

N1034A N1034S

BACKWARD WAVE OSCILLATORS

Service types CV2381 (N1034A), CV6023 (N1034S)

ABRIDGED DATA

O-type backward wave oscillators for wide band microwave receivers and oscillators, suitable for pulse or amplitude modulation.

Frequency range 2.4 to 4.5 GHz

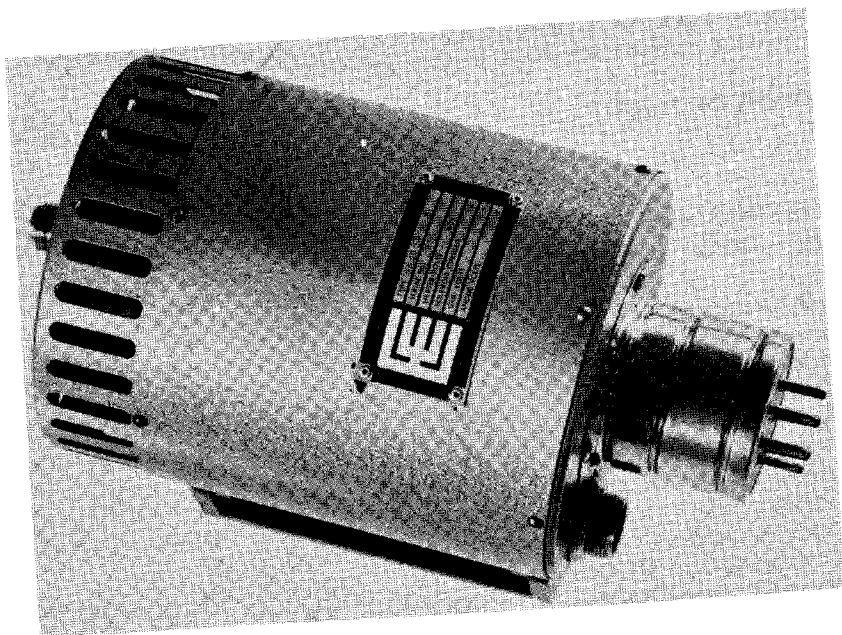
Typical output power over band 90 to 400 mW

Integral focusing: permanent magnet

N1034A solenoid

N1034S 50 Ω type N coaxial

Output connector



August 1973

GENERAL

Electrical

Cathode	indirectly heated, oxide coated	
Heater voltage	6.3	V
Heater current	2.4	A
Cathode pre-heating time (minimum)	2.0	min
Inter-electrode capacitances:		
cathode to grid, anode and delay line	10	pF
grid to cathode, anode and delay line	15	pF
anode to cathode, grid and delay line	15	pF
delay line to cathode, grid and anode	10	pF
delay line to outer shell	300	pF
Solenoid power supply (N1034S)	24V, 4A	d.c.

Mechanical

Overall dimensions	see outline drawings	
Net weight	11 pounds (5kg) approx	
Mounting position (see note 1)	any	
Base	B.S.448-B7D (JEDEC A7-17)	
R.F. output connector	50Ω type N	
Solenoid connector (N1034S)	AP208600/CV48992	
Tubes are vibration tested to withstand normal service conditions.		

Cooling (See note 2) forced-air

MAXIMUM AND MINIMUM RATINGS (Absolute values) (See note 3)

No individual rating to be exceeded.

	Min	Max	
Heater voltage	5.7	6.8	V
Heater starting current (peak)	—	4.0	A
Grid voltage (see note 4)	0	-150	V
Delay line voltage	150	1500	V
Delay line current (see note 5)	—	50	mA
Delay line dissipation	—	50	W
Anode voltage (see note 6)	—	200	V
Anode current	—	20	mA
Body temperature	—	120	°C
Solenoid voltage (N1034S)	16	24	V
Solenoid current (N1034S)	3.0	7.0	A

RANGE OF CHARACTERISTICS AND TYPICAL OPERATION

Operating Conditions (See note 3)

