L120A

LINEAR INTEGRATED CIRCUIT

TRIAC/SCR PHASE CONTROL

The L 120A is a monolithic integrated circuit in 16-lead dual in-line plastic package. It incorporates the following functions:

- AC supply 50/60 Hz
- Zero-voltage and zero-current detector
- Ramp generator
- Inhibition of casual firing pulses
- Stabilization of the internal positive DC supply
- High gain operational amplifier
- Output short-circuit protection

The L 120A is intended for use as a phase controller in industrial and consumer applications.

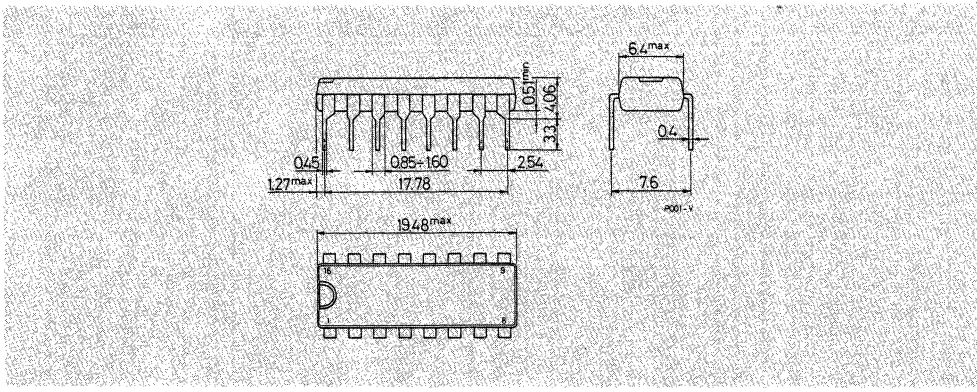
ABSOLUTE MAXIMUM RATINGS

I_9	AC peak supply current	60	mA
I_{14}	Max input current (pin 14)	20	mA
I_{D1}, I_{D2}	Input diodes peak current	1	A
V_{8-12}	Positive clamp voltage	15	V
V_{10-12}	Negative clamp voltage	15	V
V_{1-2}	Differential input voltage	± 7	V
V_{3-5}	Differential input voltage	± 8	V
P_{tot}	Total power dissipation at T_{amb}= 85°C	800	mW
T_{stg}	Storage temperature	-55 to 150	°C
T_{op}	Operating junction temperature	-25 to 150	°C

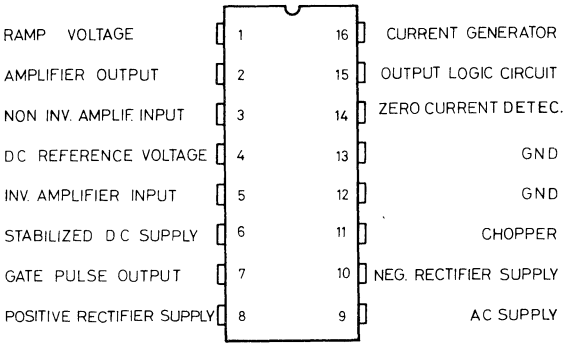
ORDERING NUMBER: L 120AB

MECHANICAL DATA

Dimensions in mm



CONNECTION DIAGRAM (top view)



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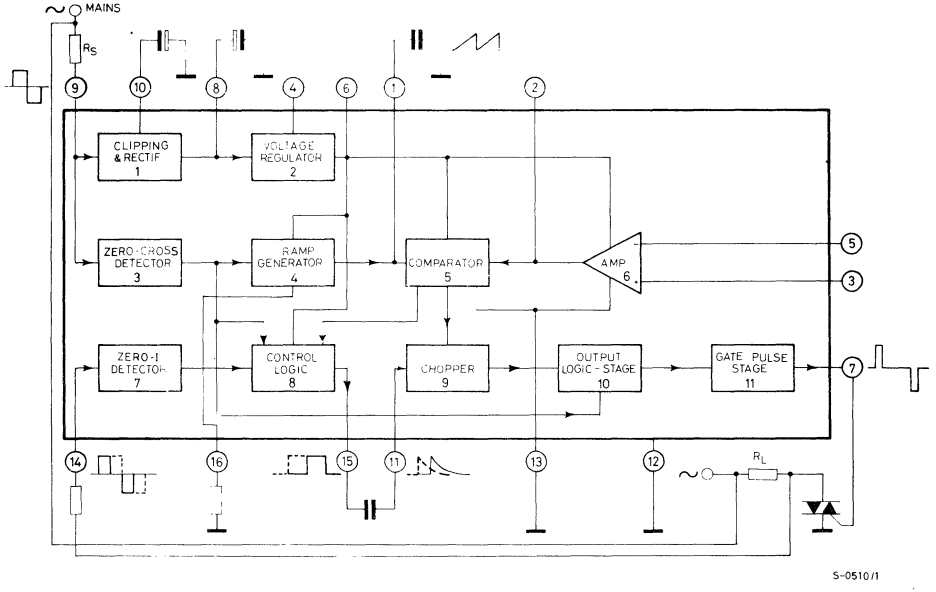
BLOCK DIAGRAM



