

**Features**

- High-accuracy reference voltage circuit ( $\pm 2\%$ ).
- Built-in short-circuit protection circuit.
- Built-in Undervoltage Lockout protection.
- Internal 2.5V Reference supply.
- Variable Dead time provides control over total Range.

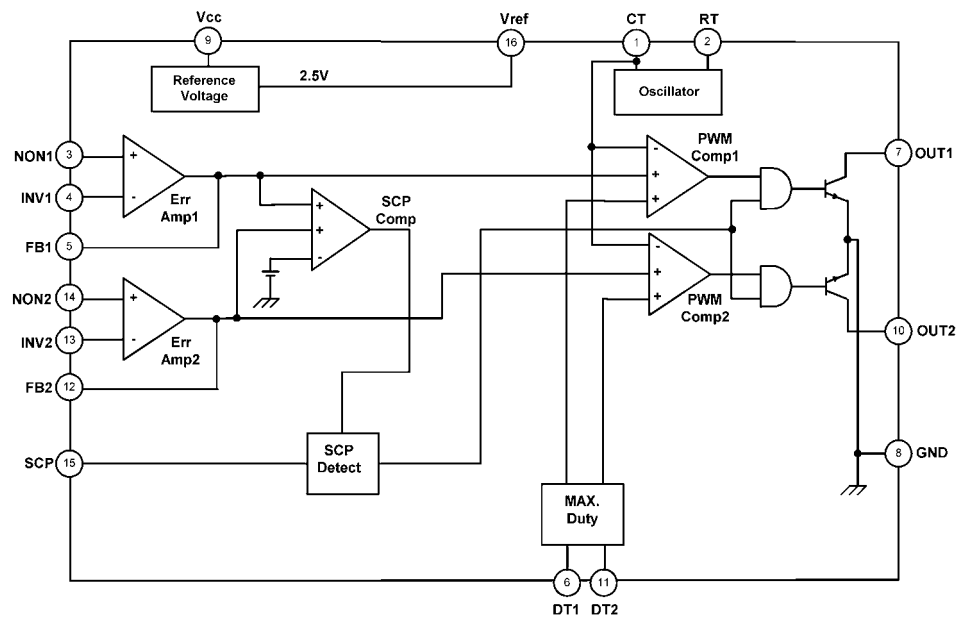
**Applications**

- LCD CCFL Backlight
- Portable equipment

**General Description**

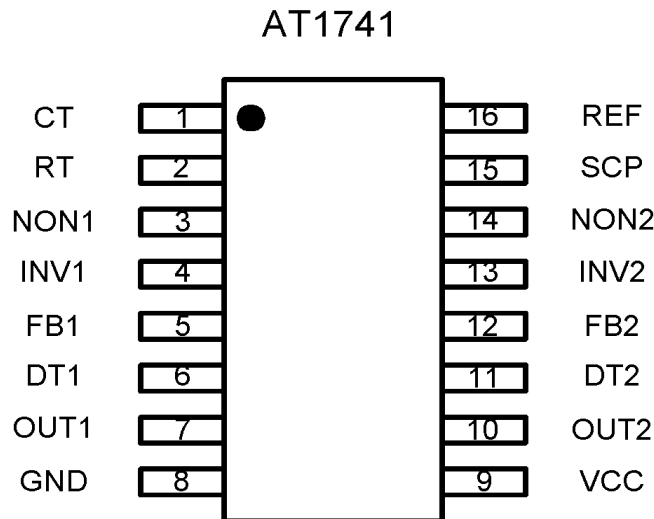
The AT1741 is 2-channel PWM switching regulator controllers that contains an on-chip 2.5V reference, two error amplifier, an adjustable oscillator, two dead-time comparators, under-voltage lockout circuitry and 2 common-emitter output. It is idea for step-up, step-down, and inverting converter.

