### **General Description**

The MAX17055G/MAX17055X evaluation kits (EV kits) are fully assembled and tested surface-mount PCBs that evaluate the stand-alone ModelGauge™ m5 host-side fuel gauge ICs for lithium-ion (Li+) batteries in handheld and portable equipment.

The MAX17055G/MAX17055X EV kits include the Maxim DS91230+ USB interface, IC evaluation board, and RJ-11 connection cable. Windows<sup>®</sup> based graphical user interface (GUI) software is available for use with the EV kit and can be downloaded from Maxim's website **www.maximintegrated.com/evkitsoftware**. Windows 7 or newer Windows operating system is required to use the EV kit GUI software.

#### **Features**

- ModelGauge m5 Algorithm
- Monitors 1-Cell Lithium-Ion Battery Packs
- Battery Pack Input Voltage Range of +2.3V to +4.9V
- On-chip Temperature Measurement and External Thermistor Measurement Network
- Optional On-Board PCB Trace Sense Resistor
- Windows 7 or Newer Compatible Software
- Proven PCB Layout
- Fully Assembled and Tested

#### MAX17055K EV Kit Files

FILE	DECRIPTION
MAX17055K_Vx_x_x_x_Install.exe	Installs all EV kit files on your computer

Ordering Information appears at end of data sheet.

ModelGauge is a trademark of Maxim Integrated Products, Inc. Windows is a registered trademark and registered service mark of Microsoft Corporation.

### **Quick Start**

#### **Required Equipment**

- MAX17055G/MAX17055X EV kit
- 1-cell lithium-ion battery pack
- Battery charger or power supply
- · Load circuit
- DS91230+ USB adapter
- RJ-11 6pos reverse modular cord
- PC with Windows 7 or newer Windows operating system and USB port

#### Procedure

The EV kits are fully assembled and tested. Follow the steps below to install the EV kit software, make required hardware connections, and start operation of the kits. The EV kit software can run without hardware attached. It automatically locates the hardware when connections are made. Note that after communication is established, the IC must still be configured correctly for the fuel gauge to be accurate. See the <u>Battery Selection</u> section for details.

- 1) Visit <u>www.maximintegrated.com/evkitsoftware</u> to download the latest version of the MAX17055K EV kit software. Save the EV kit software to a temporary folder and unpack the ZIP file.
- 2) Install the EV kit software on your computer by running the MAX17055K\_Install.exe program inside the temporary folder. The program files are copied and icons are created in the Windows Start menu. The software requires the .NET Framework 4.5 or later. If you are connected to the Internet, Windows automatically updates .NET framework as needed.



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- 3) The EV kit software launches automatically after install or alternatively it can be launched by clicking on its icon in the Windows **Start** menu.
- Connect the DS91230+ adapter to a USB port on the PC. The DS91230+ is a HID device and is located automatically by Windows without the need to install additional drivers.
- 5) Make connections to the EV kit board based on cell pack configuration as shown in <u>Figure 1</u>. The load or charger circuit can be connected at this time as well. The cell connects between the PACK- and PACK+ pads and the charger/load connect between the SYSGND- and SYSPWR+ pads.
- 6) Connect the RJ-11 cable between the USB adapter and the EV kit board. The GUI software establishes communication automatically.
- 7) At initial power-up, a battery profile must be created. The battery selection window opens and allows the user to generate a profile for the battery they are using. They can either select EZ configuration or if a custom .INI characterization file is available for the battery it can be selected at this time. See the *Battery Selection* section for details.



Figure 1. MAX17055 Board Connections

#### **Detailed Description of Hardware**

The MAX17055 EV kit board provides a variety of features that highlight the functionality of the IC. The following sections detail the most important aspects of the EV kit board.

#### **Communication Connections**

The RJ-11 connector provides all signal lines necessary for I<sup>2</sup>C communication between the IC and the software GUI interface. When developing code separately, connections to the communication lines can be made directly to the board. <u>Table 1</u> summarizes the connections. The user must apply the appropriate external pullup resistors to the communication lines when not using the DS91230+ communication interface.

