

# TLF4277-2 Demo Board

Product Manual

## Application Note

Rev. 1.3, 2015-11-18

Automotive Power

## 1 Introduction

The TLF4277-2 Demoboard is a demonstration of the Infineon low drop out linear voltage regulator with integrated current monitor capability. The adjustable output voltage makes the TLF4277-2 suitable for supplying the majority of standard active antenna applications.

This application note contains information for the TLF4277-2 Demoboard.

### 1.1 General Description

The TLF4277-2 is the ideal companion IC to supply active antennas for car infotainment applications. The adjustable output voltage makes the TLF4277-2 capable of supplying the majority of standard active antennas such as:

- FM/AM
- DAB
- XM
- SIRIUS

The TLF4277-2 is a monolithic integrated low drop out voltage regulator capable of supplying loads up to 300 mA. For an input voltage up to 40 V the TLF4277-2 provides an adjustable output voltage in a range from 5 V up to 12 V. The integrated current monitor function is a unique feature that provides diagnosis and system protection functionality. Fault conditions such as overtemperature and output overvoltage are monitored and indicated at the current sense output. The maximum output current limit of the device is adjustable to provide additional protection to the connected load.

Via the enable function the IC can be disabled to lower the power consumption. The PG-SSOP14 EP package provides an enhanced thermal performance within a SO8 body size.

For more detailed information please see also data sheet [\[1\]](#).

### 1.2 TLF4277-2 Feature List

- Integrated Current Monitor
- Overvoltage, Overtemperature and Overcurrent Detection
- Adjustable Output Voltage
- Output Current up to 300 mA
- Adjustable Output Current Limitation
- Very Low Current Consumption
- Very Low Dropout Voltage
- Stable with Ceramic Output Capacitor of 1  $\mu$ F
- Wide Input Voltage Range up to 40 V
- Reverse Polarity Protection
- Short Circuit Protected
- Overtemperature Shutdown
- Automotive Temperature Range  $-40\text{ }^{\circ}\text{C} \leq T_j \leq 150\text{ }^{\circ}\text{C}$
- Green Product (RoHS and WEEE compliant)
- AEC Qualified

