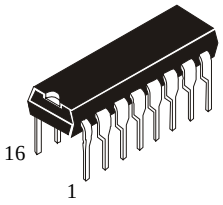
SWITCHMODE Pulse Width Modulation Control Circuit

The KA7500 is a fixed frequency, pulse width modulation control circuit designed primarily for SWITCHMODE 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



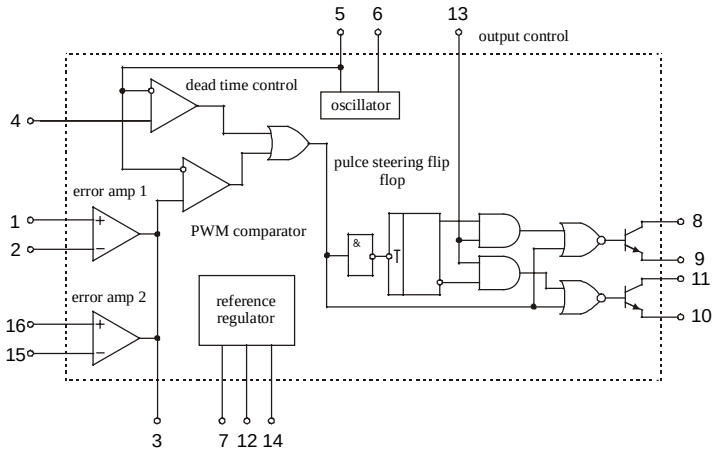
N SUFFIX
PLASTIC

ORDERING INFORMATION

KA 7500	Plastic
KA 7500	Chip

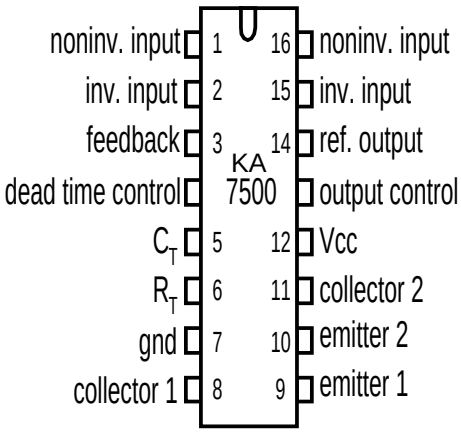
T_A = - 20° to +85°C

LOGIC DIAGRAM



Pin 7 = GND
Pin 12 = V_{cc}

PIN ASSIGNMENT



MAXIMUM AND RECOMMENDED OPERATING CONDITIONS

Symbol	Parameter	Recommended operating conditions		Maximum ratings		Unit
		Min	Max	Min	Max	
V_{CC}	Supply Voltage	7	40		41	V
V_I	Amplifier Input Voltage	-0.3	V_{CC}-2		V_{CC}+0.3	V
V_O	Collector Output Voltage		40		41	V
I_{OC}	Collector Output Current (Each Transistor)		200		250	mA
T	Storage Temperature Range			-65	150	°C
T	Operating Free-Air Temperature Range	-20	85			°C

ELECTRICAL CHARACTERISTICS (T_A= -20 …+85°C, f =10kHz)

Symbol	Parameter	Test Conditions	Value		Tempe-rature,° C	Unit
			Min	Max		
V_{ref}	Output voltage	I_0=1.0mA V_{CC}=15V	4.75	5.25	-20…+85	V
U_{regin}	Input regulation	V_{CC}=7… 40V I_0=1.0mA	-	25	25	mV
U_{regout}	Output regulation	I_0=1… 10 mA V_{CC} =15V	-	15	25	mV
ΔV_{ref}	Output voltage change with temperature	I_0=1mA V_{CC} =15V	-	1.0	-20…+85	%
I_{SC}	Short circuit output current	V_{ref}=0 tsc< 1s V_{CC}=15 V	-	50		mA
f_{osc}	Frequency	C=0.01μF, R=12kΩ V_{CC}=15V $V_{(03)}$=0.7V	6.0	14		kHz
σf_{osc}	Standard Deviation of Frequency *	V_{CC}=15V $V_{(03)}$=0.7V	-	15		%
$\sigma f_{osc(\Delta V)}$	Frequency Change with Voltage	V_{CC}=7…40 V $V_{(03)}$=0.7V	-	10	25	%
$\sigma f_{osc(\Delta T)}$	Frequency Change with Temperature	C=0.01μF, R_T=12kΩ V_{CC}=15V $V_{(03)}$=0.7V	-	2.0	-20…+85	%
$I_{IB(2T)}$	Input bias current (pin 4)	V_I=0…5.25V V_{CC}=15V $V_{(03)}$=0.7V	-	-10		μA
DCmax	Maximum duty cycle (each output)	$V_{I(04)}$=0V V_{CC}=15V $V_{(03)}$=0.7V	45	-		%
V_{THD1}	Input threshold voltage (pin 4) (Zero Duty Cycle)	DCmax=0 V_{CC}=15V $V_{(03)}$=0.7V	-	3,3		V

