L5973AD

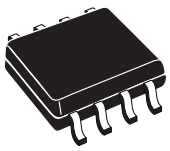
2 A switch step down switching regulator

Features

- 2 A Internal switch
- Operating input voltage from 4 V to 36 V
- 3.3 V / (±2 %) reference voltage
- Output voltage adjustable from 1.235 V to 35 V
- Low dropout operation: 100 % duty cycle
- 500 kHz Internally fixed frequency
- Voltage feedforward
- Zero load current operation
- Internal current limiting
- Inhibit for zero current consumption
- Synchronization
- Protection against feedback disconnection
- Thermal shutdown

Applications

- Consumer: STB, DVD, TV, VCR, car radio, LCD monitors
- Networking: XDSL, modems, DC-DC modules
- Computer: printers, audio/graphic cards, optical storage, hard disk drive
- Industrial: chargers, car battery, DC-DC converters

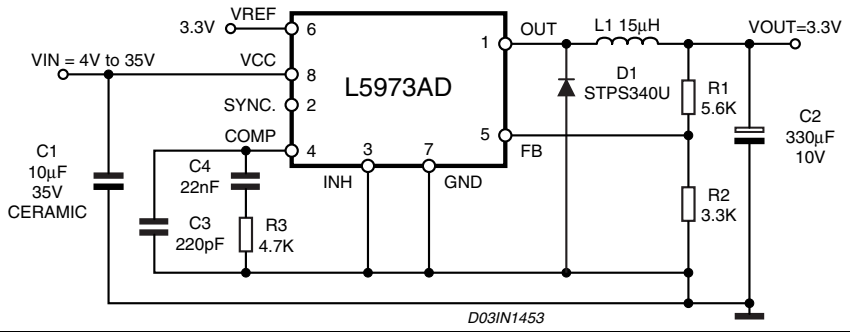


HSOP8 exposed pad

Description

The L5973AD is a step down monolithic power switching regulator with a switch current limit of 2A so it is able to deliver more than 1.5 A DC current to the load depending on the application conditions.
The output voltage can be set from 1.235 V to 35 V. The high current level is also achieved thanks to an SO8 package with exposed frame, that allows to reduce the R_{thJA} down to approximately 40 °C/W.
The device uses an internal P-Channel D-MOS transistor (with a typical of 200 mΩ) as switching element to avoid the use of bootstrap capacitor and guarantee high efficiency.
An internal oscillator fixes the switching frequency at 500 kHz to minimize the size of external components.
Having a minimum input voltage of 4 V only, it is particularly suitable for 5 V bus, available in all computer related applications.
Pulse by pulse current limit with the internal frequency modulation offers an effective constant current short circuit protection.

Figure 1. Test application circuit



3 Electrical characteristics

Table 4. Electrical characteristics
(T_J = 25 °C, V_{CC} = 12 V, unless otherwise specified)

Symbol	Parameter	Test condition	Min	Typ	Max	Unit
V_{CC}	Operating input voltage range	V_o = 1.235 V; I_o = 2 A	4		36	V
$R_{DS(on)}$	Mosfet on Resistance			0.250	0.5	Ω
I_l	Maximum limiting current	V_{CC} = 4.4 V to 36 V	2	2.3		A
f_s	Switching frequency			500		kHz
	Duty cycle		0		100	%
Dynamic characteristics (see test circuit).						
V_5	Voltage feedback	4.4 V < V_{CC} < 36 V, 20 mA < I_O < 2 A	1.220	1.235	1.25	V
η	Efficiency	V_O = 5 V, V_{CC} = 12 V		90		%
DC characteristics						
I_{qop}	Total operating quiescent current			5	7	mA
I_q	Quiescent current	Duty cycle = 0; V_{FB} = 1.5 V			2.7	mA
$I_{qst\text{-}by}$	Total stand-by quiescent current	V_{inh} > 2.2 V		50	100	µA
Inhibit						
	INH threshold voltage	Device ON			0.8	V
		Device OFF	2.2			V
Error amplfier						
V_{OH}	High level output voltage	VFB = 1 V	3.5			V
V_{OL}	Low level output voltage	VFB = 1.5 V			0.4	V
$I_{o\ source}$	Source output current	V_{COMP} = 1.9 V; V_{FB} = 1 V	200	300		µA
$I_{o\ sink}$	Sink output current	V_{COMP} = 1.9 V; V_{FB} = 1.5 V	1	1.5		mA
I_b	Source bias current			2.5	4	µA
	DC open loop gain	R_L = ∞	50	57		dB

Table 4. Electrical characteristics (continued)
(T_J = 25 °C, V_{CC} = 12 V, unless otherwise specified)

