Ordering number : ENA0470A

SANYO Semiconductors
DATA SHEET

LB1801CL — Monolithic Digital IC Stepping Motor Driver IC

Overview

The LB1801CL is a 2-channel low-saturation drive low-voltage operation forward/reverse motor driver IC.
Its ultraminiature package makes it optimal for 2-phase excitation drive of 2-phase bipolar stepping motors which are commonly used in various portable devices such as digital still cameras.

Features

- Low saturation voltage, V_O (sat) = 0.3V typ. at I_O of 150mA
- Built-in through current prevention circuit
- Zero current drawn in standby mode
- On-chip index comparator (open collector output)
- On-chip ENA interlocked power supply
- Built-in thermal shutdown circuit
- ECSP2828-12 ultraminiature leadless package (2.8mm×2.8mm×0.8mm typ)

Absolute Maximum Ratings at Ta = 25°C

Parameter	Symbol	Conditions	Ratings	Unit
Maximum power supply voltage	V_{CC} max		-0.3 to +8.0	V
Output application voltage	V_{OUT} max	OUT1, OUT2, OUT3, OUT4 pin	V_{CC}+VSF	V
Input application voltage	V_{IN} max	ENA, IN1, IN2 pin	-0.3 to +8.0	V
GND pin outflow current	I GND	Per channel	300	mA
Allowable power dissipation	Pd max	Mounted on a circuit board *	450	mW
Operating temperature	Topr		-30 to +75	°C
Storage temperature	Tstg		-40 to +150	°C

* Mounted on a specified board: 20.0mm×10.0mm×0.8mm, paper phenol

■ Any and all SANYO Semiconductor Co.,Ltd. products described or contained herein are, with regard to "standard application", intended for the use as general electronics equipment (home appliances, AV equipment, communication device, office equipment, industrial equipment etc.). The products mentioned herein shall not be intended for use for any "special application" (medical equipment whose purpose is to sustain life, aerospace instrument, nuclear control device, burning appliances, transportation machine, traffic signal system, safety equipment etc.) that shall require extremely high level of reliability and can directly threaten human lives in case of failure or malfunction of the product or may cause harm to human bodies, nor shall they grant any guarantee thereof. If you should intend to use our products for applications outside the standard applications of our customer who is considering such use and/or outside the scope of our intended standard applications, please consult with us prior to the intended use. If there is no consultation or inquiry before the intended use, our customer shall be solely responsible for the use.

■ Specifications of any and all SANYO Semiconductor Co.,Ltd. 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 Semiconductor Co., Ltd.
TOKYO OFFICE Tokyo Bldg., 1-10, 1 Chome, Ueno, Taito-ku, TOKYO, 110-8534 JAPAN

Allowable Operating Range at Ta = 25°C

Parameter	Symbol	Conditions	Ratings	Unit
Power supply voltage	V_{CC}		2.2 to 7.5	V
Input high level voltage	V_{IH}	ENA, IN1, IN2 pin	1.5 to 7.5	V
Input low level voltage	V_{IL}		-0.3 to +0.3	V
Allowable comparator output current	I_{COMP}		1.0	mA