Heater voltage	6.3	V
Grid voltage	0	V
Load v.s.w.r.	1.2:1	max

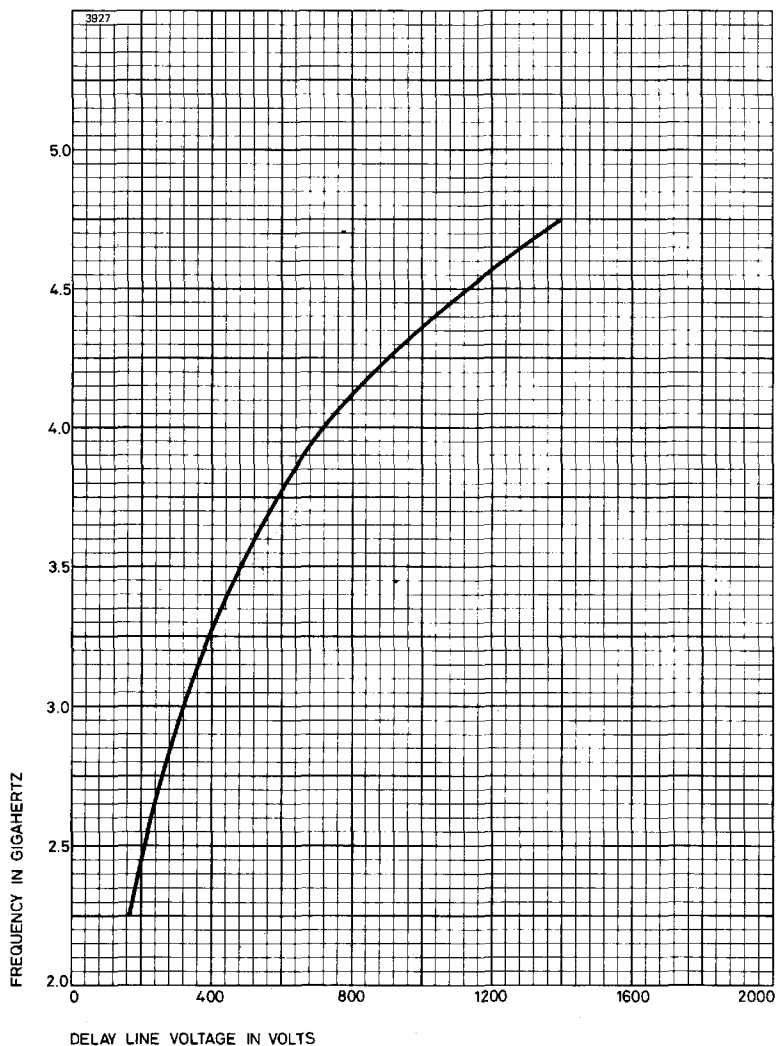
Typical Performance

	Min	Typical	Max	
Heater current	2.1	2.4	2.6	A
Delay line voltage:				
at 2.4GHz	150	190	200	V
at 2.6GHz	180	225	235	V
at 3.4GHz	400	440	460	V
at 4.5GHz	1030	1130	1170	V
Delay line current:				
at 2.4GHz	16	35	40	mA
at 2.6GHz	—	36	—	mA
at 3.4GHz	30	38	50	mA
at 4.5GHz	30	45	50	mA
Anode voltage (see note 7) . . .	100	150	200	V
Anode current	—	3.0	20	mA
Solenoid current for N1034S (see note 7)	3.0	4.0	7.0	A
Solenoid voltage	16	21	24	V
Grid cut-off voltage (see note 8) . .	—	—50	—100	V
Output power:				
at 2.4GHz	20	90	—	mW
at 2.6GHz	50	160	—	mW
at 3.4GHz	150	340	—	mW
at 4.5GHz	250	400	—	mW
Frequency pulling (see note 9) . . .	—	6.0	7.0	MHz
Signal to noise ratio (see note 10)	150	155	—	db/Hz

