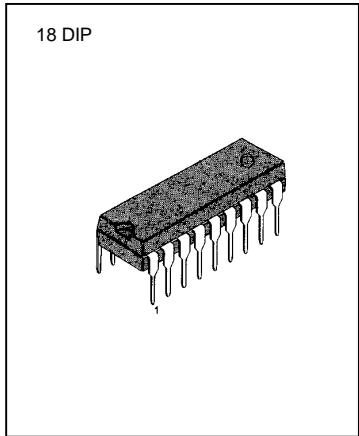


# KA3526B

# SMPS CONTROLLER

## VOLTAGE - MODE PWM CONTROLLER

The KA3526B is an excellent PWM controller for SMPS and other power control applications. Functions included in an 18 dual-in-line package are a temperature stable voltage reference, pulse width modulator, error amplifier, sawtooth oscillator and two low impedance power drivers. Protective features are included such as under voltage lockout, soft start, digital current limiting, adjustable deadtime and double pulse inhibit.



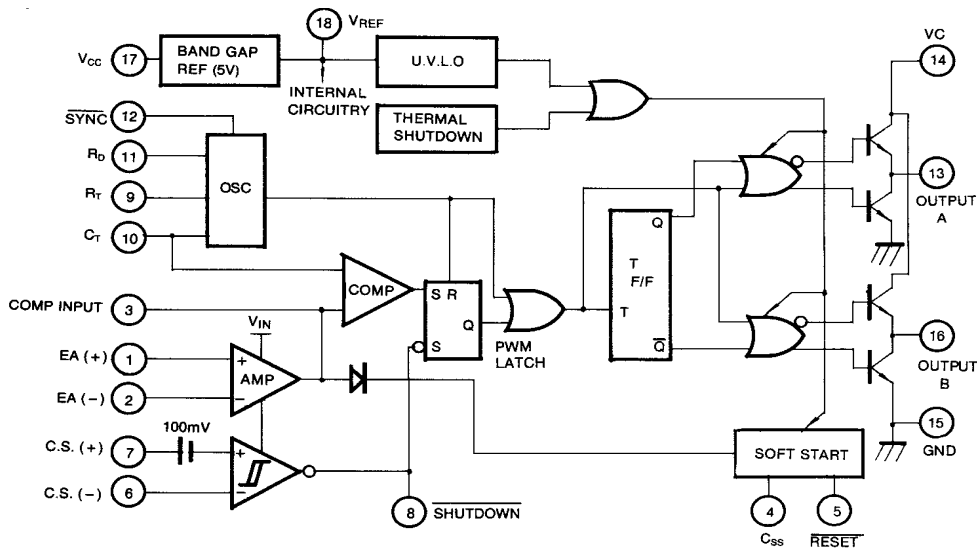
## FEATURES

- 8 to 35V Operation
- 5V Bandgap Reference Trimmed to  $\pm 1\%$
- Dual 100mA Source/Sink Outputs
- Programmable Dead Time
- Under-Voltage Lockout
- Single Pulse Metering
- Programmable Soft-Start
- Wide Current Limit Common Mode Range
- TTL/CMOS Compatible Logic Parts
- Symmetry Correction Capability
- Digital Current Limiting

## ORDERING INFORMATION

Device	Package	Operating Temperature
KA3526B	18 DIP	0 ~ +70 °C

## BLOCK DIAGRAM



**ABSOLUTE MAXIMUM RATINGS**

Characteristic	Symbol	Value	Unit
Supply voltage	$V_{CC}$	40	V
Collector Supply Voltage	$V_C$	40	V
Output Current, Sink or Source	$I_o$	200	mA
Reference Output Current	$I_{REF}$	50	mA
Power Dissipation ( $T_A = 25^\circ\text{C}$ )	$P_D$	1000	mW
Operating Temperature	$T_{OPR}$	0 ~ +70	$^\circ\text{C}$
Storage Temperature	$T_{STG}$	- 65 ~ +150	$^\circ\text{C}$
Lead Temperature (Soldering, 10sec)	$T_{LEAD}$	+300	$^\circ\text{C}$