Electrical Characteristics at Ta = 25°C, V_{CC} = 3.3V

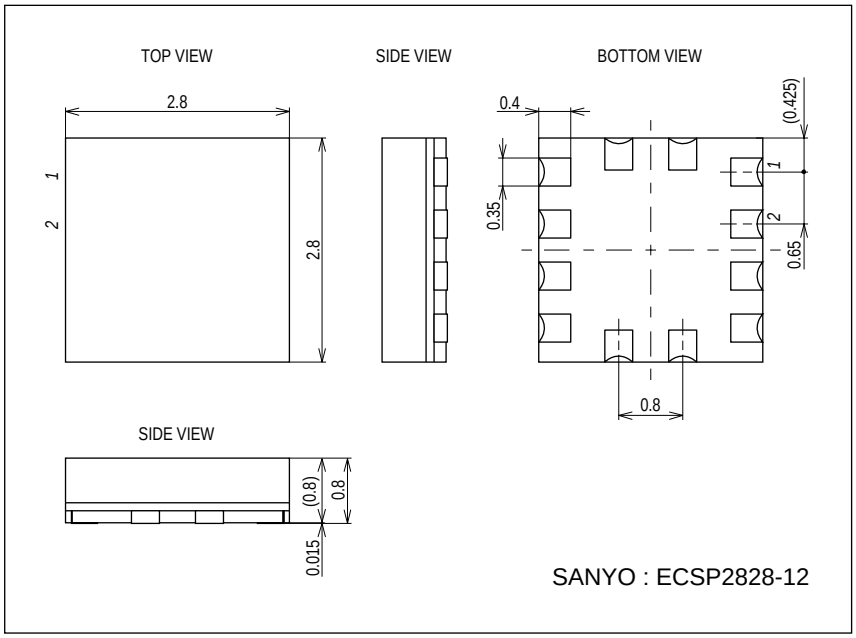
Parameter	Symbol	Conditions	Ratings			unit
			min	typ	max	
Power source current	$I_{CC}0$	ENA = 0V, V_{IN} = 3V or 0V		0.1	1	μA
	$I_{CC}1$	ENA = 3V, V_{IN} = 3V or 0V		17	18.5	mA
Output saturation voltage	$V_{OUT}1$	ENA = 3V, V_{IN} = 3V or 0V, I_{OUT} = 100mA		0.23	0.3	V
	$V_{OUT}2$	ENA = 3V, V_{IN} = 3V or 0V, I_{OUT} = 200mA *		0.5		
Input current	I_{IN}	V_{IN} = 3V		60	70	μA
	I_{ENA}	V_{ENA} = 3V		60	70	
Index comparator						
Internal reference voltage	$V_{IN}P$		1.30	1.35	1.40	V
Common-mode input voltage range	VCOM		0		V_{CC}	V
Input hysteresis width	VHYS1		0.15	0.22	0.25	V
Low-level output voltage	VLCOMP	Sink = 1mA		0.2	0.4	V
LNA interlocked power supply						
Current capacity	IBIAS	Δ (V_{IN}-VBIAS) = 0.2V	50			mA
Spark killer diode						
Reverse current	IS(leak)				1	μA
Forward voltage	VSF	I_{OUT} = 200mA *		1.7		V
Thermal shutdown						
Operating temperature	TSD1	*		170		°C
Hysteresis width	TSD2	*		20		°C

*: Design target value and no measurement was made.

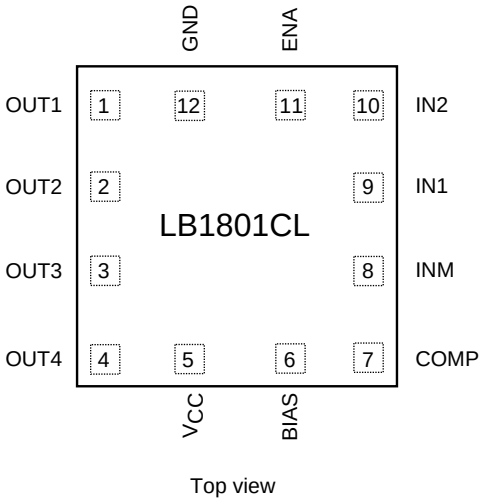
Package Dimensions

unit : mm (typ)

