iW7028 Product Summary

10-Channel LED Driver for LCD Panel Backlighting

1.0 Features

- 10-channel LED driver with external power MOSFET, with 5V and 9-16V(Typ=12V) input supply voltage range
- Patented BroadLED™ adaptive switch mode technology for high current matching at maximum efficiency
  - » Channel Current matching accuracy ±3%
  - » Enables use of cheaper, loosely binned LED arrays for lower BOM cost
- Dynamic external Boost or Buck controller interface to optimize system power efficiency
  - » Dual interface controls one or two DC-DC converters
  - » Programmable LED channel assignment for individual DC-DC converters
- High speed SPI interface and SPI daisy-chain support
- PWM-generator clock
  - » Internal OSC
  - » External clock (HSYNC)
  - » PLL-synthesized clock from external signal
- Industry only Patented Gate Sensing to detect channel short without external component
- Dimming control
  - » 12-bit PWM dimming range from 0% to 99.9%
  - » Supports direct PWM dimming control
- Supports Scan Mode
- Supports VSYNC frequency from 50Hz to 480Hz.
- Programmable external MOS driver slew rate
- Integrated OTP with 2 times programmable access
  - » With ECC for one bit error
  - » Two bit OTP error fault generation
- Programmable burn-in mode and direct PWM mode
- Supports different channel delay in all VSYNC range setting for every channel
- Comprehensive protection features
  - » LED open fault detection
  - » Programmable LED short level fault detection
  - » Over-temperature shutdown
  - » Over two OTP bits error shutdown
  - » Microcontroller interruption interface

2.0 Description

The iW7028 is a versatile, 10-channel, high precision LED backlight driver for medium to large size LCD display panels.

The LED current sink MOSFETs are external, allowing maximum flexibility for different current and voltage configurations. Built-in safety features include over-temperature shutdown, open and short LED detection.

High Speed SPI daisy-chain interface simplifies the system design when multiple IW7028s are used to support more than 10 LED strings.

Scan mode provide flexible PWM mode to reduce motion blur.

Internal PLL simplifies the system requirement with only Vsync signal needed.

It uses Dialog's patented 2-pin sensing technology to realize LED short detection.

3.0 Applications

- LED backlighting for LCD-TV sets and LCD monitors

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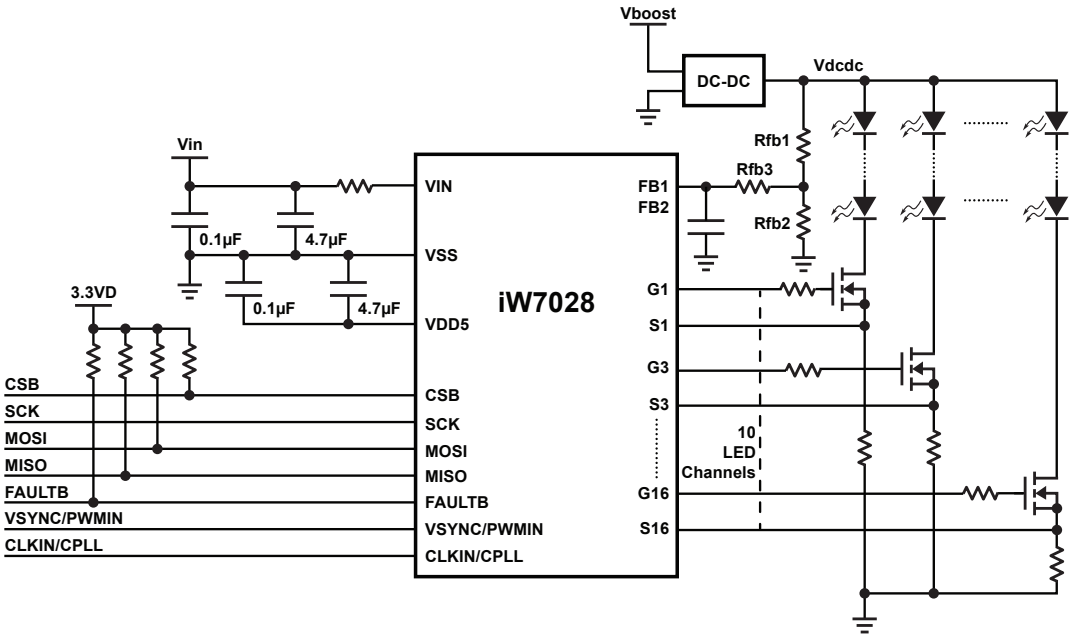


