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

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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

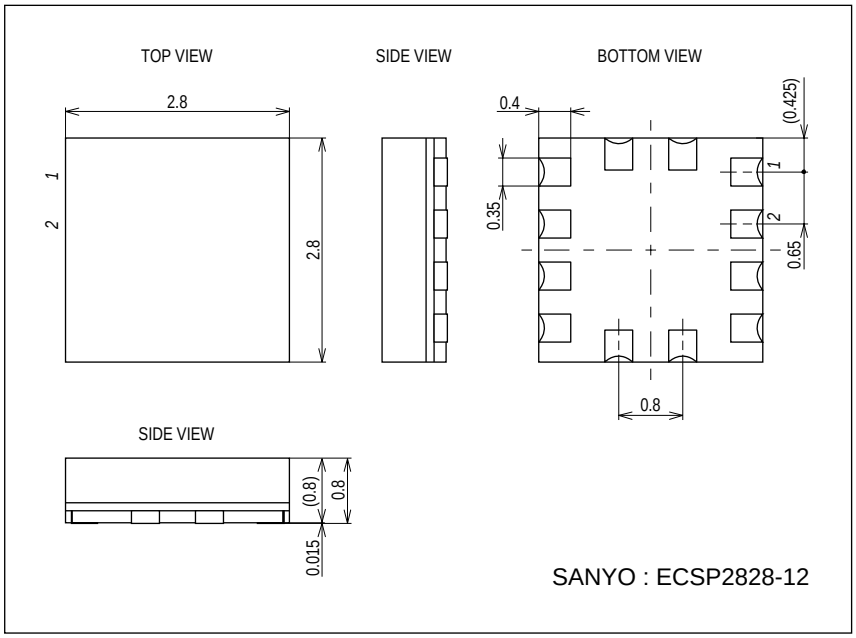
Parameter	Symbol	Conditions	Ratings			unit
			min	typ	max	
Power source current	$I_{CC}0$	ENA = 0V, V_{IN} = 3V or 0V		0.1	1	μA
	$I_{CC}1$	ENA = 3V, V_{IN} = 3V or 0V		17	18.5	mA
Output saturation voltage	$V_{OUT}1$	ENA = 3V, V_{IN} = 3V or 0V, I_{OUT} = 100mA		0.23	0.3	V
	$V_{OUT}2$	ENA = 3V, V_{IN} = 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.

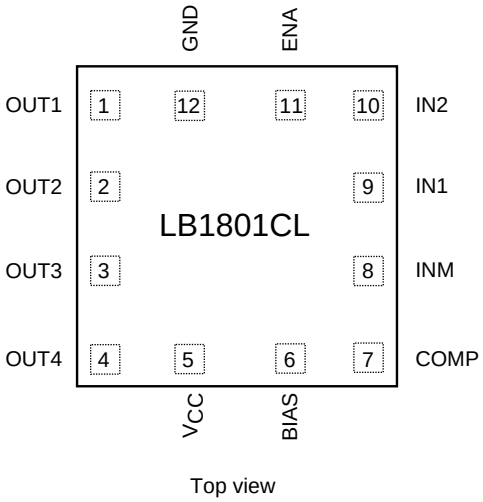
Package Dimensions

unit : mm (typ)