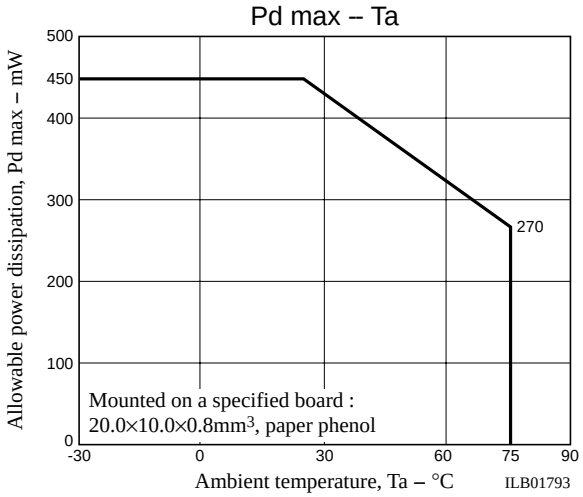
3324



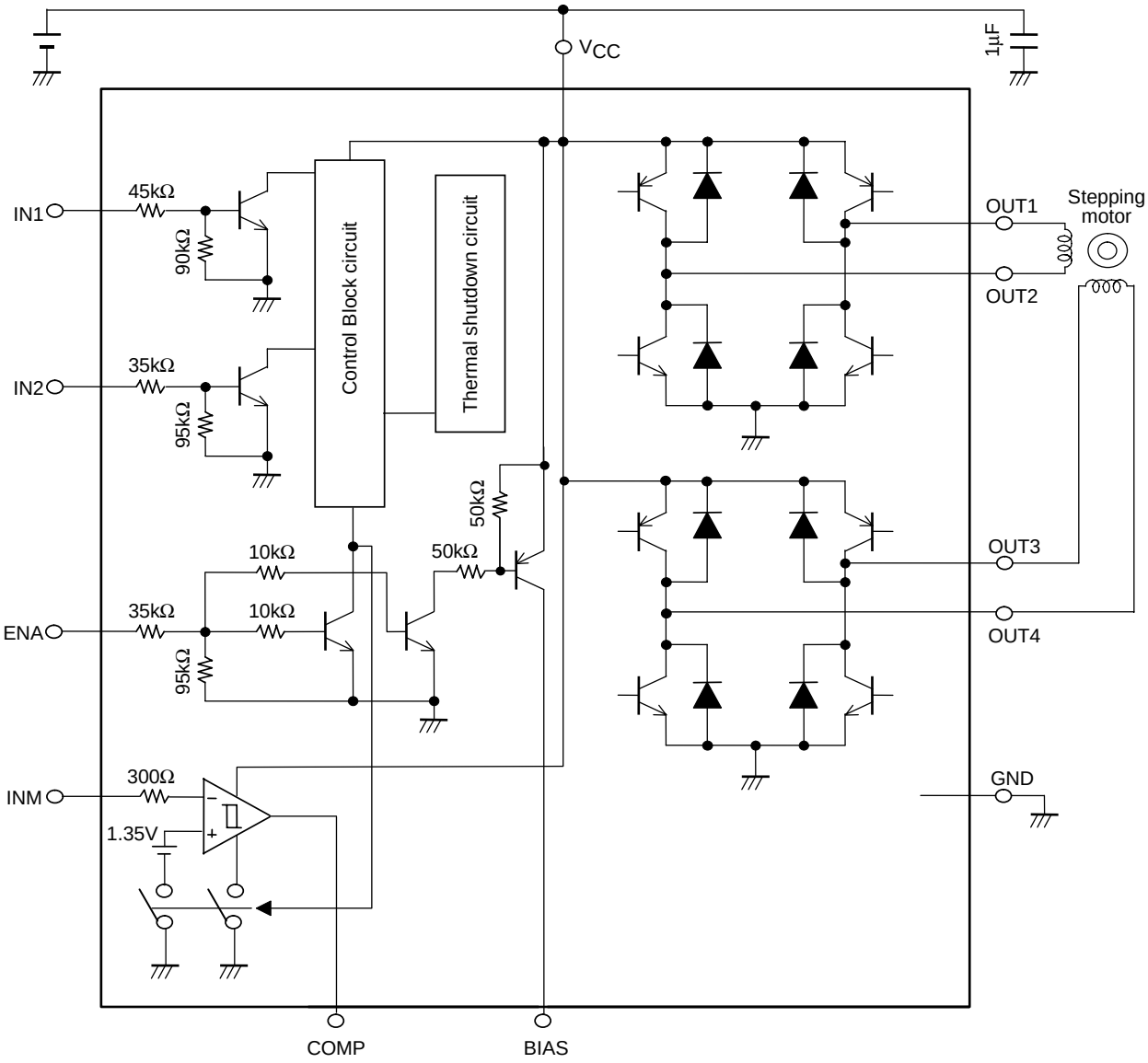
Pin Assignment



Top view



Block Diagram



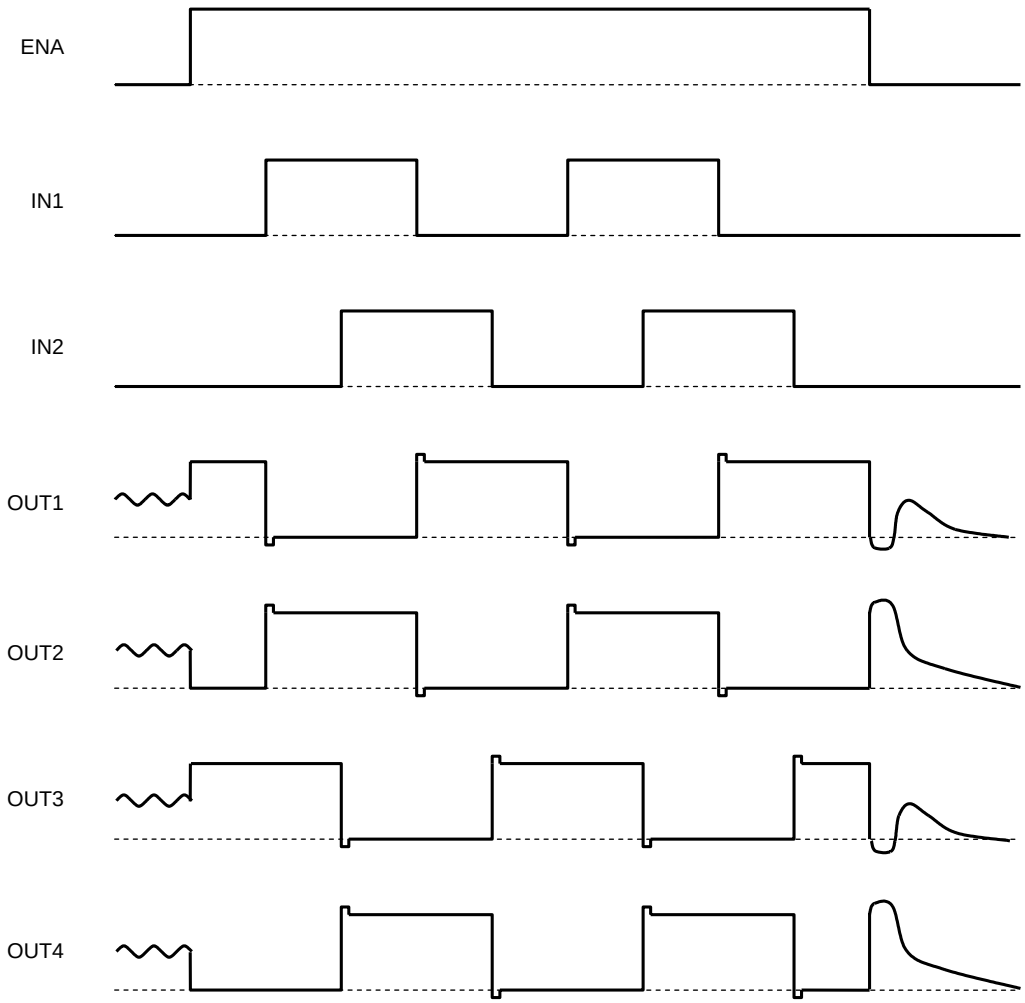
Truth Table

Input			Output						Remarks
ENA	IN1	IN2	OUT1	OUT2	OUT3	OUT4	BIAS	COMP	
L	-	-	OFF	OFF	OFF	OFF	OFF	OFF	Standby
H	L	L	H	L	H	L	ON	ON	2 phase excitation
	L	H	H	L	L	H			
	H	H	L	H	L	H			
	H	L	L	H	H	L			

Pin Functions

Pin No.	Pin Name	Pin Functions
1	OUT1	H bridge output pin
2	OUT2	H bridge output pin
3	OUT3	H bridge output pin
4	OUT4	H bridge output pin
5	V_{CC}	Power supply pin
6	BIAS	Position sensor power pin
7	COMP	Comparator output pin
8	INM	Comparator input pin
9	IN2	Input pin for controlling outputs OUT3 and OUT4
10	IN1	Input pin for controlling outputs OUT1 and OUT2
11	ENA	Enable pin (H input: active, L input: idle)
12	GND	Ground pin