#### **External Thermistor**

The MAX17055 can be configured to use internal temperature measurements or an external thermistor. All EV kit boards come with a thermistor installed as surface mount component RT1. If the application requires direct thermal contact to the cells, RT1 can be removed and replaced with a leaded thermistor connected between the RT1+/ RT1- solder pads (J2 and J3).

#### **Sense Resistor Options**

All EV kit boards are shipped with an 0805 size  $0.010\Omega$  chip sense resistor installed. Oversized land pattern pads allow for different size sense resistors to be used if desired. Also, each board contains an optional  $0.003\Omega$  copper trace sense resistor that can be enabled if desired. To do so, the chip sense resistor must be removed and

# Table 1. Communication LineSolder Points

COMMUNICATION LINE	CONNECTION POINT
SDA	J7
SCL	J8
GND	J10

 $0\Omega$  jumpers must be resoldered to change the circuit. Table 2 summarizes the changes. Note that the IC must be reconfigured to support the new resistor type.

#### **Detailed Description of Software**

The MAX17055G/MAX17055X evaluation kit software gives the user complete control of all functions of the MAX17055, as well as the ability to load a custom model into the ICs. Separate control tabs allow the user access to view real-time updates of all monitored parameters. The software also incorporates a data-logging feature to monitor a cell over time.

#### **Software Installation**

The software requires a Windows 7 or newer operating system. .NET version 4.5 is required for operation and is automatically installed if an older version of .NET framework is detected. To install the evaluation software, exit all programs currently running and unzip the provided MAX17055K Installation Package zipped file.

Double click the MAX17055K\_V\_x\_x\_x\_ Install.exe icon and the installation process begins. Follow the prompts to complete the installation. The evaluation software can be uninstalled in the **Add/Remove** programs tool in the **Control Panel**. After the installation is complete, open the **Maxim Integrated/MAX17055K** folder and run **MAX17055K.exe** or select it from the program menu. Figure 2 shows a splash screen containing information about the evaluation kit that appears while program is loading.

# Table 2. Sense Resistor Selectionfor MAX17055

COMPONENT	VALUE FOR SMD RESISTOR SENSE	VALUE FOR BOARD TRACE SENSE
R3	0Ω	Not populated
R4	Not populated	0Ω
R5	Desired sense value	Not populated
R6	Not populated	0Ω (R7 is trace resistor)

#### **Communication Port**

The EV kit software automatically finds the DS91230+ adapter when connected to any USB port. Communication status is shown on the right-hand side of the bottom status bar. See Figure 3. If the adapter cannot be found, a "No USB Adapter" message is displayed. If the adapter is found, but the EV kit board cannot be found, a "No Slave Device" message is displayed. Otherwise, if communication is valid, a green bar updates as the software continuously reads the IC registers.

If the DS91230+ is connected, the status bar should be active. The bottom status bar also displays information on hibernation status, IC serial number, selected currentsense resistor value, selected battery profile, and IC's firmware revision.

#### **Battery Selector**

The MAX17055 must always have a battery profile for the battery it is presently fuel gauging. The first time the MAX17055K software is run, the **Battery Selector Form** opens automatically to allow the user to set up the first profile. Afterwards, the user can launch the form either from the **Configure** tab or the **Device** pull-down menu. A new profile should be created for each individual battery monitored by the IC. Care should also be taken to always have the correct profile selected for the battery that is attached to the IC so that the fuel gauge is accurate and that save and restore information is properly maintained. Battery profile files are stored under **My Documents/ Maxim Integrated/MAX17055/Batteries**. Custom .INI files are also automatically copied by the program to this location as well.

maxim integrated.	
✓ ModelGauge m5 Fuel Gauge	
MAX17055 Evaluation Kit, Version 1.0.2.1	
© 2016 Maxim Integrated All rights reserved. Website: <u>www.maximintegrated.com</u> Support: <u>support@maximintegrated.com</u>	
Disable Splash Screen OK	

