

STEPPER MOTOR DRIVE CIRCUIT

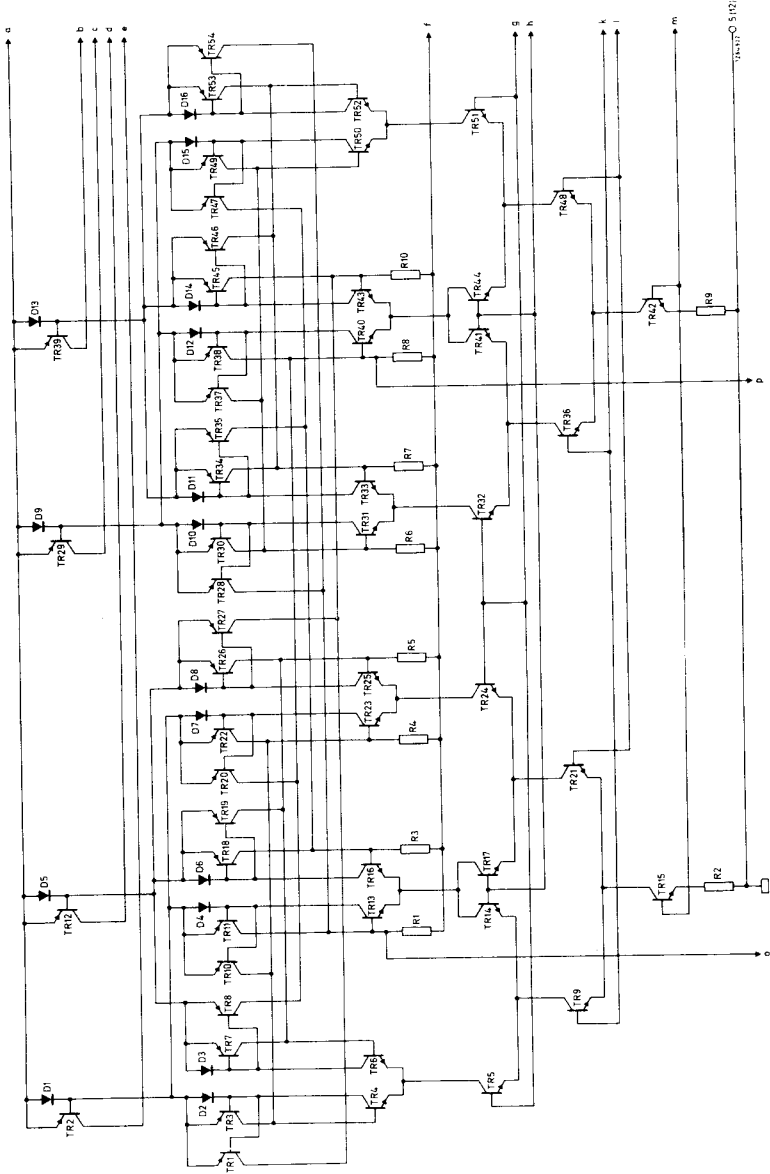
The SAA1027 is intended for driving a four phase two stator stepper motor. The circuit consists of four output stages, a logic part and three input stages. The logic part is driven by three input stages; a trigger input stage, an input stage which can change the switching sequence of the logic part so 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			

