

## **Hitachi Releases 16 V LCD Drive Voltage, 480-Output, 256-Grayscale TFT Driver for SXGA and UXGA Size High-Definition, Wide-Viewing-Angle TFT LCD Panels**

— LCD panel data line drive achieved with eight (SXGA) or ten (UXGA) chips, for lower system cost —

Tokyo, June 7, 2001— Hitachi, Ltd. (TSE: 6501) today announced the HD66353 TFT LCD driver offering 480 outputs and 256-grayscale at an LCD drive voltage up to 16 V, as a data line driver for SXGA\*<sup>1</sup> and UXGA\*<sup>2</sup> size high-definition TFT LCD panels with a wide viewing angle. Sample shipments will begin on June 20, 2001 in Japan.

TFT LCD panels mounted in monitors, space-saving desktop PCs, and notebook PCs, are becoming available in larger screen sizes and are shifting high-definition from the XGA\*<sup>3</sup> to SXGA and UXGA. In addition, TFT LCD panels offering high display quality together with a wide viewing angle have appeared on the market, and are in increasing demand. However, TFT LCD panels offering a wide viewing angle require a high LCD drive voltage, bringing a need for an LCD driver capable of generating the necessary high voltage in addition to supporting high-definition display.

Hitachi has previously released the 384-output, 256-grayscale HD66351, with an LCD drive voltage of 14.5 to 15.5 V, and supporting the XGA and SXGA, as a data line driver for TFT LCD panels with a wide viewing angle, and is now extending the TFT driver lineup in response to market demand with the release of the HD66353, offering 480-output and 256-grayscale at an LCD drive voltage of 11 to 16 V, for use with SXGA and UXGA panels.

The HD66353 operates over a wide LCD drive voltage range, from a maximum of 16 V to a minimum of 11 V. The data line drive outputs, comprising 8-bit D/A converters and op-amps, accept 8-bit digital data per pixel and generate voltages for 256-grayscale. The output voltage generation circuitry employs Hitachi's original chopper type amplifiers, with automatic cancellation of deviations in output voltage between frames, enabling an output voltage precision of  $\pm 2$  mV to be achieved despite the high 16 V voltage level. This makes it possible to achieve an LCD panel offering a high-quality display with a wide viewing angle and 16.77-million color display capability.

The 480 data line drive outputs are an ideal number for configuring an SXGA or UXGA size screen. With the 480 outputs of the HD66353, SXGA LCD panel data line drive can be handled by eight chips, and UXGA by ten, compared with ten and 13 chips, respectively, in the case of current 384-output devices. This enables the number of system components to be reduced, and, with UXGA display in particular, makes it possible to design an efficient LCD panel that uses all the pins, in contrast to the inefficient situation with previous 384-output and 192-output devices where some pins are not used.

The internal circuits operate at a low voltage of 2.3 V, and the interface to external circuits such as an LCD drive timing controller has also been made operable at 2.3 V as a CMOS interface, enabling overall system voltage and power consumption to be reduced.

The HD66353 is available in a COF\*<sup>4</sup> or TCP\*<sup>5</sup> package.

Future plans call for further extension of the product lineup in line with trends in the TFT LCD panel market.

Notes:

1. SXGA (Super Extended Graphics Array): A display definition standard. The display comprises 1,280 × 1,024 dots.
2. UXGA (Ultra Extended Graphics Array): A display definition standard. The display comprises 1,600 × 1,200 dots.
3. XGA (Extended Graphics Array): A display definition standard. XGA is a trademark of IBM Corporation, indicating a display comprising 1,024 × 768 dots.
4. COF (Chip On Film): A package mounted on an ultra-thin-film tape, allowing bending of 1 mm or less.
5. TCP (Tape Carrier Package): A package mounted on a thin-film tape, allowing ultra-thin type mounting (1 mm or less)

#### < Typical Applications >

SXGA and UXGA TFT LCD panel (monitors, space-saving desktop PCs, notebook PCs)

#### < Prices in Japan > (For Reference)

Product Code	Shipment Form	Sample Unit Price (Yen)
HD66353C	COF	1,800
HD66353TA0	TCP	1,800

**< Specifications >**

<b>Item</b>	<b>Specification</b>
Function	TFT data line driver of 256-grayscale
Power supply voltage	2.3 V to 3.6 V (logic circuits) 11.0 V to 16.0 V (analog circuits)
Operation temperature	-20 to +75°C
Data input	48-bit digital input (8 bits × 6 pixels)
Display drive outputs	480 outputs
Output voltage precision	±2 mV (offset cancellation operating)
Clock frequency	70 MHz (V <sub>cc</sub> = 3.0 V to 3.6 V) 55 MHz (V <sub>cc</sub> = 2.7 V to 3.0 V) 45 MHz (V <sub>cc</sub> = 2.3 V to 2.7 V)
Other functions	Offset cancellation Dot inversion drive n-raster-row inversion drive Data inversion function
Packages	560-pin COF and TCP