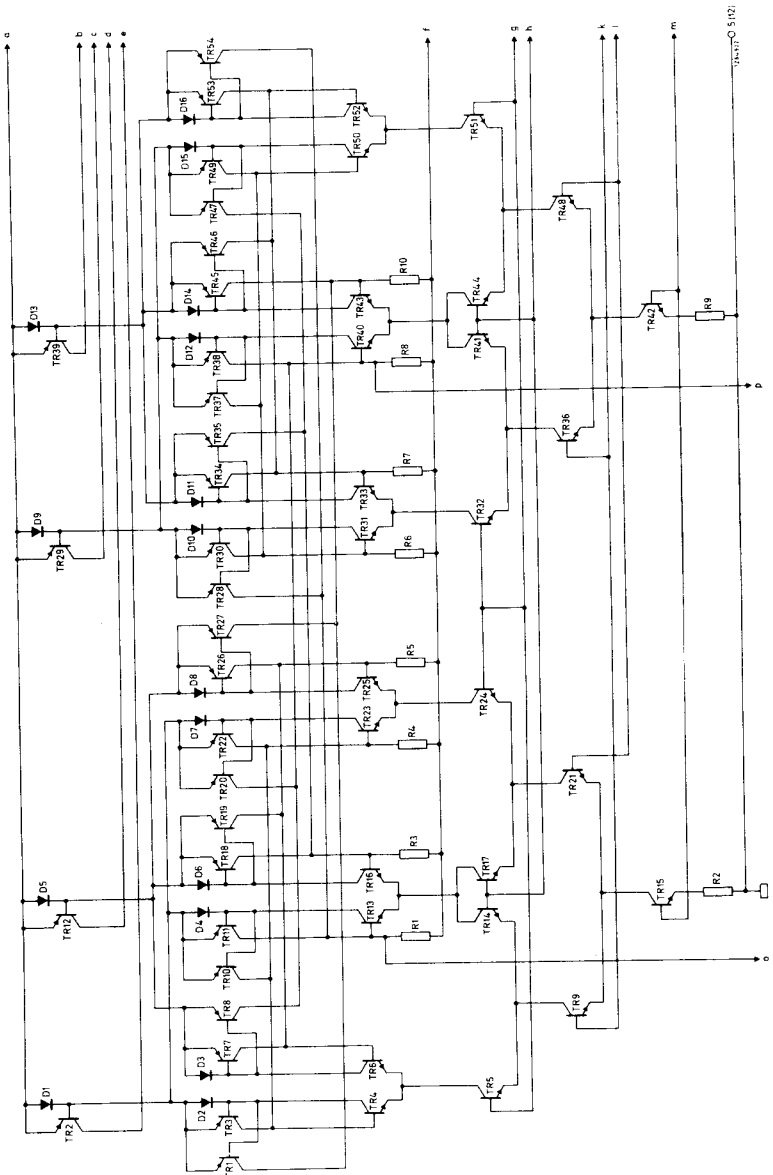
STEPPER MOTOR DRIVE CIRCUIT

The SAA1027 is intended for driving a four phase two stator stepper motor. The circuit consists of four output stages, a logic part and three input stages. The logic part is driven by three input stages; a trigger input stage, an input stage which can change the switching sequence of the logic part so that the motor can rotate clock wise (CW) or counter clock wise (CCW) and a set input stage to set the four output stages. The three inputs are compatible with high noise immunity logic to ensure proper operation, even in noisy environments. The output can deliver 350 mA in each phase. The right switching sequence of the four phases is obtained from the logic part of the circuit. Integrated diodes protect the outputs against transient spikes.

QUICK REFERENCE DATA				
Supply voltage	V_P		9,5 to 18	V
Load current (each output)	I_Q	max.	350	mA
Logic for CW and CCW operation				

PACKAGE OUTLINE 16 lead plastic power dual in-line (see page 9)

