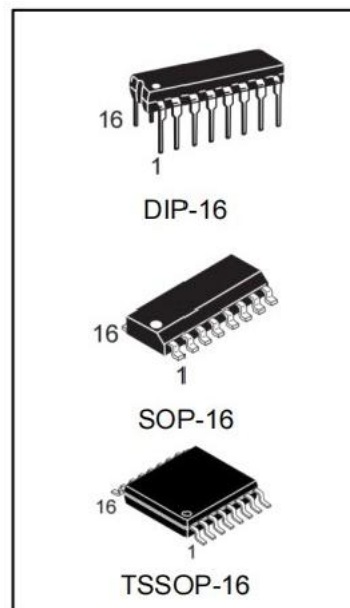


## General Description

The TL494 is a fixed frequency,pulse width modulation control circuit designed primarily for SWITCHMODE power supply control

### Features

- Input levels:
- Complete Pulse Width Modulation Control Circuitry
- On-Chip Oscillator with Master or Slave Operation
- On-Chip Error Amplifiers
- On-Chip 5.0 V Reference
- Adjustable Deadtime Control
- Uncommitted Output Transistors Rated to 500 mA Source or Sink
- Output Control for Push-Pull or Single-Ended Operation
- Undervoltage Lockout



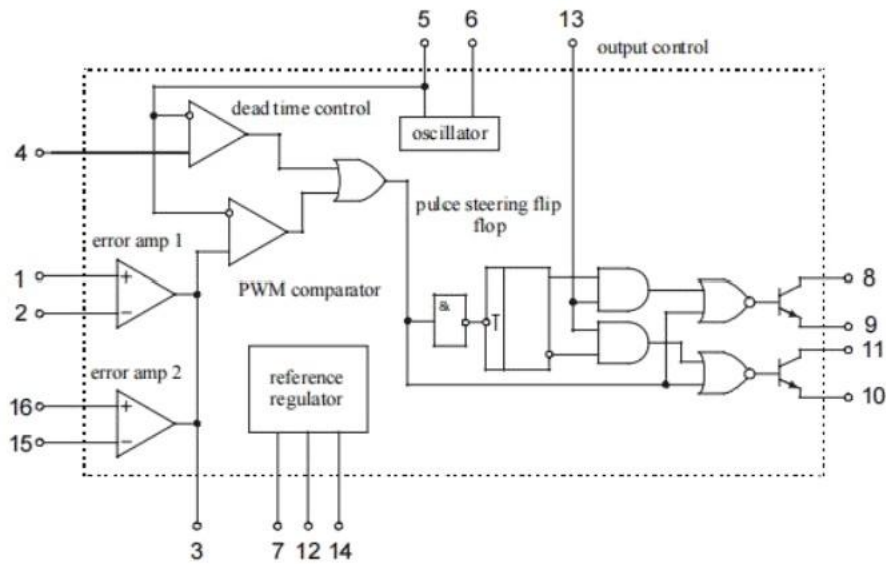
### Order Information

Product Model	Package Type	Marking	Packing	Packing Qty
TL494CN	DIP-16	TL494C	TUBE	1000pcs/box
T1494CMTR	SOP-16	TL494C	REEL	2500pcs/reel
TL494CMT/TR	TSSOP-16	TL494C	REEL	2500pcs/reel
TL494IN	DIP-16	TL494I	TUBE	1000pcs/box
TL494IM/TR	SOP-16	TL494I	REEL	2500pcs/reel

## PIN ASSIGNMENT

noninv. input	1	16	noninv. input
inv. input	2	15	inv. input
feedback	3	14	ref. output
dead time control	TL494		output control
$C_T$	5	12	Vcc
$R_T$	6	11	collector 2
gnd	7	10	emitter 2
collector 1	8	9	emitter 1

## LOGIC DIAGRAM



**Pin 7=GND**

**Pin 12 =Vcc**

## Maximum And Recommended Operating Conditions

Symbol	Parameter		Recommended operating conditions		Maximum ratings		Unit
			Min	Max	Min	Max	
V <sub>cc</sub>	Supply Voltage		7	40		41	V
V <sub>i</sub>	Amplifier Input Voltage		-0.3	V <sub>cc</sub> -2		V <sub>cc</sub> +0.3	V
V <sub>o</sub>	Collector Output Voltage			40		41	V
I <sub>OC</sub>	Collector Output Current(Each Transistor)			200		250	mA
T <sub>srg</sub>	Storage Temperature Range				-65	150	°C
T <sub>A</sub>	Operating Free-Air Temperature Range	TL494C	0	70			°C
		TL494I	-40	85			°C
T <sub>L</sub>	Lead Temperature (Soldering, 10 seconds)					<b>245</b>	°C

**Note:** Absolute Maximum Ratings indicate limits beyond which damage to the device may occur. Operating Ratings indicate conditions for which the device is intended to be functional, but specific performance is not ensured.

