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### KIT33984PNAEVB

### Dual 4mOhm Self Protected Silicon Switch

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## IMPORTANT NOTICE

**Freescale provides the enclosed product(s) under the following conditions:**

**This evaluation kit is intended for use of ENGINEERING DEVELOPMENT OR EVALUATION PURPOSES ONLY.** It is provided as a sample IC pre-soldered to a printed circuit board to make it easier to access inputs, outputs, and supply terminals. This EVB may be used with any development system or other source of I/O signals by simply connecting it to the host MCU or computer board via off-the-shelf cables. This EVB is not a Reference Design and is not intended to represent a final design recommendation for any particular application. Final device in an application will be heavily dependent on proper printed circuit board layout and heat sinking design as well as attention to supply filtering, transient suppression, and I/O signal quality.

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## INSTRUCTIONS

### **KIT33984PNAEVB**

#### **Dual 4mOhm Self Protected Silicon Switch**

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### **Installing SPIGen Freeware on your Computer**

There are two different versions of SPIGen. One is designed to run on Windows 95/98/Me, and the other is designed to run on Windows NT/2000/XP. Be sure to choose the appropriate installation program for your computer.

Each version of SPIGen includes a README.txt file which will describe the operating systems that the software should be installed on. Before you install the program, refer to the SPIGen README.txt file to check the compatibility of the installation program and your computer operating system.

To install the software from the CD-ROM, insert the CD-ROM into your CD drive. Click the Start button, and then click "Run...".

If you are running Windows 95, Windows 98, or Windows Me, type "D:\SPIGen\_Win\_95\_98\_Me\Setup.exe" in the box, and then click "OK".

If you are running Windows NT, Windows 2000, or Windows XP, type "D:\SPIGen\_Win\_NT\_2000\_XP\Setup.exe" in the box, and then click "OK".

Several temporary files will be copied to your computer, and then the Installation Wizard will guide you through the rest of the process.

To use SPIGen, Go to the Windows Start menu, then Programs, then SPIGen, and click on the SPIGen icon. The SPIGen "Generic SPI Generator" GUI will appear. Go to the File menu in the upper left hand corner of the GUI, and select Open, then browse the CD to find and select the SPIGen Configuration ".spi" file for the EVB you are using. Click Open, and SPIGen will open a specifically configured SPI command generator for your EVB.

## INSTRUCTIONS

### **KIT33984PNAEVB**

#### **Dual 4mOhm Self Protected Silicon Switch**

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### Using the EVB

**Warning: Always wear Safety Glasses when working around electronic modules and when soldering.**

Please remove of the capacitor, C8, when testing reverse supply voltage on VBAT. Also that the thermal resistance from junction to ambience of this PCB is approximately 25 degree/W.

1. The 33984 Evaluation card allows the customer to quickly evaluate features of the device with a simple bench top setup. All switch inputs may be evaluated using the onboard switch banks or actual system switches connected to the switch input edge connector.
2. Using a standard 25 pin Sub-D parallel port cable and the enclosed SPIGen SPI Driver software, you can use a personal computer to provide the Serial Peripheral Interface (SPI) communication with this EVB (see SETUP\_EVB).
3. Connect power supplies to the VBAT on the VBAT bolt. Connect GND , GNDBAT and +12 volt supply on Connector X,EVB's power terminal. On board 5 volt regulator supply can be either supplied through VBAT or +12V by selecting the jumper JSUPPLY. Make sure the voltages provided are in accordance with the device data sheet and that the supply currents are sufficient to supply the attached loads. The led L5V should light up indicating the presence of 5 volt regulated supply. Move IC from reset state by shorting jumper JRSTB to 2-3 position ( It short RSTB PIN to VDD).
4. Connect the desired loads to(e.g. relay coils, LEDs, or panel lamps) SB and SA bolt.
5. For direct control of SA, put jumper, JINA, at position 2-3. For direct control of SB, put jumper, JINB, at position 2-3. Disable watchdog placing a jumper at JFSI on position1-2 ( shorting the PIN to GND) and not placing jumper on JWAKE. (Shorting PIN to GND). Led LA and LB should light up if jumper are placed on JLA and JLB.
6. To use SPIGen, Go to the Windows Start menu, then Programs, then SPIGen, and click on the SPIGen icon. The SPIGen "Generic SPI Generator" GUI will appear. Go to the File menu in the upper left hand corner of the GUI, and select Open, then browse the CD to find and select the 33984\_EVB\_CONFIGURATION\_FILE.spi. file for the KIT33984PNAEVB. Click Open, and SPIGen will open a specifically configured SPI command generator for the KIT33984PNAEVB. The configuration file will set all parameters for SPI signals from the PC and provide a list of commands that may be sent to the EVB.

