

## DESCRIPTION

The PT16512 is 1/4 duty general-purpose LCD driver that can be used for frequency display in electronic tuners under the control of a microcontroller. The PT16512 can drive an LCD with up to 208 segments directly. The PT16512 can also control up to 8 general-purpose output ports.

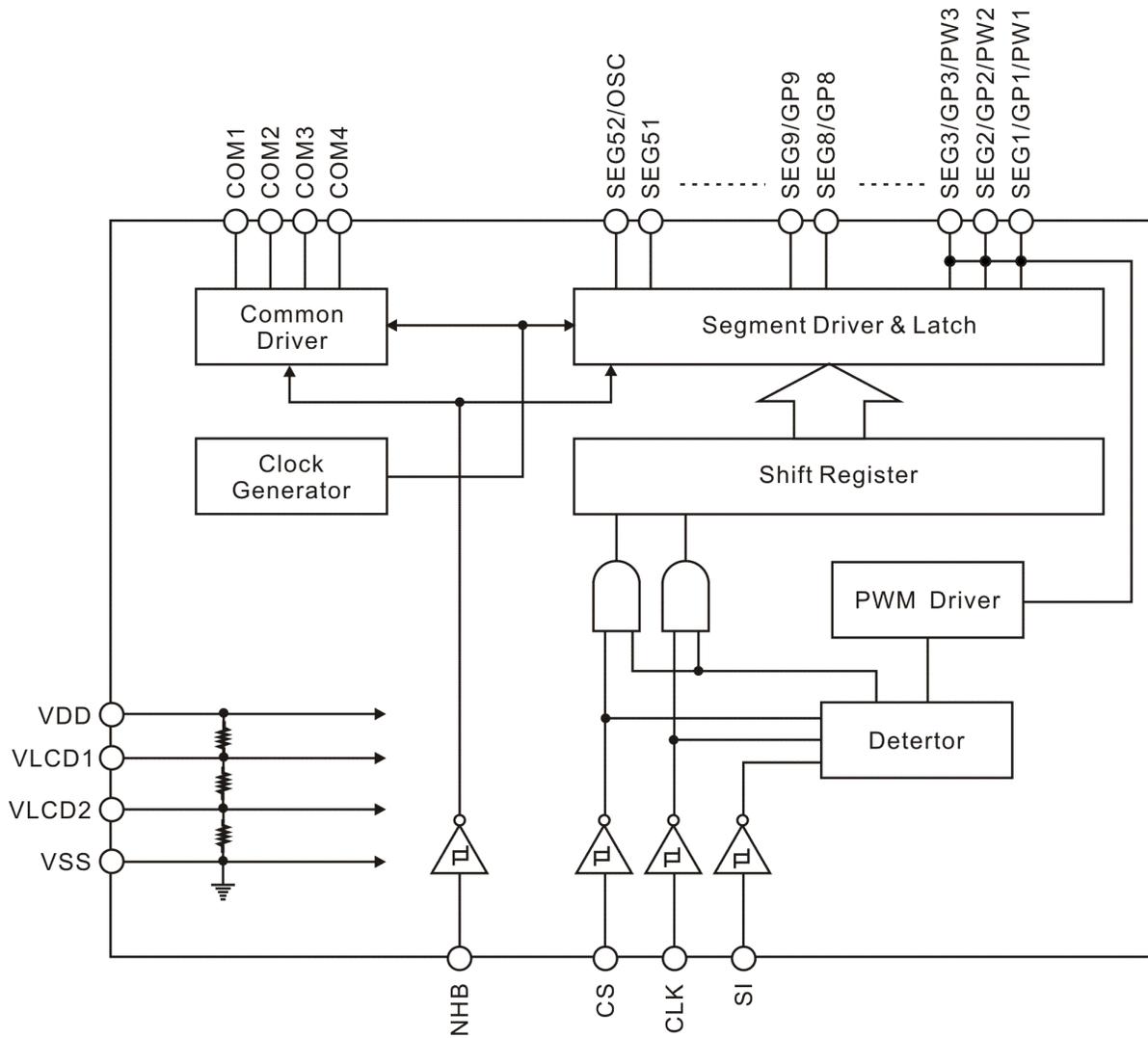
## APPLICATION

- Electronic equipment with LCD Display

## FEATURES

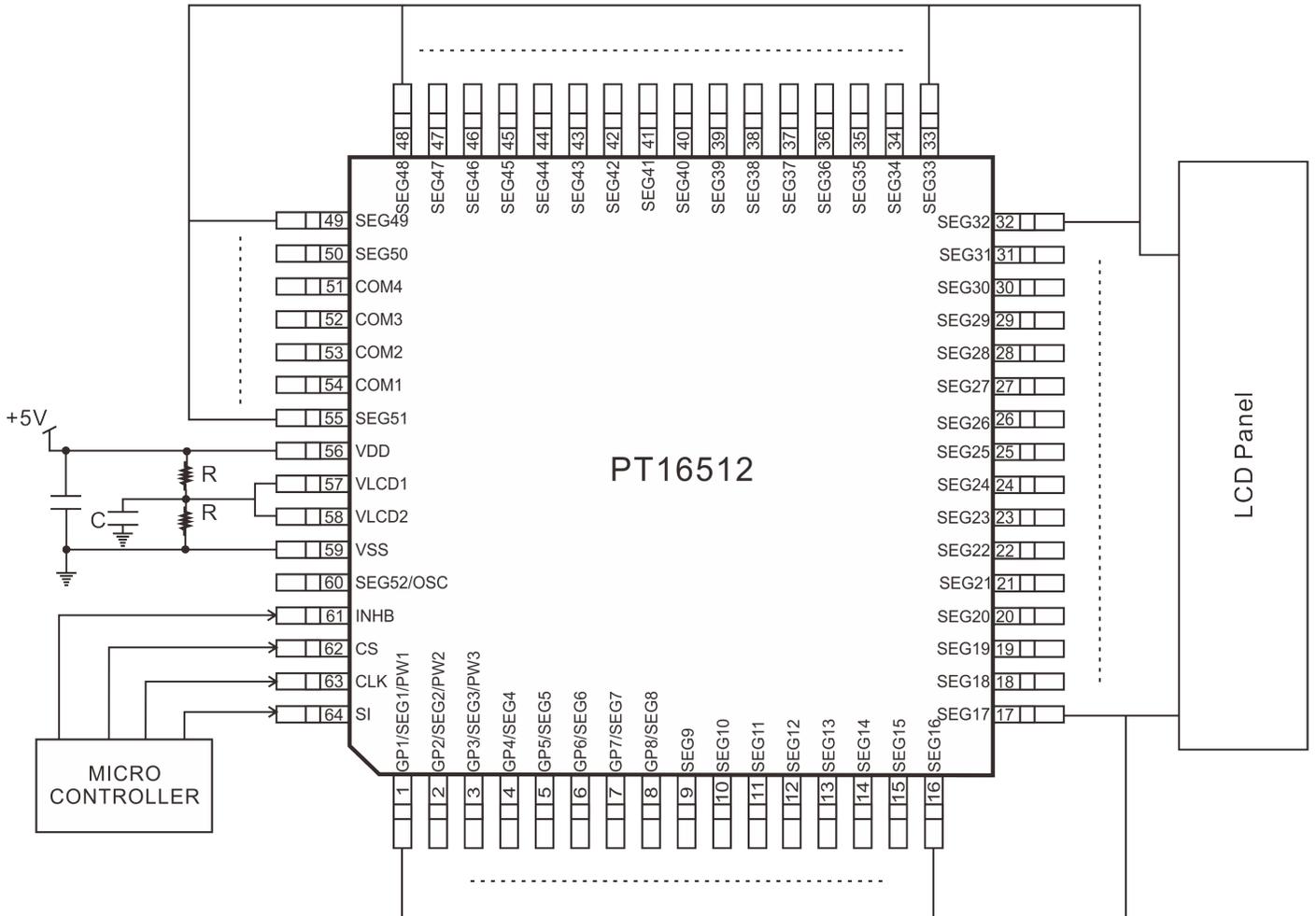
- Switching between 1/2 bias and 1/3 bias drive techniques under serial data control.
- Up to 208 segments for 1/4 duty drive can be displayed.
- Serial data control of switching between the segment output port and the general-purpose output port functions.
- Serial data control of frame frequency for common and segment output waveforms.
- High generality, since display data is displayed directly without decoder intervention.
- Built-in OSC circuit
- The INHB pin can force the display to the off state.
- Programmable PWM signal output pins
- AEC-Q100 Grade2 Complaint for Automotive Applications

