



# SANYO Semiconductors DATA SHEET

## LA1652C — Monolithic Linear IC Time Code Reception IC

### Overview

The LA1652C time code reception IC receives long-wave time standard broadcasts (such as the Japanese JJY and German DCF77 standards) and detects and outputs the time code superposed on the long-wave signal.

Applications can automatically correct their clock's time setting by using the time code received by the LA1652C. Note that the LA1652C is a bare chip product that is not packaged.

### Functions

- RF amplifier, rectifier, detector, time code output, and standby circuit.

### Features

- Low-voltage operation (operating  $V_{CC}$  as low as 1.8V).
- Standby mode current drain less than or equal to 0.1 $\mu$ A.  
Japan : JJY 40/60kHz  
Germany : DCF77 77.5kHz

### Specifications

#### Maximum Ratings at $T_a = 25^\circ\text{C}$

Parameter	Symbol	Conditions	Ratings	Unit
Maximum supply voltage	$V_{CC\ max}$		5.0	V
Operating temperature	$T_{opr}$		-20 to +70	$^\circ\text{C}$
Storage temperature	$T_{stg}$		-40 to +125	$^\circ\text{C}$

#### Operating Conditions at $T_a = 25^\circ\text{C}$

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Recommended supply voltage	$V_{CC}$			3.0		V
Operating supply voltage range	$V_{CC\ op}$		1.8		3.6	V

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# LA1652C

## Operating Characteristics at $T_a = 25^\circ\text{C}$ , $V_{CC} = 3.0\text{V}$

\* : Packaged in an SSOP16 package and measured using the IC51-0162-911 socket (Yamaichi Electronics Co., Ltd.)

### Overall Characteristics

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Quiescent current	$I_{CCO}$	No input		55	70	$\mu\text{A}$
Standby mode current drain	$I_{STB}$	PAD15 = 3.0V		0.01	0.1	$\mu\text{A}$

### Amplifier Input Characteristics

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Input impedance	$Z_I$	PAD1		2.0		$\text{M}\Omega$
Input frequency range	$F_{IN}$		37.5		80.0	kHz
Minimum input voltage	$V_{MIN}$	PAD1 input level		1	2	$\mu\text{V}_{rms}$
Maximum input voltage	$V_{MAX}$	PAD1 input level	50	100		$\text{mV}_{rms}$

### TCO Output Characteristics - Input pad = PAD1, $f_{in} = 40\text{kHz}$

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
High-level output voltage	$V_{OH}$		2.90	2.95		V
Low-level output voltage	$V_{OL}$			0.05	0.10	V
Output pulse width (500 ms input)	T500	$V_{IN} = 0$ to 100dB $\mu\text{V}$ , AM modulation (1Hz square wave, duty = 50%, 10:1 modulation)	350	450	550	ms
Output pulse width (800 ms input)	T800	$V_{IN} = 0$ to 100dB $\mu\text{V}$ , AM modulation (1Hz square wave, duty = 80%, 10:1 modulation)	650	750	850	ms
Output pulse width (200 ms input)	T200	$V_{IN} = 0$ to 100dB $\mu\text{V}$ , AM modulation (1Hz square wave, duty = 20%, 10:1 modulation)	100	200	300	ms

# LA1652C

## Chip Specifications

Parameter	Conditions	Ratings	Unit
Chip size		1.73×2.60	mm <sup>2</sup>
Chip thickness		330(±20)	μm
Pad size		140×140	μm <sup>2</sup>
Pad opening		115×115	μm <sup>2</sup>

