iW7011 Product Summary

6-Channel LED Driver for LCD Panel Backlighting

1.0 Features

- 6-channel LED driver, 65V (max) per channel
- Integrated DC-DC boost controller
- Channel current matching accuracy ±2%
- Absolute current accuracy ±0.5%
- Support external power switches for both LED driver and DC-DC boost controller
- 10V to 28V input power supply
- Dimming control
  - » 14-bit at 120Hz, SPI dimming interface
  - » Direct 14-bit at 120Hz, adaptive phase-shifted PWM dimming
  - » 8-bit analog dimming
- PWM-generator clock sources
  - » Internal oscillator (Default)
  - » Internal PLL clock locked to VSYNC
  - » External master input clock
- Support VSYNC frequency from 50Hz to 480Hz
- Comprehensive protection features,
  - » LED open fault detection (MCU interrupt interface)
  - » Single-pin, 2-bit programmable LED short level (3 V/6V/12V) fault detection with default at 6V
  - » Over-temperature shutdown
  - » Boost controller over-current, over-voltage and UVLO protection
- Package QFP44 with 10mm x 10mm body at 0.8mm pitch
- Pin-out optimized for a single-layer PCB layout

2.0 Description

The iW7011 is a versatile, 6-channel, high precision LED backlight driver for medium to large size LCD display panels.

The DC-DC boost controller is integrated on-chip to provide high voltage power supply for the external LED strings. The LED current sink MOSFETs and boost power MOSFET are external, allowing maximum flexibility for different current and voltage configurations. Both SPI interface control and direct, phase shifted PWM mode control are supported. Built-in safety features include over-temperature shutdown, boost over-current and over-voltage gate shut down protection, as well as open and short LED detection.

3.0 Applications

- LED backlighting for LCD-TV sets and LCD Monitors

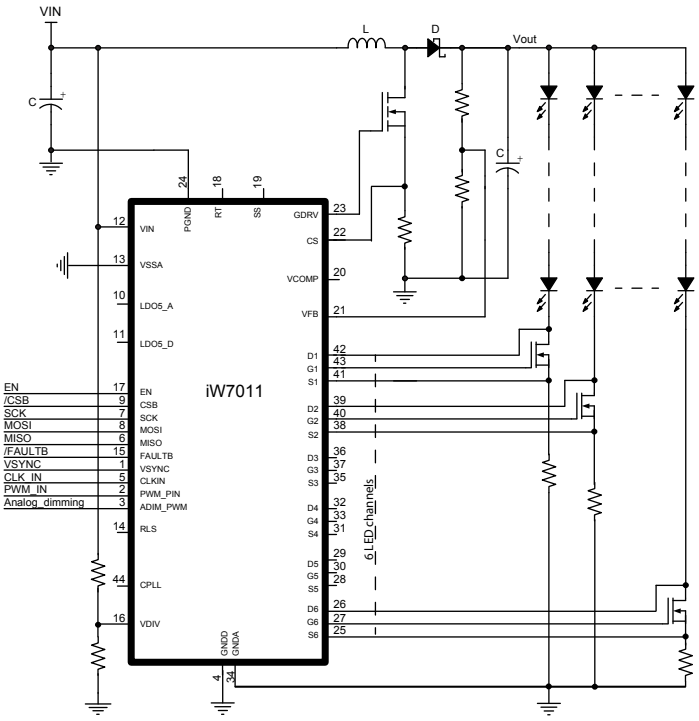
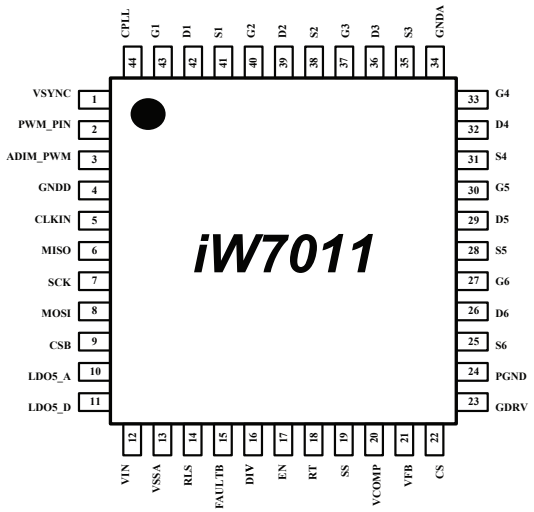


