

KA3525A

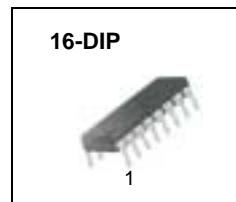
SMPS Controller

Features

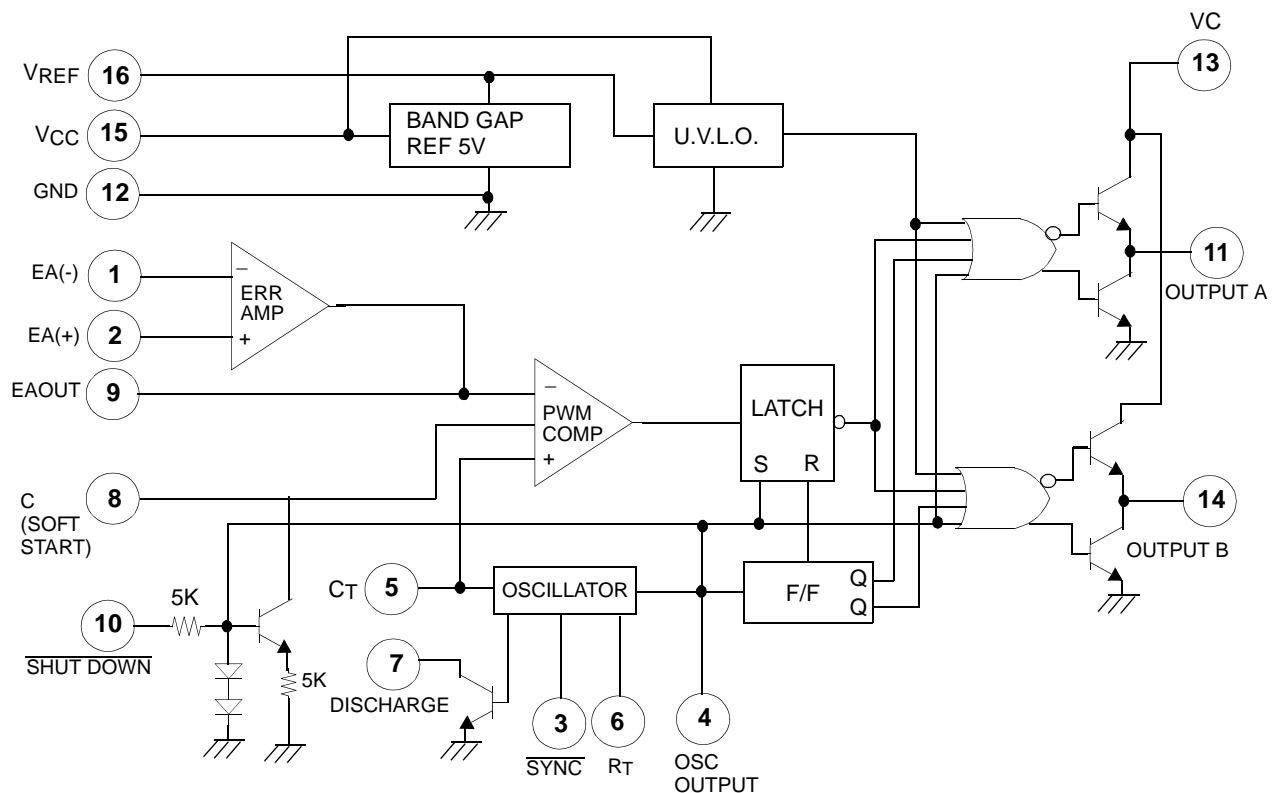
- 5V $\pm 1\%$ Reference
- Oscillator Sync Terminal
- Internal Soft Start
- Deadtime Control
- Under Voltage Lockout

Description

The KA3525A is a monolithic integrated circuit that includes all of the control circuits necessary for a pulse width modulating regulator. There are a voltage reference, an error amplifier, a pulse width modulator, an oscillator, an under voltage lockout, a soft start circuit, and the output driver in the chip.



