



## LA3430M

### PLL FM MPX Stereo Demodulator with Pilot Canceler for Car Stereo Use

#### Overview

The LA3430M (MFP-16 package version of LA3430) is an MPX IC for FM car stereo use. It contains the VCO non-adjusting function, skip noise eliminating function, and pilot cancel function.

#### Functions

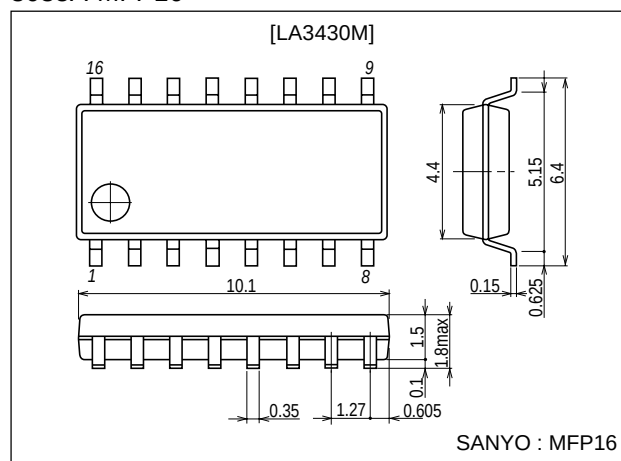
- VCO non-adjusting function.
- Pilot cancel function (Level follow-up type).
- Stereo noise control function (SNC function).
- High cut control function (HCC function).
- Stereo - monaural automatic select (Pilot input prioritized).
- VCO oscillation stop function.
- Forced monaural function for reception mode (Stereo lamp unlighted, pilot cancel function and HCC function held). This function is provided by disconnecting pin 14 from  $V_{CC}$ .

| How to provide forced monaural mode at stereo reception | Lamp      | HCC | Pilot cancel |
|---------------------------------------------------------|-----------|-----|--------------|
| Pin 12 GND                                              | Lighted   | ○   | ○            |
| 7.3V or greater applied to pin 11                       | Unlighted | ×   | ×            |
| Pin 15 GND                                              | Unlighted | ○   | ×            |
| Pin 14 disconnected                                     | Unlighted | ○   | ○            |

#### Package Dimensions

unit:mm

3035A-MFP16



#### Features

- Non-adjusting VCO : Eliminates the need to adjust free-running frequency.
- VCO is stable to ambient temperature changes :  $\pm 0.1$  to  $0.15\%$  for  $\pm 50^\circ\text{C}$  change.
- Low distortion ( $0.07\%$  typ./300mV input mono).
- Good ripple rejection of power supply (35dB typ.).
- Wide operating voltage range ( $V_{CC}=6.5$  to  $12\text{V}$ ).

■ Any and all SANYO products described or contained herein do not have specifications that can handle applications that require extremely high levels of reliability, such as life-support systems, aircraft's control systems, or other applications whose failure can be reasonably expected to result in serious physical and/or material damage. Consult with your SANYO representative nearest you before using any SANYO products described or contained herein in such applications.

■ SANYO assumes no responsibility for equipment failures that result from using products at values that exceed, even momentarily, rated values (such as maximum ratings, operating condition ranges, or other parameters) listed in products specifications of any and all SANYO products described or contained herein.

**SANYO Electric Co.,Ltd. Semiconductor Company**

TOKYO OFFICE Tokyo Bldg., 1-10, 1 Chome, Ueno, Taito-ku, TOKYO, 110-8534 JAPAN

21000TH (KT)/1258TA, TS No.2720-1/4

## Specifications

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

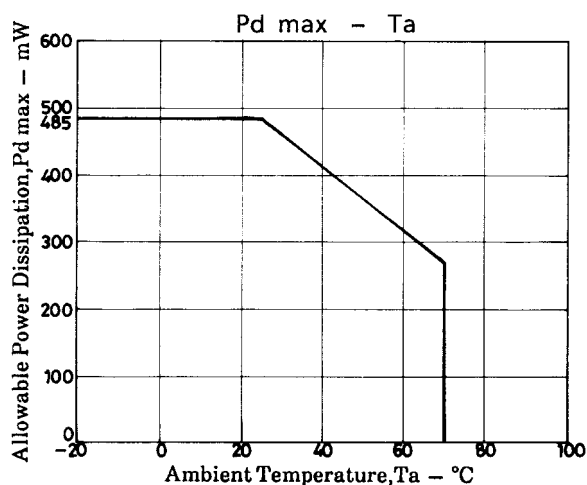
| Parameter                   | Symbol              | Conditions | Ratings     | Unit               |
|-----------------------------|---------------------|------------|-------------|--------------------|
| Maximum Supply Voltage      | $V_{CC\text{ max}}$ |            | 16          | V                  |
| Lamp Driving Current        | $I_L\text{ max}$    |            | 30          | mA                 |
| Allowable Power Dissipation | $P_d\text{ max}$    |            | 485         | mW                 |
| Operating Temperature       | $T_{opr}$           |            | -20 to +70  | $^{\circ}\text{C}$ |
| Storage Temperature         | $T_{stg}$           |            | -40 to +125 | $^{\circ}\text{C}$ |

