

KA3842AC/KA3842AE SMPS Controller

Features

- Low start current 0.2mA (Typ.)
- Operating range up to 500kHz
- Cycle by cycle current limiting
- Under Voltage Lock Out (UVLO) with hysteresis
- Short shutdown delay time: Typ.100ns
- High current totem-pole output
- Output swing limiting: 22V

Description

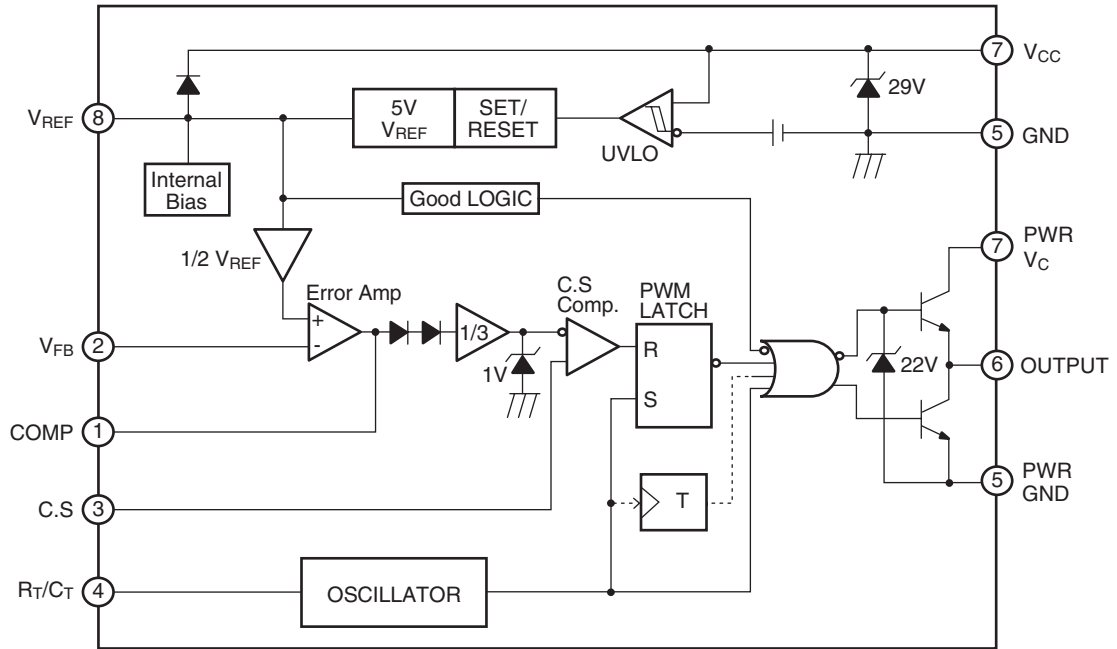
The KA3842AC/KA3842AE are fixed PWM controllers for Off Line and DC to DC converter applications. The internal circuits include UVLO, low start up current, temperature compensated reference, high gain error amplifier, current sensing comparator, and high current totem pole output for driving a POWER MOSFET. Also KA3842AC/KA3842AE provides low start up current below 0.3mA and short shutdown delay time, typically 100ns. The KA3842AC/KA3842AE has a UVLO threshold of 16V(on) and 10V(off). The KA3842AC/KA3842AE can operate within a 100% duty cycle.



Ordering Information

Part Number	Operating Temp. Range	Pb-Free	Package	Packing Method
KA3842AC	-0 to +70°C	Yes	8-DIP	Tube
KA3842AE				

Internal Block Diagram



Absolute Maximum Ratings

The “Absolute Maximum Ratings” are those values beyond which the safety of the device cannot be guaranteed. The device should not be operated at these limits. The parametric values defined in the Electrical Characteristics tables are not guaranteed at the absolute maximum ratings. The “Recommended Operating Conditions” table will define the conditions for actual device operation.

