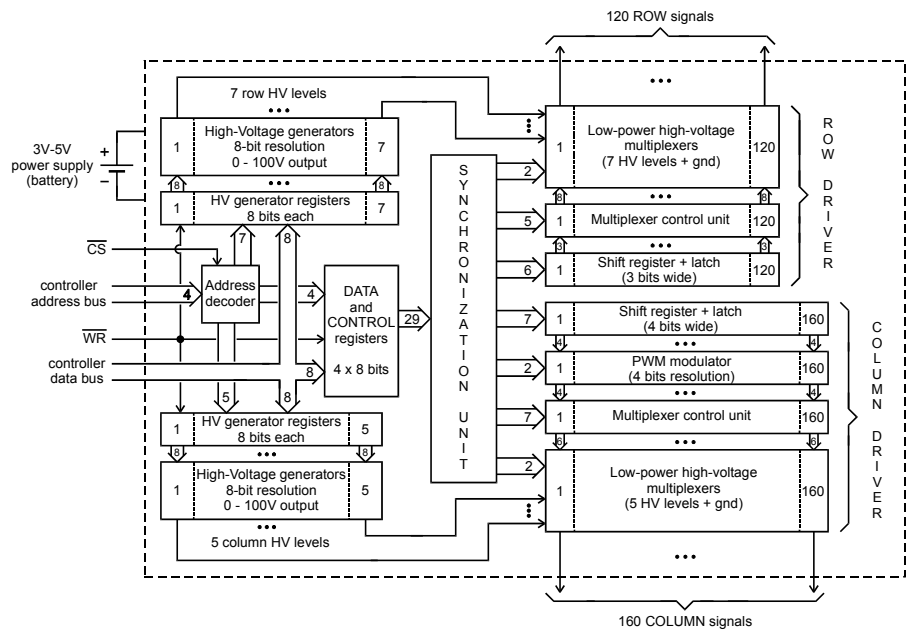


**A**dvanced  
**L**ow  
**P**ower,  
**H**igh-Voltage  
**A**ASIC for the  
**D**evelopment of  
**D**isplay  
**D**riving schemes

## Features

- 1/16 VGA output
- gnd to 100V line drive
- 4-bit gray levels (PWM, AM)
- 12 integrated 2.5V → 100V generators
- Ultra low power consumption
- 3 to 5V power supply
- Maximum flexibility in waveform synthesis



## Description

High-Voltage driver chip with integrated high-voltage generators. Combines 100 V driving capability with extremely low power consumption from a 3V battery (e.g. a total power dissipation below 20mW for a 1/16 VGA Cholesteric LCD during scanning). Intended for developing and prototyping different types of high-voltage display systems, it features maximum flexibility in waveform synthesis in order to achieve maximum optical performance at minimum power consumption.

## Low power, High-Voltage Multiplexer drivers

The row (column) driver consists of a 120 (160)-stage shift registers plus latch, a logical control unit and 120 (160) high-voltage multiplexers (0-100V) selecting one of 7 (5) high-voltage levels or ground. The column driver also contains a 4-bit PWM modulator for producing PWM gray shades. The level shifters employ the ‘dynamic charge control’ technique, where energy (6nJ @100V) is only consumed during the transition of each switch, avoiding the continuous power dissipation in traditional level shifters. The voltage switches can source 4mA and sink 1.5mA, the ground switch can sink 12mA. Response time is 2µs. All outputs are short-circuit protected.

## Integrated High-Voltage generators

The HV levels can be externally applied or internally generated by 7 row and 5 column generators from a 3V battery. All generators are digitally programmable between 2.5V and 108V with 8 bit resolution (0.43V).

- Non linearity: < 1 LSB
- Max. O/P current: 2mA @ 25V, 200µA @100V
- Efficiency: 60% @ 25V, 35% @100V
- Ripple: < 1LSB

## Interface and control

All functions of the chip are controlled by 16 internal registers (12 for the generators and 4 for the row and column drivers). Communication between these internal registers and an external µcontroller is established through standard data and address bus architecture.

## Physical features

19315µm X 18543µm naked die, 366pins @ 126µm pitch. Also available on 9X6cm<sup>2</sup> pcb with 600µm pitch fast-speed smd connector.

## Maximum flexibility in waveform synthesis

- Arbitrary waveform generation
- Low-speed conventional addressing schemes
- High-speed multi-phase dynamic driving schemes
- Bipolar or unipolar driver operation
- 4-bits PWM gray levels
- Full-color operation
- Charge recycling
- Global display reset

## Waveform Development Tool

The Alpha3D ASIC is specially designed for the “Waveform Development Tool”, a GUI-based waveform generator for developing and prototyping different types of high-voltage display systems.

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# Alpha3D

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## IMPORTANT NOTICE

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