX25601DAUI/V+	EVKIT PART - IC; MAX25601DAUI/V+; SYNCHRONOUS BOOST AND SYNCHRONOUS BUCK LED CONTROLLERS ; TSSOP28- EP; PACKAGE CODE U28+1C; LAND PATTERN: 90- 100069; PACKAGE OUTLINE DRAWING: 21-100182
2	U4	BCS-110-L-S-TE	SAMTEC		CONNECTOR; FEMALE; THROUGH HOLE; TIGER CLAW PASS-THROUGH SOCKET; STRAIGHT; 10PINS
2	U4	TSW-110-07-F-S	SAMTEC		CONNECTOR; MALE; THROUGH HOLE; 0.025 IN SQ POST HEADER; STRAIGHT; 10PINS

MAX25606 EV System Schematic Diagrams

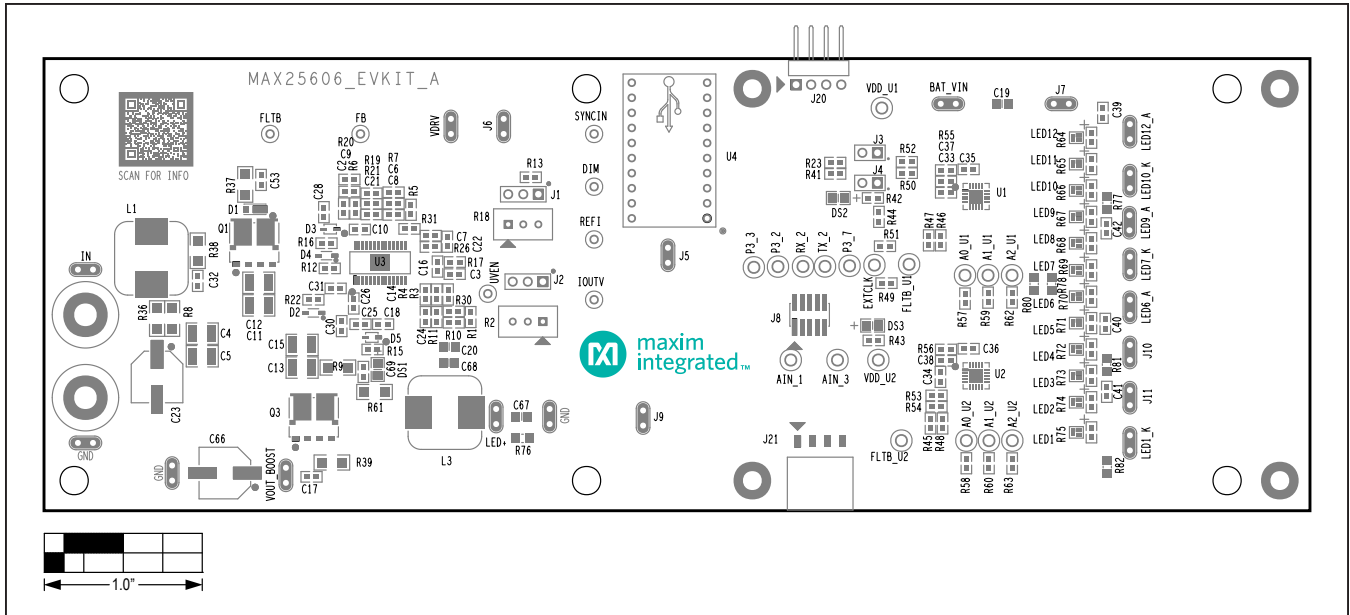


MAX25606 EV System Schematic Diagrams (continued)