## ELECTRICAL CHARACTERISTICS(TA=-40~+85°C,f=10kHz)

Symbol	Parameter	Test Conditions	Value		Temperature, °C	Unit
			Min	Max		
Vref	Output voltage	Io=1.0mA,Vcc=15V	4.75	5.25	-40~+85	V
Uregir	Input regulation	Vcc=7~40V,Io=1.0mA		25	25	mV
Uregout	Output regulation	Io=1~10 mA,Vcc=15V		15	25	mV
Vref	Output voltagechange with temperature	Io=1mA,Vcc=15V		1.0	-40~+85	%
ISC	Short circuit output current	Vrer=0,tsc<1s Vcc=15V		50		mA
fosc	Frequency	C=0.01uF,R=12k Vcc=15V,V(o3)=0.7V	6.0	14		kHz
fosc	Standard Deviationof Frequency*	Vcc=15V,V(o3)=0.7V		15		%
fosc(ΔV)	Frequency Change with Voltage	Vcc=7~40V,V(o3)=0.7V		10	25	%
fosc(ΔT)	Frequency Change with Temperature	C=0.01uF,Rr=12k Vcc=15V,V(o3)=0.7V		2.0	-40~+85	%
IIB(2T)	Input bias current(pin 4)	Vi=0...5.25V,Vcc=15V V(o3)=0.7V		-10		A
DCmax	Maximum duty cycle (each output)	V1(O4)=0V,Vcc=15 V V(o3)=0.7V	45			%
VTHD1	Input thresholdvoltage (pin 4) (Zero Duty Cycle)	DCmax=0,Vcc=15V V(o3)=0.7V		3,3		V
VTHD2	Input thresholdvoltage (pin 4)(Maximum DutyCycle)	Dcmax Vcc=15V,V(o3)=0.7V	0			V
trc	Output voltage risetime (Common-Emitter)	Vcc=15V,V(o3)=2.0V		200	-40~+85	ns
tfc	Output voltage falltime (Common-Emitter)	Vcc=15V,V(o3)=2.0V		100		ns
trf	Output voltage risetime (Emitter-Follower)	Vcc=Vc=15V, V(o3)=2.0V		200		ns
tff	Output voltage falltime (Emitter-Follower)	Vcc=Vc=15V, V(o3)=2.0V		100		ns
VTHP	Input thresholdvoltage (pin 3)	DCmax=0,Vcc=15V		4.5	-40~+85	V
I	Input sink current(pin 3)	Vcc=15V,V(o3)=0.7V	0.3			mA
VIO	Input offset voltage	Vcc=15V,Vo(o3)=2.5V		10		mV
Ilo	Input offset current	Vcc=15V,Vo(o3)=2.5V		250		nA
IIB	Input bias current	Vcc=15V,Vo(o3)=2.5V		1		A

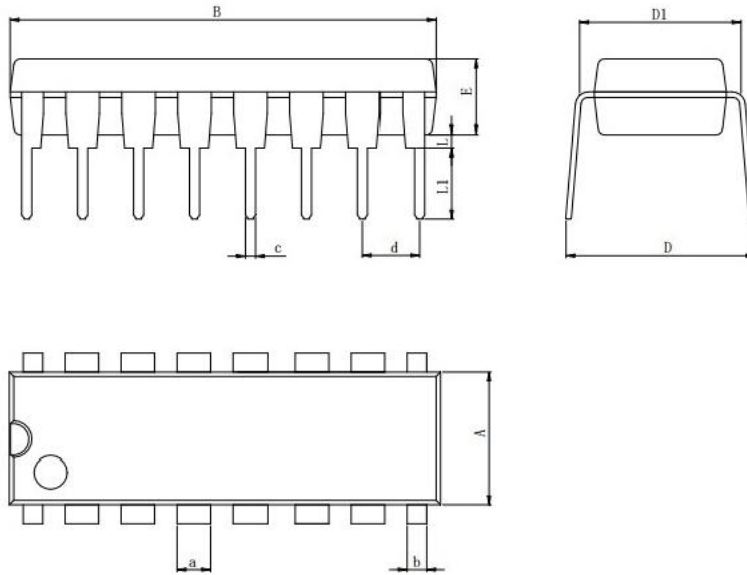
VICRL	Low Input common mode voltage range	V <sub>cc</sub> =7~40V	-0.3			V
VICRH	High Input common mode voltage range	V <sub>cc</sub> =7~40V	V <sub>cc</sub> -2			V
AVOL	Open loop voltage amplification	V <sub>o</sub> =3V, V <sub>cc</sub> =15V V <sub>o</sub> =0.5~3.5V	70			dB
f <sub>o</sub>	Unity-gainbandwidth	V <sub>cc</sub> =15V	100			kHz
CMRR	Common mode rejection ratio	V <sub>cc</sub> =40V	65	=	25	dB
IOL	Output sink current(pin 3)	V <sub>cc</sub> =15V, V <sub>o</sub> (o <sub>3</sub> )=0.7V	0.3			mA
IOH	Output sourcecurrent (pin 3)	V <sub>cc</sub> =15V, V <sub>o</sub> (o <sub>3</sub> )=3.5V	-2.0		-40~+85	mA
IC(off)	Collector off-state current	V <sub>cE</sub> =V <sub>cc</sub> =40V		100		A
IE(off)	Emitter off-state current	V <sub>cc</sub> =V <sub>c</sub> =40V, V <sub>E</sub> =0V		-100		A
VSAT(C)	Collector -Emitter saturation voltage (Common-Emitter)	V <sub>cc</sub> =15V, V <sub>E</sub> =0V V <sub>o</sub> (o <sub>3</sub> )=3.0V, I <sub>c</sub> =200mA		1.3		V
VSAT(E)	Collector -Emitter saturation voltage (Emitter-follower)	V <sub>cc</sub> =V <sub>c</sub> =15V I <sub>E</sub> =-200mA, V <sub>o</sub> (o <sub>3</sub> )=3.0V			-20~+85	V
IOCH	Output control input current	V <sub>CC</sub> =15V V <sub>0</sub> (03)=0.7V		3.5		mA
ICC15	Standby Supply Current at VCC 15V	V <sub>cc</sub> =15V		10	25	mA
ICC40	Standby Supply Current at VCC 40V	V <sub>CC</sub> =40V		15	25	mA
ICCA	Average Supply Current	V <sub>CC</sub> =15V V <sub>0</sub> (03)=0.7V V <sub>0</sub> (04)=2.0V		15	-40~+85	mA

