


SANYO Semiconductors

DATA SHEET

LB8684CL — Monolithic Digital IC Digital Camera Motor Driver for Cell Phones

Overview

The LB8684CL is a low-voltage, low-saturation 1.5-channel constant current forward/reverse driver IC provided in a miniature package suitable for use in cell phone cameras. The LB8684CL can be driven directly from a microcontroller and is optimal for control of the voice coil motors used for shutter and aperture control in cell phone cameras.

Features

- Supports low-voltage drive. (2.2V or more)
- Ultraminiature package (ECSP2828-12)

Functions

- Constant current control ($I_{OUT} = 100\text{mA}$ at $R_F = 2\Omega$)
- Built-in thermal protection circuit
- Built-in reference voltage (0.2V typical)
- Built-in spark killer diode
- ENA input logic (3-port interface)

Specifications

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

Parameter	Symbol	Conditions	Ratings	Unit
Maximum supply voltage	V_{CC} max		-0.3 to +8.0	V
Output voltage	V_{OUT} max	OUT1, OUT2, OUT3	$V_{CC} + V_{SF}$	V
Input voltage	V_{IN} max	ENA, CHSEL, IN	-0.3 to +8.0	V
Ground pin source current	IGND	Per channel	400	mA
Allowable power dissipation	P_d max	When mounted on a circuit board *	450	mW
Operating temperature	T_{opr}		-30 to +85	$^\circ\text{C}$
Storage temperature	T_{stg}		-40 to +150	$^\circ\text{C}$

* Specified circuit board : $20.0 \times 10.0 \times 0.8\text{mm}^3$, paper-phenol

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LB8684CL

Allowable Operating Ranges at Ta = 25°C

Parameter	Symbol	Conditions	Ratings	Unit
Supply voltage	V _{CC}		2.2 to 7.5	V
High-level input voltage	V _{IH}	ENA, CHSEL, IN	1.5 to 7.5	V
Low-level input voltage	V _{IL}		-0.3 to 0.5	V

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

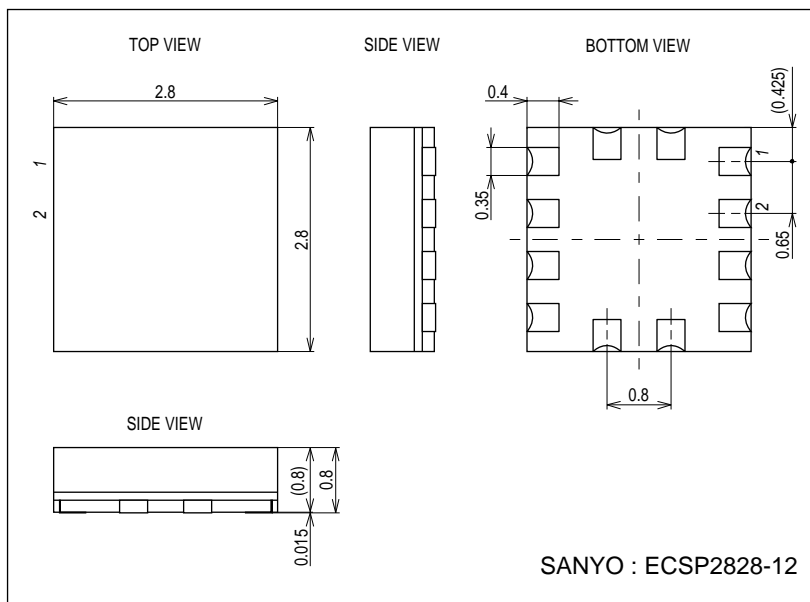
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Supply current	I _{CCO}	ENA = 0V		0.1	1	μA
	I _{CCO1}	ENA = 3V, FC = 0V		3.8	5.5	mA
	I _{CCO2}	ENA = 3V, RF = 2Ω, excluding the output current, I _O		5.5	8.0	mA
Output saturation voltage	V _{OUT1}	ENA = 3V, I _{OUT} = 100mA		0.2	0.3	V
	V _{OUT2}	ENA = 3V, I _{OUT} = 200mA*		0.41	0.6	V
Output constant current	I _{OUT1}	Between REF and GND : 2Ω	95	100	105	mA
	I _{OUT2}	Between REF and GND : 1Ω*	190	200	210	mA
Input current	I _{IN}	V _{IN} = 3V		50	70	μA
Spark killer diode						
Reverse current	IS(leak)				1	μA
Forward voltage	V _{SF1}	I _{OUT} = 100mA			1.7	V
	V _{SF2}	I _{OUT} = 200mA*			1.7	V

* Design guarantee: These characteristics are design targets and are not measured.

