

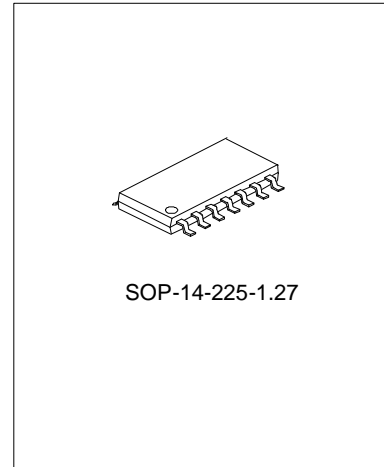
CASCADE LED DRIVER OF HEAVY CURRENT

DESCRIPTION

SC16722 is a chip special for LED driver. It utilizes advanced CMOS technology and provides low power dissipation. This circuit has the protecting circuit for all the inputs and outputs to avoid the damage caused by the static discharge. And it has the ability of driving load and features high noise immunity.

FEATURES

- * 3 bits driving output (Max.=30mA)
- * Provides the interface suited for cascade.
- * Input compatible with 5V CMOS voltage.
- * Maximum 15M serial clock frequency.



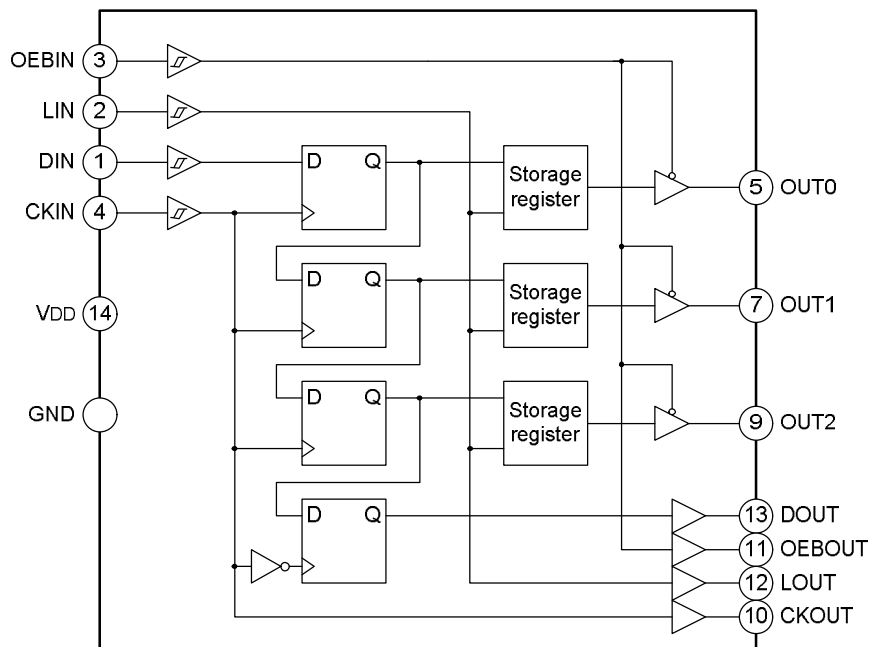
APPLICATION

- * Lights decorations
- * Outdoors lights

ORDERING INFORMATION

| Device | Package |
|---------|-----------------|
| SC16722 | SOP-14-225-1.27 |
| SC16722 | COB |

BLOCK DIAGRAM



ABSOLUTE MAXIMUM RATINGS ($T_{amb}=25^{\circ}\text{C}$)

| Characteristics | Symbol | Ratings | Unit |
|-----------------------|--------|----------------|--------------------|
| Power Supply Voltage | VDD | 0~+5.0 | V |
| Input Voltage | VIN | -0.4~ VDD +0.4 | V |
| Output Current | IOUT | 30 | mA |
| Output Voltage | VOUT | -0.5~ VDD +0.5 | V |
| Clock Frequency | FCLK | 15 | MHz |
| Power Dissipation | PD | 600 | mW |
| Pin Temperature | TL | 260(10S) | $^{\circ}\text{C}$ |
| Operating Temperature | Topr | -40~+85 | $^{\circ}\text{C}$ |
| Storage Temperature | Tstg | -65~+150 | $^{\circ}\text{C}$ |

