



SANYO Semiconductors DATA SHEET

LA6576 — Monolithic Linear IC 5-channel Driver for Compact Disk Applications

Overview

The LA6576 is a 5-channel driver for optical disc drives with a VREF switching function.

Features

- Power amplifier 5-channel built-in. (Bridge-connection (BTL): 4-channel, H bridge: 1-channel)
- I_O max 1A.
- Level shift circuit built-in (except H bridge).
- Mute circuit (output ON/OFF) built-in.
(Operable with BTL AMP with CH1 to 4 and not operable for the H bridge of 5VREG)
- 5V regulator built-in (external PNP transistor).
- With VREF changeover function (H: external, L: internal).
- Overheat protection circuit (thermal shutdown) built-in.

Specifications

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

Parameter	Symbol	Conditions	Ratings	Unit
Maximum supply voltage	V_{CC} max		14	V
Maximum output current	I_O max	Each output for H bridge, channel 1 to 4	1	A
Maximum input voltage	V_{INB}		13	V
Mute pin voltage	V_{MUTE}		13	V
Allowable operation	P_d max	Independent IC	0.8	W
		Specified board*	2	W
Operating temperature	T_{opr}		-30 to +85	$^\circ\text{C}$
Storage temperature	T_{stg}		-55 to +150	$^\circ\text{C}$

*1 A circuit board for mounting (76.1mm×114.3mm×1.6mm, glass epoxy resin)

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

Parameter	Symbol	Conditions	Ratings	Unit
Supply voltage	V_{CC}		5.6 to 13	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.

LA6576

Electrical Characteristics at $V_{CC1} = V_{CC2} = 8V$, $V_{REF} = 2.5V$, $T_a = 25^\circ C$, unless especially specified.

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
All blocks						
No-load current drain ON	I_{CC-ON}	BTL-AMP output ON, LOADING block OFF *1		30	50	mA
No-load current drain OFF	I_{CC-OFF}	All outputs OFF *1		10	15	mA
Thermal shutdown temperature	TSD	Design guarantee value	150	175	200	$^\circ C$
VREF-AMP						
VREF-AMP offset voltage	VREF-OFFSET		-10		10	mV
VREF Input voltage range	VREF-IN		1		$V_{CC}-1.5$	V
VREF-OUT output current	I-VREF-OUT	CH1 input reference voltage	2	5		mA
BTL AMP Block (CH1 to CH4)						
Output offset voltage	VOFF	Voltage difference between outputs for BTL AMP, each channel. *2	-50		50	mV
Input voltage range	V_{IN}	Input voltage range for input for OP-AMP.	0		$V_{CC}-1.5$	V
Output voltage	V_O	Each voltage between V_{O+} and V_{O-} when $R_L = 8\Omega$. *3	5.7	6.2		V
Closed-circuit voltage gain	VG	Input and output gain. Input OP-AMP : BUFFER	3.6	4	4.4	deg
Slew rate	SR	AMP Independent Multiply 2 between outputs.		0.5		V/ μs
MUTE ON voltage	VMUTE-ON	Output ON voltage, each MUTE *4	2			V
MUTE OFF voltage	VMUTE-OFF	Output OFF voltage, each MUTE *4			0.5	V
Input AMP Block (CH1 to CH4)						
Input voltage range	V_{IN-OP}		0		$V_{CC}-1.5$	V
Output current (SINK)	SINK-OP		2			mA
Output current (SOURCE)	SOURCE-OP	*5	300	500		μA
Output offset voltage	VOFF-OP		-10		10	mV
CH1 input changeover voltage 1	VSW-OP1	CH1 input AMP (B), external VREF select *6	2			V
CH1 input changeover voltage 2	VSW-OP2	CH1 input AMP (A), internal VREF select 6*			0.5	V
Loading Block (CH5, H bridge)						
Output voltage	V_{O-LOAD}	Between forward and reverse outputs, $R_L = 8\Omega$	5.7	6.5		V
Break output saturation voltage	VCE-BREAK	Output voltage at braking *8			0.3	V
Input low level	V_{IN-L}				1	V
Input high level	V_{IN-H}		2			V
Power Supply Block (PNP transistor: 2SB632K-use)						
5V supply output	V_{OUT}	$I_O = 200mA$	4.8	5.0	5.2	V
REG-IN SINK current	REG-IN-SINK	Base current to external PNP	5	10		mA
Line regulation	$\Delta VOLN$	$6V \leq V_{CC} \leq 12V$, $I_O = 200mA$		10	100	mV
Load regulation	$\Delta VOLD$	$5mA \leq I_O \leq 200mA$		10	100	mV

*1. Current dissipation that is a sum of V_{CC1} and V_{CC2} at no load.

*2. Input AMP is a BUFFER AMP.

*3. Voltage difference between both ends of load (8Ω). Output saturated.

