Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from,Europe,America and south Asia,supplying obsolete and hard-to-find components to meet their specific needs.

With the principle of “Quality Parts,Customers Priority,Honest Operation,and Considerate Service”,our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

We are looking forward to setting up business relationship with you and hope to provide you with the best service and solution. Let us make a better world for our industry!

Contact us

Tel: +86-755-8981 8866 Fax: +86-755-8427 6832
Email & Skype: info@chipsmall.com Web: www.chipsmall.com
Address: A1208, Overseas Decoration Building, #122 Zhenhua RD., Futian, Shenzhen, China

MAX33054E Shield

Evaluates: MAX33054E

General Description

The MAX33054E Shield is a fully assembled and tested PCB that demonstrates the functionality of the MAX33054E fault-protected with extended common mode input range and ±25kV ESD Human Body Model (HBM) controller area network (CAN) transceiver. The shield features a digital isolator, used as a level translator (between the controller and transceiver) and operates from 1.71V to 5.5V supply.

Features

- Integrated Protection Increases Robustness
  - ±65V Fault Tolerant CANH and CANL
  - ±25kV ESD HBM (Human Body Model)
  - ±25V Extended Common Mode Input Range (CMR)
  - Transmitter Dominant Timeout Prevents CAN Bus Lockup
  - Short-Circuit Protection
  - Thermal Shutdown
- MAX33054E Provides Flexible Design Options
  - STBY Input for Low-Current Mode, Slow Slew Rate, Normal Operating Mode
  - 1.62V to 3.6V Logic-Supply (V_L) Range
- High-Speed Operation of Up to 2Mbps
- Operating Temperature Range of -40ºC to +125ºC in 8-pin SOIC Package

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

Quick Start

Required Equipment

- MAX33054E Shield
- 3.3V, 500mA DC power supply
- Signal/function generator
- Oscilloscope

Procedure

1) Place the MAX33054E Shield on a nonconductive surface to ensure that nothing on the PCB gets shorted to the workspace.
2) Set the jumpers of **JU1**, **JU2**, **JU_CANH**, and **JU_CANL** to 2-3 position.
3) Place two shunts on **JU8**
   a. Shunt pins 4-5 to connect TXD signal to D0 of **J6**.
   b. Shunt pins 2-3 to connect RXD signal to D1 of **J6**.
4) Shunt STBY_U1 and GND on **JU12**, 1-2 position.
5) Place shunts on **JU3**, **JU10**, **JU15**, and **JU20**, 1-2 position.
6) Verify that all jumpers are in their default position as shown in Table 1.
7) With +3.3V power supply disabled, connect the positive terminal to VCC_EXT, VL_EXT, and IOREF test points. Connect the negative terminal to the GND test point.
8) Connect the positive terminal of the function generator to D1 of J6 and negative terminal to any GND test points on the shield.
9) Turn on the +3.3V DC Power Supply.
10) Set Function generator to output a 250kHz square wave between 0V and 3.3V, and then enable function generator output.
11) Connect oscilloscope probes on CANH and CANL to GND test points of the Shield. Verify the difference voltage between CANH and CANL matches TXD input signal. The difference voltage should be between 1.5V–3V in dominant mode and -120mV to +12mV in recessive mode.
12) Connect an oscilloscope probe on D0 of J6 and verify the RXD output signal matches the TXD input signal.

maxim integrated™

Detailed Description of Hardware

The MAX33054E Shield is a fully assembled and tested circuit board for evaluating the MAX33054E fault-protected, high-speed CAN transceiver (U1) with ±65V of fault protection. The Shield is designed to evaluate MAX33054E alone or in a CAN system. The MAX33054E Shield enables Mbed or Arduino platform to communicate on a CAN bus. The MAX14932 digital isolator is used as a level translator with a 1.71V to 5.5V supply range.

