

KA3882/3/4/5

SMPS CONTROLLER

CURRENT MODE PWM CONTROLLER

The KA3882/3/4/5 are fixed PWM controller for Off-Line and DC to DC converter applications. The internal circuits include UVLO, low start up current circuit, temperature compensated reference, high gain error amplifier, current sensing comparator, and high current totempole output for driving a POWER MOSFET. Also KA 3882/3/4/5 provide low start up current below 0.3mA and short shutdown delay time typ. 100ns.

The KA3882 and KA3884 have UVLO threshold of 1.6V(on) and 10V(off).

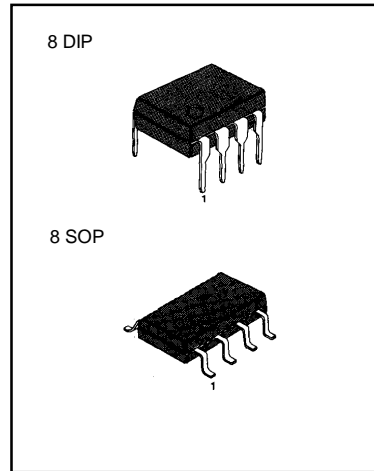
The KA3883 and KA3885 are 8.4V(on) and 7.6V(off).

The KA3882 and KA3883 can operate within 100% duty cycle.

The KA3884 and KA3885 within 50% by using T Flip-Flop.

FEATURES

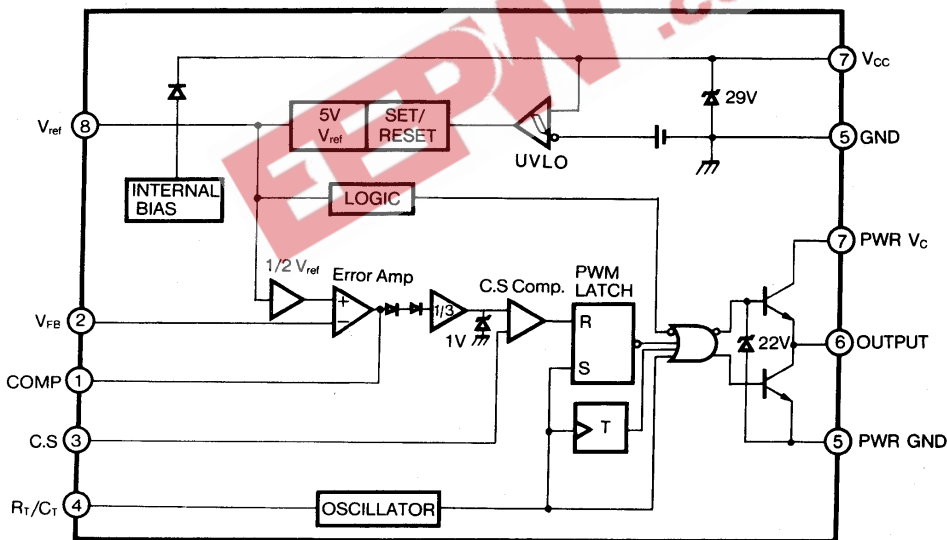
- Low Start Current 0.2mA (typ)
- Operating Range Up To 500KHz
- Cycle by Cycle Current Limiting
- Under Voltage Lock Out With Hysteresis
- Short Shutdown Delay Time: typ.100ns
- High Current Totempole Output
- Output Swing Limiting: 22V



ORDERING INFORMATION

Device	Package	Operating Temperature
KA388X	8 DIP	0 ~ +85°C
KA388XD	8 SOP	0 ~ +85°C

BLOCK DIAGRAM



ABSOLUTE MAXIMUM RATINGS

Characteristic	Symbol	Value	Unit
Supply Voltage	V_{CC}	30	V
Output Current	I_O	+ 1	A
Analog Inputs (pin 2, 3)	$V_{I(ANA)}$	- 0.3 to 6.3	V
Error Amp. Output Sink Current	$I_{SINK(EA)}$	10	mA
Power Dissipation	P_D	1	W

ELECTRICAL CHARACTERISTICS

($V_{CC} = 15V$, $R_T = 10K\Omega$, $C_T = 3.3nF$, $T_A = 0^\circ C$ to $+85^\circ C$, Unless otherwise specified)