Figure 3.1 : iW7011 Simplified Application Diagram

4.0 Pinout Description



Pin #	Name	Type	Pin Description
1	VSYNC	Digital Input	VSYNC clock input in SPI dimming mode
2	PWM_PIN	Digital Input	Direct PWM dimming control input (direct PWM dimming mode)
3	ADIM_PWM	Digital Input	Analog dimming control input (direct PWM dimming mode)
4	GNDD	Ground	Digital ground
5	CLKIN	Digital Input	External clock input pin
6	MISO	Digital Output	SPI interface data output
7	SCK	Digital Input	SPI interface clock input (Logic high = 3.3V)
8	MOSI	Digital Input	SPI interface data input (Logic high = 3.3V)
9	CSB	Digital Input	SPI interface chip select input, active low. (Logic high = 3.3V)
10	LDO5_A	Analog Output	LDO compensation pin for internal analog power supply
11	LDO5_D	Analog Output	LDO compensation pin for internal digital power supply
12	VIN	Analog Input	Chip power supply input
13	VSSA	Ground	Quiet analog ground for voltage and current references
14	RLS	Analog Input	LED short levels selection with using different resistor values
15	FAULTB	Digital Output	Fault output (active low, open drain)
16	VDIV	Analog Input	Boost UVLO comparator input to detect a voltage of 1.2V
17	EN	Digital Input	Chip enable input (Logic high = 3.3V)
18	RT	Analog Input	Programmable boost switching frequency (ground: 128KHz; ldo5_a: 179KHz)
19	SS	Analog Input	Programmable soft start time through external capacitor
20	VCOMP	Analog Input	Boost controller loop compensation
21	VFB	Analog Input	Boost controller feedback pin (regulated at 1.2V)
22	CS	Analog Input	Boost current sense input

Pinout Description (cont.)

Pin #	Name	Type	Pin Description
23	GDRV	Analog Output	Boost gate drive for external MOSFET
24	PGND	Ground	Noisy boost gate pre-driver ground path
25	S6	Analog Input	Source of external MOSFET
26	D6	Analog Input	Drain of external MOSFET
27	G6	Analog Output	Gate of external MOSFET
28	S5	Analog Input	Source of external MOSFET
29	D5	Analog Input	Drain of external MOSFET
30	G5	Analog Output	Gate of external MOSFET
31	S4	Analog Input	Source of external MOSFET
32	D4	Analog Input	Drain of external MOSFET
33	G4	Analog Output	Gate of external MOSFET
34	GNDA	Ground	Ground sensing for ILED ground on PCB. Put ILED ground as close as possible to this pin
35	S3	Analog Input	Source of external MOSFET
36	D3	Analog Input	Drain of external MOSFET
37	G3	Analog Output	Gate of external MOSFET
38	S2	Analog Input	Source of external MOSFET
39	D2	Analog Input	Drain of external MOSFET
40	G2	Analog Output	Gate of external MOSFET
41	S1	Analog Input	Source of external MOSFET
42	D1	Analog Input	Drain of external MOSFET
43	G1	Analog Input	Gate of external MOSFET
44	CPLL	Analog Output	PLL external loop filter pin

