

# LX24232 - 32 Channel BackLight LED Driver

#### DESCRIPTION

# The LX24232 is a 32-channel display backlight LED controller. The device is part of a chipset consisting of the LX24232 and the LX23108A 8-channel LED driver. Each controller is capable of controlling up to 32 LED channels, by controlling up to four LX23108A LED drivers. Each driver contains eight FETs and controls up to 4 x 8 LED channels, where each channel is capable of driving a current of up to 200mA.

The LX24232 has 32 independent, frame-by-frame controlled PWM output channels; each output channel supports independent duty-cycle and phase delay control. It uses a  $V_{\text{sync}}$  input for flexible synchronization schemes, including synchronization to either rising or falling edges, optimal  $V_{\text{sync}}$  jitter support, as well as single or multiple PWM cycles per frame support, and loss of  $V_{\text{sync}}$  support.

The LX24232 consists of an on-chip internal power supply control circuitry that can be used to adjust the voltage level of an external LED power source. This is done by regulating the LED supply voltage to the optimum level, and thus minimizing the system power loss. At the same time, accurate current regulation for each of the 32 LED strings is maintained.

The LX24232 includes an on-chip analog to digital converter for drain voltage (VD) measurements, for power supply control, fault detection and protection. The device is configured through the SPI interface which speeds up communication and reduces the number of control signals between the LX24232 and the host system (FPGA, Video Processor, and CPU).

The LX24232 supports a daisy chain connection in case more than 32 channels are required and can detect three types of system faults on each of its 32 channels (over-temperature, open LEDs and short LEDs). After detecting the faults the unit takes the required measures to protect the system.

The LX24232 is capable of controlling up to 8 LX23108A drivers, in a special configuration where two consecutive channels are connected together for increased current support. Refer to the application note for more details.

### KEY FEATURES

- White LED or RGB BackLight driver for large size display panels
- Up to 32 LED strings with ±1.5% precision current matching
- Wide dimming ratio with PWM and LED current amplitude control
- 12-bit PWM duty-cycle resolution and 8-bit resolution for LED current setting
- LED power supply voltage control
- SPI communication interface
- Open string, short LED and over-temperature protection for each individual channel
- On-chip thermal monitoring

	PACKAGE ORDER INFO
T <sub>A</sub> (°C)	Plastic 8x8mm QFN 56 pin
	RoHS Compliant/Pb free
-40 to +85°C	LX24232ILQ
Note: Available in Tape & Reel. Append the letters "TR" to the part number. (i.e. LX24232ILQ-TR)	



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# **Pin Configuration**

	PSEL_SIG PWM00 PWM01 PWM02 PWM03 PWM06 PWM06 PWM06 PWM06 PWM07 PWM09 PWM10 PWM11 PWM11	
PS_CTRL	1 56 55 54 53 52 51 50 49 48 47 46 45 44 43 42	PWM13
SDI	2 41	PWM14
MOD0	3 40	PWM15
MOD1	4 39	FAULT_IN
CLK	5 38	VZAP
SCAN0	6 LX24232ILQ 37	VREF
SCAN1	7	ATB_P
VDD	8 32-CHANNEL 35	ATB_N
SCAN2	9 LED DRIVER 34	VDMEAS
SCAN3	10 33	VCC
SCK	11 32	PSEL_CLK
CS_N	12 31	PWM16
SYNC_IN	13 30	PWM17
SYNC_OUT	14 29	PWM18
15 16 17 18 19 20 21 22 23 24 25 26 27 28		
	PWM20 PWM21 PWM21 PWM22 PWM23 PWM24 PWM26 PWM26 PWM26 PWM27 PWM27 PWM28 PWM30 PWM30 PWM31	

### ABSOLUTE MAXIMUM RATINGS

Notes: Exceeding these ratings could result in damage to the device. All voltages are with respect to Ground.

## THERMAL DATA (POWER CONSUMPTION)

21°C/W - according to JESD51-7.

THERMAL RESISTANCE-JUNCTION TO AMBIENT

Junction Temperature Calculation:  $T_J = T_A + (P_D \times \theta_{JA})$ .

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