

MILITARY SPECIFICATION  
**CV7536-50**  
SEMICONDUCTOR DEVICE, REFERENCE DIODE

Description:- This specification covers the detail requirements for Silicon Reference Diodes, single ended and is in accordance with K1007, Issue 3. except as otherwise stated.

Mechanical Dimensions and Outlines:- See Drawing Fig. 2. Page 11

Connections:- The cathode lead will be indicated

Absolute Maximum Ratings:-

| RATING | V <sub>F</sub> | P <sub>tot</sub> | T <sub>op</sub> | T <sub>stg</sub> | I <sub>R</sub> | Vibration | Shock |
|--------|----------------|------------------|-----------------|------------------|----------------|-----------|-------|
| UNIT   | V              | mW               | °C              | °C               | mA             | g         | g     |
| MIN    | -              | -                | -40             | -40              | -              | -         | -     |
| MAX    | 1.2            | 300              | +150            | +150             |                | 20        | 100   |
| NOTES  |                | A                |                 |                  | B              |           | C     |

Note A. Averaged over any 20 mSec period, up to 50°C  
See Derating Curve Fig. 1. Page 10

B. Max. Peak Reverse Current (mA). See Table 1  
Page 2.

C. Duration = 6 mS.

# CV 7536-50

**TABLE 1**

| Number  | mA (max) | Number  | mA (max) |
|---------|----------|---------|----------|
| CV 7536 | 110      | CV 7544 | 45       |
| CV 7537 | 110      | CV 7545 | 42       |
| CV 7538 | 90       | CV 7546 | 40       |
| CV 7539 | 80       | CV 7547 | 35       |
| CV 7540 | 75       | CV 7548 | 30       |
| CV 7541 | 65       | CV 7549 | 27       |
| CV 7542 | 60       | CV 7550 | 25       |
| CV 7543 | 50       |         |          |

**Primary Electrical Characteristics**

| Characteristic | $V_Z$  |      |        | $r_z$ | $S_Z$ |       | C  | $I_R$  | $I_R$ |
|----------------|--------|------|--------|-------|-------|-------|----|--------|-------|
|                | V      |      |        | ohms  | %/°C  |       | pF | µA     | µA    |
|                | Min.   | Typ. | Max.   | Max.  | Min.  | Max.  |    | Max.   | Max.  |
| CV7536         | 3.135  | 3.3  | 3.465  | 130   | -.08  | -.03  | 90 | 1.0    | 5     |
| CV7537         | 3.420  | 3.6  | 3.780  | 100   | -.06  | -.02  | 90 | 1.0    | 5     |
| CV7538         | 3.705  | 3.9  | 4.095  | 90    | -.06  | -.02  | 85 | 1.0    | 5     |
| CV7539         | 4.085  | 4.3  | 4.515  | 80    | -.05  | -.01  | 85 | 1.0    | 5     |
| CV7540         | 4.465  | 4.7  | 4.935  | 75    | -.04  | 0.00  | 80 | 1.0    | 5     |
| CV7541         | 4.845  | 5.1  | 5.355  | 70    | -.03  | +0.02 | 80 | 1.0    | 5     |
| CV7542         | 5.320  | 5.6  | 5.880  | 40    | -.02  | +0.03 | 60 | 1.0    | 5     |
| CV7543         | 5.890  | 6.2  | 6.510  | 15    | 0.00  | +0.05 | 60 | 1.0    | 5     |
| CV7544         | 6.460  | 6.8  | 7.140  | 10    | +0.02 | +0.07 | 45 | 1.0    | 5     |
| CV7545         | 7.125  | 7.5  | 7.875  | 10    | +0.03 | +0.07 | 45 | 0.1    | 5     |
| CV7546         | 7.790  | 8.2  | 8.610  | 15    | +0.04 | +0.08 | 40 | 0.1    | 5     |
| CV7547         | 8.645  | 9.1  | 9.555  | 18    | +0.05 | +0.08 | 40 | 0.1    | 5     |
| CV7548         | 9.500  | 10   | 10.500 | 25    | +0.05 | +0.08 | 25 | 0.1    | 5     |
| CV7549         | 10.4   | 11   | 11.6   | 35    | .05   | +0.09 | 25 | 0.1    | 5     |
| CV7550         | 11.400 | 12   | 12.600 | 45    | +0.05 | +0.09 | 25 | 0.1    | 5     |
| $I_R$ mA       | 5      |      |        | 5     | 5     |       |    |        |       |
| $V_R$ V        | -      |      |        | -     | -     |       | -1 | Note D |       |
| $T_1$ °C       | -      |      |        | -     | 25    |       | -  | -      |       |
| $T_2$ °C       | -      |      |        | -     | 60    |       | -  | -      |       |
| T °C           | 25     |      |        | 25    | -     |       | 25 | 25     | 100   |