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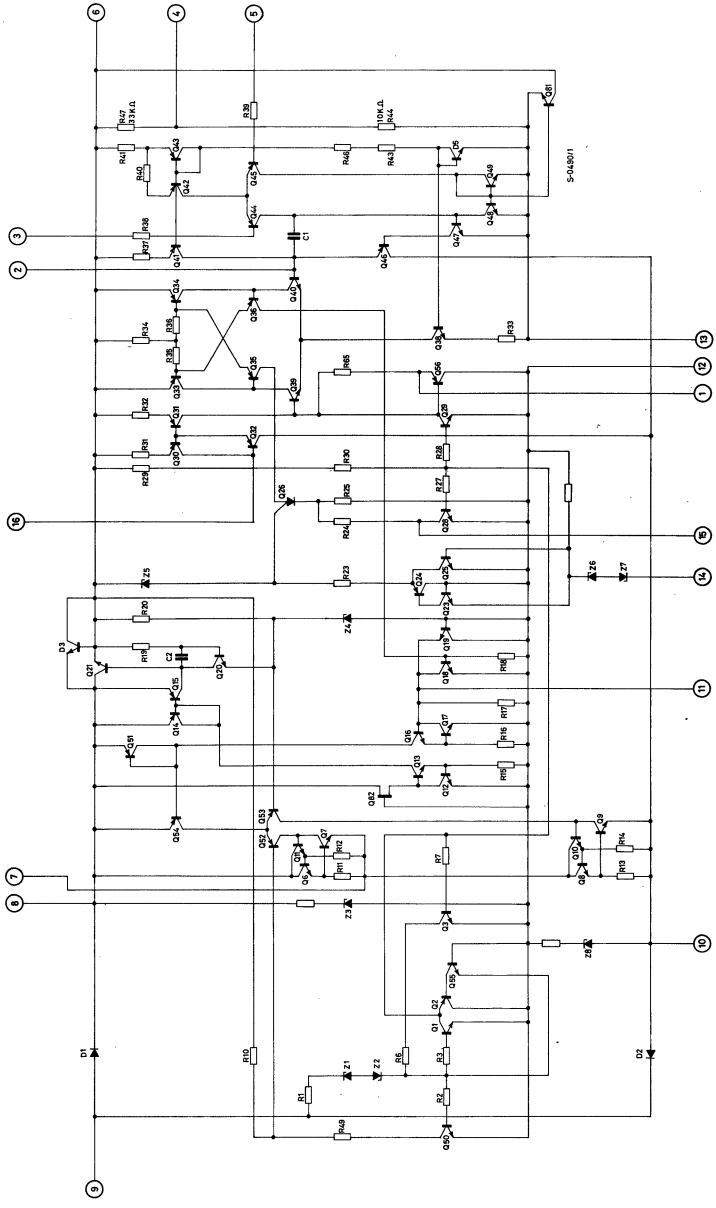
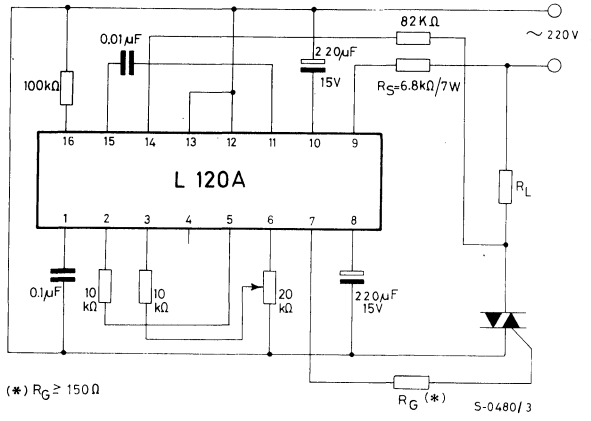
SCHEMATIC DIAGRAM