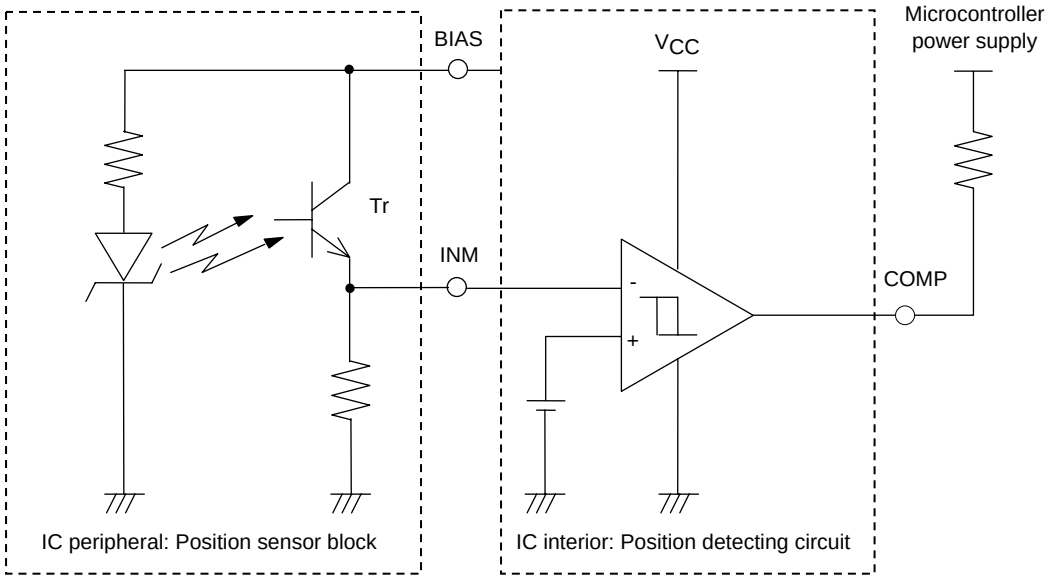
Timing Chart



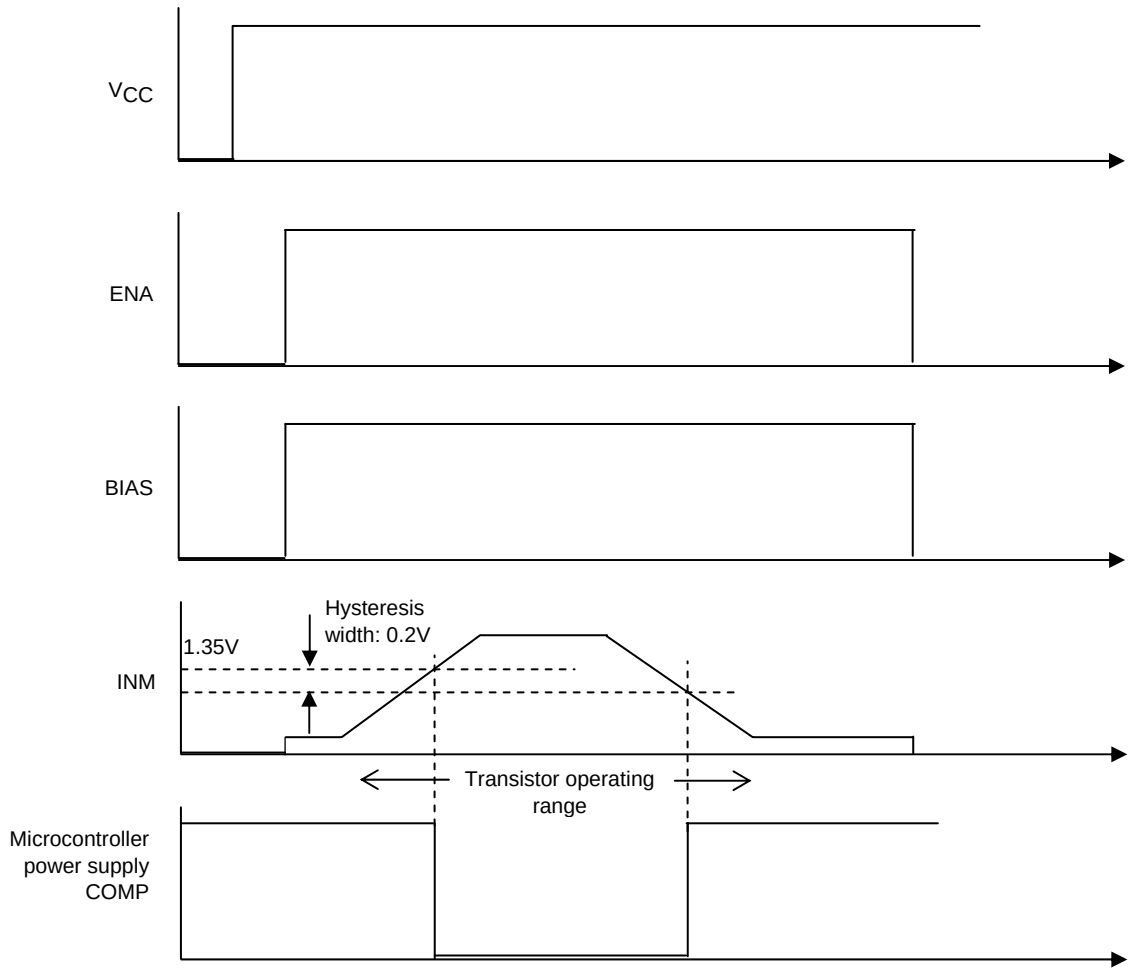
[Timing Chart for Stepping Motor 2-Phase Excitation]