## INSTRUCTIONS

### **KIT33984PNAEVb**

#### **Dual 4mOhm Self Protected Silicon Switch**

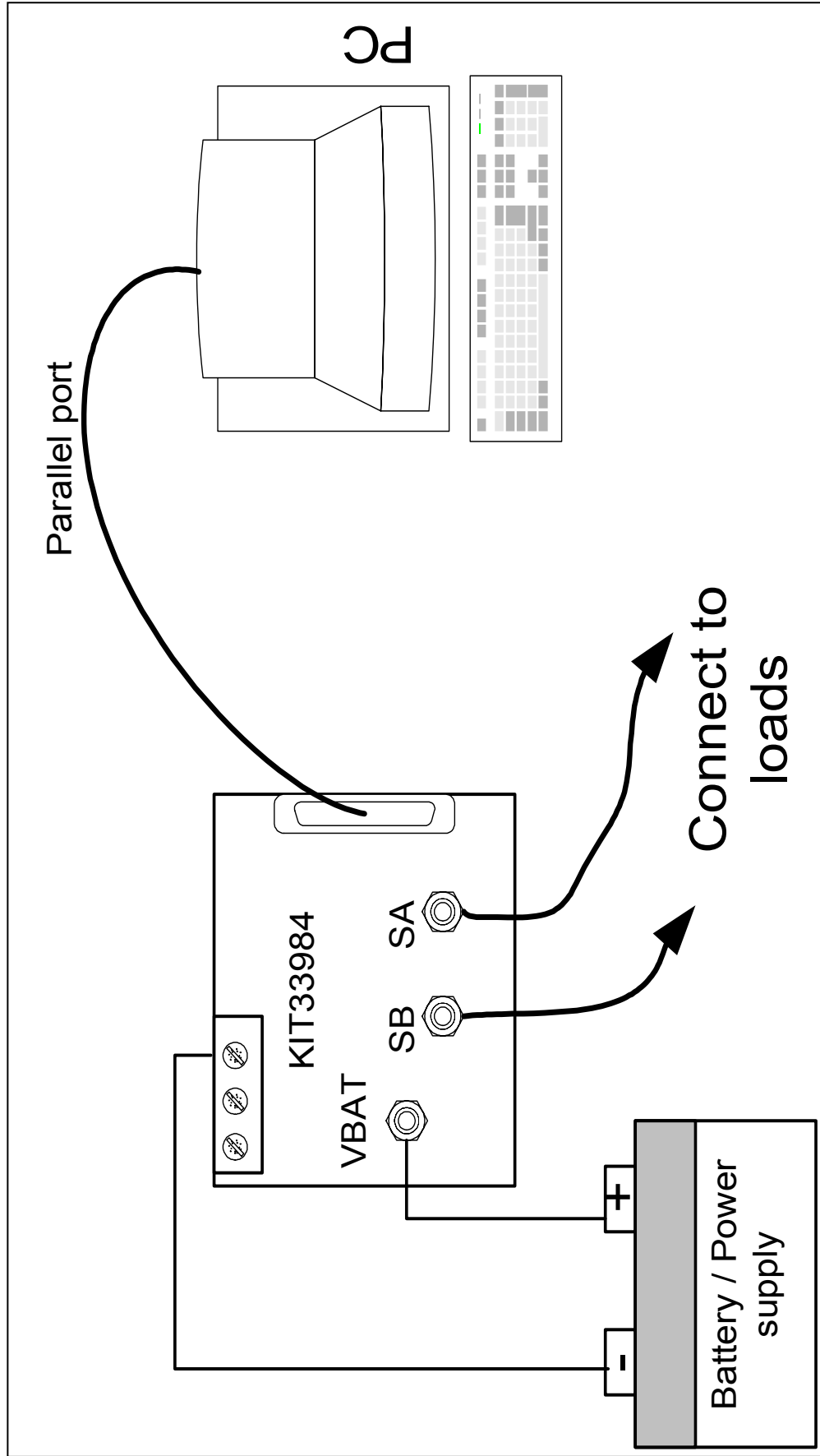
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7, To prepare the Evaluation card for SPIGen, Place jumper JINA, JINB, JRSTB, JWAKE to 1-2 position