TEST CIRCUIT



THERMAL DATA

$R_{th\ j\text{-}amb}$	Thermal resistance junction-ambient	max	80	°C/W

ELECTRICAL CHARACTERISTICS (T_{amb} = 25°C, refer to the test circuit unless otherwise specified)

Parameter		Test conditions	Min.	Typ.	Max.	Unit
V_{8-12}	Positive clamp voltage		10	11.5	13	V
V_{10-12}	Negative clamp voltage		10	11.5	13	V
V_{8-12}	External DC supply voltage		10.5			V
V_{10-12}	External DC supply voltage		-10.5			V
V_{9-12}	Sync input threshold			± 12.5		V
V_{14-12}	Zero current threshold		± 8.8	± 10	± 11.2	V

ELECTRICAL CHARACTERISTICS (continued)

Parameter		Test conditions		Min.	Typ.	Max.	Unit
V_{10-14} V_{8-14}	Zero current threshold			1.2			V
I_{14}	Operative input current to avoid inibition (pin 14)			0.4			mA
V_{1-12}	Ramp discharge level					1.1	V
V_{1-12}	Maximum ramp level			7.2			V
V_{1-2}	Comparat. differential trigger level				70	100	mV
G_v	Amplifier voltage gain (open loop)	V_2 (peak to peak) = 6V		60	70		dB
V_{2-13}	Max output voltage			7			V
V_{2-13}	Min output voltage					0.9	V
V_{3-13}, V_{5-13}	Input offset voltage	$R_{3-13} = R_{5-13} = 50\Omega$			3	6	mV
I_b	Input bias current (pin 3, 5)				0.1	1	μA
V_{3-5}	Differential input voltage					$\pm$ 7	V
V_{3-13}, V_{5-13}	Input voltage range			0.5		7.5	V
CMR	Common mode rejection	$R_{3-13} = R_{5-13} \leq 1k\Omega$			60		dB
V_{6-13}	Regulator output voltage			8.3		9.5	V
I_6	Max regulator output current			3			mA
$\frac{\Delta V_6}{V_6}$	Load regulation	$I_6 = 0$ to 3 mA			0.5	2	%
$\frac{\Delta V_6}{\Delta V_8}$	Line regulation	V_8 = 12 to 14V $I_6 = 0$			46		dB
SVR	Supply voltage rejection	V_8 = 12V f_{ripple} = 50 Hz V_{ripple} (peak to peak) = 4V			46		dB
V_4	Reference voltage	$I_4 = 10\ \mu A$			1.5		V
V_{7-12}	Firing pulse amplitude	$R_{7-12} = 1\ k\Omega$	positive	4.5	5.5		V
			negative	8	9.5		V
I_7	Maximum output current	$R_{7-12} = 10\Omega$		80			mA
t_{pw}	Output pulse width	$R_{7-12} = 50\Omega$			200		μs
t_r	Output pulse rise time				200		ns