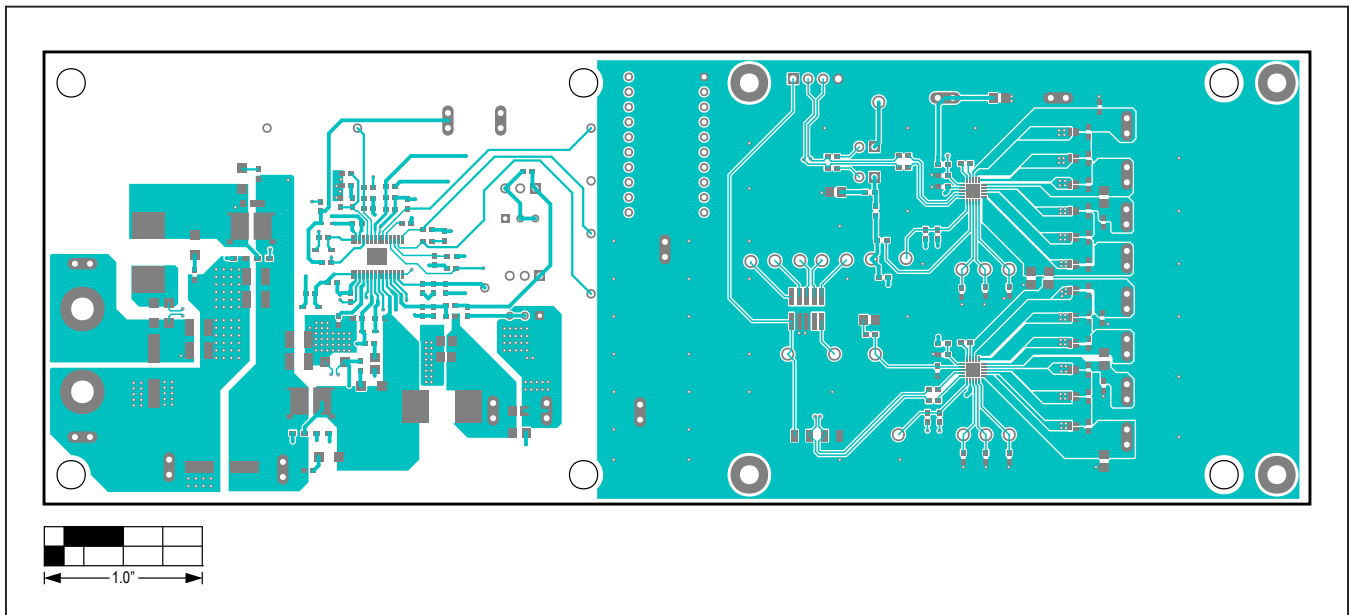




MAX25606 EV System PCB Layout Diagrams

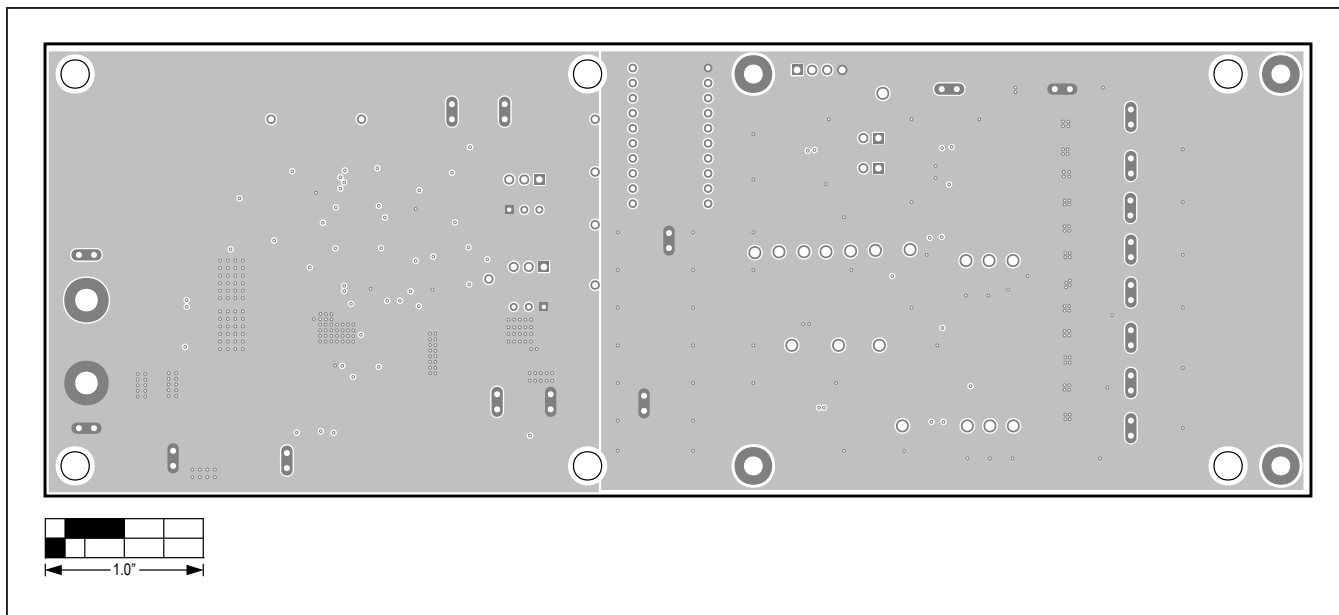


MAX25606 EV System Component Placement Guide—Top Silkscreen

