

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.)

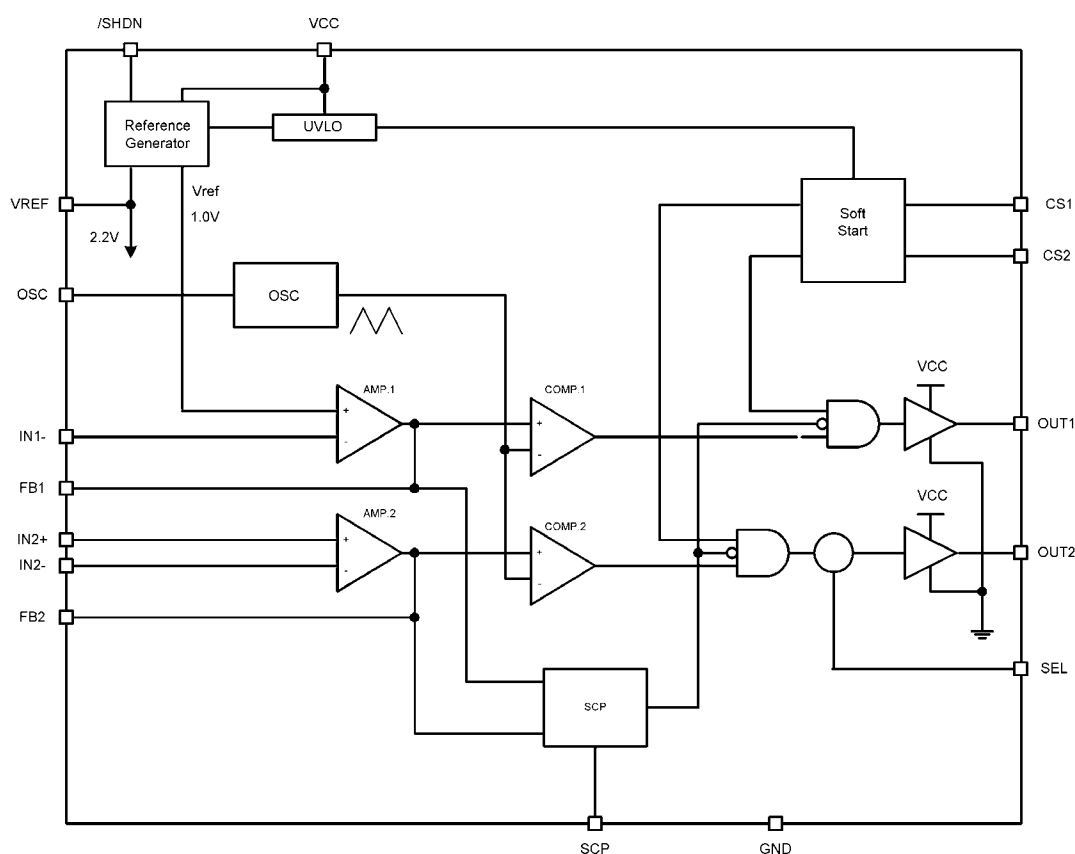
General Description

The AT1730 is a PWM DC/DC converter control IC with 2 channel outputs that can directly drive power MOSFET. This IC is 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).

Applications

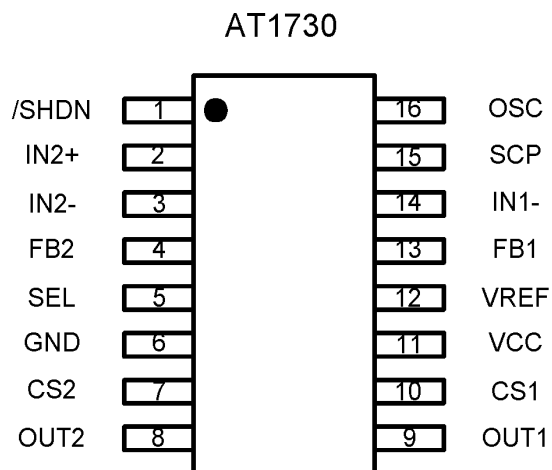
- LCD Displays Bias
- Power Supply for general equipment