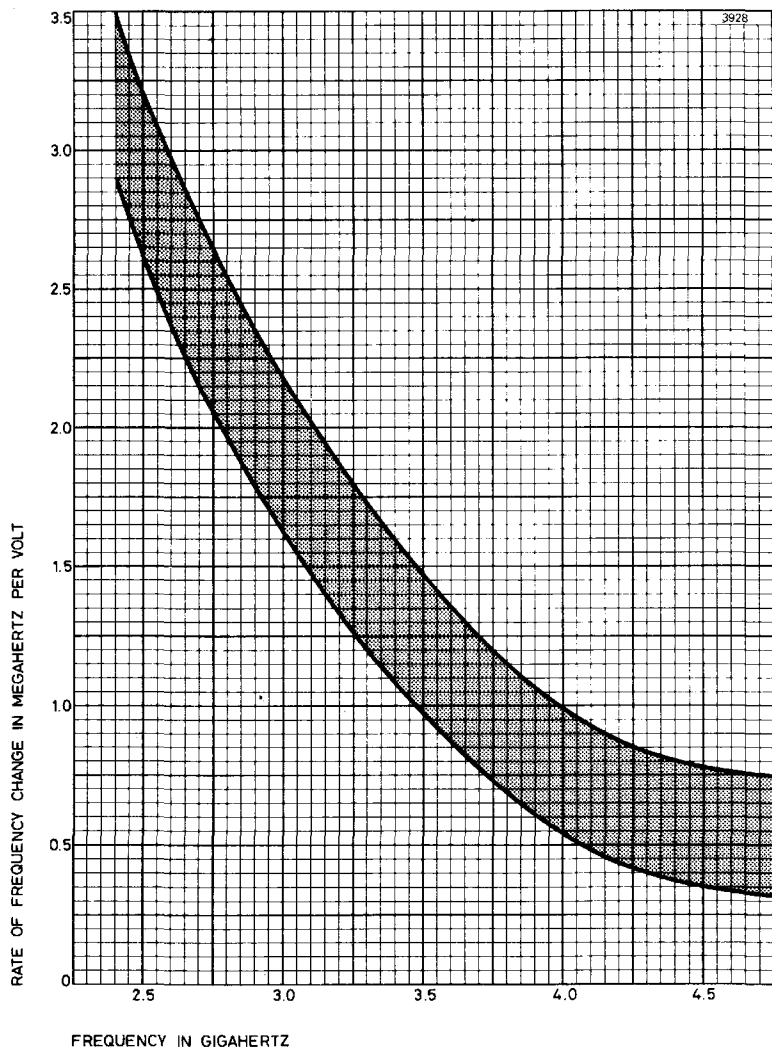
NOTES

1. Any magnetic materials must at all times be kept at least 8 inches (20cm) away from the N1034A, or a permanent loss of performance may result.
2. For the N1034A an airflow of $10\text{ft}^3/\text{min}$ ($0.28\text{m}^3/\text{min}$) is required, directed at the radiator; for the N1034S $20\text{ft}^3/\text{min}$ ($0.57\text{m}^3/\text{min}$), directed at the radiator and the sides of the solenoid. The pressure drop is less than 1 inch w.g.
3. All voltages except the heater voltage are with respect to cathode.
4. The grid must never become positive with respect to cathode. For normal c.w. operation the grid is connected to cathode.
5. The delay line and collector are internally connected.
6. Anode voltage must never be applied before the delay line voltage.
7. The optimum anode voltage and solenoid current (for N1034S) are marked on each tube.
8. The grid voltage at which oscillation ceases.
9. With a mismatch of v.s.w.r. 1.5:1, varied through all phases.
10. Measured as the ratio of the signal to the average noise in a 10MHz bandwidth, centred at least 20MHz from the carrier. For low noise performance the N1034A should be at least 18 inches (460mm) from any magnetic materials. Either the cathode, anode or delay line should be earthed.

