

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.

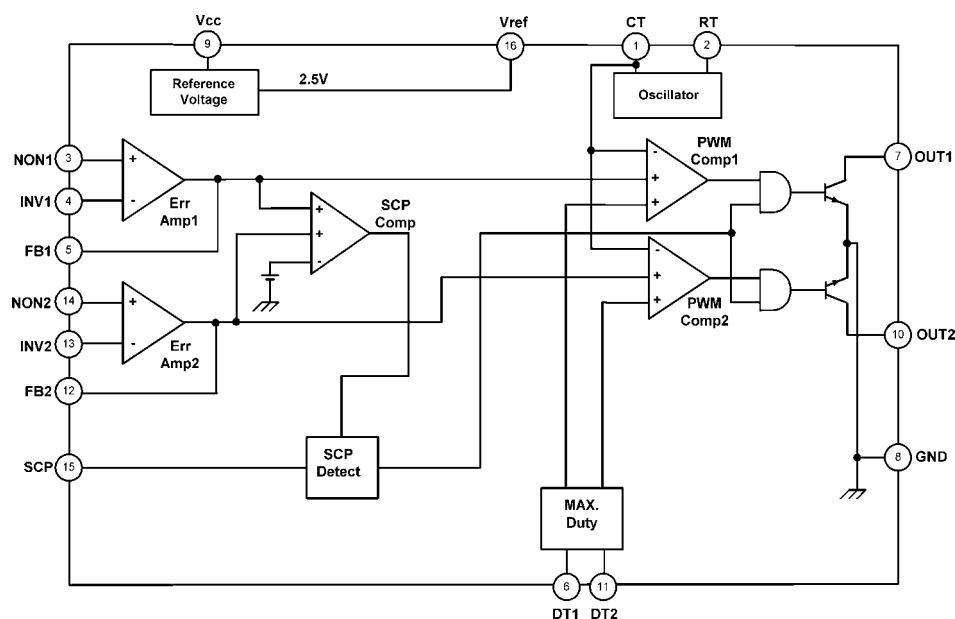
Applications

- LCD CCFL Backlight
- Portable equipment

General Description

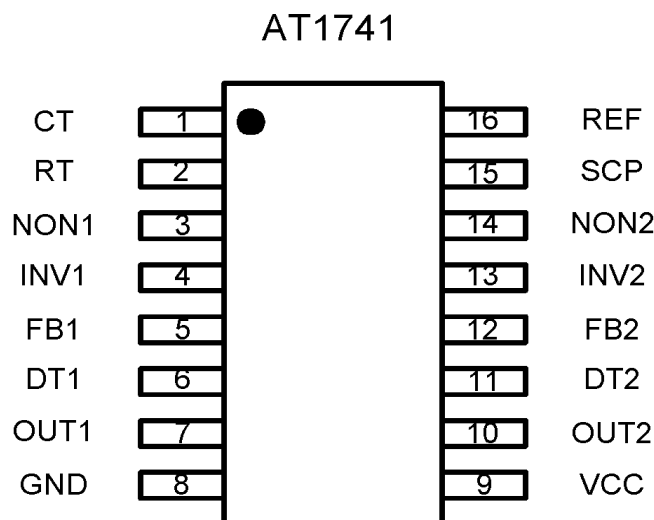
The AT1741 is 2-channel PWM switching regulator controllers that contains an on-chip 2.5V reference, two error amplifier, an adjustable oscillator, two dead-time comparators, under-voltage lockout circuitry and 2 common-emitter output. It is idea for step-up, step-down, and inverting converter.

Block Diagram



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

Pin Configuration



Ordering Information

Part number	Package	Marking
AT1741	SOP16	AT1741S
AT1741	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

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(Ta=+25°C)

Parameter	Symbol	Limits	Unit
Power supply voltage	V _{cc}	30	V
Power dissipation	P _d	500* ¹	mW
Operating temperture	T _{opr}	-30~+85	°C
Storage temperture	T _{stg}	-55~+125	°C
Output current	I _o	120* ²	mA
Output voltage	V _o	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.