NOTE D.  $V_R$  conditions for these tests can be seen on Pages 4 and 6

Reliability Assurance Requirements

Under discussion

## Requirements:-

### Marking

The device shall be marked as K1007 Section B.  
1.3.4. Minimum requirements 1.3.4.1(a) and (b).

## Quality Assurance Provisions:-

### Destructive Tests:

The tests listed in Table 2. Group B Inspection, Sub Groups 2 and 3 and Table 3. Group C Inspection, Sub Group 2 are considered destructive.

### Group C Inspection

This inspection shall be conducted on the initial lot, and thereafter every ninety days or every fifth lot, whichever occurs first.

## Preparation for Delivery:-

### Packaging

The device shall be packed according to K1007. Issue 3. Section A. 1.2.(c).

## NATO Stock Numbers:-

CV7536 = 5960-99-037-3789  
CV7537 = 5960-99-037-3790  
CV7538 = 5960-99-037-3791  
CV7539 = 5960-99-037-3792  
CV7540 = 5960-99-037-3793  
CV7541 = 5960-99-037-3794  
CV7542 = 5960-99-037-3795  
CV7543 = 5960-99-037-3796  
CV7544 = 5960-99-037-3797  
CV7545 = 5960-99-037-3798  
CV7546 = 5960-99-037-3799  
CV7547 = 5960-99-037-3800  
CV7548 = 5960-99-037-3801  
CV7549 = 5960-99-037-3802  
CV7550 = 5960-99-037-3803

This specification has been prepared by, and the Qualification Approval Authority is:-

Ministry of Aviation, Royal Radar Establishment, Malvern, Worcs., England.

27th May, 1964

Page 3

TABLE 1. GROUP A INSPECTION

| Examination or Test                             | K1007/NATO Ref. | TEST CONDITIONS               |  | AQL % | Insp. Level | Sym- bol | LIMITS   |  | Units                                |
|---|-----------------|-------------------------------|--|-------|-------------|----------|--|--|--------------------------------------|
|   |                 | Specific Conditions           |  |       |             |          | Min.   | Max.   |                                      |
| SUB GROUP 1<br>Visual and Mechanical Inspection | 5.1             | Excluding Physical Dimensions |  | 0.65  | I           |          |  |  |                                      |
|   | 8A.2.4          | $I_R = 5mA$                   | CV7536<br>CV7537<br>CV7538<br>CV7539<br>CV7540<br>CV7541<br>CV7542<br>CV7543<br>CV7544<br>CV7545<br>CV7546<br>CV7547<br>CV7548<br>CV7549<br>CV7550 | 0.65  | II          | $V_Z$    | 3.1<br>3.4<br>3.7<br>4.0<br>4.4<br>4.8<br>5.3<br>5.8<br>6.4<br>7.1<br>7.7<br>8.6<br>9.40<br>10.40<br>11.40 | 3.5<br>3.8<br>4.1<br>4.5<br>5.0<br>5.4<br>6.0<br>6.6<br>7.2<br>7.9<br>8.7<br>9.6<br>10.60<br>11.6<br>12.60 | V<br>" " " " " " " " " " " " " " " " |
| SUB GROUP 2<br>Zener Voltage                    | 8A.2.2          |                               | $V_R = 0.5V$   |       |             |          |  |  | $\mu A$                              |
|   |                 |                               | $V_R = 1.0V$   |       |             |          |  |  | $\mu A$                              |
|   |                 |                               | $V_R = 3.0V$   |       |             |          |  |  |                                      |
| Reverse Current (1)                             |                 |                               | CV7536 - CV7537<br>CV7538 - CV7548<br>CV7549 - CV7550  |       |             | $I_R$    | -<br>-<br>-  | 1.0<br>1.0<br>0.1  | $\mu A$<br>$\mu A$<br>$\mu A$        |

