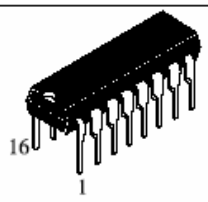
Pulse- Width-Modulation Control Circuit KK494A

The KK494 is a fixed frequency, pulse width modulation control circuit designed primarily for SWITCH MODE power supply control.

- • 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

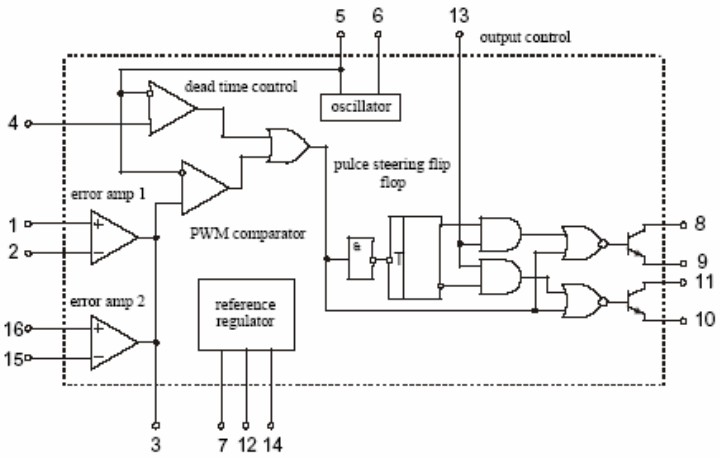


ORDERING INFORMATION

KK494AN	16-DIP
KK494AD	16-SOP

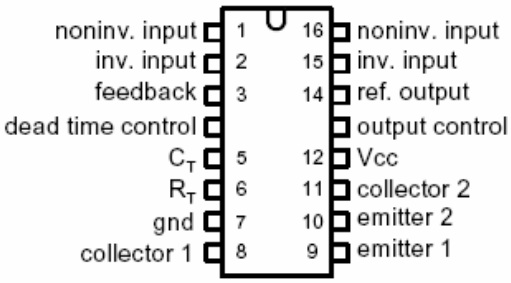
T_A = -20°C to 85° C for all packages

LOGIC DIAGRAM



Pin 7 = GND
Pin 12 = V_{CC}

PIN ASSIGNMEN



MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V_{CC}	Supply Voltage	41	V
V_I	Amplifier Input Voltage	V_{CC} +0.3	V
V_O	Collector Output Voltage	41	V
	Collector Output Current	250	mA
Tstg	Storage Temperature	-65 to +150	°C

RECOMMENDED OPERATING CONDITIONS

Symbol	Parameter	Min	Max	Unit
V_{CC}	Supply Voltage	7	40	V
V_I	Amplifier Input Voltage	-0.3	V_{CC} - 2	V
V_O	Collector Output Voltage		40	V
	Collector Output Current (Each Transistor)		200	mA
	Current Into Feed back Terminal		0.3	mA
C_T	Timing Capacitor	0.47	10.000	nF
R_T	Timing Resistor	1.8	500	KΩ
	Oscillator Frequency	1	300	KHz
T_A	Operating Free-Air Temperature	-20	+85	°C

ELECTRICAL CHARACTERISTICS (Temperature -20 ~ 85°C, V_{CC} = 15 V, f=10 kHz)