Powering the Board

The MAX33054E Shield requires one power supply for 3.3V operation. The power supply can come from an external supply or the Arduino/Mbed microcontroller's 3.3V supply. To select the external supply, shunt the JU1 VDD pin to VDD_EXT pin option, 2-3 (default position). To connect the Arduino/Mbed 3.3V supply to VDD, shunt JU1 VDD pin to 3.3V, 1-2 position. Similarly, the VL supply is selected using JU2. Shunt JU2 to 2-3 position to select the external supply. Shunt JU2 to 1-2 position to select the Arduino/Mbed 3.3V supply. Refer to Table 1 for jumper settings.

On-Board Termination

A properly terminated CAN bus is terminated at each end with the characteristic impedance of the cable. The MAX33054E Shield features a selectable 60Ω load and a 60Ω-60Ω split termination circuit between the CANH and CANL driver outputs. The 60Ω–60Ω split termination has a footprint for a capacitor to reduce high-frequency noise and common mode drift. If the board is evaluated in a system and is connected at the end of the cable, then select the 120Ω (60Ω-60Ω) termination. The termination resistors on the MAX33054E Shield should be changed to a 60Ω with optional footprint for a 100pF load, to simulate a complete system load during evaluation. CANH and CANL can also be left unloaded with JU2 open.

TXD and RXD Configuration

Digital channel assignments for TXD and RXD are selected via JU8. It consists of three columns, and 16 rows. The columns labeled TXD and RXD are connected to INA1 and OUTA1 pins on the MAX14932FASE (U2), respectively. The middle column is the digital I/O pins, D0 to D15. This provides flexibility for the user to select different resources on the microcontroller for transmitting and receiving signals to and from the CAN transceiver. Table 2 shows the list of JU8 jumper options.

DB9 Connector

The MAX33054E Shield has a DB9 connector to CANH and CANL (pins 7 and 2, respectively).

SD Card

The MAX33054E Shield has a SD Card socket. The micro-SD card is connected to D10-D13 to interface with Arduino/Mbed board through SPI. Users can store CAN messages.

Table 1. Table Jumper Settings

JUMPER	SHUNT POSITION	DESCRIPTION
JU_CANH and JU_CANL	1-2	Connects 120.8Ω between CANH and CANL
	2-3*	Connects 60.4Ω between CANH and CANL
	Open	No load is connected between CANH and CANL
JU1	1-2	VDD is shorted to 3.3V supply
	2-3*	VDD is shorted to VDD_EXT supply
	Open	VDD is open
JU2	1-2	VL is shorted to 3.3V supply
	2-3*	VL is shorted to VL_EXT supply
	Open	VL is open
JU3	1-2*	Connects VL to U1 Pin 5
JU8	-	Refer to TXD and RXD Configuration in Table 2.
JU9	1-2	Connects STBY to D7
	Open*	Disconnects STBY from D7

Table 1. Table Jumper Settings (continued)

JUMPER	SHUNT POSITION	DESCRIPTION
JU10	1-2*	Connects TVS diode to CANL
	Open	Disconnects TVS diode to CANL
JU12	1-2*	Connects STBY to ground
	1-3	Connects STBY to a 26.1KΩ resistor to ground.
	1-4	Connects STBY to the U2's OUTB2 pin used for Arduino/mbed interface.
	Open	Internal pull up for standby mode.
JU15	1-2*	Connects 15pF to receiver output to ground.
	Open	Disconnects 15pF on receiver output.
JU20	1-2*	Connects TVS diode to CANH
	Open	Disconnects TVS diode to CANH

Note: *'*' indicates default jumper state.*

Table 2. Table TXD and RXD Jumper Setting

JUMPER	SHUNT POSITION	DESCRIPTION
JU8	1-2	Connects TXD to D0
	4-5*	Connects TXD to D1
	7-8	Connects TXD to D2
	10-11	Connects TXD to D3
	13-14	Connects TXD to D4
	16-17	Connects TXD to D5
	19-20	Connects TXD to D6
	22-23	Connects TXD to D7
	25-26	Connects TXD to D8
	28-29	Connects TXD to D9
	31-32	Connects TXD to D10
	34-35	Connects TXD to D11
	37-38	Connects TXD to D12
	40-41	Connects TXD to D13
	43-44	Connects TXD to D14
	46-47	Connects TXD to D15

