



## UA7524

### LINEAR INTEGRATED CIRCUIT

## POWER FACTOR CONTROLLER

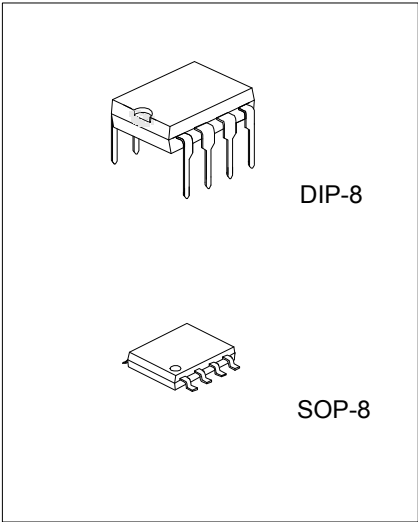
### DESCRIPTION

The UTC **UA7524** provides the necessary features to implement the Electronic BALLAST control and S.M.P.S application for designing active power factor correction circuit

### FEATURES

- \* Internal self-starting
- \* Micro power start up mode
- \* Included under voltage lockout circuit
- \* Internal 2% reference
- \* High output current: peak 500mA

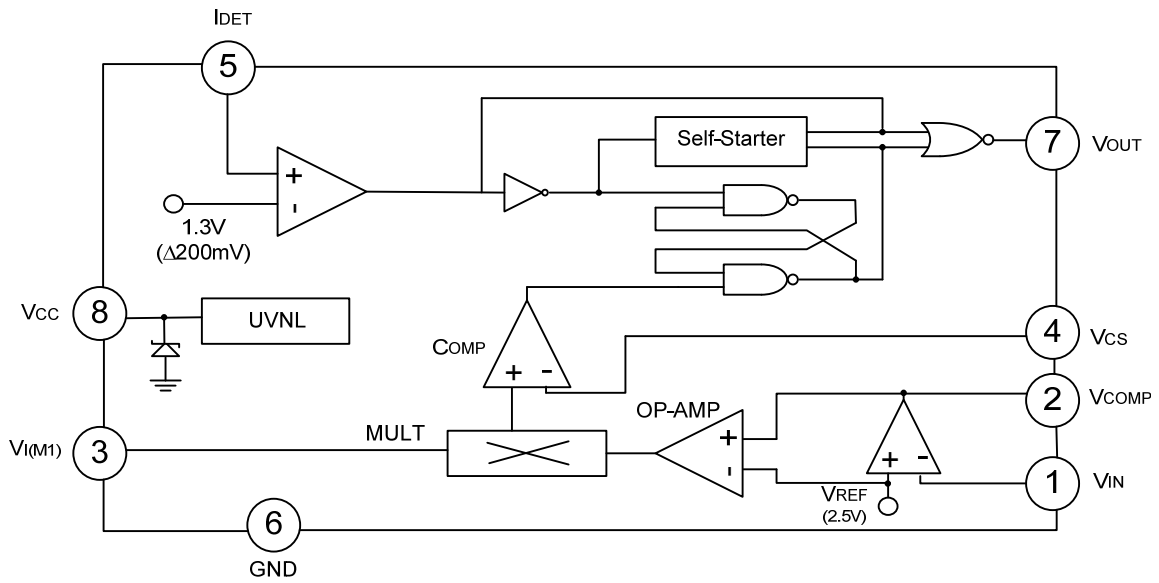
### ORDERING INFORMATION



Ordering Number		Package	Packing
Lead Free	Halogen Free		
UA7524L-D08-T	UA7524G-D08-T	DIP-8	Tube
UA7524L-S08-R	UA7524G-S08-R	SOP-8	Tape Reel
UA7524L-S08-T	UA7524G-S08-T	SOP-8	Tube

<p>UA7524L-D08-T</p> <p>(1)Packing Type (2)Package Type (3)Lead Free</p>	<p>(1) T: Tube, R: Tape Reel (2) D08: DIP-8, S08: SOP-8 (3) G: Halogen Free, L: Lead Free</p>
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■ BLOCK DIAGRAM



■ ABSOLUTE MAXIMUM RATINGS (T<sub>A</sub> = 25°C)

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	V <sub>CC</sub>	20	V
Peak Driver Output Current	I <sub>O(PEAK)</sub>	500	mA
Detect Clamping Diode Current	I <sub>DET</sub>	10	mA
Output Clamping Diode Current	I <sub>O(CD)</sub>	10	mA
Junction Temperature	T <sub>J</sub>	+125	°C
Operating Temperature	T <sub>OPR</sub>	-20~+85	°C
Storage Temperature	T <sub>STG</sub>	-40~+150	°C

Note 1. Absolute maximum ratings are those values beyond which the device could be permanently damaged. Absolute maximum ratings are stress ratings only and functional device operation is not implied.