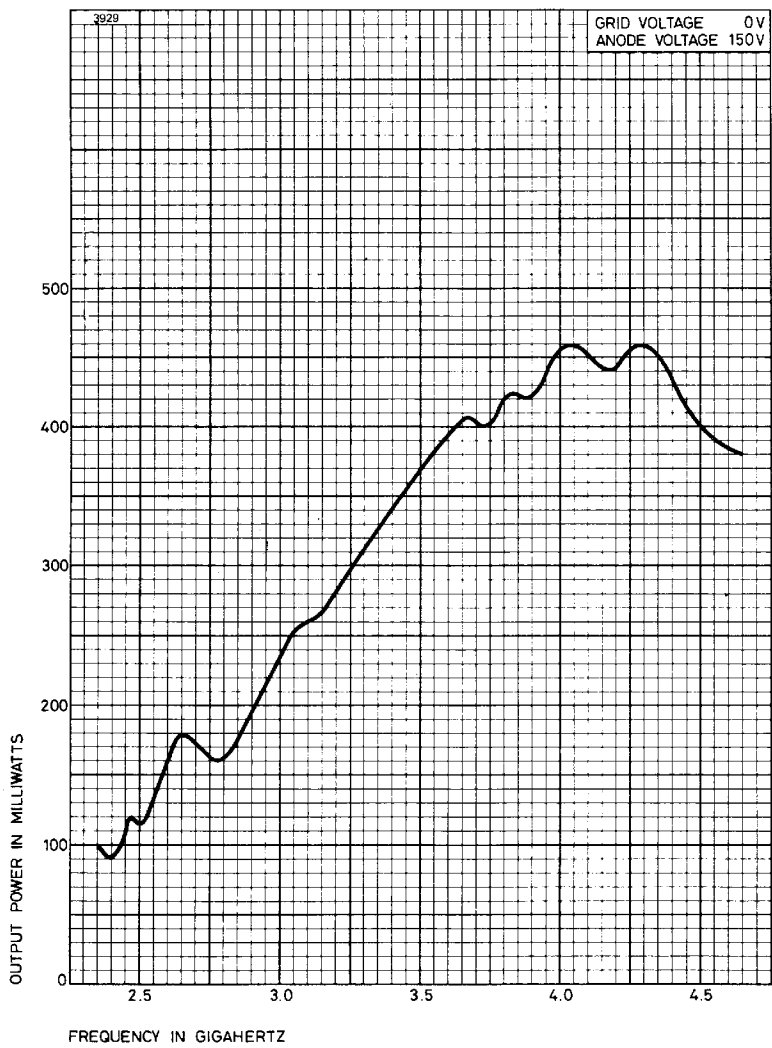
TYPICAL DELAY LINE VOLTAGE CHARACTERISTIC