RECOMMENDED OPERATING CONDITIONS

| Characteristics | Symbol | Test conditions | Min. | Typ. | Max. | Unit |
|------------------------|--------|---------------------------|----------|------|------|--------------------|
| Operating Voltage | VDD | | 2.0 | | 6.0 | V |
| Output Voltage | VOUT | -40~85 $^{\circ}\text{C}$ | | 5 | | V |
| Output Current | IOUT | Driving output | 25 | 30 | | mA |
| | IOH | Other output | | | 1.0 | mA |
| | IOL | Other output | | | -1.0 | mA |
| Input Voltage | VIH | | 4 | 5 | 5.5 | V |
| | VIL | | -0.3 | | 2.1 | V |
| Clock Frequency | FCLK | | | | 15 | MHz |
| Clock High Level Width | CLKH | | 25 | | | ns |
| Clock Low Level Width | CLKL | | 25 | | | ns |
| Signal Set-up Tme | SETUP | | 10 | | | ns |
| Signal Hold Time | HOLD | | 10 | | | ns |
| Power Dissipation | CLKH | | | | 450 | mW |
| Clock Low Level Width | CLKL | | 25ns | | | ns |
| Storage Temperature | Tstg | | -40~+100 | | | $^{\circ}\text{C}$ |

ELECTRICAL CHARACTERISTICS

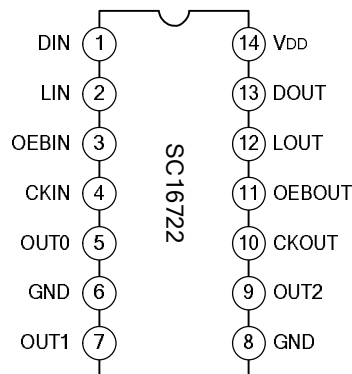
| Characteristics | Symbol | Test conditions | VDD | $T_{amb}=25^{\circ}\text{C}$ | | $T_{amb}=-40\sim 85^{\circ}\text{C}$ | $T_{amb}=-55\sim 125^{\circ}\text{C}$ | Unit |
|-------------------------------|--------|-----------------------------|-----|------------------------------|-----------|--------------------------------------|---------------------------------------|---------------|
| The Minimum Output High Level | VOH | VIN= VIH or VIL IOUT <30 | | TYP. | | Limit value | | |
| | | | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | V |
| | | | 4.5 | 4.5 | 4.4 | 4.4 | 4.4 | V |
| | | | 6.0 | 6.0 | 5.9 | 5.9 | 5.9 | V |
| The Maximum Output Low Level | VOL | VIN= VIH or VIL IOUT <30 | | TYP. | | Limit value | | |
| | | | 2.0 | 0 | 0.1 | 0.1 | 0.1 | V |
| | | | 4.5 | 0 | 0.1 | 0.1 | 0.1 | V |
| | | | 6.0 | 0 | 0.1 | 0.1 | 0.1 | V |
| The Maximum Input Current | IIN | VIN= VDD or GND | 6.0 | | ± 0.1 | ± 0.1 | ± 0.1 | μA |

TIME SEQUENCE CHARACTERISTICS

| Characteristics | Symbol | Test conditions | Min. | Typ. | Max. | Unit |
|------------------------|--------|-----------------|------|------|------|------|
| Clock High Level Width | CLKH | | 25 | | | ns |
| Clock Low Level Width | CLKL | | 25 | | | ns |
| Signal Set-up Time | SETUP | | 10 | | | ns |
| Signal Hold Time | HOLD | | 10 | | | ns |

| Characteristics | Symbol | VDD | T _{amb} =25°C | | T _{amb} = -40~85°C | T _{amb} = -55~125°C | Unit | |
|--|--------------|-----|------------------------|-------------|--------------------------------|---------------------------------|------|----|
| | | | TYP. | Limit value | | | | |
| The Maximum Input Rising and Falling Time | Tr Tf | 2 | | 1000 | 1000 | 1000 | ns | |
| | | | 4.5 | 500 | 500 | 500 | ns | |
| | | | 6 | 400 | 400 | 400 | ns | |
| The Maximum Output Rising and Falling Time | TTHL TTLH | 2 | 25 | 60 | 75 | 90 | ns | |
| | | | 4.5 | 7 | 12 | 15 | 18 | ns |
| | | | 6 | 6 | 10 | 13 | 15 | ns |