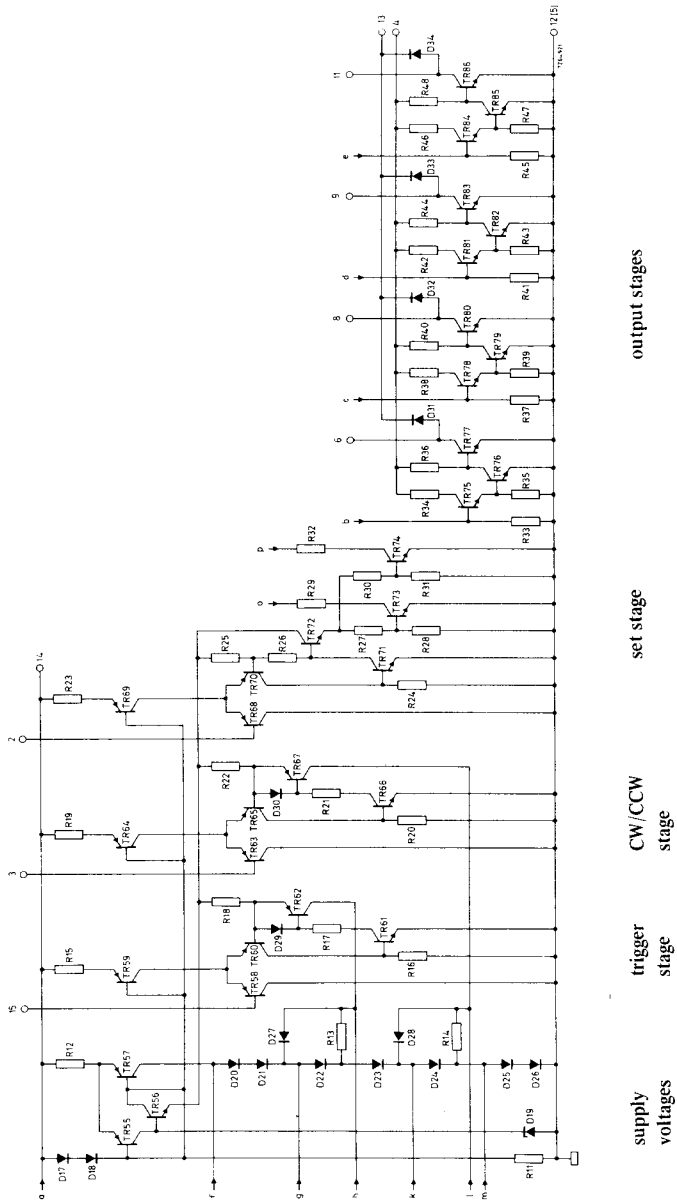
Be sure to visit ChipDocs site for more information
http://www.chipdocs.com



CIRCUIT DIAGRAM

bi-directional, 4 position, synchronous counter

Be sure to visit ChipDocs site for more information
http://www.chipdocs.com



Be sure to visit ChipDocs site for more information
http://www.chipdocs.com

RATINGS Limiting values in accordance with the Absolute Maximum System (IEC 134)

Voltages

Supply voltage (pins 4, 13, 14)	V_P	max.	20 V
Input voltage; R (pin 3), S (pin 2), T (pin 15)	V_I	max.	20 V

Current

Output current; Q_1 (pin 6), Q_2 (pin 8), Q_3	I_Q	max.	500 mA

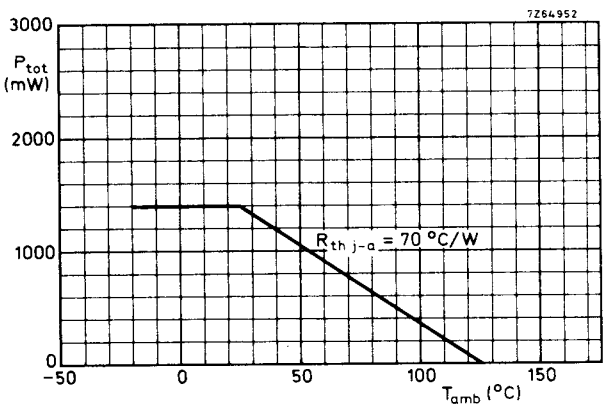
Power dissipation — see derating curve below [1]

Temperatures

Storage temperature	T_{stg}	−40 to +125 °C
Operating ambient temperature	T_{amb}	−20 to + 70 °C

THERMAL RESISTANCE

From junction to ambient $R_{th\ j\text{-}a}$ = 70 °C/W



[1] Additional power caused by the self-inductance of the motor-coils will be dissipated in the diodes (D31 to D34).
This extra dissipation has not been considered in the bottom graph on page 8.
If necessary external diodes must be used.

Be sure to visit ChipDocs site for more information
http://www.chipdocs.com

FUNCTION TABLE

Direction conditions (R)

The direction of rotation can be changed at any moment independent of the state of the T and S inputs.