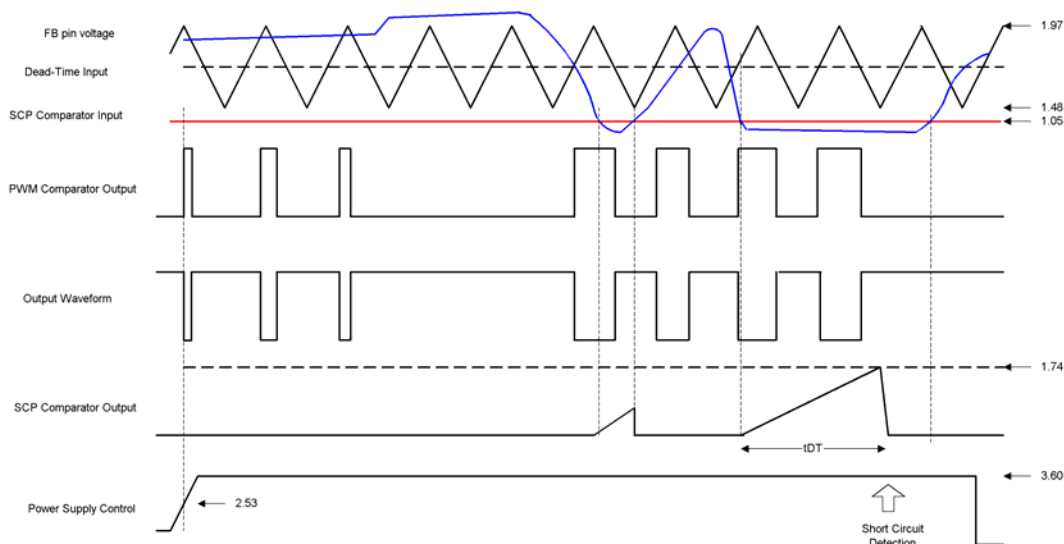
* 2 Should not exceed P_d and values.

Recommended Operating Conditions

(Ta=+25°C)

Parameter	Symbol	Values			Unit
		Min.	Typ.	Max.	
Power supply voltage	V _{CC}	3.6	6.0	28	V
Output current	I _o	--	--	100	mA
Output voltage	V _o	--	--	25	V
Error amplifier input voltage	V _{OM}	0.3	--	1.6	V
Timing capacitor	C _{CT}	100	--	15000	pF
Timing resistor	R _{RT}	5.1	--	50	kΩ
Oscillator frequency	F _{OSC}	10	--	800	kHz

Timing chart

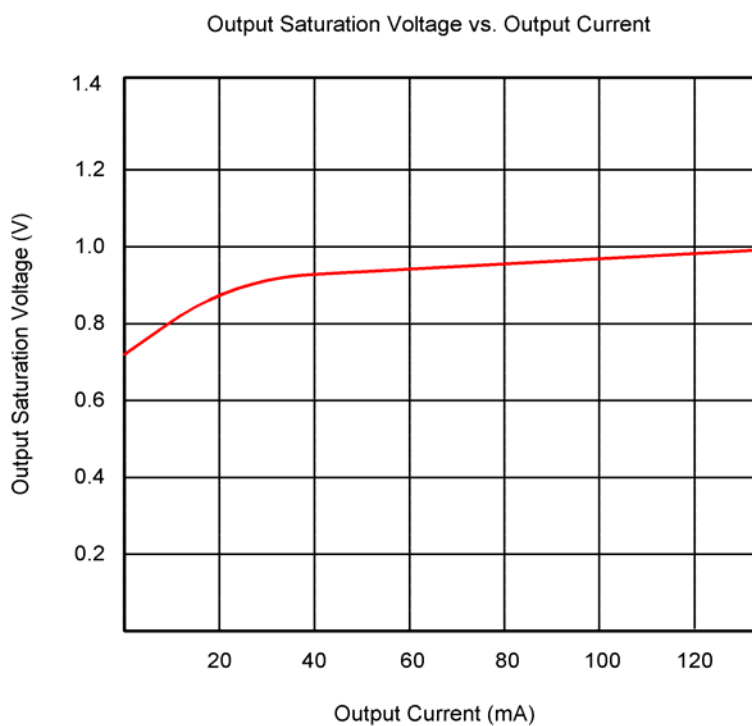
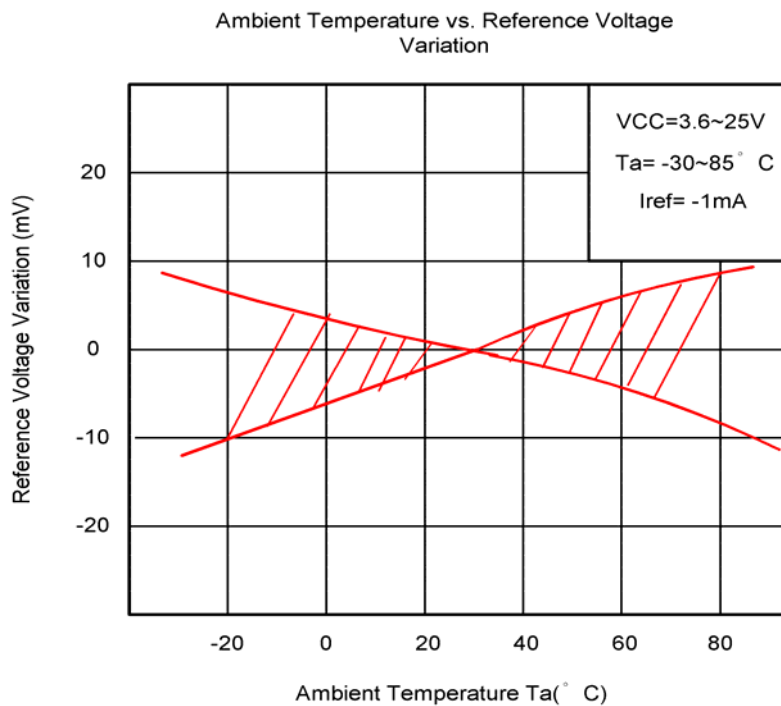


