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MAX25308 Evaluation Kit

Evaluates: MAX25308

General Description

The MAX25308 EV kit is a fully assembled and tested PCB intended to demonstrate the capability of the MAX25308 LDO regulator. The MAX25308 is a 3-output linear regulator family that delivers up to 600mA on Channel 1 and up to 300mA on channels 2 and 3 with only 37 μ V_{RMS} of output noise from 10Hz to 100kHz. These regulators maintain $\pm 1.25\%$ output accuracy over a wide input voltage range, requiring only 155mV (max) of input-to-output headroom at full load. The 1.95mA maximum no-load supply current is independent of dropout voltage. Each output is factory programmable between 0.6V to 3.7875V in 12.5mV steps. No external components are needed except for the input, output, and bypass capacitors. Each output has an independent enable input and RESET output.

Features

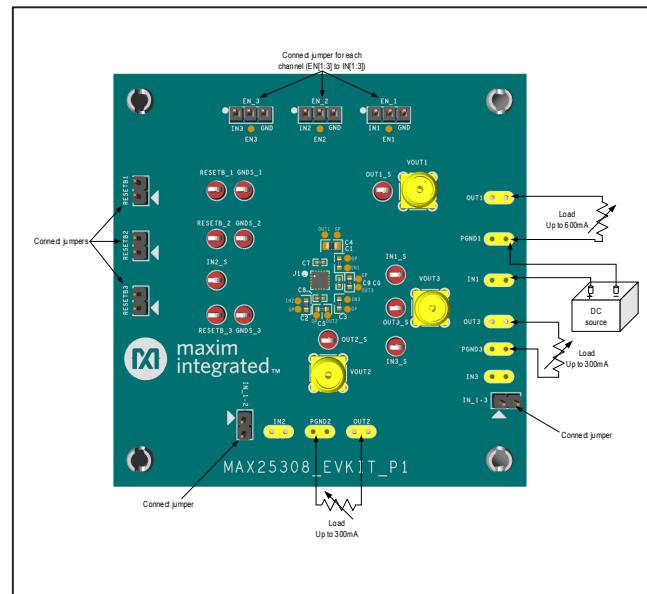
- 1.7V to 5.5V Input Voltage Range
- Factory-Selectable Output Voltage of 0.6V to 3.7875V in 12.5mV Steps
- 1.95mA (Max) Operating Supply Current
- 70dB PSRR at 10kHz
- 600mA Maximum Output Current (OUT1)
- 300mA Maximum Output Current (OUT2/3)
- $\pm 1.25\%$ DC Accuracy Over Load, Line, and Temperature

Quick Start

Required Equipment

- MAX25308 EV kit
- 6V, 5A power supply
- Appropriate resistive load, or an electronic load
- Multimeters

Test setup



Ordering Information appears at end of data sheet.

Procedure

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

Channel 1 operation:

- 1) Populate jumper (EN_1) between EN1 and IN1.
- 2) Populate jumper RESETB1 to monitor power-good (RESETB) signal.
- 3) Connect 3.3V power supply between IN1 and PGND1 (set power-supply current limit to at least 2A).
- 4) Turn on power supply.
- 5) Measure input voltage at IN1_S test point.
- 6) Measure output voltage at OUT1_S and measure RESETB1 signal at RESETB_1 test point. RESETB1 signal should be high (same as IN1).

Channel 2 operation:

- 1) Populate jumper IN_1-2.
- 2) Populate jumper (EN_2) between EN2 and IN2.
- 3) Populate jumper RESETB2 to monitor power-good (RESETB) signal.
- 4) Connect 3.3V power supply between IN1 and PGND1 (set power-supply current limit to at least 2A).
- 5) Turn on power supply.
- 6) Measure input voltage at IN2_S test point. It should be the same as IN1.
- 7) Measure output voltage at OUT2_S and measure RESETB2 signal at RESETB_2 test point. RESETB2 signal should be high (same as IN2).

Channel 3 operation:

- 1) Populate jumper IN_1-3.
- 2) Populate jumper (EN_3) between EN3 and IN3.
- 3) Populate jumper RESETB3 to monitor power-good (RESETB) signal.
- 4) Connect 5V power supply between IN1 and PGND1 (set power-supply current limit to at least 2A).
- 5) Turn on power supply.
- 6) Measure input voltage at IN3_S test point. It should be the same as IN1.
- 7) Measure output voltage at OUT3_S and measure RESETB3 signal at RESETB_3 test point. RESETB3 signal should be high (same as IN3).