Figure 3.1 : iW7028 Application 1 Boost Diagram

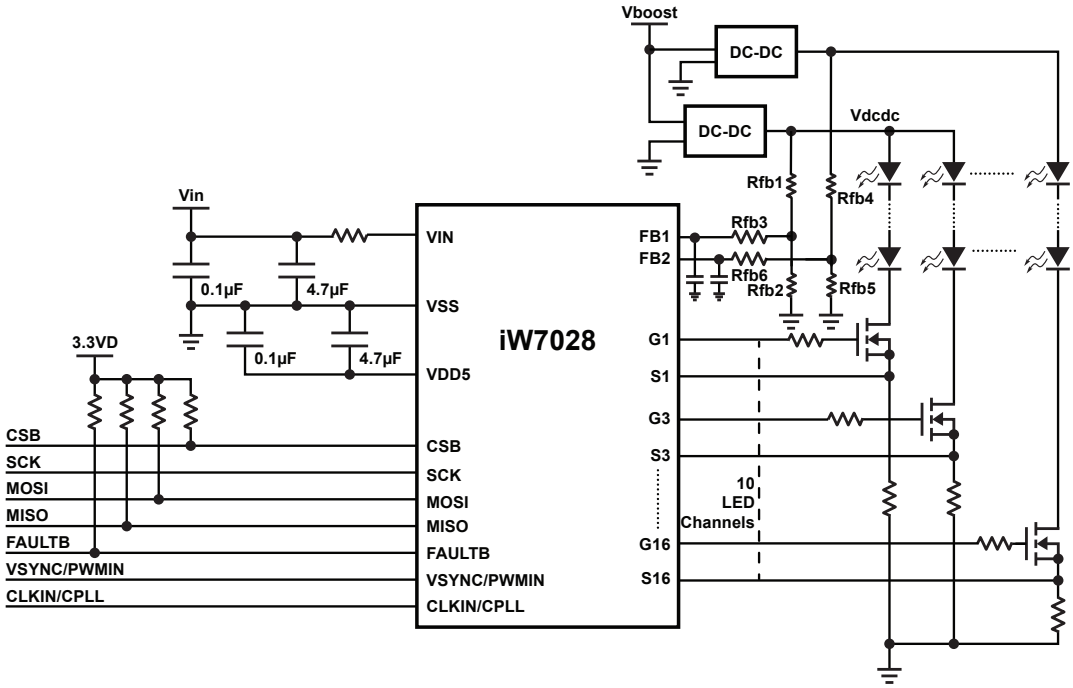


Figure 3.2 : iW7028 Application 2 Boost Diagram

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4.0 Pinout Description

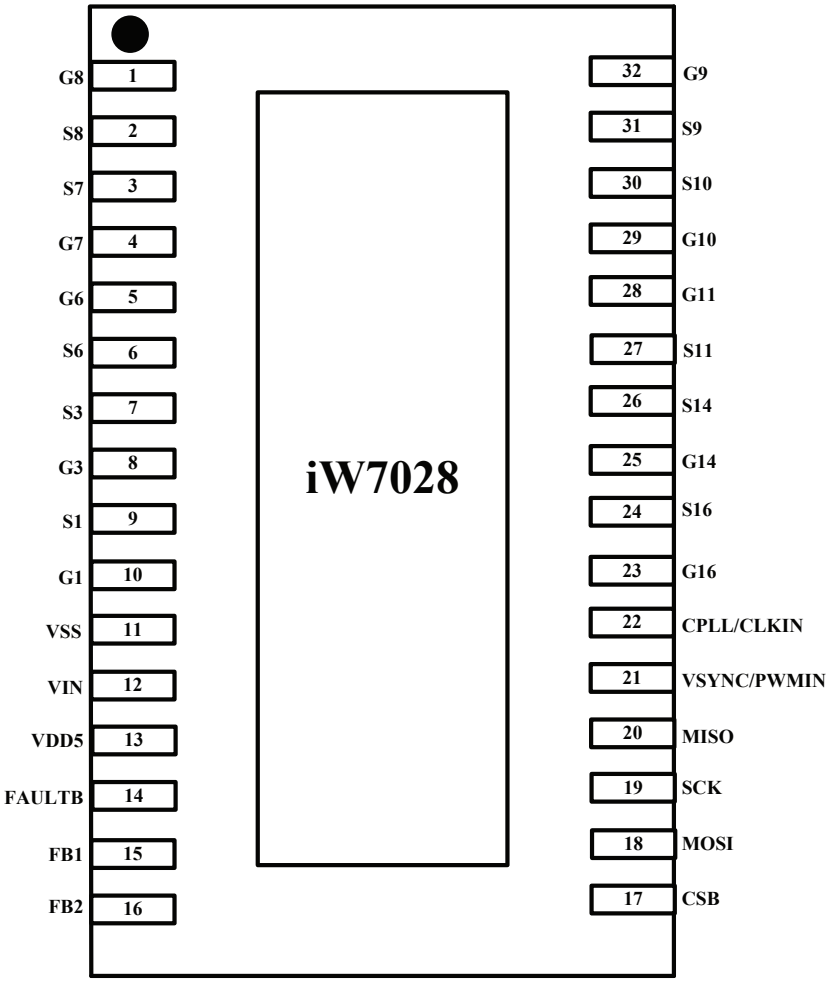


Figure 4.1 : iW7028 Pin Configuration for SOP32 Package

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Pinout Description (continued)

Pin Number in SOP32	Name	Type	Pin Description
1	G8	Analog Output	Gate of external MOSFET.
2	S8	Analog Input	Source of external MOSFET.
3	S7	Analog Input	Source of external MOSFET.
4	G7	Analog Output	Gate of external MOSFET.
5	G6	Analog Output	Gate of external MOSFET.
6	S6	Analog Input	Source of external MOSFET.
7	S3	Analog Input	Source of external MOSFET.
8	G3	Analog Output	Gate of external MOSFET.
9	S1	Analog Input	Source of external MOSFET.
10	G1	Analog Output	Gate of external MOSFET.
11	VSS	Ground	Chip ground.
12	VIN	Supply Input	Input voltage to the main supply rail.
13	VDD5	Analog Output	5V input and LDO compensation pin.
14	FAULTB	Analog Output	Fault status (active low) - open drain. Pull-up to 5V with a 100KΩ +5% resistor.
15	FB1	Analog Output	Analog DAC output interface with external Buck or Boost converter for LED.
16	FB2	Analog Output	Analog DAC output interface with external Buck or Boost converter for LED.
17	CSB	Digital Input	Slave select input for SPI (Chip Select Bar). Active LOW.
18	MOSI	Digital Input	Master output, slave input for SPI.
19	SCK	Digital Input	Serial clock input for Serial Peripheral Interface (SPI)/In Direct PWM Mode. It can be reused as PWM In.