JUMPER	SHUNT POSITION	DESCRIPTION
JU8	2-3*	Connects RXD to D0
	5-6	Connects RXD to D1
	8-9	Connects RXD to D2
	11-12	Connects RXD to D3
	14-15	Connects RXD to D4
	17-18	Connects RXD to D5
	20-21	Connects RXD to D6
	23-24	Connects RXD to D7
	26-27	Connects RXD to D8
	29-30	Connects RXD to D9
	32-33	Connects RXD to D10
	35-36	Connects RXD to D11
	38-39	Connects RXD to D12
	41-42	Connects RXD to D13
	44-45	Connects RXD to D14
	47-48	Connects RXD to D15

Note: *'*' indicates default jumper state.*

Ordering Information

PART	TYPE
MAX33054ESHLD#	Shield

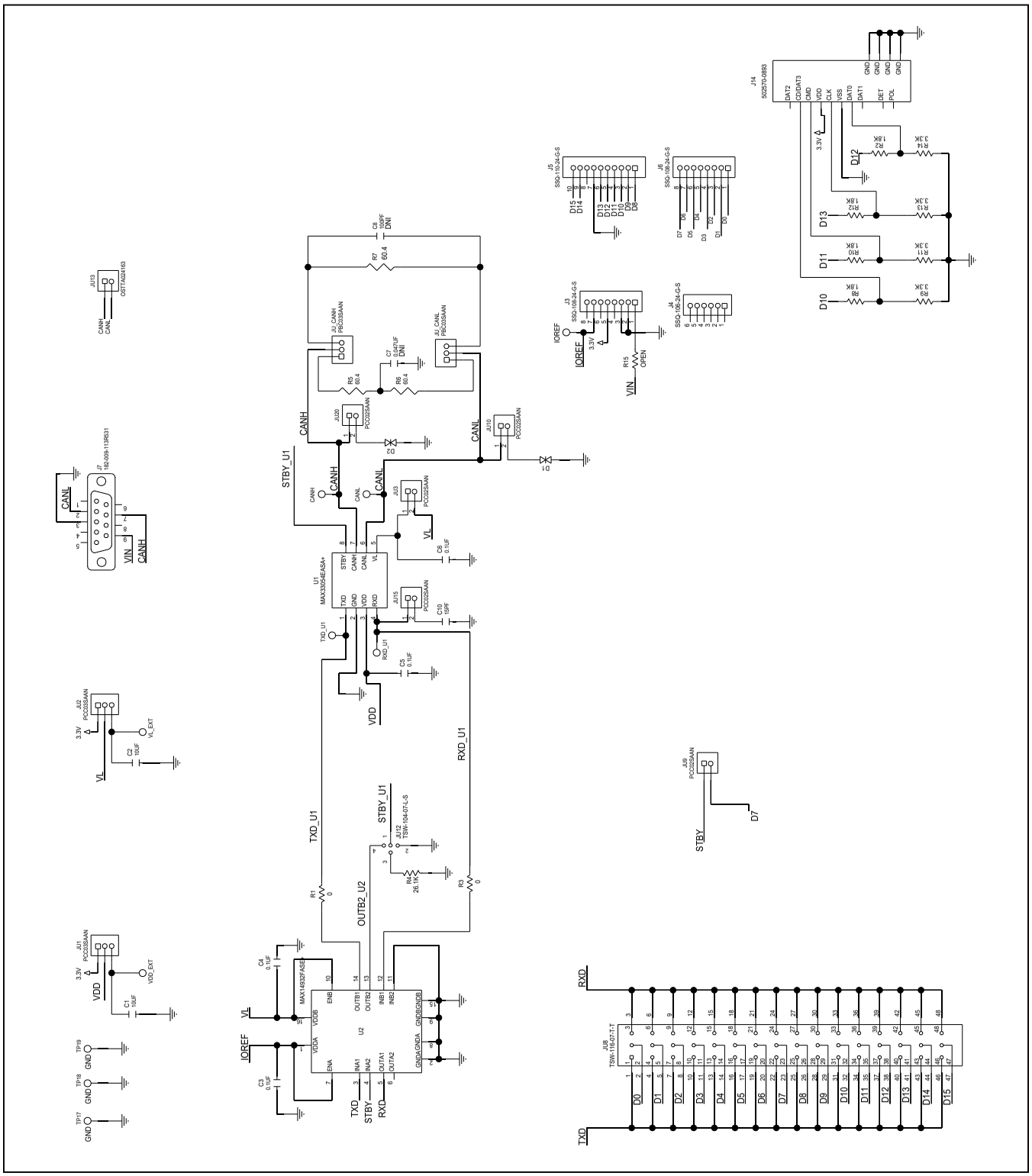
MAX33054E Shield Bill of Materials

ITEM	REF_DES	DNI/DNP	QTY	MFG PART #	MANUFACTURER	VALUE	DESCRIPTION	COMMENTS
1	C1, C2	-	2	GRM21BR71A106KE51	MURATA	10UF	CAPACITOR; SMT (0805); CERAMIC CHIP; 10UF; 10V; TOL=10%; MODEL=GRM SERIES; TG=-55 DEGC TO +125 DEGC; TC=X7R	
2	C3-C6	-	4	C0402C104J4RAC	KEMET	0.1UF	CAPACITOR; SMT; 0402; CERAMIC; 0.1uF; 16V; 5%; X7R; -55degC to + 125degC; 0 +/-15% degC MAX.	
3	C7	-	1	C1005X7R1E473K; GRM155R71E473K	TDK;MURATA	0.047UF	CAPACITOR; SMT (0402); CERAMIC CHIP; 0.047UF; 25V; TOL=10%; TG=-55 DEGC TO +125 DEGC	
4	C10	-	1	C0402C0G500-150JNP; GRM1555C1H150JA01	VENKEL LTD.; MURATA	15PF	CAPACITOR; SMT (0402); CERAMIC CHIP; 15PF; 50V; TOL=5%; TG=-55 DEGC TO +125 DEGC; TC=C0G	
