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# **RT5956**

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**Built-in Swift Register 4-channel 5.3A P-MOS with Anti-ghosting Control**

2019/01

Version: 0.6 (Preliminary)

## Description

RT5956 is an integrated 4-channel PMOS outputs IC for scan type LED display applications. Built-in the 4-bit shift register, RT5956 make the data transfer by serial connection without decode components on board to simplify the PCB layout. By giving a simple control model to determine the turn-on, discharge, and row blank timing, the RT5956 can effectively to eliminate the LED ghost image phenomena, to prevent LED cascading/cross bright line caused by an LED short/LED open and to avoid the over reverse voltage to damage LEDs. One RT5956 can control 4 row LED time-multiplexing.

## Features

- 5.3A output current per channel (2-pin parallel)
- Built-in anti-ghosting circuit
- Eliminate the LED cascading/cross bright line caused by LED short/open
- Operating voltage from 3.3~5V
- Serial Data connection transfer for easy and simplified PCB layout
- Wipe off 138 decoder
- High speed switch
- Extra low  $R_{DS(ON)}$ 

$$R_{DS(ON)}, V_{gs}@-5.0V, I_{ds}@-1.0A \leq 90m\Omega$$

$$R_{DS(ON)}, V_{gs}@-5.0V, I_{ds}@-2.0A \leq 130m\Omega$$

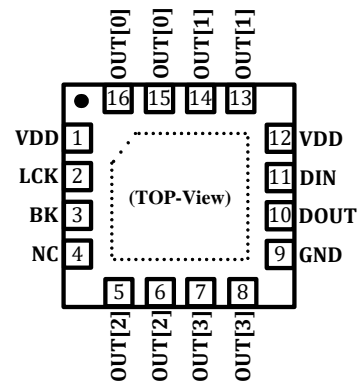
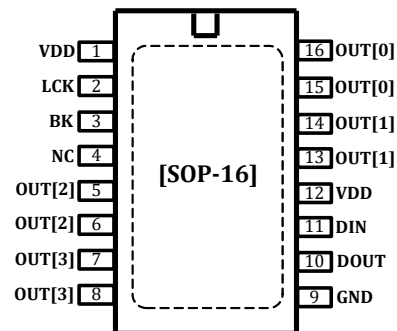
## Application

Indoor and Outdoor large current LED display

## Order Information

No.	Part No.	Package
1	RT5956SP	SOP16-150 mil-1.27 mm
2	RT5956QN	QFN16-4mm*4mm

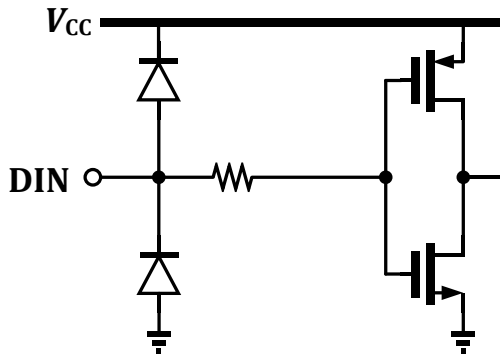
## Pin Assignment



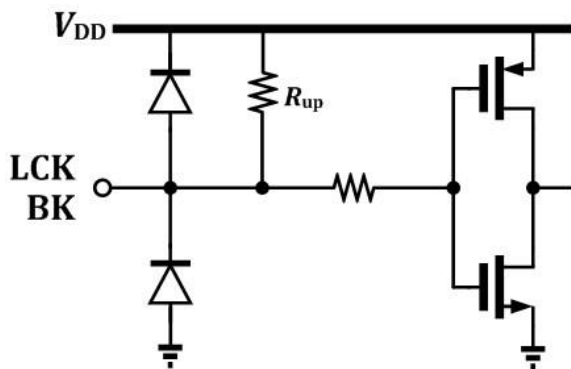
Pin No.	Pin Name	Description
1, 12	VDD	Power supply
2	LCK	Serial data strobe input
3	BK	Discharge enable control
4	NC	No connection
5, 6, 7, 8, 13, 14, 15, 16,	OUT[0:3]	Current output[0:3]
9	GND	Ground Terminal
10	DOUT	Serial data output
11	DIN	Serial data input

