

## DESCRIPTION

The PT16576 is 1/3 duty and 1/4 duty general-purpose LCD driver that can be used for frequency display in electronic tuners under the control of a microcontroller. The PT16576 can drive an LCD with up to 340 segments directly. The PT16576 can also control up to 8 general-purpose output ports.

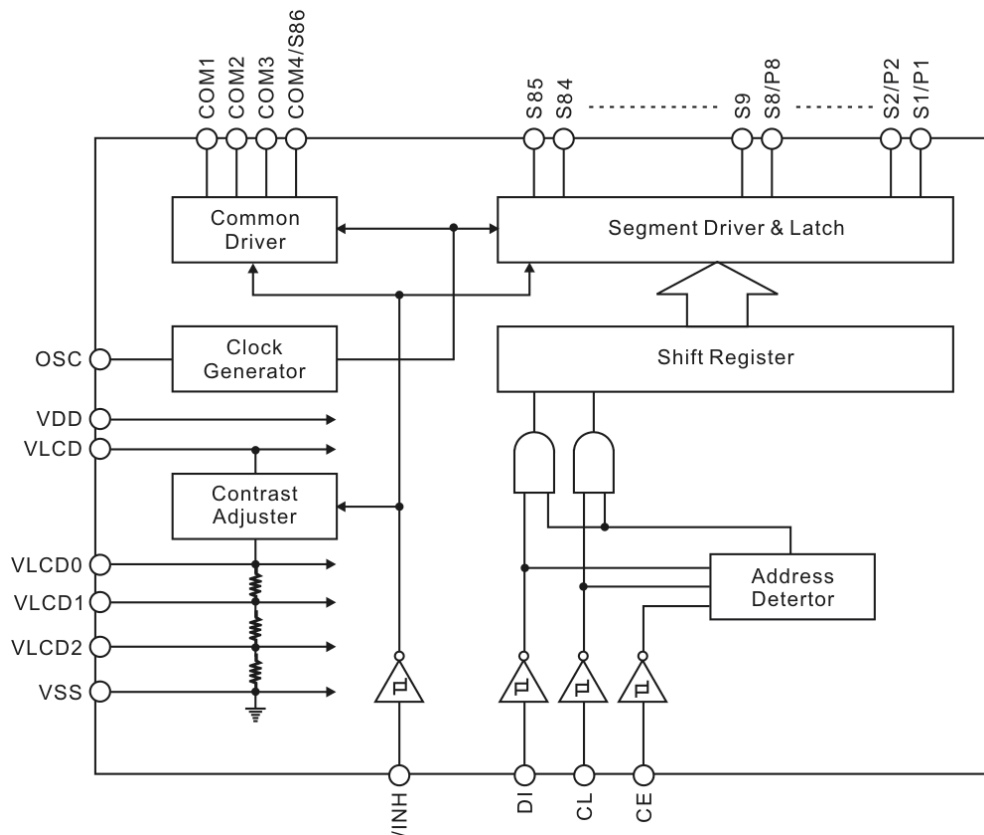
## APPLICATION

- Electronic equipment with LCD Display

## FEATURES

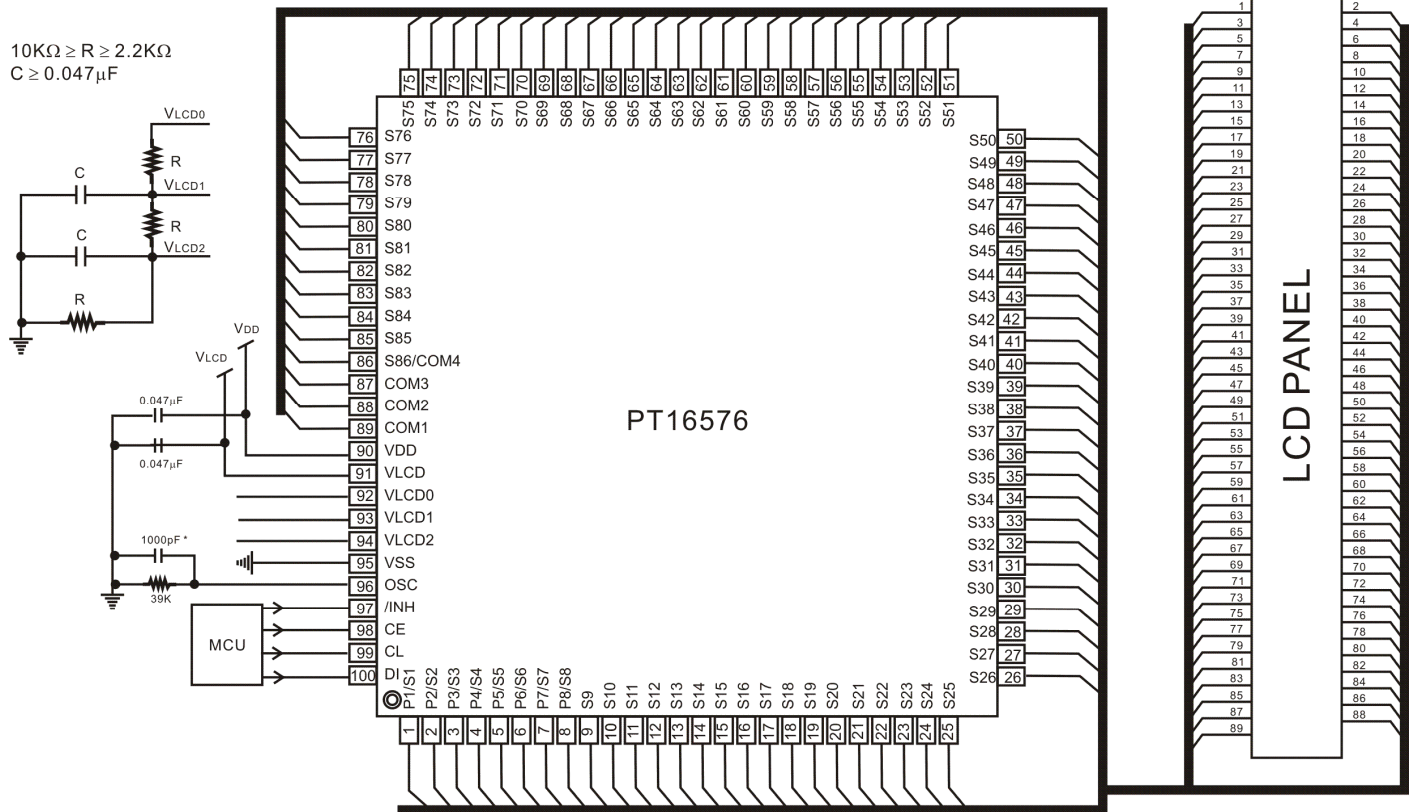
- Switching between 1/3 duty and 1/4 duty drive techniques under serial data control.
- Switching between 1/2 bias and 1/3 bias drive techniques under serial data control.
- Up to 258 segments for 1/3 duty drive and 340 segments for 1/4 duty drive can be displayed.