Block Diagram



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

Pin Configuration



Ordering Information

Part number	Package	Marking
AT1730	TSSOP16	AT1730P
		-

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 ($T_a=+25^{\circ}\text{C}$)	-	500	mW
Operating temperature	—	-30	+85	$^{\circ}\text{C}$
Junction temperature	—	-	+125	$^{\circ}\text{C}$
Storage temperature	—	-40	+150	$^{\circ}\text{C}$
Lead temperature	—	-	+300	$^{\circ}\text{C}$

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

($T_a=+25^{\circ}\text{C}$)

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}	-30	+25	+85	$^{\circ}\text{C}$

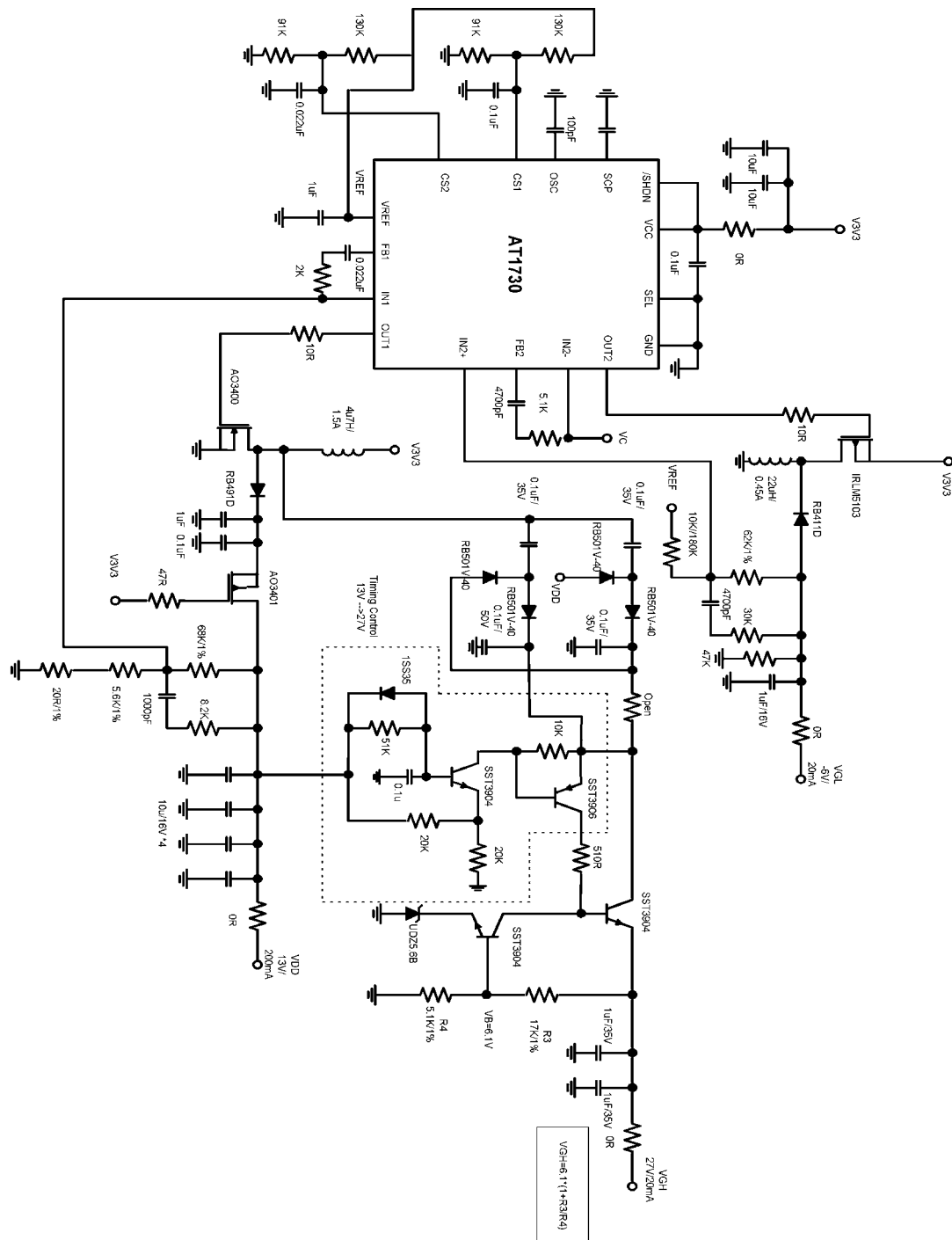
Electrical Characteristics

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

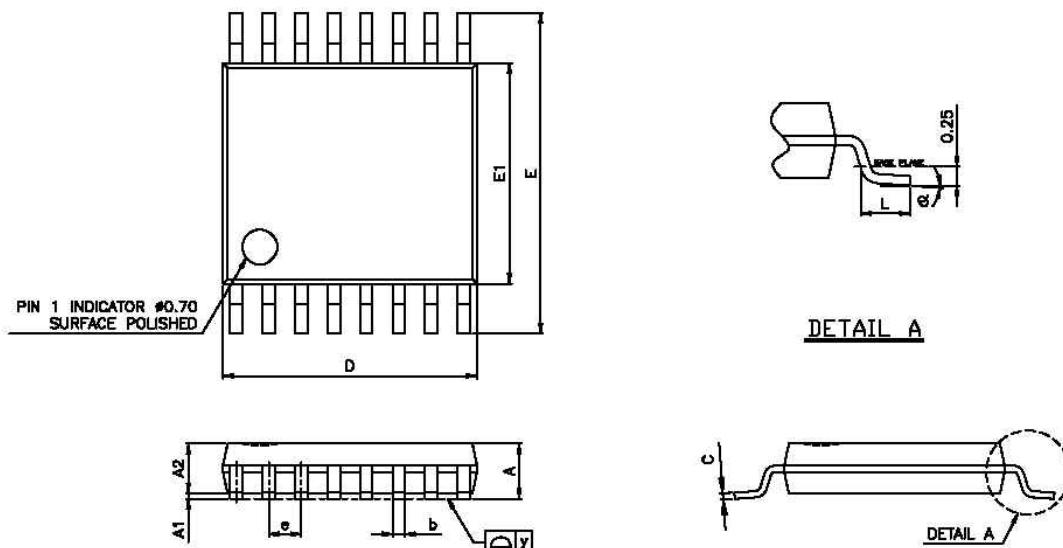
Parameter		Symbol	Condition	Values			Unit
				Min.	Typ.	Max.	
Entire device	Input Supply Range	V _{CC}		2.4	-	5.5	V
