TCS3720

ALS/Color and Proximity Sensor for Behind OLED Applications

General Description

The TCS3720 features ambient light, color (RGB) sensing and proximity detection. The device integrates two advanced emitter drivers within a compact 3.34mm x 1.36mm x 0.6mm OLGA package.

The ambient light and color sensing function provides four concurrent ambient light sensing channels: Red, Green, Blue, and Clear. The RGB and Clear channels are covered with an UV/IR blocking filter. This architecture accurately measures ambient light and enables the calculation of illuminance and color temperature to manage display appearance.

The proximity function synchronizes IR emission and detection to sense nearby objects. The architecture of the engine features self-maximizing dynamic range, ambient light subtraction, advanced crosstalk cancellation, and interrupt-driven I^2C communication. Sensitivity, power consumption, and noise can be optimized with adjustable IR VCSEL timing and power. The proximity engine recognizes detect/release events and produces a configurable interrupt whenever the proximity result crosses upper or lower threshold settings.

Key Benefits & Features

The benefits and features of TCS3720 are listed below:

Figure 1:
Added Value of Using TCS3720

Benefits	Features
• Proximity detection behind OLED displays	• Integrated factory calibrated emitter drivers • Display synchronization with highly programmable Proximity Start Delay (PSD) • Crosstalk and ambient light cancellation • Optimized sensitivity and noise level • Wide configuration range
• Ambient light sensing behind OLED displays	• Red, green, blue and clear ALS channels with improved sensitivity • Highly programmable gain and integration time • Display synchronization with highly programmable ALS Start Delay (ASD) • 737kHz ALS clock rate • 1KB FIFO

Benefits	Features
• Low power consumption	• 1.8V power supply with 1.8V I²C bus • Configurable sleep mode • Interrupt driven device
• Integrated status checking for all functions	• Proximity saturation flag • Digital and analog ALS saturation flags • VSYNC status check

Applications

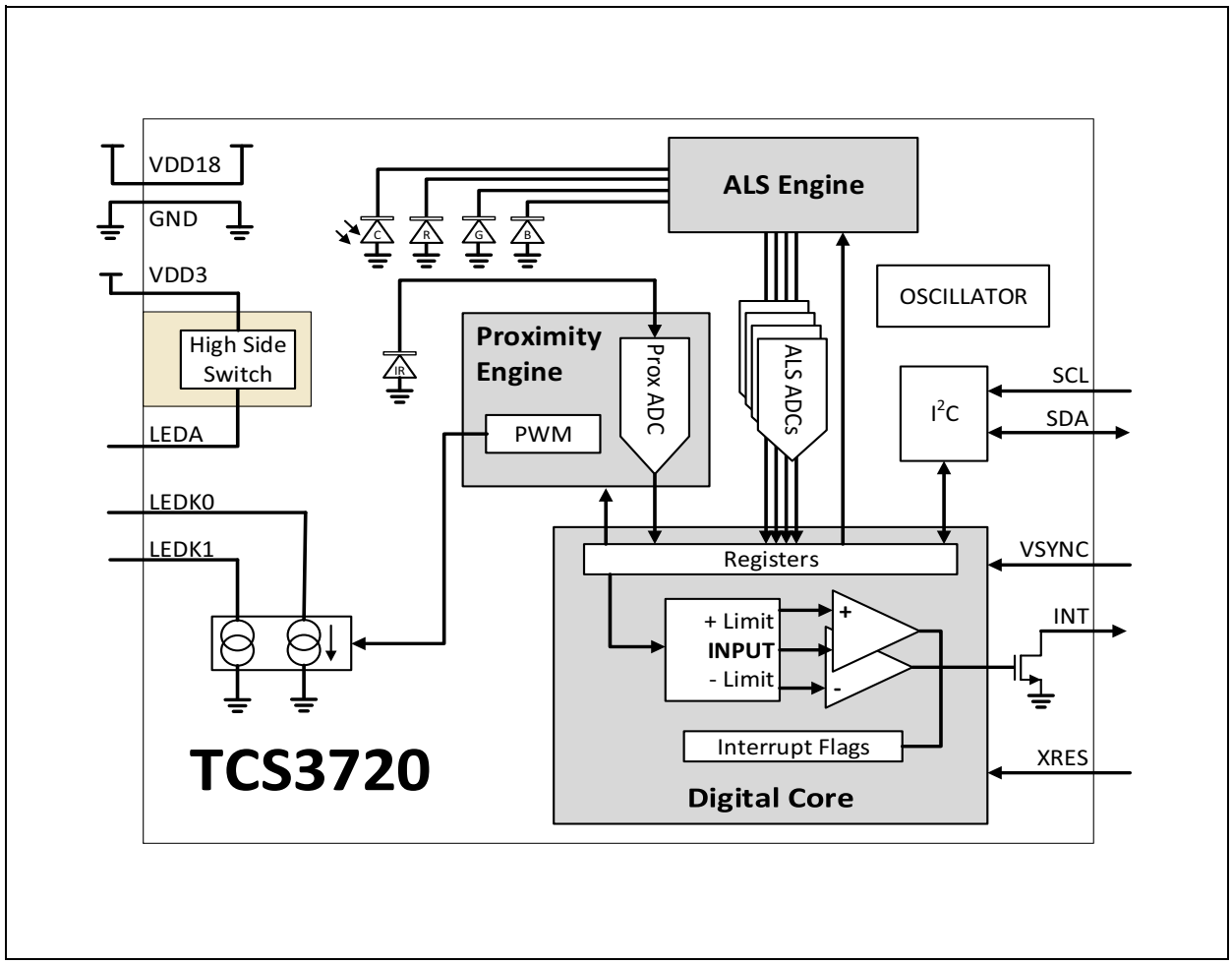
The TCS3720 applications include:

