Introduction of Volume Production of a High Grayscale Segment LCD Driver for Instrument Cluster Displays

The S1D15106 LCD driver provides high contrast, supports 16-level grayscale segment displays, and has stronger safety functionality

Seiko Epson Corporation (TSE: 6724, "Epson") has developed and recently begun volume production of the S1D15106, Epson's first high-grayscale segment LCD driver for instrument cluster display systems.

S1D15106 bare die

The amount of information that needs to be shown on instrument cluster displays is increasing as vehicles gain additional features and functions. On the other hand, larger displays with higher definitions increase costs. For this reason, there has been an increase, especially in emerging countries, in the number of combination-type dashboard displays that use TFT LCDs for things that require display flexibility and that use segment LCDs for fixed items such as indicators and icon.

The S1D15106 is a segment LCD driver that can be directly connected to a microcontroller. Image data transferred from the microcontroller can be displayed on the segment display without an external memory.[1] Static driving enables high contrast, while pulse-width modulation (PWM) enables the 16-level grayscale segment display, making this driver ideal for the visualization of things such as speedometers and tachometers.[2,3]

Furthermore, the driver circuit is equipped with display safety functions such as segment/common output problem (open/short) detection, and if a line from driver output to display is open and a display abnormality is detected, the display can be restored by switching the driver output terminal via control from the microcontroller. The safety functions of the driver circuit support the construction of highly reliable display systems. This driver satisfies the strict quality requirements for automotive products. It is compliant with AEC-Q100 and operates at temperatures up to 105°C.[4]

Product Features

- Segment: 368 outputs   Common: 1 output

- Static driving for high contrast

- 16-level grayscale display enabled by PWM

- Display safety functions

Outline Specifications

Model No.	S1D15106
Supply voltage	System power supply, V_{DD}: 2.7 V to 5.5 V
	LCD voltage range, V_{LCD}: 2.7 V to 8.0 V
MPU interface	3-wire serial interface
LCD driver	Segments: 368 outputs Common: 1 output
Grayscale display	16 grayscale levels (PWM)
Safety functions	Display safety functions
LCD driving duty	1/1 (static driving)
LCD driving bias	1/1 (static driving)
Error detection	Command register
	Segment/common output problem (open/short) detection, etc.
Automotive standard conformance	AEC-Q100
Operating temperature range	-40 to +105ºC
Other	Built-in oscillator circuit
	Power-on reset
Shipping configuration	Bare die (gold bumped)

S1D15106 Information

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[1] A microcontroller, or MCU, is an integrated circuit that is primarily used in built-in systems of electronic equipment.

An MCU is a type of computer that has been optimized for the control of electronic equipment.

[2] Static driving is a method in which the display segment of the liquid crystal panel and the segment terminal of the

liquid crystal driver are connected and driven on a one-to-one basis.

[3]   Pulse width modulation is a modulation method that modules pulse width (= ON time).

[4]   AEC-Q100: The Automotive Electronics Council (AEC) is an industry group that creates standards for the reliability and qualification of automotive electronics. It was formed by the "Big Three" U.S. automobile manufacturers in partnership with major electronic component manufacturers. The AEC standard is a de facto global standard that has been widely adopted as a standard for automotive electronic components.

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