PIN CONFIGURATIONS



PIN DESCRIPTION

| Pin No. | Pin Name | I/O | Descriptions |
|---------|----------|-----|----------------------|
| 1 | DIN | I | Serial data input |
| 2 | LIN | I | Loading signal input |
| 3 | OEIN | I | Output enable input |
| 4 | CKIN | I | Serial clock input |

(To be continued)

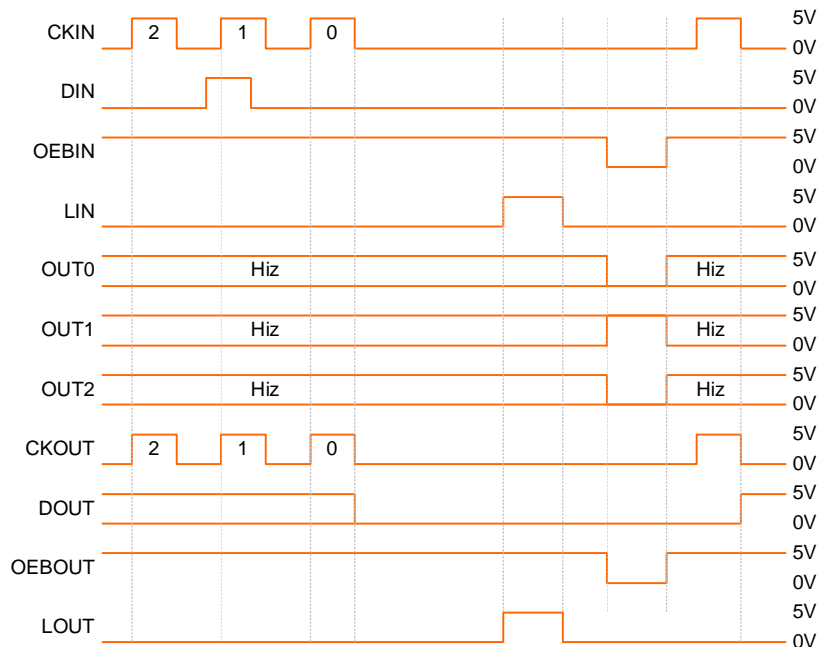
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| Pin No. | Pin Name | I/O | Descriptions |
|---------|----------|-----|-----------------------|
| 5 | OUT0 | O | Driving output |
| 6 | GND | I/O | Ground |
| 7 | OUT1 | O | Driving output |
| 8 | GND | I/O | Ground |
| 9 | OUT2 | O | Driving output |
| 10 | CKOUT | O | Serial clock output |
| 11 | OEOUT | O | Output enable output |
| 12 | LOUT | O | Loading signal output |
| 13 | DOUT | O | Serial data output |
| 14 | VDD | I/O | Power supply |