Internal Block Diagram



Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Supply Voltage	V _{CC}	40	V
Collector Supply Voltage	V _C	40	V
Output Current, Sink or Source	I _O	500	mA
Reference Output Current	I _{REF}	50	mA
Oscillator Charging Current	I _{CHG(OSC)}	5	mA
Power Dissipation (T _A = 25°C)	P _D	1000	m/W
Operating Temperature	T _{OPR}	0 ~ +70	°C
Storage Temperature	T _{STG}	-65 ~ +150	°C
Lead Temperature (Soldering, 10sec)	T _{LEAD}	+300	°C

Electrical Characteristics

(V_{CC} = 20V, T_A = 0 to +70°C, unless otherwise specified)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
REFERENCE SECTION						
Reference Output Voltage	V _{REF}	T _J = 25°C	5.0	5.1	5.2	V
Line Regulation	ΔV _{REF}	V _{CC} = 8 to 35V	-	9	20	mV
Load Regulation	ΔV _{REF}	I _{REF} = 0 to 20mA	-	20	50	mV
Short Circuit Output Current	I _{SC}	V _{REF} = 0, T _J = 25°C	-	80	100	mA
Total Output Variation (Note1)	ΔV _{REF}	Line, Load and Temperature	4.95	-	5.25	V
Temperature Stability (Note1)	ST _T	-	-	20	50	mV
Long Term Stability (Note1)	ST	T _J = 125°C, 1KHRs	-	20	50	mV
OSCILLATOR SECTION						
Initial Accuracy (Note1, 2)	ACCUR	T _J = 25°C	-	±3	±6	%
Frequency Change With Voltage	Δf/ΔV _{CC}	V _{CC} = 8 to 35V (Note1, 2)	-	±0.8	±2	%
Maximum Frequency	f _(MAX)	R _T = 2kΩ, C _T = 470pF	400	430	-	kHz
Minimum Frequency	f _(MIN)	R _T = 200kΩ, C _T = 0.1uF	-	60	120	Hz
Clock Amplitude (Note1, 2)	V _(CLK)	-	3	4	-	V
Clock Width (Note1, 2)	t _{W(CLK)}	T _J = 25°C	0.3	0.6	1	μs
Sync Threshold	V _{TH(SYNC)}	-	1.2	2	2.8	V
Sync Input Current	I _{I(SYNC)}	Sync = 3.5V	-	1.3	2.5	mA

Electrical Characteristics (Continued)

