MAX16550 Evaluation Kit

Evaluates: MAX16550/ MAX16550A/MAX16550B

General Description

The MAX16550 family are protection ICs with integrated low-resistance MOSFETs and lossless current sense circuitry featuring SMBus/PMBus™ control and reporting.

The IC is designed to provide the optimum solution for distribution, control, monitoring, and protection of the system's 12V power supply. An internal LDO provides the supply voltage for the protection IC.

If no fault is detected, the IC initiates the startup and has been designed to provide controlled, monotonic startup. Programmable soft-start ramp and delay is implemented to limit the in-rush current during startup.

The IC monitors the current, voltage and power of the 12V system power rail and provides multiple levels of protection with fast turn-off if a fault is detected.

Maxim's patented, lossless current sense provides high-accuracy current-sensing over load and temperature, improving overall system-energy efficiency, and reducing dissipation.

Output voltage is monitored at all times. If at any time the output voltage falls below the programmable output undervoltage-lockout threshold, the PWRGD signal is asserted low. If, at any time, the input voltage falls below the programmable input undervoltage lockout threshold, the PWRGD signal is asserted low. These ICs can be programmed through PMBus to provide input overvoltage protection. Input overvoltage protection is disabled by default. When enabled through PMBus, if the input voltage exceeds a programmable overvoltage threshold, the MOSFET is latched off and a fault indicated.

The evaluation kit (EV kit) consists of an assembled and tested printed circuit board implementation of a 12V power distribution network using the MAX16550 protection ICs. All of the MAX16550 features can be verified using this EV kit. More thorough explanations of topics discussed in this manual may be found in the MAX16550 data sheet.

The MAX16550 EV kit also evaluates the MAX16550A and MAX16550B devices if the board is reworked to replace U7 accordingly.

Features

- High-Density (4mm x 4.5mm for 30A): Less than 25% of the Board Area of Conventional Solutions
  - Monolithic Integration of Power, Control, and Monitoring
- Integrated Power MOSFET with 1.9mΩ Total Resistance in 12V Power Path ($R_{DS(ON)}$, Including Package)
  - Integrated Lossless, Precise Current Sensing
  - Integrated LDO Provides V_{DD} Supply (1.8V Bias Supply)
- Enables Advanced System Power Management—PMBus/SMBus Telemetry with Extensive Status Monitoring and Reporting
  - Load Current Indicator (I_{LOAD}) Pin Provides Analog Output Current Reporting with High Accuracy
  - Programmable Soft-Start for Inrush Current Limiting
- Detection and Isolation of Severe Overcurrent in Less than 5µs
- Fail-Safe Overcurrent (Safe-OCP) Detection and Isolation in Less than 250ns
  - Three Levels of Programmable Overcurrent Protection
  - V_{IN}-to-V_{OUT} Short Protection During Startup

Additional Features

- Programmable Soft-Start and Delay
- Programmable Input Undervoltage-Lockout Threshold (UVLO)
- Programmable Power-Good Threshold
- PWRGD Pin for Output UVLO/Input UVLO Reporting
- FAULTB Pin for Fault Reporting

Systems and Applications

Servers, Networking, Storage, Communication Equipment and AC/DC Power Supplies

- Integrated Protection IC on 12V
  - Electronic Circuit Breaker, Hot Swap
  - 240VA

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

319-100368; Rev 2; 8/20

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Table 1. System Configuration

Parameter	Component/Setting
Integrated Protection IC on 12V Bus	**MAX16550**
Input Capacitors	**(Note 1)**
Output Capacitors	2 x 330µF (OS-CON) 1 x 10µF 1 x 2.2µF 1 x 0.1µF
PMBus Address Programming Resistor (R23)	1.78kΩ
PMBus Address	40h
Input Transient Voltage Suppressor	20V, 600W
Output Schottky Diode	30V, 2A
Pullup Resistors (FAULTB, PWRGD, SMBUS_DATA, SMBUS_CLOCK, SMBUS_ALERTB)	5 x 10kΩ (0402)
EN/UVLO Voltage Divider (R15, R16)	1 x 20kΩ 1 x 2.26kΩ
Input UVLO Threshold	9.85V
Bootstrap Capacitor	0.22µF
Soft-Start Capacitor C_{SS} (C2)	47nF (0402, 25V)
Soft-Start Time	19ms
R_{OCP} (R9 + R10/R11). Moderate/Severe OCP Threshold Programming Resistor	1 x 158kΩ 1 x 237kΩ
Moderate OCP Threshold	34A/20A
Severe OCP Threshold (Default)	44A/26A
R_{ILOAD} (R13). Current Reporting Resistor	8.66kΩ
I_{LOAD} Reporting Range	0 – 31.2A
PMBus Settings	
Severe OCP Threshold	130% of Moderate/Reference OCP
Severe OCP Timeout	0µs
Input OVP Protection	14V (Disabled by default)
Startup Delay	0µs
Output PWRGD Threshold	11V
Self-Test Threshold	9V
Overtemperature Warning/Fault Thresholds	Disabled/135°C
Input Overpower Warning Threshold	Disabled
Reporting and Warning Averaging Size	1 Sample
Output Overcurrent Warning	Disabled
Input/Output Undervoltage Warning	Disabled
Current Hysteresis	Disabled
Startup OCP	8A
Moderate OCP Timeout	100µs

