NCP6951EVK

Camera PMIC with Flash LED Driver Evaluation Board User's Manual

ON Semiconductor®

EVAL BOARD USER'S MANUAL

Overview

The NCP6951EVK evaluation kit is a full assembled circuit board for evaluation and test of the NCP6951. This document provides documentation, test procedure and equipment set−up for the complete evaluation of the NCP6951.The NCP6951EVK comes with one NCP6951 evaluation board, 1 MCU board for I^2C master and associated cables.

General Description

The NCP6951 integrated circuit is part of the ON Semiconductor mini power management IC family. It is optimized to supply battery powered portable application sub−systems such as camera function, microprocessors, etc. This device integrates one high efficiency 600 mA Step−down DCDC converter with DVS (Dynamic Voltage Scaling), 5 low dropout (LDO) voltage regulators and a 1.5 A Flash LED driver in WLCSP24 package.

Features

- 1 Flash LED Driver
  - Adaptive Boost Supply or Bypass Mode depending on V_{in} and V_{flash} Conditions
  - Programmable Flash Current from 100 mA to 1.6 A by 100 mA Steps
  - Programmable Safety and Inhibit Timer to Limit the Flash Duration and Protect the Application

- 1 DC−DC Converters (3 MHz, 1 μH / 10 μF, 600 mA)
  - Peak Efficiency 95%
  - Programmable Output Voltage from 0.8 V to 2.3 V by 50 mV Steps
- 5 Low Noise − Low Dropout Regulators
  - Programmable Output Voltage from 1.7 V to 3.3 V for LDOs 1, 2, 3
  - Programmable Output Voltage from 1.2 V to 2.85 V for LDOs 4, 5
  - 200 mA Output Current Capability: LDOs 1, 2, 3, 4
  - 300 mA Output Current Capability LDO 5
  - 45 μVrms Low Output Noise
- Control
  - Fully Programmable through a 400 kHz / 3.4 MHz I^2C with Pins Selectable I^2C Address and Interrupt Output
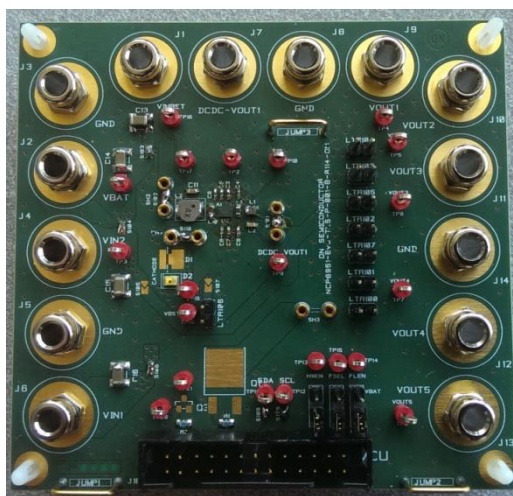- Small Footprint: 2.57 x 1.65 mm WLCSP 0.4 mm Pitch

Figure 1. Evaluation Board Picture

Table 1. BOARD COMPONENTS DESCRIPTION

Qty	Reference	Value	PCB Footprint	MFR	Part Number
1	–	NCP6951 PMIC	–	ON Semiconductor	NCP6951
1	C1	Ceramic Capacitor 2.2 µF 6.3 V X5R	0402	TDK	C1005X5R0J225K050BC
7	C3 → C9	Ceramic Capacitor 1 µF 6.3 V X5R	0402	TDK	C1005X5R0J105K05BB
1	C11	Ceramic Capacitor 4.7 µF 6.3 V X5R	0603	TDK	C1608X5R0J475K080AB
1	C2	Ceramic Capacitor 10 µF 6.3 V X5R	0603	TDK	C1608X5R0J106K080AB
1	C10	Ceramic Capacitor 22 µF 6.3 V X5R	0603	TDK	C1608X5R0J226M080AC
4	C13 → C16	Ceramic Capacitor 100 µF 6.3 V X5R	1210	TDK	C3225X5R0J107M250AC
1	C12	Ceramic Capacitor 100 nF 6.3 V X5R	0402	TDK	
1	L1	Inductor	2016	TOKO	DFE201612R–H–1R0N
1	L2	Inductor		TOKO	FDSD0412–1R0 or DFE252012F–1R0
1	D1			LUMILED	LXCL–PWF4
1	D2			SAMSUNG	SPFCW04301BL
8	LTR100 → LTR107	Jumper Header Vertical Mount, 2 positions, 100 mils	100 mils	Tyco Electronics / AMP	5–826629–0
3	J15 → J17	Jumper Header Vertical Mount, 3 positions, 100 mils	100 mils	Tyco Electronics / AMP	5–826629–0
14	J1 → J14	Banana Jack		Hirchmann Test and Measurement	930160000
1	J18	Connector header 26 pos		3M	N2526–6002–RB
19	TP1 → TP19	Test Point		Keystone Electronics	5011
4	Q1, Q3, R1, R2	Not Mounted			
3	JUMP1 → JUMP3	Jumper Connector	400 mils	Harwin	D3082–B01
10	S101 → S110	Shorted			
4	SH1 → SH4	Current sense			
4	Spacer nylon	H1, H2, H3, H4		Richco Plastic co	R908–4

