AAT2430A

Sixteen-Channel White LED Driver Solution with LED Current and Timing Control

General Description

The AAT2430A is a highly integrated, high efficiency white LED backlight solution for large size LCD panels used in LCD TVs. By controlling external power MOSFETs (such as the Skyworks' AAT2491 high-voltage TrenchDMOS array), the AAT2430A facilitates 16 current sink channels to provide precision, constant-current drive for strings of white LEDs, where the number of series-connected LEDs per string is only limited by the system LED voltage supply. Current in each backlight string and string-to-string matching is controlled using I-Precise™ sensing and control circuitry, a novel on-chip method to accurately control drain current in external discrete power MOSFETs independent of their construction and without the need for precision sense resistors.

A 15MHz SPI compatible interface allows fast, independent digital control of each current sink. Full scale LED current is programmed using an external resistor. DOT correction may be applied globally to all sink channels with 8-bit resolution. Both phase delay and grayscale clock (GS Clock) PWM on-time are user programmable with 12-bit resolution for each current sink channel. Timing and synchronization are determined by externally applied V_{SYNC} and GS Clock signals.

The AAT2430A provides latched fault handling and fault reporting through the SPI interface and fault flag output pin. The fault detection system reports open or short circuit LED strings and over-temperature events. The short circuit LED detection threshold is user programmable.

The LED string supply voltage may be regulated by using the voltage or current mode current sense feedback signal to the LED voltage regulator. This analog signal represents the highest V_F string of LEDs. Thermal protection circuitry shuts down the device in the event of an over-temperature condition.

The AAT2430A is available in the Pb-free, thermally enhanced 64-pin 9mm x 9mm QFN and 64-pin 14mm x 14mm LQFP packages.

Features

- V_{IN} Range: 10.8V – 28V
- 16 Programmable LED Current Sinks
  - ±1.5% Accuracy @ 25°C
  - ±1.5% Matching @ 25°C
- SPI Interface
  - Digitally Programmable Individual Channels
  - Up to 15MHz Clock Speed
  - Read/Write Registers
- High Resolution Digital Control for Individual Channels
  - 12-Bit Resolution Grayscale PWM Brightness
  - 12-Bit Resolution Channel Phase Delay
  - 8-Bit Resolution Global Current Setting (Dot Correction)
- V_{SYNC} PWM and Delay Synchronization
- Integrated Fault Protection
  - Open Circuit LED(s)
  - Programmable Short LED Threshold
  - Over-Temperature Protection
- 3D Feedback Function
- 9mm x 9mm 64-pin QFN Package with 0.5mm pitch or 14mm x 14mm 64-pin Low Profile QFP Package with 0.8mm pitch

Applications

- Large Size LCD TVs, Panels
- White LED Backlight, Dynamic Edge LCD TV Backlight

AAT2430A

Sixteen-Channel White LED Driver Solution with LED Current and Timing Control

Ordering Information

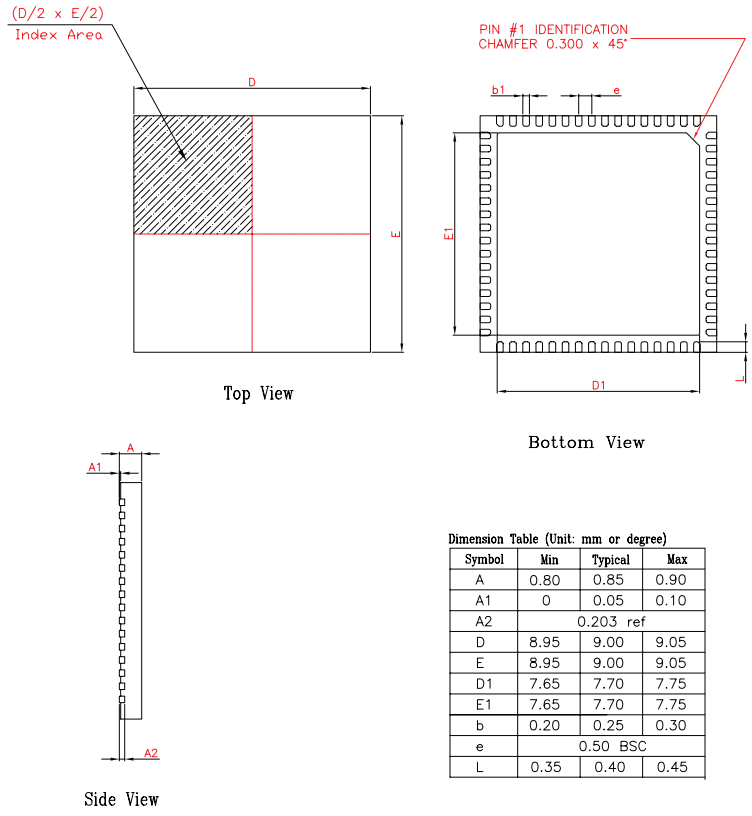
Package	Marking[1]	Part Number (Tape and Reel)[2]
QFN99-64	W6XYY	AAT2430AIDX-T1
LQFP1414-64	XXYY 2430A	**AAT2430AISX-T1**