Characteristic	Symbol	Test Conditions	Min	Typ	Max	Unit
REFERENCE SECTION						
Output Voltage	V_{REF}	$T_J = 25^\circ C$, $I_O = 1mA$	4.9	5.0	5.1	V
Line Regulation	ΔV_{REF}	$V_{CC} = 12V$ to $25V$	-	6	20	mV
Load Regulation	ΔV_{REF}	$I_O = 1mA$ to $20mA$	-	6	25	mV
Output Short Circuit	I_{SC}	$T_a = 25^\circ C$	-	- 100	- 180	mA
OSILLATOR SECTION						
Initial Accuracy	F_{OSC}	$T_J = 25^\circ C$	47	52	57	KHz
Voltage Stability	ST_V	$V_{CC} = 12V$ to $25V$	-	0.2	1	%
Amplitude	V_{OSC}	V_{PIN4} , Peak to Peak	-	1.7	-	V
Discharge Current	I_{DISCHG}	$T_J = 25^\circ C$, $PIN4 = 2V$	7.8	8.3	8.8	mA
CURRENT SENSE SECTION						
Gain	G_V	(NOTE 2, 3)	2.85	3	3.15	V/V
Maximum Input Signal	$V_{I(MAX)}$	$V_{PIN1} = 5V$ (NOTE 2)	0.9	1.0	1.1	V
PSRR	PSRR	$V_{CC} = 12V$ to $25V$ (NOTE 1, 2)	-	70	-	dB
Input Bias Current	I_{BIAS}	-	-	- 2	-10	uA
Delay to Output	T_D	$V_{PIN3} = 0V$ to $2V$ (NOTE1)	-	100	200	ns

ELECTRICAL CHARACTERISTICS(Continued)(V_{CC} = 15V, R_T = 10K Ω , C_T = 3.3nF, T_A = 0 $^{\circ}$ C to + 85 $^{\circ}$ C, Unless otherwise specified)

Characteristic	Symbol	Test Conditions	Min	Typ	Max	Unit
ERROR AMPLIFIER SECTION						
Input Voltage	V _I	T _{PIN1} = 2.5V	2.42	2.50	2.58	V
Input Bias Current	I _{BIAS}	-	-	-0.3	- 2	μ A
Open Loop Gain	G _{VO}	V _O = 2V to 4V (NOTE 1)	65	90	-	dB
Unity Gain Bandwidth	GBW	T _J = 25 $^{\circ}$ C (NOTE 1)	0.7	1	-	MHz
PSRR	PSRR	V _{CC} = 12V to 25V (NOTE 1)	60	70	-	dB
Output Sink Current	I _{SINK}	V _{PIN2} = 2.7V V _{PIN1} = 1.1V	2	6	-	mA
Output Source Current	I _{SOURCE}	V _{PIN2} = 2.3V V _{PIN1} = 5.0V	-0.5	-0.8	-	mA
Output High Voltage	V _{OH}	V _{PIN2} = 2.3V R1 = 15K Ω to GND	5	6	-	V
Output Low Voltage	V _{OL}	V _{PIN2} = 2.7V R1 = 15K Ω to Pin8	-	0.8	1.1	V
OUTPUT SECTION						
Output Low Level	V _{OL}	I _{SINK} = 20mA	-	0.1	0.4	V
		I _{SINK} = 200mA	-	1.5	2.2	V
Output High Level	V _{OH}	I _{SOURCE} = 20mA	13	13.5	-	V
		I _{SOURCE} = 200mA	12	13.5	-	V
Rise Time	t _R	T _J = 25 $^{\circ}$ C, C1 = 1nF (NOTE 1)	-	40	100	ns
Fall Time	t _F	T _J = 25 $^{\circ}$ C, C1 = 1nF (NOTE 1)	-	40	100	ns
Output Voltage Swing Limit	V _{OLIM}	V _{CC} = 27V, C1 = 1nF	-	22	-	V
UNDER VOLTAGE LOCKOUT SECTION						
Start Threshold	V _{TH}	KA3882/4	15	16	17	V
		KA3883/5	7.8	8.4	9.0	V
Min.Operating Voltage (After turn on)	V _{TL}	KA3882/4	9	10	11	V
		KA3883/5	7.0	7.6	8.2	V

ELECTRICAL CHARACTERISTICS(Continued)(V_{CC} = 15V, R_T = 10K Ω , C_T = 3.3nF, T_A = 0 $^{\circ}$ C to +85 $^{\circ}$ C, unless otherwise specified)

Characteristic	Symbol	Test Conditions	Min	Typ	Max	Unit
PWM SECTION						
Maximum Duty Cycle	D _{MAX}	KA3882/3	94	96	100	%
		KA3884/5	47	48	50	%
Minimum Duty Cycle	D _{MIN}	-	-	-	0	%
TOTAL STANDBY CURRENT						
Start-Up Current	I _{ST}	-	-	0.2	0.4	mA
Operating Supply Current	I _{CC}	V _{PIN2} = V _{PIN3} = 0V	-	11	17	mA
V _{CC} Zener Voltage	V _Z	I _{CC} = 25mA	-	29	-	V

* Adjust V_{CC} above the start threshold before setting at 15V

NOTE 1. These parameters, although guaranteed, are not 100% tested in production.

2. Parameter measured at trip point of latch with V₂ = 0V.3. Gain defined as: $G_V = \Delta V_{PIN1} / \Delta V_{PIN3}$ (V_{PIN3} = 0 to 0.8V)



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