Table 2. CONNECTOR DESCRIPTION

	Pin	Description
Input Power		
J1 → J6	J3, J5	Negative input connected to GND pin
	J1	Flash LED power supply
	J2	DCDC power supply
	J4, J5	LDOs power supply
Input Power		
J7 → J14	J8, J14	Negative output connected to GND pin
	J7	DCDC1 output
	J9	LDO1 output
	J10	LDO2 output
	J11	LDO3 output
	J12	LDO4 output
	J13	LDO5 output
Chip Control		
MCU	SDA	I^{2}C data, connect to SDA pin or the 26 pins ribbon cable
	SCL	I^{2}C data, connect to SCL pin or the 26 pins ribbon cable
	HWEN	Master enable pin connected to the 26 pins ribbon cable thru J3
	FLEN	Flash LED driver enable pin
	FLSEL	Flash LED driver selectable pin

NCP6951EVK

ASSEMBLY LAYER

Figure 2. Assembly Layer

NCP6951EVK
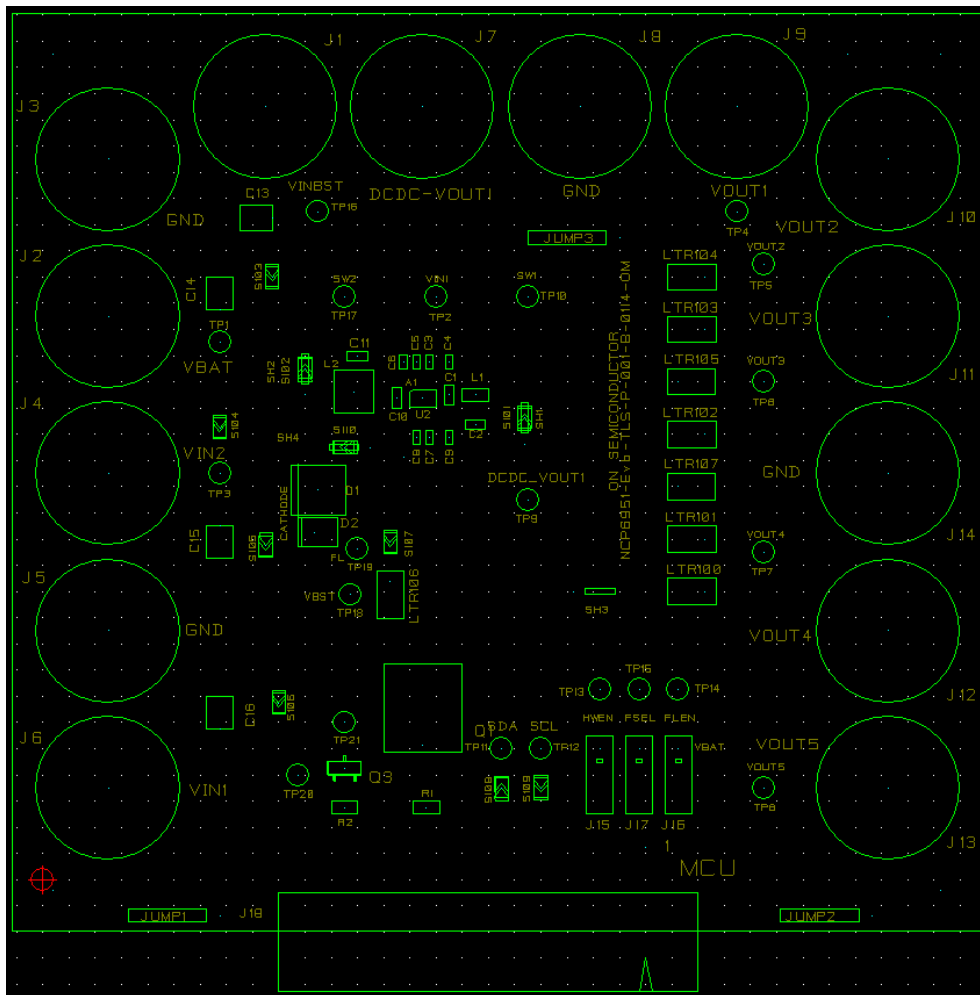
SCHEMATIC

Figure 3. Evaluation Board Schematic

NCP6951EVK

SOFTWARE INSTALLATION

Double click on NCP6951_setup.exe file. Follow the instructions set−up.