Figure 2. EV Kit Splash Screen



Figure 3. EV Kit Bottom Status Bar

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Figure 4 shows the format of the Battery Selector Form. To change known batteries, the user should select the proper battery profile from the pull-down box and then click **Save Profile and Update IC**. To create a profile for a new battery, follow these steps:

- 1) Select a new profile number from the **Battery Profile** pull-down box.
- 2) Give the profile a detailed description so that it can easily be matched to its battery.
- If no custom .INI file has been created, select the Use Default IC Settings (EZ Config) option and fill out the five settings for your application. Proceed to Step 5.

- 4) If a custom .INI file has been provided by Maxim, select Load INI File option and select the file.
- 5) Select to restore battery history data after model load or not to.
- 6) Click **Save Profile and Update IC** to load the model and exit the form.

If the user ever wishes to delete a battery profile, select the profile number from the drop-down box and then click **Delete Profile** to remove it permanently.

and no battery an INI file. Also	profiles are available, a new one must be created. S select whether or not to restore battery history info	this is the first time the software has been launched Select either EZ Configuration or load the profile from rmation after the model is loaded. It is recommended
	ry information. A different profile should be kept for e that the correct battery profile is used each time.	each battery used with the EV Kit. Make sure to label
Battery Profile	Description	
2	Profile 2	
INI File Option		
• Use Defau	It IC Settings (EZ Config) 1500 Cell Size (mAH) 3.3 Empty Voltage (V per cell) 100.00 Charge Termination Current (mA) Charge voltage is greater than 4.275V ile	LiCoO2 (Common)   Model ID*  Contact Maxim for special cell chemistries not listed in the Model ID drop down box.
Path:		
	Select File	
Save and Res	tore Option	
- C	aved Fuel Gauge Data After Loading the Model ng IC Fuel Gauge Register Data After Loading the	Model
Delete Prof	ile Cancel and Exit Save Profile and Upo	late IC

Figure 4. Battery Selector Form

#### **Program Tabs**

All functions of the program are divided under four tabs in the main program window. Click on the appropriate tab to move to the desired function page. Located on the **ModelGauge m5** tab is the primary user information measured and calculated by the IC. The **Graphs** tab visually displays fuel gauge register changes over time. The **Registers** tab allows the user to modify common fuel gauge registers one at a time. The **Configure** tab allows for special operations such as initiating fuel gauge logging and performing fuel gauge reset. All tabs are described in more detail in the following sections.

#### ModelGauge m5 Tab

The **ModelGauge m5** tab displays the important output information read from the IC. Figure 5 shows the format of the ModelGauge m5 Tab. Information is grouped by function and each is detailed separately.

#### State of Charge

The **State of Charge** group box displays the main output information from the fuel gauge: state of charge of the cell, remaining capacity, time to full, and time to empty.

#### **Cell Information**

The **Cell Information** group box displays information related to the health of the cell such as the cell's age, internal resistance, present capacity, number of equivalent full cycles, and change in capacity from when it was new.



Figure 5. ModelGauge m5 Tab

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#### **Measurements**

The **Measurements** group box displays ADC measurements that are used by the fuel gauge to determine state of charge.

#### Alerts

The **Alerts** group box tracks all eleven possible alert trigger conditions. If any alert occurs, the corresponding checkbox is checked for the user to see. The clear alerts button resets all alert flags. The configure button allows the alert threshold settings to be changed by the user. Figure 6 shows the **Alerts Configuration** application form.

#### At Rate

The **At Rate** group box allows user to input a hypothetical load current and the fuel gauge calculates the corresponding hypothetical Qresidual, TTE, AvSOC, and AvCap values.