Detailed Description of Hardware

EV Kit Interface

The Channel 1 inputs (IN1 and PGND1) are the main input supply points. IN1 powers the common circuitry of the device. This requires power to IN1 to be supplied before OUT2 and/or OUT3 can be turned on. Channel 2 and Channel 3 can be supplied from either IN1 or external supply. To use external supply at IN2 and/or IN3, remove jumpers IN_1-2 and/or IN_1-3 respectively, which disconnects them from IN1 supply. VOUT1, VOUT2, and VOUT3 (SMA connectors) can be used for output voltage measurement or noise measurement. MAX25308 EV kit has exposed pads (IN1/2/3, OUT1/2/3, and GP (ground point)) to measure input and/or output voltage across ceramic capacitors, which also can be used for probe measurements or PSRR measurement.

Evaluating IC Capabilities

The default device populated on the board is a MAX25308AATEA/V+. This is a 3-channel device. The MAX25308 includes individual enable inputs for each output (EN1/EN2/EN3). Set EN_1/2/3 jumper to either IN1/2/3 or GND to pull EN high or low, respectively. The MAX25308 includes an open-drain output, RESETB, for each output that goes low to indicate that the output voltage is out of regulation. The MAX25308 EV kit has a 10kΩ pullup resistor from the RESETB pin to IN1, IN2, and IN3, respectively—one for each channel.

MAX25308 EV Kit Jumpers, Test points, and Connectors

JUMPER/TEST POINTS/CONNECTORS	TYPE	SIGNAL	DEFAULT POSITION	FUNCTION
EN_1	Jumper	EN1	OFF	Jumper for activating Channel 1 enable signal
EN_2	Jumper	EN2	OFF	Jumper for activating Channel 2 enable signal
EN_3	Jumper	EN3	OFF	Jumper for activating Channel 3 enable signal
RESETB1	Jumper	RESETB1	NA	Jumper to connect Channel 1 power good (RESETB) signal
RESETB2	Jumper	RESETB2	NA	Jumper to connect Channel 2 power good (RESETB) signal
RESETB3	Jumper	RESETB3	NA	Jumper to connect Channel 3 power good (RESETB) signal
IN_1-2	Jumper	V _{IN1}	NA	Jumper to connect IN2 and IN1. IN2 is supplied from channel1 input (IN1)
IN_1-3	Jumper	V _{IN1}	NA	Jumper to connect IN3 and IN1. IN3 is supplied from channel1 input (IN1)
RESETB_1	Test point	RESETB1	NA	Test point to monitor Channel 1 power good signal
RESETB_2	Test point	RESETB2	NA	Test point to monitor Channel 2 power good signal
RESETB_3	Test point	RESETB3	NA	Test point to monitor Channel 3 power good signal
IN1_S	Test point	V _{IN1}	NA	Test point to measure Channel 1 input voltage
IN2_S	Test point	V _{IN2}	NA	Test point to measure Channel 2 input voltage
IN3_S	Test point	V _{IN3}	NA	Test point to measure Channel 3 input voltage
OUT1_S	Test point	V _{OUT1}	NA	Test point to monitor Channel 1 output voltage
OUT2_S	Test point	V _{OUT2}	NA	Test point to monitor Channel 2 output voltage
OUT3_S	Test point	V _{OUT3}	NA	Test point to monitor Channel 3 output voltage
VOUT1	Connector	V _{OUT1}	NA	SMA connector to measure Channel 1 output voltage. Can also be used for noise measurement.
VOUT2	Connector	V _{OUT2}	NA	SMA connector to measure Channel 1 output voltage. Can also be used for noise measurement.
VOUT3	Connector	V _{OUT3}	NA	SMA connector to measure Channel 1 output voltage. Can also be used for noise measurement.
GNDS_1, GNDS_2, GNDS_3	Test point	GND	NA	Additional ground points provided