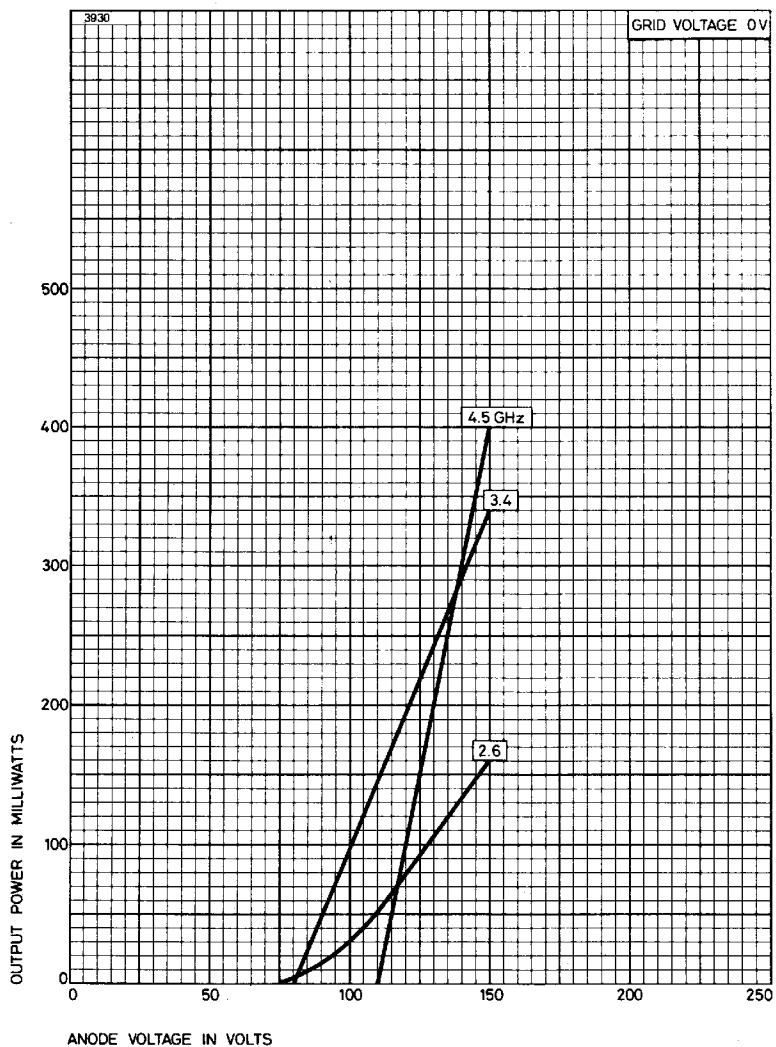
FREQUENCY CHANGE CHARACTERISTIC



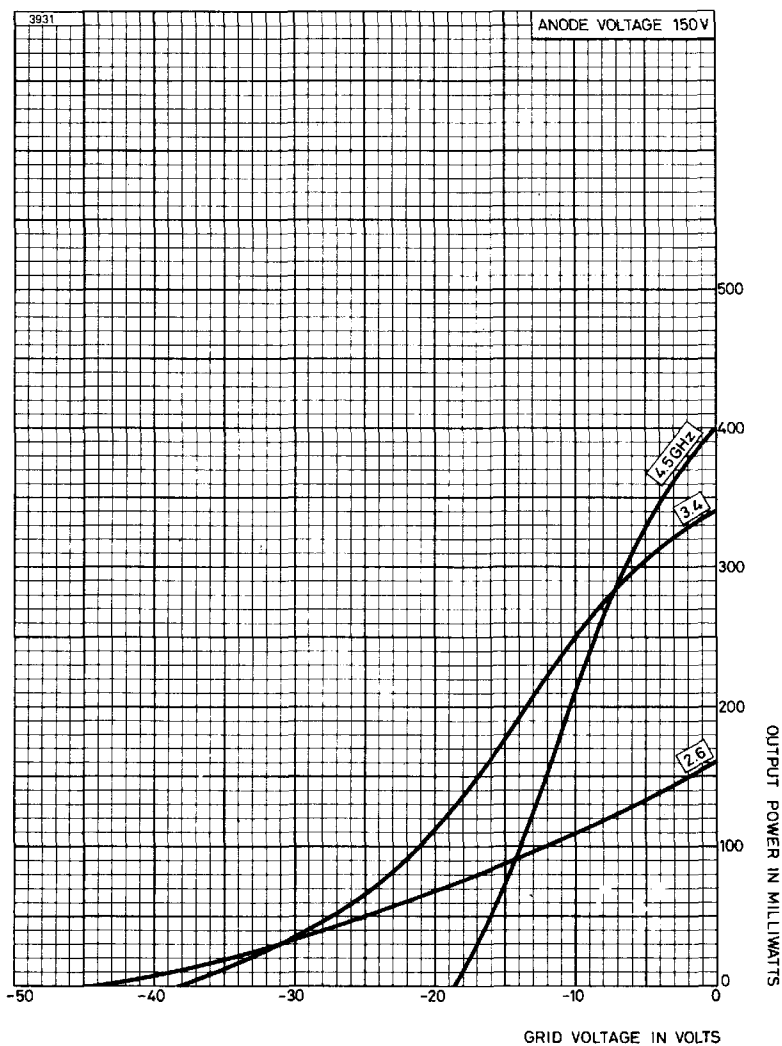
TYPICAL POWER CHARACTERISTIC



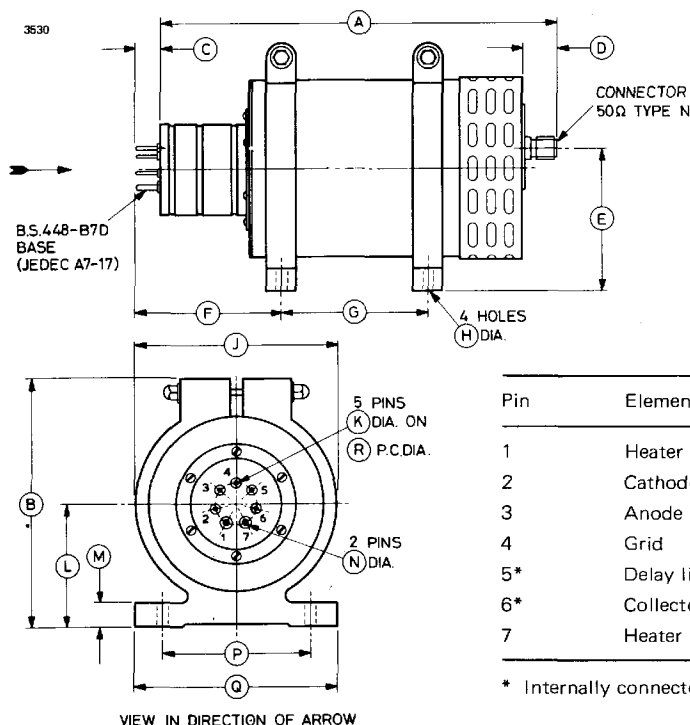
TYPICAL ANODE MODULATION CHARACTERISTICS