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

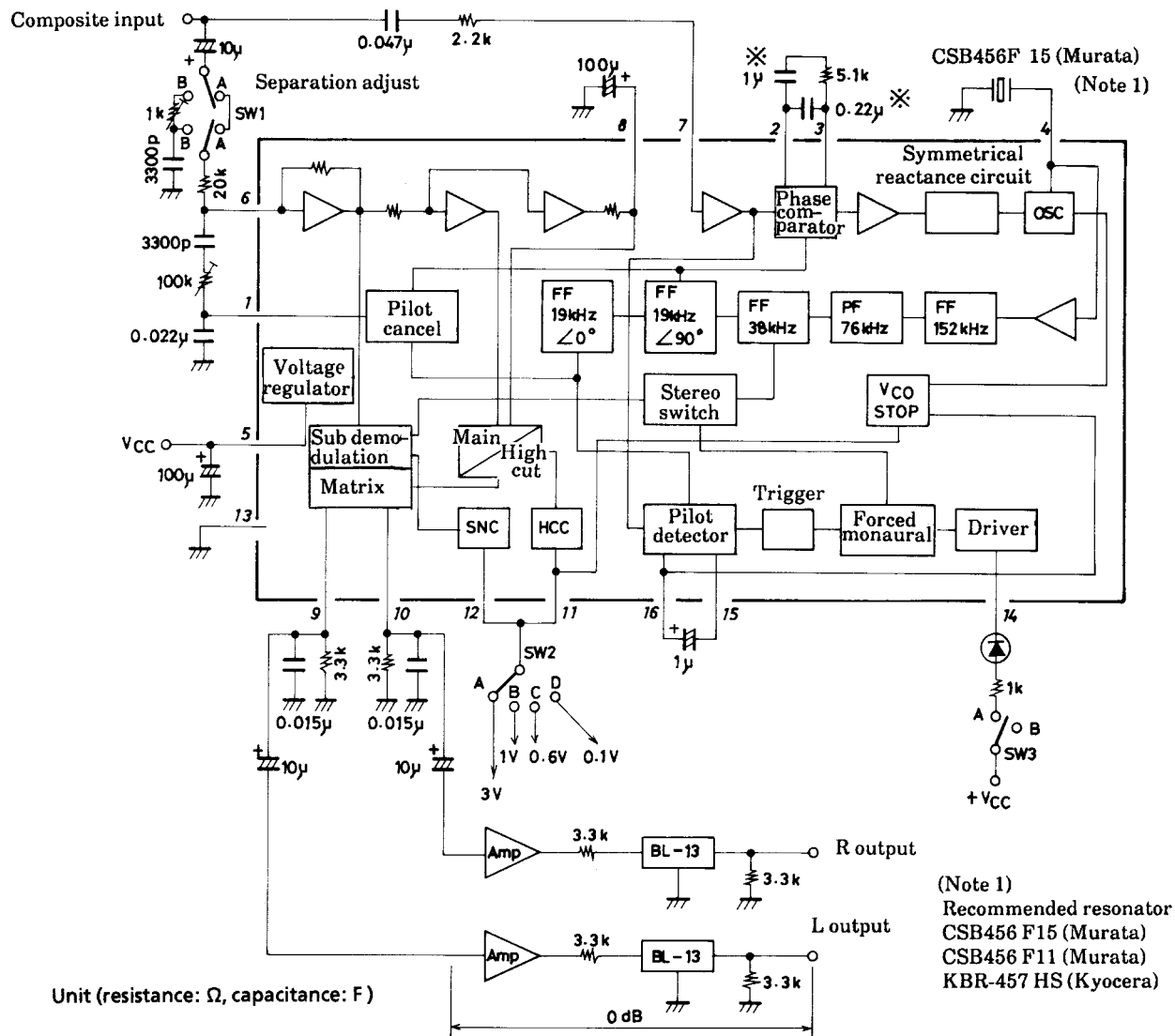
| Parameter                        | Symbol             | Conditions | Ratings    | Unit |
|----------------------------------|--------------------|------------|------------|------|
| Recommended Supply Voltage       | $V_{CC}$           |            | 10         | V    |
| Operating Voltage Range          | $V_{CC\text{ op}}$ |            | 6.5 to 12  | V    |
| Recommended Input Signal Voltage | $V_i$              |            | 200 to 300 | mV   |