**Block Diagram**



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

### Pin Configuration



### Ordering Information

Part number	Package	Marking
AT1741S	SOP16	AT1741S
AT1741S_GRE	SOP16,Green	AT1741S, date code with one bottom line
AT1741D	DIP16	AT1741D

### Pin Description

Pin No.	Symbol	I/O	Description
1	CT	--	External timing capacitor
2	RT	--	External timing resistor
3	NON1	I	Positive input for error amplifier 1
4	INV1	I	Negative input for error amplifier 1
5	FB1	O	Error amplifier 1 output
6	DT1	I	Output 1 dead time / soft start setting
7	OUT1	O	Output 1
8	GND	--	Ground
9	Vcc	--	Power supply
10	OUT2	O	Output 2
11	DT2	I	Output 2 dead time / soft start setting
12	FB2	O	Error amplifier 2 output
13	INV2	I	Negative input for error amplifier 2
14	NON2	I	Positive input for error amplifier 2
15	SCP	--	Time latch setting
16	REF	O	Reference voltage output ( 2.5V )

### Absolute Maximum Ratings

(Ta=+25°C)

Parameter	Symbol	Limits	Unit
Power supply voltage	V <sub>cc</sub>	28	V
Power dissipation	P <sub>d</sub>	500* <sup>1</sup>	mW
Operating temperature	T <sub>opr</sub>	-30~+85	°C
Storage temperature	T <sub>stg</sub>	-55~+125	°C
Output current	I <sub>o</sub>	120* <sup>2</sup>	mA
Output voltage	V <sub>o</sub>	30	V

\* 1 When mounted on 70mm×70mm×1.6mm glass epoxy board. Reduced by 6.5mw for each increase in Ta of 1°C over 25°C.

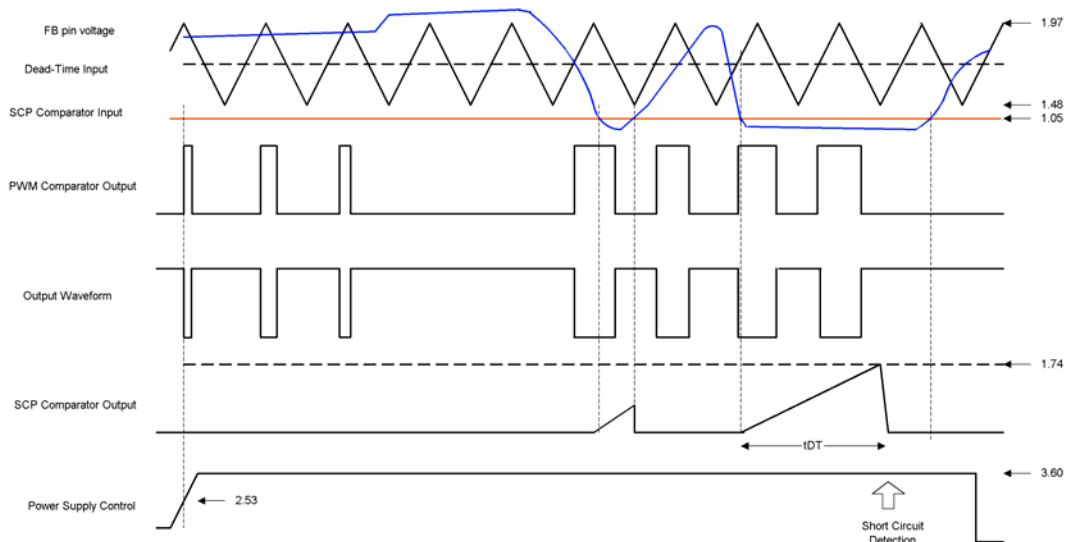
\* 2 Should not exceed Pd and values.

### Recommended Operating Conditions

(Ta=+25°C)

Parameter	Symbol	Values			Unit
		Min.	Typ.	Max.	
Power supply voltage	V <sub>CC</sub>	3.6	6.0	25	V
Output current	I <sub>o</sub>	--	--	100	mA
Output voltage	V <sub>o</sub>	--	--	25	V
Error amplifier input voltage	V <sub>OM</sub>	0.3	--	1.6	V
Timing capacitor	C <sub>CT</sub>	100	--	15000	pF
Timing resistor	R <sub>RT</sub>	5.1	--	50	kΩ
Oscillator frequency	F <sub>OSC</sub>	10	--	800	kHz