*4. Output ON with MUTE: [H] and OFF with MUTE: [L] (HI impedance).

*5. The source of input OP-AMP is a constant current. As the $11k\Omega$ resistance to the next stage is a load, pay due attention when setting the input OP-AMP gain.

*6. With V_{IN1-SW} : [L], the input AMP selects AMP-A while VREF selects internal VREF ($\approx 2.5V$).

With V_{IN1-SW} : [H], the input AMP selects AMP-B while VREF selects external VREF ($\approx 2V_{REF-IN}$).

*7. Voltage of upper (SOURCE) + lower (SINK) sides. At forward/reverse, the output voltage is determined by subtracting this voltage from V_{CC} .

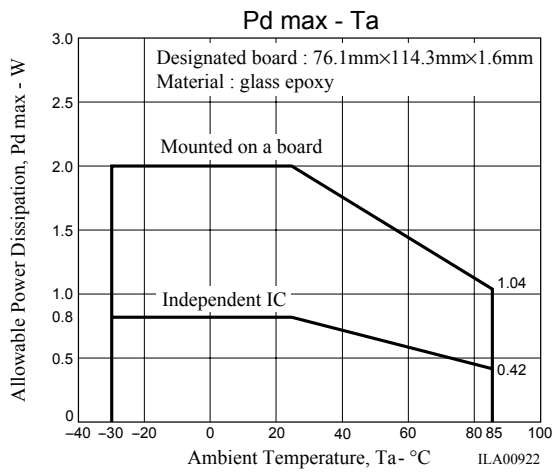
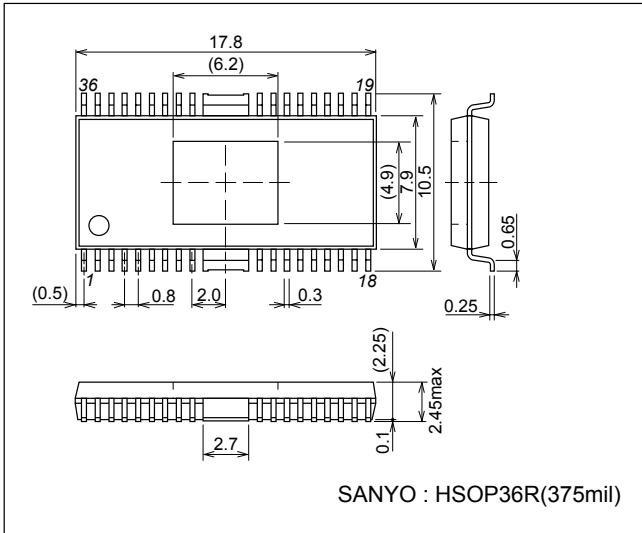
*8. Short (GND) brake used. SINK side output ON.

*9. 5VREG incorporates a drooping protection circuit and operated when the base current is 10mA (TYP).