Ordering Information

PART	TYPE
MAX25308EVKIT#	EV Kit

MAX25308 EV Kit Bill of Materials

REFERENCE	VALUE	DESCRIPTION	MANUFACTURER	MFG PART #
C2, C3	1UF	CAPACITOR; SMT (0603); CERAMIC CHIP; 1UF; 25V; TOL=10%; TG=-55 DEGC TO +125 DEGC; TC=X7R	TDK	CGA3E1X7R1E105K080AC
C1, C4	4.7UF	CAPACITOR; SMT (0805); CERAMIC CHIP; 4.7UF; 16V; TOL=10%; MODEL=GRM SERIES; TG=-55 DEGC TO +125 DEGC; TC=X7R	TDK	CGA4J3X7R1C475K125AE
C5, C6	2.2UF	CAPACITOR; SMT (0603); CERAMIC; 2.2UF; 6.3V; TOL=10%; TG=-55 DEGC TO +125 DEGC; TC=X7R	TDK	CGA3E1X7R0J225K080AC
C7-C9	0.01UF	CAPACITOR; SMT (0402); CERAMIC CHIP; 0.01UF; 50V; TOL=5%; TG=-55 DEGC TO +125 DEGC; TC=X7R	MURATA	GRM155R71H103JA88
C10	150UF	CAP TANT POLY 150UF 6.3V 2917 (7343 Metric) 25mOhm	Panasonic Electronic Components	6THE150M
EN_1-EN_3	-	CONNECTOR; MALE; THROUGH HOLE; BREAKAWAY; STRAIGHT; 3PINS	SULLINS	PEC03SAAN
GNDS_1-GNDS_3, IN1_S-IN3_S, OUT1_S-OUT3_S, RESETB_1-RESETB_3	-	TEST POINT; PIN DIA=0.125IN; TOTAL LENGTH=0.35IN; BOARD HOLE=0.063IN; RED; PHOSPHOR BRONZE WIRE SILVER PLATE FINISHED	Keystone Electronics	5005
IN1-IN3, OUT1-OUT3, PGND1-PGND3	-	EVK KIT PARTS; MAXIM PAD; WIRE; NATURAL; SOLID; WEICO WIRE; SOFT DRAWN BUS TYPE-S; 20AWG	WEICO WIRE	9020 BUSS
IN_1-2, IN_1-3, RESETB1-RESETB3	-	CONNECTOR; MALE; 2.54MM PIN HEADER; STRAIGHT; 2PINS	WURTH ELECTRONICS INC	61300211121
R1-R6	10K	RESISTOR; 0603; 10K OHM; 0.1%; 25PPM; 0.1W; THICK FILM	VISHAY DALE;KOA SPEER ELECTRONICS	TNPW060310K0BE; RN731JTTD1002B
VOUT1-VOUT3	-	CONNECTOR; FEMALE; SMA MIXED TECHNOLOGY; STRAIGHT; 5PINS	SAMTEC	SMA-J-P-H-ST-MT1
J1	-	EVKIT PART - IC	MAXIM	MAX25308AATEA/V+