Symbol	Parameter	Value	Unit
V_{CC}	Supply Voltage	30	V
I_O	Output Current	± 1	A
$V_{I(ANA)}$	Analog Inputs (Pins 2, 3)	-0.3 to 6.3	V
$I_{SINK(EA)}$	Error Amp. Output Sink Current	10	mA
P_D	Power Dissipation	1	W
$R\theta_{ja}$	Thermal Resistance, Junction-to-Air ⁽⁴⁾	95	$^{\circ}C/W$

Electrical Characteristics

($V_{CC} = 15V$, $R_T = 10k\Omega$, $C_T = 3.3nF$, $T_A = 0^{\circ}C$ to $+70^{\circ}C$, unless otherwise specified)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
REFERENCE SECTION						
V_{REF}	Output Voltage	$T_J = 25^{\circ}C$, $I_O = 1mA$	4.9	5.0	5.1	V
ΔV_{REF}	Line Regulation	$V_{CC} = 12V$ to $25V$	–	6	20	mV
	Load Regulation	$I_O = 1mA$ to $20mA$	–	6	25	mV
I_{SC}	Output Short Circuit	$T_A = 25^{\circ}C$	–	-100	-180	mA
OSILLATOR SECTION						
F_{OSC}	Initial Accuracy	$T_J = 25^{\circ}C$	47	52	57	kHz
ST_V	Voltage Stability	$V_{CC} = 12V$ to $25V$	–	0.2	1	%
V_{OSC}	Amplitude	V_{PIN4} , Peak to Peak	–	1.7	–	V
I_{DISCHG}	Discharge Current	$T_J = 25^{\circ}C$, Pin 4 = 2V	7.8	8.3	8.8	mA
CURRENT SENSE SECTION						
G_V	Gain ⁽²⁾⁽³⁾		2.85	3	3.15	V/V
$V_{I(MAX)}$	Maximum Input Signal ⁽²⁾	$V_{PIN1} = 5V$	0.9	1.0	1.1	V
PSRR	PSRR ⁽¹⁾⁽²⁾	$V_{CC} = 12V$ to $25V$	–	70	–	dB
I_{BIAS}	Input Bias Current		–	-2	-10	μA
T_D	Delay to Output ⁽¹⁾	$V_{PIN3} = 0V$ to $2V$	–	100	200	ns
ERROR AMPLIFIER SECTION						
V_I	Input Voltage	$T_{PIN1} = 2.5V$	2.42	2.50	2.58	V
I_{BIAS}	Input Bias Current		–	-0.3	-2	μA
G_{VO}	Open Loop Gain ⁽¹⁾	$V_O = 2V$ to $4V$	65	90	–	dB
GBW	Unity Gain Bandwidth ⁽¹⁾	$T_J = 25^{\circ}C$	0.7	1	–	MHz
PSRR	PSRR ⁽¹⁾	$V_{CC} = 12V$ to $25V$	60	70	–	dB
I_{SINK}	Output Sink Current	$V_{PIN2} = 2.7V$ $V_{PIN1} = 1.1V$	2	6	–	mA
I_{SOURCE}	Output Source Current	$V_{PIN2} = 2.3V$ $V_{PIN1} = 5.0V$	-0.5	-0.8	–	mA
V_{OH}	Output High Voltage	$V_{PIN2} = 2.3V$, $R1 = 15k\Omega$ to GND	5	6	–	V
V_{OL}	Output Low Voltage	$V_{PIN2} = 2.7V$ $R1 = 15k\Omega$ to Pin 8	–	0.8	1.1	V

Electrical Characteristics (Continued)(V_{CC} = 15V, R_T = 10k^{3/4}, C_T = 3.3nF, T_A = 0°C to +70°C, unless otherwise specified)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
OUTPUT SECTION						
V _{OL}	Output Low Level	I _{SINK} = 20mA	–	0.1	0.4	V
		I _{SINK} = 200mA	–	1.5	2.2	V
V _{OH}	Output High Level	I _{SOURCE} = 20mA	13	13.5	–	V
		I _{SOURCE} = 200mA	12	13.5	–	V
t _R	Rise Time ⁽¹⁾	T _J = 25°C, C ₁ = 1nF	–	40	100	ns
t _F	Fall Time ⁽¹⁾	T _J = 25°C, C ₁ = 1nF	–	40	100	ns
V _{OLIM}	Output Voltage Swing Limit	V _{CC} = 27V, C ₁ = 1nF	–	22	–	V
UNDER VOLTAGE LOCKOUT SECTION						
V _{TH}	Start Threshold		15	16	17	V
V _{TL}	Min. Operating Voltage (After turn on)		9	10	11	V
PWM SECTION						
D _{MAX}	Maximum Duty Cycle		94	96	100	%
D _{MIN}	Minimum Duty Cycle		–	–	0	%
TOTAL STANDBY CURRENT						
I _{ST}	Start-Up Current		–	0.2	0.4	mA
I _{CC}	Operating Supply Current	V _{PIN2} = V _{PIN3} = 0V	–	11	17	mA
V _Z	V _{CC} Zener Voltage	I _{CC} = 25mA	–	29	–	V