Package Dimensions

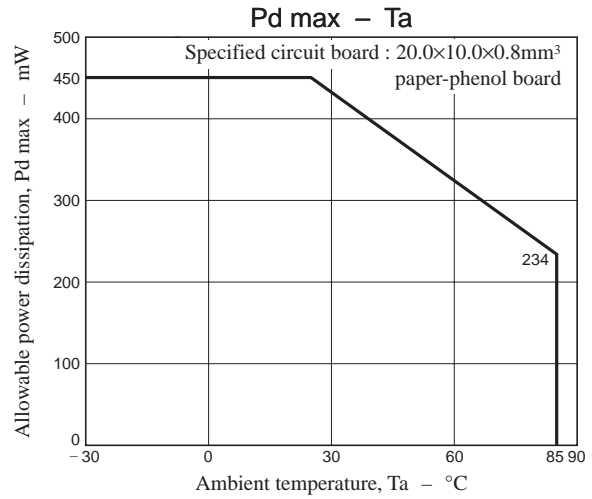
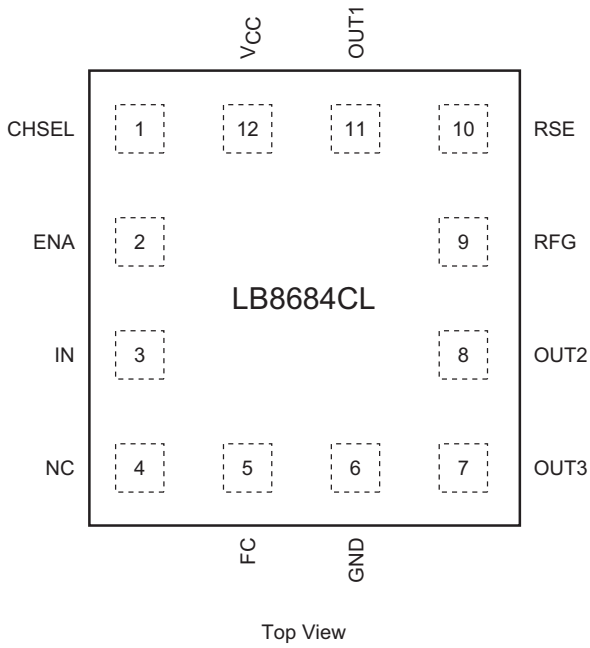
unit:mm (typ)

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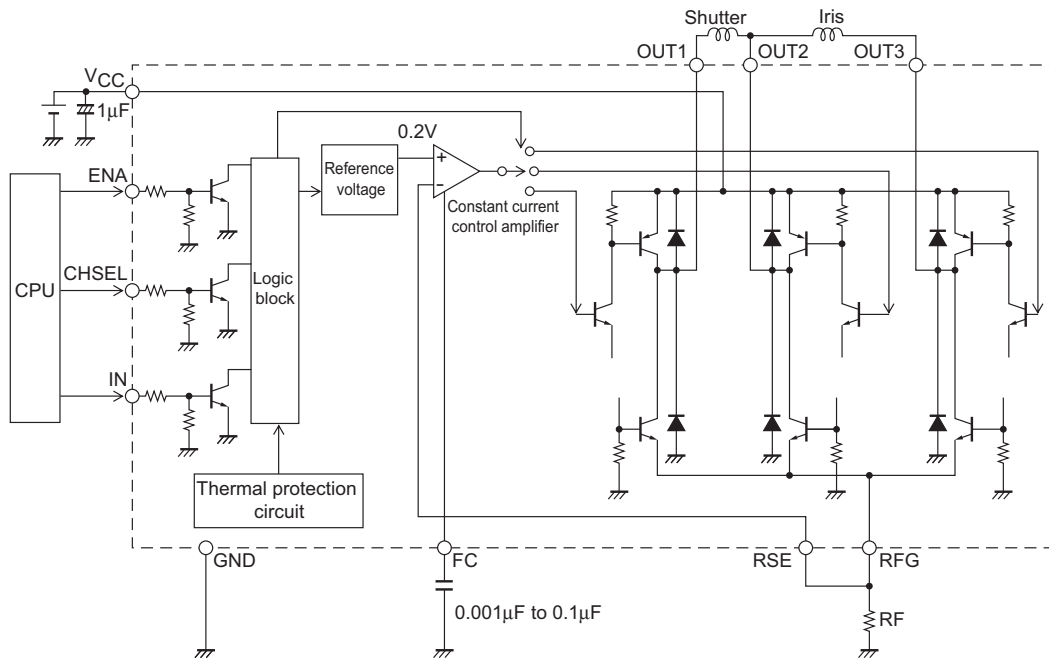