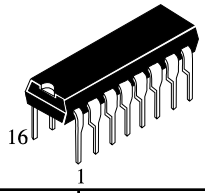
Symbol	Parameter	Test Conditions	Value		Tempe-rature, °C	Unit
			Min	Max		
V_{ref}	Output voltage	I_0=1.0mA V_{CC}=15V	4.90	5.10	-20~+85	V
V_{regin}	Input regulation	V_{CC}=7÷ 40V I_0=1.0mA	-	25	25	mV
V_{regout}	Output regulation	I_0=1÷ 10 mA V_{CC} =15 V	-	15	25	mV
ΔV_{ref}	Output voltage change with temperature	I_0=1 mA V_{CC} =15 V	-	1.0	-20~+85	%
I_{SC}	Short circuit output current	V_{ref}=0, tsc< 1 s V_{CC}=15 V	-	50		mA
f_{osc}	Frequency	C=0.01µF, R=12kΩ V_{CC}=15 V $V_{(03)}$=0.7 V	6.0	14		kHz
σf_{osc}	Standard Deviation of Frequency *	V_{CC}=15 V $V_{(03)}$=0.7 V	-	15		%
$\sigma f_{osc(\Delta V)}$	Frequency Change with Voltage	V_{CC}=7÷40 V $V_{(03)}$=0.7 V	-	10	25	%
$\sigma f_{osc(\Delta T)}$	Frequency Change with Temperature	C=0.01µF, R_T=12 kΩ V_{CC}=15 V $V_{(03)}$=0.7 V	-	2.0	-20~+85	%
$I_{IB(2T)}$	Input bias current (pin 4)	V_I=0÷5.25V V_{CC}=15 V $V_{(03)}$=0.7 V	-	-10		µA
DCmax	Maximum duty cycle (each output)	$V_{I(04)}$=0V V_{CC}=15 V $V_{(03)}$=0.7 V	45	-		%
V_{THD1}	Input threshold voltage (pin 4) (Zero Duty Cycle)	DCmax=0 V_{CC}=15 V $V_{(03)}$=0.7 V	-	3,3		V
V_{THD2}	Input threshold voltage (pin 4) (Maximum Duty Cycle)	DCmax V_{CC}=15 V $V_{(03)}$=0.7 V	0	-		V
t_{rc}	Output voltage rise time (Common-Emitter)	V_{CC}=15 V $V_{(03)}$=2.0 V	-	200	-20~+85	ns
t_{fc}	Output voltage fall time (Common-Emitter)	V_{CC}=15 V $V_{(03)}$=2.0 V	-	100		ns
t_{rf}	Output voltage rise time (Emitter-Follower)	V_{CC}=V_C=15 V $V_{(03)}$=2.0 V	-	200		ns
t_{ff}	Output voltage fall time (Emitter-Follower)	V_{CC}= V_C= 15 V $V_{(03)}$= 2.0 V	-	100	-20~+85	ns

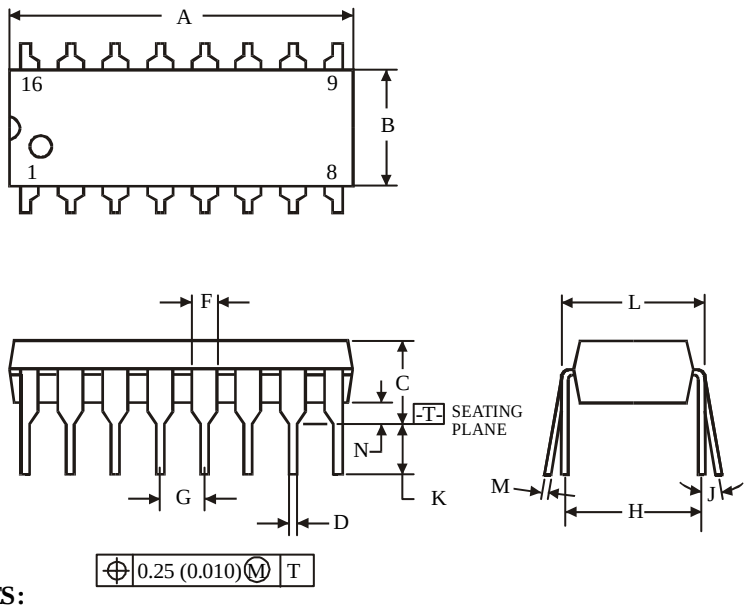
ELECTRICAL CHARACTERISTICS (Temperature -20 ~ 85°C, V_{CC} = 15 V, f=10 kHz)