### Timing chart

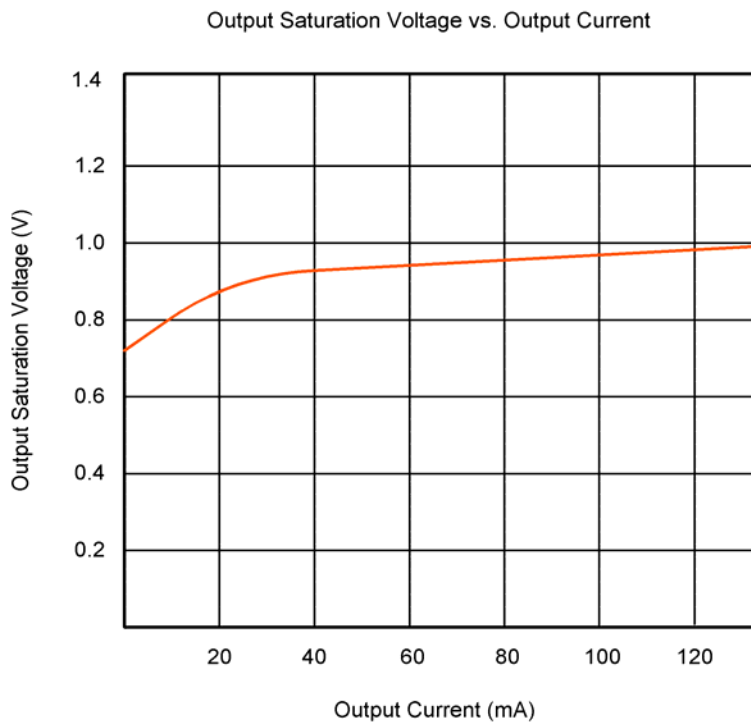
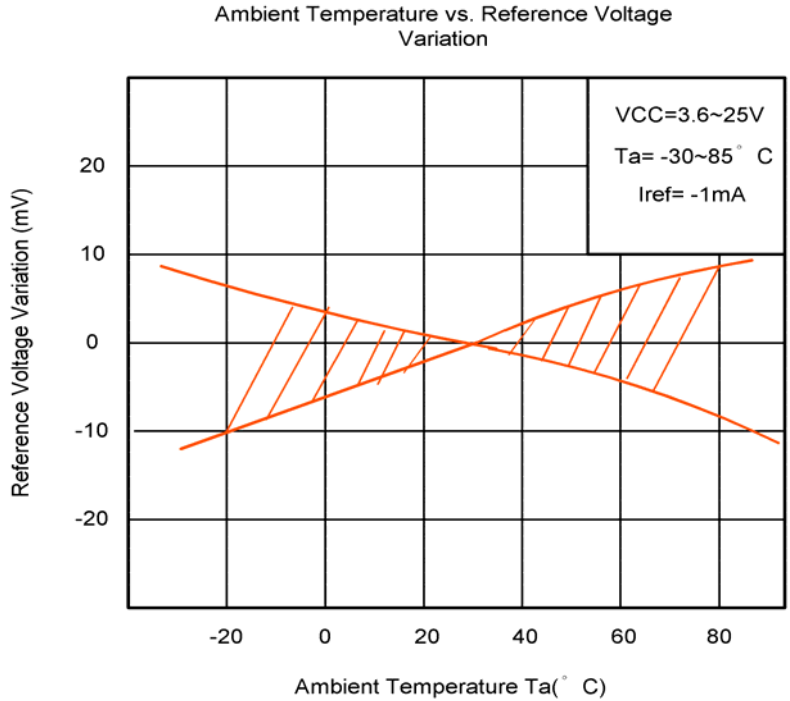


