Raffar Technology Corp.

RT5965

16 channel PWM Constant Current LED Driver IC built-in SRAM for maximum 64 Time-Multiplexing LED Display

2020/06

Version: 0.5 (Preliminary)

Description

RT5965 is a PWM constant current LED driver IC with built-in 32K-bit SRAM to support time-multiplexing up to 64 scans in high refresh rate program. The 16 constant current outputs of RT5965 are kept from influence of loading effect. The output current can be optimized by setting an external resistor and adjusted by 6-bit current gain.

By sending the complete frame data for the 32K-bit SRAM of RT5965, the display can be running on an efficiency of data transmission without increasing DCK clock frequency. The GCK multiplier technology is easy to raise the display visual refresh rate without increasing the clock frequency of GCK. In addition, RT5965 also builds in innovative functions of eliminating ghost issue and relieving LED cross bright line caused by LED defected. A built-in smart power saving technology is helpful to reduce the power consumption of LED display.

Applications

Fine pitch full color LED display
Mini LED, Micro full color LED display

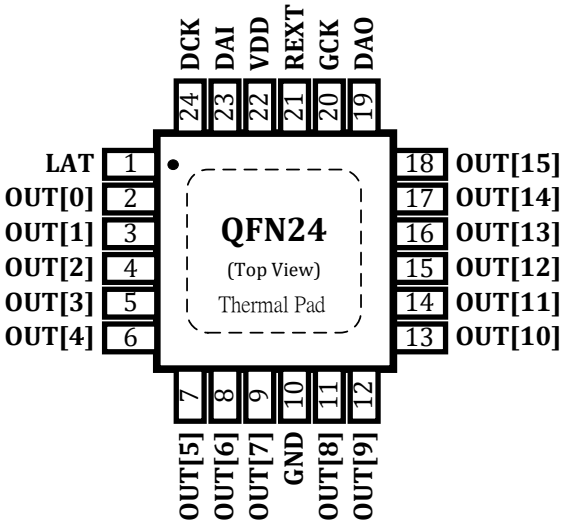
Package Information

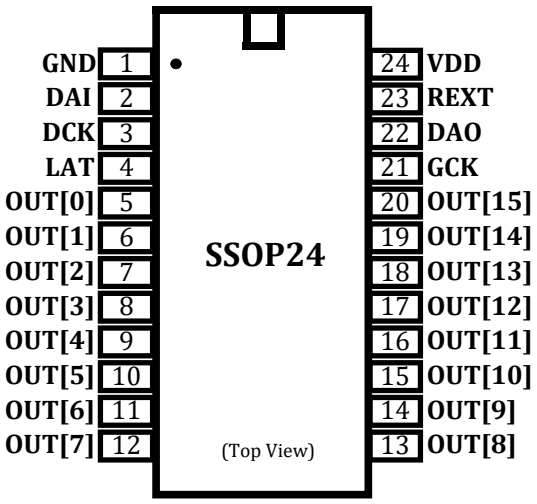
No.	Part No.	Package
1	RT5965SS	SSOP24-150 mil-0.635 mm
2	RT5965QN	QFN24-4*4mm

Features

- Supply voltage : 3.3V~ 5.0V
- Support time-multiplexing from 1~64 scans with built-in 32K-bit SRAM
- 16 constant current outputs
- Constant current output range : 0.5~25mA @ VDD= 4.2V~5.0V
- Selectable PWM control with spreading PWM pulse output mode to support HDR:
  - 16/15 bits grayscale level
  - 14/13 bits grayscale level to improve the visual refresh rate
- 64 steps current gain adjustment (40%~160%)
- GCK multiplier technology to improve the visual refresh rate
- Anti-ghost circuit and first-line dark compensation technology
- Eliminating bright line caused by defected LEDs
- LED open/short detection
- Smart power saving technology
- Low grayscale and brightness improvement functions
- Accurate constant output current driving:
  -Channel to Channel: ±1% (Typ.)
  -Chip to Chip: ±1% (Typ.)

