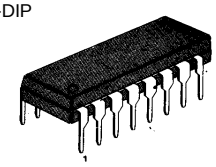
KA3525A SMPS CONTROLLER

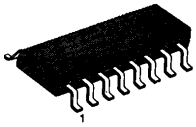
VOLTAGE-MODE PWM CONTROLLER

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

16-DIP



16-SOP-225A



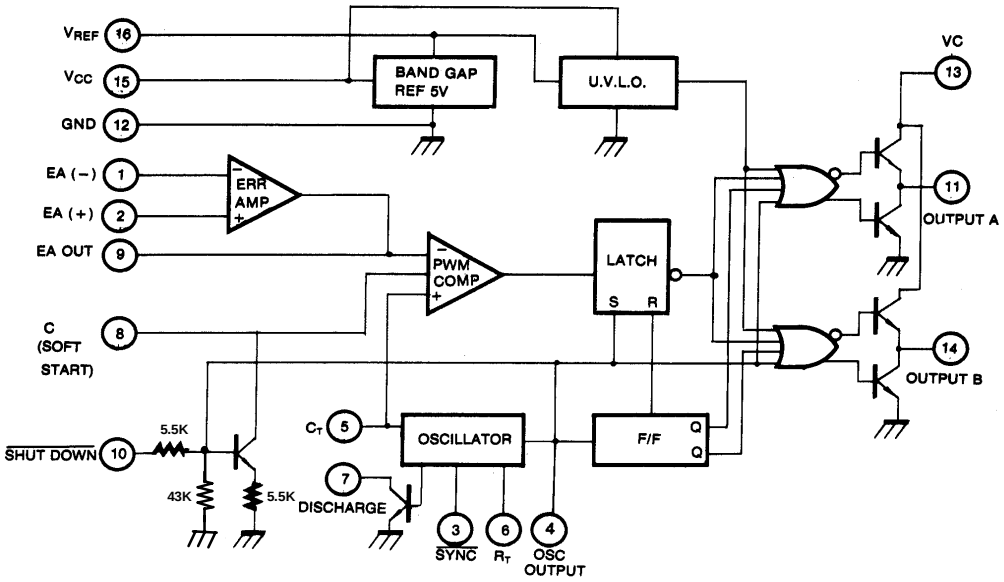
FEATURES

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

ORDERING INFORMATION

Device	Package	Operating Temperature
KA3525A	16 DIP	-30 ~ +85℃
KA3525AD	16-SOP-225A	-30 ~ +85℃

BLOCK DIAGRAM



FAIRCHILD SEMICONDUCTOR™

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	500	mA
Reference Output Current	I_{REF}	50	mA
Oscillator Charging Current	$I_{CHG(OSC)}$	5	mA
Power Dissipation (T_A = 25℃)	P_D	1000	m/W
Operating Temperature	T_{OPR}	0 ~ +70	℃
Storage Temperature	T_{STG}	-65 ~ +150	℃
Lead Temperature (Soldering, 10 sec)	T_{LEAD}	+300	℃

ELECTRICAL CHARACTERISTICS

(V_{CC} = 20V, T_A = -35℃ to + 85℃, unless otherwise specified)

Characteristic	Symbol	Test Conditions	Min	Typ	Max	Unit
REFERENCE SECTION						
Reference Output Voltage	V_{REF}	T_J = 25℃	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℃		80	100	mA
Total Output Variation (Note 1)	ΔV_{REF}	Line, Load and Temperature	4.95		5.25	V
Temperature Stability (Note 1)	ST_T			20	50	mV
Long Term Stability (Note 1)	ST	T_J = 125℃, 1 KH_{RS}		20	50	mV
OSCILLATOR SECTION						
Initial Accuracy (Note 1, 2)	ACCUR	T_J = 25℃		± 3	± 6	%
Frequency Change With Voltage	$\Delta f/\Delta V_{CC}$	V_{CC} = 8 to 35V (Note 1, 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 = 0.1μ F		60	120	Hz
Clock Amplitude (Note 1, 2)	$V_{(CLK)}$		3	4		V
Clock Width (Note 1, 2)	$t_{W(CLK)}$	T_J = 25℃	0.3	0.6	1	μ s
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

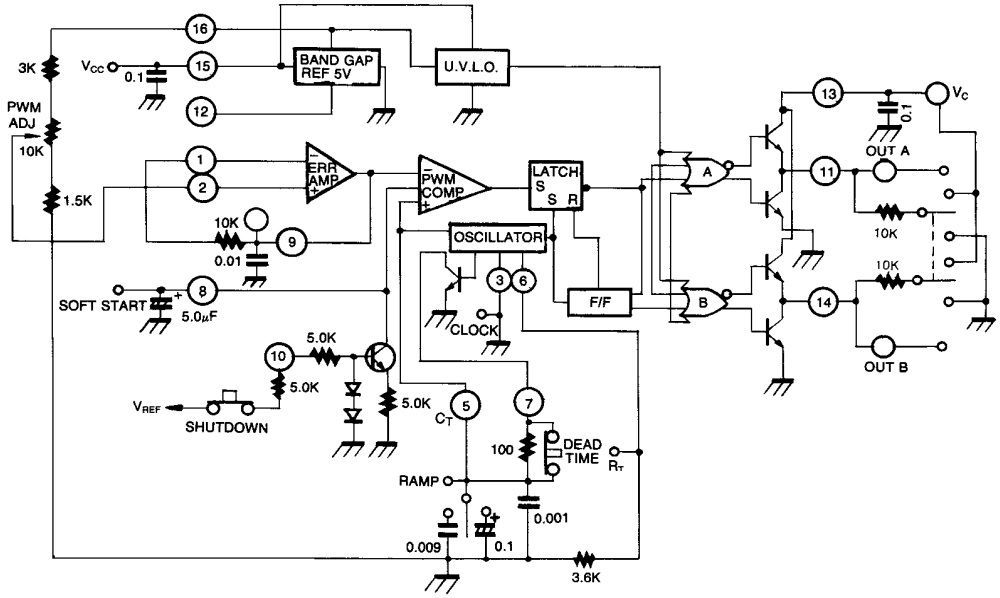
(V_{CC} = 20V, T_A = -35℃ to +85℃, unless otherwise specified)

Characteristic	Symbol	Test 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_{BAIS}			1	10	μA
Input Offset Current	I_{IO}			0.1	1	μA
Open Loop Voltage Gain	G_{VO}	$R_L \geq$ 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 (Note 2)	V_{TH1}	Zero Duty Cycle	0.7	0.9		V
Input Threshold Voltage (N0te 2)	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	$V_{TH(SD)}$		0.7	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 (Note 1)	t_R	C_L = 1μF, T_J = 26℃		80	600	nS
Fall Time (Note 1)	t_F	C_L = 1μF, T_J = 25℃		70	300	nS
STANDBY CURRENT						
Supply Cuttent	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}=40 KHz (R_T =3.6K, C_T =0.01μF, R_l = 0Ω)

TEST CIRCUIT



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PRODUCT STATUS DEFINITIONS

Definition of Terms

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