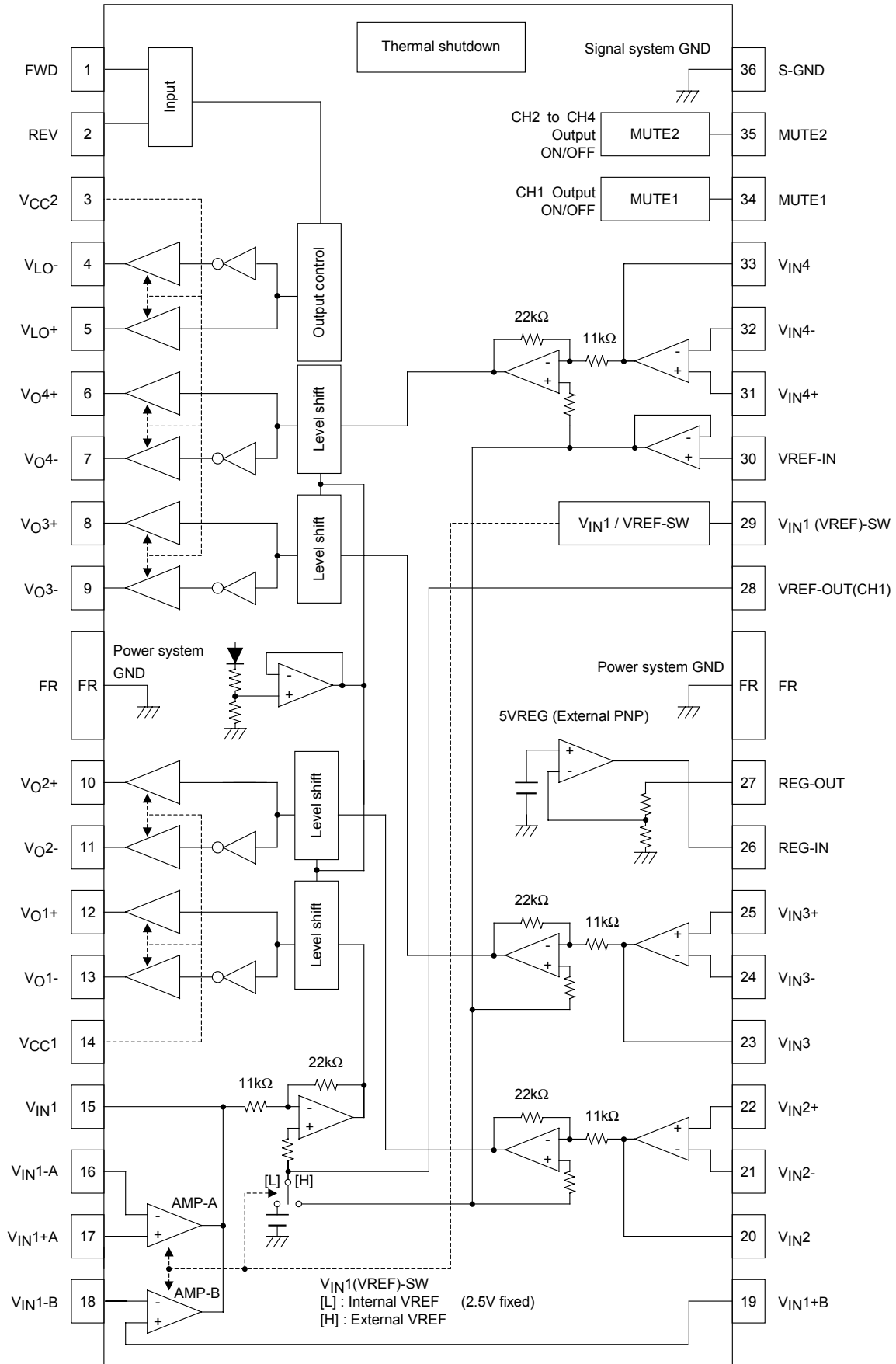
Package Dimensions

unit : mm

3251



Block Diagram

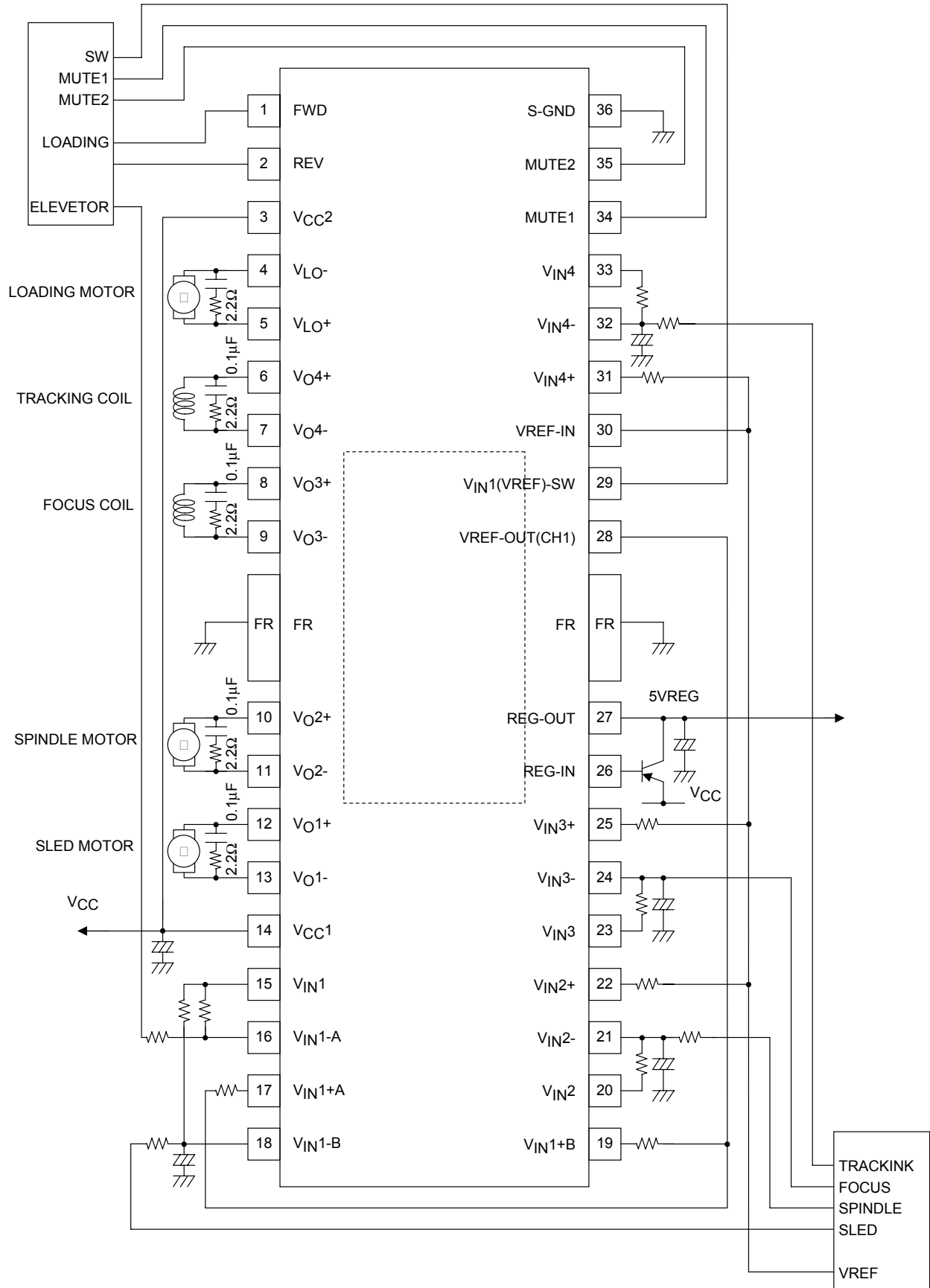


LA6576

Pin Description

Pin name	Pin name	Pin no.	Equivalent circuit	Pin explanation
Input (CH1 to 4)	V _{IN} 1+A V _{IN} 1+B V _{IN} 1-A V _{IN} 1-B V _{IN} 1 V _{IN} 2+ V _{IN} 2- V _{IN} 2 V _{IN} 3+ V _{IN} 3- V _{IN} 3 V _{IN} 4- V _{IN} 4+ V _{IN} 4	17 19 16 18 15 22 21 20 25 24 23 32 31 33		Input pin (CH1 to 4)
Input (H bridge)	FWD REV	1 2		Logic input pin. By combining H and L of this pin, any one of four modes (forward/reversed/brake/idling) can be selected.
Output (BTL-AMP)	V _O 1+ V _O 1- V _O 2+ V _O 2- V _O 3+ V _O 3- V _O 4+ V _O 4-	12 13 10 11 8 9 6 7		Output for channel 1 to 4.
Output (H bridge)	V _{LO} - V _{LO} +	4 5		H bridge (LOADING) output
MUTE	MUTE1 MUTE2	34 35		BTL AMP output, which turns ON/OFF the output for CH1 – CH4, MUTE: H Output ON MUTE: L Output OFF

Sample Application Circuit