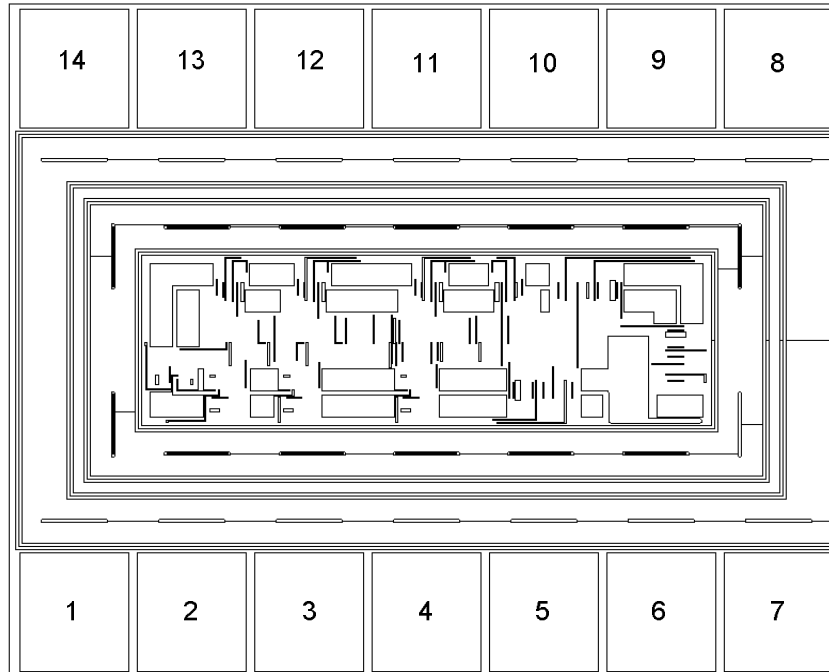
FUNCTION DESCRIPTION

SC16722 provides serial shift register and output storage register. When the serial clock input signal (CKIN) leaps from low level to high level, the serial input data (DIN) is stored in register and the serial input changes to 3 bits parallel output; When the loading signal input (LIN) leaps from low level to high level, the output of register is as the input of the output storage register. SC16722 applies for LED display device, and it can provide 3 driving output of heavy current. Also it adapts to various cascade applications.

TIME SEQUENCY SCHEME



CHIP TOPOGRAPHY



Chip size: 0.90x0.76 (mm²)

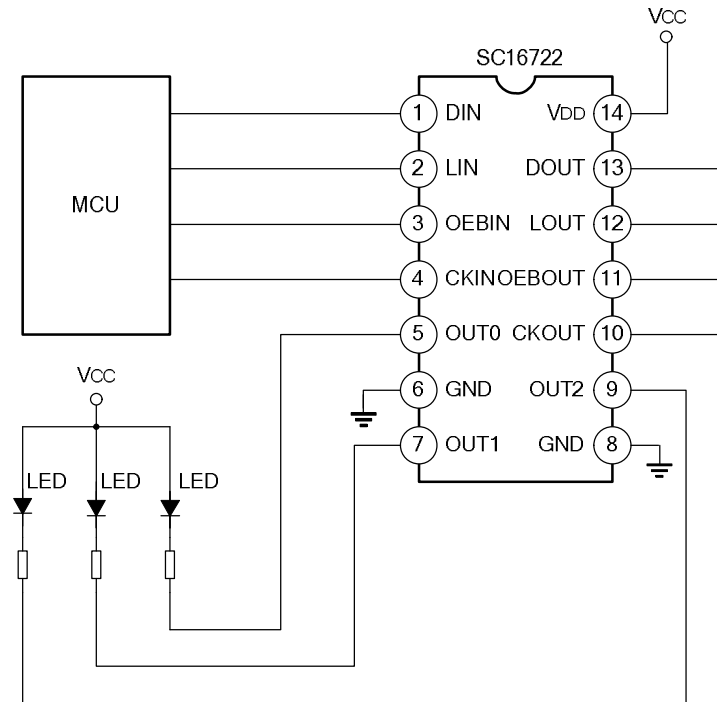
Note: The substrate is connected with GND.

BONDING PAD COORDINATES

| Boding pad | Symbol | X | Y | Boding pad | Symbol | X | Y |
|------------|--------|---------|---------|------------|--------|---------|---------|
| 1 | DIN | -329.10 | -263.90 | 8 | GND | 330.90 | 263.875 |
| 2 | LIN | -219.10 | -263.90 | 9 | OUT2 | 220.90 | 263.875 |
| 3 | OEBIN | -109.10 | -263.90 | 10 | CKOUT | 110.90 | 263.875 |
| 4 | CKIN | 0.90 | -263.90 | 11 | OEBOUT | 0.90 | 263.875 |
| 5 | OUT0 | 110.90 | -263.90 | 12 | LOUT | -109.10 | 263.875 |
| 6 | GND | 220.90 | -263.90 | 13 | DOUT | -219.10 | 263.875 |
| 7 | OUT1 | 330.90 | -263.90 | 14 | VDD | -329.10 | 263.875 |

Note: The original point of the coordinate is the die center.