#### **Graphs Tab**

The **Graphs** tab displays up to 13 fuel gauge outputs. <u>Figure 7</u> shows the format of the **Graphs** tab. Graph information is grouped into four categories: voltages, temperatures, capacities, and currents. The user can turn on or off any data series using the check boxes on the right-hand side of the tab. The graph visible viewing area can be adjusted from 10 minutes up to 1 week. The graphs remember up to 1 week worth of data. If the viewing area is smaller than the time range of the data already collected, the scroll bar below the graphs can be used to scroll through graph history. All graph history information is maintained by the program. Graph settings can be changed at any time without losing data.

SOC Change alerts can be enabled disable a threshold, set to its maxim									
📃 Enable Voltage	, Current, and S	SOC Ale	rts						
🗸 Enable Tempera	ature Alerts								
Enable 1% SOC	Change Alerts	6							
Max Voltage Threshold (V):	5.10 <u>+</u>	Ν	Ain Voltage	Threshold (V)	0.	00	+	VALRT St	icky
Max Temperature Threshold (°C):	127 📩	Min Te	mperature	Threshold (°C)	-1	28	+	TALRT Sti	icky
Max SOC Threshold (%):	255 _		Min SOC	Threshold (%)	: (	)	+	SALRT St	icky
Max Current Threshold (A):	5.080 +	Ν	Min Current	Threshold (A)	-5.1	120	+		
	Cancel			Update					

Figure 6. Alerts Configuration Form



Figure 7. Graphs Tab

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#### **Registers Tab**

The **Registers** tab allows the user access to all fuel gauge related registers of the IC. Figure 8 shows the format of the **Registers** tab. By using the drop-down menu on the left side of the tab, the user can sort the registers either by function or by their internal address. Each line of data contains the register name, register address,

hexadecimal representation of the data stored in the register, and if applicable a conversion to application units. To write a register location click on the button containing the register name. A pop-up window allows the user to enter a new value in either hexadecimal units or application units. The main read loop temporarily pauses while the register updates.

AndelCause mE Causha Davi	Carfinger	1						
NodelGauge m5 Graphs Regi	sters Configure							
Display:	Register Data							
Voltage and Temperature	Voltages	Addr	Hex	Value	Temperatures	Addr	Hex	Value
	VCell	0x09	0xCBD8	4.077V	Temp	0x08	0x15F8	21.969°C
Show Register Viewer	AvgVCell	0x19	0xCBE1	4.078V	AvgTA	0x16	0x15F4	21.953°C
	dVAcc	0x30	0x0400	1.280V	TempNom	0x24	0x1400	20.000°C
	AvgVCell0	0x44	0xCBDB	4.077V	TempLim	0x25	0x2305	35.020°C
	VRipple	0xBC	0x0000	0.000V	AvgTA0	0x26	0x1600	22.000°C
	ScOcvLim	0xD1	0x479E	1.432V	AIN	0x27	0x88D0	53.443%
	ScOcvH	0xD2	0x0000	0.000V	TGain	0x2C	0xEE56	
	OCV	0xEE	0xA7A0		TOff	0x2D	0x1DA4	
	VoltRaw	0xF9	0x565E		DieTemp	0x34	0x15F8	21.969°C
	VFOCV	0xFB	0xCBF7					
	VFLT	0xFE	0xCBD8	4.077V				

Figure 8. Registers Tab

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The **Registers** tab has a button to launch the register viewer form. The viewer can also be launched under the Device pull-down menu. The register viewer is a separate application window that allows systems with higher screen resolutions to see more IC registers simultaneously.