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

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)
4. Junction-to-air thermal resistance test environments

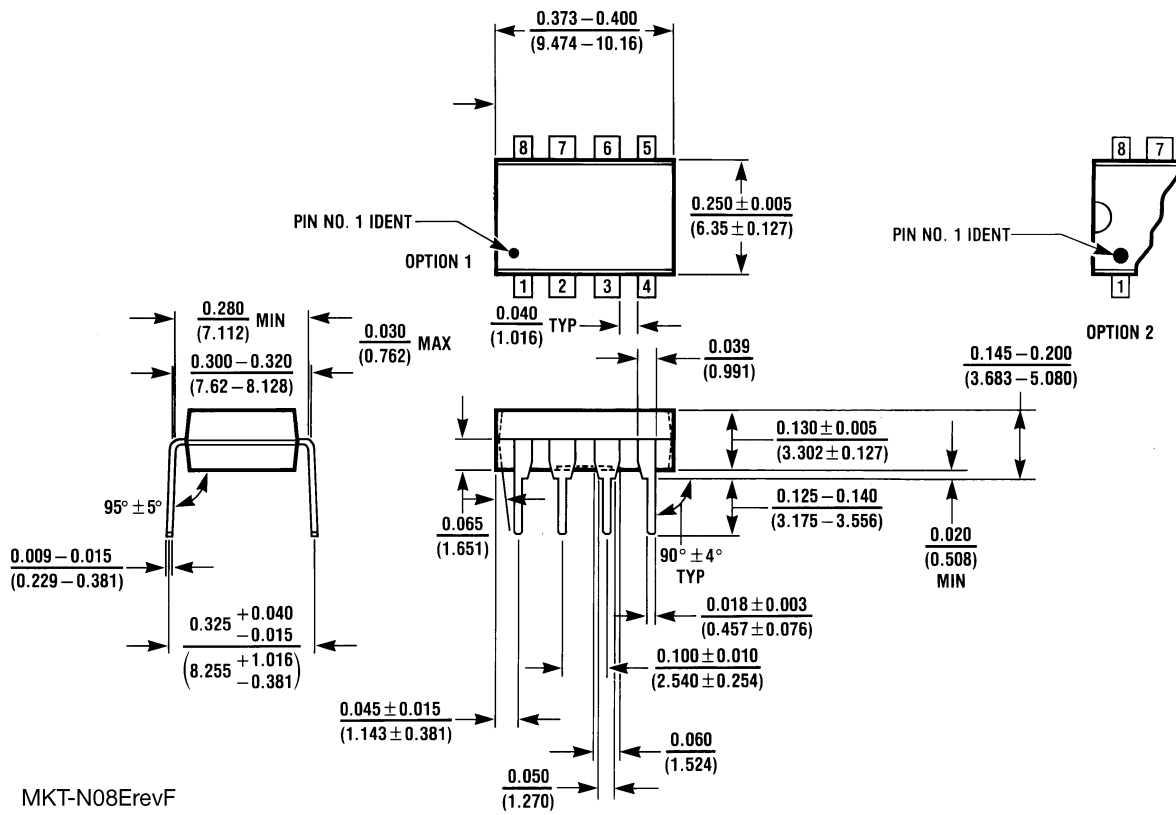
PCB information:

Board thickness; 1.6mm, Board dimension: 76.2 X 114.3mm², Ref.: EIA/JSED51-3 and EIA/JSED51-7
 Board structure; Using the single layer PCB.

Package Dimensions

8-Pin DIP

Dimensions in millimeters



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