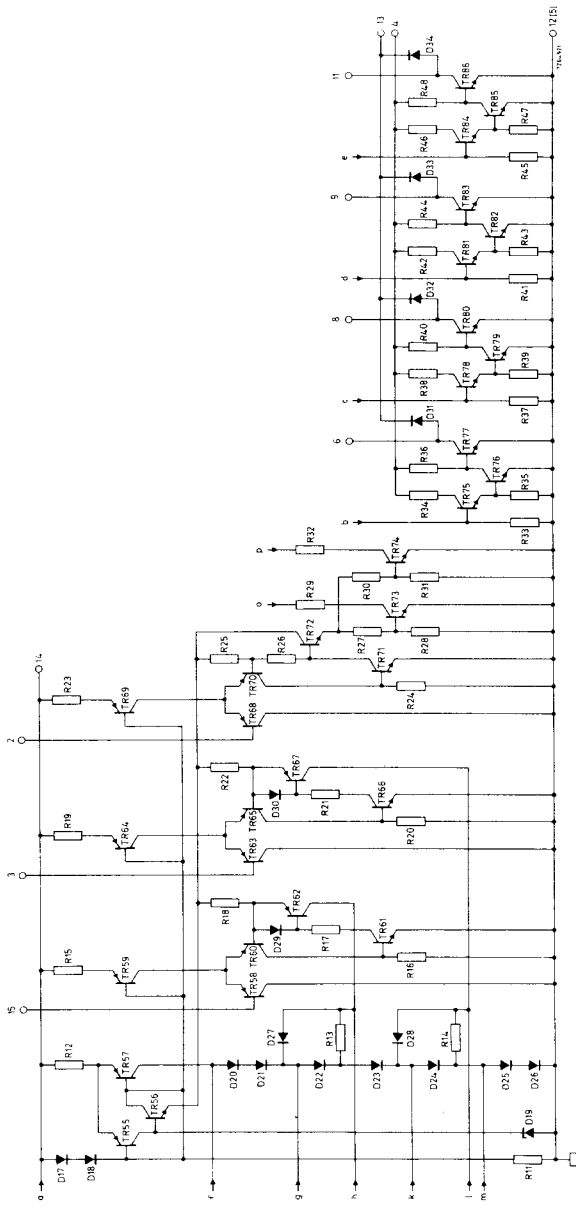
PACKAGE OUTLINE 16 lead plastic power dual in-line (see page 9)

CIRCUIT DIAGRAM



bi-directional, 4 position, synchronous counter

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output stages

set stage

CW/CCW stage

trigger stage

supply voltages

SAA1027

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
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Power dissipation

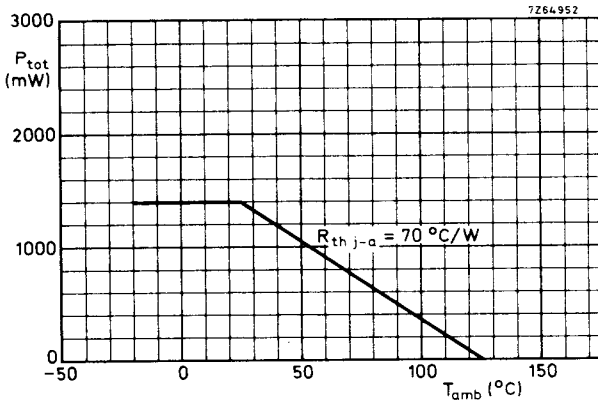
see derating curve below 1)

Temperatures

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

THERMAL RESISTANCE

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

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: Q₁ = L, Q₂ = H, Q₃ = L, Q₄ = H.

Trigger conditions (T)

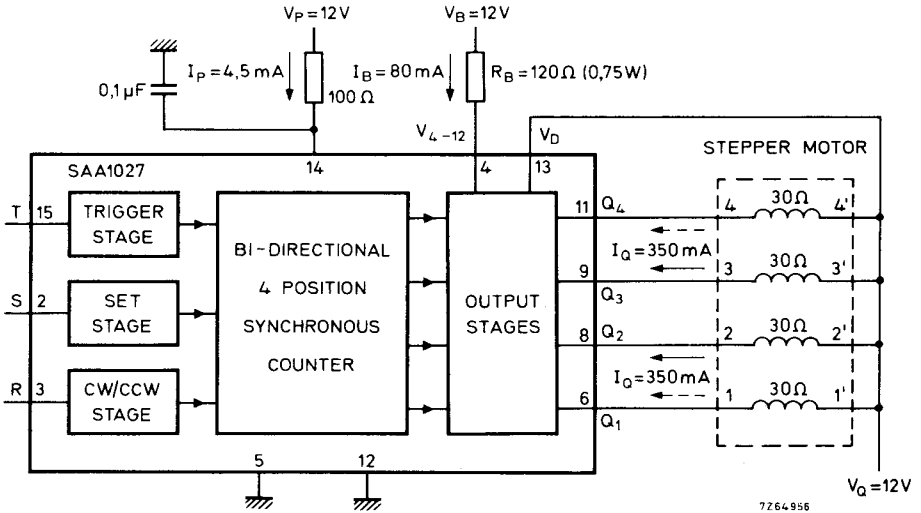
S = H									
R = H					R = L				
T	Q ₁	Q ₂	Q ₃	Q ₄	T	Q ₁	Q ₂	Q ₃	Q ₄
0	L	H	L	H	0	L	H	L	H
1	H	L	L	H	1	L	H	H	L
2	H	L	H	L	2	H	L	H	L
3	L	H	H	L	3	H	L	L	H
4	L	H	L	H	4	L	H	L	H