Note 1: *For electronic circuit breaker operation, add desired input capacitors C_{IN}.*

Additional Components

- Additional input capacitors can be added if electronic circuit breaker configuration is desired. By default, the EV kit has no input capacitors (Hot-Swap configuration).
- 100mA LDO to provide 3.3V pullup voltage for PMBus and LEDs.
- A transient voltage suppressor to protect MAX16550 from damage in case of high inductance input connection.

The EV kit provides additional circuitry for measurements and testing:

- PMBus interface for telemetry and programming
- Fast output short to ground
- “On-the-Fly” Moderate/Severe OCP threshold change (MAX16550)
- “On-the-Fly” Severe OCP threshold change
- Soft-start capacitor C_SS discharge fail
- Pass FET short protection
- Wrong ROCP or SMBUS_ID resistor fault detection

Additional components like sense/test jumpers and connectors could be loaded on the board.

Getting Started

The following steps explain how to verify the EV kit operation:

1) There are four board standoffs provided with the EV kit. These standoffs should be installed on holes located on each edge of the board.
2) Check that J14 jumper is not loaded for initial board operation. This jumper is used to perform FET short protection tests. See chapter “*Using the EV Kit,*” section “*MAX16550 Protection Against Faults Validation*” for details.
3) Check that all the following switches are in the correct position:
   a) SW2: Switch is used to control EN/UVLO signal.
   b) EN/UVLO should be set low before startup (SW2 pointing away from the edge of the board) SW4: Switch to enable circuitry for V_{OUT} to GND short testing. Set SW4 to off position at startup (switch pointing towards the USB connector). See chapter "*Using the EV Kit,*" section "*MAX16550 Protection Against Fault Validation*" for details.
4) Monitoring
   a) Output voltage can be monitored at J10.
   b) Input voltage on the MAX16550 VIN pins can be monitored by connecting a voltmeter across J12 or placing a differential oscilloscope probe in J12.
   c) Load current as reported by the MAX16550 can be monitored by connecting a voltmeter across J9 pins 13 and 14. See chapter “*Using the EV Kit*,” section “*Analog Load Current Reporting*” for details.
   d) Soft-start voltage (SS pin) across soft-start capacitor can be monitored using J13.
   e) PWRGD reporting pin can be monitored on J9_4. LED D5 should illuminate when the PWRGD is asserted high.
   f) FAULTB reporting pin can be monitored on J9_6. LED D3 should illuminate when the FAULTB is asserted low.
   g) EN/UVLO signal at the IC pin can be monitored on J9_2.
   h) Use J19 connector (pins 1 and 3) to accurately measure voltage across device (V_{OUT} - V_{IN}).
5) Connect a powered off 12V power source to terminal blocks J2 (+12V) and J3 (GND).
6) Turn on the 12V input power source. Make sure that the power source is not current limited. Note that 3.3V voltage is provided by LDO (loaded by default). This LDO is powered by 12V input supply. Therefore, if accurate 12V input current measurement is desired, disable the LDO by removing R30 and R31. If LDO is disabled, a 3.3V should be supplied to J4.
7) Verify that there is no fault reported: FAULTB is not asserted low; LED D3 is not illuminating.
8) Verify that PWRGD is asserted LOW. LED D5 is NOT illuminating.
9) Enable output voltage by toggling SW2. Output voltage should ramp up to 12V within programmed soft start time. FAULTB should stay de-asserted (LED D3 should not illuminate) and PWRGD signal should be asserted high (LED D5 should illuminate).

Using the EV Kit

Detailed product and applications information for the integrated protection IC can be found in the MAX16550 data sheet. Links to the EV kit's top and bottom silkscreen layers, assembly drawings for the board, and schematic are located at the end of this document.

