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KA3525A

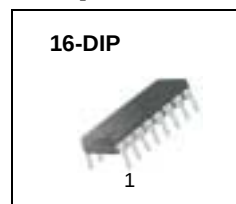
SMPS Controller

Features

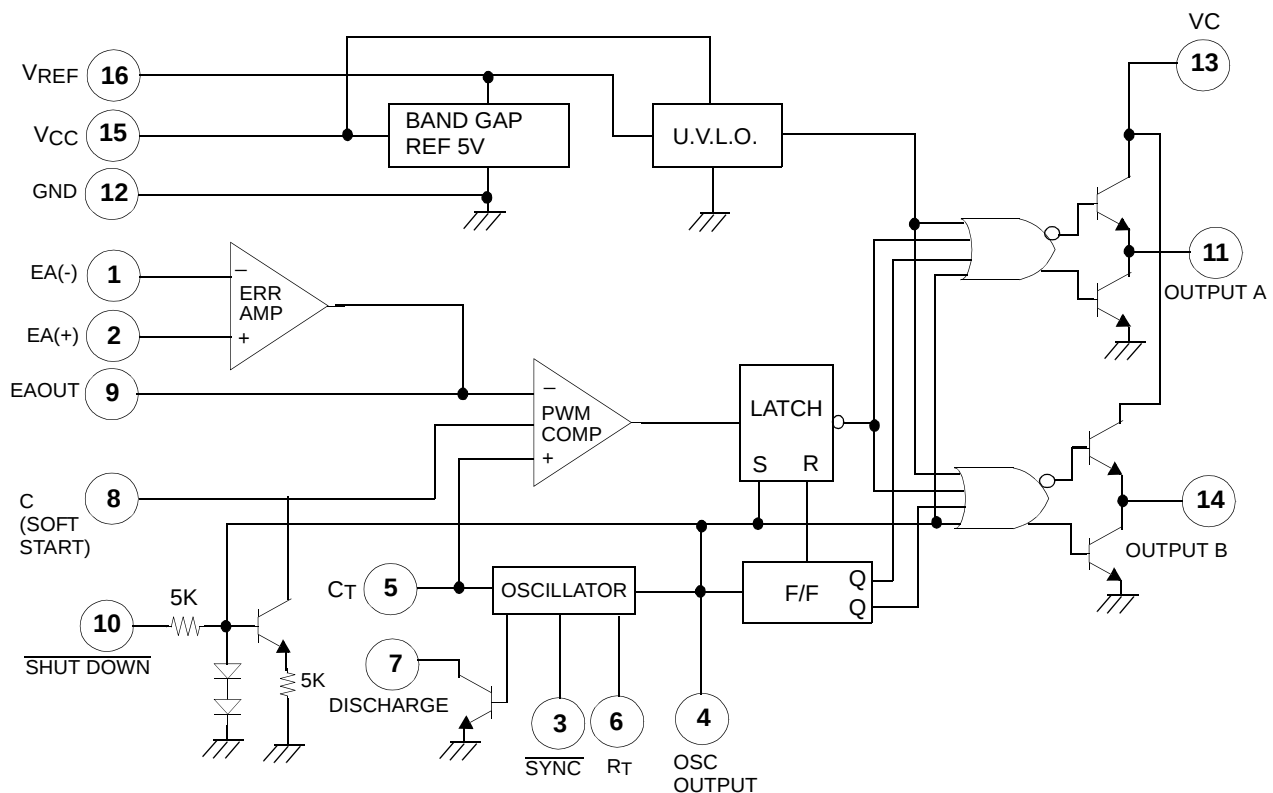
- 5V $\pm 1\%$ Reference
- Oscillator Sync Terminal
- Internal Soft Start
- Deadtime Control
- Under Voltage Lockout

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	mW
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 = 0.1μF	-	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)