- Serial interface for clock, Data Input, Data Output, Strobe pins.
- Serial data control of the power-saving mode based backup function and all the segments forced off function.
- 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 display contrast adjustment circuit
- Independent VLCD for the LCD driver block
- The /INH pin can force the display to the off state.
- RC oscillator circuit

## BLOCK DIAGRAM





# APPLICATION CIRCUIT



Note:

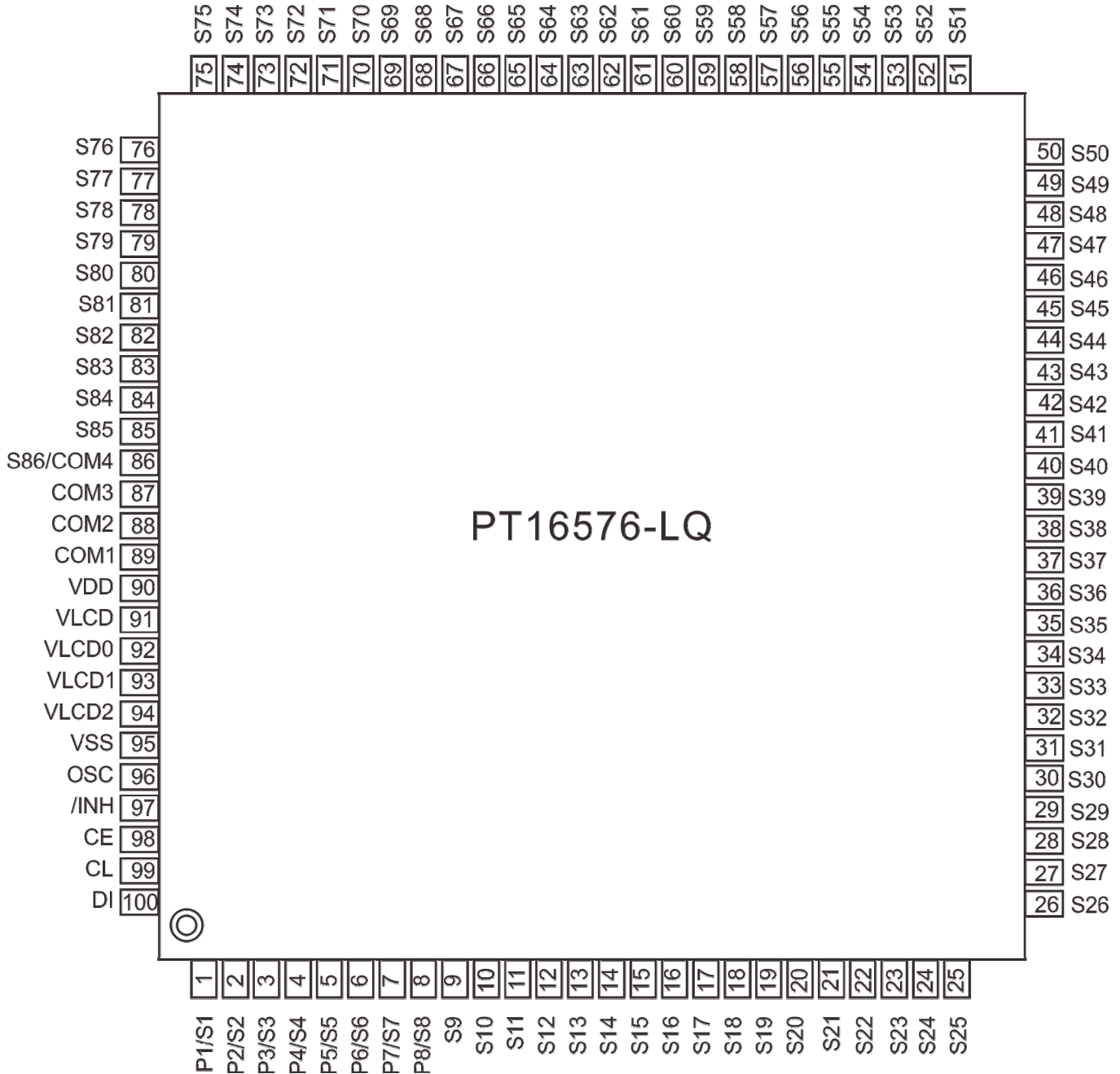
\*=When a capacitor except the recommended external capacitance (Cosc=1000pF) is connected the OSC pin, we recommend that applications connect the OSC pin with a capacitor in the range 220 to 2200pF.