TYPICAL GRID MODULATION CHARACTERISTICS



OUTLINE OF N1034A (All dimensions without limits are nominal)



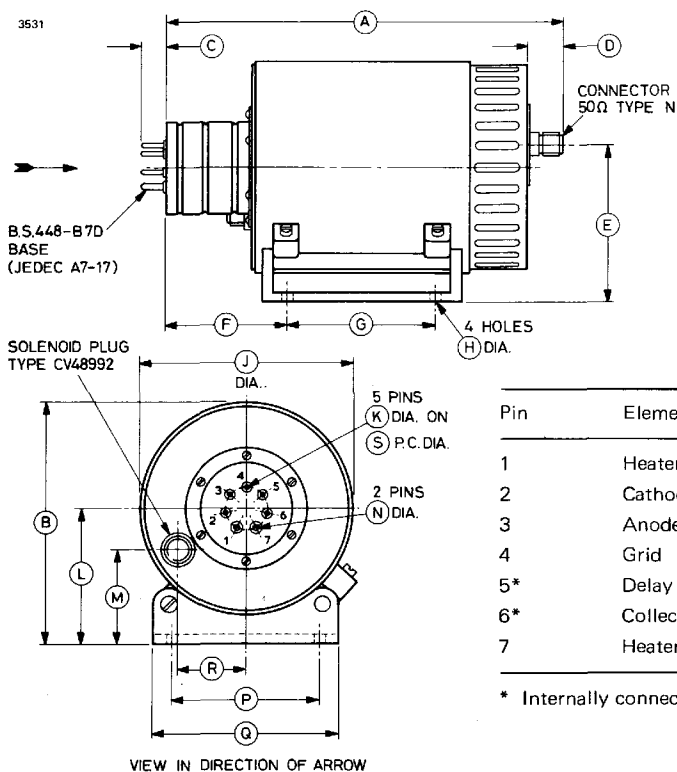
Pin	Element
1	Heater
2	Cathode
3	Anode
4	Grid
5*	Delay line
6*	Collector
7	Heater

* Internally connected

Ref	Inches	Millimetres	Ref	Inches	Millimetres
A	9.625 ± 0.250	244.5 ± 6.4	J	4.961 ± 0.062	126.0 ± 1.6
B	6.000 max	152.4 max	K	0.125 ± 0.003	3.175 ± 0.076
C	0.625 max	15.88 max	L	2.953	75.01
D	0.813	20.65	M	0.400	10.16
E	3.504	89.00	N	0.156 ± 0.003	3.962 ± 0.076
F	3.460 ± 0.375	87.88 ± 9.53	P	3.543 ± 0.010	89.99 ± 0.25
G	3.543 ± 0.010	89.99 ± 0.25	Q	4.961 ± 0.062	126.0 ± 1.6
H	0.217	5.51	R	1.000	25.40

Millimetre dimensions have been derived from inches.

OUTLINE OF N1034S (All dimensions without limits are nominal)



Pin	Element
1	Heater
2	Cathode
3	Anode
4	Grid
5*	Delay line
6*	Collector
7	Heater

* Internally connected

Ref	Inches	Millimetres
A	9.625 ± 0.250	244.5 ± 6.4
B	5.860 ± 0.125	148.8 ± 3.2
C	0.625 max	15.88 max
D	0.813	20.65
E	3.801 ± 0.187	96.55 ± 4.75
F	3.000 ± 0.250	76.20 ± 6.35
G	3.543 ± 0.010	89.99 ± 0.25
H	0.218	5.54
J	5.181 ± 0.015	131.6 ± 0.4

Ref	Inches	Millimetres
K	0.125 ± 0.003	3.175 ± 0.076
L	3.270 ± 0.031	83.06 ± 0.79
M	2.343 ± 0.187	59.51 ± 4.75
N	0.156 ± 0.003	3.962 ± 0.076
P	3.543 ± 0.010	89.99 ± 0.25
Q	4.500 ± 0.031	114.3 ± 0.8
R	1.606 ± 0.187	40.79 ± 4.75
S	1.000	25.40

Millimetre dimensions have been derived from inches.