## BLOCK DIAGRAM



# APPLICATION CIRCUIT 1

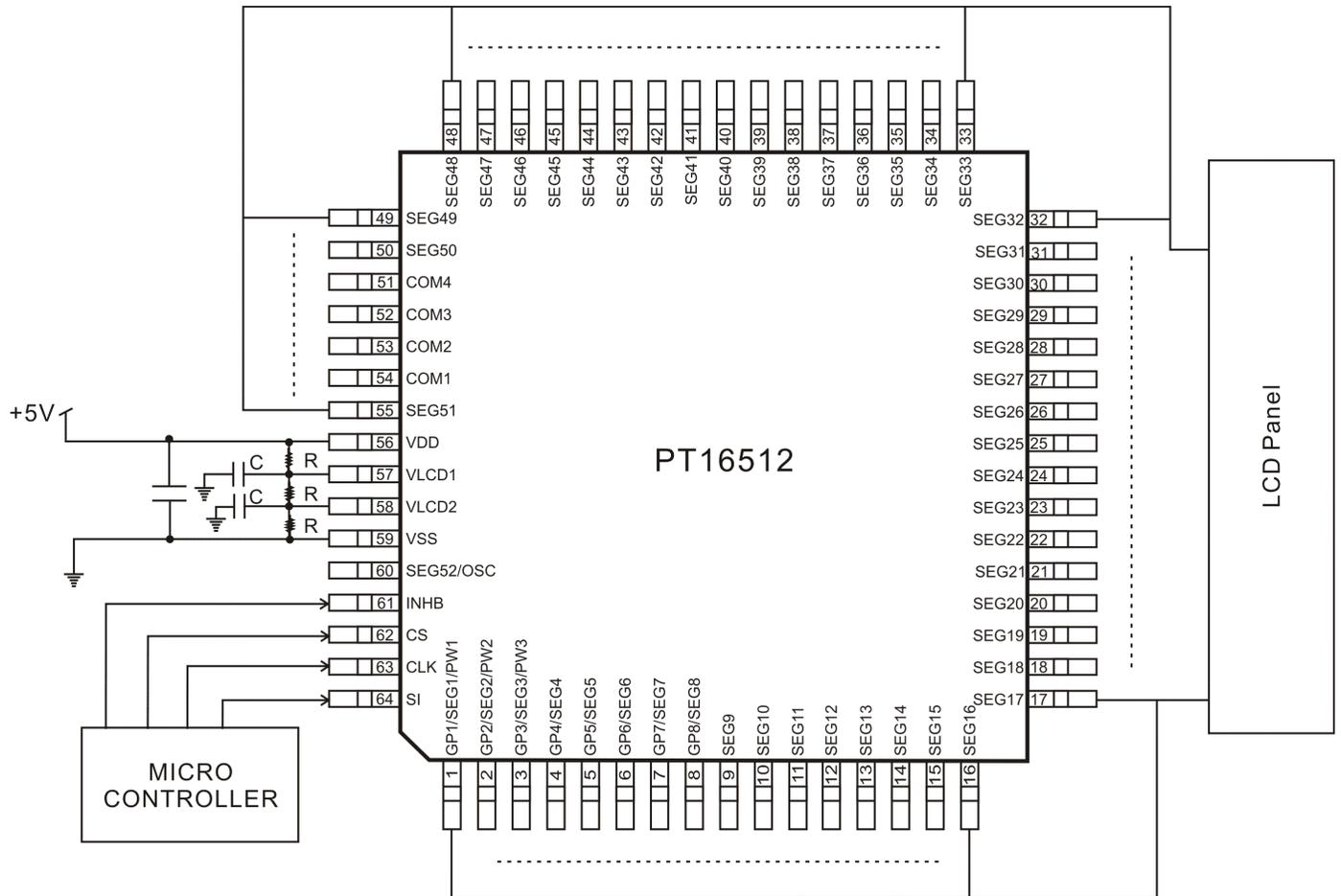
## 1/2 BIAS



- Notes:
1.  $10K\Omega > R > 1K\Omega$
  2.  $C > 0.047\mu F$
  3. The resistance value must be decided by the LCD panel size.