Electrical Characteristics

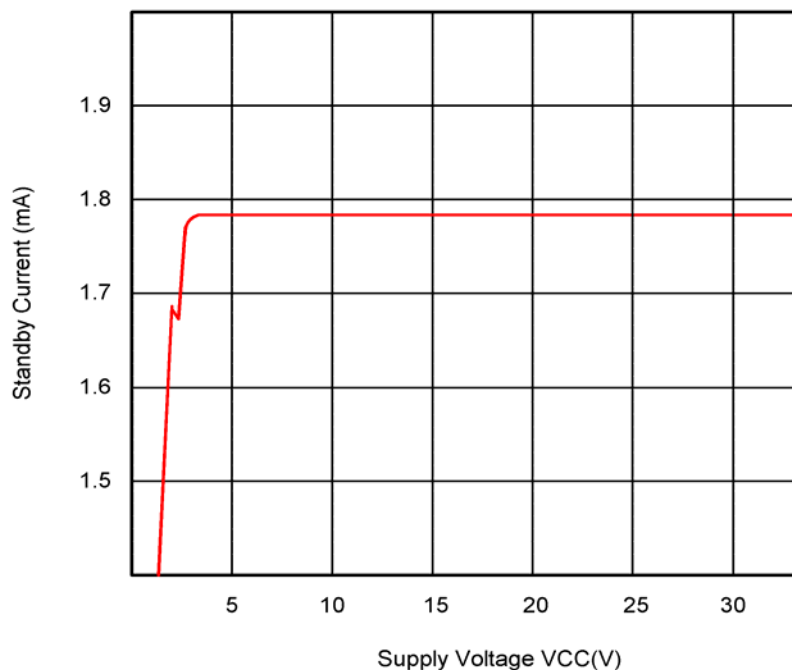
(unless otherwise noted, Ta=25°C, and Vcc=6V)

