Actual size

NXP one-wire single LED driver for cell phones PCA9901

Longer standby times in mobile and portable applications

By offloading the microcontroller and using this small, easily programmed driver to control the blinking of an indicator LED, the standby power in a cell phone or other portable device can be extended by as much as 30%.

Key features

- LED driver controlled by high-side current
  - Maximum current in LED (1 to 20 mA) set by external resistor
- Full command set
  - Training start
  - Training end
  - Run once
  - Run
  - Stop
  - Reset
- Up to three blinking patterns in sequence
- 8-bit (255 steps) LED ON and OFF timings for each blinking element
  - ON timing captured between 1 and 255 ms
  - OFF timing between 20 ms and 5.1 s
- One-wire interface compliant with 1.8-V logic interface
- Maximum dropout voltage of 110 mV at 20 mA
- Short-circuit and thermal protection
- Power supply of 2.7 to 5.5 V
- Operating temperature range of -40 to +85 °C
- 6-pin CSP package (10. x 1.2 x 0.6 mm)
- 8-pin TSSOP8 and XSON8U

Applications

- Cell phones
- Digital still cameras (DSCs)
- Camcorders
- PDAs
- Any equipment with an indicator LED

When the battery in a cell phone or other portable device runs low, the blinking indicator LED can consume as much as 40% of the system's available standby power. Using the NXP onewire single LED driver, a six-pin driver that enables standalone blinking of a predefined pattern, instead of the system's microcontroller to manage the blinking, power consumption can be reduced by up to a factor of four, requiring only 10% of the available standby power.

Programming the PCA9901 is simple. The host controller sends the blink sequence over a uni-directional, one-wire interface to the CTRL pin. The PCA9901 captures the sequence and memorizes it at the same time. Then the controller also sends commands that instruct the PCA9901 to execute the sequence once or in a loop until notified to stop.

NXP founded by Philips

A total of six commands are available: Training Start, Training End, Run Once, Run, Stop, and Reset. Training Start indicates the beginning of a training sequence. The PCA9901 starts capturing the blinking sequence.

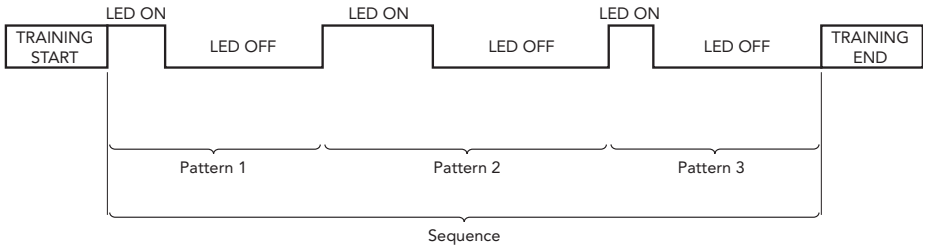
Training End indicates the training sequence is over. The capture stops and the sequence is stored in the corresponding registers. The PCA9901 then goes into Shutdown mode.

Run Once tells the PCA9901 to execute the memorized sequence once and then go into Shutdown mode. Run tells the PCA9901 to execute the memorized sequence until a Stop command occurs.

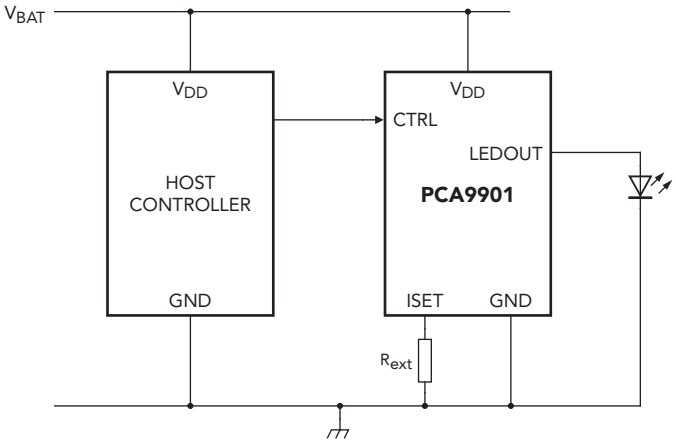
With the Stop command, the PCA9901 switches the LED output off at the end of the current LED ON time and goes into Shutdown mode. The Reset command tells the PCA9901 to return all the internal registers to default zones and go into Shutdown mode.

A single blinking sequence can include up to three different blinking patterns, each defined by its own ON and OFF timings.

An external resistor sets the maximum current that flows in the LED, and can be programmed between 1 and 20 mA. The driver operates from a power supply of 2.7 to 5.5 V and is housed in Chip Scale Package (CSP) that measures only 1.0 x 1.2 x 0.6 mm.



Blinking-sequence capture in the PCA9901



PCA9901 block diagram

Ordering information

Type number	Package	Number of pins
PCA9901UK	CSP (1.0 x 1.2 x 0.6mm)	6
PCA9901DP	TSSOP8	8
PCA9901GD	XSON8U	8

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