### 1.3 Block Diagram

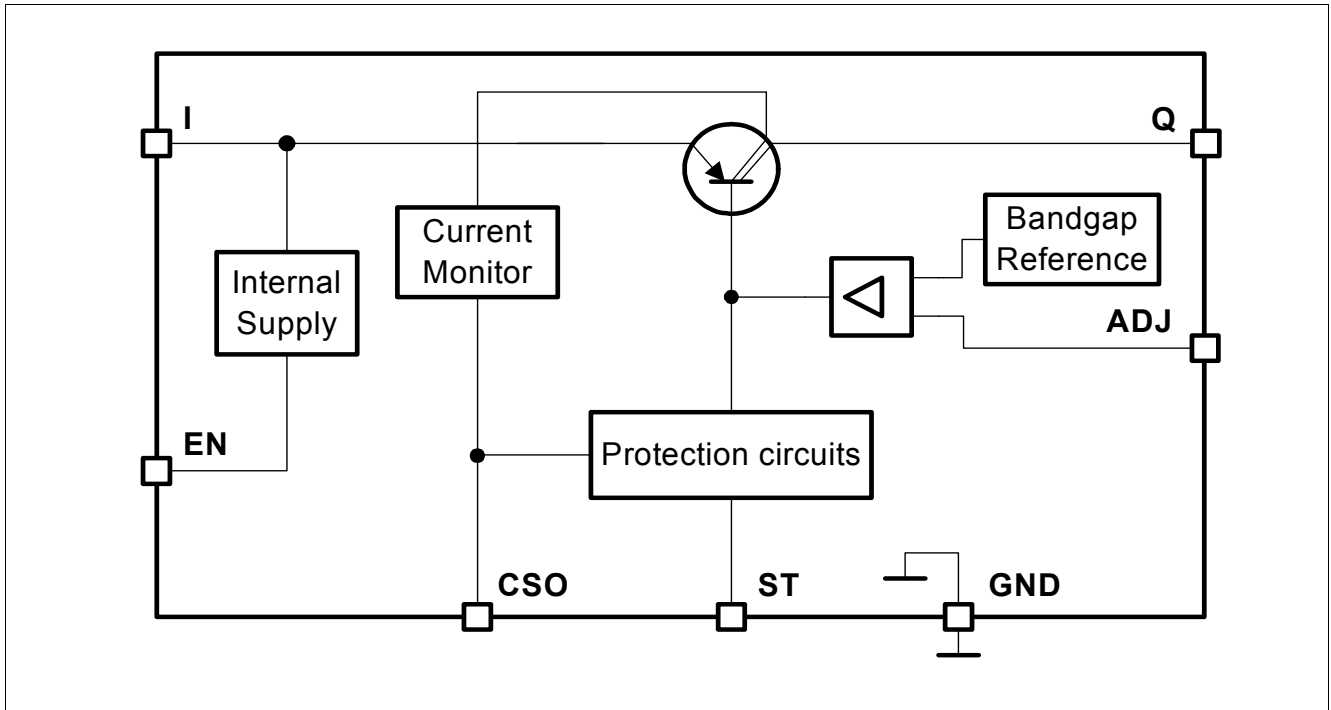


Figure 1 Block Diagram of TLF4277-2

## 2 Demo Board

The TLF4277-2 Demo Board is equipped by default with TLF4277-2 and all necessary components.

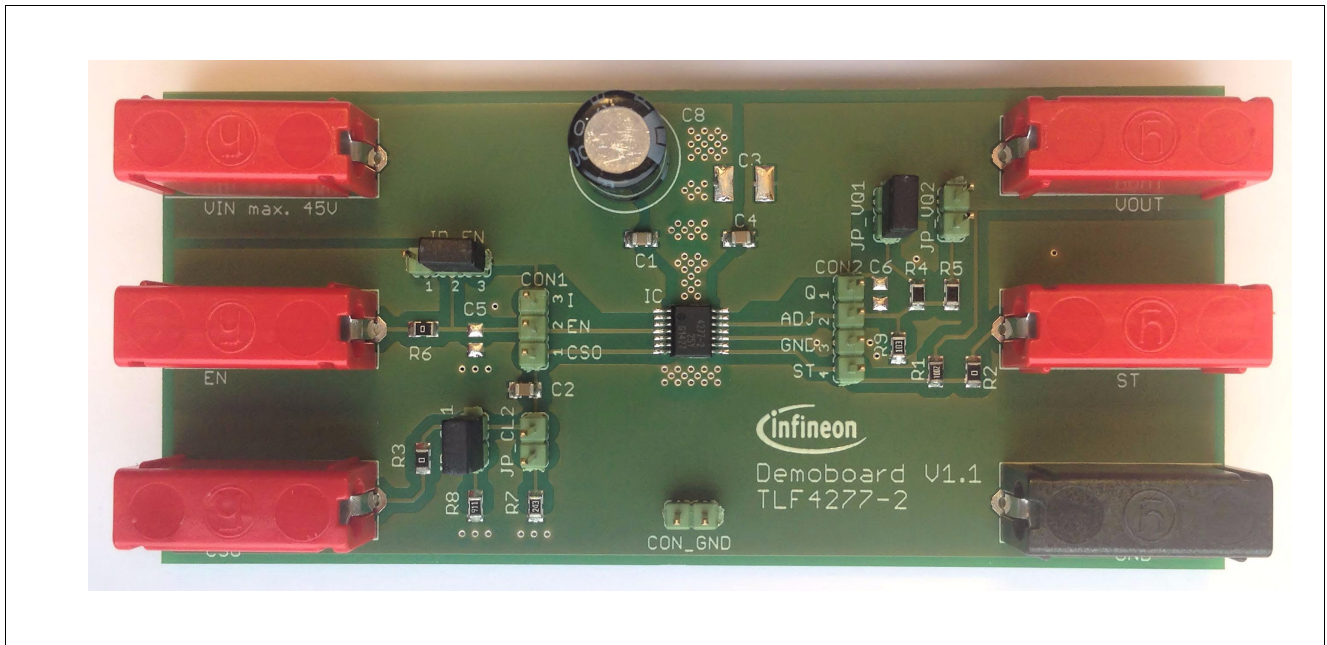


Figure 2 TLF4277-2 Demo Board

### 2.1 Operating Conditions

To avoid any electrical damage of the Demo Board, the maximum operating range defined in [Table 1](#) must be followed.