### Electrical Characteristics

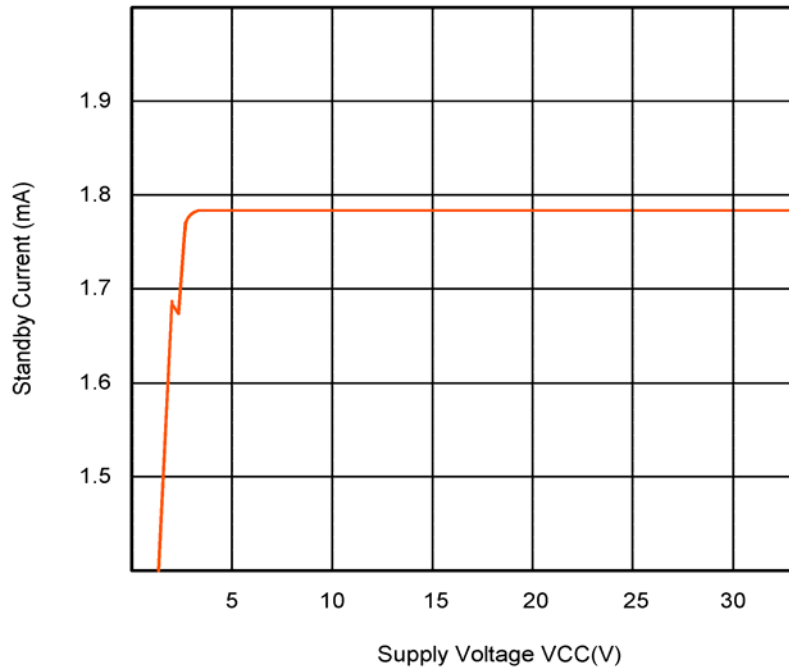
(unless otherwise noted, Ta=25°C, and Vcc=6V)

Parameter	Symbol	Condition	Values			Unit	
			Min.	Typ.	Max.		
Reference voltage block	Output voltage	Vref	Iref=1mA	2.45	2.5	2.55	V
	Input stability	V <sub>DLI</sub>	Vcc=3.6~25V	--	1	10	mV
	Load stability	V <sub>DLO</sub>	Iref=0~5mA	--	1	10	mV
Triangular wave oscillator	Oscillation frequency	Fosc	R <sub>RT</sub> =10kΩ, C <sub>CT</sub> =220pF	320	400	480	kHz
	Frequency deviation	F <sub>DV</sub>	Vcc=3.6~25V	--	1	--	%
Protection circuit	Threshold voltage	V <sub>IT</sub>	--	1.48	1.64	1.80	V
	Standby voltage	V <sub>STB</sub>	No pull up	--	50	100	mV
	Latch voltage	V <sub>LT</sub>	No pull up	--	30	100	mV
	Source current	I <sub>SCP</sub>	--	-1.5	-2.5	-3.5	μA
	Comparator threshold voltage	V <sub>CT</sub>	Pin 5, Pin 12	0.9	1.05	1.2	V
Rest period adjustment circuit	Input threshold voltage (fosc=10kHz)	V <sub>I0</sub>	Duty cycle=0%	1.79	1.97	2.15	V
		V <sub>I100</sub>	Duty cycle=100%	1.32	1.48	1.64	V
	On duty cycle	D <sub>ON</sub>	Divide Vref using 13 kΩ and 27 kΩ	60	70	80	%
	Input bias current	I <sub>BDT</sub>	DT1, DT2=2.0V	--	-0.1	-1	μA
	Latch mode source current	I <sub>DT</sub>	DT1, DT2=0V	-200	-560	--	μA
Latch input voltage	V <sub>DT</sub>	I <sub>DT</sub> =40 μA	2.28	2.48	--	V	
Low-voltage input miss-operation prevention circuit	Threshold voltage	V <sub>UT</sub>	--	--	2.53	--	V
Error amplifier	Input offset voltage	V <sub>IO</sub>	--	--	--	6	mV
	Input offset current	I <sub>IO</sub>	--	--	--	30	nA
	Input bias current	I <sub>IB</sub>	--	--	15	100	nA
	Open circuit gain	AV	--	70	85	--	dB
	Common-mode input voltage range	V <sub>OM</sub>	Vcc=3.6~25V	0.3	--	1.6	V
	Common-mode rejection ratio	CMRR	--	60	80	--	dB
	Maximum output voltage	V <sub>OH</sub>	--	2.3	2.5	--	V
	Minimum input voltage	V <sub>OL</sub>	--	--	0.7	0.9	V
	Output sink current	I <sub>OI</sub>	FB=1.25V	3	20	--	mA
Output source current	I <sub>OO</sub>	FB=1.25V	-45	-75	--	μA	
PWM comparator	Input threshold voltage (fosc=10kHz)	V <sub>I0</sub>	Duty cycle=0%	1.79	1.97	2.15	V
		V <sub>I100</sub>	Duty cycle=100%	1.32	1.48	1.64	V
Output block	Saturation voltage	V <sub>SAT</sub>	I <sub>o</sub> =75mA	--	0.8	1.2	V
	Leak current	I <sub>REAK</sub>	V <sub>o</sub> =25V	--	0	5	μA
Total device	Standby current	I <sub>CCS</sub>	When output is off	--	1.3	1.8	mA
	Average current consumption	I <sub>CCA</sub>	R <sub>RT</sub> =10 kΩ	--	1.6	2.3	mA

