AT1730

Preliminary Product Information

2-Channel PWM Controller for LCD Bias

Features

- Low input voltage: 2.4V to 6V
- 2-Channels PWM Control:
  Nch-MOSFET driving(CH1)
  Nch/Pch-MOSFET driving(CH2)
- Adjustable Soft start time and maximum duty cycle
- Built-in timer latch for short circuit protection:
- Built-in under-voltage lockout
- High operating frequency: 100kHz to 1.0MHz
- Low operating current: 2mA (typ.)

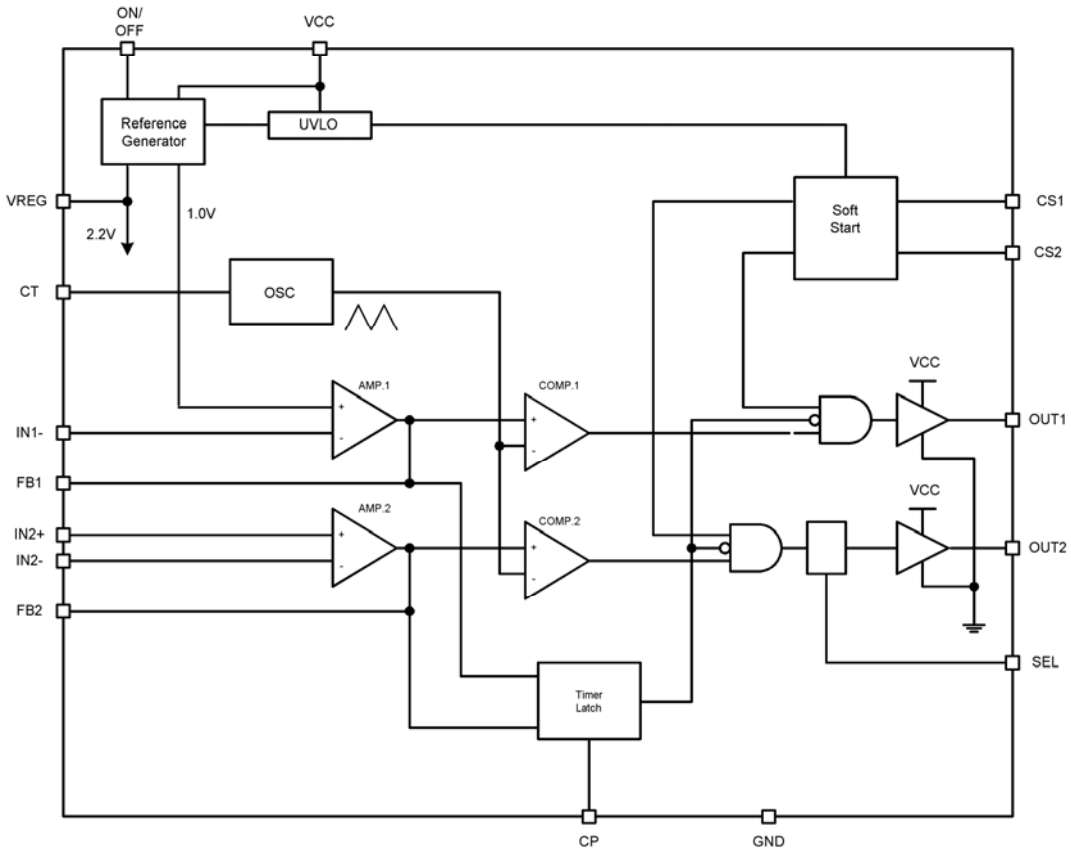
Applications

- LCD Displays Bias
- Power Supply for general equipment

General Description

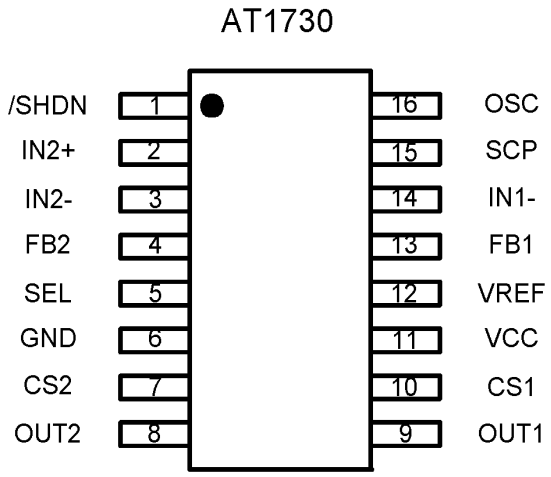
The AT1730 is a PWM DC/DC converter control IC with 2 channel outputs that can directly drive power MOSFET. This IC ia suitable for very small DC/DC converters because of their small and thin package(1.1 mm max.), and high operation frequency (up to 1.0MHz).