It is recommended to copy the NCP6951_setup.exe to a local directory: If eval kit is already installed, a simple double click on NCP6951.exe will launch the GUI.

Important notice: In order to properly install drivers and software, please launch NCP6951_setup.exe file before connects the MCU board.
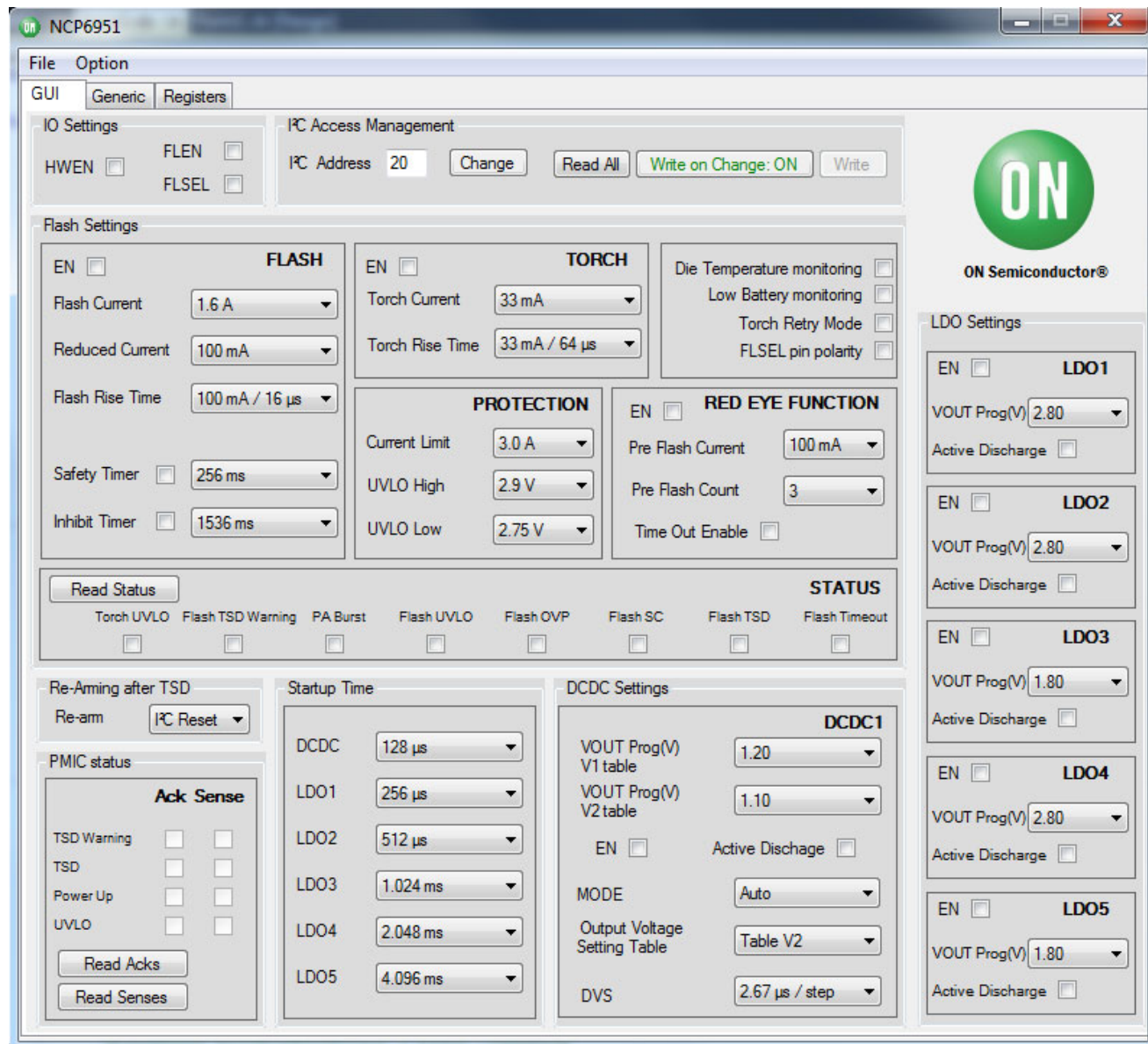
Figure 4.