**ELECTRICAL CHARACTERISTICS**

( $V_{CC} = 15\text{V}$ ,  $T_A = 0^\circ\text{C}$  to  $+70^\circ\text{C}$ , unless otherwise specified)

Characteristic	Symbol	Test Conditions	Min	Typ	Max	Unit
<b>REFERENCE SECTION</b>						
Reference Output Voltage	$V_{REF}$	$T_J = 25^\circ\text{C}$	4.9	5.0	5.1	V
Line Regulation	$\Delta V_{REF}$	$V_{CC} = 7$ to $35\text{V}$		2.0	15	mV
Load Regulation	$\Delta V_{REF}$	$I_{REF} = 0$ to $20\text{mA}$		5.0	20	mV
Temperature Stability (Note)	$ST_T$	$T_J = 0$ to $+70^\circ\text{C}$		15	50	mV
Output Voltage Range (Note)	$\Delta V_{REF}$		4.85	5.0	5.15	V
Short-Circuit Output Current	$I_{SC}$	$V_{REF} = 0\text{V}$	25	50	100	mA
<b>UNDER-VOLTAGE LOCKOUT SECTION</b>						
RESET Output Voltage	$V_{O(RESET)}$	$V_{REF} = 3.8\text{V}$		0.2	0.4	V
RESET Output Voltage	$V_{O(RESET)}$	$V_{REF} = 4.7\text{V}$	2.4	4.8		V
<b>OSCILLATOR SECTION (<math>f = 40\text{KHz}</math>; <math>R_T = 4.12\text{K}\Omega \pm 1\%</math>, <math>C_T = 0.01\mu\text{F} \pm 1\%</math>, <math>R_D = 0\Omega</math>)</b>						
Initial Accuracy	ACCUR	$T_J = 25^\circ\text{C}$		$\pm 3$	$\pm 8$	%
Frequency Change with Voltage	$\Delta f/\Delta V_{CC}$	$V_{CC} = 7$ to $35\text{V}$		0.5	1.0	%
Frequency Change with Temperature(Note)	$\Delta f/\Delta T$	$T_J = 0$ to $70^\circ\text{C}$		1.0	3.0	%
Minimum Frequency	$f_{(MIN)}$	$R_T = 150\text{K}\Omega$ , $C_T = 20\mu\text{F}$			1.0	Hz
Maximum Frequency	$f_{(MAX)}$	$R_T = 2\text{K}\Omega$ , $C_T = 470\text{pF}$	550	650		KHz
Sawtooth Peak Volotage	$V_{PK(SAW)}$	$V_{CC} = 35\text{V}$		3.0	3.5	V
Sawtooth Valley Voltage	$V_{VL(SAW)}$	$V_{IN} = 7\text{V}$	0.5	1.0		V
SYNC Pulse Width	$t_{W(SYNC)}$	$R_L = 2.7\Omega$ to $V_{REF}$ , $T_J = 25^\circ\text{C}$		1.1		$\mu\text{S}$