PMBus Communication

The device supports wide range of PMBus features as described in the data sheet. The EV kit supports PMBus communication through USB interface and custom software, which is available upon request. Simply connect USB cable to J16 to enable communication with MAX16550. J18 can be used to bypass the USB and control the PMBus data and clock lines directly. Note that R58 and R59 should be removed in this case.

Programmable Soft Start

The MAX16550 implements soft start with externally programmable soft start time (through soft-start capacitor C2). Default soft start time is described in Table 1. A different soft-start time T_{SS} can be obtained by changing the value of C2.

The following equation can be used to calculate the soft-start capacitance value for obtaining desired T_{SS} time.

$$C_{SS} = \frac{T_{SS} \times i_{SS}}{12}$$

where,

T_{SS} = ramp duration (ms)

i_{SS} = soft start current (µA)

C_{SS} = C2 value (nF)

Soft-Start Time Limitation

- T_{SS} Upper Limit: T_{SS} should be < 30ms to guarantee the device stays within SOA at all times.
- T_{SS} Lower Limit: During startup, output bypass capacitance is charged up by a constant current I = C_{OUT} x V_{IN}/T_{SS}, the inrush current during the start-up should be small enough (i.e., T_{SS} should be long enough) to insure proper startup without OCP fault trip and meeting SOA limitations. More detailed information can be found in the MAX16550 data sheet.

Configuration

The MAX16550 is configured using both analog programming resistors and PMBus. Default EV kit configuration is shown in Table 1.

Moderate/Reference OCP Threshold

Moderate (MAX16550) and Reference OCP threshold is on-the-fly analog programmable by selecting the value of ROCP resistor connected to ROCP pin. This EV kit provides option to program the Moderate/Reference OCP threshold on-the-fly by toggling SW1 to choose between “HIGH” or “LOW” settings (SW1 pointed towards "L" label selects “LOW” setting and “HIGH” if pointed towards "H" label).

Severe OCP Threshold

Severe OCP threshold is programmed using PMBus Reg_D0h bit [7], default value is 130% of Moderate/Reference OCP (Reg_D0h[7] = 0).

Analog Load Current Reporting

The MAX16550 provides a dedicated pin (I_{LOAD}) to report analog current representation of a load current. Current representation of a load current should be measured across resistor R13. The voltage across R13 can be measured by connecting a voltmeter across J9 (pins 13 and 14). Voltage V_{REP} [V], as reported by the voltmeter, represents the reported output current that can be calculated using the following equation.

$$I_{OUT} = 1000 \times \frac{V_{REP}}{G_{ILOAD} \times R_{ILOAD}}$$

where,

V_{REP} = voltage reported on I_{LOAD} pin (V)

G_{ILOAD} = current reporting gain (= 5µA/A)

R_{ILOAD} = value of R_{ILOAD} resistor (kΩ)

I_{OUT} = output current value (A)

Output Enable

The output voltage may be enabled or disabled by using the EN/UVLO switch (SW2). At restart, the MAX16550 performs a pass FET short test, C_{SS} discharge and resistors check tests.

Fault Reporting

The EV kit provides options to monitor FAULTB and PWRGD fault reporting signals. PWRGD and FAULTB can be monitored on J9 (pins 4 and 6, respectively). In addition, two LEDs (D5 and D3) are loaded by default to indicate fault status. D5 will illuminate if PWRGD is asserted high. D3 will illuminate if FAULTB is asserted low. Refer to the MAX16550 data sheet for the tables to interpret fault and status conditions reported by FAULTB and PWRGD pins.

Fault Testing and Validation Protection

This EV kit enables verification of the MAX16550 protection against fault conditions that could cause system failure. Required board modification for specific tests and test guidelines are provided in subsequent chapters.

Moderate Overcurrent Protection (MAX16550)

Test procedure to verify the moderate overcurrent protection feature is provided below:

1) Power up the EV kit: Follow the instructions provided in *Getting Started* section. Make sure that a load is connected to the output.
2) Select Moderate_OCP threshold = “HIGH”.
3) Apply a load current to achieve Moderate_OCP threshold < I_{OUT} < Severe_OCP threshold (Severe_OCP threshold is set to 130% of Moderate_OCP threshold by default). Keep the load for longer than Moderate OCP timeout. After the timer expiration, the MAX16550 should turn off the pass FET and assert the FAULTB signal low. This is a latching fault that can be removed by cycling the $12V_{IN}$ supply, PMBus commands, or EN/UVLO toggling. PWRGD is expected to be asserted low after a fault condition.