	VCC Undervoltage Lockout	UVLO		2.00	2.20	2.35	V
	Reference Voltage	V _{TH1/2}		0.98	1.00	1.02	V
	Reference Voltage line-regulation	V _{TH-Line}	VCC=2.5V to 5.5	-	-	10	mV
	Reference Variation with Temperature		T _a = -30°C to +85°C	-	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 = -30°C to +85°C	-	-	20	%
	Sink current Variation with temperature		T _a = -30°C to +85°C	-	-	20	%
	Unity Gain Bandwidth	f _T		-	1.6	-	MHz
	Common Mode Input Voltage Range	V _{COM}		0	-	V _{CC} -0.4	V
	DC Open Loop Gain	A _V		-	100	-	dB
Sawtooth wave Oscillator (OSC)	Frequency	f _{osc}	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		V _{CC} =2.5V to 5.5V	-	-	5	%
	Variation with temperature		T _a = -30°C to +85°C	-	5	7	%
Regulated Voltage for internal Control Block	Regulated Voltage	V _{REG}	I _{REG} =no load	2.16	2.20	2.24	V
	Line Regulator	V _{REG-line}	V _{CC} =2.5V to 5.5V	-	-	20	mV
	Load Regulator	V _{REG-load}	I _{REG} =0~1mA	-20	-	20	mV