Skyworks Green™ products are compliant with all applicable legislation and are halogen-free. For additional information, refer to *Skyworks Definition of Green™*, document number SQ04-0074.

Package Information

Dimensions subject to change without notice.

QFN99-64



Dimension Table (Unit: mm or degree)

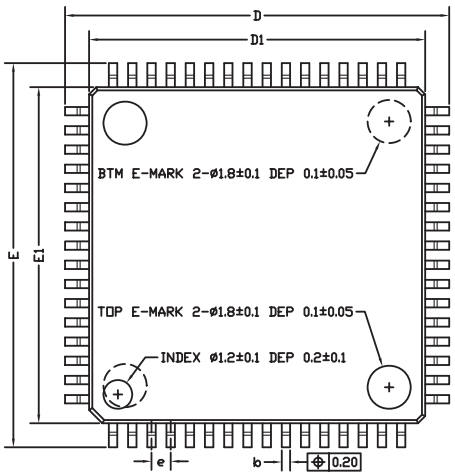
Symbol	Min	Typical	Max
A	0.80	0.85	0.90
A1	0	0.05	0.10
A2		0.203 ref	
D	8.95	9.00	9.05
E	8.95	9.00	9.05
D1	7.65	7.70	7.75
E1	7.65	7.70	7.75
b	0.20	0.25	0.30
e		0.50 BSC	
L	0.35	0.40	0.45

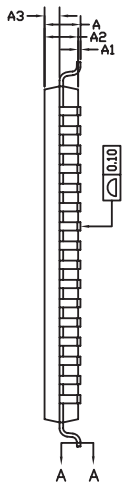
All dimensions in millimeters.

1. XYY, XXYY = assembly and date code.
2. Sample stock is generally held on part numbers listed in **BOLD**.
3. The leadless package family, which includes QFN, TQFN, DFN, TDFN and STDFN, has exposed copper (unplated) at the end of the lead terminals due to the manufacturing process. A solder fillet at the exposed copper edge cannot be guaranteed and is not required to ensure a proper bottom solder connection.

Skyworks Solutions, Inc. • Phone [781] 376-3000 • Fax [781] 376-3100 • sales@skyworksinc.com • www.skyworksinc.com

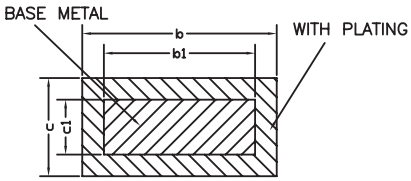
LQFP1414-64



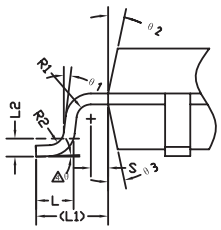


SYMBOL	MIN	NOM	MAX
A	–	–	1.60
A1	0.05	–	0.15
A2	1.35	1.40	1.45
A3	0.59	0.64	0.69
b	0.31	–	0.44
b1	0.30	0.35	0.40
c	0.13	–	0.18
c1	0.12	0.127	0.134
D	15.80	16.00	16.20
D1	13.90	14.00	14.10
E	15.80	16.00	16.20
E1	13.90	14.00	14.10
e	0.70	0.80	0.90
L	0.45	0.60	0.75
L1	1.00REF		
L2	0.25BSC		
R1	0.08	–	–
R2	0.08	–	0.20
S	0.20	–	–
θ	0°	3.5°	7°
θ 1	0°	–	–
θ 2	11°	12°	13°
θ 3	11°	12°	13°

NOTES:
ALL DIMENSIONS MEET JEDEC STANDARD MS–026 BEB DO NOT INCLUDE MOLD FLASH OR PROTRUSIONS.



Section A-A



All dimensions in millimeters.