Pin Assignment



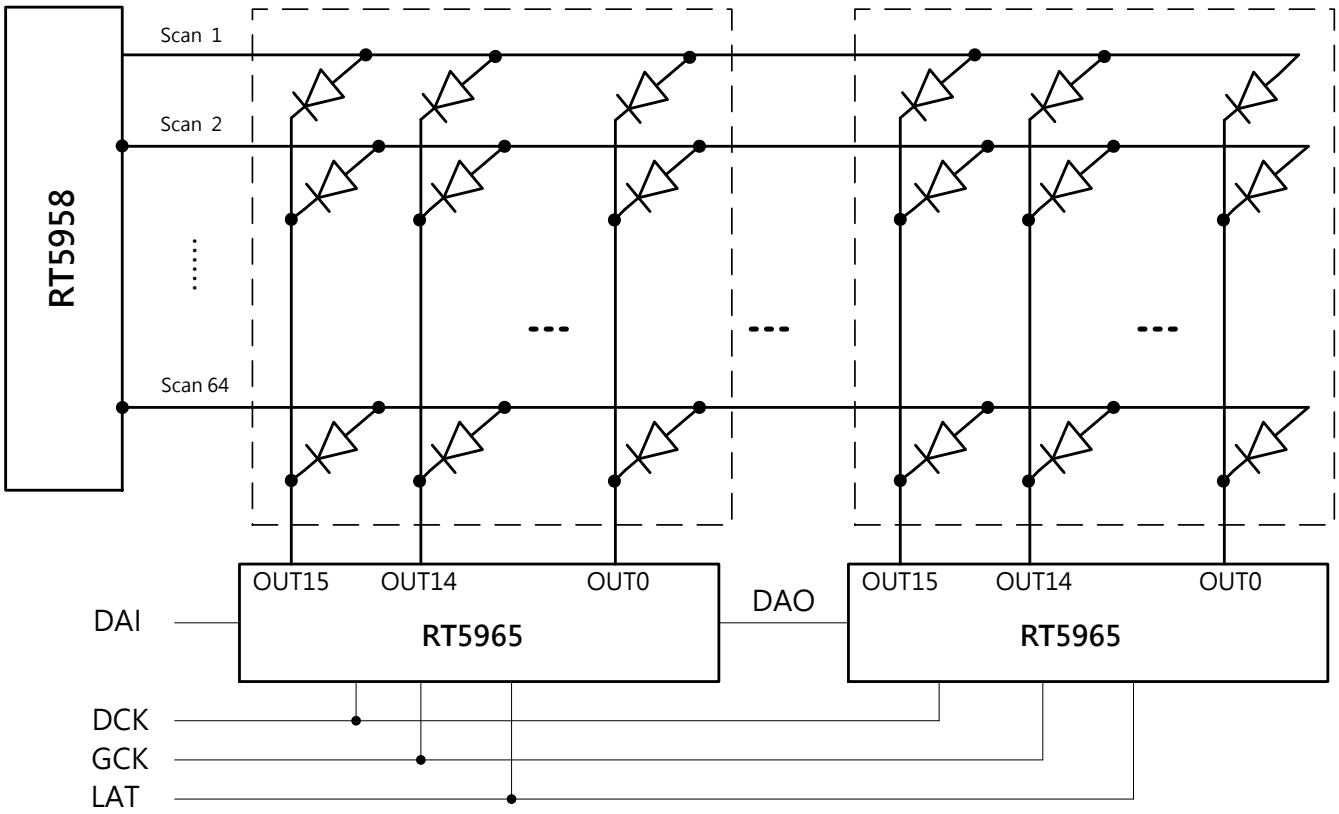


Pin Name	Description
GND	Ground terminal
DAI	Serial data input
DCK	Clock signal input for serial data
LAT	Input data strobe signal
OUT[0-15]	Constant current outputs
GCK	Clock signal input for gray scale
DAO	Serial data output
REXT	External resistor terminal , to set the output current
VDD	Supply voltage terminal
Thermal pad	QFN24: Floating or connect to GND

The Typical Design Structure of scan type LED Display

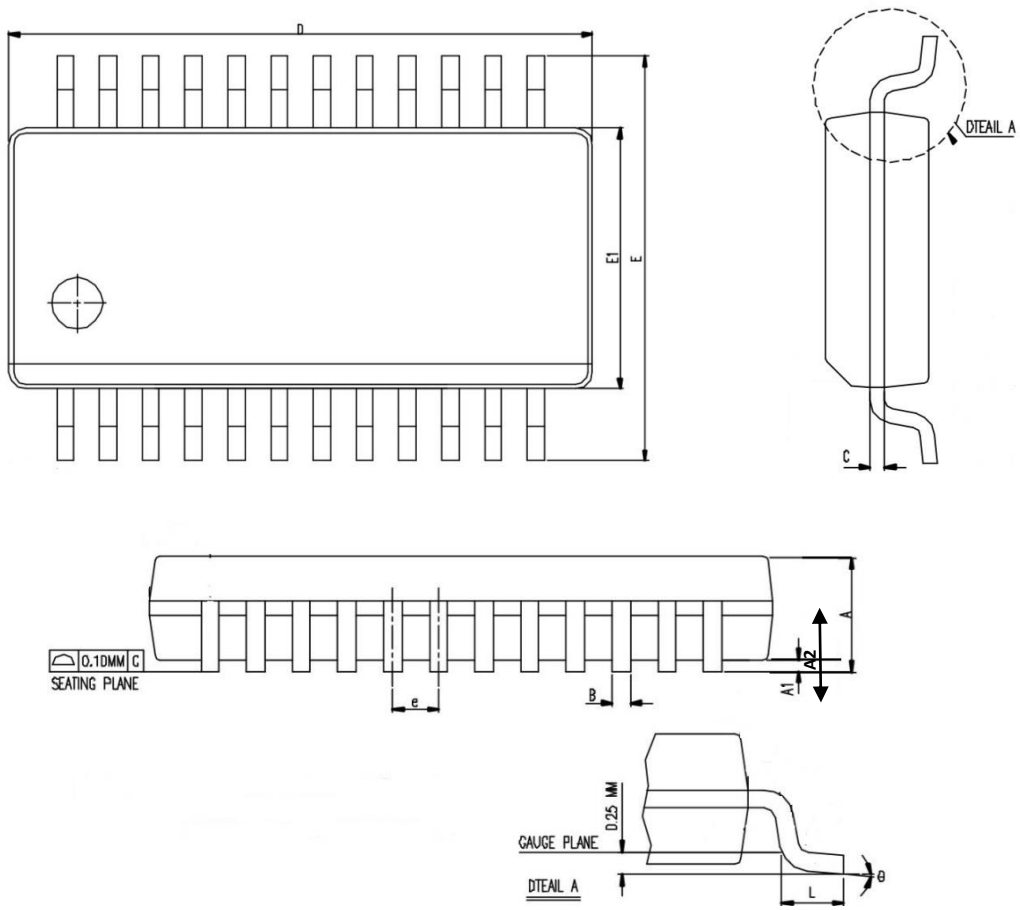
The structure below shows the N-row multiplexing LED display application with RT5965.
RT5965 is controlled by the command data composing of DCK and LAT as well as DAI and DAO for PWM data. In the meanwhile, OUT0~OUT15 switch to different scan by the gate ICs, RT5958, Scan1~Scan64 (max.), for displaying the image data.

