Ordering number : ENA1241

SANYO Semiconductors
DATA SHEET

Bi-CMOS LSI

LV5744V — 2-channel Step-down Switching Regulator

Overview

The LV5744V is a 2-channel step-down switching regulator.

Features

- Provides dual switching regulator control circuits integrated on the chip.
- Output-stage push-pull structure enabling high efficient operation.
- Provides power supply (V_{CC}-5V) for protecting the external P channel MOS gate.
- Built-in timer latch type SCP (short-circuit protection circuit)
- Built-in UVLO (Low voltage malfunction prevention circuit)
- Built-in reference voltage circuit
- Max_On_Duty is adjustable.

Specifications

Absolute Maximum Ratings at Ta = 25°C

Parameter		Symbol	Conditions	Ratings	Unit
Maximum supply voltage		V_{CC} max		35	V
Output voltage		V_O max		33	V
Allowable power dissipation		Pd max	Mounted on a specified board *	0.74	W
Operating temperature		Topr		-40 to +85	°C
Storage temperature		Tstg		-55 to +150	°C
Allowable pin voltage					
1	CT, NON1, NON2, INV1, INV2, FB1, FB2, DT1, DT2, SCP, VREF			7	V
2	V_{CC}-5V			30	V
3	GND, OUT1, OUT2, V_{CC}			35	V

* : Specified board : 114.3×76.1×1.6mm^3, glass epoxy board

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Allowable Operating Ratings at Ta = 25°C

Parameter	Symbol	Conditions	Ratings	Unit
Supply voltage	V_{CC}		8 to 33	V
Error amplifier input voltage	V_{IN}		0 to 3.3	V
Timing capacitance	C_{CT}		50 to 5000	pF
Oscillation frequency	F_{CT}		20k to 1M	Hz

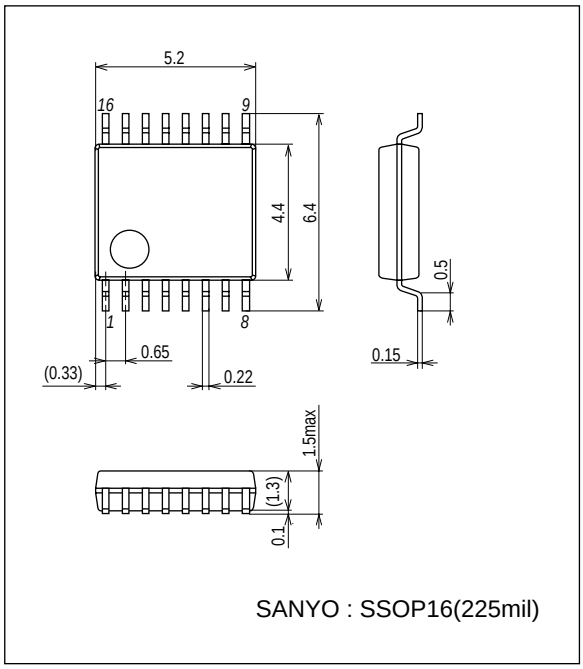
Electrical Characteristics at Ta = 25°C, V_{CC} = 12V