To monitor system behavior and the MAX16550 protection response, it is suggested to sense:

- Output voltage
- Load current
- FAULTB
- PWRGD
- Voltage across soft-start capacitor C2

Moderate Overcurrent Protection—“On-The-Fly” Threshold Validation (MAX16550)

Test procedure to verify the moderate overcurrent protection feature is provided below:

1) Power up the EV kit: Follow the instructions provided in *Getting Started* section. Make sure that a load is connected to the output.
2) Select Moderate_OCP threshold = “HIGH” (SW1 pointing towards J3).
3) Apply a load current: square waveform: 0 - (0.8 * Moderate_OCP), 1Hz, 50% duty cycle. Verify that the MAX16550 stays in normal operation (no overcurrent fault is detected).
4) Toggle SW1 to select Moderate_OCP threshold “LOW”. The MAX16550 should turn off the pass FET and assert the FAULTB signal low. This is a latching fault that can be removed by cycling the $12V_{IN}$ supply, toggling EN/UVLO, or through PMBus commands. PWRGD is expected to be de-asserted low and FAULTB asserted low.

Severe OCP Protection

Test procedure to verify the Circuit Breaker protection feature is provided below:

1) Power up the EV kit: Follow the instructions provided in *Getting Started* section. Make sure that a load is connected to the output.
2) Apply a load current to achieve output current I_{OUT} > Severe_OCP threshold (Severe_OCP threshold is set to 130% of Moderate/Reference OCP threshold by default). The MAX16550 should turn off the pass FET and assert the FAULTB signal low. This is a latching fault that can be removed by cycling the $12V_{IN}$ supply, toggling EN/UVLO, or through PMBus commands. PWRGD is expected to be asserted low and FAULTB asserted LOW.

V_{OUT} to GND Short Fault Protection

The EV kit provides options to test V_{OUT} to GND short fault protection. The MAX16550 should turn off the pass FET and assert FAULTB signal LOW. This is a latching fault that can be removed by cycling the $12V_{IN}$ supply, cycling EN/UVLO, or through PMBus commands.

1) Option 1: Testing V_{OUT} to GND short during normal operation:

a. Power-up the EV kit: Follow the instructions provided in *Getting Started* section.

b. Toggle SW4 to EN (switch pointing towards J1).

This test could be performed in any operating condition (i.e., any load condition including no load and full load).

2) Option 2: Testing the system starting into shorted output:

a. Get ready to power up the EV kit: Follow the instructions provided in *Getting Started* section but do not enable the MAX16550 (i.e., keep EN/UVLO signal de-asserted (do not toggle SW2)).

b. Before testing the system starting into shorted output, it is required to toggle SW4 into off position (switch pointing towards the USB connector).

c. Short output connectors by shorting top and bottom sides of output edge connector (J1).

d. Complete the MAX16550 turn on by toggling EN/UVLO switch to EN.

Overtemperature Fault Protection

Test procedure to verify overtemperature protection is provided below:

1) Power up the EV kit: Follow the instructions provided in *Getting Started* section.
2) Increase the device temperature beyond overtemperature protection threshold (135°C).
   Note: Maxim recommends placement of a thermocouple on the IC to monitor IC temperature. The thermocouple should be placed on the bottom-side of the IC and above the FET section as it allows more precise temperature monitoring.
   A heat gun, in addition to soldering heater, placed under the EV kit could be used. To improve temperature reporting it is recommended not to aim the heat gun directly at the IC: thermocouple will report temperature higher than actual IC temperature.

MAX16550 Faults Protection

1) CSS Discharge Fail Fault

The MAX16550 performs CSS discharge test at restart to insure correct and repeatable soft start.

a. Power up the EV kit: Follow the instructions provided in *Getting Started* section.
b. Connect 1V power supply to J13_2 header.
c. Disable the MAX16550 by de-asserting EN/UVLO signal low (toggle the SW2), forcing the system to shutdown, and then re-enable the MAX16550 by asserting EN/UVLO signal HIGH (toggle the SW2).

As a response to CSS discharge fail fault, the MAX16550 will not turn the pass FET on and will report the fault by asserting the FAULTB signal low. This is a latching fault state. The PWRGD signal remains asserted low.
To restart the part, de-assert the EN/UVLO low (toggle the SW2), open J13, cycle the 12V power supply, and assert EN/UVLO high (toggle SW2).