2. The device is guaranteed to meet performance specification within 0°C~+70°C operating temperature range and assured by design from -20°C~+85°C.

■ ELECTRICAL CHARACTERISTICS (T<sub>A</sub> = 25°C, All voltage referenced to GND, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
<b>Under Voltage Lockout Section</b>						
Start Threshold Voltage	V <sub>THR(ST)</sub>		9.2	10	10.8	V
UV lockout Hysteresis	V <sub>HYS(UV)</sub>		1.8	2.0	2.2	V
Supply Zener Voltage	V <sub>Z</sub>			17		V
<b>SUPPLY CURRENT SECTION</b>						
Start-up Supply Current	I <sub>START</sub>	V <sub>CC</sub> <V <sub>I(THR)</sub>		0.25	0.5	mA
Operating Supply Current	I <sub>CC</sub>	V <sub>CC</sub> =12V, No load		6	12	mA
Dynamic Operating Current	I <sub>CC(D)</sub>	V <sub>CC</sub> =12V, f=50KHZ, C <sub>GS</sub> =1000pF		10	20	mA
<b>REFERENCE SECTION (Note 1)</b>						
Reference Voltage	V <sub>REF</sub>		2.45	2.5	2.55	V
Line Regulation	ΔV <sub>OUT</sub>	12V< V <sub>CC</sub> <16V		0.1	10	mV
Load Regulation	ΔV <sub>OUT</sub>	0< I <sub>REF</sub> <2mA		0.1	10	mV
Temperature Stability	ST <sub>T</sub>			20		mV
<b>ERROR AMPLIFIER SECTION</b>						
Input Offset Voltage	V <sub>I(OFF)</sub>		-15		15	mV
Input Bias Current	I <sub>I(BIAS)</sub>		-1	-0.1	1	μA
Large Signal Open Loop gain	G <sub>V</sub>		60	100		dB
Power Supply Rejection Ratio	RR		60	86		dB
Output Current	I <sub>SOURCE</sub>		2			mA
	I <sub>SINK</sub>				-2	mA
Output Voltage range	V <sub>O(P)</sub>		1.2		4	V
Unity Gain Bandwidth	UB <sub>W</sub>			1.0		MHZ
Phase Margin	MPH			57		°C
<b>MULTIPLIER SECTION</b>						
M1 Input Voltage Range	V <sub>I(M1)</sub>		0		2	V
M2 Input Voltage Range	V <sub>I(M2)</sub>		V <sub>REF</sub>		V <sub>REF</sub> +1	V
Input Bias Current	I <sub>I(BIAS)</sub>		-2	-0.5	2	μA
Multiplier Gain (Note2)	G <sub>V</sub>	V <sub>I(M1)</sub> =0.5V, V <sub>I(M2)</sub> =3V		0.8		/V
Multiplier Gain Stability	ST <sub>T</sub>			-0.2		%/°C
<b>CURRENT DETECT SECTION</b>						
Input Voltage Threshold	V <sub>I(THR)</sub>		1.0	1.3	1.6	V
Hysteresis	V <sub>HYS</sub>			200		mV