	Variation with Temperature		$T_a = -30^{\circ}\text{C}$ to $+85^{\circ}\text{C}$	-	-	1.5	%
Soft-Start and Duty Section	Threshold voltage of CS1/2	$V_{\text{CS1/2 } 0}$	Duty Cycle=0%	0.38	0.39	0.40	V
	Threshold voltage of CS1/2	$V_{\text{CS1/2 } 100}$	Duty Cycle=100%	0.96	1.01	1.06	V
Timer Latch Section (TL)	Threshold Voltage of CP	$V_{\text{CP TH}}$		-	1.00	-	V
	Threshold Voltage of FB1/2	$V_{\text{FB TL}}$		-	1.22	-	V
	Charge Current of CP	I_{CP}	$V_{\text{CP}} = V_{\text{REG}} - 0.5\text{V}$	0.75	1.25	1.75	μA
Output Section	Rise time of OUT1,2	$t_{\text{r1,2}}$	$C_o = 1000\text{pF}$ between OUT1,2-GND	20	25	35	ns
	Fall time of OUT1,2	$t_{\text{f1,2}}$	$C_o = 1000\text{pF}$ between OUT1,2-GND	20	25	35	ns
	High Level on Resistance of OUT1,2	$R_{\text{1,2AH}}$	$I_{\text{OUT1,2}} = -50\text{mA}$	11.5	14	17	Ω
	Low Level on Resistance of OUT1,2	$R_{\text{1,2AL}}$	$I_{\text{OUT1,2}} = 50\text{mA}$	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



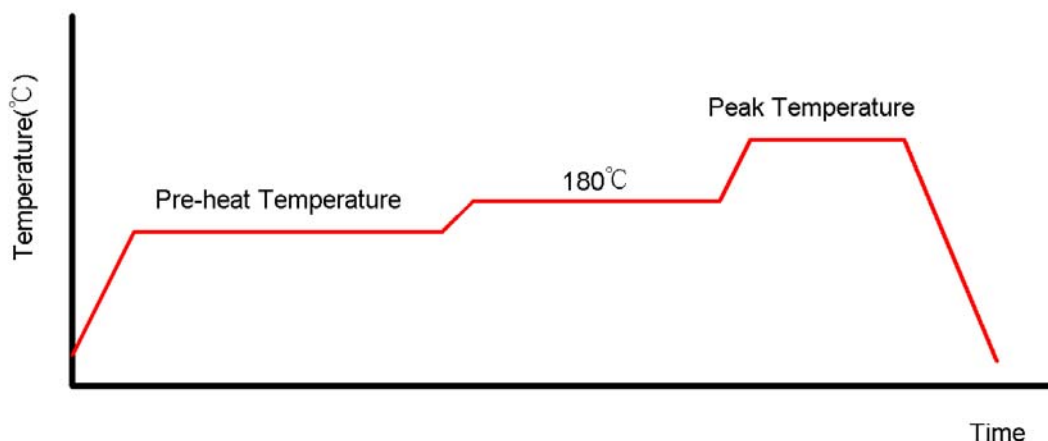
Package Outline 16-pin TSSOP



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°

Reflow Condition (IR/Convection or VPR Reflow)

Reference JEDEC Standard J-STD-020A



Classification Reflow Profiles

	Convection or IR/Convection	VPR
Average Heating Rate(180°C to peak)	5°C/second max.	10°C/second max.
Preheat Temperature(125±20°C)	120 seconds max.	
Temperature maintained above 180°C	10~150 seconds	
Time within 5°C of actual Peak Temperature	10~20 seconds	60 seconds
Peak Temperature Range(Note 1)	219~225°C or 235~240°C	219~225°C or 235~240°C
Cooling Rate	6°C /second max.	10°C/second max.
Time 25°C to Peak Temperature	6 minutes max.	

*1 The maximum peak temperatures for IR and VP reflow are depending on package dimensions.

Package Reflow Conditions

Pkg. Thickness ≥2.5mm and all bags	Pkg. Thickness <2.5mm and Pkg. Volume ≥350 mm ³	Pkg. Thickness <2.5mm and Pkg. Volume <350 mm ³
Convection 219~225°C		Convection 235~240°C
VPR 219~225°C		VPR 235~240°C
IR/Convection 219~225°C		IR/Convection 235~240°C