**ELECTRICAL CHARACTERISTICS** ( $V_{CC} = 15V$ ,  $T_A = 0^\circ C$  to  $+70^\circ C$ , unless otherwise specified)

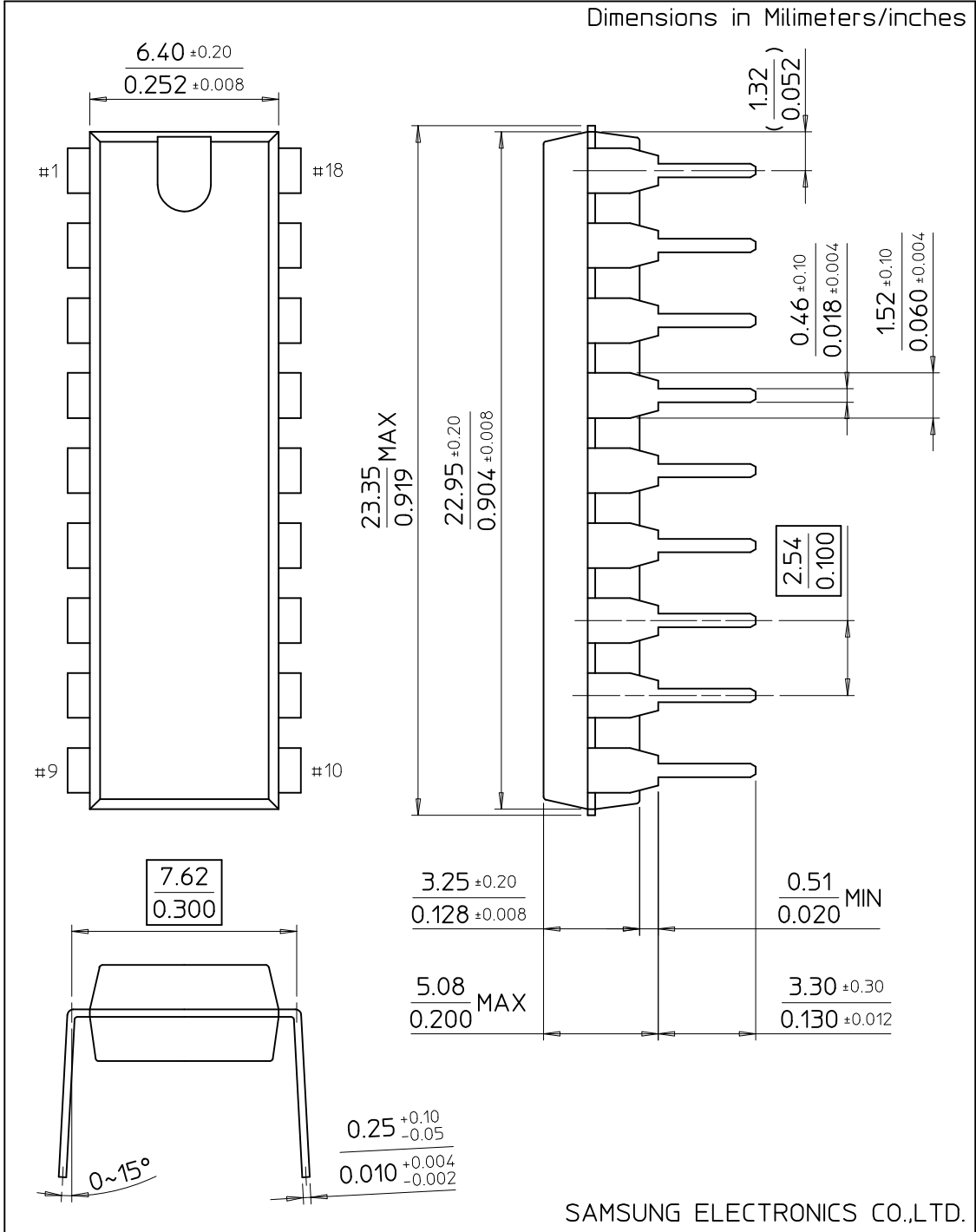
Characteristic	Symbol	Test Conditions	Min	Typ	Max	Unit
<b>ERROR AMPLIFIER SECTION (<math>V_{CM} = 0</math> to <math>5.2V</math>)</b>						
Input Offset Voltage	$V_{IO}$	$R_S \leq 2K\Omega$		0.8	10	mV
Input Bias Current	$I_{BIAS}$			- 90	- 2000	nA
Input Offset Current	$I_{IO}$			5	200	nA
Open Loop Voltage Gain	$G_{VO}$	$R_1 \geq 10M\Omega$ , $T_J = 25^\circ C$	60	72		dB
High Output Voltage	$V_{OH}$	$V_1 - V_2 \geq 0.15V$ $I_{SOURCE} = 100\mu A$	3.6	4.2		V
Low Output Voltage	$V_{OL}$	$V_2 - V_1 \geq 0.15V$ $I_{SOURCE} = 100\mu A$		0.2	0.4	V
Common Mode Rejection Ratio	CMRR	$R_2 \leq 2K\Omega$	70	94		dB
Power Supply Rejection Ratio	PSRR	$V_{CC} = 12$ to $18V$	66	80		dB
<b>PWM COMPARATOR SECTION (<math>f = 40KHz</math>; <math>R_T = 4.12K\Omega \pm 1\%</math>, <math>C_T = 0.01\mu F \pm 1\%</math>, <math>R_D = 0\Omega</math>)</b>						
Minimum Duty Cycle	$D_{(MIN)}$	$V_3 = 0.4V$			0	%
Maximum Duty Cycle	$D_{(MAX)}$	$V_3 = 3.6V$	45	49		%
<b>DIGITAL PORTS (SYNC, SHUTDOWN and RESET)</b>						
High Output Voltage	$V_{OH}$	$I_{SOURCE} = 40\mu A$	2.4	4.0		V
Low Output Voltage	$V_{OL}$	$I_{SINK} = 3.6mA$		0.2	0.4	V
High Input Current	$I_{IH}$	$V_{IH} = 2.4V$		-125	- 200	$\mu A$
Low Input Current	$I_{IL}$	$V_{IL} = 0.4V$		- 225	- 360	$\mu A$