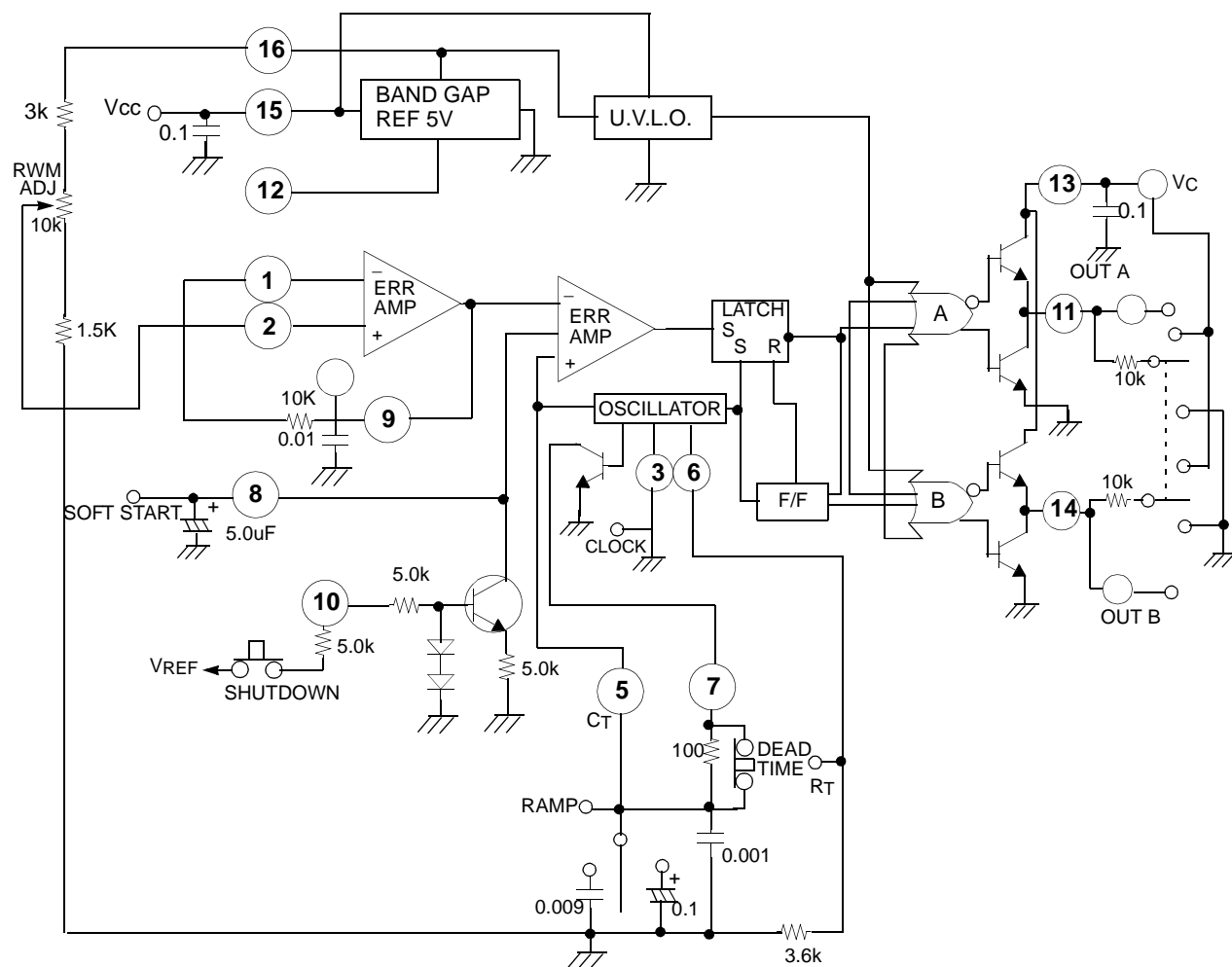
(VCC = 20V, TA = 0 to +70°C, unless otherwise specified)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
ERROR AMPLIFIER SECTION (V_{CM} = 5.1V)						
Input Offset Voltage	V _{IO}	-	-	1.5	10	mV
Input Bias Current	I _{BIAS}	-	-	1	10	μA
Input Offset Current	I _{IO}	-	-	0.1	1	μA
Open Loop Voltage Gain	G _{VO}	R _L ≥ 10MΩ	60	80	-	dB
Common Mode Rejection Ratio	CMRR	V _{CM} = 1.5 to 5.2V	60	90	-	dB
Power Supply Rejection Ratio	PSRR	V _{CC} = 8 to 3.5V	50	60	-	dB
PWM COMPARATOR SECTION						
Minimum Duty Cycle	D(MIN)	-	-	-	0	%
Maximum Duty Cycle	D(MAX)	-	45	49	-	%
Input Threshold Voltage (Note2)	V _{TH1}	Zero Duty Cycle	0.7	0.9	-	V
Input Threshold Voltage (Note2)	V _{TH2}	Max Duty Cycle	-	3.2	3.6	V
SOFT-START SECTION						
Soft Start Current	I _{SOFT}	V _{SD} = 0V, V _{SS} = 0V	25	51	80	μA
Soft Start Low Level Voltage	V _{SL}	V _{SD} = 25V	-	0.3	0.7	V
Shutdown Threshold Voltage	V _{TH(SD)}	-	0.9	1.3	1.7	V
Shutdown Input Current	I _{N(SD)}	V _{SD} = 2.5V	-	0.3	1	mA
OUTPUT SECTION						
Low Output Voltage I	V _{OL I}	I _{SINK} = 20mA	-	0.1	0.4	V
Low Output Voltage II	V _{OL II}	I _{SINK} = 100mA	-	0.05	2	V
High Output Voltage I	V _{CH I}	I _{SOURCE} = 20mA	18	19	-	V
High Output Voltage II	V _{CH II}	I _{SOURCE} = 100mA	17	18	-	V
Under Voltage Lockout	V _{UV}	V ₈ and V ₉ = High	6	7	8	V
Collector Leakage Current	I _{LKG}	V _{CC} = 35V	-	80	200	μA
Rise Time (Note1)	t _R	C _L = 1μF, T _J = 25°C	-	80	600	ns
Fall Time (Note1)	t _F	C _L = 1μF, T _J = 25°C	-	70	300	ns
STANDBY CURRENT						
Supply Current	I _{CC}	V _{CC} = 35V	-	12	20	mA

Note :