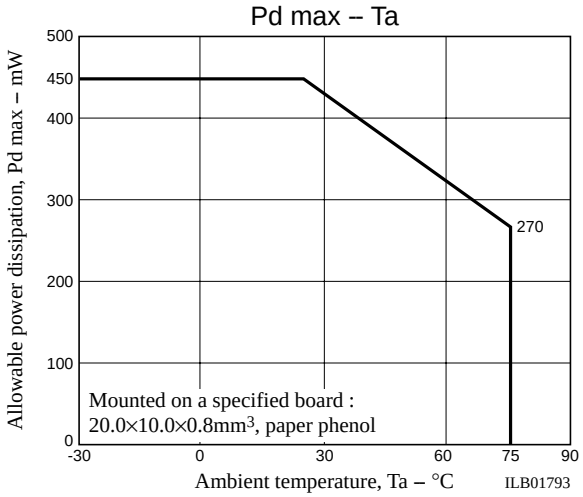
3324



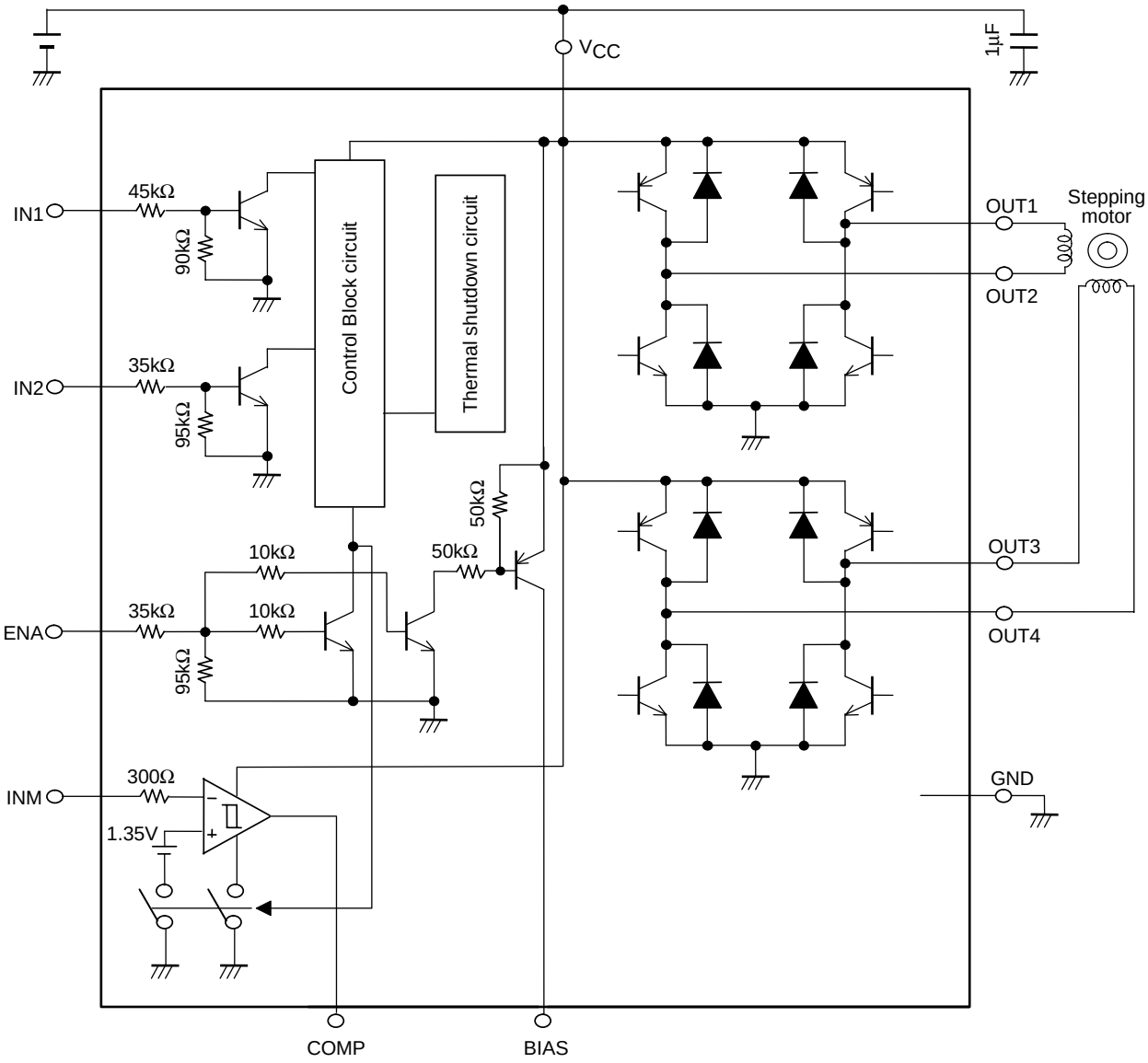
Pin Assignment



Top view



Block Diagram