### Operating Characteristics at $T_a = 25^{\circ}\text{C}$ , $V_{CC}=10\text{V}$ , $V_i=300\text{mV}$ , $f=1\text{kHz}$ , $L+R=90\%$ , $\text{pilot}=10\%$

| Parameter                        | Symbol           | Conditions                                              | Ratings |         |      | Unit             |
|----------------------------------|------------------|---------------------------------------------------------|---------|---------|------|------------------|
|                                  |                  |                                                         | min     | typ     | max  |                  |
| Quiescent Current                | $I_{cco}$        | No input                                                |         | 28      | 38   | mA               |
| Channel Separation               | Sep              |                                                         | 40      | 50      |      | dB               |
| Total Harmonic Distortion        | THD              | Monaural                                                |         | 0.07    | 0.2  | %                |
|                                  |                  | Main                                                    |         | 0.07    | 0.2  | %                |
| Lamp Lighting Level              | $V_L$            | $L+R=90\%$ , $\text{pilot}=10\%$                        | 50      | 85      | 120  | mV               |
| Lamp Hysteresis                  | hy               |                                                         |         | 2       | 6    | dB               |
| Capture Range                    | CR               |                                                         |         | $\pm 1$ |      | %                |
| Output Signal Level              | $V_O$            | Sub                                                     | 150     | 215     | 300  | mV               |
| Signal to Noise Ratio            | S/N              | $R_g=20\text{k}\Omega$                                  | 68      | 74      |      | dB               |
|                                  |                  | $R_g=10\text{k}\Omega$                                  | 70      | 78      |      | dB               |
| Input Resistance (Pin 6)         | $r_i$            |                                                         |         | 20      |      | $\text{k}\Omega$ |
| SCA Rejection                    | SCA rej          |                                                         |         | 80      |      | dB               |
| Allowable Input Voltage          | $V_i$            | THD=1%, $R_g=20\text{k}\Omega$                          | 700     | 900     |      | mV               |
|                                  |                  | THD=1%, $R_g=10\text{k}\Omega$                          |         | 450     |      | mV               |
| SNC Output Attenuation           | Att SNC          | $V_{12}=0.6\text{V}$ , $L-R=90\%$ , $\text{pilot}=10\%$ | -8.5    | -3.0    | -0.3 | dB               |
| SNC Output Voltage               | $V_O\text{ sub}$ | $V_{12}=0.1\text{V}$ , $L-R=90\%$ , $\text{pilot}=10\%$ |         |         | 5    | mV               |
| HCC Output Attenuation           | Att HCC1         | $V_{11}=0.6\text{V}$ , $L+R=90\%$ , $\text{pilot}=10\%$ | -15.0   | -6.0    | -0.5 | dB               |
|                                  | Att HCC2         | $V_{11}=1\text{V}$ , $L+R=90\%$ , $\text{pilot}=10\%$   | -2.0    |         | 0    | dB               |
| Ripple Rejection of Power Supply | Rr               |                                                         |         | 35      |      | dB               |
| VCO Stop Voltage                 |                  |                                                         |         | 7.3     |      | V                |
| Channel Balance                  |                  |                                                         |         | 0.5     | 1.5  | dB               |
| Pilot Cancel                     |                  |                                                         | 16      | 23      |      | dB               |
| Stereo Lamp Current              |                  | Minimum stereo operating current                        | 1.0     |         |      | mA               |
| Saturation Voltage (Pin 14)      |                  | $I_L=10\text{mA}$                                       |         | 1.0     |      | V                |



## Test Circuit and Internal Equivalent Block Diagram



\* : When a polarized electrolytic capacitor is used in your application, the positive pole may be connected to either pin 2 or pin 3.

SW1 : For characteristics other than separation, place in the A position.

SW2 : For characteristics other than HCC, SNC, place in the A position.

SW3 : Forced monaural of reception mode.

Amp : Bandwidth 100kHz or greater, THD=0.01% or less, input impedance 330k $\Omega$  or greater.

- Specifications of any and all SANYO products described or contained herein stipulate the performance, characteristics, and functions of the described products in the independent state, and are not guarantees of the performance, characteristics, and functions of the described products as mounted in the customer's products or equipment. To verify symptoms and states that cannot be evaluated in an independent device, the customer should always evaluate and test devices mounted in the customer's products or equipment.
- SANYO Electric Co., Ltd. strives to supply high-quality high-reliability products. However, any and all semiconductor products fail with some probability. It is possible that these probabilistic failures could give rise to accidents or events that could endanger human lives, that could give rise to smoke or fire, or that could cause damage to other property. When designing equipment, adopt safety measures so that these kinds of accidents or events cannot occur. Such measures include but are not limited to protective circuits and error prevention circuits for safe design, redundant design, and structural design.
- In the event that any or all SANYO products(including technical data, services) described or contained herein are controlled under any of applicable local export control laws and regulations, such products must not be exported without obtaining the export license from the authorities concerned in accordance with the above law.
- No part of this publication may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopying and recording, or any information storage or retrieval system, or otherwise, without the prior written permission of SANYO Electric Co., Ltd.
- Any and all information described or contained herein are subject to change without notice due to product/technology improvement, etc. When designing equipment, refer to the "Delivery Specification" for the SANYO product that you intend to use.
- Information (including circuit diagrams and circuit parameters) herein is for example only ; it is not guaranteed for volume production. SANYO believes information herein is accurate and reliable, but no guarantees are made or implied regarding its use or any infringements of intellectual property rights or other rights of third parties.

This catalog provides information as of February, 2000. Specifications and information herein are subject to change without notice.