1. These parameters, although guaranteed over the recommended operating conditions, are not 100% tested in production
2. Tested at f_{OSC}=40kHz (R_T =3.6K, C_T =0.01μF, R_I = 0Ω)

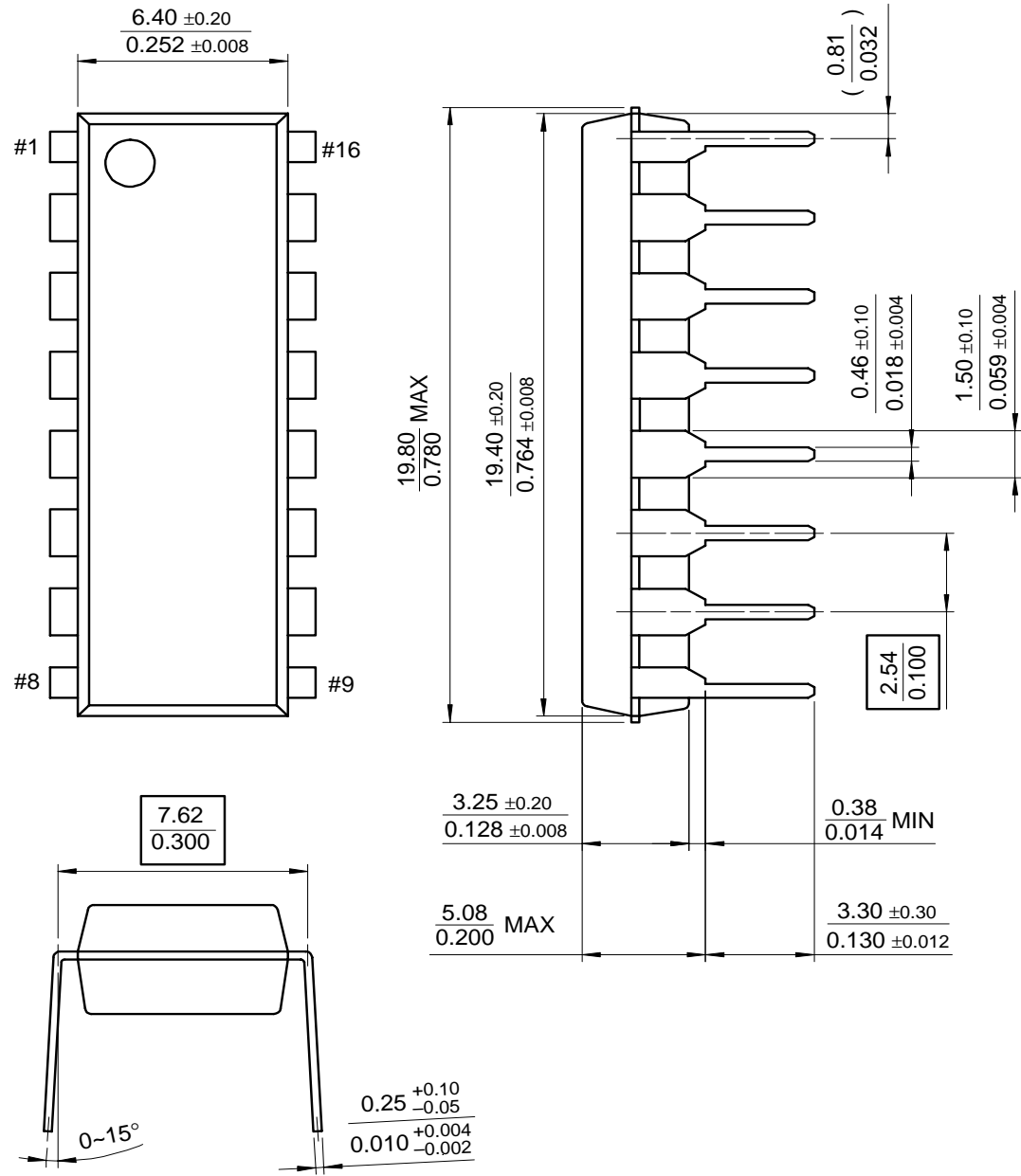
Test Circuit



Mechanical Dimensions

Package

16-DIP



Ordering Information

Product Number	Package	Operating Temperature
KA3525A	16-DIP	0 ~ +70°C

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