Ordering number : ENA0204

SANYO Semiconductors
DATA SHEET

Monolithic Linear IC

# LA1654FN — Time Code Reception IC

## Overview

The LA1654FN 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 LA1654 FN.

## Functions

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

## Features

- Low-voltage operation (operating $V_{CC}$ as low as 1.5V).
- Standby mode current drain less than or equal to 0.05µA.
  Japan : JJY 40/60kHz
  Germany : DCF77 77.5kHz

## Specifications

### Maximum Ratings at Ta = 25°C

| Parameter | Symbol | Conditions | Ratings | Unit |
|---|---|---|---|---|
| Maximum supply voltage | $V_{CC}$ max | | 5.0 | V |
| Allowable power dissipation | Pd max | Ta ≤ 70°C | 10 | mW |
| Operating temperature | Topr | | -20 to +70 | °C |
| Storage temperature | Tstg | | -40 to +125 | °C |

### Operating Conditions at Ta = 25°C

| Parameter | Symbol | Conditions | Ratings | | | Unit |
|---|---|---|---|---|---|---|
| | | | min | typ | max | |
| Recommended supply voltage | $V_{CC}$ | | 1.5 | | 3.0 | V |
| Operating supply voltage range | $V_{CC}$ op | | 1.1 | | 3.6 | V |


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## Operating Characteristics at Ta = 25°C, $V_{CC}$ = 3.0V

### Overall Characteristics

| Parameter | Symbol | Conditions | Ratings | | | Unit |
|---|---|---|---|---|---|---|
| | | | min | typ | max | |
| Quiescent current | $I_{CCO}$ | No input, Pin15 = 0V, Pin10 = 3V | 30 | 37 | 50 | μA |
| Standby mode current drain | $I_{STB}$ | Pin15 = 3.0V | | | 0.05 | μA |

### AGC Amplifier Input Characteristics

| Parameter | Symbol | Conditions | Ratings | | | Unit |
|---|---|---|---|---|---|---|
| | | | min | typ | max | |
| Input impedance | $Z_I$ | Pin1 | | 800 | | kΩ |
| Input frequency range | $F_{IN}$ | Pin1 | 37.5 | | 80.0 | kHz |
| Minimum input voltage | $V_{MIN}$ | Pin1 input level | | | 1 | μVrms |
| Maximum input voltage | $V_{MAX}$ | Pin1 input level | 100 | | | mVrms |

### TCO Output Characteristics - Input signal = Pin1, fin = 40kHz, Pin10 = 3V, Pin15 = 0V

| Parameter | Symbol | Conditions | Ratings | | | Unit |
|---|---|---|---|---|---|---|
| | | | min | typ | max | |
| High-level output voltage | $V_{OH}$ | Pin 11 output level | 2.9 | | 3.0 | V |
| Low-level output voltage | $V_{OL}$ | Pin 11 output level | 0 | | 0.1 | V |
| Output pulse width (500 ms input) | T500 | $V_{IN}$ = 0 to 100dBμV, AM modulation (1Hz square wave, duty = 50%, 10:1 modulation) | 400 | 520 | 600 | ms |
| Output pulse width (800 ms input) | T800 | $V_{IN}$ = 0 to 100dBμV, AM modulation (1Hz square wave, duty = 80%, 10:1 modulation) | 600 | 730 | 800 | ms |
| Output pulse width (200 ms input) | T200 | $V_{IN}$ = 0 to 100dBμV, AM modulation (1Hz square wave, duty = 20%, 10:1 modulation) | 200 | 300 | 400 | ms |

### STB Control Characteristics

| Parameter | Symbol | Conditions | Ratings | | | Unit |
|---|---|---|---|---|---|---|
| | | | min | typ | max | |
| Standby on voltage | $V_{SH}$ | Pin15 DC voltage | 2.9 | | 3.0 | V |
| Standby off voltage | $V_{SL}$ | Pin15 DC voltage | 0 | | 0.1 | V |
| High-level pin input current | $I_{SH}$ | Pin15 = 3V | | | 0.1 | μA |
| Low-level pin input current | $I_{SL}$ | Pin15 = 0V | | | 0.3 | μA |