5.0 Absolute Maximum Ratings

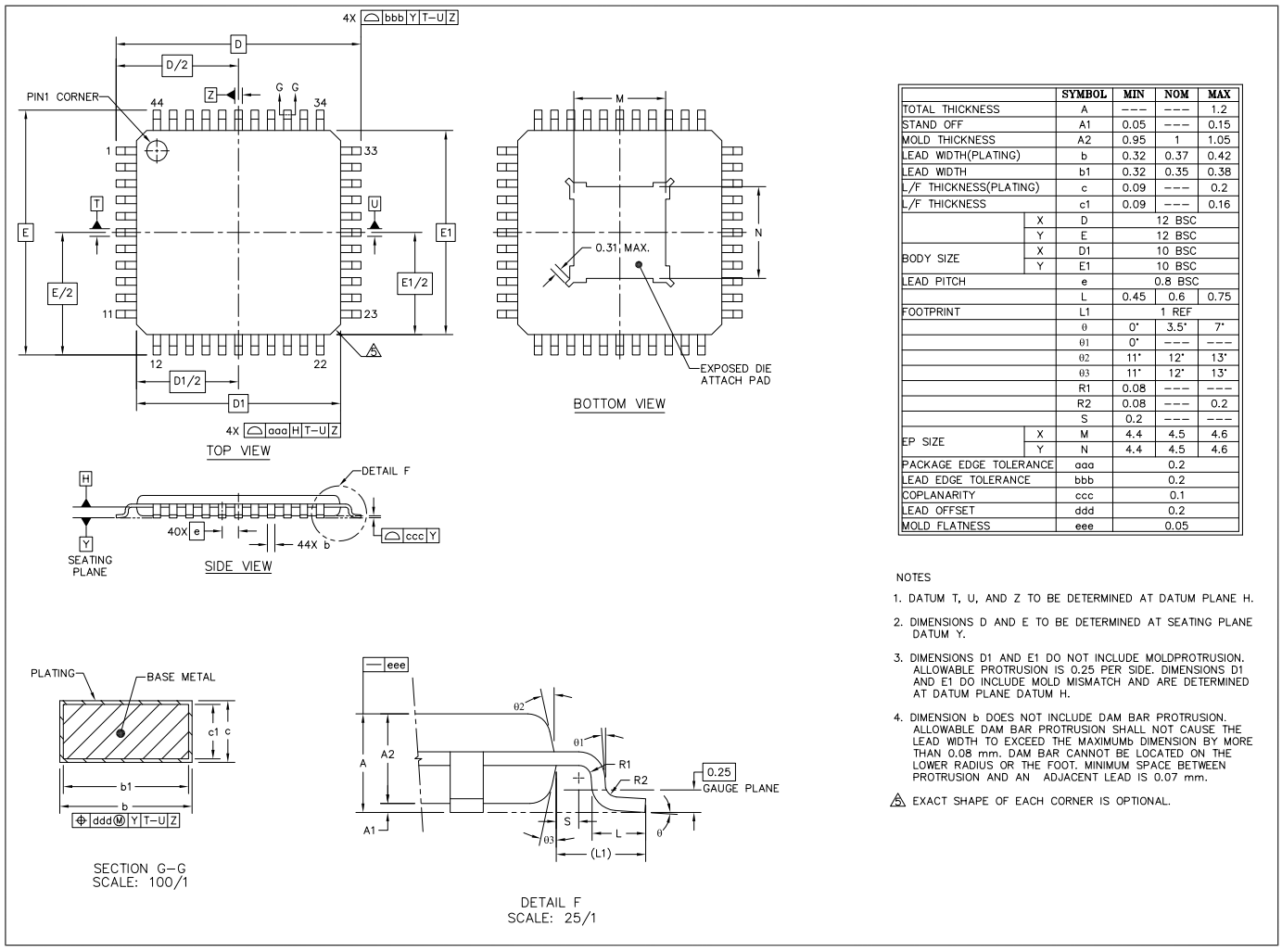
Absolute maximum ratings are the parameter values or ranges which can cause permanent damage if exceeded. For maximum safe operating conditions, refer to Electrical Characteristics in Section 7.0.