Position Detecting Comparator Application Circuit Example 1

a) Circuit diagram

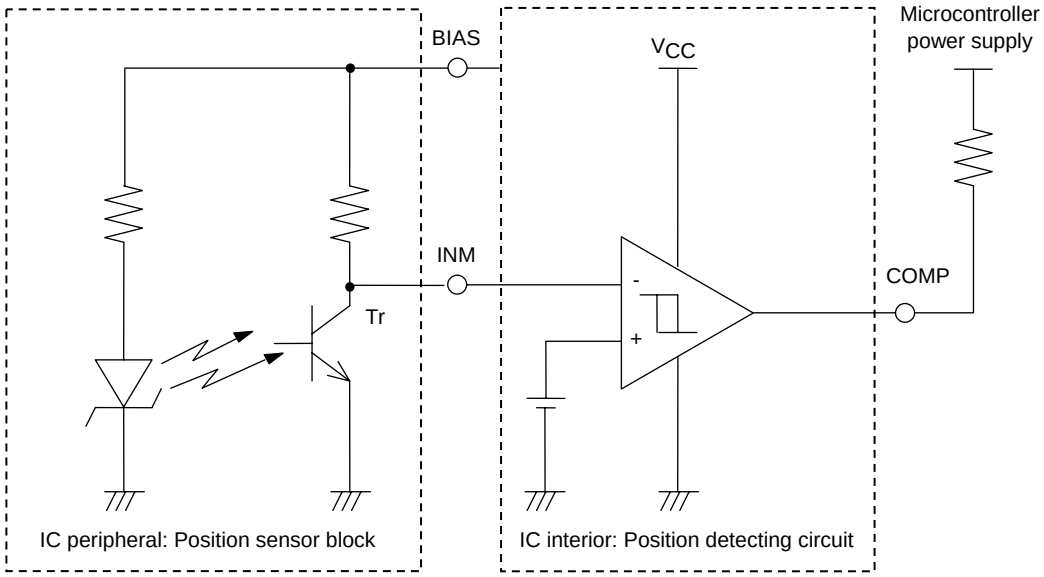


b) Timing chart

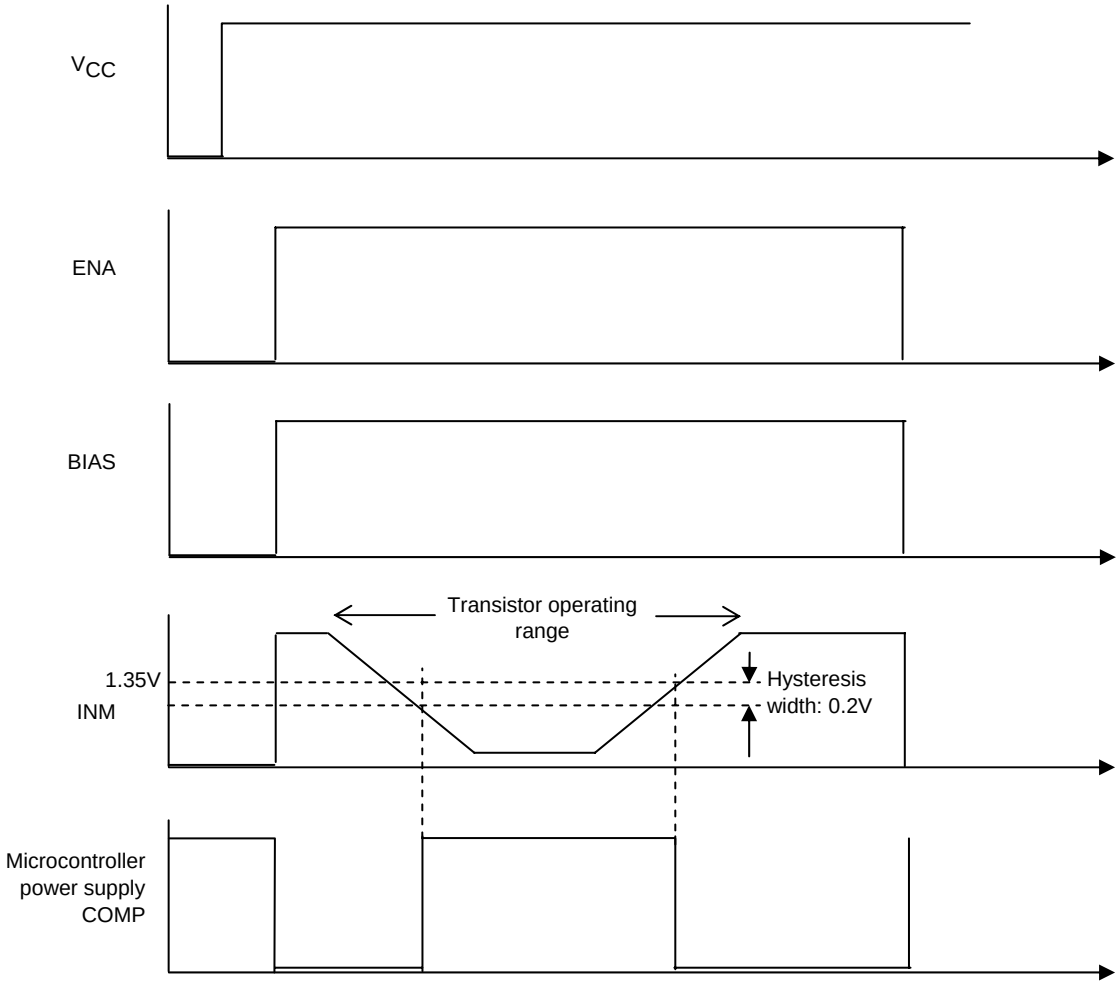


Position Detecting Comparator Application Circuit Example 2

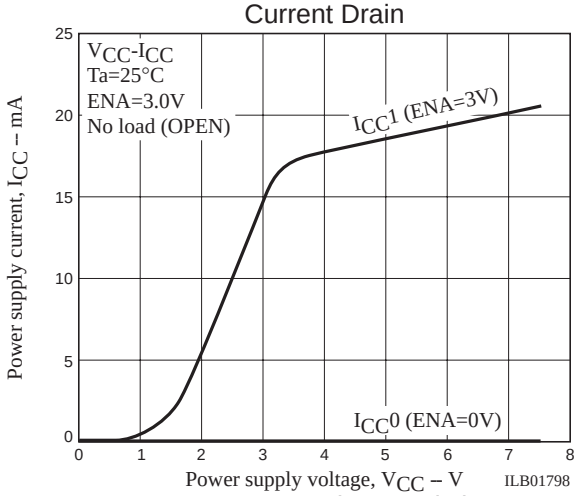
a) Circuit diagram



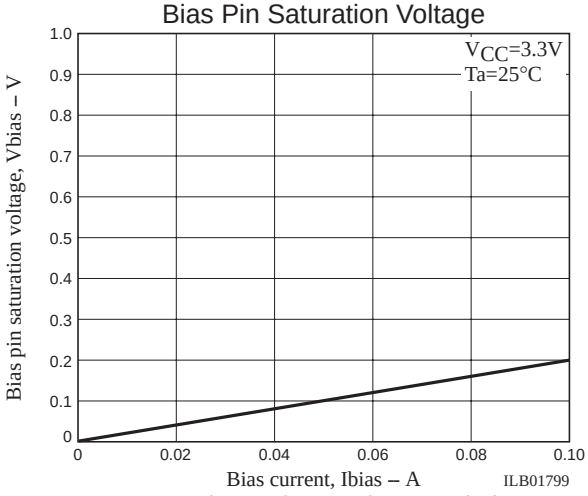
b) Timing chart



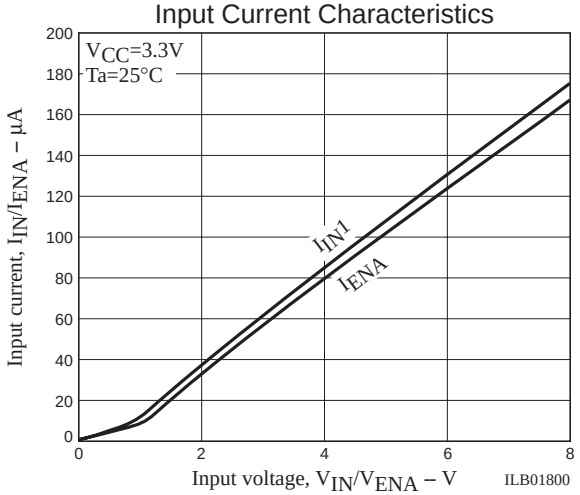
Current Drain



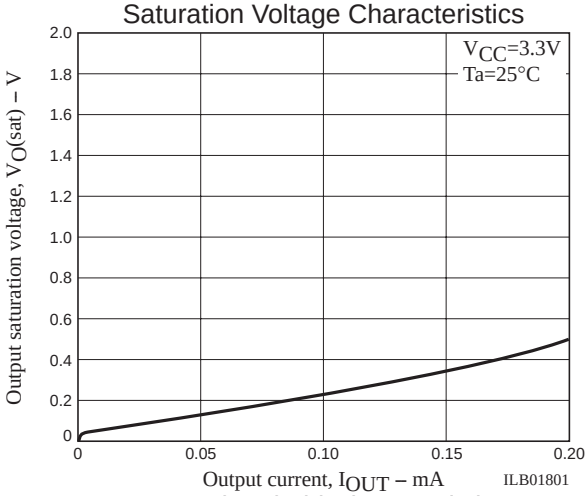
Bias Pin Saturation Voltage



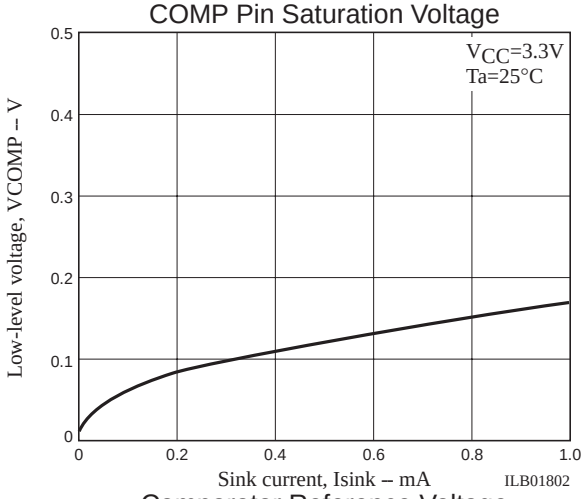
Input Current Characteristics



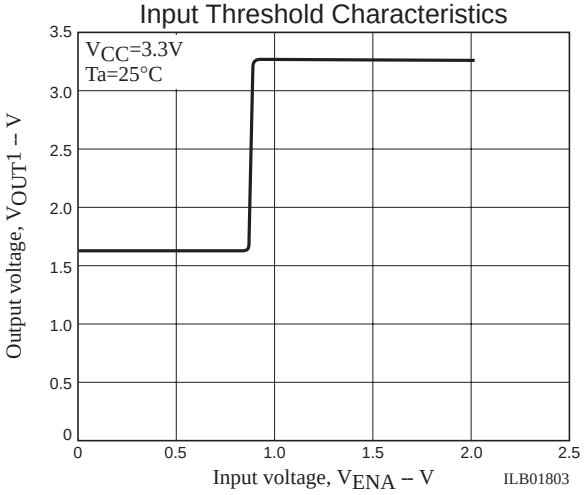
Saturation Voltage Characteristics



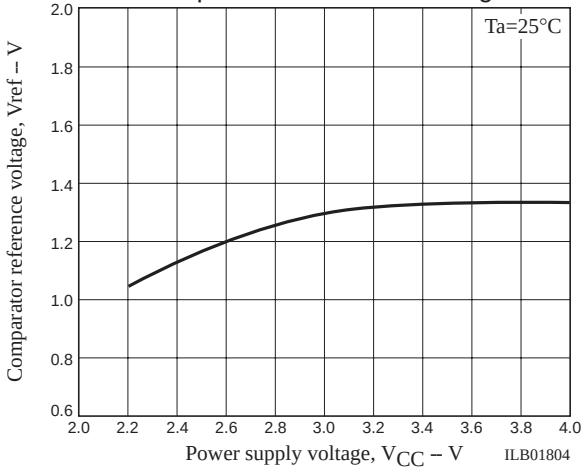
COMP Pin Saturation Voltage



Input Threshold Characteristics



Comparator Reference Voltage



- SANYO Semiconductor Co.,Ltd. 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 Semiconductor Co.,Ltd. products described or contained herein.
- SANYO Semiconductor Co.,Ltd. strives to supply high-quality high-reliability products, however, any and all semiconductor products fail or malfunction with some probability. It is possible that these probabilistic failures or malfunction could give rise to accidents or events that could endanger human lives, trouble that could give rise to smoke or fire, or accidents 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 Semiconductor Co.,Ltd. products described or contained herein are controlled under any of applicable local export control laws and regulations, such products may require 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 consent of SANYO Semiconductor 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 Semiconductor Co.,Ltd. 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.
- Upon using the technical information or products described herein, neither warranty nor license shall be granted with regard to intellectual property rights or any other rights of SANYO Semiconductor Co.,Ltd. or any third party. SANYO Semiconductor Co.,Ltd. shall not be liable for any claim or suits with regard to a third party's intellctual property rights which has resulted from the use of the technical information and products mentioned above.

This catalog provides information as of June, 2007. Specifications and information herein are subject to change without notice.