## ORDER INFORMATION

Valid Part Number	Package Type	Top Code
PT16576-LQ	100 Pins, LQFP	PT16576-LQ

## PIN CONFIGURATION



## PIN DESCRIPTION

Pin Name	I/O	Active	Handling when unused	Function	Pin No.
S1/P1 to S8/P8 S9 to S85	O	-	Open	Segment outputs for displaying the display data transferred by serial data input. The pins S1/P1 to S8/P8 can be used as general-purpose output ports when so set up by the control data.	1 to 8 9 to 85
COM1 to COM3 COM4/S86	O	-	Open	Common driver outputs. The frame frequency is $f_0$ Hz. The COM4/S86 pin can be used as a segment output in 1/3 duty.	89 to 87 86
OSC	I/O	-	VDD	Oscillator connection. An oscillator circuit is formed by connecting an external resistor and capacitor to this pin.	96
CE CL DI	I	H	GND	Serial data transfer inputs. These pins are connected to the control microprocessor. CE: Chip enable CL: Synchronization clock DI: Transfer data	98
	I				99
	I	-			100
/INH	I	L	GND	Display off control input <ul style="list-style-type: none"> <li>/INH=low (<math>V_{SS}</math>)...off S1/P1 to S8/P8=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) S9 to S85=low (<math>V_{SS}</math>) COM1 to COM3=low (<math>V_{SS}</math>) COM4/S86=low(<math>V_{SS}</math>)</li> <li>/INH=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.	97
VLCD0	O	-	Open	LCD Drive 3/3 bias voltage (high level) supply. This level can be modified using the display contrast adjustment circuit. However, note that $V_{LCD0}$ must be greater than or equal to 2.7V. Also, since this IC provides the built-in display contrast adjustment circuit, applications must not attempt to provide this level from external circuits.	92
VLCD1	I	-	Open	LCD drive 2/3 bias voltage (middle level) supply. It is possible to supply the 2/3 $V_{LCD0}$ voltage to this pin externally. This pin must be shorted to $V_{LCD2}$ if 1/2 bias is used.	93
VLCD2	I	-	Open	LCD drive 1/3 bias voltage (middle level) supply. It is possible to supply the 1/3 $V_{LCD0}$ voltage to this pin externally. This pin must be shorted to $V_{LCD1}$ if 1/2 bias is used.	94
VDD	-	-	-	Logic block power supply. Provide a voltage in the range 2.7 to 6.0V.	90
VLCD	-	-	-	LCD driver block power supply. When $V_{LCD0}$ is between $0.7V_{LCD}$ and $0.95V_{LCD}$ , supply a voltage in the range 4.0 to 6.0V. When $V_{LCD0}$ and $V_{LCD}$ will be equal, supply a voltage in the range 2.7 to 6.0V.	91
VSS	-	-	-	Ground pin. Connect to ground.	95

## **IMPORTANT NOTICE**

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