

## NXP Chip-On-Glass (COG) LCD character drivers PCA2117 & PCF2117

# COG LCD character drivers for 2 lines by 20 characters & 200 icons

These highly integrated, full-featured drivers use programmable  $V_{LCD}$  (up to 16 V) and programmable frame frequency (up to 360 Hz) to support a wide range of applications, including high-contrast Vertical Alignment (VA) displays with true-black background and a wide viewing angle.

### KEY FEATURES

- ▶ 2-line display of up to 20 characters or 1-line display of up to 40 characters in 5 x 8 format plus 200 icons
- ▶ 240 characters in 5 x 8 format stored in CGROM
- ▶ Up to 48 user-defined characters in CGRAM
- ▶ Low-power mode for icon-only display
- ▶ On-chip generation of  $V_{LCD}$  from 4 to 16 V
- ▶ Software-programmable temperature compensation of  $V_{LCD}$  for high, stable contrast over full temperature range
- ▶ Software-programmable and calibrated frame frequency from 45 to 360 Hz
- ▶ Integrated temperature sensor with temperature readout
- ▶ Wide power supply range: 2.5 to 5.5 V
- ▶ 2-line I<sup>2</sup>C (up to 400 kHz) or 4-line SPI (up to 3 MHz) selectable via input pin
- ▶ Bare die with gold bumps for COG applications
- ▶ PCA2117DUG for automotive (-40 to +105 °C)
  - AEC-Q100 compliant
- ▶ PCF2117DUG for industrial and consumer (-40 to +85 °C)
  - NXP QRS compliant

### APPLICATIONS

- ▶ Automotive (PCA2117DUG)
  - Car radio
  - Instrument clusters
  - Car entertainment
  - Climate control
- ▶ Industrial and consumer (PCF2117DUG)
  - Machine control systems
  - Information boards
  - Measuring equipment
  - White goods
  - Medical and healthcare
  - General-purpose display modules
  - Home entertainment

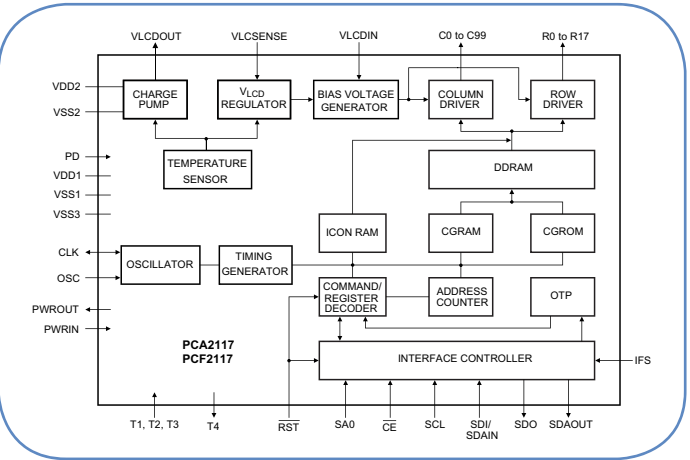
The NXP PCA2117 and PCF2117 are single-chip LCD drivers that can drive up to 2 lines by 20 characters or 1 line by 40 characters, plus 200 icons. The on-chip Character Generator ROM (CGROM) stores 240 characters. The initial release includes the character set "R" and "S" in CGROM; other character sets are available on request.



The Character Generator RAM (CGRAM) stores up to 48 user-defined characters.

Suitable for use with a wide range of LCDs, the drivers feature an internal charge pump with internal capacitors for on-chip generation of the LCD supply ( $V_{LCD}$ ) of up to 16 V.

To ensure optimal and stable contrast over the entire temperature range, the PCA2117 and PCF2117 include advanced temperature compensation of  $V_{LCD}$  with six temperature regions and eight programmable slopes in each region.



Block diagram

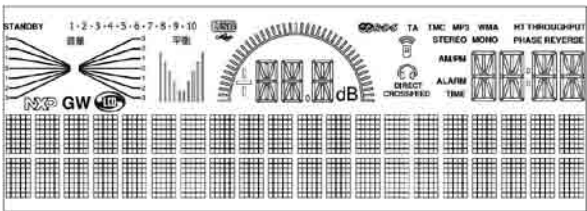
The PCA2117 and PCF2117 feature an internal oscillator that governs data flow from the internal RAM to the display.

The oscillator also generates the LCD frame frequency, which is factory-calibrated and programmable from 45 to 360 Hz.

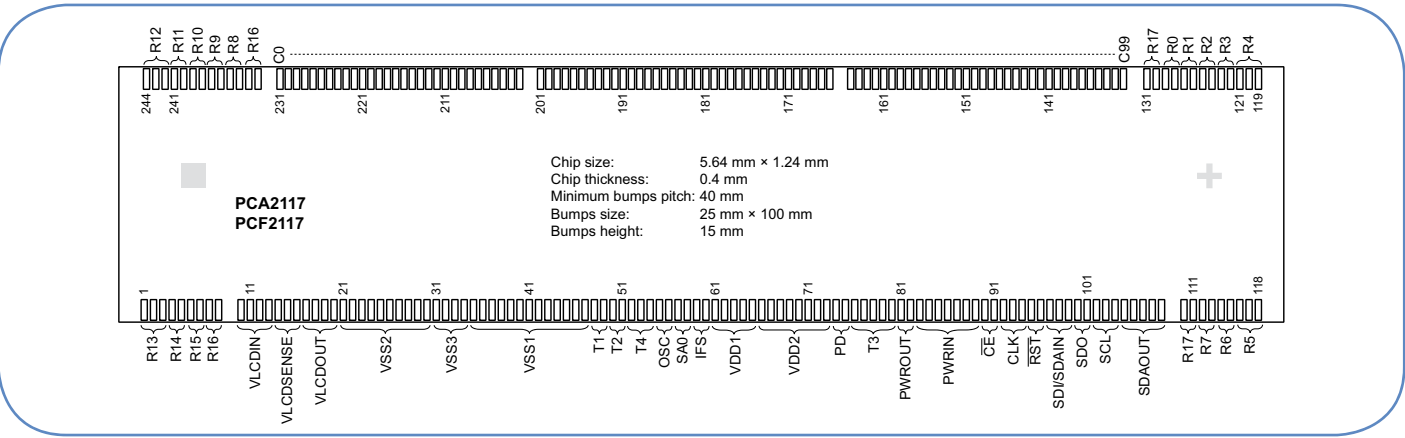
The PCA2117 and PCF2117 communicate via the two-line I<sup>2</sup>C-bus (up to 400 kHz) or the four-line SPI-bus (up to 3 MHz). The serial interface is selectable through an input pin.

Display up to 25 seven-digit elements with dot or a combination of seven-digit elements and icons

Display module



Display with 2-lines by 20 characters and additional 200 icons. The additional icons can be used to display up to 25 seven-digit elements with dot or a combination of seven-digit elements and icons.



Pinning information

Ordering information

Type	Package and description	Delivery format	IC version
PCF2117DUGx/DA x = R for character-set R x = S for character-set S	Bare die; 244 bumps; 5.64 x 1.24 x 0.4 mm; Gold bump hardness: 60 to 120 HV	Chip in tray	1
PCA2117DUGx/DA x = R for character-set R x = S for character-set S	Bare die; 244 bumps; 5.64 x 1.24 x 0.4 mm; Gold bump hardness: 60 to 120 HV	Chip in tray	1