Set conditions (S)

When T is HIGH and S LOW then the outputs are set: Q_1 = L, Q_2 = H, Q_3 = L, Q_4 = H.

Trigger conditions (T)

S = H									
R = H					R = L				
T	Q_1	Q_2	Q_3	Q_4	T	Q_1	Q_2	Q_3	Q_4
0	L	H	L	H	0	L	H	L	H
1	H	L	L	H	1	L	H	H	L
2	H	L	H	L	2	H	L	H	L
3	L	H	H	L	3	H	L	L	H
4	L	H	L	H	4	L	H	L	H

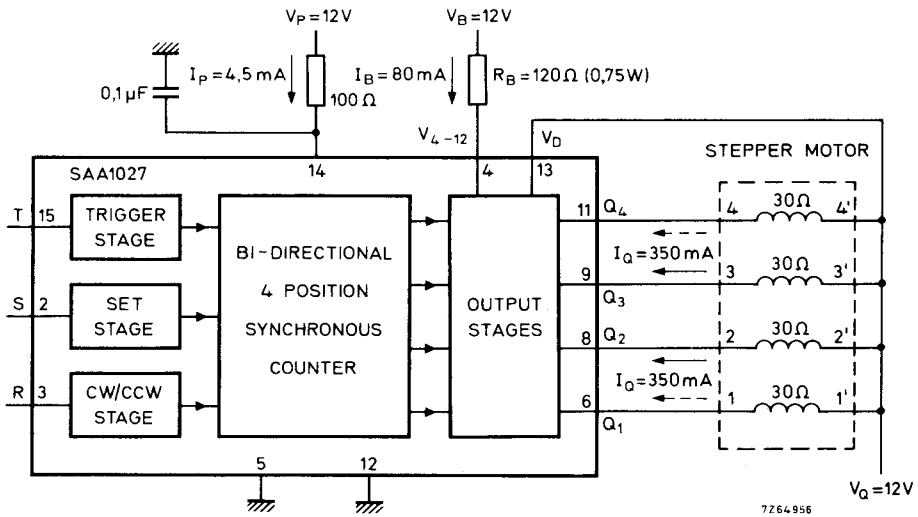
CHARACTERISTICS at T_{amb} = −20 to +65 °C; V_P = 12 V

Supply voltage (pin 14)	V_P	typ.	12 V
			9,5 to 18 V
Supply current (without load, all inputs HIGH, pin 4 open)	I_P	typ.	4,5 mA
			2,0 to 6,5 mA
Input logic voltage levels and currents for R, S and T			
HIGH	V_{IH}	>	7,5 V
	I_{IH}	typ.	1 µA
LOW	V_{IL}	<	4,5 V
	I_{IL}	typ.	30 µA
Supply voltage (each output stage)	V_Q	typ.	12 V
			1,5 to 18 V
Supply current (each output stage)	I_Q	<	350 mA
Saturation voltage of output transistors at I_Q = 350 mA (pins 6, 8, 9, 11)	V_{sat}	<	1,0 V

Bias voltage and current (max. values; pin 4)	See top graph on page 7
Bias resistor	See bottom graph on page 7
Power dissipation in bias resistor	See top graph on page 8
Total device power dissipation	See bottom graph on page 8