Shutdown Delay	$t_{D(SD)}$	From Pin 8, $T_J = 25^\circ C$		160		ns
<b>CURRENT LIMIT COMPARATOR SECTION (<math>V_{CM} = 0</math> to <math>12V</math>)</b>						
Sense Voltage	$V_{SENSE}$	$R_S \leq 50\Omega$ , $T_J = 25^\circ C$	80	100	120	mV
Input Bias Current	$I_{BIAS}$			- 3.0	- 10	$\mu A$
<b>SOFT-START SECTION</b>						
Error Clamp Voltage	$V_{EC}$	$V_5 = 0.4V$		0.1	0.4	V
$C_S$ Charging Current	$I_{CHG(CS)}$	$V_5 = 2.4V$	50	100	150	$\mu A$
<b>OUTPUT DRIVERS (Each Output) (<math>V_C = 15V</math>)</b>						
High Output Voltage 1	$V_{OH1}$	$I_{SOURCE} = 20mA$	12.5	13.5		V
High Output Voltage 2	$V_{OH2}$	$I_{SOURCE} = 100mA$	12	13		V
Low Output Voltage 1	$V_{OL1}$	$I_{SINK} = 20mA$		0.2	0.3	V
Low Output Voltage 2	$V_{OL2}$	$I_{SINK} = 100mA$		1.2	2.0	V
Collector Leakage Current	$I_{LKG}$	$V_C = 40V$		50	150	$\mu A$
Rise Time	$t_R$	$C_L = 1nF$		0.3	0.6	$\mu S$
Fall Time	$t_F$	$C_L = 1nF$		0.1	0.2	$\mu S$
Cross Conduction Charge	$C_C$	Per Cycle, $T_J = 25^\circ C$		8		nC
<b>POWER CONSUMPTION SECTION (<math>V_{CC} = 35V</math>, <math>R_T = 4.12K\Omega</math>)</b>						
Supply Current	$I_{CC}$	$V_8 = 0.4V$		14	25	mA

## NOTE

- These parameters although guaranteed over the recommended operating conditions are not 100% tested in production.

# 18-DIP-300A

Dimensions in Millimeters/inches



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