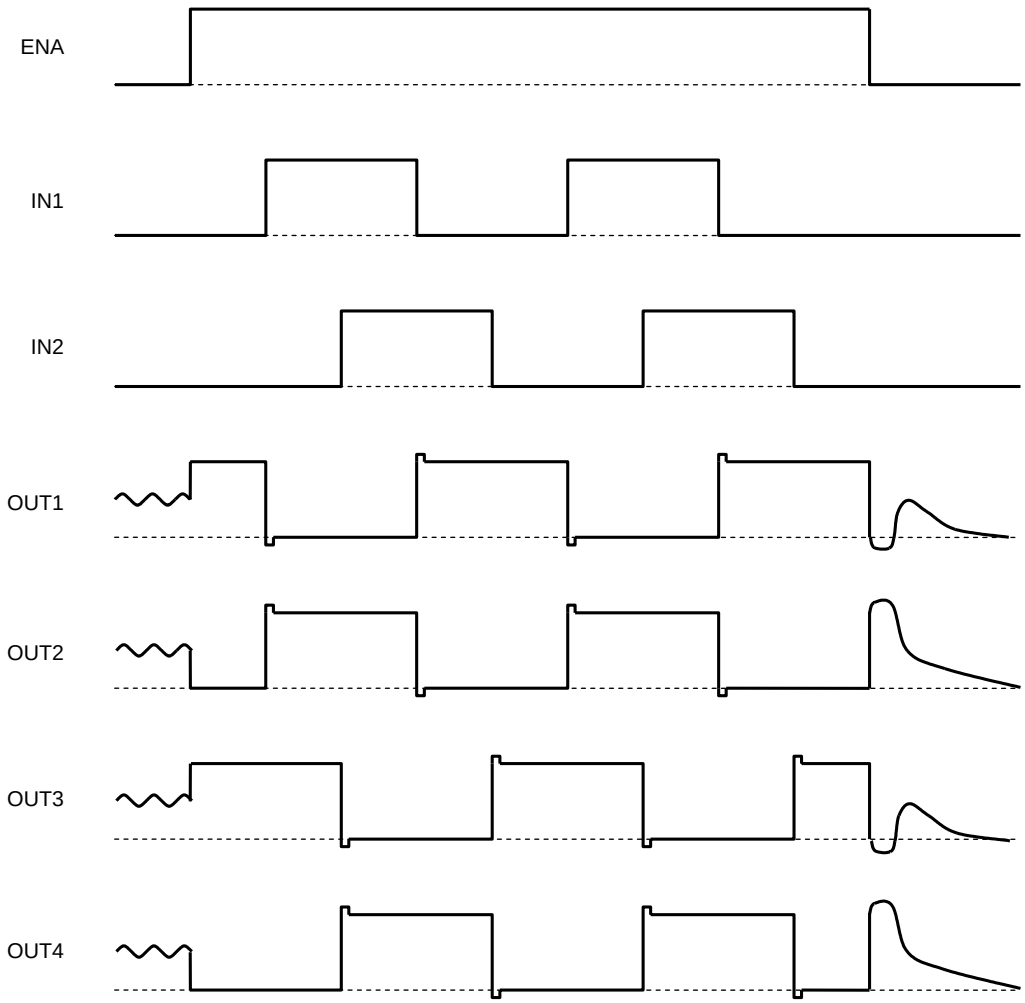
Truth Table

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