8. To set up the 33984 device to read switch inputs the user may use the batch commands from the "Send a Batch of Commands" tab. In the "Send a Batch of Commands" window, the Full Initialize batch will appear. To send the batch of commands to the EVB, click the Send Once tab. To quickly evaluate the EVB and device, simply click on the "Send one Command at a Time" tab, select the switch status command from the Quick Commands list, and click the Send Continuous tab. The opening and closing of switches may now be seen on the Word Received bits window field. Refer to the device data sheet for detailed information on I/O communication and device operation.

REVISIONS

REV	DESCRIPTION	DATE	APPROVED
0	ORIGINAL	2/27/2004	FV



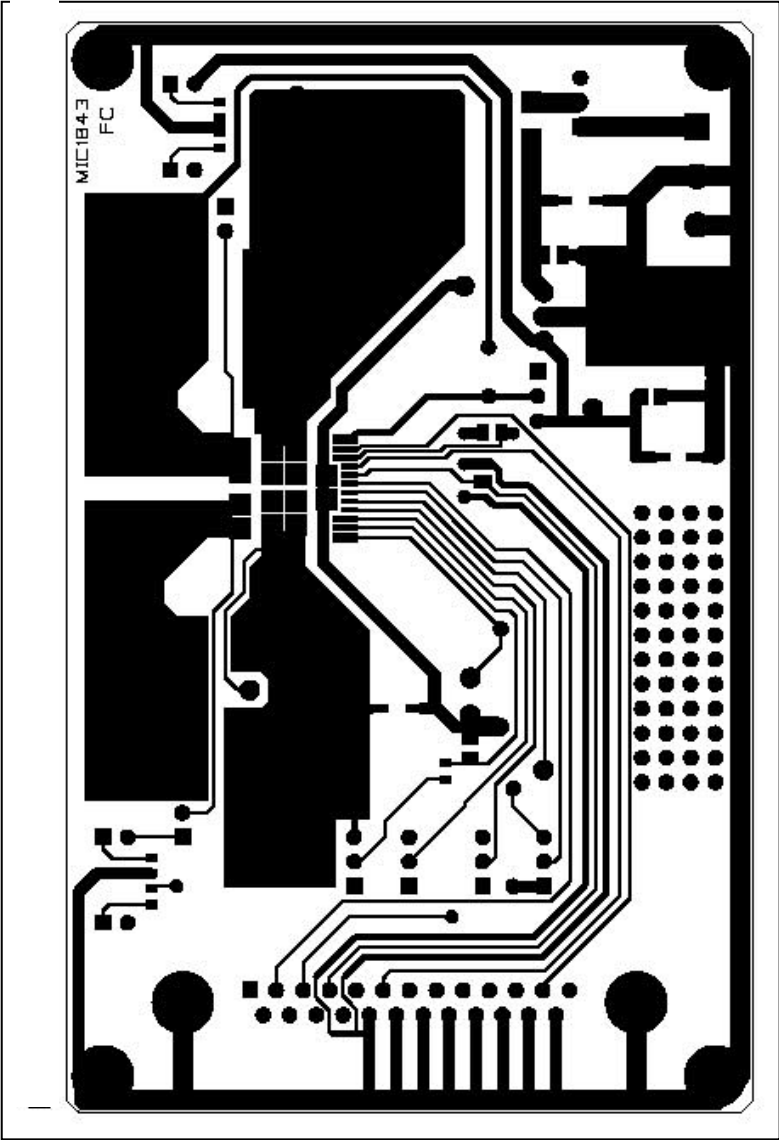






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TITLE

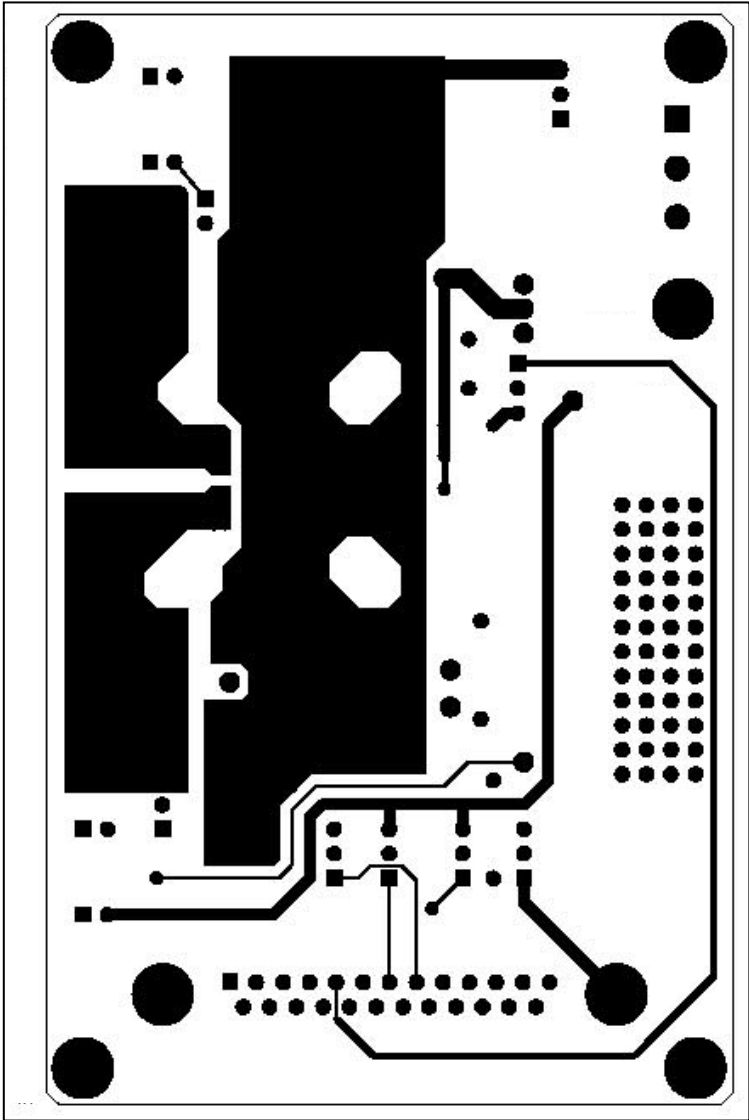
PWB33984PNAEVB  
TOP COPPER


REV

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REV	DESCRIPTION	DATE	APPROVED
0	ORIGINAL	2/24/2004	FV

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## BILL OF MATERIAL

### BILL OF MATERIAL

#### BOM33984PNAEVB

#### Dual 4mOhm Self Protected Silicon Switch

QTY	PART NUMBER	REF. DES	PACKAGE	DESCRIPTION	MANUFACTURER