Block Diagram



Aimtron reserves the right without notice to change this circuitry and specifications.

Pin Configuration



Ordering Information

Part number	Package	Marking
AT1730P	**TSSOP16**	**AT1730P**
AT1730P_GRE	**TSSOP16, Green**	**AT1730P, Date Code with one bottom line**

Pin Description

Symbol	Pin No.	Descript	Symbol	Pin No.	Descript
/SHDN	1	ON/OFF Function	**OUT1**	9	CH1 output for Nch-MOSFET
IN2+	2	CH2 non-inverting input to error amplifier	**CS1**	10	Soft-star for CH1
IN2-	3	CH2 inverting input to error amplifier	**VCC**	11	Power Supply
FB2	4	CH2 error amplifier output	**VREF**	12	Regulated voltage output
SEL	5	Selection of type of driven MOSFET	**FB1**	13	CH1 error amplifier output
GND	6	Ground	**IN1-**	14	CH1 inverting input to error amplifier
CS2	7	Soft-Start for CH2	**SCP**	15	Timing capacitor for timer latch delay
OUT2	8	CH2 Output for Nch or Pch MOSFET	**OSC**	16	Oscillator timing capacitor

Absolute Maximum Ratings

Parameter	Condition	Rated Value		Unit
		Min.	Max.	
Power Supply Voltage	—	-	+6	V
Source Average Current of OUT1 OUT2, OUT3	—	-	-50	mA
Sink Average Current of OUT1 OUT2, OUT3	—	-	50	mA
Output current of VREG	—	-	10	mA
Input Voltage to Error Amplifier	—	-	6.5	V
Continuous power dissipation	TSSOP16（T_a=+25℃）	-	500	mW
Operating temperature	—	-30	+85	^{0}C
Junction temperature	—	-	+125	^{0}C
Storage temperature	—	-40	+150	^{0}C
Lead temperature	—	-	+300	^{0}C

Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

Recommended Operating Conditions

(Ta=+25^{0}C)

Parameter	Symbol	Values			Unit
		Min.	Typ.	Max.	
Power supply voltage	V_{CC}	2.4	--	5.5	V
Oscillation frequency	f_{OSC}	100	500	1000	KHz
Operating temperature	T_{OP}	-10	+25	+85	℃