## PAD Coordinates

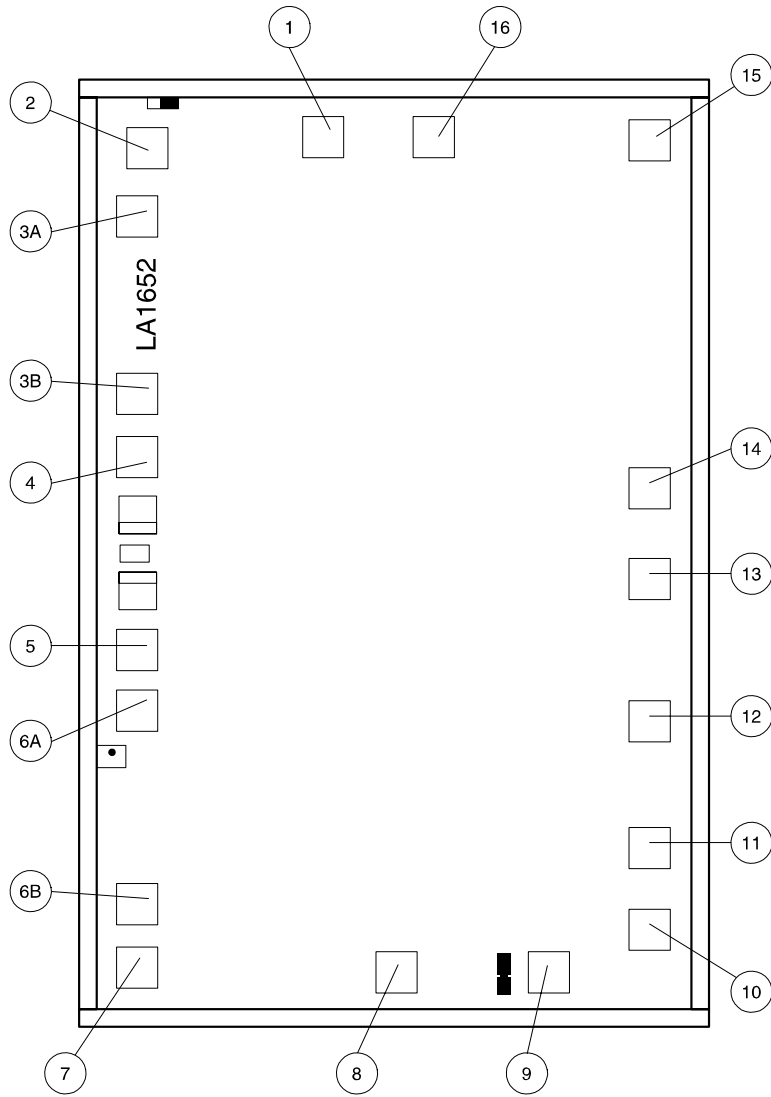
PAD	X-Axis	Y-Axis	PAD	X-Axis	Y-Axis
P1	664	150	P9	1293	2450
P2	180	180	P10	1580	2330
P3A	150	864	P11	1580	2103
P3B	150	372	P12	1580	1754
P4	150	1034	P13	1580	1360
P5	150	1563	P14	1580	1108
P6A	150	2269	P15	1570	160
P6B	150	1733	P16	974	150
P7	160	2440			
P8	876	2450			

### Notes

1. The left upper corner of the Pad Layout Diagram on the following page is the origin, the X axis increases to the right and the Y axis increases in the downward direction.
2. Units : μm
3. The pad coordinates give the coordinate values of the center of the pads.
4. Both of each of the pairs P3A/P3B (V<sub>CC</sub>) and P6A/P6B (ground) must be bonded.