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

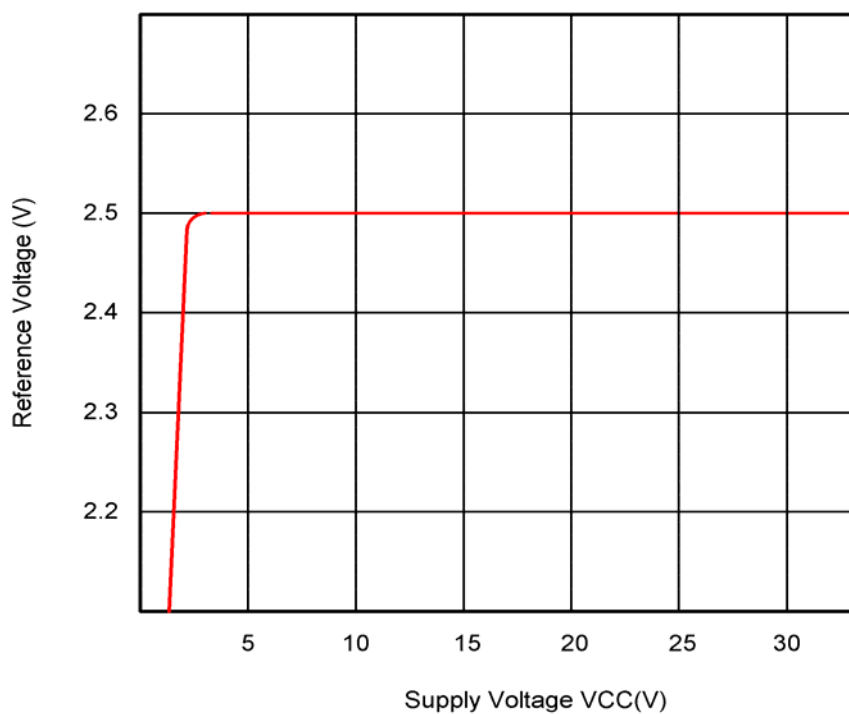
Timing Curve



