TD4165

TDDI product brief

New 120 Hz Fine High Definition (fHD)
Touch and Display Driver Integration
for Next-Generation Smartphone LCD Displays

OMNIVISION Display Solutions' TD4165 touch and display driver integration (TDDI) supports up to 900p resolution and provides a solution for next-generation smartphone applications. The TD4165 is designed with interleave and sink-bump pin map to provide narrow border solutions for a-Si and LTPS panels.

The TD4165 enables 900RGB pixel fine high definition (fHD) resolution, up to 120 Hz display rate, and high touch report rate with multi-finger for LCD smartphones. The TD4165

cooperates with the panel to provide next-generation application of 900 x 2100 pixel at over 326 ppi, resulting in sharper, smoother, and more realistic display for the human eye. Upgraded from the TD4160 which is in mass production in hundreds of millions of tier-one OEM phones, OMNIVISION's new TD4165 is committed to providing innovative and stable solutions for customers.

Find out more at www.ovt.com.

TD4165

Applications

- smartphones

Touch Features

- multi-touch coordinate sensing without ghost points
  - voltage correction circuits enhance the sensitivity (supporting automatic calibration)
- RISC CPU optimized for capacitive sensing and other human interactions
- supports up to 18x32 electrodes to provide the maximum accuracy
  - analog front ends (AFEs) support up to 576 receiver pads
- supports I2C and SPI with OMNIVISION TouchComm protocol for communication with the host
- proprietary intelligent algorithms, run locally on the CPU facilitates removal of mechanical buttons and switches, which increases reliability and reduces footprint and component cost
- low power sensing modes enable wake-up gesture functionality

- face-detect proximity capability reduces cost by eliminating the need for other proximity sensing components
- display synchronization and increased voltage capability enable improved performance over discrete touch implementations
- programmable sensing speed of 50 kHz to 250 kHz to minimize noise interference
- includes support to control segmented VCOM in-cell touch scanning circuits and enable ultra-thin, low cost integrated sensing schemes
- high signal-to-noise ratio (SNR) touch AFE improves touch performance
- 120/60 Hz touch sensing
- low power wake-up gesture (LPWG)

Display Features

- 16.777M colors (24 bpp data format) single chip driver for a 256-grayscale TFT with a resolution of 900 RGB x 2100-dot graphics (with power supply circuits and supporting amorphous silicon (a-Si) panel)
- 4-lane/1-port MIPI DSI-2 D option interface for highspeed and low power transmission in both directions with low EMI noise (DSI-2 1.0, D-PHY1.1, DCS 1.2)
- 3-trio/1-port MIPI DSI-2 C option interface for more high-speed and low power transmission in both directions with fewer data lane number and low noise (DSI-2 1.0, C-PHY1.1, DCS 1.2)
- MIPI DSI-2 D option video image display interface (see patents) with 1.3 Gbps/lane
- MIPI DSI-2 C option video image display interface (see patents) with 1.1 Gsps/trio

- digital pixel processing
  - digital GAMMA for RGB separate gamma correction function
  - content adaptive backlight control (CABC)
  - color enhancement (CE) with color space management
  - sunlight readability enhancement (SRE) function
  - outline sharpness function
  - automatic contrast optimization (ACO) function
  - paper mode
- direct compressed data input
  - 1/3 data compressed data input with one port
  - compression interface supports DSC (VESA) version 1.2 (DSC v1.2 has backward compatibility with DSC v1.1 to change the PPS setting)
- low-power consumption architecture (allowing direct input of the interface I/O power supply)
  - input power supply voltage:
    - interface and logic power supply: IOVCC
    - analog power supply: VSP, VSN
    - MIPI D-PHY power supply: DPHYVCC
    - MIPI C-PHY power supply: DPHYVCC

Functional Block Diagram

OMNIVISION®