MAX25308 EV Kit Schematic

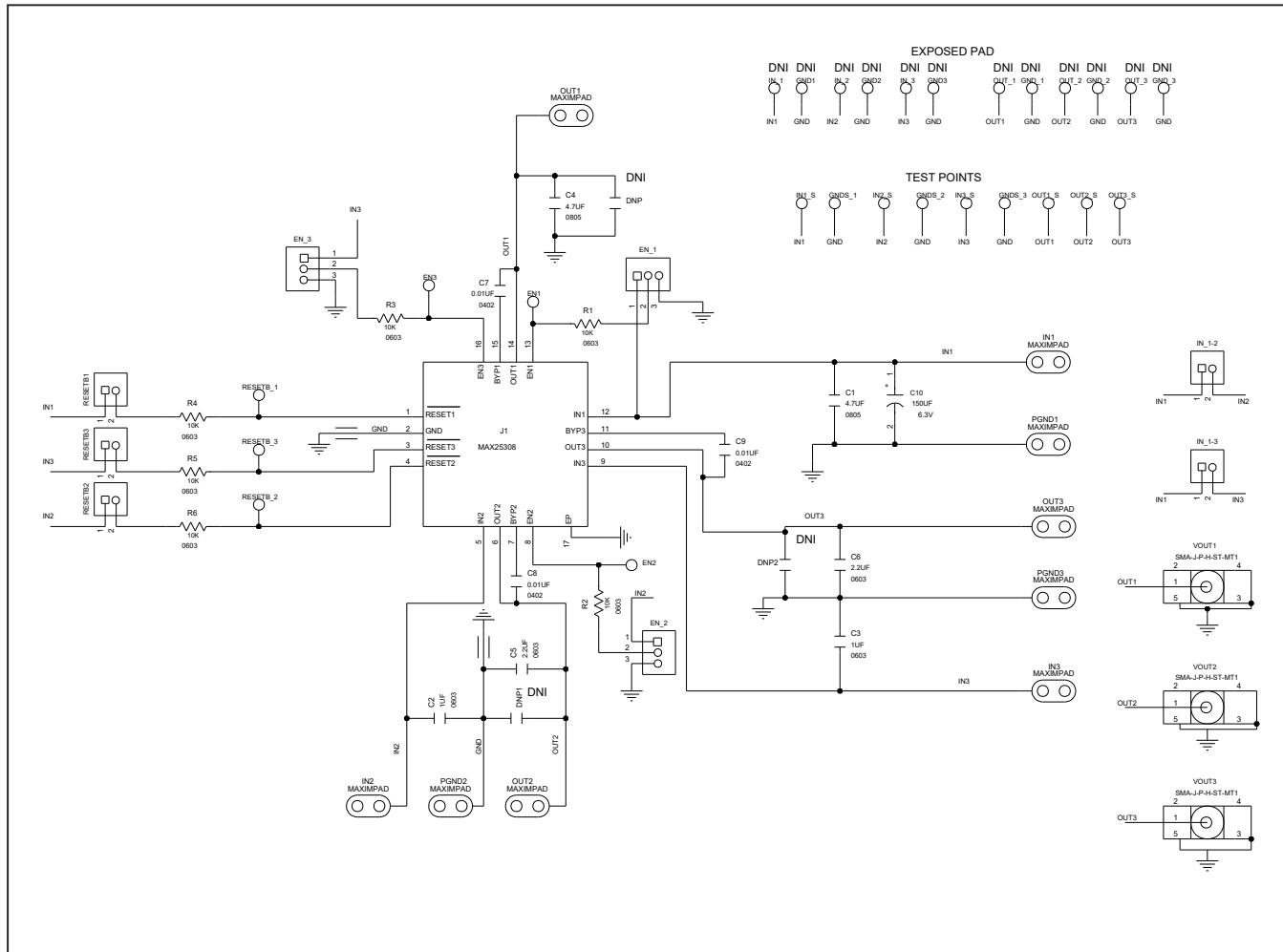


Figure 1. MAX25308 EV Kit Schematic

MAX25308 Evaluation Kit

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MAX25308 EV Kit PCB Layout Diagrams