2) V_{IN} to V_{OUT} Short Detection and Protection

The MAX16550 performs V_{IN} to V_{OUT} short test at restart to avoid startup in severe failure condition. If the MAX16550 detects the V_{IN} to V_{OUT} short during startup, it will report it by asserting both FAULTB and PWRGD signals low. This is a latching fault.

a. Power up the EV kit: Follow the instructions provided in the *Getting Started* section.
b. Short the MAX16550 input and output pins by shorting J14 (placing jumper).
c. Toggle EN/UVLO to low and then again to high, forcing the MAX16550 to shut down and restart with V_{IN} to V_{OUT} short fault condition present.

The MAX16550 will not start and assert FAULTB pin low, PWRGD signal will stay deasserted low.

3) Wrong ROCP Fault

Programming resistor (ROCP) for moderate OCP threshold is monitored at all times, including start-up. If R_{OCP} value is detected to be outside the range specified in the MAX16550 data sheet, the MAX16550 will turn off the pass FET and will report a fault by asserting the FAULTB signal low. This is a latching fault that can be removed by cycling the $12V_{IN}$ supply, toggling EN/UVLO, or through PMBus command.

Board modification is required to perform this test:

Option 1: Wrong ROCP fault response testing during normal operation:

a. Mount R10 = 0W.
b. Select OCP_M threshold = “LOW” (SW1 pointing towards to L).
c. Power up the EV kit: Follow the instructions provided in *Getting Started* section.
d. Select OCP_M threshold = “HIGH”: IC will latch the FET off and it will report FAULTB low.

Option 2: Wrong ROCP fault response testing during startup:

a. Mount R10 = 0W.
b. Select OCP_M threshold = “HIGH.”
c. Power up the EV kit: Follow the instructions provided in *Getting Started* section.
d. IC will not start and it will report FAULTB low.

4) MOSFET V_{GS} UVLO Fault

The MAX16550 performs pass FET V_{GS} UVLO test at restart to avoid startup in fault condition. If the pass FET V_{GS} does not exceed its UVLO thresholds within 110ms (max) after startup is initiated, the MAX16550 will not turn the pass FET on and will report a fault by asserting the FAULTB signal low (latching fault). The following board modifications are required to perform this test:

a. Preparing the EV kit for power-up: Follow the instructions provided in the *Getting Started* section, but do not enable the MAX16550 , (i.e., keep EN/UVLO signal de-asserted—do not toggle SW2).
b. Short MAX16550 SS pin to GND (use J13).
c. Complete the MAX16550 turn-on by toggling EN/UVLO switch SW2.

d. MAX16550 should report FAULTB 110ms (max) after enabling (FAULTB asserted low). PWRGD remains de-asserted low.

Special Notes

1) If a fast load transient resulting in fast and large transient output voltage deviation is possible in the application, an additional capacitor (100nF) between the SS pin and 12V V_{OUT} is recommended to keep pass FET V_{GS} above its UVLO threshold during the transients (C47 not stuffed by default).

2) Circuitry provided on the EV kit is designed to be used for testing protection against V_{OUT} short to GND during normal operation only. This circuitry is not to be used for V_{OUT} to GND short test during startup. Use edge connector J1 to perform start into short circuit tests (it can be also used for V_{OUT} short to GND during normal operation).