Symbol	Parameter	Test Conditions	Value		Tempe-rature, °C	Unit
			Min	Max		
V_{THP}	Input threshold voltage (pin 3)	DCmax=0 V_{CC}=15 V	-	4.5	-20~+85	V
I_I	Input sink current (pin 3)	V_{CC}= 15 V $V_{(03)}$= 0.7 V	0.3	-		mA
V_{IO}	Input offset voltage	V_{CC}= 15 V $V_{O(03)}$= 2.5 V	-	10		mV
I_{IO}	Input offset current	V_{CC}= 15 V $V_{O(03)}$= 2.5 V	-	250		nA
I_{IB}	Input bias current	V_{CC}= 15 V $V_{O(03)}$= 2.5 V	-	1		µA
V_{ICRL}	Low Input common mode voltage range	V_{CC}= 7÷40 V	-0.3	-		V
V_{ICRH}	High Input common mode voltage range	V_{CC}= 7÷40 V	V_{CC} -2	-		V
A_{VOL}	Open loop voltage amplification	ΔV_0=3 V V_{CC}= 15 V V_O= 0.5÷ 3.5 V	70	-		dB
f_b	Unity-gain bandwidth	V_{CC}= 15 V	100	-		kHz
CMRR	Common mode rejection ratio	Vcc=40 V	65	-	25	dB
I_{OL}	Output sink current (pin 3)	V_{CC}= 15 V $V_{0(03)}$= 0.7 V	0.3	-	-20~+85	mA
I_{OH}	Output source current (pin 3)	V_{CC}= 15 V $V_{0(03)}$= 3.5 V	-2.0			mA
$I_{C(off)}$	Collector off-state current	V_{CE}= V_{CC}= 40 V	-	100		µA
$I_{E(off)}$	Emitter off-state current	V_{CC}= V_C= 40 V V_E= 0 V	-	-100		µA
$V_{SAT(C)}$	Collector - Emitter saturation voltage (Common-Emitter)	V_{CC}= 15 V V_E= 0 V $V_{0(03)}$= 3.0 V I_C= 200 mA	-	1.3		V
$V_{SAT(E)}$	Collector - Emitter saturation voltage (Emitter-follower)	V_{CC}=V_C= 15 V I_E= - 200 mA $V_{0(03)}$= 3.0 V	-	2.5	25	V
				2.9	-20~+85	
I_{OCH}	Output control input current	V_{CC}= 15 V $V_{0(03)}$= 0.7 V	-	3.5	25	mA
I_{CC15}	Standby Supply Current at V_{CC} 15V	V_{CC}= 15 V	-	10		mA
I_{CC40}	Standby Supply Current at V_{CC} 40V	V_{CC}= 40 V	-	15		mA
I_{CCA}	Average Supply Current	V_{CC}= 15 V $V_{0(03)}$= 0.7 V $V_{0(04)}$= 2.0 V	-	17	-20~+85	mA

* - Standard deviation is a measure of the statistical distribution about the mean as derived from the formula $\sigma = \sqrt{\frac{\sum_{n=1}^{N} (Xn - \overline{X})^2}{N-1}}$

N SUFFIX PLASTIC DIP
(MS - 001BB)



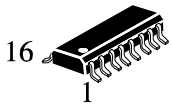


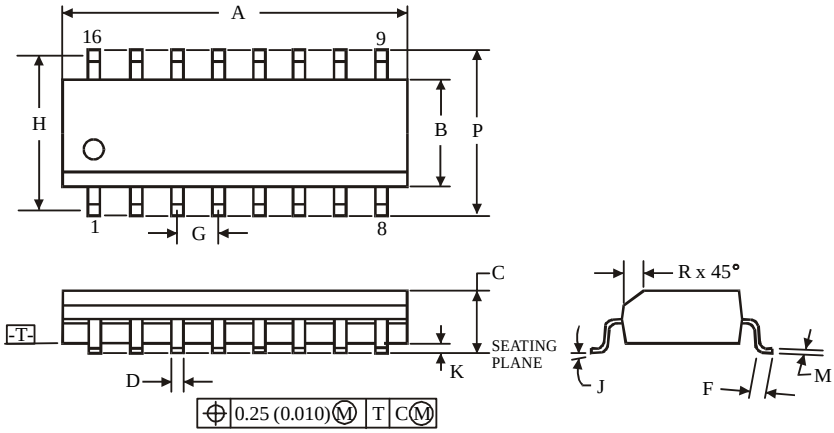
	Dimension, mm	
Symbol	**MIN**	**MAX**
A	18.67	19.69
B	6.1	7.11
C		5.33
D	0.36	0.56
F	1.14	1.78
G	2.54	
H	7.62	
J	0°	10°
K	2.92	3.81
L	7.62	8.26
M	0.2	0.36
N	0.38	

NOTES:

1. Dimensions “A”, “B” do not include mold flash or protrusions.
   Maximum mold flash or protrusions 0.25 mm (0.010) per side.

D SUFFIX SOIC
(MS - 012AC)





	Dimension, mm	
Symbol	**MIN**	**MAX**
A	9.8	10
B	3.8	4
C	1.35	1.75
D	0.33	0.51
F	0.4	1.27
G	1.27	
H	5.72	
J	0°	8°
K	0.1	0.25
M	0.19	0.25
P	5.8	6.2
R	0.25	0.5

NOTES:

1. Dimensions A and B do not include mold flash or protrusion.
2. Maximum mold flash or protrusion 0.15 mm (0.006) per side for A; for B – 0.25 mm (0.010) per side.