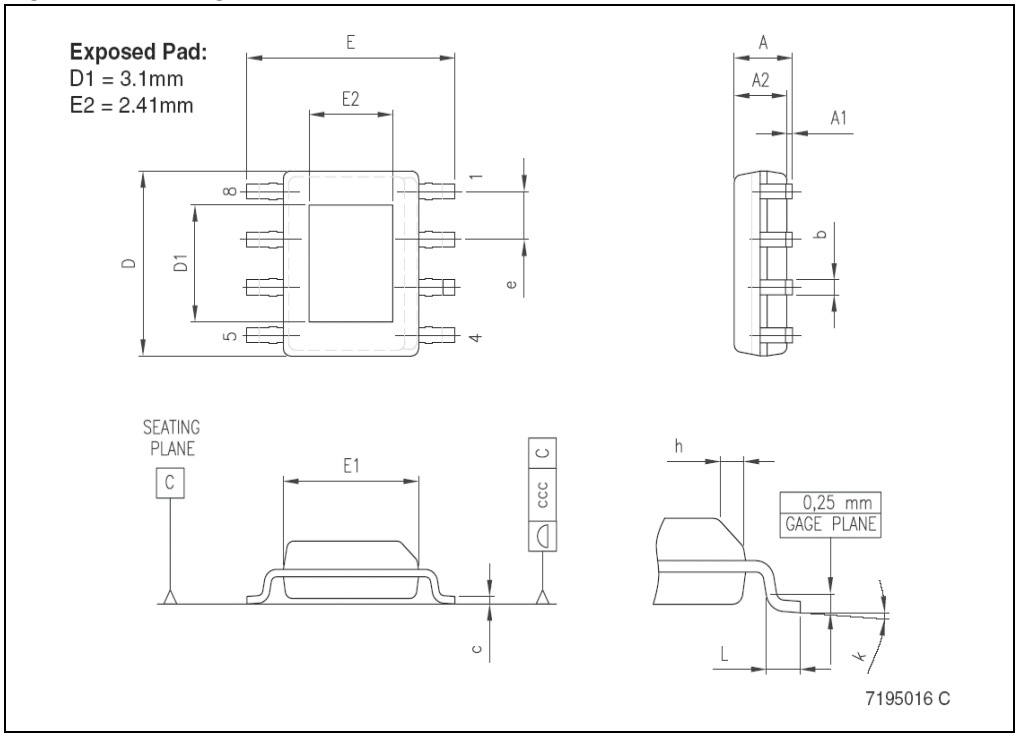
Symbol	Parameter	Test condition	Min	Typ	Max	Unit
gm	Transconductance	I_{comp} = -0.1 mA to 0.1mA V_{COMP} = 1.9 V		2.3		mS
Sync function						
	High input voltage	V_{CC} = 4.4 V to 36 V	2.5		V_{REF}	V
	Low input voltage	V_{CC} = 4.4 V to 36 V			0.74	V
	Slave sink current	V_{sync} = 0.74 V (1) V_{sync} = 2.33 V	0.11 0.21		0.25 0.45	mA mA
	Master output amplitude	I_{source} = 3 mA	2.75	3		V
	Output pulse width	no load, V_{sync} = 1.65 V	0.20	0.35		µs
Reference section						
	Reference voltage		3.234	3.3	3.366	V
		I_{REF} = 0 to 5 mA V_{CC} = 4.4 V to 36 V	3.2	3.3	3.399	V
	Line regulation	I_{REF} = 0 mA V_{CC} = 4.4 V to 36 V		5	10	mV
	Load regulation	I_{REF} = 0 to 5 mA		8	15	mV
	Short circuit current		10	18	30	mA

1. Guaranteed by design.

Table 7. HSOP8 mechanical data

Dim.	mm.			inch		
	Min	Typ	Max	Min	Typ	Max
A			1.70			0.0669
A1	0.00		0.15		0.00	0.0059
A2	1.25			0.0492		
b	0.31		0.51	0.0122		0.0201
c	0.17		0.25	0.0067		0.0098
D	4.80	4.90	5.00	0.1890	0.1929	0.1969
D1	3	3.1	3.2	0.118	0.122	0.126
E	5.80	6.00	6.20	0.2283		0.2441
E1	3.80	3.90	4.00	0.1496		0.1575
E2	2.31	2.41	2.51	0.091	0.095	0.099
e		1.27				
h	0.25		0.50	0.0098		0.0197
L	0.40		1.27	0.0157		0.0500
k	0		8			0.3150
ccc			0.10			0.0039

Figure 16. Package dimensions



8 Order code

Table 8. Order code

Part number	Package	Packaging
L5973AD	HSOP8 (Exposed pad)	Tube
L5973ADTR	HSOP8 (Exposed pad)	Tape and reel