Parameter	Symbol	Min	Units
DC supply voltage at V_{IN}	V_{IN}	-0.3 to 28	V
Maximum voltage for 5V pins	V_{5V}	-0.3 to 7	V
Maximum voltage for pin D1-D6	V_{Dx}	-0.3 to 65	V
Latch-up immunity	$I_{latchup}$	±1000	mA
Storage temperature	T_{STRG}	-55 to 150	°C
Humidity		5 to 85	%
Electrostatic discharge on all 5V pins	V_{ESD}	±2,000	V
Body temperature during soldering	T_{BODY}	260	°C

6.0 Recommended Operating Conditions

Parameter	Min	Typ	Max	Units
Thermal resistance junction		50		°C/W
Operating temperature	-40		90	°C
Junction temperature	-40		150	°C
LEDn voltage			65	V
Supply voltage	10		28	V

7.0 Physical Dimensions



		SYMBOL	MIN	NOM	MAX
TOTAL THICKNESS		A	---	---	1.2
STAND OFF		A1	0.05	---	0.15
MOLD THICKNESS		A2	0.95	1	1.05
LEAD WIDTH(PLATING)		b	0.32	0.37	0.42
LEAD WIDTH		b1	0.32	0.35	0.38
L/F THICKNESS(PLATING)		c	0.09	---	0.2
L/F THICKNESS		c1	0.09	---	0.16
BODY SIZE	X	D		12 BSC	
	Y	E		12 BSC	
	X	D1		10 BSC	
	Y	E1		10 BSC	
LEAD PITCH		e		0.8 BSC	
		L	0.45	0.6	0.75
FOOTPRINT		L1		1 REF	
		θ	0°	3.5°	7°
		θ1	0°	---	---
		θ2	11°	12°	13°
		θ3	11°	12°	13°
		R1	0.08	---	---
		R2	0.08	---	0.2
		S	0.2	---	---
EP SIZE	X	M	4.4	4.5	4.6
	Y	N	4.4	4.5	4.6
PACKAGE EDGE TOLERANCE		aaa		0.2	
LEAD EDGE TOLERANCE		bbb		0.2	
COPLANARITY		ccc		0.1	
LEAD OFFSET		ddd		0.2	
MOLD FLATNESS		eee		0.05	

NOTES

1. DATUM T, U, AND Z TO BE DETERMINED AT DATUM PLANE H.
2. DIMENSIONS D AND E TO BE DETERMINED AT SEATING PLANE DATUM Y.
3. DIMENSIONS D1 AND E1 DO NOT INCLUDE MOLDPROTRUSION. ALLOWABLE PROTRUSION IS 0.25 PER SIDE. DIMENSIONS D1 AND E1 DO INCLUDE MOLD MISMATCH AND ARE DETERMINED AT DATUM PLANE DATUM H.
4. DIMENSION b DOES NOT INCLUDE DAM BAR PROTRUSION. ALLOWABLE DAM BAR PROTRUSION SHALL NOT CAUSE THE LEAD WIDTH TO EXCEED THE MAXIMUMb DIMENSION BY MORE THAN 0.08 mm. DAM BAR CANNOT BE LOCATED ON THE LOWER RADIUS OR THE FOOT. MINIMUM SPACE BETWEEN PROTRUSION AND AN ADJACENT LEAD IS 0.07 mm.

⚠5 EXACT SHAPE OF EACH CORNER IS OPTIONAL.

This product is RoHS compliant and Halide free.

Package is IPC/JEDEC Std 020D Moisture Sensitivity Level 3

Figure 7.1 : Physical dimensions TQFP44 (10mm x 10mm)

8.0 Ordering Information

Part Number	Package	Description
iW7011-CU-TQ2E-1	TQFPEP-10m-44L	Tape & Reel[1]
iW7011-CU-TQ2E-2	TQFPEP-10m-44L	Tray[2]

Note 1: Tape & Reel packing quantity is 1,250/reel. Minimum ordering quantity is 1,250.

Note 2: Tray minimum packing quantity is 800/carton. Minimum ordering quantity is 800.

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