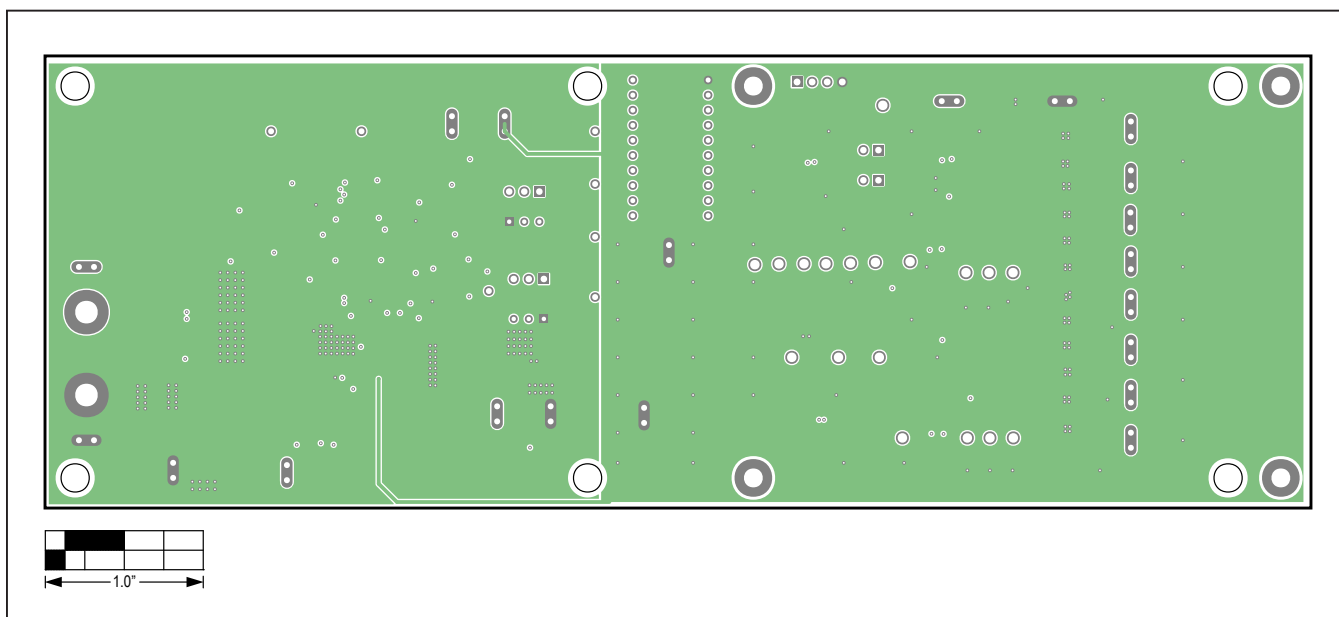


MAX25606 EV System PCB Layout Diagram—Top Layer

MAX25606 EV System PCB Layout Diagrams (continued)