V_{THD2}	Input threshold voltage (pin 4) (Maximum Duty Cycle)	Dcmax V_{CC}=15V $V_{(03)}$=0.7V	0	-		V

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Symbol	Parameter	Test Conditions	Value		Tempe-rature,° C	Unit
			Min	Max		
t_{rc}	Output voltage rise time (Common-Emitter)	V_{CC}=15V $V_{(03)}$=2.0V	-	200	-20…+85	ns
t_{fc}	Output voltage fall time (Common-Emitter)	V_{CC}=15V $V_{(03)}$=2.0V	-	100		ns
t_{rf}	Output voltage rise time (Emitter-Follower)	V_{CC}=V_C=15V $V_{(03)}$=2.0V	-	200		ns
t_{ff}	Output voltage fall time (Emitter-Follower)	V_{CC}=V_C=15V $V_{(03)}$=2.0V	-	100	-20…+85	ns
V_{THP}	Input threshold voltage (pin 3)	DCmax=0 V_{CC}=15V	-	4.5		V
I_I	Input sink current (pin 3)	V_{CC}=15V $V_{(03)}$=0.7V	0.3	-		mA
V_{IO}	Input offset voltage	V_{CC}=15V $V_{O(03)}$=2.5V	-	10		mV
I_{IO}	Input offset current	V_{CC}=15V $V_{O(03)}$=2.5V	-	250		nA
I_{IB}	Input bias current	V_{CC}=15V $V_{O(03)}$=2.5V	-	1		μA
V_{ICRL}	Low Input common mode voltage range	V_{CC}=7…40V	-0.3	-		V
V_{ICRH}	High Input common mode voltage range	V_{CC}=7…40V	V_{CC} -2	-		V
A_{VOL}	Open loop voltage amplification	ΔV_0=3V V_{CC}=15V V_O=0.5…3.5V	70	-		dB
f_b	Unity-gain bandwidth	V_{CC}=15V	100	-		kHz
CMRR	Common mode rejection ratio	Vcc=40V	65	-	25	dB
I_{OL}	Output sink current (pin 3)	V_{CC}=15V $V_{0(03)}$=0.7V	0.3	-	-20…+85	mA
I_{OH}	Output source current (pin 3)	V_{CC}=15V $V_{0(03)}$=3.5V	-2.0			mA
$I_{C(off)}$	Collector off-state current	V_{CE}=V_{CC}=40V	-	100		μA

$I_{E(off)}$	Emitter off-state current	V_{CC}=V_C=40V V_E=0V	-	-100		μA
$V_{SAT(C)}$	Collector - Emitter saturation voltage (Common-Emitter)	V_{CC}=15V V_E=0V $V_{0(03)}$=3.0V I_C=200mA	-	1.3		V
$V_{SAT(E)}$	Collector - Emitter saturation voltage (Emitter-follower)	V_{CC}=V_C=15V I_E=-200mA $V_{0(03)}$=3.0V	-	2.5	25	V
				2.9	-20…+85	
I_{OCH}	Output control input current	V_{CC}=15V $V_{0(03)}$=0.7V	-	3.5	25	mA
I_{CC15}	Standby Supply Current at V_{CC} 15V	V_{CC}=15V	-	10		mA

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Symbol	Parameter	Test Conditions	Value		Tempe-rature,° C	Unit
			Min	Max		
I_{CC40}	Standby Supply Current at V_{CC} 40V	V_{CC}=40V	-	15	25	mA
I_{CCA}	Average Supply Current	V_{CC}=15V $V_{0(03)}$=0.7V $V_{0(04)}$=2.0V	-	17	-20…+85	mA

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

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