5	CANH, CANL, RXD_U1, TXD_U1	-	4	5002	KEYSTONE	N/A	TEST POINT; PIN DIA=0.1IN; TOTAL LENGTH=0.3IN; BOARD HOLE=0.04IN; WHITE; PHOSPHOR BRONZE WIRE SILVER;	
6	D1, D2	-	2	SM15T30CA	ST MICROELECTRONICS	25.6V	DIODE; TVS; SMC (DO-214AB); VRM=25.6V; IPP=36A	
7	IOREF	-	1	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;	
8	J3, J6	-	2	SSQ-108-24-G-S	SAMTEC	SSQ-108-24-G-S	CONNECTOR; FEMALE; THROUGH HOLE; .025INCH SQ POST SOCKET; STRAIGHT; 8PINS ;	
9	J4	-	1	SSQ-106-24-G-S	SAMTEC	SSQ-106-24-G-S	CONNECTOR; FEMALE; THROUGH HOLE; .025INCH SQ POST SOCKET; STRAIGHT; 6PINS ;	
10	J5	-	1	SSQ-110-24-G-S	SAMTEC	SSQ-110-24-G-S	CONNECTOR; FEMALE; THROUGH HOLE; .025INCH SQ POST SOCKET; STRAIGHT; 10PINS ;	
11	J7	-	1	182-009-113R531	NORCOMP	182-009-113R531	CONNECTOR; MALE; THROUGH HOLE; D-SUBMINIATURE CONNECTOR; RIGHT ANGLE; 9PINS	
12	J14	-	1	502570-0893	MOLEX	502570-0893	CONNECTOR; FEMALE; SMT; MICROSD CARD CONNECTOR; RIGHT ANGLE; 10PINS	
13	JU1, JU2	-	2	PCC03SAAN	SULLINS	PCC03SAAN	CONNECTOR; MALE; THROUGH HOLE; BREAKAWAY; STRAIGHT THROUGH; 3PINS; -65 DEGC TO +125 DEGC	
14	JU3, JU9, JU10, JU15, JU20	-	5	PCC02SAAN	SULLINS	PCC02SAAN	CONNECTOR; MALE; THROUGH HOLE; BREAKAWAY; STRAIGHT THROUGH; 2PINS; -65 DEGC TO +125 DEGC	
15	JU8	-	1	TSW-116-07-T-T	SAMTEC	TSW-116-07-T-T	CONNECTOR; MALE; THROUGH HOLE; 0.025IN SQ POST HEADER; STRAIGHT; 48PINS	