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	V _{IH}	>	7,5 V
HIGH	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

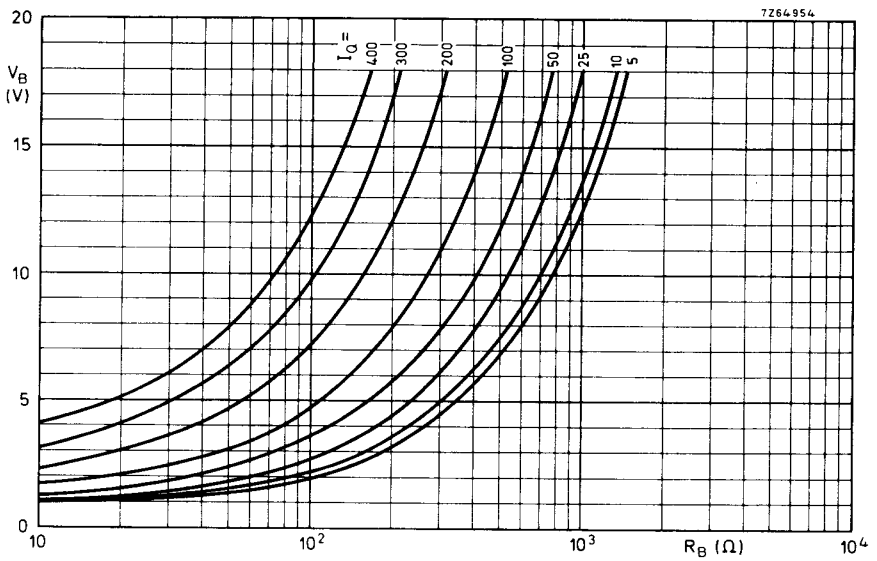
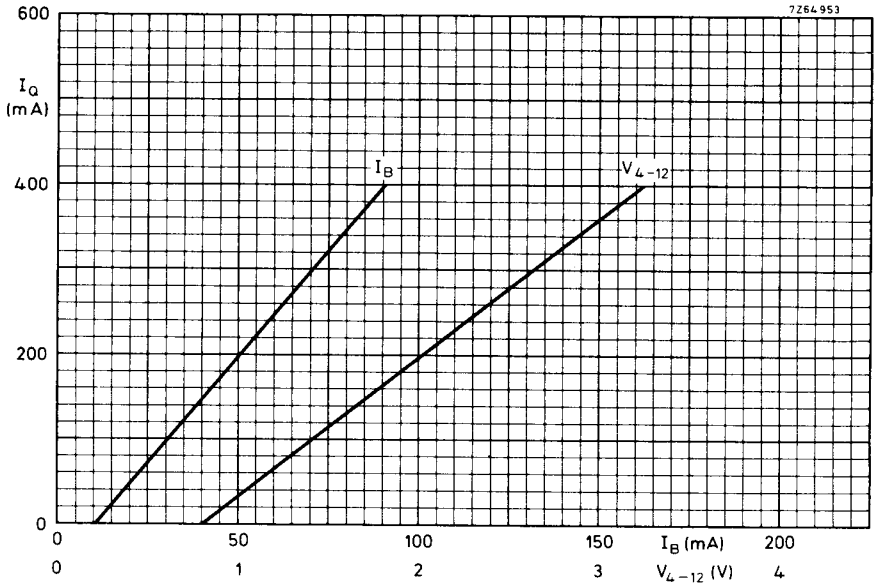


