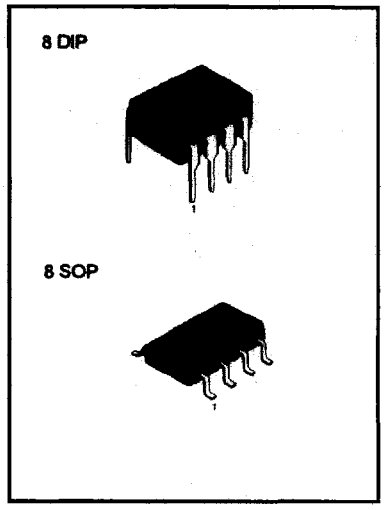
POWER FACTOR CONTROLLER

The KA7524B provides the necessary features to implement the Electronic BALLAST control and S.M.P.S application for designing on active power factor correction circuit.

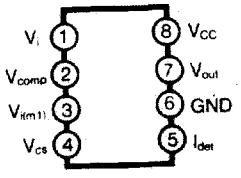


FEATURES

- Internal self-starting
- Micro power start up mode
- Included under voltage lockout circuit
- Internal 1% reference
- High output current : Peak 500mA

CONNECTION DIAGRAM

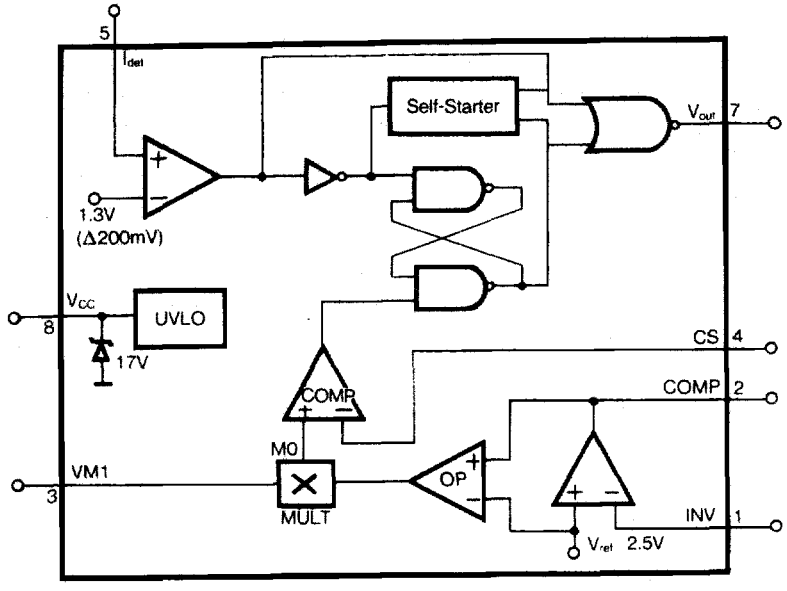
KA7524/KA7524D (8 DIP, 8 SOP)



ORDERING INFORMATION

Device	Ref. Voltage	Package	Operating Temperature
KA7524B	1%	8 DIP	-25 ~ + 100℃
KA7524BD	1%	8 SOP	

BLOCK DIAGRAM



ABSOLUTE MAXIMUM RATINGS

Characteristic	Symbol	Value	Unit
Supply Voltage	V_{CC}	20	V
Peak driver output current	$I_{O(P)}$	500	mA
Detect clamping diode current	I_{DET}	10	mA
Output clamping diode current	$I_{O(C.D)}$	10	mA
Operating ambient temperature	T_{OPR}	-25 ~ + 100	℃
Storage Temperature	T_{STG}	-65 ~ + 150	℃

ELECTRICAL CHARACTERISTICS

Characteristic	Symbol	Test Conditions	Min	Typ	Max	Unit
Under Voltage Lockout Section						
Start Threshold Voltage	$V_{TH(ST)}$		9.2	10	10.8	V
UV Lockout Hysteresis	V_{THS}		1.8	2.0	2.2	V
Supply Zener Voltage	V_Z			17		V
Supply Current Section						
Start-Up Supply Current	I_{START}	$V_{CC} < V_{TH}$		0.25	0.5	mA
Operating Supply Current	I_{CC}	V_{CC} = 12V, No Load		6	12	mA
Dynamic Operating Current	$I_{CC(D)}$	V_{CC} = 12V, f = 50KHz, C_{GS} = 1000PF		10	20	mA
Reference Section(Note1)						
Reference Voltage	V_{REF}	KA7524B/BD	2.475	2.5	2.525	V
Line regulation	V_{REF}	$12V < V_{CC} < 16V$		0.1	10	mV
Load Regulation	V_{REF}	$0 < I_{REF} < 2mA$		0.1	10	mV
Temperature Stability	ST_T			20		mV
Error Amplifier Section						
Input Offset Voltage	V_{IO}		-15		15	mV
Input Bias Current	I_{BIAS}		-1	-0.1	1	uA
Large Signal Open Loop Gain	G_V		60	100		dB
Power Supply Rejection Ratio	PSRR		60	86		dB
Output Current	I_{SOURCE}		2			mA
	I_{SINK}				-2	mA
Output Voltage Range	$V_{O(P)}$		1.2		4	V
Unity Gain Bandwidth	UBW			1.0		MHz
Phase Margin	MPH			57		℃