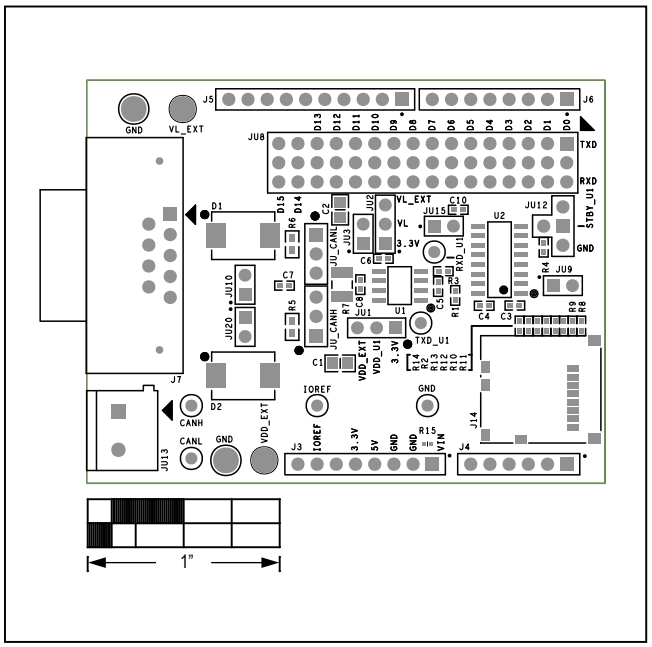
MAX33054E Shield Bill of Materials (continued)

ITEM	REF_DES	DNI/DNP	QTY	MFG PART #	MANUFACTURER	VALUE	DESCRIPTION	COMMENTS
16	JU12	-	1	TSW-104-07-L-S	SAMTEC	TSW-104-07-L-S	EVKIT PART-CONNECTOR; MALE; THROUGH HOLE; TSW SERIES; SINGLE ROW; STRAIGHT; 4PINS	
17	JU13	-	1	OSTTA024163	ON-SHORE TECHNOLOGY IN	OSTTA024163	CONNECTOR; FEMALE; THROUGH HOLE; 5.08MM TERM BLOCK CONNECTOR; STRAIGHT; 2PINS; -30 DEGC TO +105 DEGC	
18	JU_CANH, JU_CANL	-	2	PBC03SAAN	SULLINS	PBC03SAAN	CONNECTOR; MALE; THROUGH HOLE; BREAKAWAY; STRAIGHT; 3PINS; -65 DEGC TO +125 DEGC	
19	R1, R3	-	2	ERJ-2GE0R00X	PANASONIC	0	RESISTOR; 0402; 0 OHM; 0%; JUMPER; 0.10W; THICK FILM	
20	R2, R8, R10, R12	-	4	CRCW04021K80FK; RC0402FR-071K8L	VISHAY DALE; YAGEO PHICOMP	1.8K	RESISTOR, 0402, 1.8K OHM, 1%, 100PPM, 0.0625W, THICK FILM	
21	R4	-	1	CRCW040226K1FK	VISHAY DALE	26.1K	RESISTOR; 0402; 26.1K OHM; 1%; 100PPM; 0.063W; THICK FILM	
22	R5, R6	-	2	CRCW060360R4FK	VISHAY DALE	60.4	RESISTOR; 0603; 60.4 OHM; 1%; 100PPM; 0.10W; THICK FILM	
23	R7	-	1	CRCW121060R4FKEAHP	VISHAY DRALORIC	60.4	RES; SMT (1210); 60.4R; 1%; +/-100PPM/DEGK; 0.75W	
24	R9, R11, R13, R14	-	4	CRCW04023K30FK	VISHAY DALE	3.3K	RESISTOR, 0402, 3.3K OHM, 1%, 100PPM, 0.0625W, THICK FILM	
25	TP17, TP19	-	2	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;	
26	TP18	-	1	5001	KEYSTONE	N/A	TEST POINT; PIN DIA=0.1IN; TOTAL LENGTH=0.3IN; BOARD HOLE=0.04IN; BLACK; PHOSPHOR BRONZE WIRE SILVER PLATE FINISH;	
27	U1	-	1	MAX33054EASA+	MAXIM	MAX33054EASA+	EVKIT PART - IC; TXRX; +3.3V CAN TRANSCEIVER WITH +/-65V FP; +/-25V CMR AND +/-25KV ESD; PACKAGE OUTLINE DRAWING: 21-0041; LAND PATTERN NUMBER: 90-0096; PACKAGE CODE: S8+4; NSOIC8	
28	U2	-	1	MAX14932FASE+	MAXIM	MAX14932FASE+	IC; DISO; 2/2 CHANNEL; 150MBPS; DEFAULT LOW; 2.75KVRMS DIGITAL ISOLATOR; NSOIC16 150MIL	
29	VDD_EXT, VL_EXT	-	2	5010	KEYSTONE	N/A	TESTPOINT WITH 1.80MM HOLE DIA, RED, MULTIPURPOSE;	
30	PCB	-	1	-	MAXIM	PCB	PCB:MAX33054ESHLD	-
31	C8	DNP	0	C0402C101J5GAC; NMC0402NPO101J; CC0402JRNPO9BN101; GRM1555C1H101JA01; C1005C0G1H101J050	KEMET;NIC COMPONENTS CORP.;YAGEO PHICOMP;MURATA;TDK	100PF	CAPACITOR; SMT (0402); CERAMIC CHIP; 100PF; 50V; TOL=5%; TG=-55 DEGC TO +125 DEGC; TC=C0G	
32	R15	DNP	0	N/A	N/A	OPEN	RESISTOR; 0402; OPEN; FORMFACTOR	
TOTAL			55					