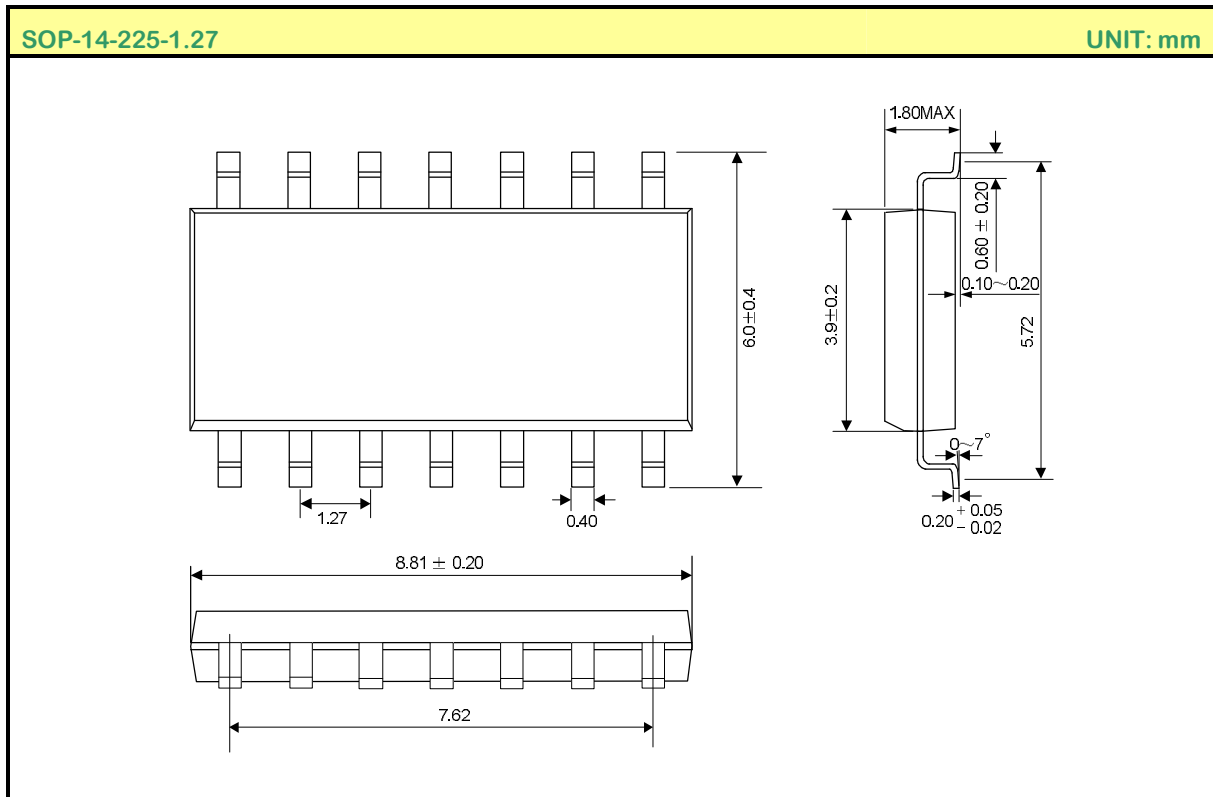
TYPICAL APPLICATION CIRCUIT



PACKAGE OUTLINE

SOP-14-225-1.27

UNIT: mm



HANDLING MOS DEVICES:

Electrostatic charges can exist in many things. All of our MOS devices are internally protected against electrostatic discharge but they can be damaged if the following precautions are not taken:

- Persons at a work bench should be earthed via a wrist strap.
- Equipment cases should be earthed.
- All tools used during assembly, including soldering tools and solder baths, must be earthed.
- MOS devices should be packed for dispatch in antistatic/conductive containers.