## Input / Output Equivalent Circuits

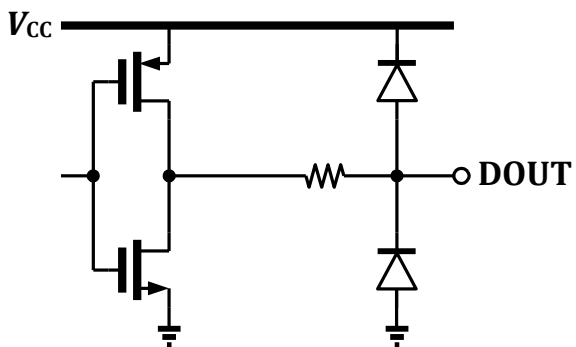
DIN



LCK, BK



DOUT

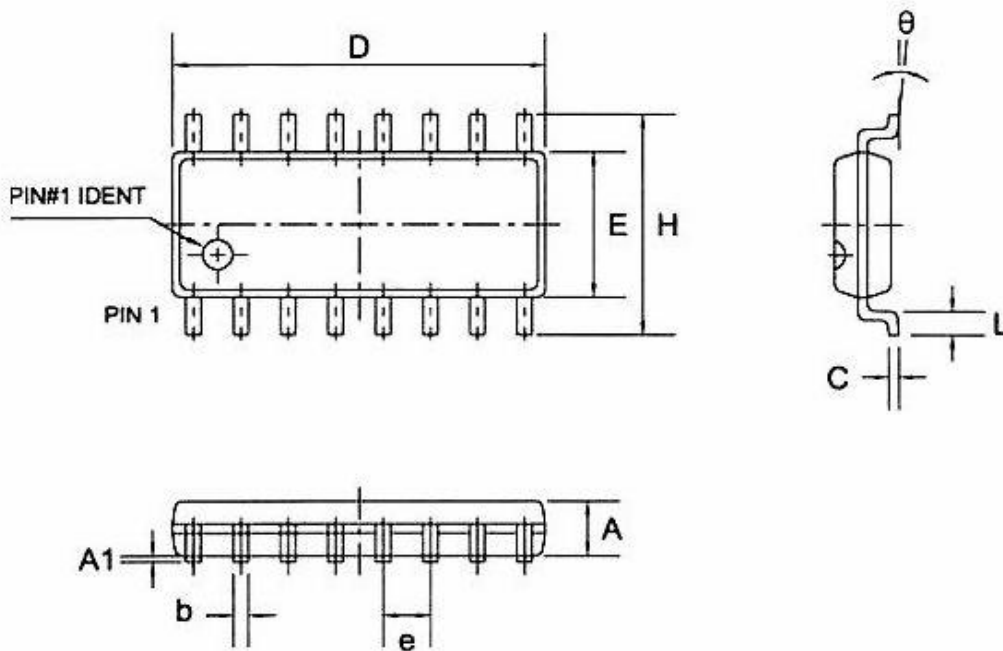


## Maximum Ratings

Parameter	Symbol	Rating	Unit
Supply Voltage	$V_{CC}$	0 ~ 7.0	V
Input Voltage (all pins)	$V_{IN}$	-0.4 ~ $V_{DD} + 0.4$	V
Drain Output Current	$I_D$	- 4.5	A
Drain Output Current (peak)	$I_{DM}$	-5.3	A
Power Dissipation (on 4-layer PCB)	$P_{D\_max}$	1.60 ( SOP-16 · $T_a = 25^{\circ}C$ ) 2.47 ( QFN-16 · $T_a = 25^{\circ}C$ )	W
Thermal Resistance (on 4-layer PCB)	$R_{th(j-a)}$	78 ( SOP-16 ) 50.6 ( QFN-16 )	$^{\circ}C/W$
Operating Temperature	$T_{opr}$	-40 ~ 85	$^{\circ}C$
Storage Temperature	$T_{stg}$	-55 ~ 150	$^{\circ}C$

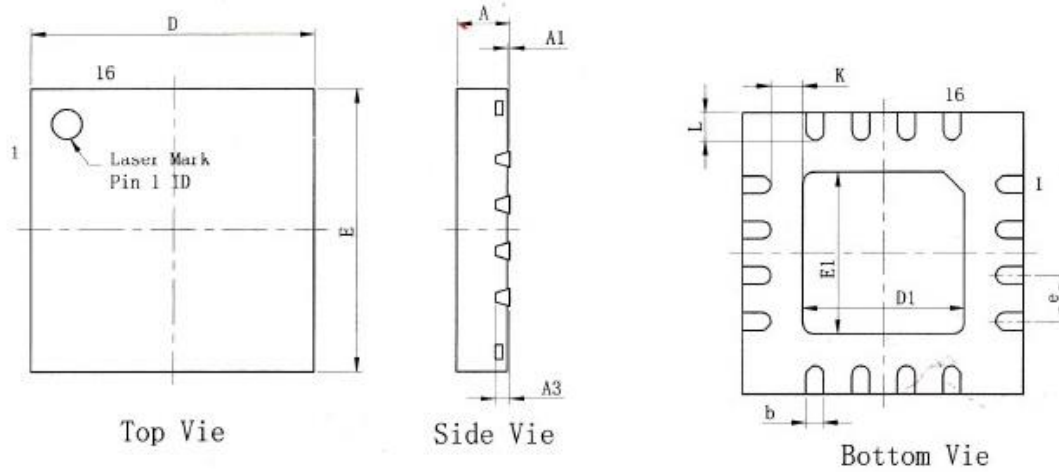
## Package

### SOP16 Dimension (150mil, 1.27mm)



Symbol	Millimeter ( mm )		Inch ( in )	
	Min.	Max.	Min.	Max.
A	1.300	1.700	0.051	0.067
A1	0.102	0.254	0.004	0.010
b	0.300	0.550	0.012	0.022
C	0.150	0.350	0.006	0.014
D	9.700	10.30	0.382	0.406
E	3.750	4.150	0.148	0.163
H	5.800	6.200	0.228	0.244
e	1.27 ( BSC )		0.050 ( BSC )	
L	0.450	0.850	0.018	0.033
$\theta^\circ$	0	8	0	8

### QFN16 Dimension (4mm x 4mm)



Symbol	Millimeter ( mm )		
	Min.	Typ.	Max.
A	0.70	0.75	0.8
A1	0.00	---	0.05
A3	0.203 REF		
b	0.20	0.25	0.30
D	3.90	4.00	4.10
E	3.90	4.00	4.10
D1	2.20	2.30	2.40
E1	2.20	2.30	2.40
e	0.65 TYP.		
K	0.20	---	---
L	0.30	0.40	0.50

## Note

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