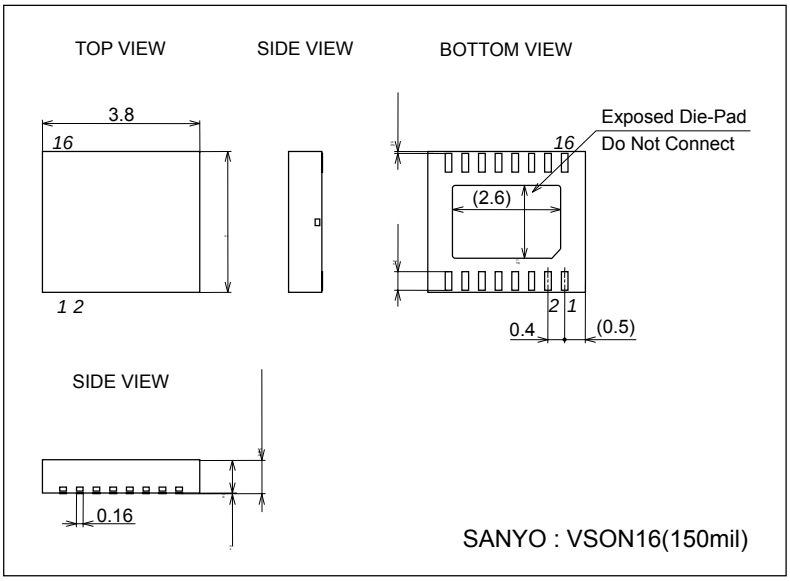
### HOLD Control Characteristics - Pin15 = 0V

| Parameter | Symbol | Conditions | Ratings | | | Unit |
|---|---|---|---|---|---|---|
| | | | min | typ | max | |
| Hold on voltage | $V_{HL}$ | Pin10 DC voltage | 0 | | 0.1 | V |
| Hold off voltage | $V_{HH}$ | Pin10 DC voltage | 2.9 | | 3.0 | V |
| High-level pin input current | $I_{HH}$ | Pin10 = 3V | | | 0.1 | μA |
| Low-level pin input current | $I_{HL}$ | Pin10 = 0V | | | 0.3 | μA |