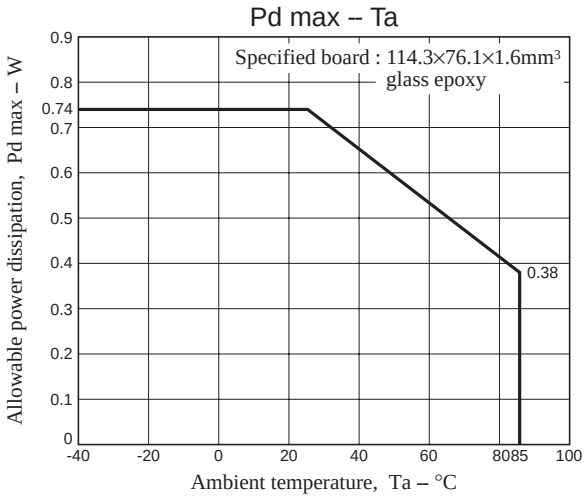
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Reference voltage block						
Output voltage	Vref	Iref = 1mA	2.4948	2.520	2.5452	V
Input stability	V_{DLI}	V_{CC} = 8 to 33V		1	10	mV
Load stability	V_{DLO}	Iref = 0 to 5mA		1	10	mV
V_{IN}-5V supply voltage	V_{N5}	I_{OUT} = -5mA	V_{CC}-5.5	V_{CC}-5.0	V_{CC}-4.5	V
Triangular wave oscillator block						
Oscillation frequency	F_{OSC}	C_{CT} = 220pF	320	400	480	kHz
Frequency fluctuation	F_{DV}	V_{CC} = 8 to 33V		1		%
Protection circuit block						
Threshold voltage	V_{IT}		1.5	1.7	1.9	V
Standby voltage	V_{STB}			50	100	mV
Latch voltage	V_{LT}			30	100	mV
Source current	I_{SCP}		1.6	2.1	2.6	μA
Comparator threshold voltage	V_{CT}		1.4	1.5	1.6	V
Quiescent time adjustment circuit block						
Input threshold voltage (fosc = 20kHz)	Vt0	Duty cycle = 0%	0.45	0.5	0.55	V
	Vt100	Duty cycle = 100%	0.95	1.0	1.05	V
Input bias current	I_{BDT}	DT1, DT2 = 0V		0.1	1	μA
Low voltage malfunction prevention circuit block						
Threshold voltage	V_{UT}		6.5	7	7.5	V
Error amplifier						
Input offset voltage	V_{IO}				6	mV
Input offset current	I_{IO}				30	nA
Input bias current	I_{IB}			15	100	nA
Open gain	AV			85		dB
Common mode input voltage range	V_{OM}	V_{CC} = 8 to 33V	0		3.3	V
Common mode rejection ratio	CMRR			80		dB
Maximum output voltage	V_{OH}			2.6		V
Minimum output voltage	V_{OL}			0.2	0.4	V
Output sink current	I_{OI}	FB = 1.25V		1		mA
Output source current	I_{OO}	FB = 1.25V		85		μA
PWM comparator						
Input threshold voltage (fosc = 20kHz)	Vt0	Duty cycle = 0%	0.45	0.5	0.55	V
	Vt100	Duty cycle = 100%	0.95	1.0	1.05	V
Output block						
Output stage on resistance (upper)	R_{ONH}			7		Ω
Output stage on resistance (lower)	R_{ONL}			2		Ω
Overall device characteristics						
Standby current	I_{CCS}	When output is off			10	mA

Package Dimensions

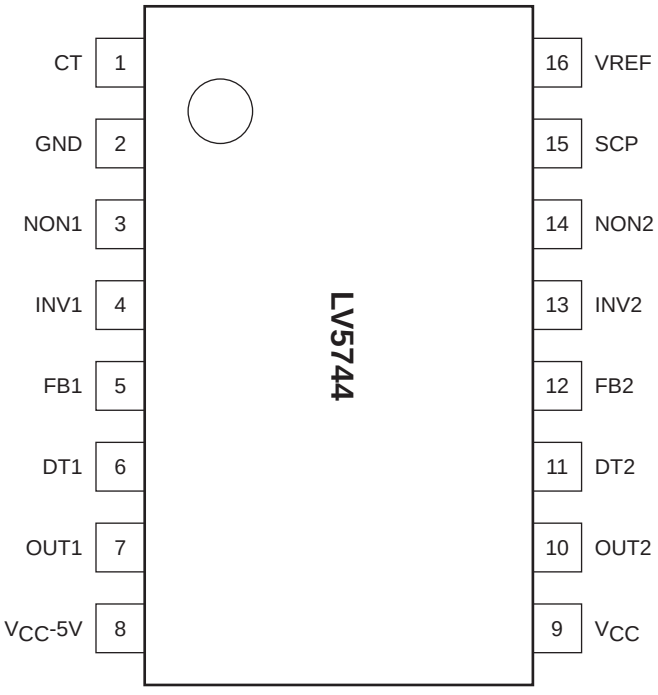
unit : mm (typ)