# APPLICATION CIRCUIT 2

## 1/3 BIAS



Notes:

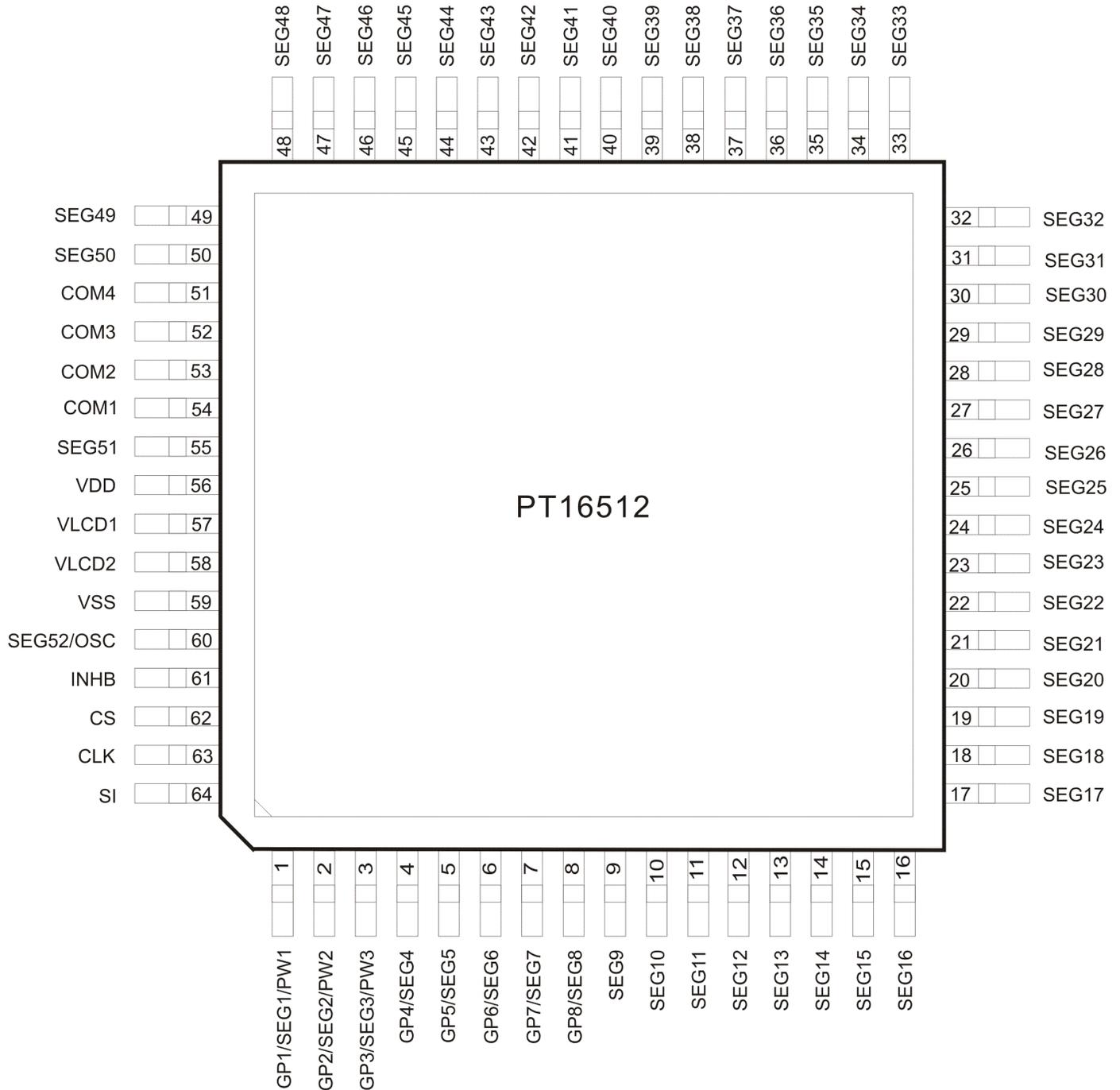
1.  $10K\Omega > R > 1K\Omega$
2.  $C > 0.047\mu F$
3. The resistance value must be decided by the LCD panel size.