Note: The external resistor of REXT pin has to be pulled low to GND.



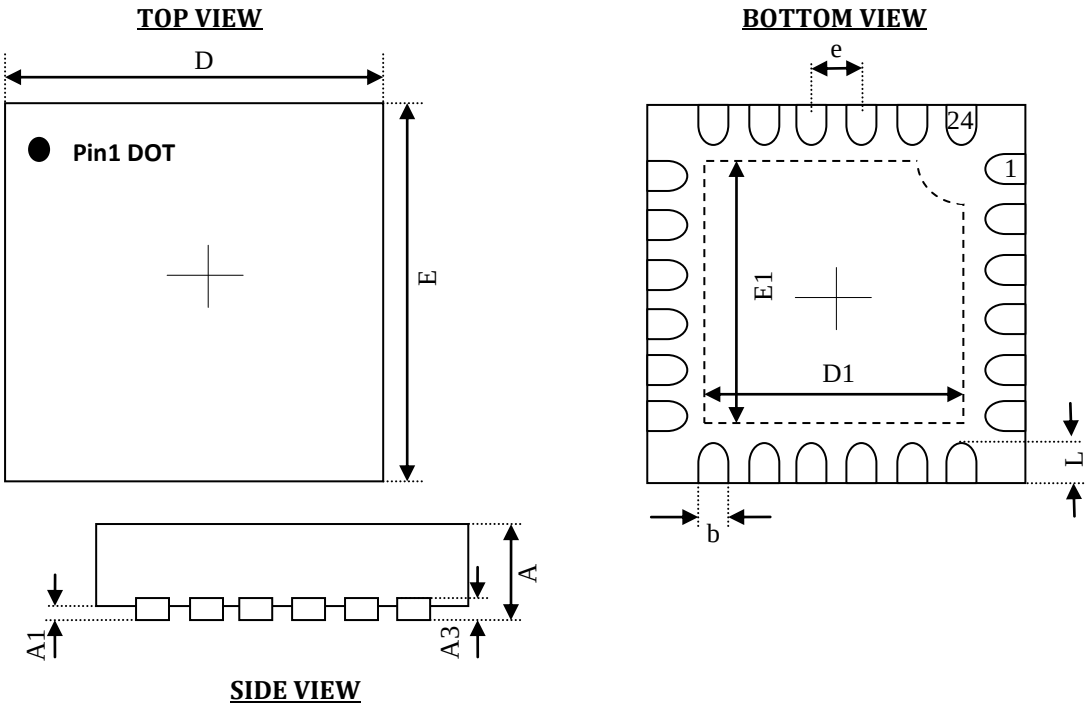
Package Outline Drawing

SSOP24 Dimension (150 mil-0.635 mm)



Symbol	Millimeters (mm)		Inches (in)	
	Min	Max	Min	Max
A	1.35	1.75	0.053	0.069
A1	0.10	0.25	0.004	0.010
A2	-	1.50	-	0.059
B	0.20	0.30	0.008	0.012
C	0.18	0.25	0.007	0.010
D	8.56	8.74	0.337	0.344
E	5.79	6.20	0.228	0.244
E1	3.81	3.99	0.150	0.157
e	0.635 (BSC)		0.025 (BSC)	
L	0.41	1.27	0.016	0.050
θ°	0	8	0	8

QFN24 Dimension (4*4mm)



Symbol	Millimeters (mm)		
	Min.	Nom.	Max.
A	0.70	0.75	0.80
A1	0	----	0.05
A3	0.203 Ref.		
D	3.90	4.00	4.10
E	3.90	4.00	4.10
D1	2.50	2.60	2.70
E1	2.50	2.60	2.70
b	0.18	0.25	0.30
e	0.50 BSC		
L	0.30	0.40	0.50

Note

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