A 1920 x 1080 screen resolution allows the user to view all user registers at once on the screen with the register viewer. The viewer size can be adjusted. Figure 9 shows the format of the register viewer form.

ister Viewer											
rrents/Timers	Addr	Hex	Value	Percentages	Addr	Hex	Value	Model	Addr	Hex	Value
AtRate	0x04	0x0000	0.000 mA	RepSOC	0x06	0x320C	50.047 %	QRTable00	0x12	0x3C00	
Current	0x0A	<b>OxFFFC</b>	-0.625 mA	Age	0x07	0x6400	100.000 %	FullSocThr	0x13	0x5000	80.000 %
AvgCurrent	0x0B	0xFFFA	-0.938 mA	MixSOC	0x0D	0x3200	50.000 %	Config	0x1D	0x2210	
CGain	0x2E	0x0400	100.000 %	AvSOC	0x0E	0x3154	49.328 %	IChgTerm	0x1E	0x0280	100.000 mA
COff	0x2F	0x0000	0.000 mA	dPAcc	<b>0x46</b>	0x0190	25.000 %	QRTable10	0x22	0x1B80	
IAvgEmpty	0x36	0xF448	-468.750 mA	MaxError	0xBF	0x0000	0.000 %	LearnCfg	0x28	0x0010	
TTE	0x11	<b>OxFFFF</b>	102.398 hr	AtAvSOC	0xDE	0x314D	49.301 %	FilterCfg	0x29	0xCEA4	
TTF	0x20	<b>OxFFFF</b>	102.398 hr	SOCi	0xF6	0x0000	0.000 %	RelaxCfg	0x2A	0x2039	
Timer	0x3E	0x49F1	0.924 hr	VFSOC	0xFF	0x3207	50.027 %	MiscCfg	0x2B	0x3870	
TimerH	0xBE	0x000F	48.0 hr					QRTable20	0x32	0x0B04	
AtTTE	0xDD	OxFFFF	102.398 hr					FullCap	0x35	0x0B8B	1477.5 mAh
Sleep	0xF7	0x0D9A	3.482 s					RComp0	0x38	0x0070	
								TempCo	0x39	0x223E	
								VEmpty	0x3A	0xA561	
								QRTable30	0x42	0x0885	
ge 00h	Addr	Hex	Value	Page 01h	Addr	Hex	Value	Page 02h	Addr	Hex	Value
Status	0x00	0x0080		FullCapRep	0x10	0x0BB8	1500.0 mAh	TTF	0x20	OxFFFF	102.398 hr
VAIrtTh	0x01	0xFF00		TTE	0x11	OxFFFF	102.398 hr	DevName	0x21	0x4010	
TAIrtTh	0x02	0x7F80		QRTable00	0x12	0x3C00		QRTable10	0x22	0x1B80	
SAIrtTh	0x03	0xFF00		FullSocThr	0x13	0x5000	80.000 %	FullCapNom	0x23	0x0BB8	1500.0 mAh
AtRate	0x04	0x0000	0.000 mA	RCell	0x14	0x0290	160.156 mOhms	AIN	0x27	0x88D0	53.443 %
RepCap	0x05	0x05DD	750.5 mAh	AvgTA	0x16	0x1659	22.348 °C	LearnCfg	0x28	0x0010	
RepSOC	0x06	0x320C	50.047 %	Cycles	0x17	0x0015	3.36 Cycles	FilterCfg	0x29	0xCEA4	
Age	0x07	0x6400	100.000 %	DesignCap	<b>0x18</b>	0x0BB8	1500.0 mAh	RelaxCfg	0x2A	0x2039	
Temp	0x08	0x1647	22.277 °C	AvgVCell	0x19	0xBF4F	3.826 V	MiscCfg	0x2B	0x3870	
VCell	0x09	0xBF5C	3.827 V	MaxMinTemp	0x1A	0x1615		TGain	0x2C	0xEE56	
Current	0x0A	<b>OxFFFC</b>	-0.625 mA	MaxMinVolt	0x1B	<b>OxBFBF</b>		TOff	0x2D	0x1DA4	
AvgCurrent	0x0B	<b>OxFFFA</b>	-0.938 mA	MaxMinCurr	0x1C	0x00FF		CGain	0x2E	0x0400	100.000 %
QResidual	0x0C	0x002D	22.5 mAh	Config	0x1D	0x2210		COff	0x2F	0x0000	0.000 mA
MixSOC	0x0D	0x3200	50.000 %	IChgTerm	0x1E	0x0280	100.000 mA				
AvSOC	0x0E	0x3154	49.328 %	AvCap	0x1F	0x05B2	729.0 mAh				
MixCap	0x0F	0x05DE	751.0 mAh								

Figure 9. Register Viewer Form

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### **Configure Tab**

The **Configure** tab allows the user to access any general IC functions not related to normal writing and reading

of register locations. Figure 10 shows the format of the **Configure** tab. Each group box of the **Configure** tab is described in detail in the following sections.