Standard deviation is a measure of the statistical distribution about the mean as derived from the formula

$$\sigma = \sqrt{\frac{\sum_{n=1}^N (X_n - \bar{X})^2}{N - 1}}$$

## Physical Dimensions

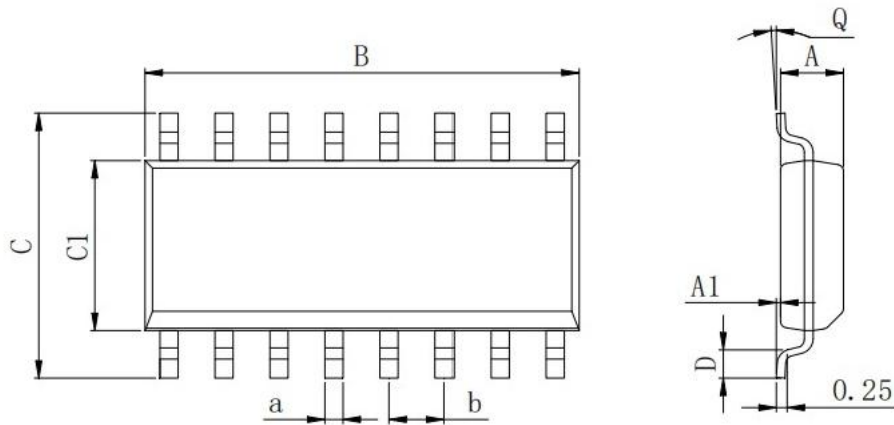
### DIP-16



Dimensions In Millimeters(DIP-16)

Symbol:	A	B	D	D1	E	L	L1	a	b	C	d
Min:	6.10	18.94	8.10	7.42	3.10	0.50	3.00	1.50	0.85	0.40	2.54 BSC
Max:	6.68	19.56	10.9	7.82	3.55	0.70	3.60	1.55	0.90	0.50	

### SOP-16

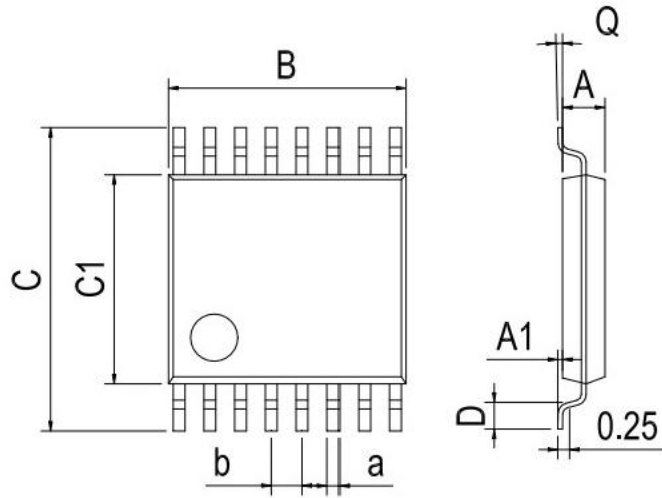


Dimensions In Millimeters(SOP-16)

Symbol:	A	A1	B	C	C1	D	Q	a	b
Min:	1.35	0.05	9.80	5.80	3.80	0.40	0°	0.35	1.27 BSC
Max:	1.55	0.20	10.0	6.20	4.00	0.80	8°	0.45	

## Physical Dimensions

### TSSOP-16



Dimensions In Millimeters(TSSOP-16)									
Symbol:	A	A1	B	C	C1	D	Q	a	b
Min:	0.85	0.05	4.90	6.20	4.30	0.40	0°	0.20	0.65 BSC
Max:	0.95	0.20	5.10	6.60	4.50	0.80	8°	0.25	