20	MISO	Digital 3-State Output	Master input, slave output for SPI.
21	VSYNC/ PWMIN	Digital Input	VSYNC clock input in SPI dimming mode.
22	CPLL/CLKIN	Analog In/Out	PLL compensation output/External Clock In.
23	G16	Analog Output	Gate of external MOSFET.
24	S16	Analog Input	Source of external MOSFET.
25	G14	Analog Output	Gate of external MOSFET.

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Pinout Description (continued)

Pin Number in SOP32	Name	Type	Pin Description
26	S14	Analog Input	Source of external MOSFET.
27	S11	Analog Input	Source of external MOSFET.
28	G11	Analog Output	Gate of external MOSFET.
29	G10	Analog Output	Gate of external MOSFET.
30	S10	Analog Input	Source of external MOSFET.
31	S9	Analog Input	Source of external MOSFET.
32	G9	Digital Input	Gate of external MOSFET.

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5.0 Absolute Maximum Ratings

Absolute maximum ratings are the parameter values or ranges which can cause permanent damage if exceeded.

Parameter	Symbol	Value	Units
VDD5 supply voltage	V_{IN}	-0.3 to 7	V
V_{IN} supply voltage		-0.3 to 20	V
VSSA		-0.3 to 0.3	V
Logic I/O pins (SCK, SDO, SDI, CSB, & VSYNC)		-0.3 to 7	V
Maximum operating junction temperature	T_{JMAX}	-40 to 150	°C
Storage temperature	T_{STG}	-40 to 150	°C
Latch-up Current		>100	mA
ESD rating per JEDEC JESD22-A114 - HBM		±2,000	V

6.0 Recommended Operating Conditions

Parameter	Min	Typ	Max	Units
V_{IN} supply voltage	4.5/9	5/12	5.5/16	V
VDD5 supply voltage	4.5	5	5.5	V
Thermal resistance junction		35.72		°C/W
Junction temperature	-40		150	°C
Operate temperature (Co-operate)	-40		90	°C