Table 1 Operating Range<sup>1)</sup>

Parameter	Symbol	Limit Values		Unit	Note
		Min.	Max.		
Board Supply <sup>2)</sup>	VIN	0	45	V	Power supply
Regulator Output	VOUT	0	12 <sup>3)</sup>	V	Regulated output for loads up to 300mA
Enable Signal	EN	0	45	V	Enable signal to switch regulator on
Current Sense Out Signal	CSO	0	5	V	Current monitor and status output (e.g. connect to ADC of $\mu$ C)
Status Output Signal	ST	0	45	V	Digital output signal (e.g. connect to GPIO or interrupt input of $\mu$ C)
Ground	GND	0	0	V	System GND

1) The Demo Board operates at ambient temperature of 25°C.

2) Functional input voltage range starts from  $V_Q + V_{dr}$  to 40 V.

3) Nominal output voltage depends on applied resistor divider at pin ADJ (functional range is from 5 V to 12 V).

## 2.2 Board Configuration

The TLF4277-2 Demo Board can be easily configured via jumpers on the board. The board provides the following configuration options:

- Enable function (JP\_EN)
- Adjust slope of external enable signal via resistor R6 and capacitor C5
- Option to preset the output current limit function (JP\_CL1, JP\_CL2)
- Adjust output current limit (R7, R8)
- Placeholder for additional output capacitor (C3)
- Placeholder for additional bypass capacitor (C6)
- Option to preset the output voltage (JP\_VQ1, JP\_VQ2)
- Adjust output voltage (R4, R5, R9)
- Placeholder for pull up resistor at status output signal (R1)

### 2.2.1 Enable Function

The jumper JP\_EN can be used to configure the enable functionality.

**Table 2 Jumper setting for enable function**

JP_EN	Enable Function
set to 1 - 2	EN is connected to GND; regulator is disabled
set to 2 - 3	EN is connected to input (I); regulator is enabled while it is supplied <sup>1)</sup>
open	EN is supplied from external via connector EN (Banana jack) <sup>2)</sup>

1) Default setting.

2) Without supplying a signal to EN, the regulator is disabled because of an internal pull down resistor.

### 2.2.2 Output Current Limit Function

The jumpers JP\_CL1 and JP\_CL2 can be used to configure the output current limit.

**Table 3 Jumper setting for output current limit**

JP_CL1	JP_CL2	Output Current Limit ( $I_{Q,lim}$ )
set	open	280 mA <sup>1)</sup>
open	set	10 mA
set	set	290 mA
open	open	An external resistor must be applied to CSO pin via connector "CSO" (Banana jack) <sup>2)</sup>

1) Default setting.

2) A resistor (850Ω to 25k5Ω) must be applied to CSO pin, in order to guarantee the proper function of the output current monitor.

### 2.2.3 Output Voltage Function

The jumpers JP\_VQ1 and JP\_VQ2 can be used to configure the output voltage. Change jumper settings only, when demo board is not powered.

**Table 4 Jumper setting for output voltage**

JP_VQ1	JP_VQ2	Output Voltage (V <sub>Q</sub> )
set	open	5 V <sup>1)</sup>
open	set	8.45 V
set	set	don't use (out of functional range for output voltage)
open	open	don't use (out of functional range for output voltage)

1) Default setting.

### 2.2.4 Signal Adaption

For easy signal adaption e.g. connecting probes for an oscilloscope, connectors CON1, CON2 and CON\_GND can be used. See overview in table [“Signals on connector” on Page 6](#).

**Table 5 Signals on connector**

Connector	Accessible Signals
CON1	- CSO (output current sense signal) - EN (enable input signal) - I (power supply)
CON2	- Q (output voltage) - ADJ (output voltage adjust signal) - GND - ST (status output signal)
CON_GND	- GND

