Chipsets for High Resolution Automotive Panels
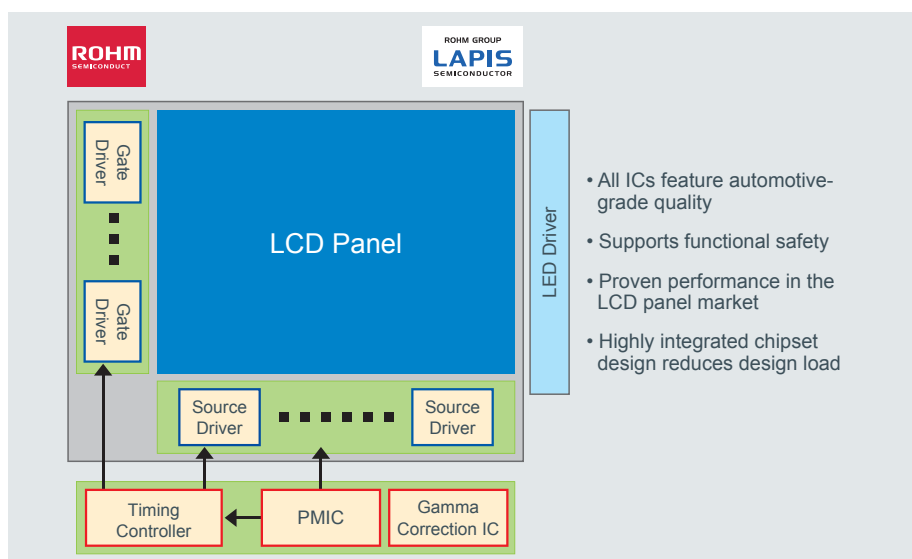
Image

Integrates all components required for HD/FHD LCD panels

Product Outline

These chipsets are designed to drive and control HD/FHD-class high resolution LCD panels increasingly adopted for instrument panels, side mirrors, navigation, and other vehicle systems. Onboard components include a gamma correction IC, timing controller, source drivers, and gate drivers for driving the panel, along with a power management IC for ensuring optimum drive operation. Conventional LCD panels used in the automotive sector are typically configured using customized components and designs. In contrast, ROHM's new chipsets make is extremely easy to construct high-definition LCD panel modules.

■ Chipset Configuration

ROHM chipsets are designed to cover a wide range of specifications, making it possible to easily configure high resolution HD/FHD class LCDs. In addition, the timing controller is equipped with a Fail detection circuit for verifying chipset operation. And the setting of each output in the power management IC can be changed by simply rewriting the internal register value. This reduces development resources while contributing to common board designs.

- All ICs feature automotive-grade quality
- Supports functional safety
- Proven performance in the LCD panel market
- Highly integrated chipset design reduces design load

Device	Function	HD720 (1280×720)		FHD Class (1920×720)		FHD1080 (1920×1080)		3K Class (2880×1080)	
		Part No.	Qty.	Part No.	Qty.	Part No.	Qty.	Part No.	Qty.
Timing Controller	LCD driver control	BU90AL211	1	BU90AL211	1	BU90AL210	1	BU90AL210	1
Source Driver	LCD panel drive	ML9882 (1440ch)	3	ML9882(1440ch)	4	ML9882(1440ch)	4	ML9882 (1440ch)	6
Gater Driver	LCD panel drive	ML9873 (960ch)	1	ML9873 (960ch)	1	ML9872 (540ch)	2	ML9872 (540ch)	2
PMIC	Multifunction power supply IC	BM81810MUV	1	BM81810MUV	1	BM81810MUV	1	BM81810MUV	1
Gamma Correction IC	Image correction	BD81849MUV	1	BD81849MUV	1	BD81849MUV	1	BD81849MUV	1

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Supporting functional safety

Each IC configured in the chipset integrates a function for mutually detecting the expected failure mode. As a result, it is possible to complementarily detect panel failure and confirm and provide feedback on information such as input signals to the LCD along with peeling/destruction of the LCD driver. Introducing functional safety contributes to the prevention of serious accidents caused by the malfunction of monitors for the speedometer, side mirrors, and other systems.

Examples of LCD Failure Detection by Chipset Functional Safety

| LCD Failure Mode		Black Screen	Freeze/Burn-In	Display Delay
Abnormality Occurrence Location		(Chipset Block diagram)	(Chipset Block diagram)	(Chipset Block diagram)
Expected IC Error Based on Abnormality Occurrence	PMIC	① Shutdown	—	—
	Timing Controller	② LVDS signal error ③ Internal register fault	⑦ LVDS signal error	—
	Source Driver	④ Input voltage error ← PMIC detected ⑤ No input signal ← T-CON detected ⑥ Fixed output Low	⑧ Indeterminate input signal	—
	Gate Driver	—	⑨ Input signal error ← T-CON detected	⑩ Input voltage error ← PMIC detected

PMIC (BM81810MUV)

Vcom, VGH Output Temperature Compensation Function

A thermistor is used to monitor the external temperature and automatically output the optimum voltage value using A/D and D/A converters. This is particularly effective for IPS LCD panels.
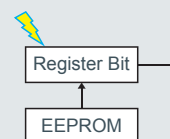
Adjust the variable temp. range

Adjust the variable voltage range
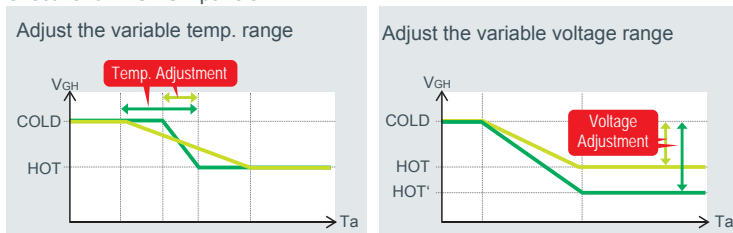
Double Register

Monitoring and matching bits (which are susceptible to damage due to noise and other factors) are performed using two registers
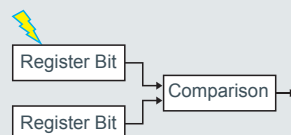
Data Refresh Function

This function prevents unexpected operation (i.e. due to noise) by reading the correct data from memory

Timing Controller (BU90AL211)

Fail Detection Function

Feedback is monitored using the DIO pin in each frame to diagnose signal transmission to the source driver. The timing controller continuously operates to detect system abnormalities.
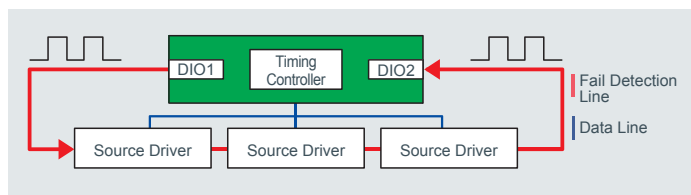
Source Driver (ML9882)

1440ch Driver Output

- 1440ch driver output optimized for FHD
- Wide LCD supply voltage range: 8.0 to 14.6V
- Supports RSDS (85MHz) and miniLVDS (300MHz)