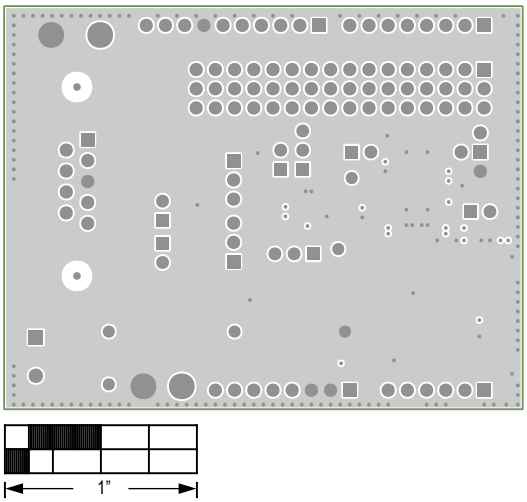
MAX33054E Shield Schematic



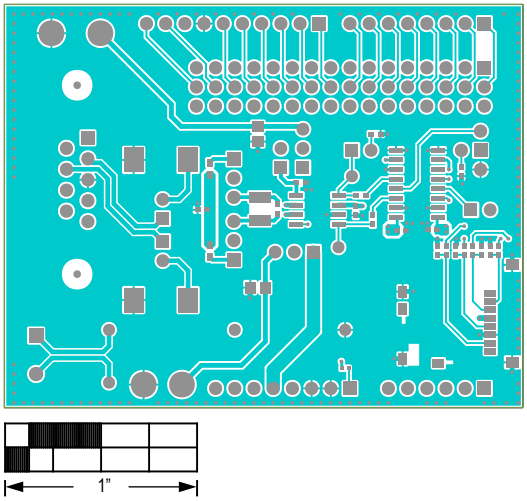
MAX33054E Shield PCB Layout Diagrams



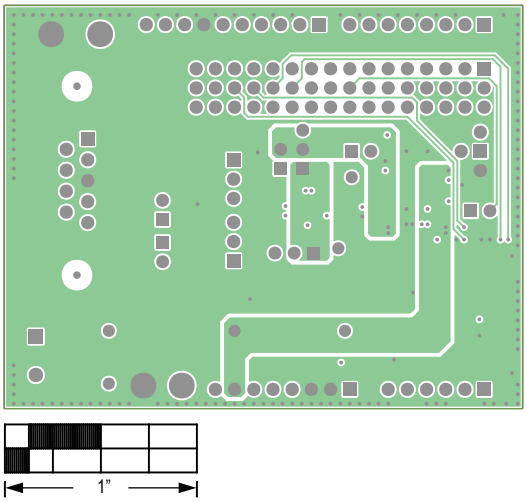
MAX33054E Shield—Top Silkscreen



MAX33054E Shield—Internal 2

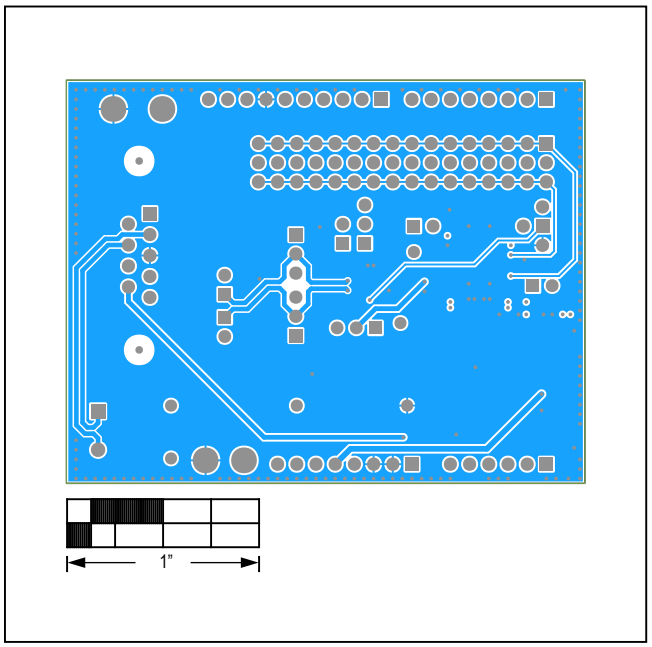