.og Data to Fi	le	Reset IC
format. The da can be adjust log is started	ill be stored in the selected logfile at the datalog interval using a .c atalog interval is fixed at 2 minutes while the IC is in hibernate mode ed from 5 seconds to 5 minutes when the IC is in active mode. An automatically every 10,000 lines to limit file sizes. The Advance bu datalog number and force the start of a new data log file earlier if	de and will need to be selected and loaded. new data utton will
Documents\/	laxim Integrated\MAX17055\Data Logs\Datalog000145.csv	Read/Write Register
	dvance 5 <sup>+</sup> / <sub>−</sub> Interval (seconds) ✓ Log Events	Reads or Writes a single register location. Valid register addresses are any location from 00 through FF. Use the full 8 bit address in hexadecimal below.
Battery Selecti		the Register h Write
system. The	55 must be configured for the battery that is presently attached to EV Kit software tracks individual batteries as they age. Each time the IC is changed, the user will need to select a matching profile.	the cell
	escription	
10 Ne	w Profile	Save and Restore
	Change Battery	Registers defined as Save and Restore contain cell characterization information that changes over time. Host
Other Settings		software tracks these values and loads them back into the IC any time it is reset. The user can change the save interval or force a
	configured for internal or external temperature measurements. Also rvalue is adjustable to a value between $0.1m\Omega$ and $1.0\Omega$ . or: 10.0 $\stackrel{+}{=}$ m $\Omega$ Temperature: Switch to Ext	Save Restore 0.64 * Interval (cycles)

Figure 10. Configure Tab

#### Log Data to File

Data logging is always active when the kit software starts. The default data log storage location is the My Documents/Maxim Integrated/MAX17055/Data Logs/ DatalogXXXXXX.csv where XXXXXX is the data log number. Each time the program is started, the previous data log reaches 10,000 lines, or the user clicks the Advance button, a new data log is started and the data log number is advanced. The user can stop or start data logging by clicking the Stop/Start button. All user available IC registers are logging in a .csv formatted file. The user can adjust the logging interval at any time. The user can also enable or disable the event logging at any time. When event logging is enabled, the data log also stores any IC write or reads that are not part of the normal read data loop and indicates any time communication to the IC is lost.

#### **Battery Selection**

The battery selection box shows which battery profile is presently selected and the user description of that profile. Clicking the **Change Battery** button opens the **Battery Selector Form** to allow the user to change the active profile, create a new profile, or delete old profiles. See the Battery Selector section for details.

#### **Other Settings**

The other settings box allows the user to change the sense resistor setting and select either internal or external temperature measurement. All capacity and current type registers use the sense resistor value to convert voltage to current and updates occur immediately when the sense resistor value is changed.

#### **Reset IC**

Clicking the **POR** button starts the IC firmware reset sequence. Operation of the IC is restarted. If the associated check box is checked, IC settings such as the battery model, thermistor selection, and alert thresholds are reloaded into the IC. It is recommended this box always remained checked. Note that resetting the IC when the cell is not relaxed causes a temporary fuel gauge error.

#### **Read/Write Register**

The user can read a single register location by entering the address in hex and clicking the **Read** button. The user can write a single register location by entering the address and data in hex and clicking the **Write** button. The read loop is temporarily paused each time to complete this action.