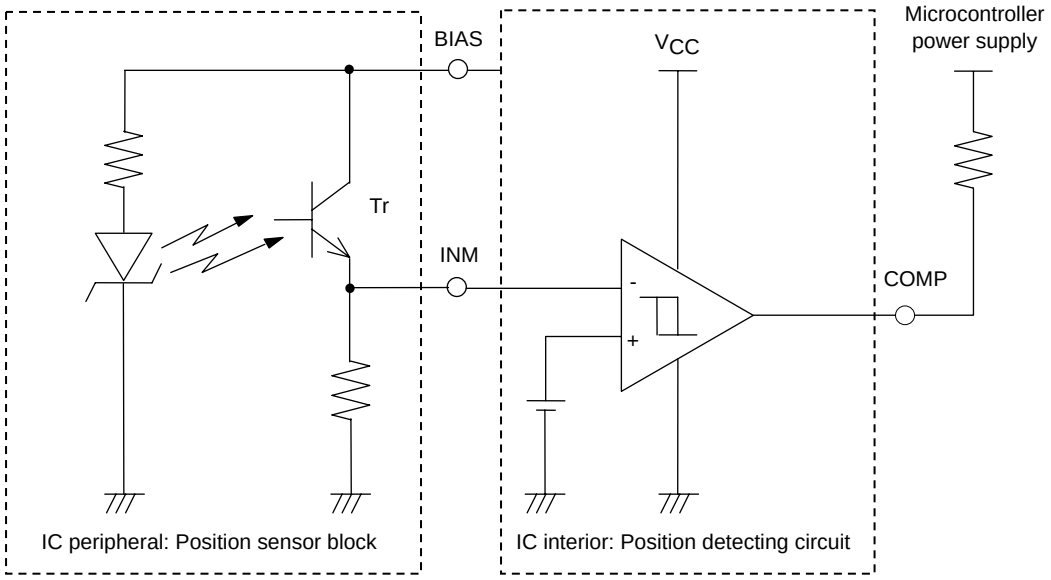
Timing Chart



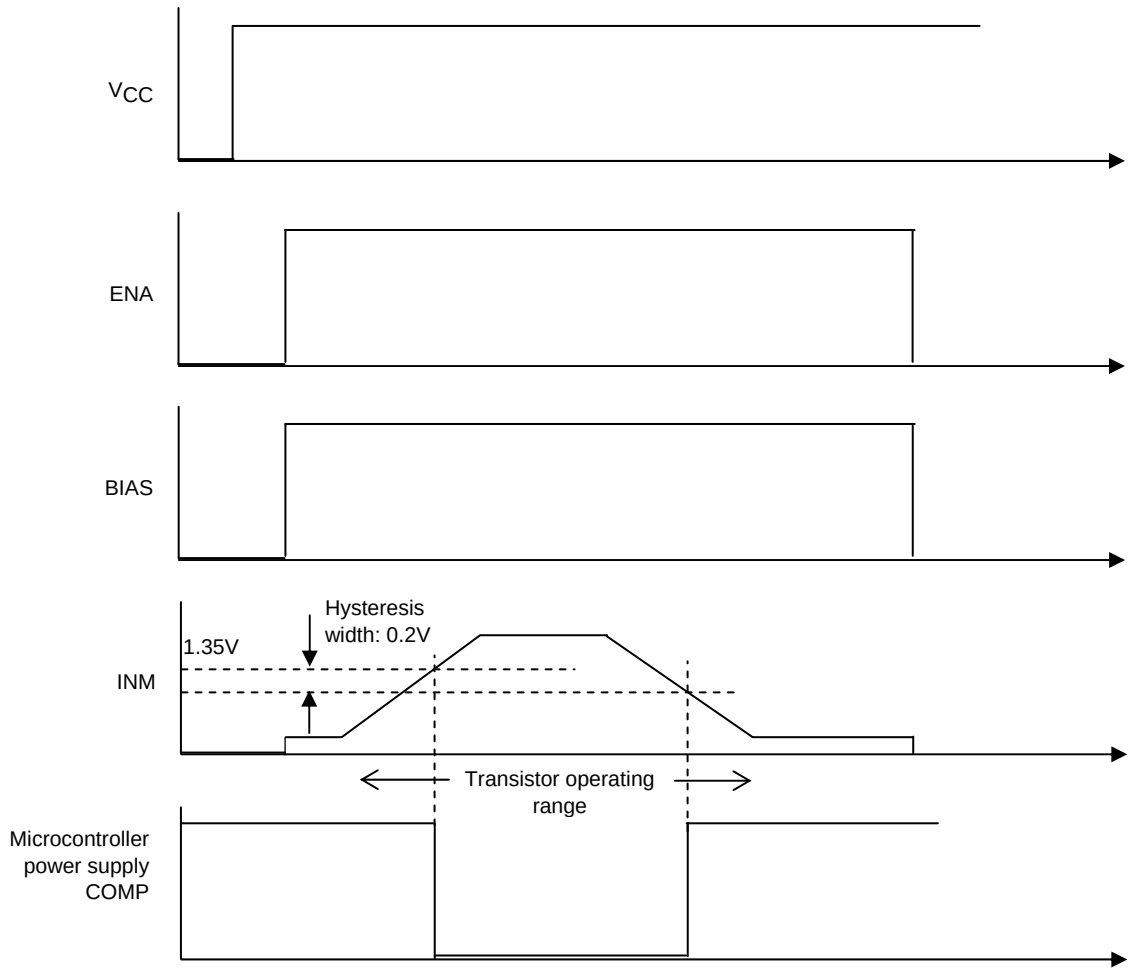
[Timing Chart for Stepping Motor 2-Phase Excitation]