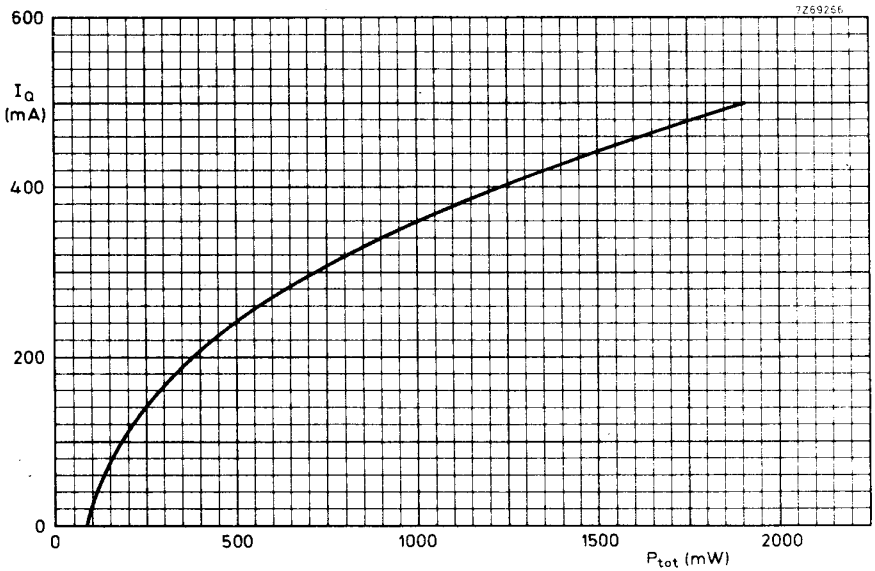
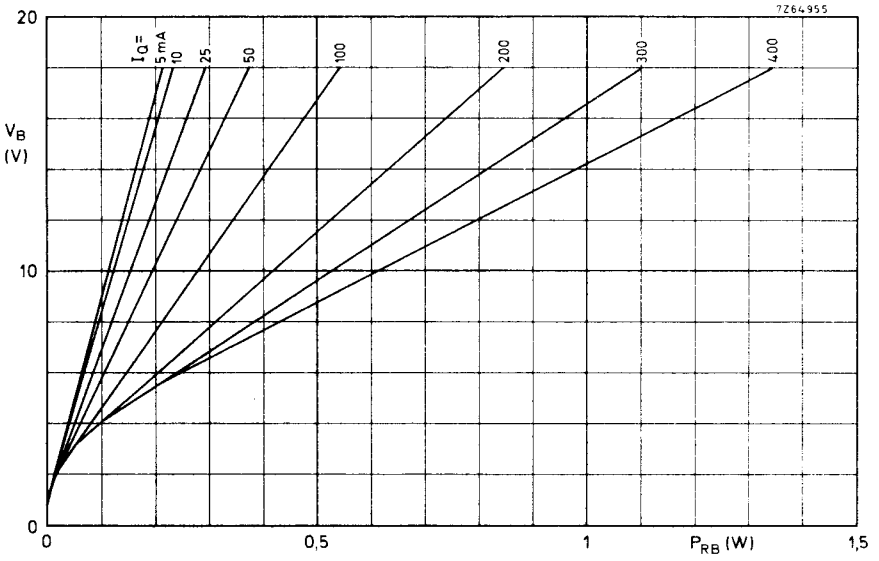
APPLICATION INFORMATION



PINNING

- | | |
|-------------------------------------|--------------------------------------|
| 1. not connected | 9. Q ₃ (output) |
| 2. S (set input) | 10. not connected |
| 3. R (CW/CCW input) | 11. Q ₄ (output) |
| 4. V _B (positive supply) | 12. Earth (negative supply) |
| 5. Earth (negative supply) | 13. V _D (positive supply) |
| 6. Q ₁ (output) | 14. V _P (positive supply) |
| 7. not connected | 15. T (trigger input) |
| 8. Q ₂ (output) | 16. not connected |





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