## ORDER INFORMATION

Valid Part Number	Package Type	Top Code
PT16512-LQ	64 Pins, LQFP	PT16512-LQ

## PIN CONFIGURATION



## PIN DESCRIPTION

Pin Name	I/O	Active	Handling when unused	Function	Pin No.
SEG1/GP1PW1 to SEG3/GP3/PW3	O	-	Open	Segment outputs for displaying the display data transferred by serial data input. The pins SEG1/GP1/PW1 to SEG8/GP8 can be used as general-purpose output ports when set up by the control data.	1 to 3
SEG4/GP4to SEG8/GP8 SEG9 to SEG51	O	-			4 to 8 9 to 50, 55
COM1 to COM4	O	-	Open	Common driver outputs. The frame frequency is $f_0$ Hz.	51 to 54
VDD	-	-	-	Logic block power supply. Provide a voltage in the range 4.5 to 6.0V.	56
VLCD1	I	-	Open	LCD drive 2/3 bias voltage (middle level) supply. It is possible to supply the 2/3 $V_{DD}$ voltage to this pin externally. This pin must be shorted to $V_{LCD2}$ if 1/2 bias is used.	57
VLCD2	I	-	Open	LCD drive 1/3 bias voltage (middle level) supply. It is possible to supply the 1/3 $V_{DD}$ voltage to this pin externally. This pin must be shorted to $V_{LCD1}$ if 1/2 bias is used.	58
VSS	-	-	-	Ground pin. Connect to ground.	59
SEG52/OSC	I/O	-	VDD	Segment outputs for displaying the display data transferred by serial data input. The pin SEG52/OSC can be used external frequency input pin when set up by the control data.	60
INHB	I	L	GND	Display off control input <ul style="list-style-type: none"> <li>INHB=low (<math>V_{SS}</math>)...off SEG1/GP1/PW1 to SEG8/GP8=low (<math>V_{SS}</math>) (These pins are forcibly set to the segment output port function and fixed at the <math>V_{SS}</math> level) SEG9 to SEG52=low (<math>V_{SS}</math>) COM1 to COM4=low (<math>V_{SS}</math>)</li> <li>INHB=high (<math>V_{DD}</math>)...on</li> </ul> Note that serial data transfers can be performed when the display is forced off by this pin.	61
CS	I	H	GND	Serial data transfer inputs. These pins are connected to the control microprocessor. CS: Chip select CLK: Synchronization clock SI: Transfer data	62
CLK	I				63
SI	I	-			64

## **IMPORTANT NOTICE**

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