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7.0 Physical Dimensions

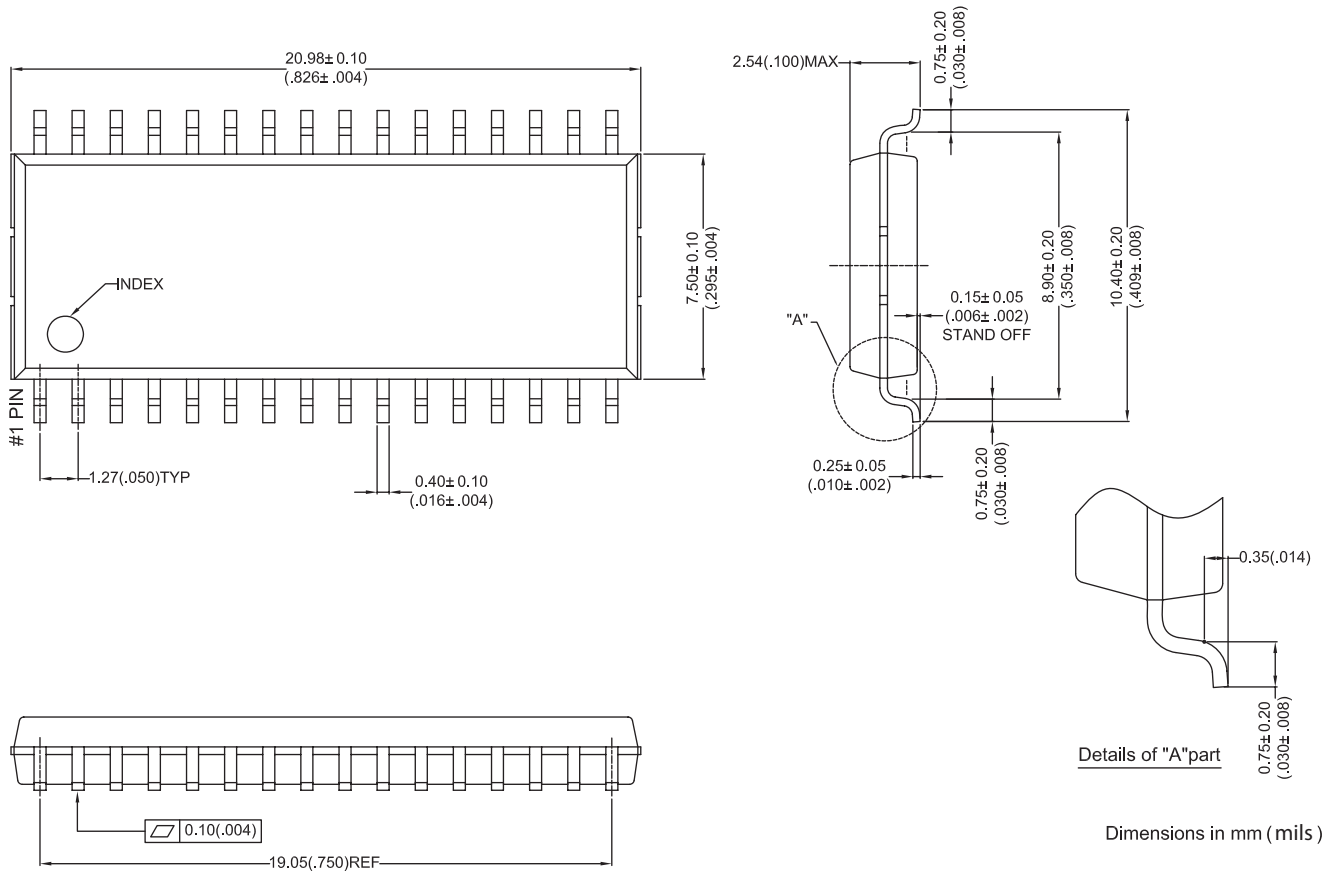


Figure 7.1 : Physical Dimensions, SOP-32 Package

This product is RoHS compliant and Halide free. Package is IPC/JEDEC Std 020D Moisture Sensitivity Level 3

8.0 Ordering Informaton

Part Number	Package	Description
iW7028-00-SO32	SOP300-32	Tape & Reel[1]

Note 1: Tape & Reel packing quantity is 1,000/reel. Minimum ordering quantity is 1,000.

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