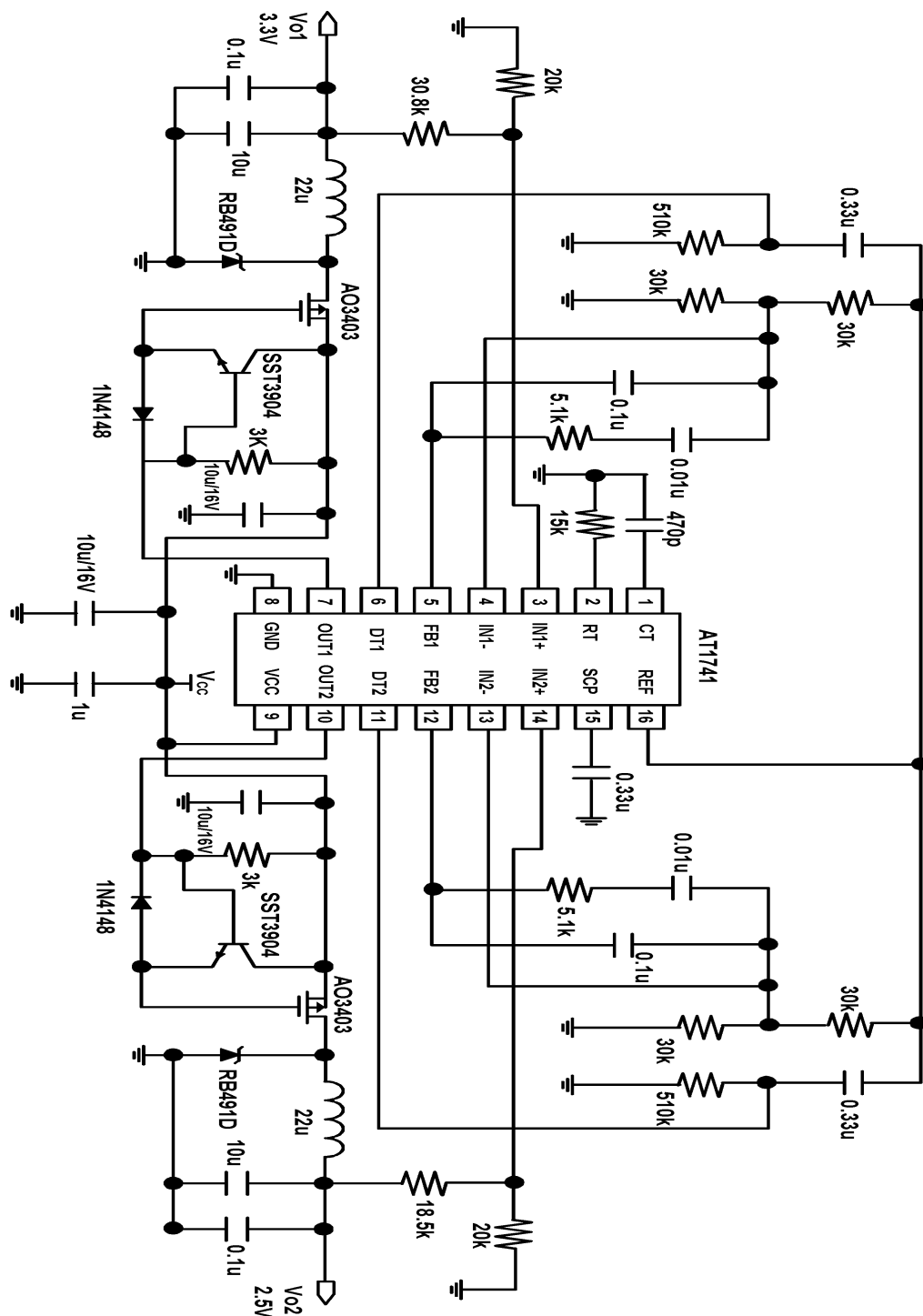
Standby Current vs. Supply Voltage



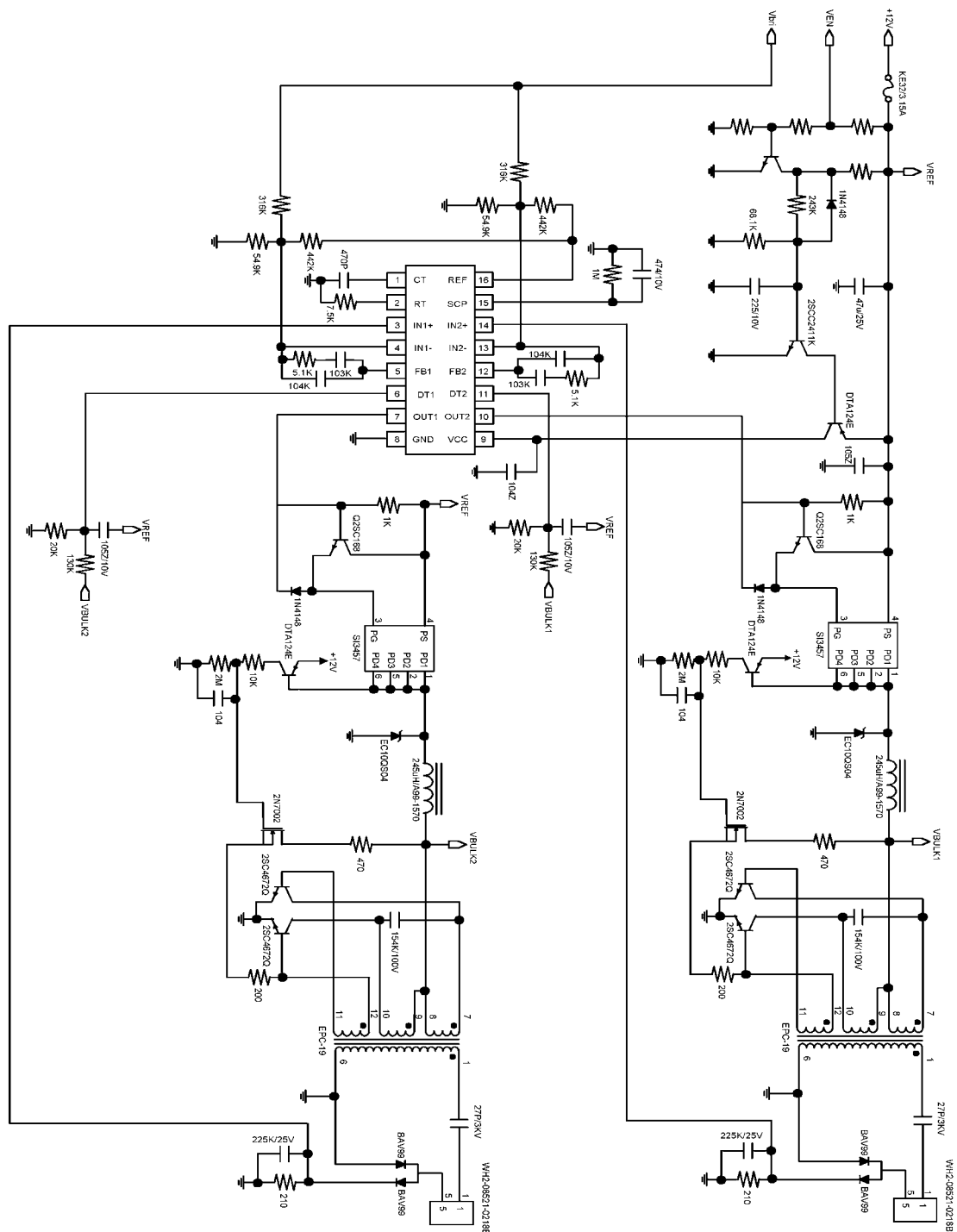