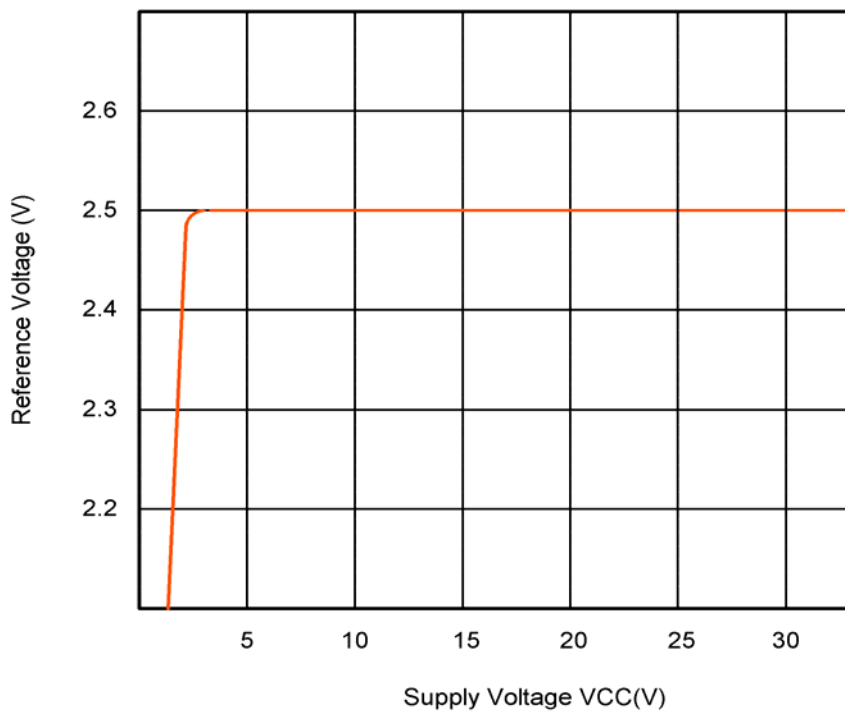
**Timing Curve**



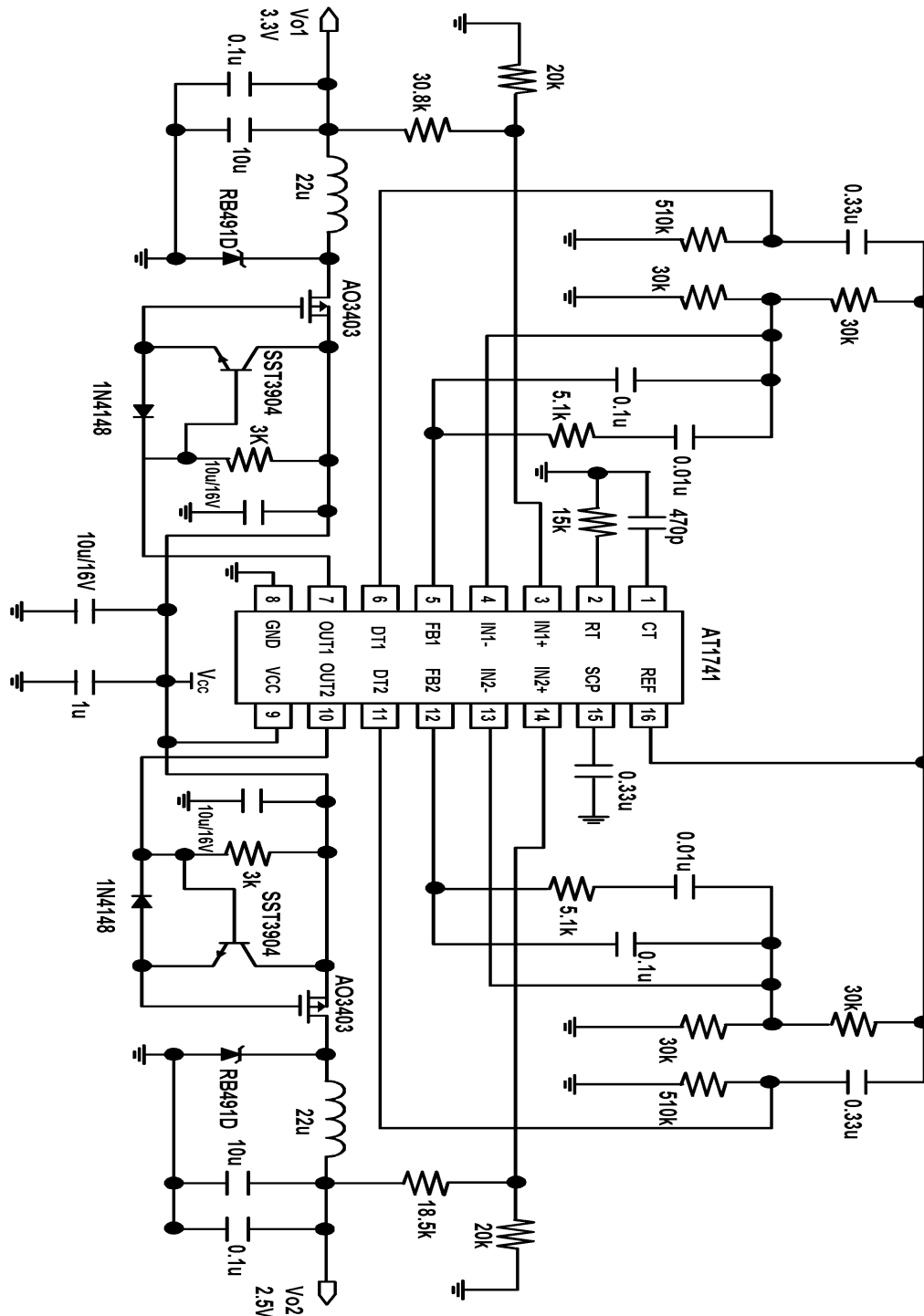
Standby Current vs. Supply Voltage



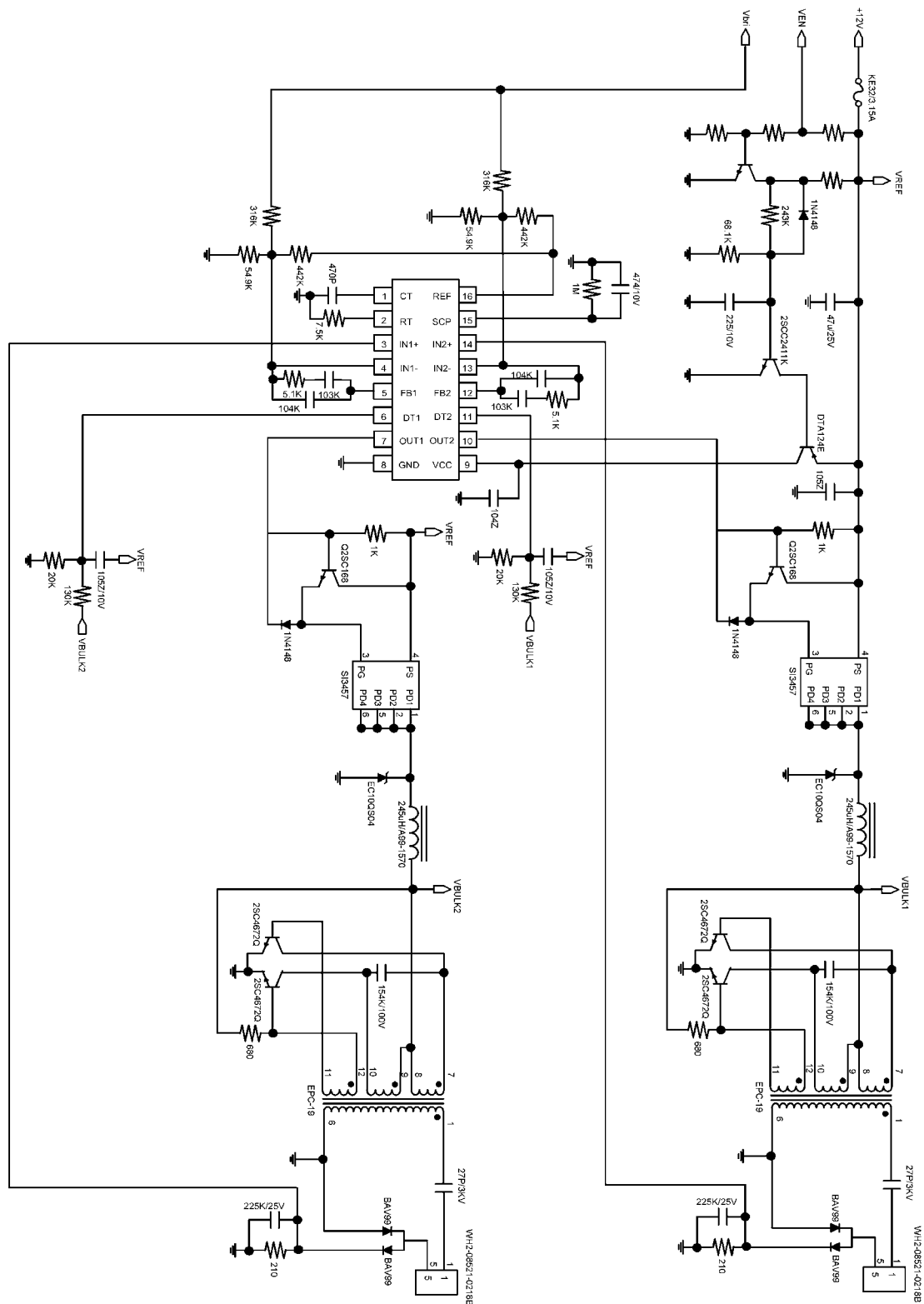
Supply Voltage vs. Reference voltage



**Application Circuit: Step-Down converter**