Position Detecting Comparator Application Circuit Example 1

a) Circuit diagram

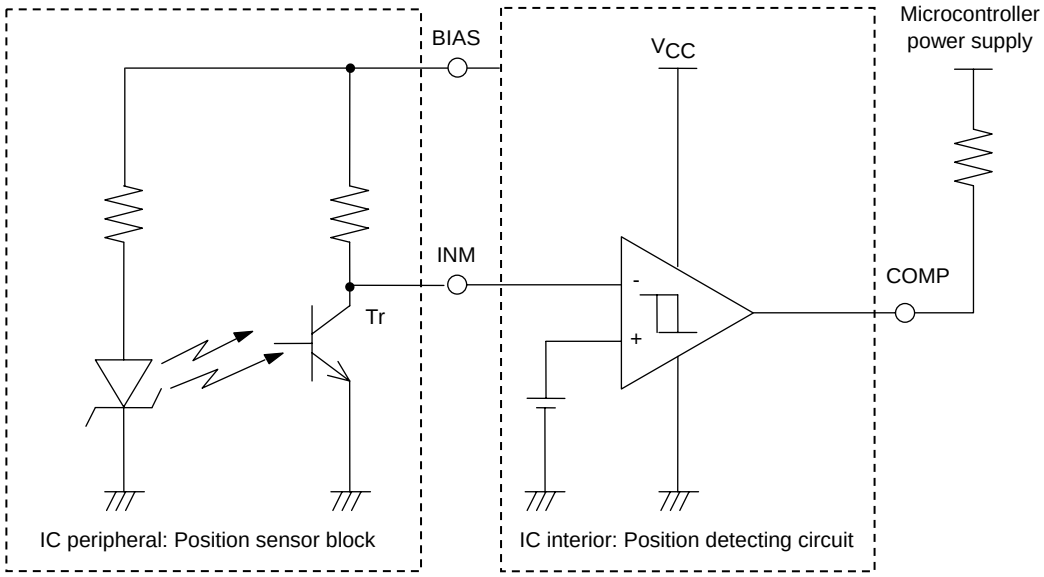


b) Timing chart

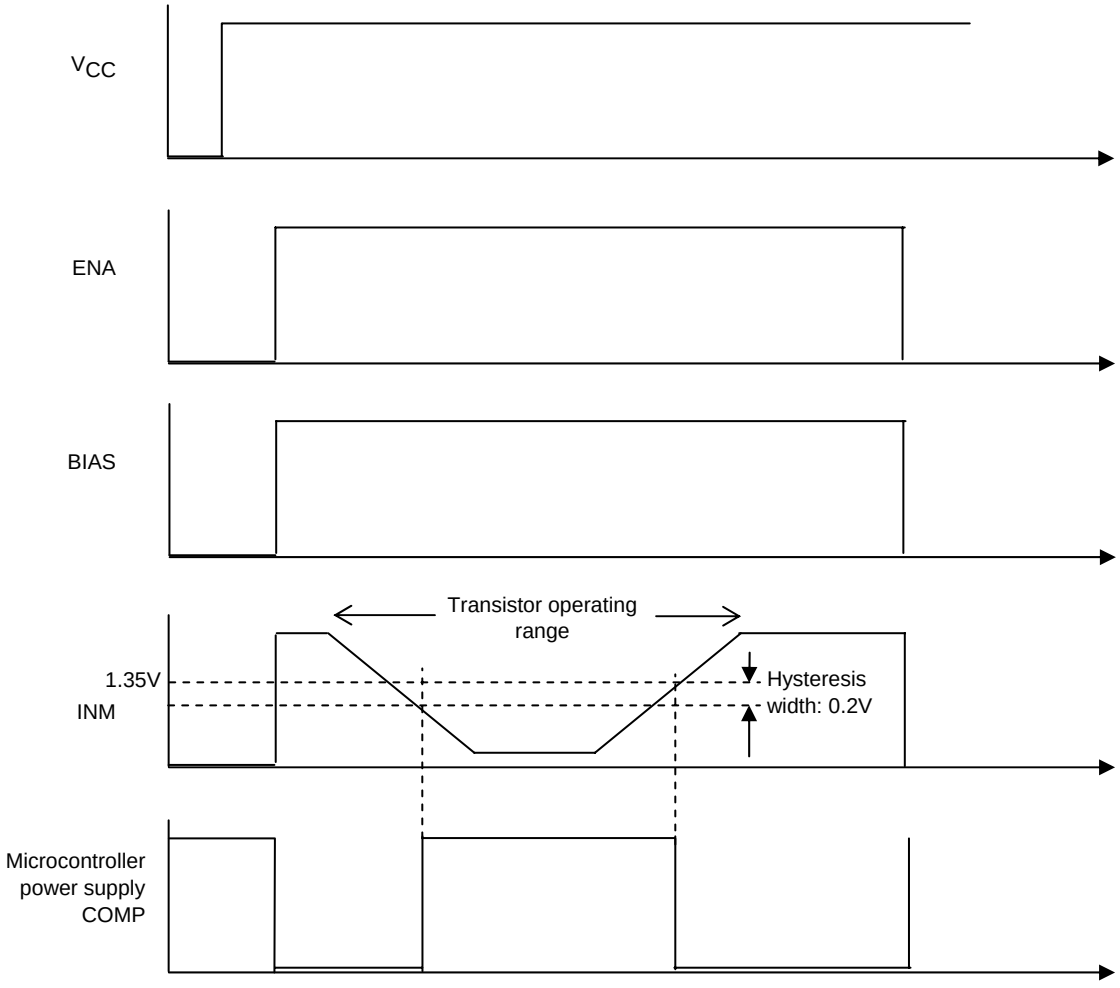


Position Detecting Comparator Application Circuit Example 2