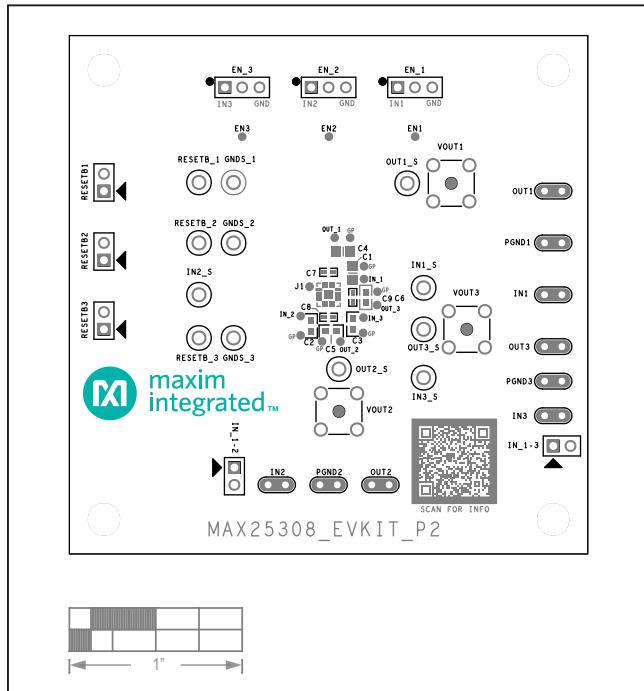


Figure 2. MAX25308 EV Kit PCB Layout—Silkscreen Top

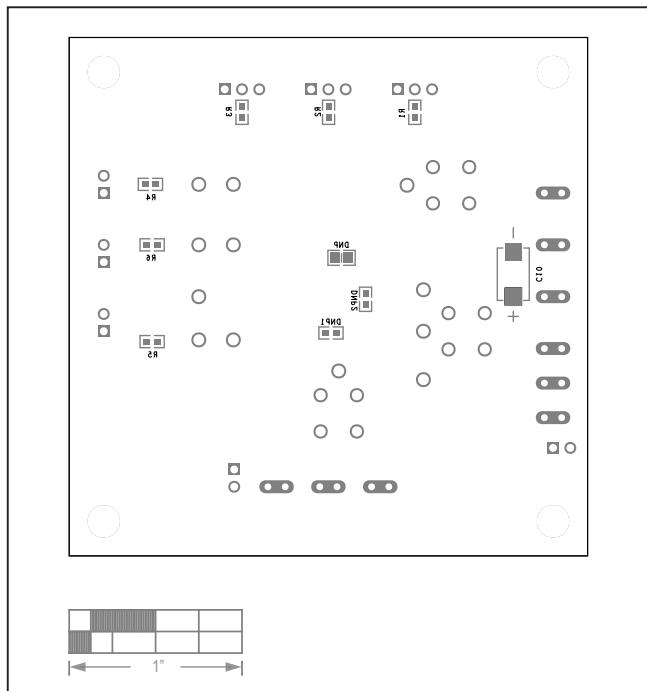


Figure 3. MAX25308 EV Kit PCB Layout—Silkscreen Bottom

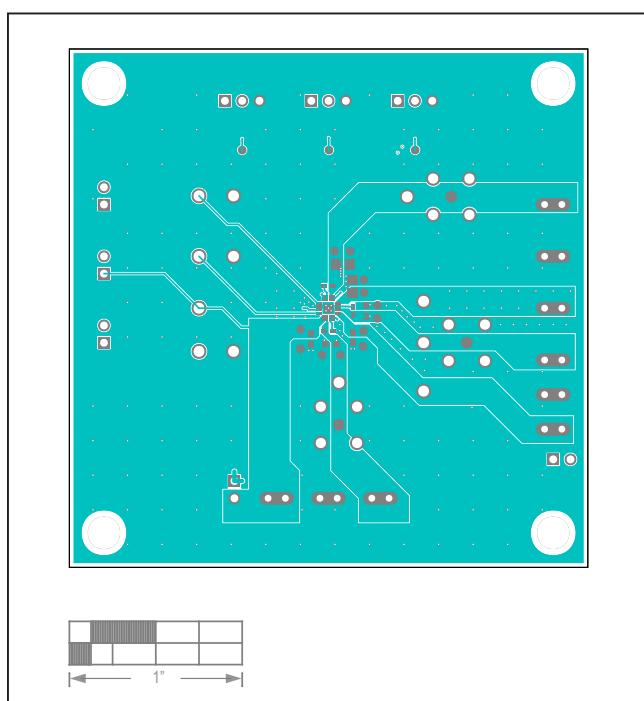


Figure 4. MAX25308 EV Kit PCB Layout—Top Layer

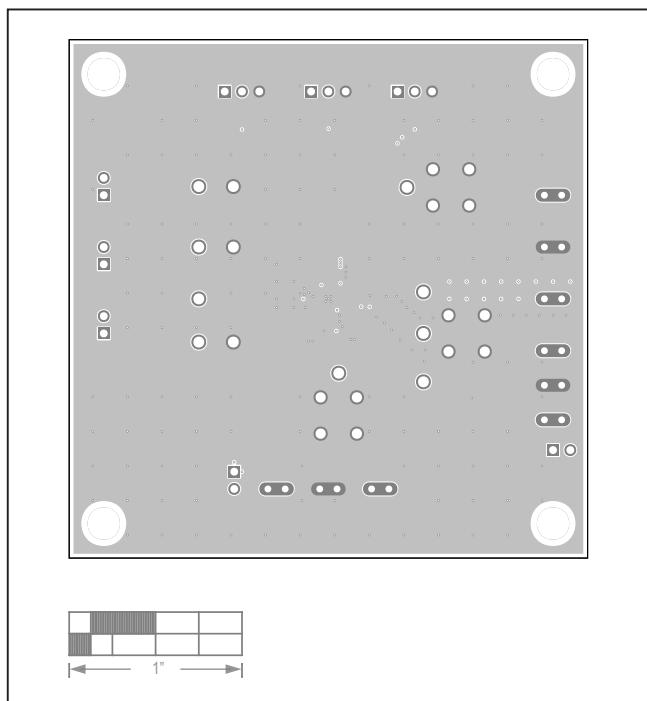


Figure 5. MAX25308 EV Kit PCB Layout—Inner Layer 2