3178B





Pin Assignment

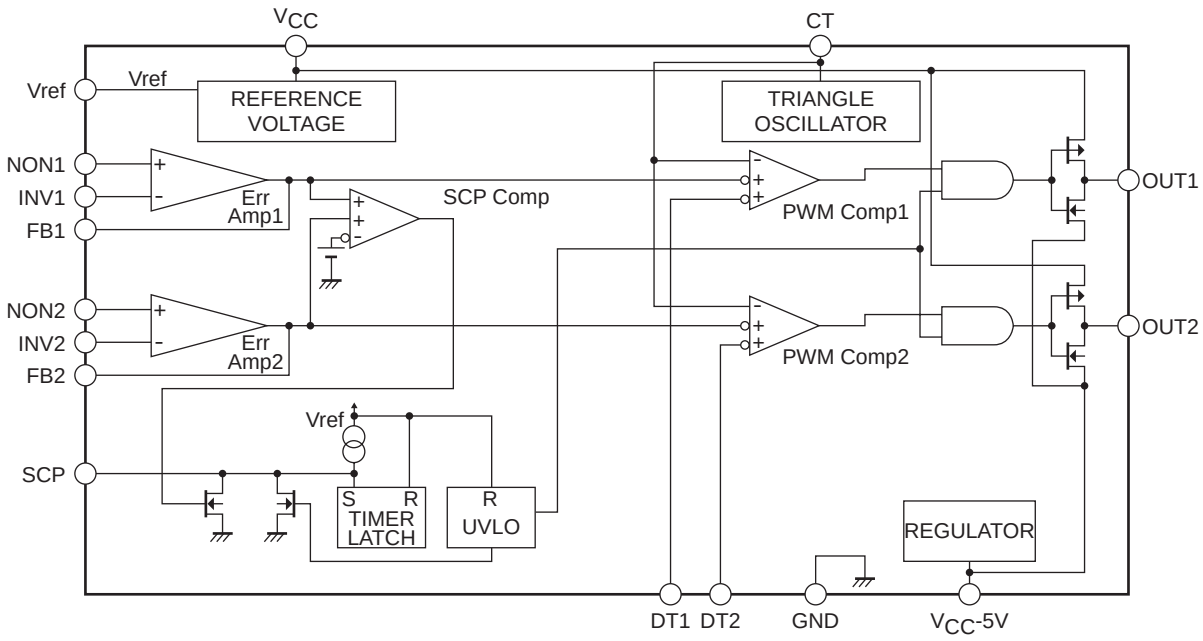


Top view

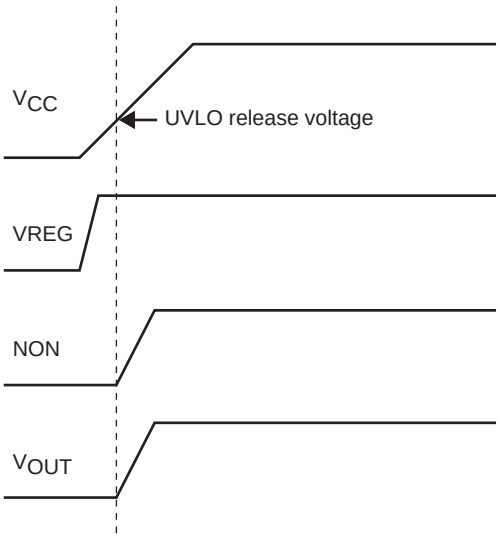
Pin Function

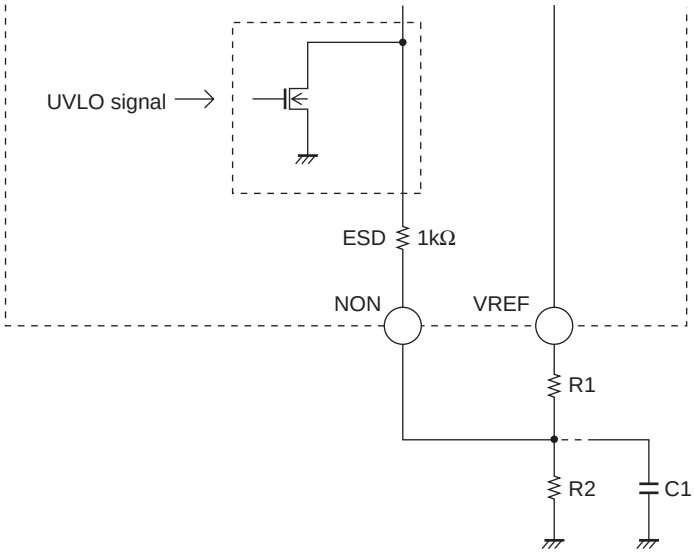
Pin No.	Pin Name	Description
1	CT	External timing capacitor connection pin
2	GND	Ground
3	NON1	Error amplifier 1 input (+)
4	INV1	Error amplifier 1 input (-)
5	FB1	Error amplifier 1 output
6	DT1	Output 1 maximum duty setting
7	OUT1	Output 1
8	V_{CC}-5V	Power supply for output stage drive
9	V_{CC}	Power supply
10	OUT2	Output 2
11	DT2	Output 2 maximum duty setting
12	FB2	Error amplifier 2 input (+)
13	INV2	Error amplifier 2 input (-)
14	NON2	Error amplifier 2 output
15	SCP	Timer latch setting
16	VREF	Reference voltage output

Block Diagram



Timing Chart





* The voltage at the NON pin is {VREF/(R1+1k)} × 1k in UVLO mode.

Application Circuit Example