Be sure to visit ChipDocs site for more information
http://www.chipdocs.com

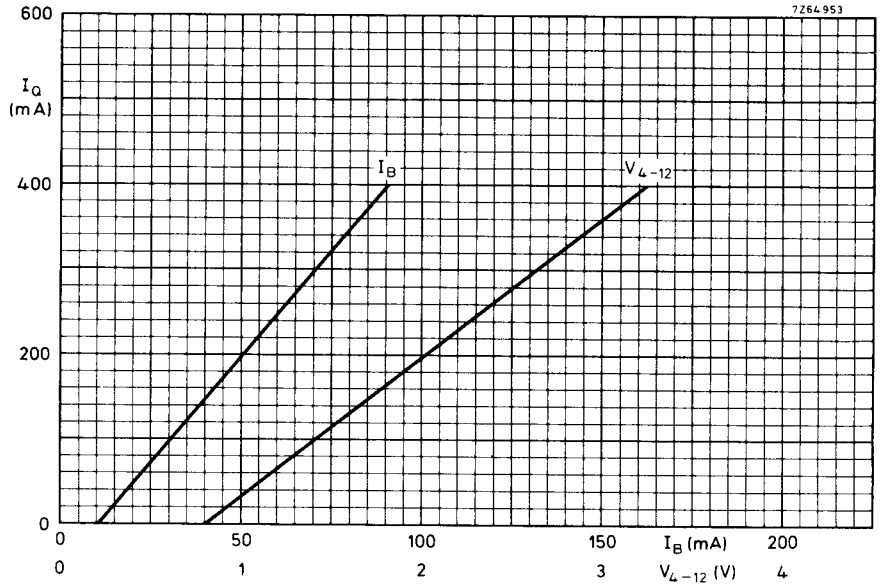
APPLICATION INFORMATION

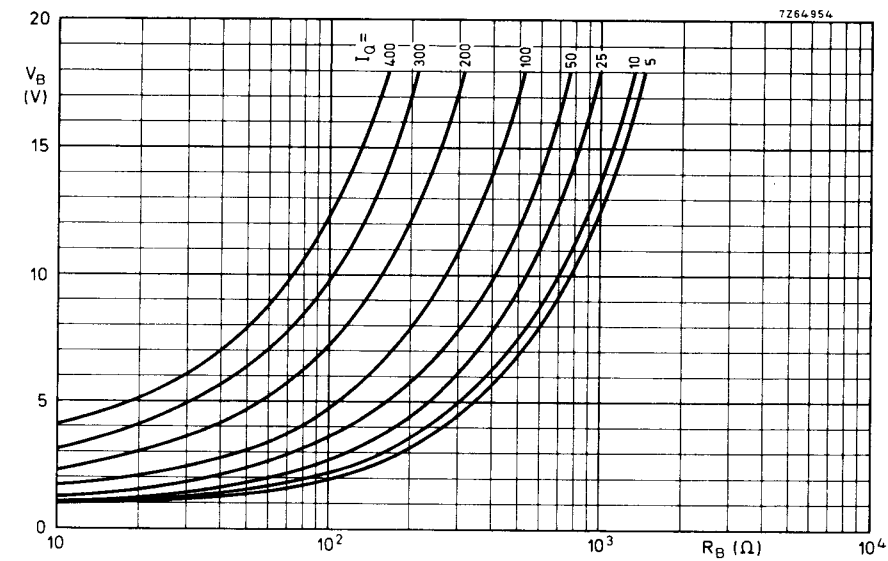


PINNING

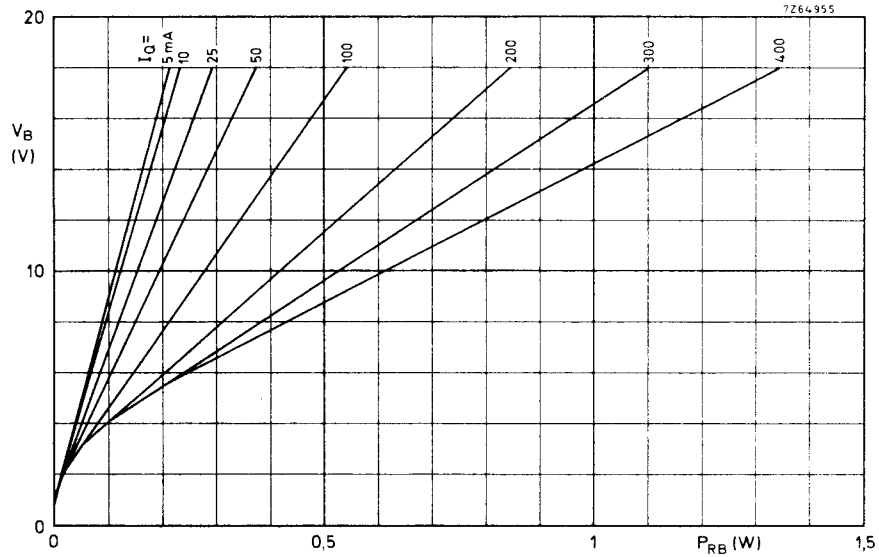
1. not connected
2. S (set input)
3. R (CW/CCW input)
4. V_B (positive supply)
5. Earth (negative supply)
6. Q_1 (output)
7. not connected
8. Q_2 (output)
9. Q_3 (output)
10. not connected
11. Q_4 (output)
12. Earth (negative supply)
13. V_D (positive supply)
14. V_P (positive supply)
15. T (trigger input)
16. not connected