Supply Voltage vs. Reference voltage



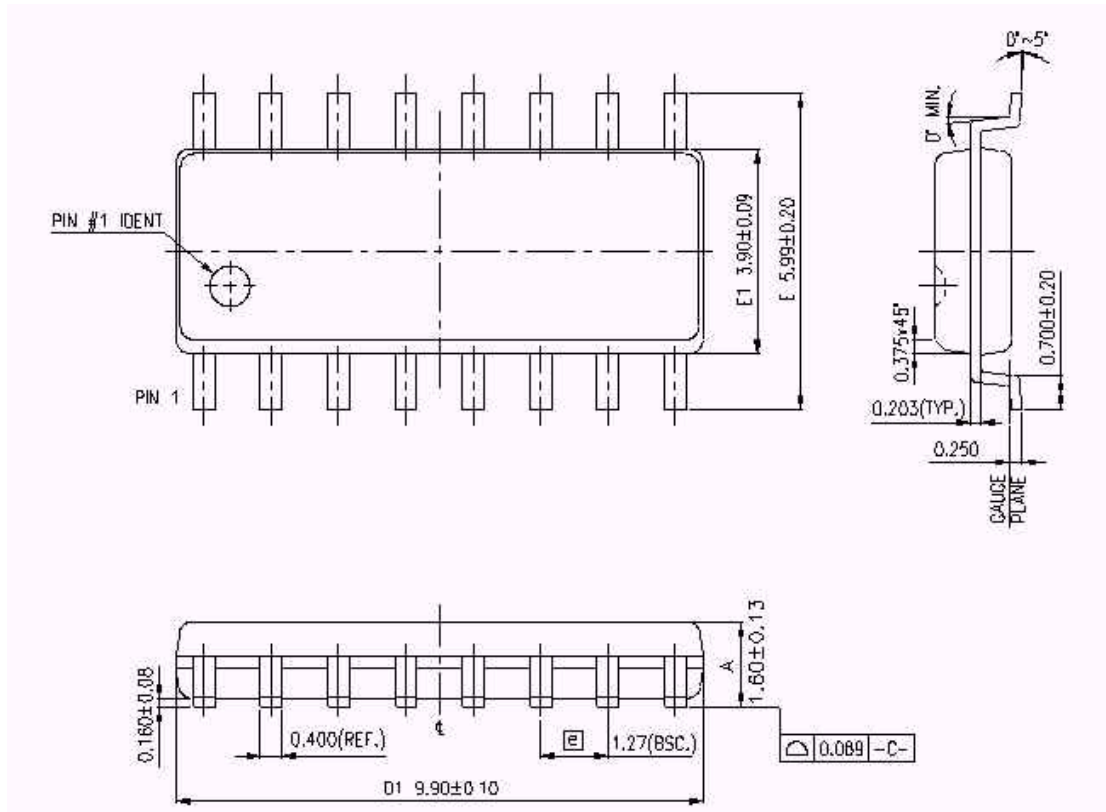
Application Circuit: Step-Down converter