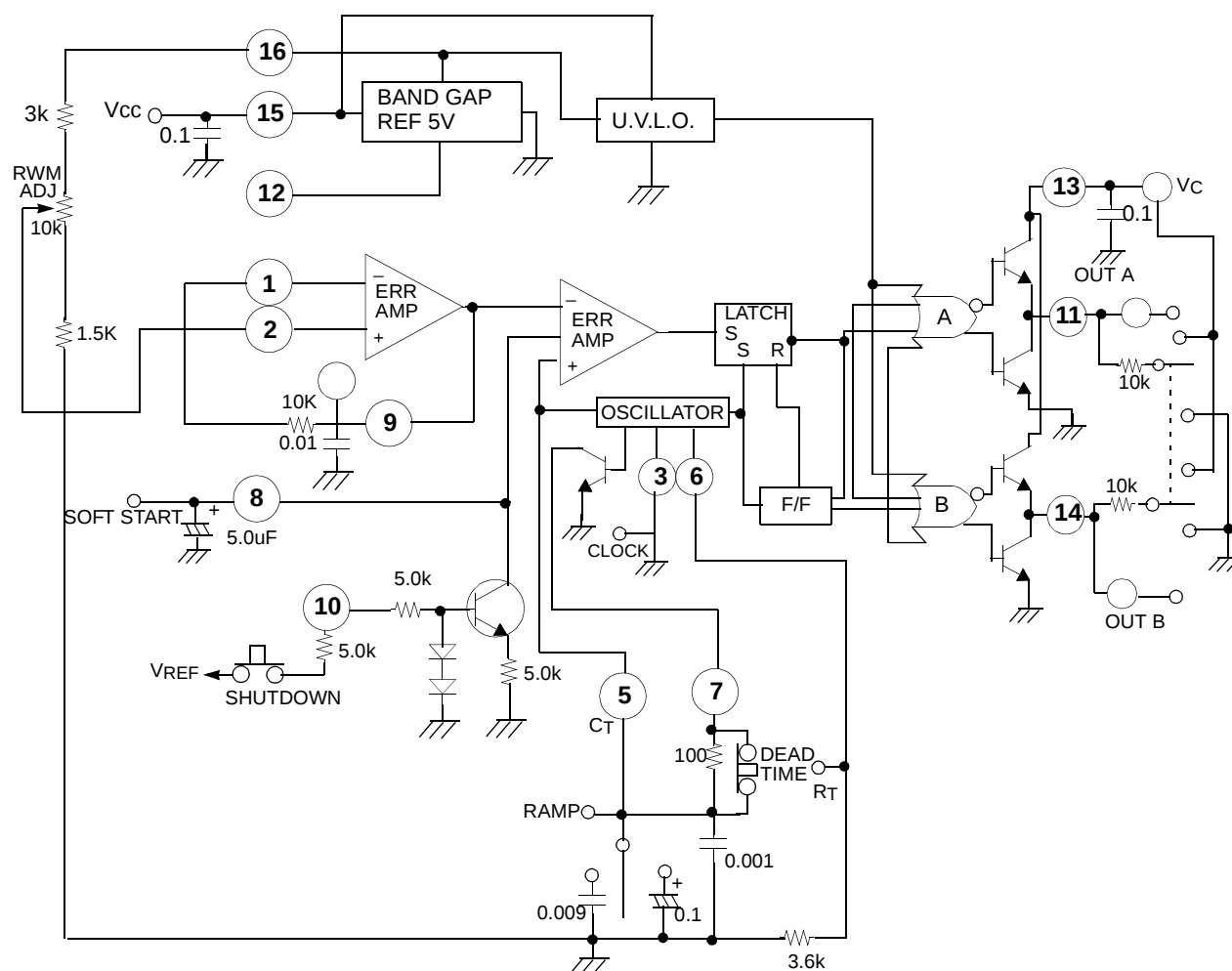
(VCC = 20V, TA = 0 to +70°C, unless otherwise specified)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
ERROR AMPLIFIER SECTION (VCM = 5.1V)						
Input Offset Voltage	VIO	-	-	1.5	10	mV
Input Bias Current	IBIAS	-	-	1	10	μA
Input Offset Current	IIO	-	-	0.1	1	μA
Open Loop Voltage Gain	GVO	RL ≥ 10MΩ	60	80	-	dB
Common Mode Rejection Ratio	CMRR	VCM = 1.5 to 5.2V	60	90	-	dB
Power Supply Rejection Ratio	PSRR	VCC = 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)	VTH1	Zero Duty Cycle	0.7	0.9	-	V
Input Threshold Voltage (Note2)	VTH2	Max Duty Cycle	-	3.2	3.6	V
SOFT-START SECTION						
Soft Start Current	ISOFT	VSD = 0V, VSS = 0V	25	51	80	μA
Soft Start Low Level Voltage	VSL	VSD = 25V	-	0.3	0.7	V
Shutdown Threshold Voltage	VTH(SD)	-	0.9	1.3	1.7	V
Shutdown Input Current	IN(SD)	VSD = 2.5V	-	0.3	1	mA
OUTPUT SECTION						
Low Output Voltage I	VOL I	ISINK = 20mA	-	0.1	0.4	V
Low Output Voltage II	VOL II	ISINK = 100mA	-	0.05	2	V
High Output Voltage I	VCH I	ISOURCE = 20mA	18	19	-	V
High Output Voltage II	VCH II	ISOURCE = 100mA	17	18	-	V
Under Voltage Lockout	VUV	V8 and V9 = High	6	7	8	V
Collector Leakage Current	ILKG	VCC = 35V	-	80	200	μA
Rise Time (Note1)	tR	CL = 1μF, TJ = 25°C	-	80	600	ns
Fall Time (Note1)	tF	CL = 1μF, TJ = 25°C	-	70	300	ns
STANDBY CURRENT						
Supply Current	ICC	VCC = 35V	-	12	20	mA

