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 ℃
KA388XD	8 SOP	0 ~ + 85 ℃



AIRCHIL

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BLOCK DIAGRAM

SMPS CONTROLLER

ABSOLUTE MAXIMUM RATINGS

Characteristic	Symbol	Value	Unit
Supply Voltage	V _{CC}	30	V
Output Current	lo	+ 1	А
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	PD	1	W

ELECTRICAL CHARACTERISTICS

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

Characteristic	Symbol	Test Conditions	Min	Тур	Max	Unit
REFERENCE SECTION	I					
Output Voltage	V _{REF}	T _J = 25 ℃ , 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}	$I_0 = 1mA \text{ to } 20mA$	-	6	25	mV
Output Short Circuit	I _{SC}	T _a = 25 ℃	-	- 100	- 180	mA
OSILLATOR SECTION						
Initial Accuracy	Fosc	T _J = 25 ℃	47	52	57	KHz
Voltage Stability	STv	V _{CC} = 12V to 25V	-	0.2	1	%
Amplitude	V _{OSC}	V _{PIN4} , Peak to Peak	-	1.7	-	V
Discharge Current	I _{DISCHG}	T」= 25℃, Pin4 = 2V	7.8	8.3	8.8	mA
CURRENT SENSE SECTION						
Gain	Gv	(NOTE 2, 3)	2.85	3	3.15	V/V
Maximum Input Signal	VI(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	TD	V _{PIN3} = 0V to 2V (NOTE1)	-	100	200	ns



SMPS CONTROLLER

ELECTRICAL CHARACTERISTICS(Continued)

(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	Тур	Max	Unit
ERROR AMPLIFIER SECTION	ł					
Input Voltage	VI	T _{PIN1} = 2.5V	2.42	2.50	2.58	V
Input Bias Current	I _{BIAS}	=	-	-0.3	- 2	uA
Open Loop Gain	G _{vo}	V _o = 2V to 4V (NOTE 1)	65	90	-	dB
Unity Gain Bandwidth	GBW	T _J = 25 ℃ (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 = 15KΩ to GND	5	6	-	V
Output Low Voltage	V _{OL}	V _{PIN2} = 2.7V R1 = 15KΩ to Pin8	-	0.8	1.1	V
OUTPUT SECTION	•			•	•	•
		I _{SINK} = 20mA	-	0.1	0.4	V
Output Low Level	V _{OL}	I _{SINK} = 200mA	-	1.5	2.2	V
	V _{OH}	I _{SOURCE} = 20mA	13	13.5	-	V
Output High Level	VOH	$I_{SOURCE} = 200 \text{mA}$	12	13.5	-	V
Rise Time	t _R	T _J = 25℃, C1 = 1nF (NOTE 1)	-	40	100	ns
Fall Time	t _F	T _J = 25℃, C1 = 1nF (NOTE 1)	-	40	100	ns
Output Voltage Swing Limit	V _{OLIM}	$V_{CC} = 27V, C1 = 1nF$	-	22	-	V
UNDER VOLTAGE LOCKOUT SE	CTION					
Start Threshold	V _{TH}	KA3882/4	15	16	17	V
	V TH	KA3883/5	7.8	7.8 8.4 9.0		V
Min.Operating Voltage	VTI	KA3882/4	9	10	11	V
(After turn on)	*1	KA3883/5	7.0	7.6	8.2	V



SMPS CONTROLLER

ELECTRICAL CHARACTERISTICS(Continued)

 $(V_{CC}$ = 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	Тур	Max	Unit
PWM SECTION						
		KA3882/3	94	96	100	%
Maximum Duty Cycle	D _{MAX}	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	Icc	$V_{PIN2} = V_{PIN3} = 0V$	-	11	17	mA
V _{cc} Zener Voltage	Vz	I _{CC} = 25mA	-	29	-	V

 \ast Adjust V_{CC} above the start threshold bifore 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: $G_V = \Delta V_{PIN1} \Delta V_{PIN3}(V_{PIN3} = 0 \text{ to } 0.8V)$



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