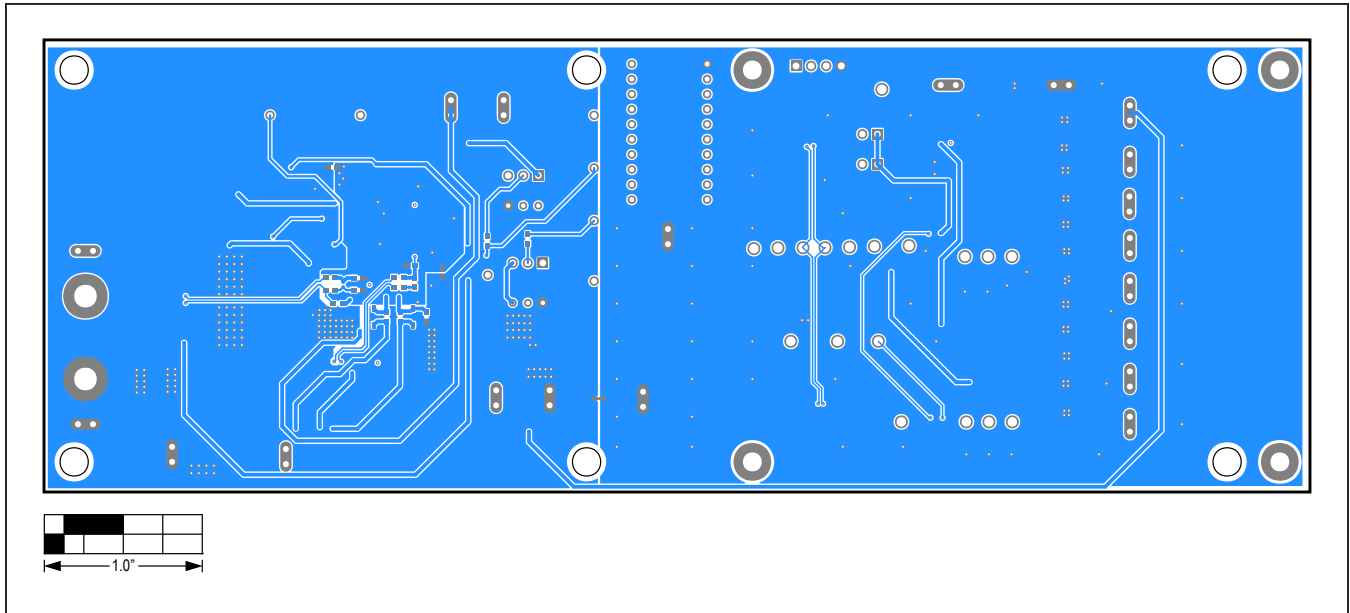
MAX25606 EV System PCB Layout Diagram—GND\_1



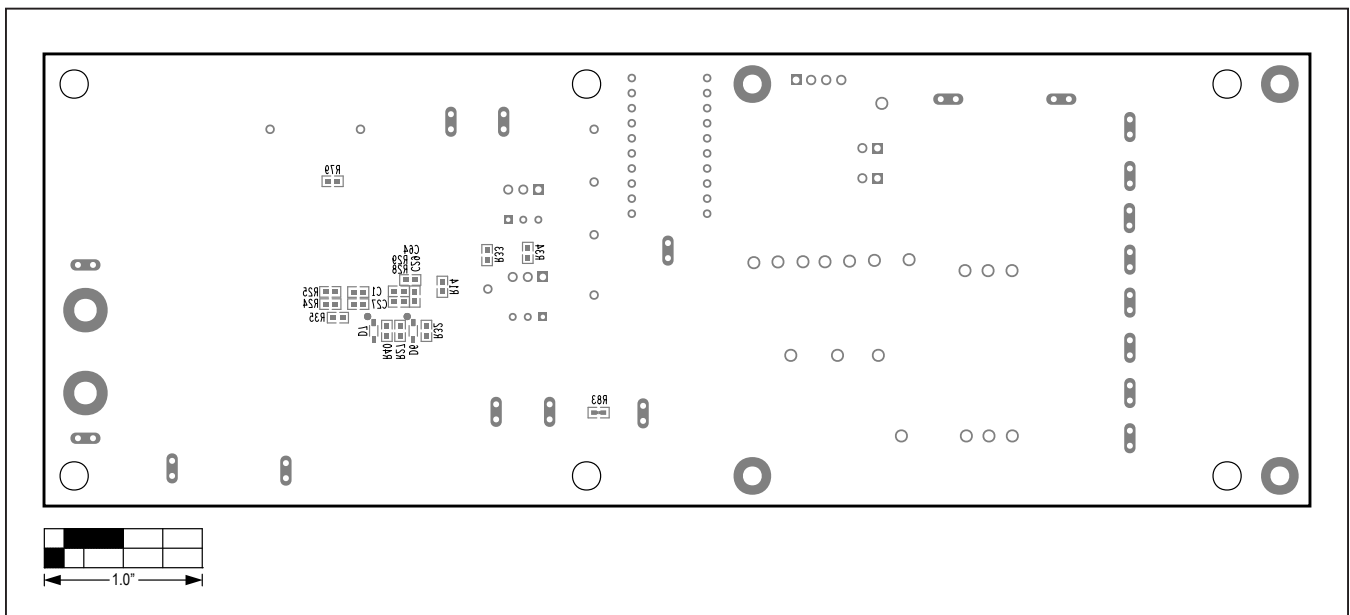
MAX25606 EV System PCB Layout Diagram—GND\_2



MAX25606 EV System PCB Layout Diagrams (continued)



MAX25606 EV System PCB Layout Diagram—Bottom Layer



MAX25606 EV System PCB Layout Diagram—Bottom Silkscreen