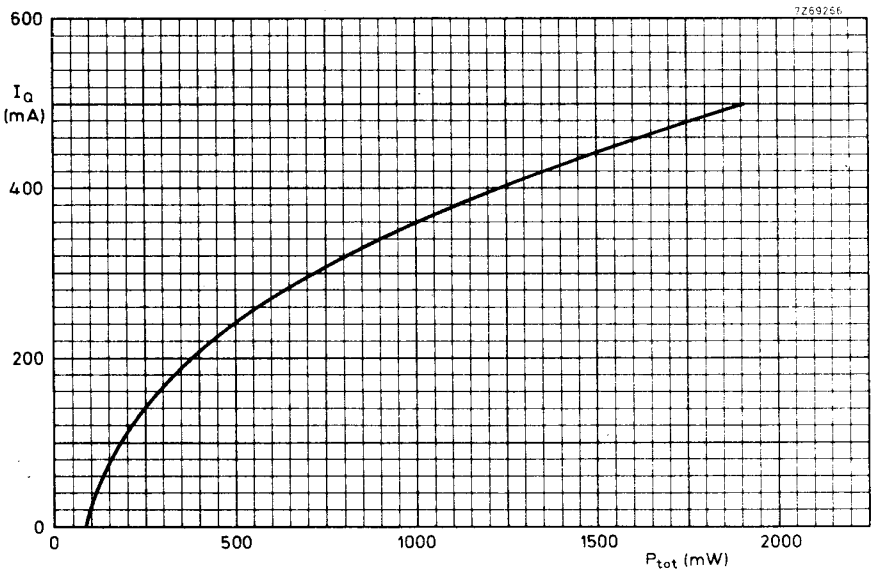
Be sure to visit ChipDocs site for more information
http://www.chipdocs.com





Be sure to visit ChipDocs site for more information
http://www.chipdocs.com

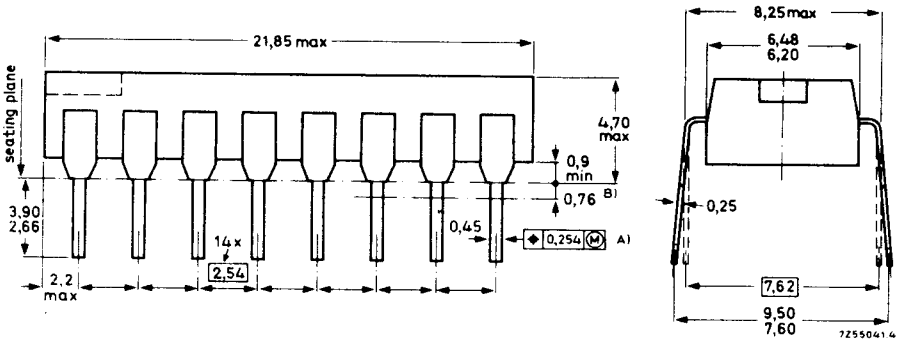


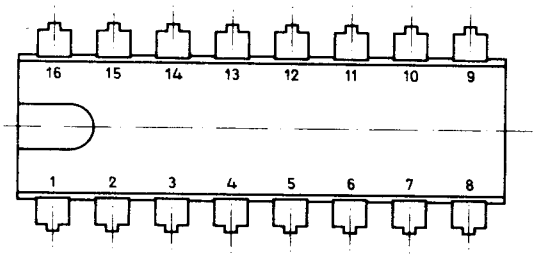


Be sure to visit ChipDocs site for more information
http://www.chipdocs.com

16 LEAD PLASTIC POWER DUAL IN-LINE

Dimensions in mm





top view

A) Centre-lines of all leads are within ±0,127 mm of the nominal positions shown; in the worst case, the spacing between any two leads may deviate from nominal by ±0,254 mm.

B) Lead spacing tolerances apply from seating plane to the line indicated

SOLDERING

1. By hand

   Apply the soldering iron below the seating plane (or not more than 2 mm above it). If its temperature is below 300 °C it must not be in contact for more than 10 seconds; if between 300 °C and 400 °C, for not more than 5 seconds.

2. By dip or wave

   260 °C is the maximum allowable temperature of the solder; it must not be in contact with the joint for more than 5 seconds. The total contact time of successive solder waves must not exceed 5 seconds.
   The device may be mounted up to the seating plane, but the temperature of the plastic body must not exceed the specified storage maximum. If the printed circuit board has been pre-heated, forced cooling may be necessary immediately after soldering to keep the temperature within the allowable limit.

3. Repairing soldered joints

   The same precautions and limits apply as in (1) above.

Be sure to visit ChipDocs site for more information
http://www.chipdocs.com