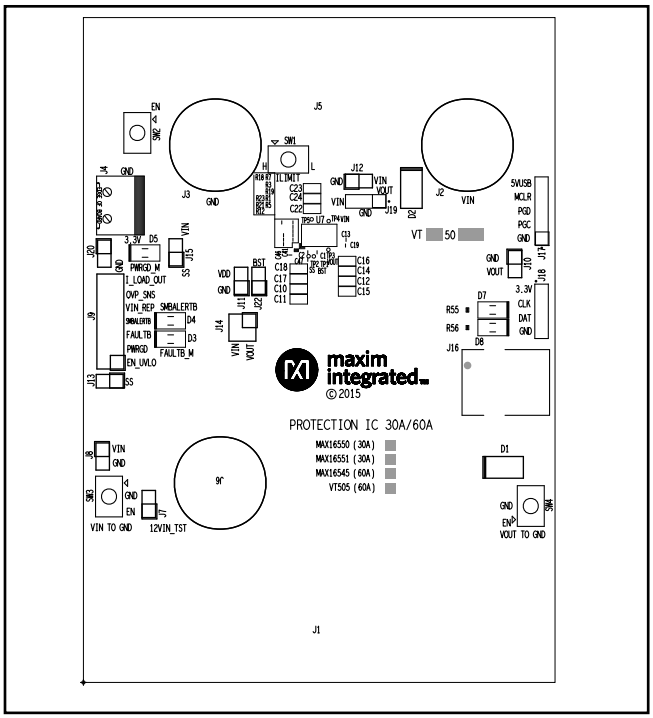
MAX16550 EV Kit Bill of Materials

REFERENCE	QTY	DESCRIPTION
C1	1	0.22uF, 25V, 10%, X6S
C16w	1	10uF, 16V, 10%, X5R
C18	1	2.2uF, 25V, 10%, X7R
C19, C44	2	0.1uF, 16V, 10%, X7R
C2	1	47000pF, 25V, 10%, X7R
C25	1	22uF, 25V, 10%, X7R
C26, C27, C41	3	1uF, 16V, +80/-20%, Y5V
C28, C29, C33	3	0.1uF, 16V, 10%, X7R
C3	1	0.01uF, 25V, 10%, X7R
C34	1	1.0uF, 25V, 10%, X5R
C36	1	.22uF, 10V, 10%, X5R
C37	1	0.47uF, 25V, 10%, X7R
C38	1	1uF, 16V, +80/-20%, Y5V
C39, C40	2	22pF, 50V, 5%, NPO
C4, C5	2	330uF, 16V, 20%, OS-CON
C45	1	1000pF, 50V, 10%, X7R
C46	1	0.1uF, 10V, 10%, X5R
D1	1	20BQ030 Schottky Rectifier 2A
D2	1	SMBJ20A Diode TVS, 600W, Vrc=32V, Ipp=18.5A
D3	1	HSMH-C650 RED LED
D4	1	CMD15-21VYC Led Yellow Clear
D5, D7, D8	3	HSMG-C650 GREEN LED
D6	1	BZT52C5V6 Zener Diode, 5.6V, 500mW, 5.6V - 6.0V
J1, J5, MTG1, MTG2, TP1, TP2, TP3, TP4, TP5	9	2_Pin-Edge Fingers
J10, J11, J12, J13, J15, J20, J22	7	2_PIN-1X2 Straight
J14	1	4_PIN-2X2 Straight
J16	1	4_PIN-4 Pin, USB B connector
J17	1	5_PIN-1X5 Straight
J18	1	4_PIN-1X4 Straight
J19	1	3_PIN-1X3 Straight
J2	1	Banana Jack Kit, Red, Large
J3	1	Banana Jack Kit, Black, Large
J4	1	2_PIN-2 Pin, Terminal Block w/Screws, Blue
J9	1	14_PIN-2X7 Straight
Q1	1	BSS138-N-Channel Logic
Q4, Q5, Q6	3	FDS6699S-30V N-Channel
R1, R2, R3, R4, R12, R44, R45, R46, R57, R58, R59	11	0Ω, 5%, 1/16W
R14	1	1020Ω, .5%, 1/16W

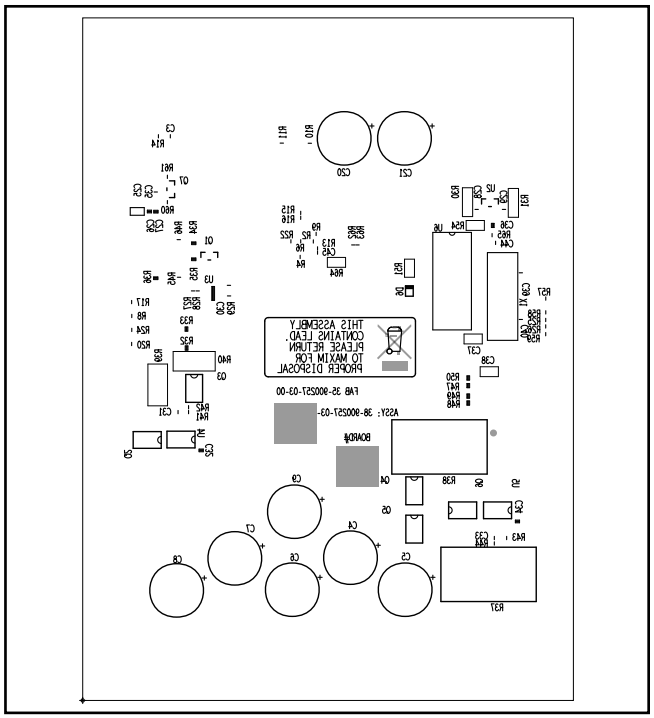
MAX16550 EV Kit Bill of Materials (continued)