Truth Table (loading (H bridge) section)

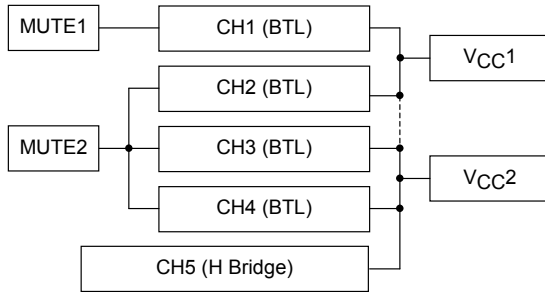
FWD	REV	V _{LO+}	V _{LO-}	Loading output
L	L	OFF	OFF	OFF *1
	H	H	L	Forward
H	L	L	H	Reversed
	H	L	L	(Short) brake *2

*1 The output has a high impedance.

*2 At brake, the SINK side transistor is ON (short brake).

V_{LO+} and V_{LO-} are approximately on the GND level.

Relation of MUTE and Power (VCC*)



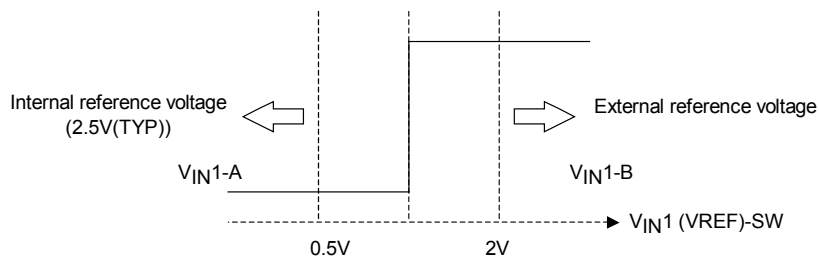
*Connect VCC1 and VCC2 externally.

(This is to minimize effects of voltage drop in internal and metal wirings.)

V_{IN1} (VREF)-SW (CH1 input AMP selection and internal/external VREF selection function)

(Relation between input AMP (CH1 only) and VREF)

V _{IN1} -SW	Input AMP (CH1) state	VREF state
L	V _{IN1} -A (AMP-A)	Internal VREF (2.5V:TYP)
H	V _{IN1} -B (AMP-B)	External VREF



- 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 December, 2005. Specifications and information herein are subject to change without notice.