LB8684CL

Pin Assignment



Block Diagram



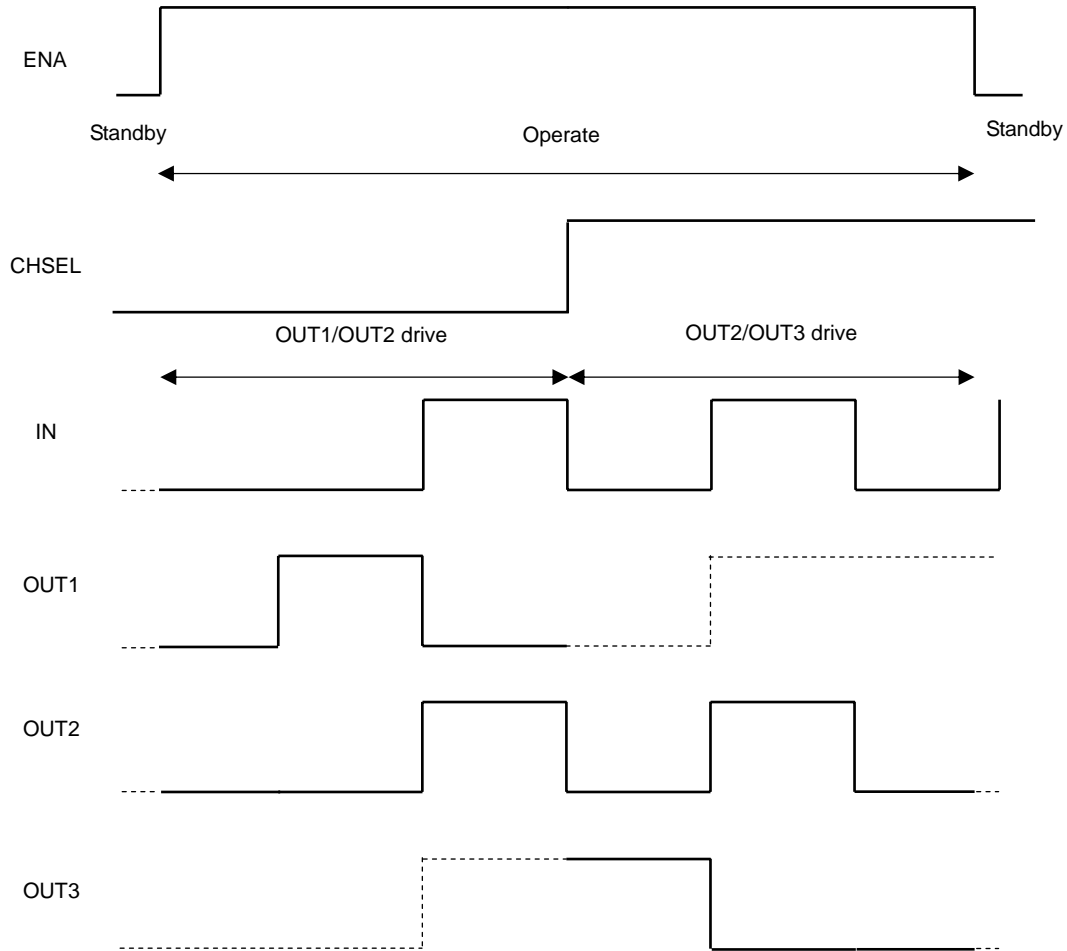
[Constant current formula] $I_{OUT} = 0.2 \div R_F$ Example : If I_O is 100mA, R_F will be 2Ω.

Usage Notes : The set current is determined, as described by the above equation, by the resistor R_F inserted between the RFG pin and ground.

Truth Table

Input			Output			Notes	
ENA	CHSEL	IN	OUT1	OUT2	OUT3		
Low	×	×	–	–	–	Standby	
High	Low	Low	High	Low	–	Shutter	Forward
		High	Low	High	–		Reverse
	High	Low	–	Low	High	Aperture	Forward
		High	–	High	Low		Reverse

Note: "–" indicates the output off state. (high-impedance)

Timing Chart

- The LB8684CL will be in standby mode when ENA is low and in normal operating mode when ENA is high.
- CHSEL selects OUT1/OUT2 drive when low, and OUT2/OUT3 drive when high.
- The IN pin is used for forward/reverse switching.
- The broken line (----) indicates the off state.
- During either OUT1/OUT2 or OUT2/OUT3 drive, the output high side transistor will be saturated and the low side transistor will not be saturated. Note that the output current is a constant current.

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