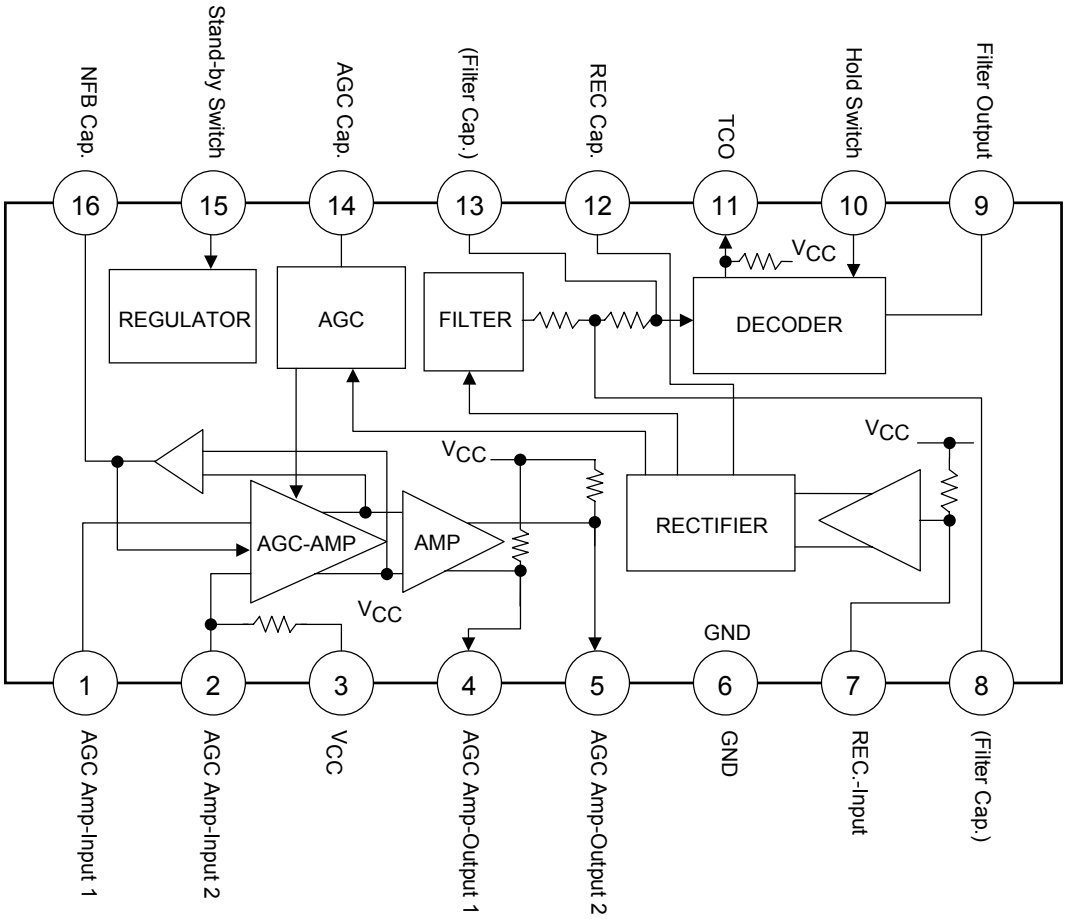
## Package Dimensions

unit : mm

3319

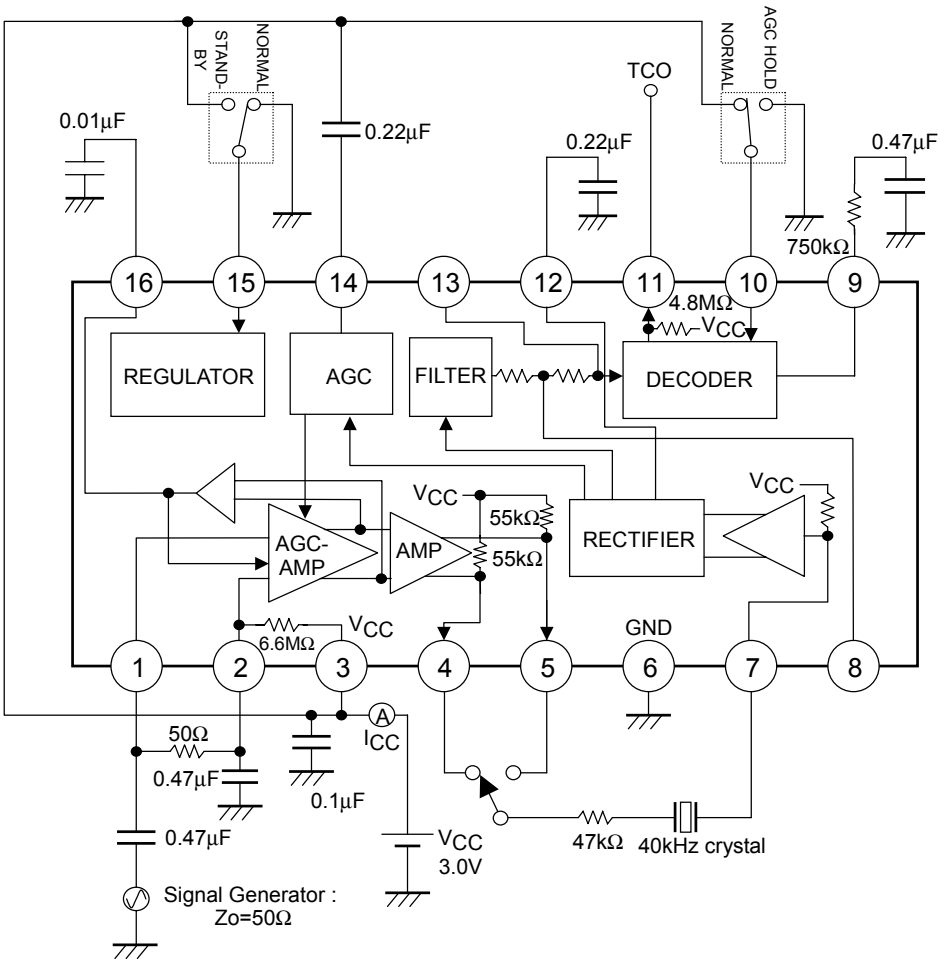



## Block Diagram




PCA00623

## Test Circuit Diagram




PCA00624


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