REFERENCE	QTY	DESCRIPTION
R15	1	20.0KΩ, 1%, 1/16W
R16	1	2.26KΩ, 1%, 1/16W
R19, R20, R24, R25, R26, R65	6	10KΩ, 1%, 1/16W
R23	1	1.78KΩ, 1%, 1/16W
R30, R31	2	0Ω, 5%, 1/8W
R32, R33	2	280Ω, 1%, 1/16W
R34	1	10KΩ, 5%, 1/16W
R35, R36	2	100Ω, 1%, 1/16W
R47, R48, R49, R50	4	0Ω, 5%, 1/16W
R51	1	1KΩ, 1%, 1/10W
R54	1	470Ω, 5%, 1/10W
R55, R56	2	750Ω, 1%, 1/16W
SW1, SW2, SW4	3	DPDT-DPDT, 6pins, 1switch
U2	1	LM3480IM3-3.3
U5	1	MIC4420BM-MOSFET Driver
U6	1	PIC18F2455
X1	1	ECS-200-20-5PX. 20.0Mhz-20.0Mhz crystal
U7	1	MAX16550
R9	1	158KΩ, 1%, 1/10W
R10	1	237KΩ, 1%, 1/10W
R13	1	8.66KΩ, 1%, 1/16W
		PCB# 35-900257-03-00