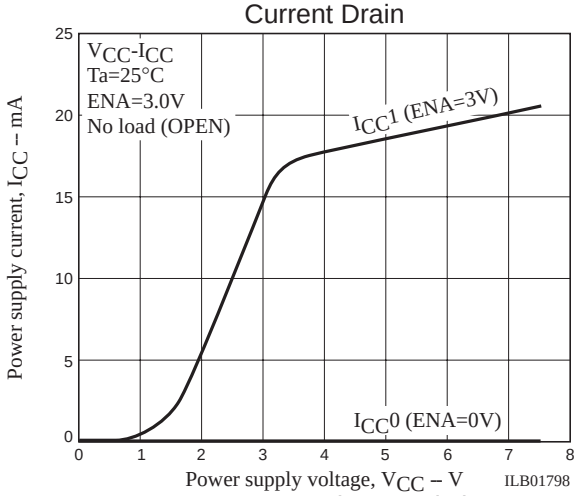
a) Circuit diagram



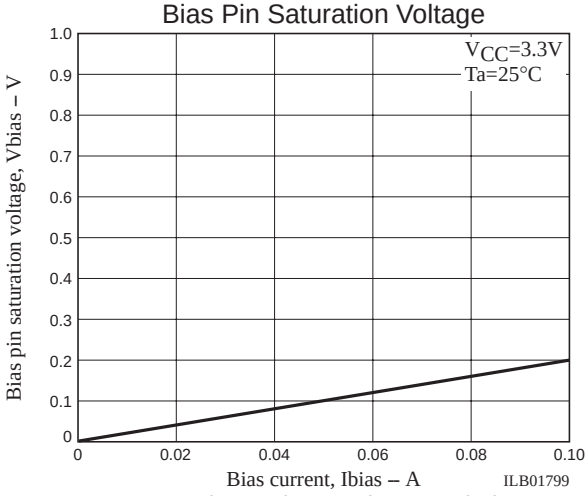
b) Timing chart



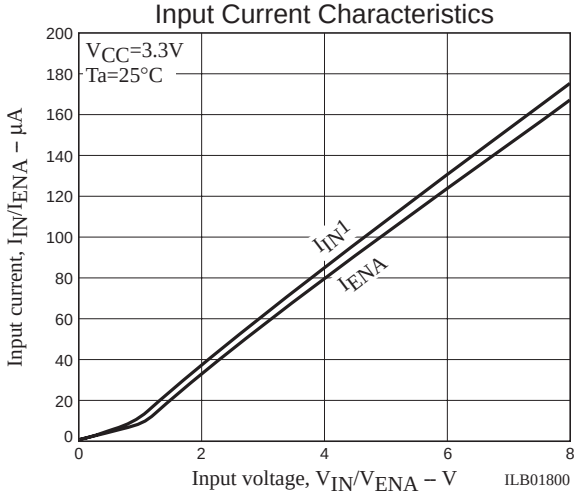
Current Drain



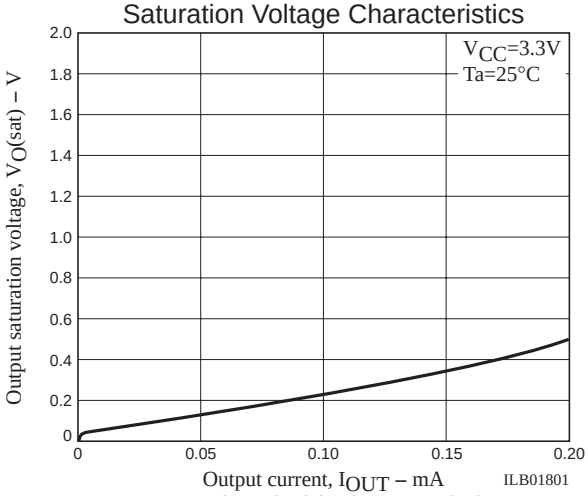
Bias Pin Saturation Voltage