NCP6951EVK

QUICK CONFIGURATION

Power Supply

NCP6951 requires at least 1 external power supply: Vbat (J2) : supply between 2.5V to 5.5V.

Jumpers Configuration

The HWEN, FLEN and FLSEL jumpers are configured by default to work with the ON Smiconductor I²C interface board.

S103, S104 and S106 shunt are soldered to use only one power supply for the DCDCs, LDOs and FLASH.

S101, S102 and S110 are soldered to close the loop of the inside buck and boost converter. To measure the current, user has to unsolder the jumper and use SH1, SH2 or SH4.

Load

DCDCx Converters

An electronic load or passive load can be connected between J7 and J8 for DCDC1.

LDOx Regulators

An electronic load or passive load can be connected between J9 and J8 or J14 for LDO1, between J10 and J8 or J14 for LDO2, J11 and J8 or J14 for LDO3, J12 and J8 or J14 for LDO4, J13 and J8 or J14 for LDO5.

FLASH LED Driver

Evaluation board is delivered with D1 or D2 soldered.

PCB LAYOUT
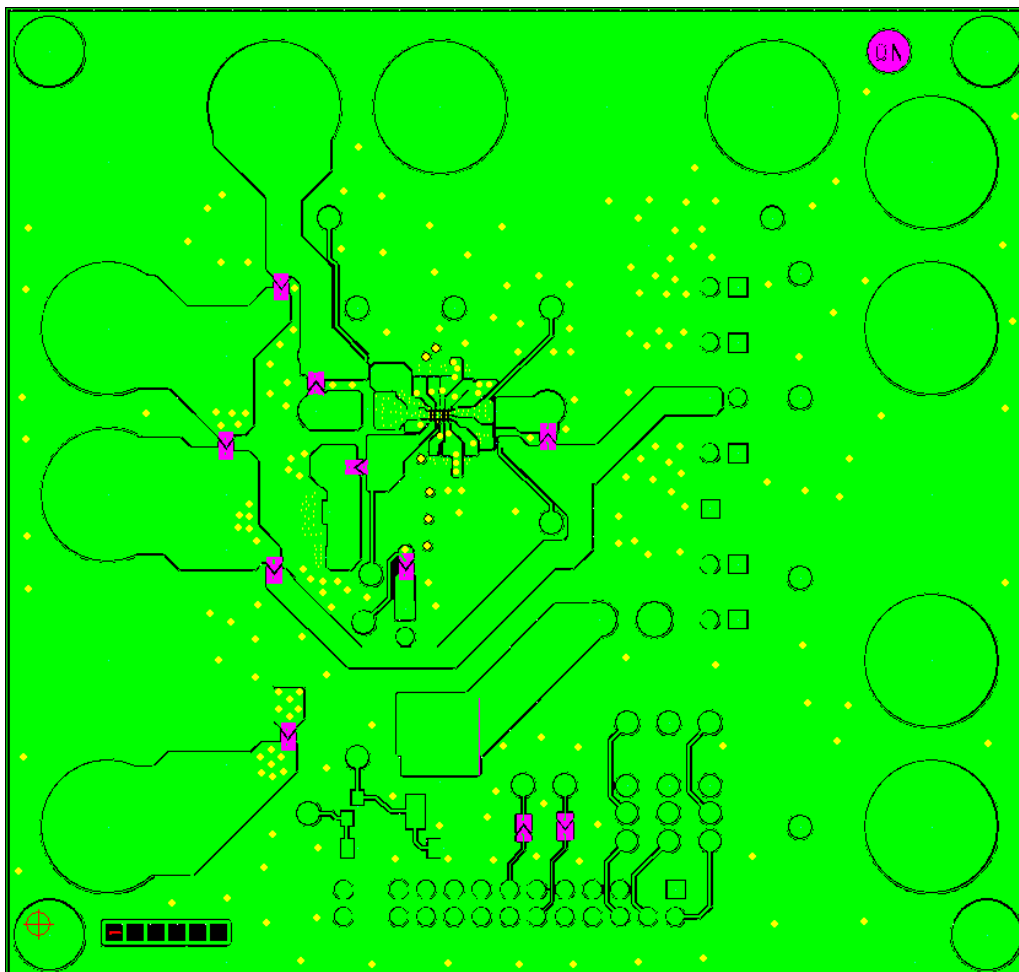
Figure 5. Top Layer

Figure 6. Bottom Layer

ADDITIONAL INFORMATION

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