Application Circuit: CCFL Inverter

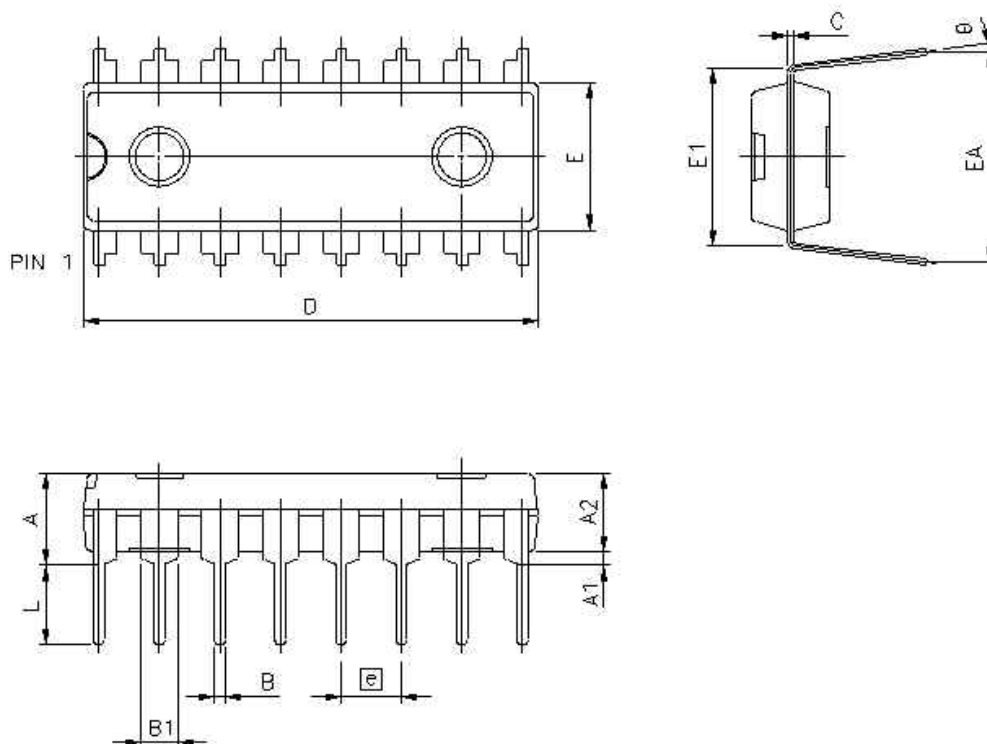


Package Outline 16-pin SOP(150mil)



*Controlling dimensions are in millimeters(mm).

Package Outline 16-pin DIP(300mil)



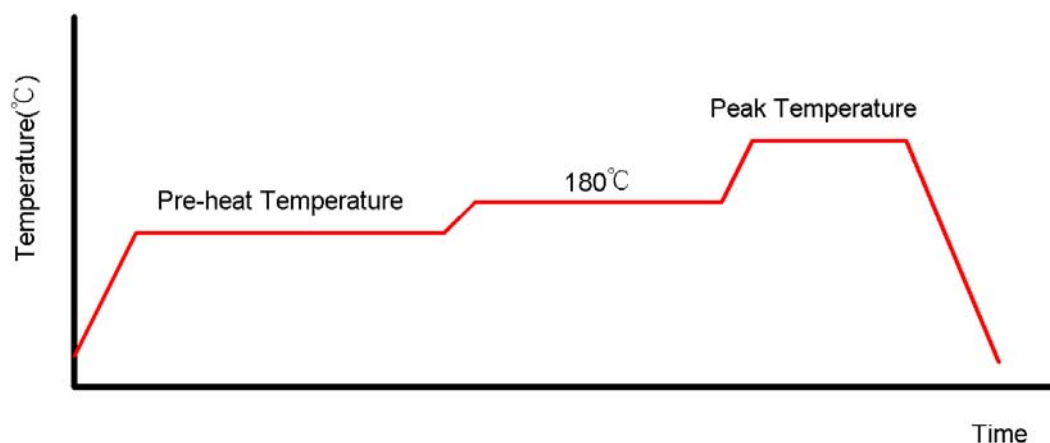
SYMBOL	DIMENSION IN INCH	DIMENSION IN MM
A	0.170 MAX.	4.318 MAX.
A1	0.015 MIN.	0.381 MIN.
A2	0.130±0.005	3.302±0.127
B	0.018 TYP.	0.457 TYP.
B1	0.060 TYP.	1.524 TYP.
C	0.010 NOM.	0.254 NOM.
D	0.752±0.005	19.101±0.127
E	0.252±0.005	6.401±0.127
E1	0.300±0.010	7.62±0.254
EA	0.355±0.020	9.017±0.508
e	0.100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

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(150±10°C)	55~85 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.

*2 Time maintained at above 200°C : 30±10 seconds Time maintained at above 220°C : 20±10 seconds

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