### 3 Schematic and Layout

#### 3.1 Schematic

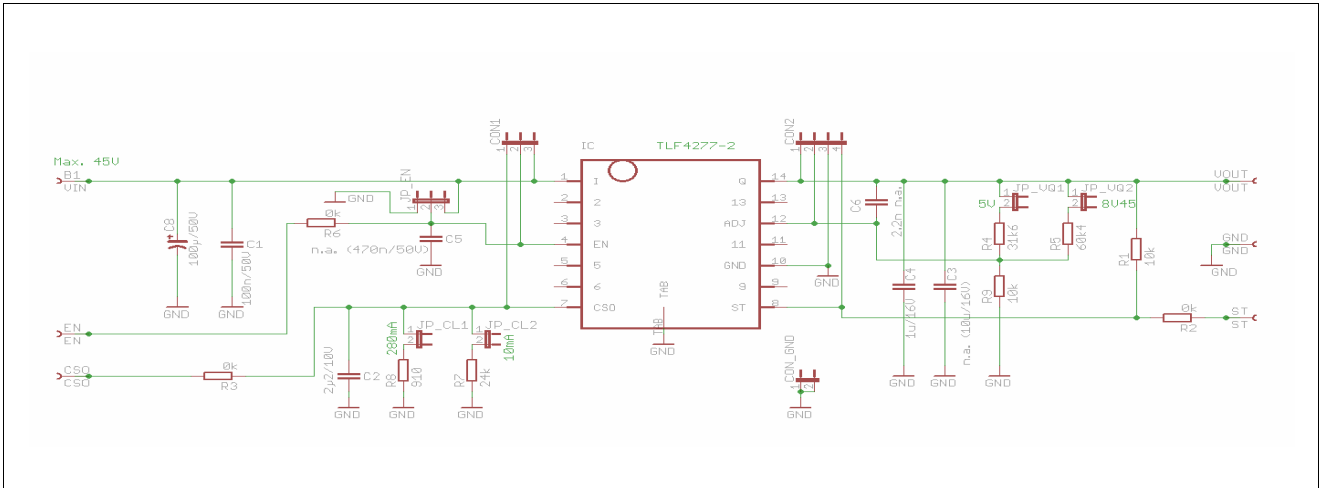


Figure 3 Schematic of TLF4277-2 Demo Board

#### 3.2 Layout

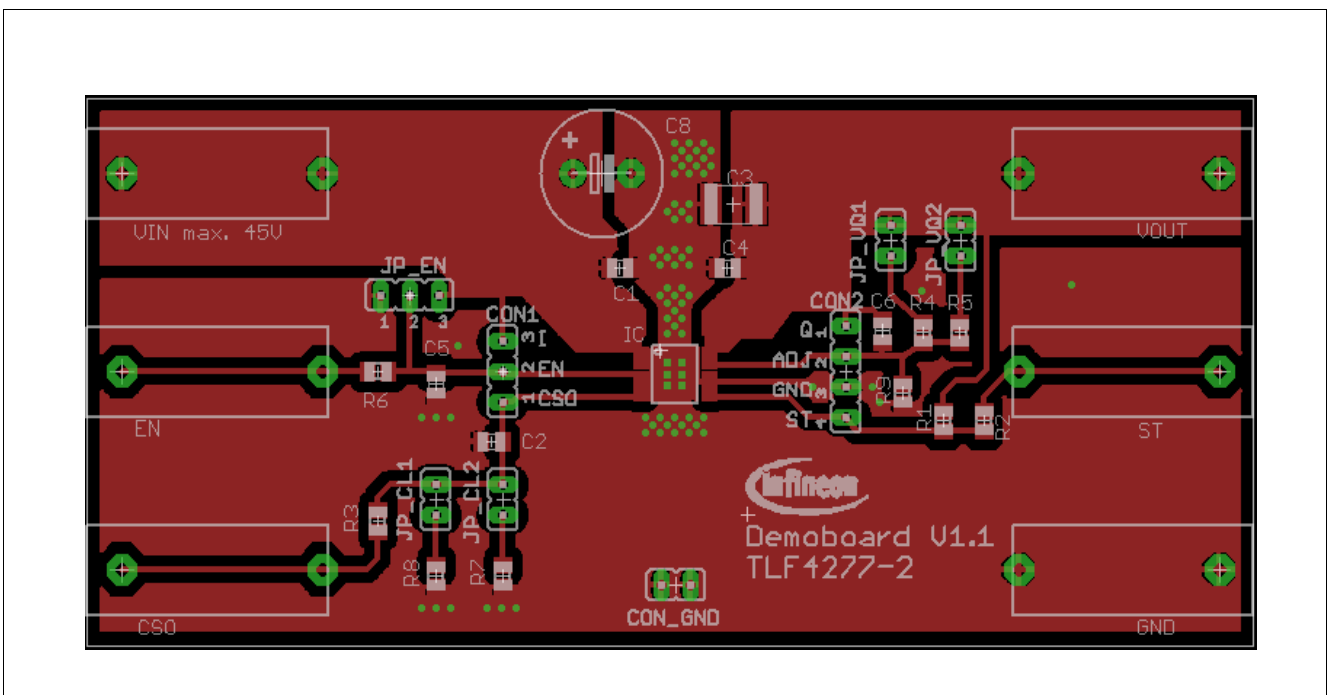


Figure 4 Top Layer of TLF4277-2 Demo Board

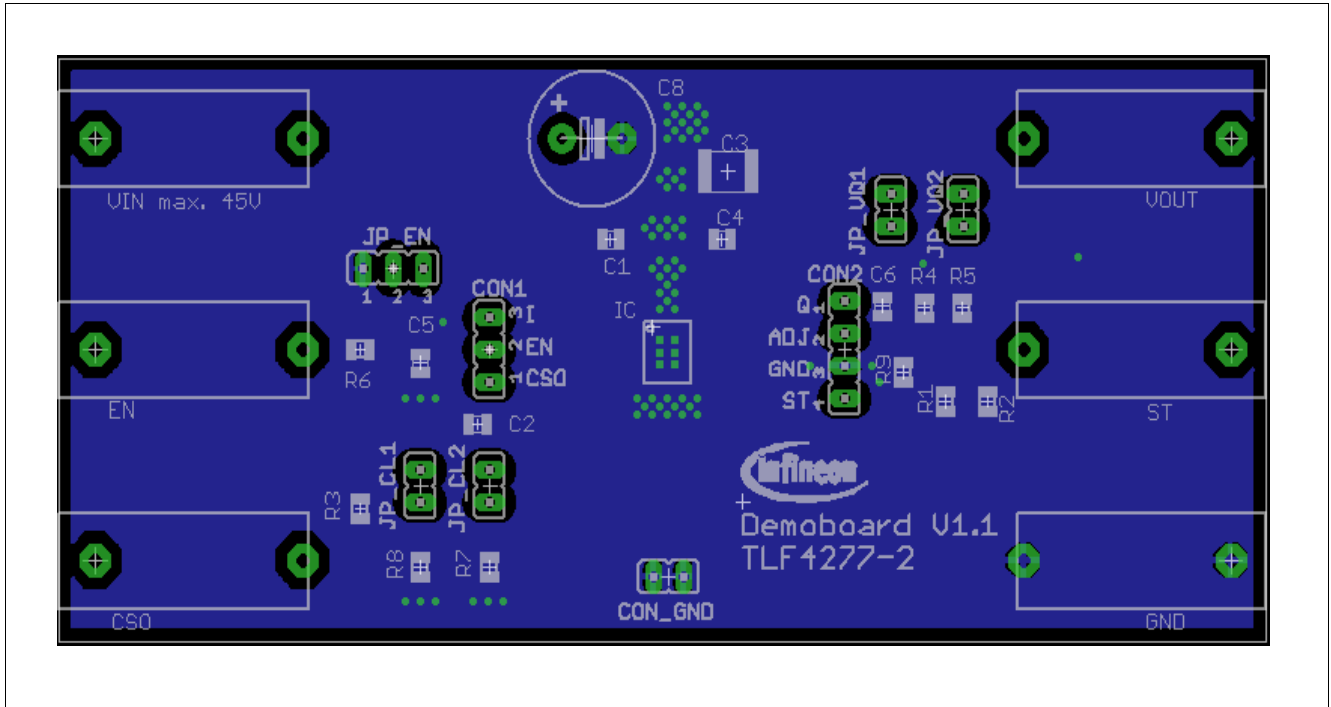


Figure 5 Bottom Layer of TLF4277-2 Demo Board

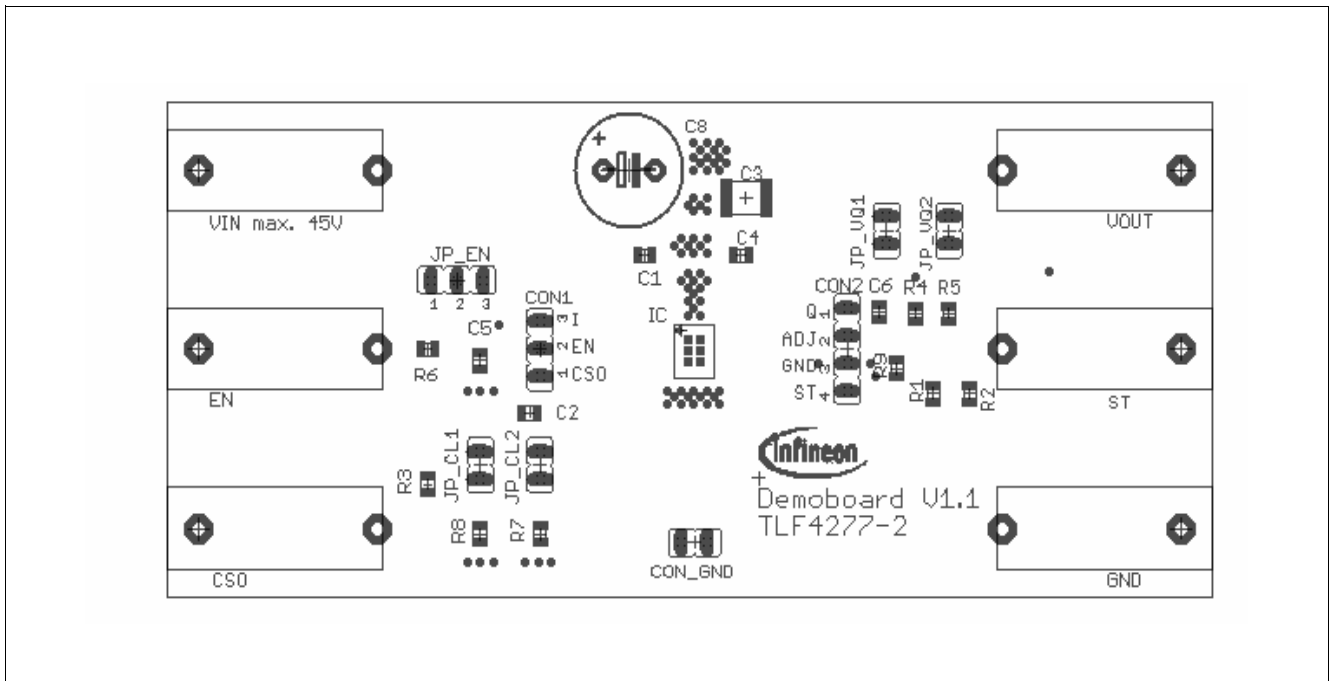


Figure 6 Top Layer components of TLF4277-2 Demo Board



## 4 Bill of Material

**Table 6** Bill of Material

Part	Value	Package
VIN	Banana jack	BABU4MM
VOUT	Banana jack	BABU4MM
ST	Banana jack	BABU4MM
CSO	Banana jack	BABU4MM
EN	Banana jack	BABU4MM
GND	Banana jack	BABU4MM
R1	10k, 1%	R0805