#### Save and Restore

The EV kit software periodically saves the values from registers related to cell characteristics that change over time. These values are then restored into an IC after reset so that the fuel gauge remains accurate as the cell ages. The software automatically performs a save operation every 64% of one cycle or when the software exits. The user can change the save interval or force a save operation at any time by clicking the **Save** button. To restore this information after the IC has been power cycled or reset through software, click the **Restore** button.

#### **Component Suppliers**

SUPPLIER	PHONE	WEBSITE
Murata Electronics North America, Inc.	770-436-1300	www.murata.com/en-us
TDK Corp.	847-803-6100	www.component.tdk.com
Vishay	402-563-6866	www.vishay.com

Note: Indicate that you are using the MAX17055 when contacting these component suppliers.

### **Ordering Information**

PART	TYPE
MAX17055GEVKIT#	EV Kit (for TDFN)
MAX17055XEVKIT#	EV Kit (for WLP)

#Denotes RoHS compliant.

PART	QTY	DESCRIPTION
C1	1	0.1uF ±10%, 16V X7R ceramic capacitor (0402)
C2	1	0.47uF ±10%, 16V X5R ceramic capacitor (0402)
R1, R3	2	0Ω resistor (0402)
R2	1	10kΩ ±1%, resistor (0402)
R4	1	0Ω resistor (0402), not populated
R5	1	0.010Ω ±1%, resistor (0805)
R6	1	0Ω resistor (0805), not populated
R8-R10, R12, R13	5	150Ω ±1%, resistor (0402)
R11	1	1KΩ ±1%, resistor (0402)
RT1	1	Thermistor 10K NTC (0402) Murata NCP15XH103F03RC
D1	1	Diode, LED Red (0603)
D2-D4	3	5.6V Zener Diode (SOD323)
J1-J8, J10	9	Plated through hole solder pad (16g wire)
J9	1	RJ-11,R/A,6-POSITION/6-CONTACTS
U1	1	MAX17055ETB+ Li+ fuel gauge IC 2x2.5 TDFN 10 pin
	1	PCB: MAX17055EVKIT
	1	USB-to-RJ11 board DS91230+
	1	RJ11 6pos-6pos reverse modular cord 6ft.

# MAX17055G EV System Bill of Materials



# MAX17055G EV System Schematic

### Evaluates: MAX17055



# MAX17055G EV System PCB Layout



Component Placement

Top Layout



Bottom Layout

PART	QTY	DESCRIPTION
C1	1	0.1uF ±10%, 16V X7R ceramic capacitor (0402)
C2	1	0.47uF ±10%, 16V X5R ceramic capacitor (0402)
R1, R3	2	0Ω resistor (0402)
R2	1	10kΩ ±1%, resistor (0402)
R4	1	0Ω resistor (0402), not populated
R5	1	0.010Ω ±1%, resistor (0805)
R6	1	$0\Omega$ resistor (0805), not populated
R8-R10, R12, R13	5	150Ω ±1%, resistor (0402)
R11	1	1KΩ ±1%, resistor (0402)
RT1	1	Thermistor 10K NTC (0402) Murata NCP15XH103F03RC
D1	1	Diode, LED Red (0603)
D2-D4	3	5.6V Zener Diode (SOD323)
J1-J8, J10	9	Plated through hole solder pad (16g wire)
J9	1	RJ-11,R/A,6-POSITION/6-CONTACTS
U1	1	MAX17055EWL+ Li+ fuel gauge IC WLP 9 pin
	1	PCB: MAX17055XEVKIT
	1	USB-to-RJ11 board DS91230+
	1	RJ11 6pos-6pos reverse modular cord 6ft.

# MAX17055X EV System Bill of Materials



# MAX17055X EV System Schematic

### Evaluates: MAX17055



# MAX17055X EV System PCB Layout



Component Placement

Top Layout



Bottom Layout

### Evaluates: MAX17055

### **Revision History**

REVISION NUMBER	REVISION DATE	DESCRIPTION	
0	1/17	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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