MAX25308 EV Kit PCB Layout Diagrams (continued)

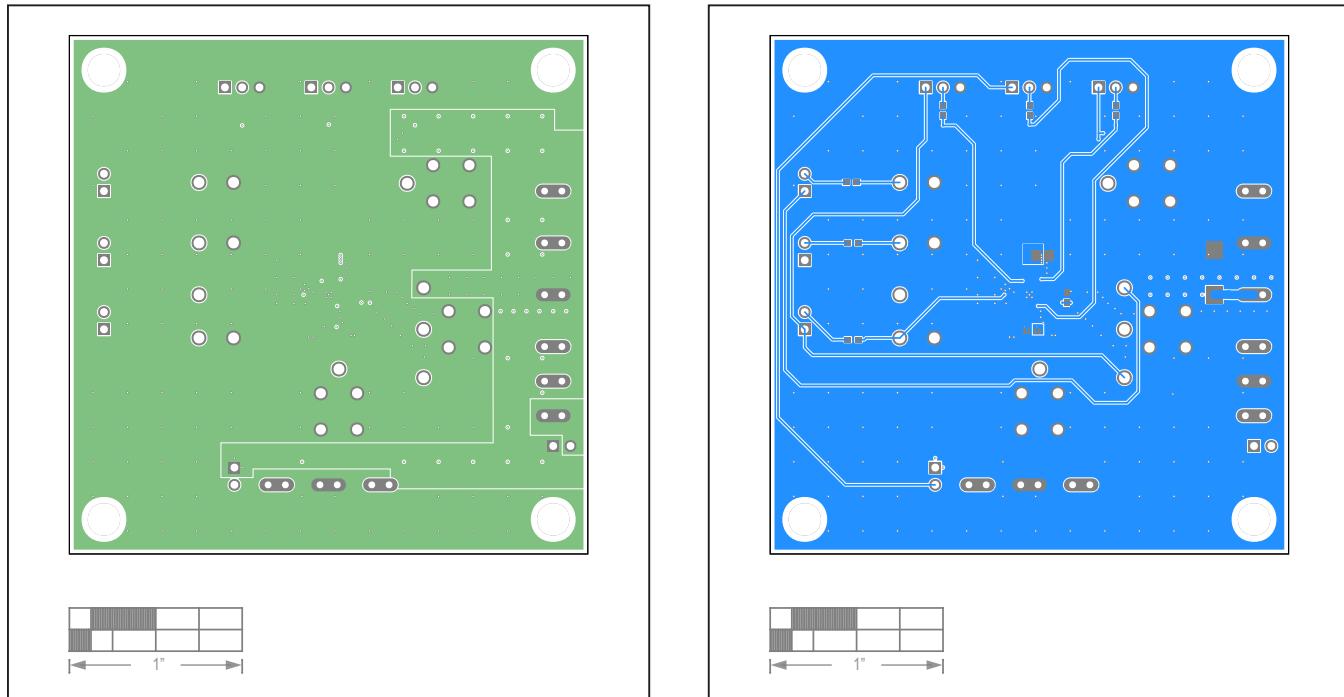


Figure 6. MAX25308 EV Kit PCB Layout—Inner Layer 3

Figure 7. MAX25308 EV Kit PCB Layout—Bottom Layer

Revision History

REVISION NUMBER	REVISION DATE	DESCRIPTION	PAGES CHANGED
0	4/21	Initial release	—

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