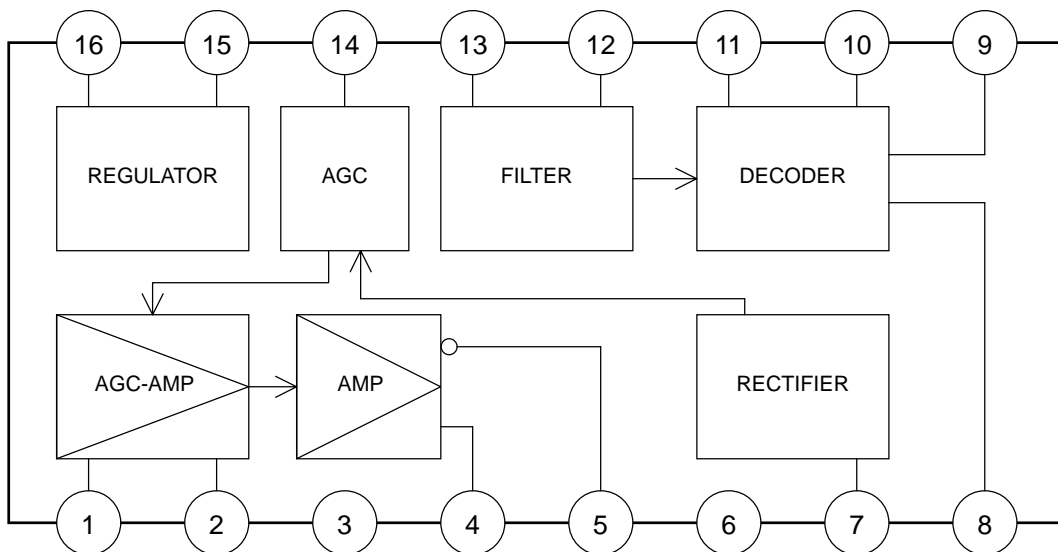
# LA1652C

## Pad Layout Diagram



PCA00615

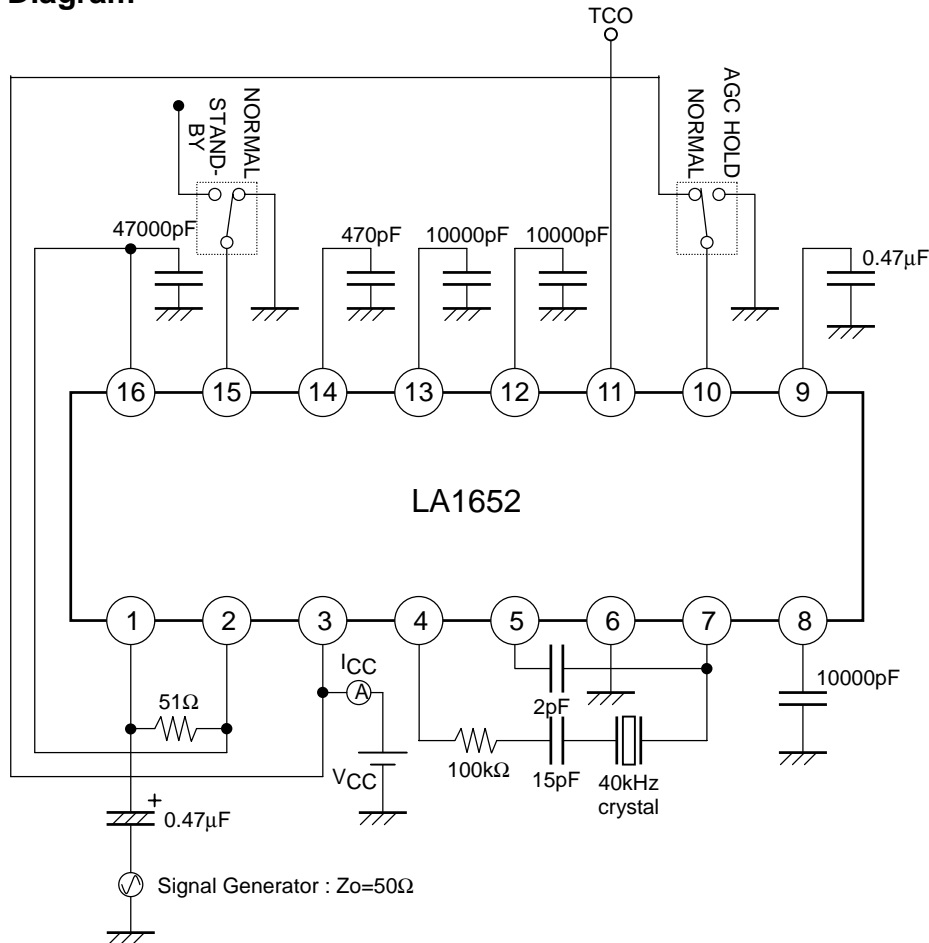
## Block Diagram



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# LA1652C

## Test Circuit Diagram



PCA00617

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