**Application Circuit: CCFL Inverter**



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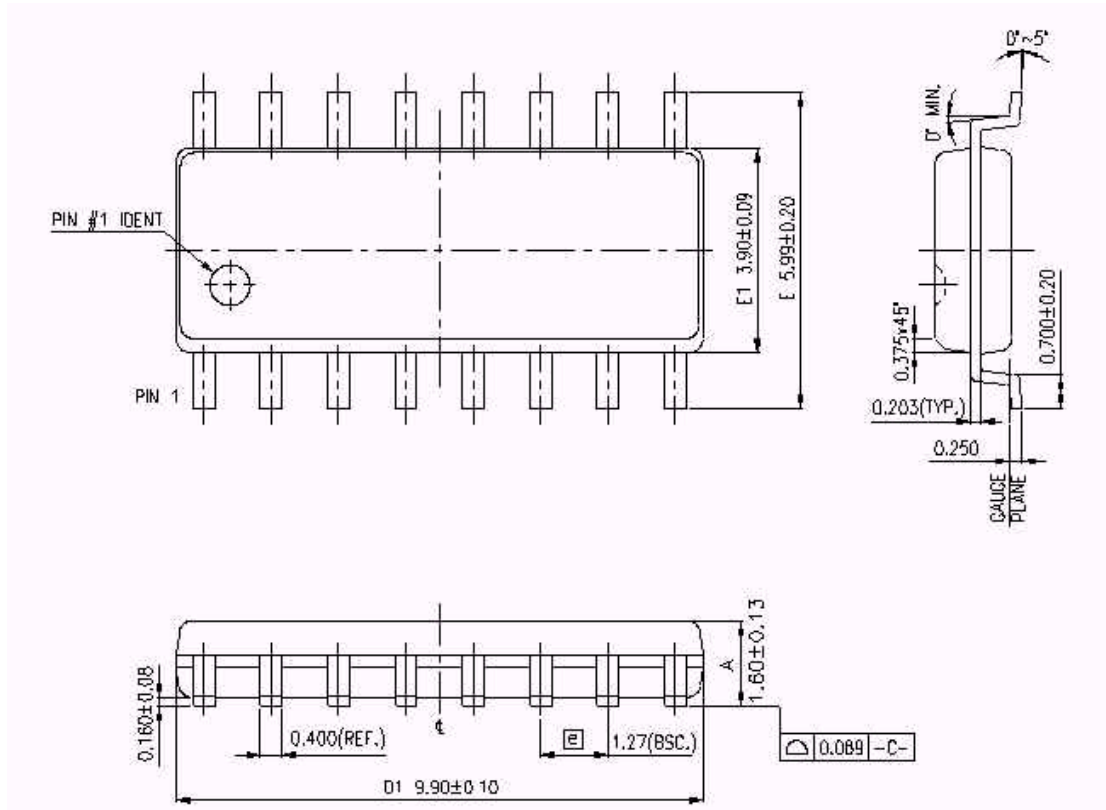
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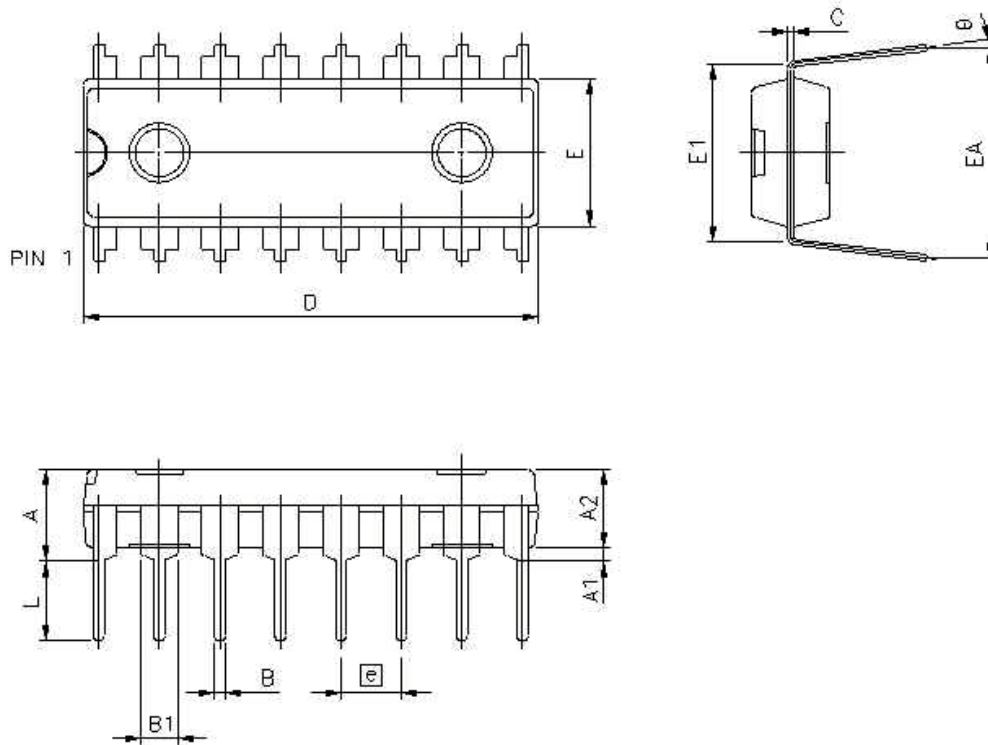


**Package Outline 16-pin SOP(150mil)**



**\*Controlling dimensions are in millimeters(mm).**

**Package Outline 16-pin DIP(300mil)**



SYMBOL	DIMENSION IN INCH	DIMENSION IN MM
A	0.170 MAX.	4.318 MAX.
A1	0.015 MIN.	0.381 MIN.
A2	0.130±0.005	3.302±0.127
B	0.018 TYP.	0.457 TYP.
B1	0.060 TYP.	1.524 TYP.
C	0.010 NOM.	0.254 NOM.
D	0.752±0.005	19.101±0.127
E	0.252±0.005	6.401±0.127
E1	0.300±0.010	7.62±0.254
EA	0.355±0.020	9.017±0.508
e	0.100 TYP.	2.540 TYP.
L	0.130±0.010	3.302±0.254
θ	0°~15°	0°~15°

NOTE:  
 1. DIMENSION D & E DOES NOT INCLUDE FLASH.