1	MC33984PNA	MC33984	PQFN	Dual 4mOhm Self Protected Silicon Switch	Freescale SPS
1	7805	REG	TO220	5v Regulator	ON Semiconductor
3	ECEV1HA 100SP	C1, C2, C8	CMS D	10uF 50V Capacitor	Panasonic
3		C3, C4, C6	805	100nF 50 V Capacitor	
2		C7, C18	805	100pF 50 V Capacitor	
3		R5, R7, R8	603	10k 5% 0.1W Resistor	
2		R9, R10	603	2k2 5%(or 2k7) Resistor	
1		RCS	Thru'hole NON-CMS	1k 1/4W 1% Resistor	
1		RFSI	Thru'hole NON-CMS	200 1/4W 5% Resistor	
4	H3192		Thru' hole	Connector to hold resistor RCS and RFSI	Harwin
2	HLMP1719	LB, LA	Thru'hole NON-CMS	2mA yellow leds	Hewlett Packard
2	HLMP1700	LFSB, L5V	Thru'hole NON-CMS	2mA red leds	Hewlett Packard
1	MRA4007T3	D1	Boitier SMA	DIODE MRA4007 (equiv. 1N4007)	Freescale
4	Type1 5001	FSB, CSNS, VDD, AGND		Testpoints for clip	keystone
1	MKDS 1,5/3-5,08	X	5,08mm	3 terminal Power connector STANDARD 5,08mm	Phoenix Contact
3		VBAT, SA, SB	etal with 4mm diameter	Screw connectors diam. 4mm +1 Nut + 2 washers each for power connection	
1	DB25P564TX.	PCON	M25H	Connector, SubD, series D, male, bent barb, to solder, 25 contacts	FCI
6	M7566-05	JINA, JINB, JSUPPLY, JFSI, JWAKE, JRSTB		JUMPER : 3 PINS + 1 jumper socket 2.54mm	Harwin
2	M7566-05	JLA,JLB		JUMPER : 2 PINS + 1 jumper socket 2.54mm	Harwin