MAX16550 EV Kit PCB Layout Diagrams

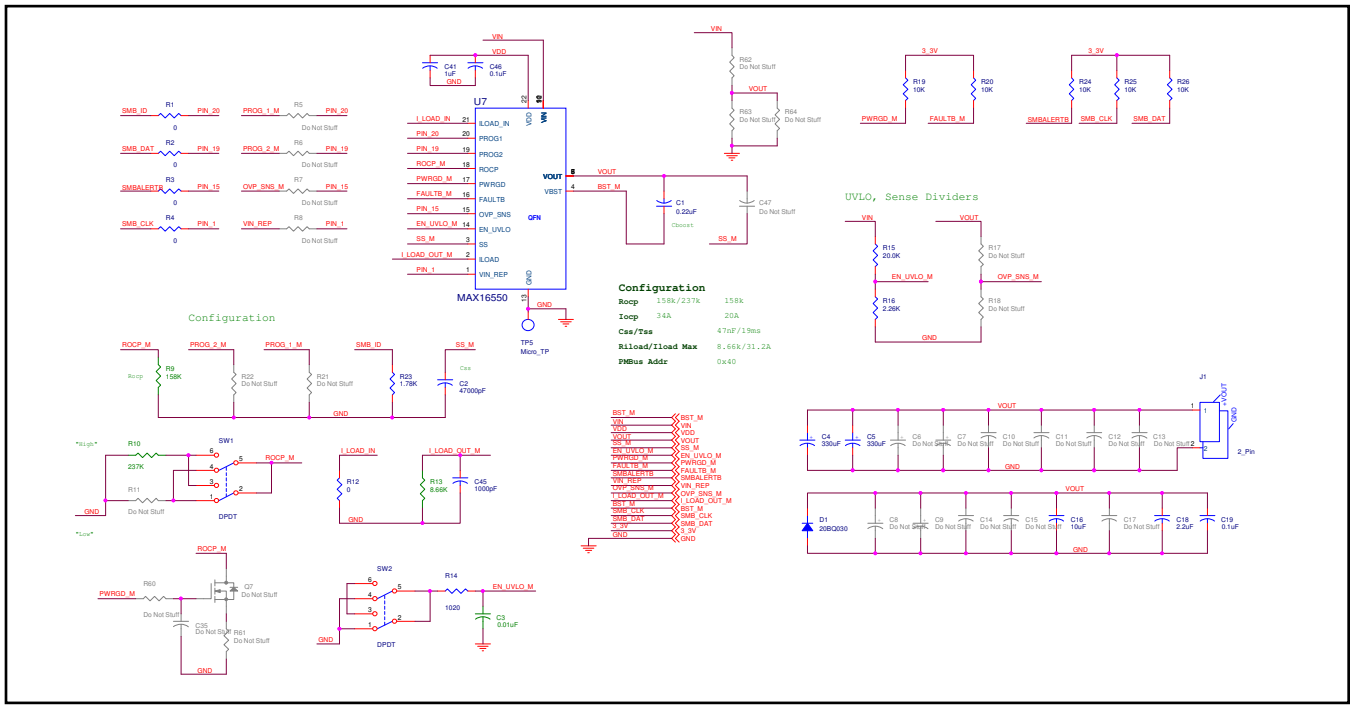


MAX16550 EV Kit—Top Silkscreen

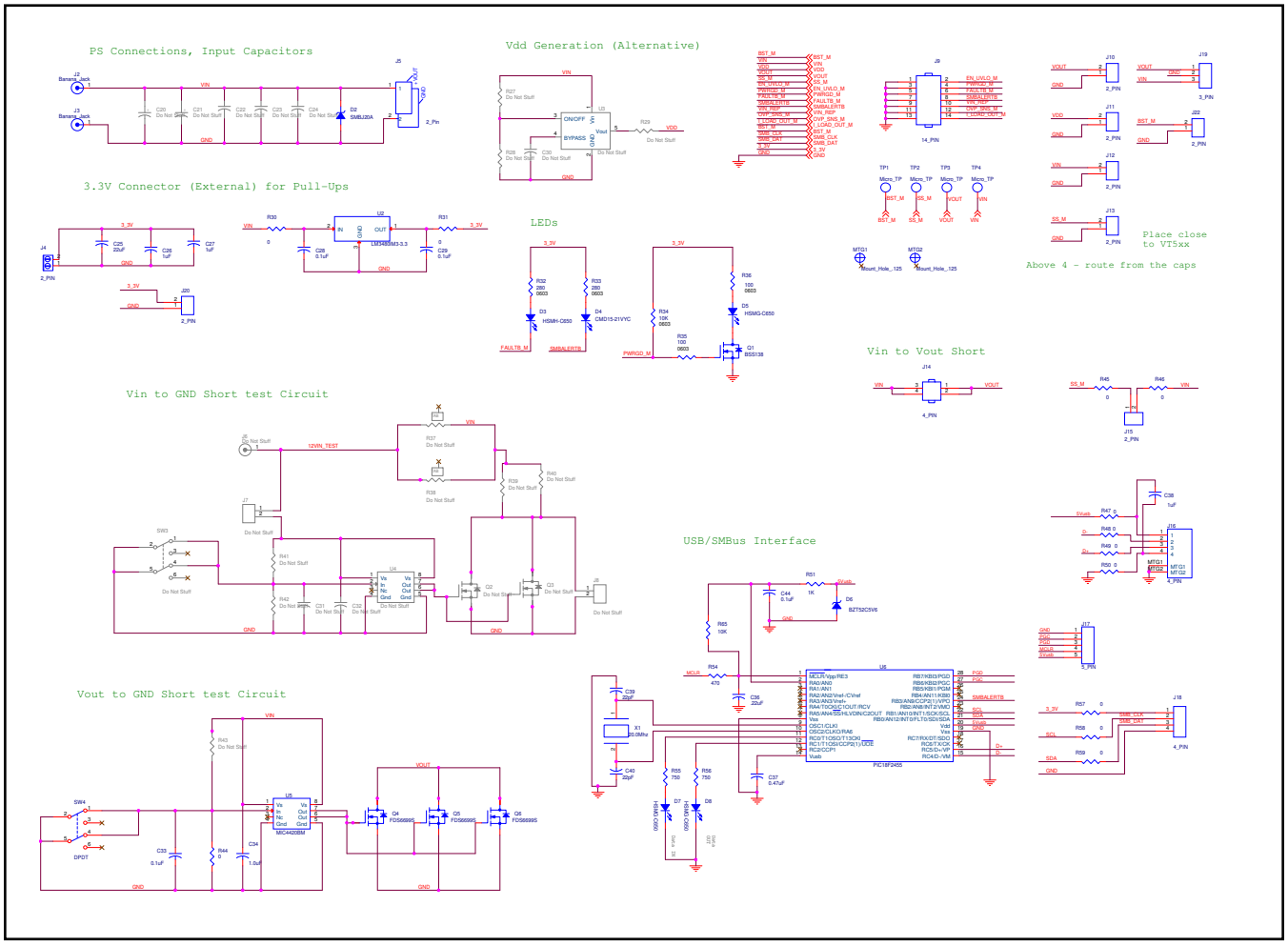


MAX16550 EV Kit—Bottom Silkscreen

MAX16550 EV Kit PCB Schematics



MAX16550 EV Kit PCB Schematics (continued)



Ordering Information

PART	TYPE
MAX16550EVKIT#	EV Kit

#Denotes RoHS compliant.

Revision History

REVISION NUMBER	REVISION DATE	DESCRIPTION	PAGES CHANGED
0	4/19	Initial release	—
1	7/20	Updated title; general cleanup and clarification	All
2	8/20	Removed MAX16551	All

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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