MAX33054E Shield—Top

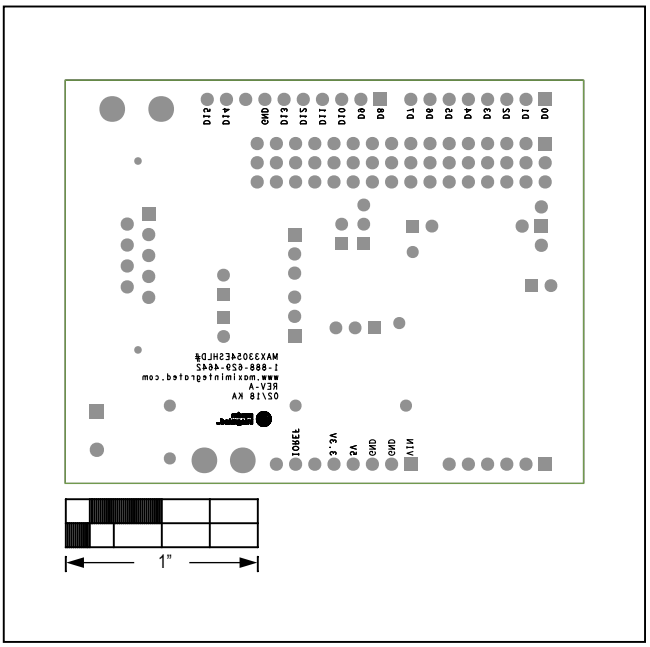


MAX33054E Shield—Internal 3

MAX33054E Shield PCB Layout Diagrams (continued)



MAX33054E Shield—Bottom



MAX33054E Shield—Bottom Silkscreen

Revision History

REVISION NUMBER	REVISION DATE	DESCRIPTION	PAGES CHANGED
0	7/18	Initial release	—