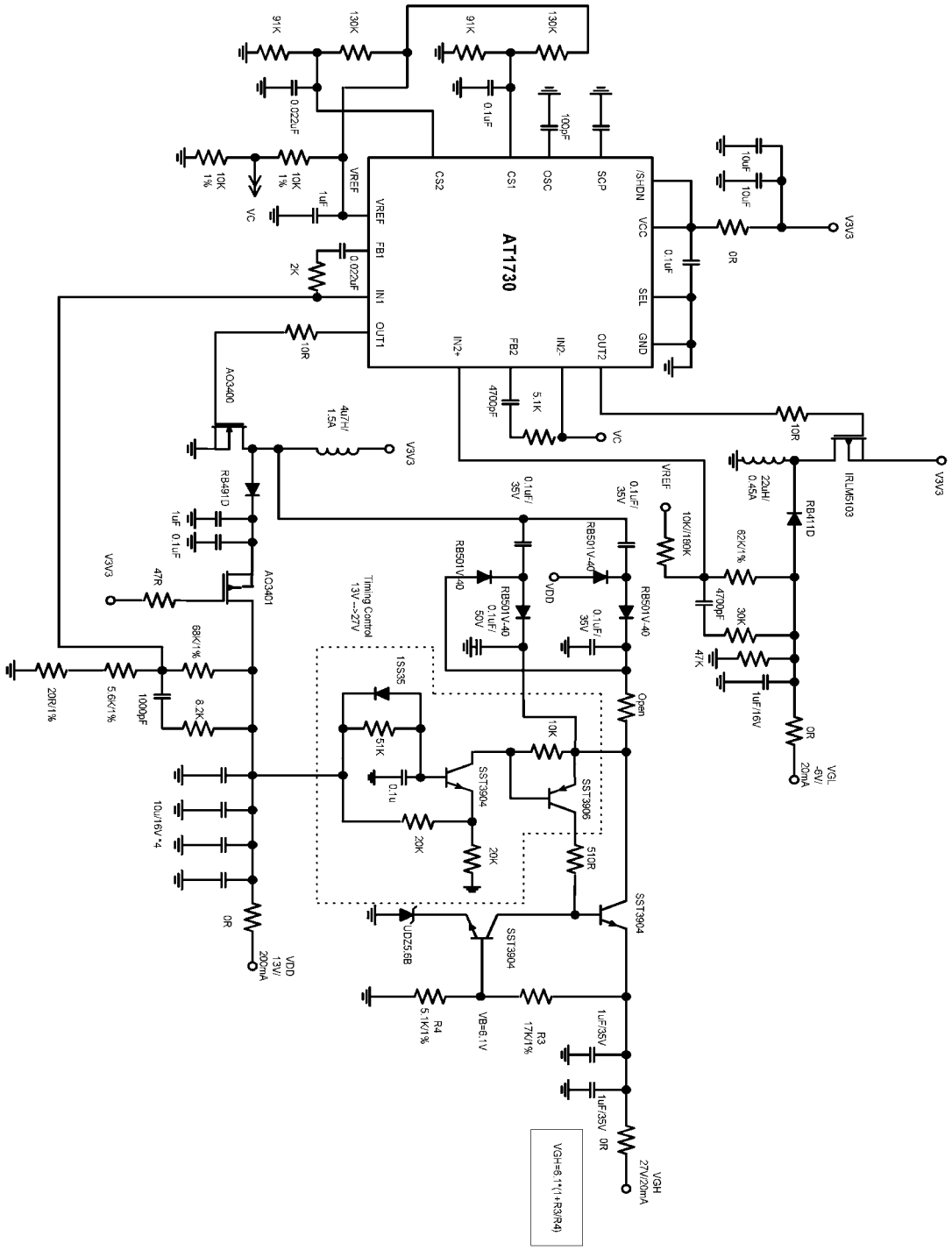
Electrical Characteristics

(VCC = 3V,T_a =+25℃, unless otherwise noted.)

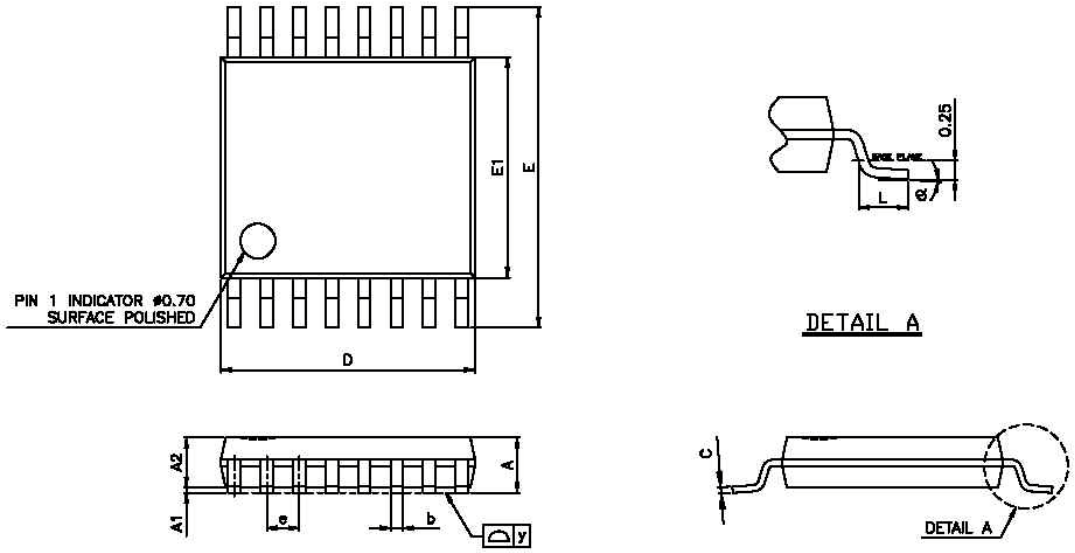
Parameter		Symbol	Condition	Values			Unit
				Min.	Typ.	Max.	
Entire device	Input Supply Range	V_{CC}		2.4	-	5.5	V
	VCC Undervoltage Lockout	UVLO		2.00	2.20	2.35	V
	EA Reference Voltage	$V_{TH1/2}$		0.98	1.00	1.02	V
	EA Reference Voltage line-regulation	$V_{TH-Line}$	VCC=2.5V to 5.5	-	-	10	mV
	EA Rference Variation with Temperature		T_a =-10℃ to +85℃	-	0.5	5	%
	Standby current	I_{CCS}	ON/OFF=GND	-	-	15	μA
	Operating Current	I_{CC}	V_{CS2}= V_{CS2}=0V IN=FB	-	1.0	2.0	mA
Error amplifier	Input Offset Voltage	V_{IO}		-	3	10	mV
	Source Current	I_{FBH}	V_{FB} = V_{REG} -0.5V	-160	-120	-70	μA
	Sink Current	I_{FBL}	V_{FB} = 0.5V	2.0	2.5	3.0	mA
	Source current Variation with temperature		T_a =-10℃ to +85℃	-	-	20	%
	Sink current Variation with temperature		T_a =-10℃ to +85℃	-	-	20	%
	Unity Gain Bandwidth	f_T		-	1.6	-	MHz
	Common Mode Input Voltage Range	V_{COM}		0	-	Vcc-0.4	V
	DC Open Loop Gain	A_V		-	100	-	dB
Sawtooth wave Oscillator (OSC)	Frequency	fosc	C_T =100pF	430	490	580	kHz
	High Level Voltage		C_T =100pF	-	1.016	-	V
	Low Level Voltage		C_T =100pF	-	0.396	-	V
	Variation with Power Supply		Vcc=2.5V to 5.5V	-	-	5	%
	Variation with temperature		T_a =-10℃ to +85℃	-	5	7	%
Regulated Voltage for internal Control Block	Regulated Voltage	V_{REF}	I_{REG} =no load	2.16	2.20	2.24	V
	Line Regulator	$V_{REF-line}$	Vcc=2.5V to 5.5V	-	-	20	mV
	Load Regulator	$V_{REF-load}$	$_{REG}$ =0~1mA	-20	-	20	mV