- Brightness management for displays
- Color management for displays
- Proximity detection for mobile phones

Block Diagram

The functional blocks of this device are shown below:

Figure 2:
Functional Blocks of TCS3720



Pin Assignments

Figure 3:
Pin Diagram

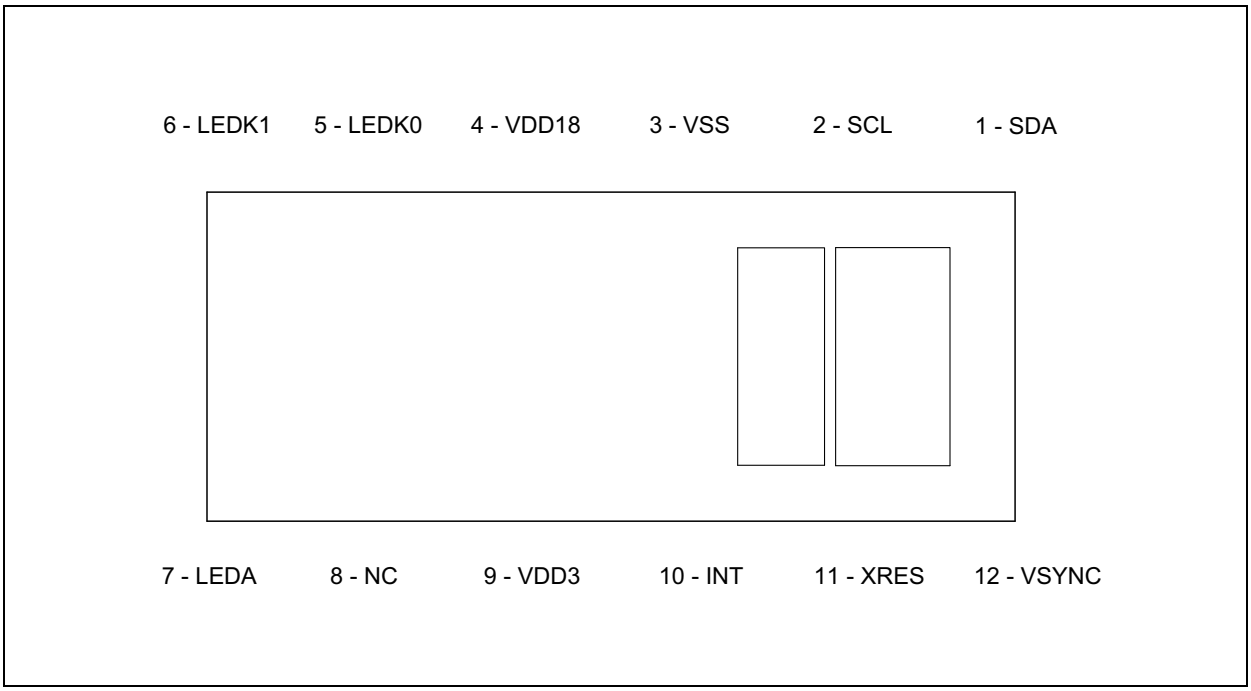


Figure 4:
Pin Description of TCS3720

Pin Number	Pin Name	Description	If Not Use
1	SDA	I^2C serial data I/O terminal	Mandatory
2	SCL	I^2C serial clock input terminal	Mandatory
3	VSS	Ground. All voltages are referenced to VSS.	Mandatory
4	VDD18	Supply voltage for sensor (1.8V)	Mandatory
5	LEDK0	Emitter driver 0. Connect to external emitter cathode.	Floating
6	LEDK1	Emitter driver 1. Connect to external emitter cathode.	Floating
7	LEDA	Connect to external emitter Anode.	Floating
8	NC	Not Connected	
9	VDD3	Supply voltage for IR emitter (3.0/3.3V)	Connect to VDD18
10	INT	Interrupt. Open drain output (active low)	Connect to GND
11	XRES	Hardware reset or PWM input. Need to enable in the register.	Connect to GND
12	VSYNC	VSYNC input	Connect to GND

Ordering & Contact Information

Figure 5:
Ordering Information

Ordering Code	I²C Bus	I²C Address	Delivery Form	Delivery Quantity
TCS37203	1.8V	0x39	Tape & Reel (13")	10000 pcs/reel
TCS37203M	1.8V	0x39	Tape & Reel (7")	2500 pcs/reel
TCS37209	1.8V	0x49	Tape & Reel (13")	10000 pcs/reel

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Revision Information

This short datasheet is derived from v3-00 of full datasheet.