R2	0k, 1%	R0805
R3	0k, 1%	R0805
R4	31k6, 0.1%	R0805
R5	60k4, 0.1%	R0805
R6	0k, 1%	R0805
R7	24k, 0.1%	R0805
R8	910Ω, 0.1%	R0805
R9	10k, 0.1%	R0805
C1	100n/50V	C0805
C2	2μ2/10V	C0805
C3	n.a. (10μ/16V)	C1206
C4	1μ/16V	C0805
C5	n.a. (470n/50V)	C0805
C6	n.a. (2.2nF/50V)	C0805
C8	100μ/50V	E5-13
CON1	3 pin connector	
CON2	4 pin connector	
CON_GND	2 pin connector	
JP_CL1		jumper
JP_CL2		jumper
JP_EN		jumper
JP_VQ1		jumper
JP_VQ2		jumper
IC	TLF4277-2	PG-SSOP-14

## 5 General Information

### 5.1 Restrictions

This Demoboard is offering limited features allowing you only to evaluate and test the Infineon products. The Demoboard is not an end product (or finished appliance), nor is it intended or authorized by Infineon to be integrated into end products. You are not authorized to use the Demoboard in any production system.

### 5.2 Additional Information

[1] TLF4277-2 Data Sheet (For further information you may contact <http://www.infineon.com/>)

### 5.3 Revision History

Revision	Date	Changes
1.3	2015-11-18	Updated to demoboard version 1.1
1.2	2014-05-13	Updated adjustable current limit setting (R7 = 24k)
1.1	2013-08-06	Updated adjustable current limit setting (R7 = 4k7) Added tolerance of resistors in BOM (Table 6)
1.0	2013-04-10	Initial version

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