Note :

1. These parameters, although guaranteed over the recommended operating conditions, are not 100% tested in production
2. Tested at fOSC=40kHz (RT =3.6K, CT =0.01μF, RI = 0Ω)

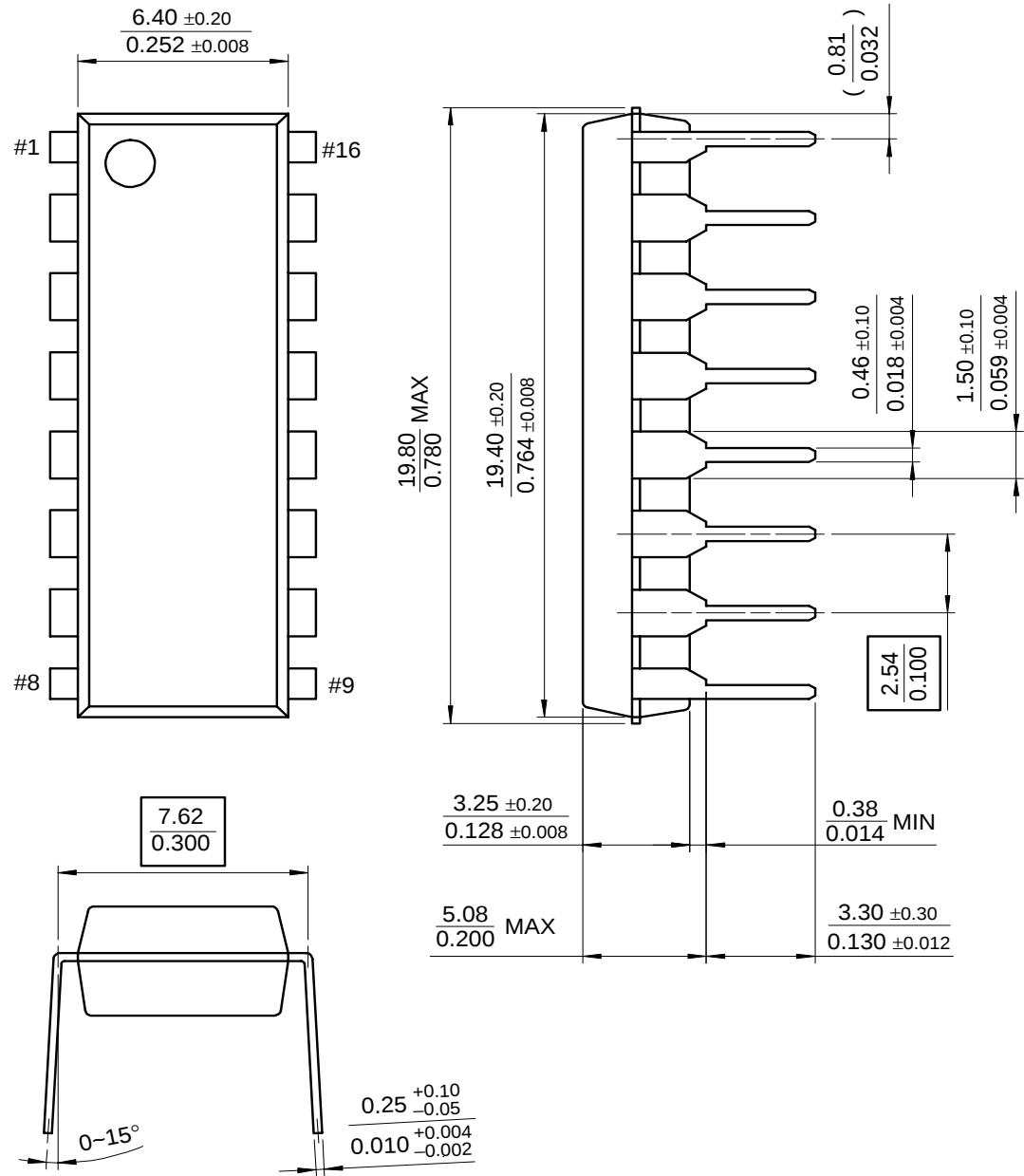
Test Circuit



Mechanical Dimensions

Package

16-DIP



Ordering Information

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

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