	Variation with Temperature		T_a =-10℃ to +85℃	-	-	1.5	%
Soft-Start and Duty Section	Threshold voltage of CS1/2	$V_{CS1/2\ 0}$	Duty Cycle=0%	0.38	0.39	0.40	V
	Threshold voltage of CS1/2	$V_{CS1/2\ 100}$	Duty Cycle=100%	0.96	1.01	1.06	V
Timer Latch Section (TL)	Threshold Voltage of CP	V_{CPTH}		-	1.00	-	V
	Threshold Voltage of FB1/2	V_{FBTL}		-	1.22	-	V
	Charge Current of CP	I_{CP}	V_{CP} =V_{REG} -0.5V	0.75	1.25	1.75	μA
Output Section	Rise time of OUT1,2	t_{r1_2}	C_O =1000pF between OUT1,2-GND	20	25	35	ns
	Fall time of OUT1,2	t_{f1_2}	C_O =1000pF between OUT1,2-GND	20	25	35	ns
	High Level on Resistance of OUT1,2	R_{1_2AH}	I_{OUT1_2}=-50mA	11.5	14	17	Ω
	Low Level on Resistance of OUT1,2	R_{1_2AL}	I_{OUT1_2}=50mA	8.5	11	17	Ω
On/OFF Section	Active mode Threshold	V_{ONH}		2.0	-	-	V
	Disable mode Threshold	V_{ONL}		-	-	0.8	V

Typical Application Circuit



Package Outline 16-pin TSSOP



SYMBOL	MILLIMETERS			INCHES		
	MIN	TYP	MAX	MIN	TYP	MAX
A	1.05	1.10	1.20	0.041	0.043	0.047
A1	0.05	0.10	0.15	0.002	0.004	0.006
A2	-	1.00	1.05	-	0.039	0.041
b	0.20	0.25	0.28	0.008	0.010	0.011
C	-	0.127	-	-	0.005	-
D	4.90	5.075	5.10	0.193	0.1998	0.200
E	6.20	6.40	6.60	0.244	0.252	0.260
E1	4.30	4.40	4.50	0.170	0.173	0.177
L	0.50	0.60	0.70	0.020	0.024	0.028
e	-	0.65	-	-	0.026	-
y	-	-	0.076	-	-	0.003
θ	0°		8°	0°		8°