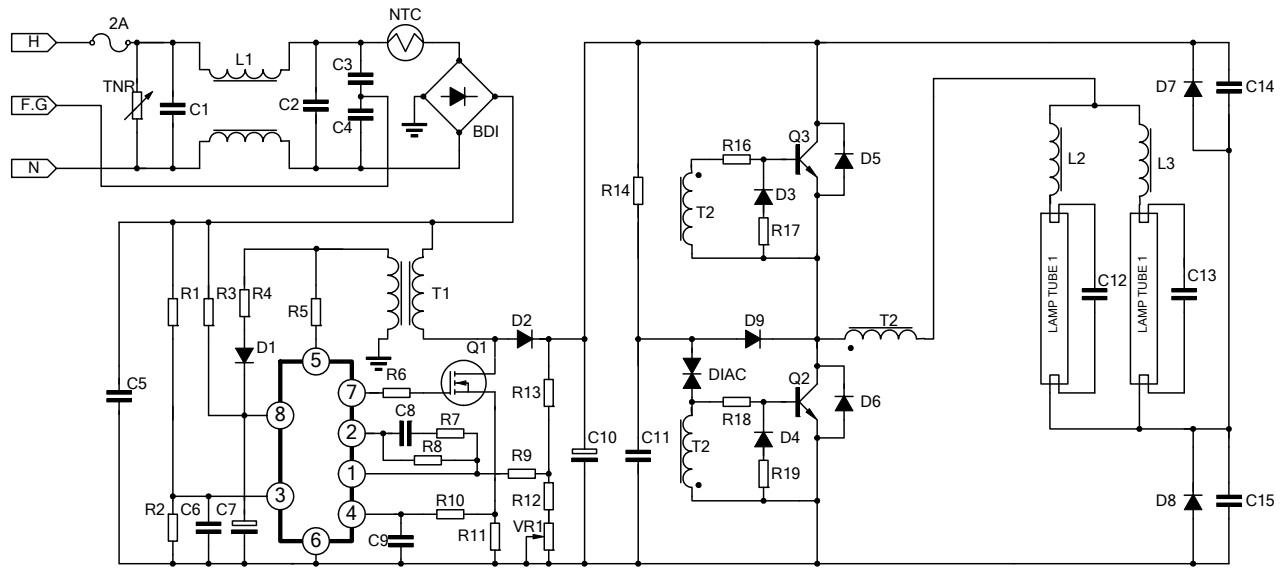
■ ELECTRICAL CHARACTERISTICS(Cont.)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
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	$I_{IN}$	$0.8V < V_{DET} < 6V$		5		$\mu A$
Input Clamp Diode Current	$I_{I(CD)}$	$V_{DET} < 0.9V, V_{DET} > 6V$			3	mA
<b>OUTPUT SECTION</b>						
Output Voltage(High)	$V_{O(H)}$	$I_{OUT} = -10mA, V_{CC} = 12V$	7	9		V
Output Voltage(low)	$V_{O(L)}$	$I_{OUT} = 10mA, V_{CC} = 12V$		0.8	1.8	V
Rising Time	$t_R$	$C_L = 1000pF$		100	200	ns
Falling Time	$t_F$	$C_L = 1000pF$		90	200	ns
<b>SELF-START SECTION</b>						
Self Starting Time	$t_{SS}$		12			$\mu s$

Note: 1. Reference can not be tested on the PKG

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

## APPLICATION CIRCUIT



### PART LIST

RESISTOR		CAPACITOR		SEMICONDUCTOR		MAGNETICS	
R1	1.8M	C1	0.1 $\mu$ F	IC1	UTC UA7524	T1	E1-25(PC30):P=70T,S=4T,Gap=0.5mm
R2	10K	C2	0.1 $\mu$ F	Q1	IRF830	T2	D15(GP-5):P=3T,S=13T
R3	100K	C3	4700pF	Q2	2SC5039	L1	EE-25(Iron Power),80mH
R4	3.3 $\Omega$	C4	4700pF	Q3	2SC5039	L2	E1-25(PC30):150T,Gap=0.4mm
R5	22K	C5	0.1 $\mu$ F	D1	1N4004		
R7	2.2K	C6	0.01 $\mu$ F	D2	1N4937		
R8	2.2M	C7	100 $\mu$ F	D3	1N4148		
R9	150K	C8	0.1 $\mu$ F	D4	1N4148		
R10	330 $\Omega$	C9	3300pF	D5	FR107		
R11	0.75 $\Omega$	C10	47 $\mu$ F/450V	D6	FR107		
R12	5.1K	C11	0.1 $\mu$ F	D7	FR107		
R13	1M	C12	3300pF	D8	FR107		
R14	390K	C13	3300pF	BD1	PBP204		
R15	3.9M	C14	0.01 $\mu$ F	TNR	12G471		
R16	5.1 $\Omega$	C15	0.01 $\mu$ F	DIAIC	32V		
R17	27 $\Omega$						
R18	5.1 $\Omega$						
R19	27 $\Omega$						
VR1	5K						
NTC	10 $\Omega$						

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