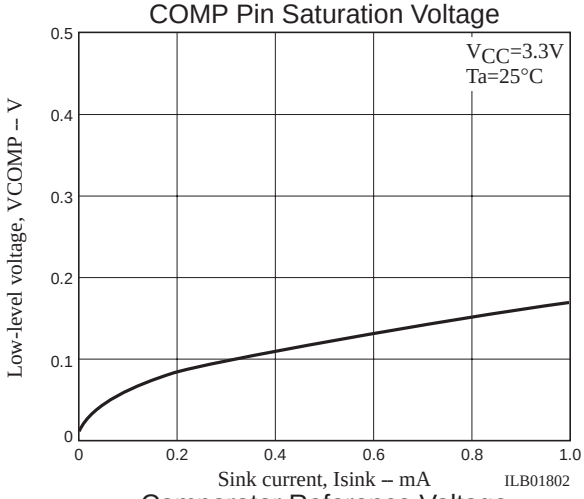
Input Current Characteristics



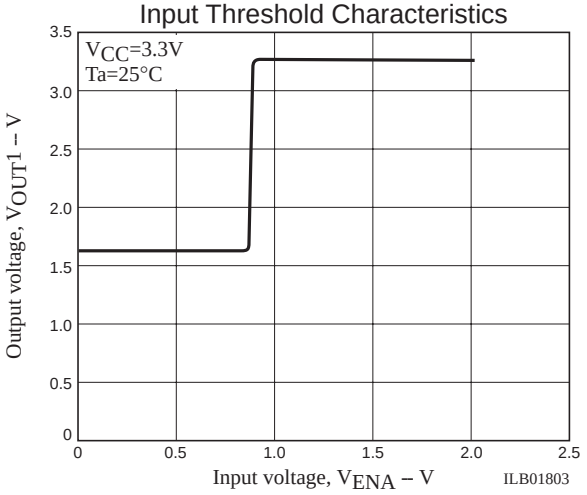
Saturation Voltage Characteristics



COMP Pin Saturation Voltage



Input Threshold Characteristics



Comparator Reference Voltage