## Jumper Connections

### Jumper connection presentation

**JMP33984PNAEVB**

REVISION 0

Dual 4mOhm Self Protected Silicon Switch

Name	Description
<b>JSUPPLY</b>	The selection between 1-2 allows the supply regulation of the 5 volt from Battery while 2-3 allows independent supply.
Diode <b>D1</b>	Diode protects against negative transients and reverse battery.
Capacitor <b>C8</b>	Removed when doing reverse battery test.
<b>JWAKE</b>	Allows wake up function of IC. 1-2 selection will give control through PCON. 2-3 selection is to wake up from battery voltage, i.e. in the case of ignition.
<b>JINA</b>	1-2 position: control through PCON to SPIGEN 2-3 position: shorting IN0 to VDD Floating: IN0 is short to ground
<b>JINB</b>	1-2 position: control through PCON to SPIGEN 2-3 position: shorting IN1 to VDD Floating: IN1 is short to ground
<b>JRSTB</b>	1-2 position: control through PCON to SPIGEN 2-3 position: Short RSTB to VDD Floating: RSTB is ground. This means that the IC is in reset mode
<b>JFSI</b>	1-2 position: Short JFSI to ground 2-3 position: Short RSTB to VDD Floating: JFSI is pulled to VDD
<b>JLA</b>	1-2 position: connect to led, LA. LA lights up when IN0 is pulled to VDD Floating: Not connected to LA.
<b>JLB</b>	1-2 position: connect to led, LB. LB lights up when IN1 is pulled to VDD Floating: Not connected to LB
Resistor <b>RCS</b> <b>RFSI</b>	Value to be change according. Value to be change according.
<b>TEST POINTS</b> <b>CSNS-AGND</b>	Several test points are present on the evaluation board to check some signals if necessary: To check the current recopy output

## SPIGen SOFTWARE

### **SDK33984PNABEVB**

#### **Dual 4mOhm Self Protected Silicon Switch**

SPIGen is a freeware software program that runs on a standard PC running Microsoft Windows 95/98/Me or Windows NT/2000/XP. Once installed and connected the user can send Serial Peripheral Interface (SPI) commands to the KIT33993DWBEVB via an easy to use GUI interface. This eliminates the need to write embedded MCU code on a development platform in order to evaluate the 33993 device. SPIGen is a configurable program that can be tailored to work with any SPI slave device. Please see the software Help facility for additional details on the operation of the SPIGen program.

SPIGen uses the parallel port (LPT port) of your computer to interface with the EVB through a standard DB25 port. SPIGen uses pins 2, 3, 4, 5, 6, 7, 8, and 9 as outputs and pins 12, 13, and 15 as inputs. Pins 1, 14, 16, and 17 are optional outputs that can be commanded via the SPIGen software. Refer to your computer's parallel port specification for information on voltage and current limitations at these pins. The assumption has been made here that these pins can source/sink at least 1 mA.

**NOTE: There is a comprehensive Help facility built into the software which also functions as a tutorial-style user's manual. The user is encouraged to read through the Help files using the Contents Tab as a guide.**

## Erratasheet

### Dual 4mOhm Self Protected Silicon Switch

JRSTB is no more a jumper but a **SWITCH**. The switch position is **opposite** to the jumper position.

With this switch was is **written** on the PCB is **wrong**.

When the switch is pushed towards the Vdd inscription, RSTB is controlled through PCON (MCU). When the switch is pushed towards the MCU inscription, RSTB is connected to Vdd.

### CONNECTION

Name	Description
JRSTB	1-2 position: Short RSTB to VDD 2-3 position: control through PCON to SPIGEN Floating: RSTB is ground. This means that the IC is in reset mode

### BOM MODIFICATIONS

QTY	PART NUMBER	REF. DES	PACKAGE	DESCRIPTION	MANUFACTURER
1	TL39P	JRSTB		Straight Terminals Single Pole Toggle Switch	APEM