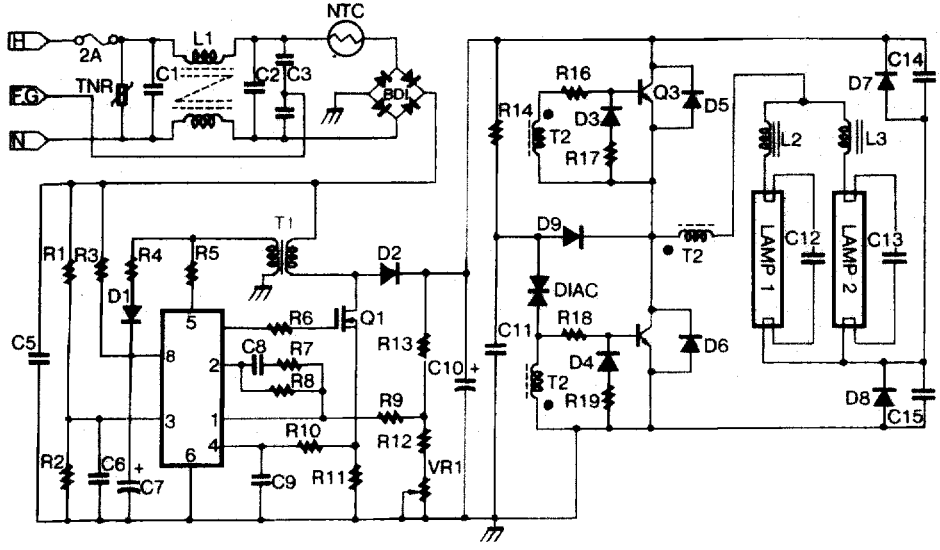
ELCTRICAL CHARACTERISTICS(Continude)

Characteristic	Symbol	Test Conditions	Min	Typ	Max	Unit
Multiplier Section						
M1 Input Voltage Range	$V_{I(M1)}$		0		2	V
M2 Input Voltage Range	$V_{I(M2)}$		V_{REF}		V_{REF+1}	V
Input Bias Current	I_{BIAS}		-2	-0.5	2	uA
Mulitiplier Gain (Note2)	G_V	$V_{I(M1)}$ = 0.5V, $V_{I(M2)}$ = 3V		0.8		uA
Multiplier Gain Stability	ST_T			-0.2		%/℃
Current Sdnse Section						
Input Offset Voltage	V_{IO}		-10		10	mV
Input Bias Current	I_{BIAS}	0V < V_{CS} < 1.7V	-5		5	uA
C. Sense Delay to Output	$t_{D(S)}$	Error Amp Output = 3.7V		200	500	nS
Current Detect Section						
Input Voltage Threshold	V_{TH}		1.0	1.3	1.6	V
Hysteresis	V_{THS}			200		mV
Input Low Clamp Voltage	$V_{IC(L)}$	I_{DET} = 0mA			0.95	V
Input High Clamp Voltage	$V_{IC(H)}$	I_{DET} = 3mA	6.1	7.1		V
Input Current	I_J	0.9 < V_{DET} < 6V		5		uA
Input Clam Diode Current	I_{CD}	V_{DET} < 0.9V, V_{DET} > 6V			3	mA
Current Detect Section						
Output Voltage(High)	$V_{O(H)}$	I_O = -10mA, V_{CC} = 12V	7	9		V
Output Voltage(Low)	$V_{O(L)}$	I_O = 10mA, V_{CC} = 12V		0.8	1.8	V
Rising Time	t_R	CL = 1000pF		100	200	nS
Falling Time	t_F	CL = 1000pF		90	200	nS
Self-Starting Section						
Self-Starting Time	t_{SS}		12			uS

Note 1. Reference can not be tested on the PKG

2. $G_V = V_{O(M)} / (V_{I(M1)} * V_{I(M2)} - V_{REF})$

KA7524B APPLICATION CIRCUIT



PART LIST

Resistor		Capacitor		Semiconductor	
R1	1.8M	C1	0.1uF	IC1	KA7524B
R2	10K	C2	0.1uF	Q1	IRF830
R3	100K	C3	4700pF	Q2	KSC5039
R4	3.3ohm	C4	4700pF	Q3	KSC5039
R5	22K	C5	0.1uF	D1	1N4004
R6	27ohm	C6	0.01uF	D2	1N4937
R7	2.2K	C7	100uF	D3	1N4148
R8	2.2M	C8	0.1uF	D4	1N4148
R9	150K	C9	3300pF	D5	FR107
R10	330ohm	C10	47uF/450V	D6	FR107
R11	0.75ohm	C11	0.1uF	D7	FR107
R12	5.1K	C12	3300pF	D8	FR107
R13	1M	C13	3300pF	BD1	PBP204
R14	390K	C14	0.01uF	TNR	12G471
R15	3.9M	C15	0.01uF	DIAC	32V
R16	5.1ohm				
R17	27ohm				
R18	5.1ohm				
R19	27ohm				
VR1	5K				
NTC	10ohm				

Magnetics

T1	EI-25 (PC30): P = 70T, S = 4T, Gap = 0.5mm
T2	D15 (GP-5): P = 3T, S = 13T
L1	EE-25 (Iron Power) 80mH
L2, L3	EI-25 (PC30): 150T, Gap = 0.4mm