Fig. 1 - Peak supply current vs. dropping resistor R_S

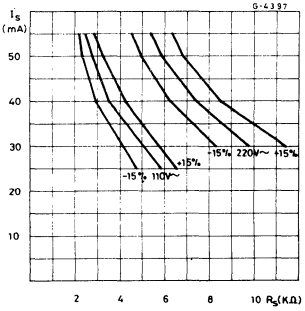


Fig. 2 - Maximum allowable average supply current vs. ambient temperature

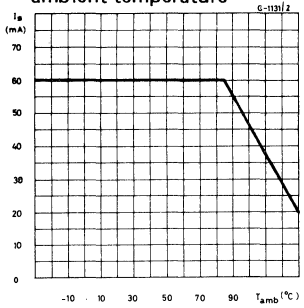


Fig. 3 - Gate pulse amplitude vs. gate resistance

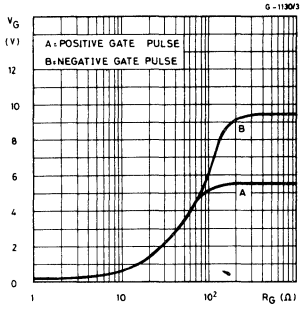


Fig. 4 - Gate current variation vs. ambient temperature

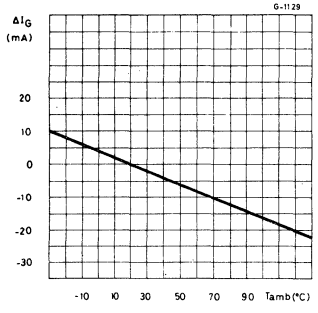


Fig. 5 - Gate pulse width vs. C_{11-15}

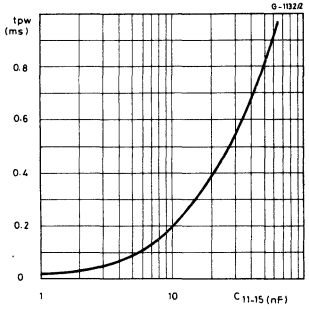
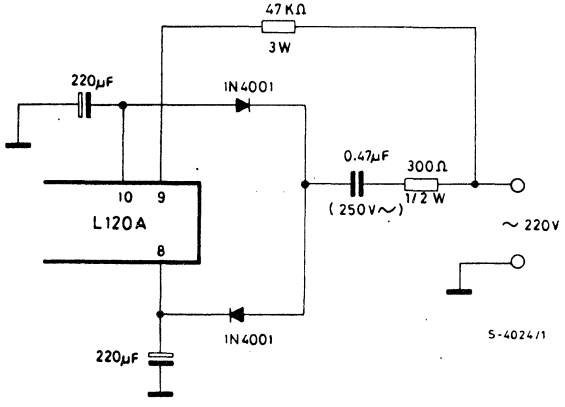


Fig. 6 - Alternative system for reduction of power dissipation



APPLICATION INFORMATION

Fig. 7 - Application circuit for AC motor speed regulators

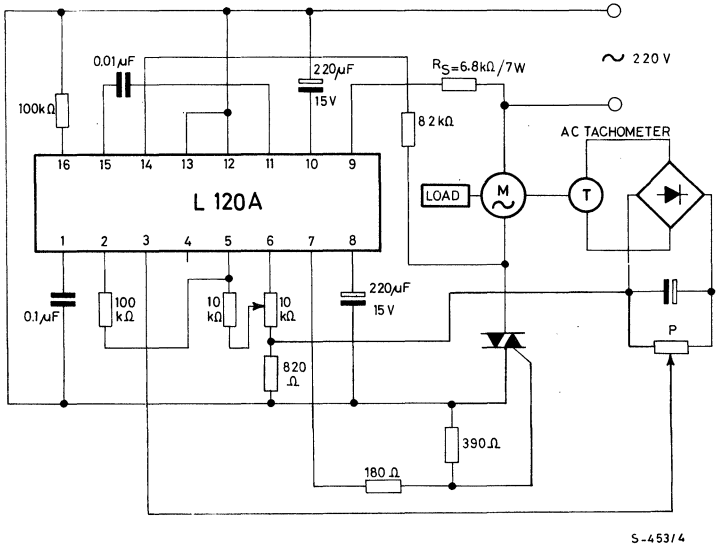
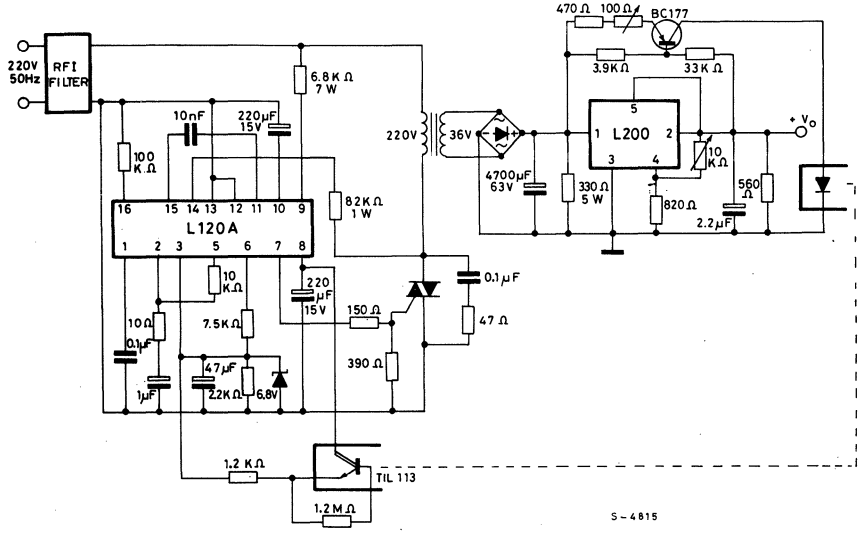


Fig. 8 - 3 to 30V adjustable power supply with preregulation



NOTE - For a more detailed description of the L120A and its applications refer to SGS-DESIGN NOTE - DN 382.