TABLE 1. GROUP A INSPECTION (Cont'd)

| Examination or Test                    | TEST CONDITIONS |  | AQL % | Insp. Level | Sym- bol | LIMITS |       | Units |
|--|-----------------|--|-------|-------------|----------|--------|-------|-------|
|  | K1007/NATO Ref. | Specific Conditions  |       |             |          | Min.   | Max.  |       |
| Slope Resistance                       | 8A.4.1          | $I_R = 5 \text{ mA}$   | 2.5   | I           | $r_z$    | -      | 130   | ohms  |
|  |                 |  |       |             |          | -      | 100   | "     |
|  |                 |  |       |             |          | -      | 90    | "     |
|  |                 |  |       |             |          | -      | 80    | "     |
|  |                 |  |       |             |          | -      | 75    | "     |
|  |                 |  |       |             |          | -      | 70    | "     |
|  |                 |  |       |             |          | -      | 40    | "     |
|  |                 |  |       |             |          | -      | 15    | "     |
|  |                 |  |       |             |          | -      | 10    | "     |
|  |                 |  |       |             |          | -      | 10    | "     |
|  |                 |  |       |             |          | -      | 15    | "     |
|  |                 |  |       |             |          | -      | 18    | "     |
|  |                 |  |       |             |          | -      | 25    | "     |
|  |                 |  |       |             |          | -      | 40    | "     |
|  |                 |  |       |             |          | -      | 45    | "     |
| SUB GROUP 3<br>Temperature Coefficient | 8A.7.3          | $I_R = 5 \text{ mA}$<br>$T_1 = 32.5 \text{ }^\circ\text{C}$<br>$T_2 = 60 \text{ }^\circ\text{C}$ | 2.5   | I           | $s_z$    | -0.08  | -0.03 | %/°C  |
|  |                 |  |       |             |          | -0.06  | -0.02 | "     |
|  |                 |  |       |             |          | -0.06  | -0.02 | "     |
|  |                 |  |       |             |          | -0.05  | -0.01 | "     |
|  |                 |  |       |             |          | -0.04  | 0.00  | "     |
| -0.03                                  | +0.02           | "  |       |             |          |        |       |       |

# CV 7536-50

TABLE 1 GROUP A INSPECTION (Cont'd)

| Examination or Test        | K1007/NATO Ref. | TEST CONDITIONS<br>Specific Conditions | AQL %           | Insp. Level | Sym- bol | LIMITS |       | Units         |
|----------------------------|-----------------|--|-----------------|-------------|----------|--------|-------|---------------|
|                            |                 |  |                 |             |          | Min.   | Max.  |               |
| SUB GROUP 3 Cont'd         |                 | CV7542                                 |                 |             |          | -0.02  | +0.03 | V             |
|                            |                 | CV7543                                 |                 |             |          | 0.00   | +0.05 | V             |
|                            |                 | CV7544                                 |                 |             |          | +0.02  | +0.07 | V             |
|                            |                 | CV7545                                 |                 |             |          | +0.03  | +0.07 | V             |
|                            |                 | CV7546                                 |                 |             |          | +0.04  | +0.08 | V             |
|                            |                 | CV7547                                 |                 |             |          | +0.05  | +0.08 | V             |
|                            |                 | CV7548                                 |                 |             |          | +0.05  | +0.08 | V             |
|                            |                 | CV7549                                 |                 |             |          | +0.05  | +0.08 | V             |
|                            |                 | CV7550                                 |                 |             |          | +0.05  | +0.09 | V             |
|                            |                 |  |                 |             |          | -      | 1.2   | V             |
| Forward Voltage Drop       | 8A.3.2          | $I_F = 100 \text{ mA}$                 |                 |             | $V_F$    |        |       |               |
| Reverse Current (2)        | 8A.2.2          | $T_{amb} = 100^\circ\text{C}$          |                 |             | $I_R$    |        |       |               |
| SUB GROUP 4<br>Capacitance |                 | CV7536 - $V_R = 1.0V$                  |                 |             |          | -      | 5.0   | $\mu\text{A}$ |
|                            |                 | CV7538 - $V_R = 3.0V$                  |                 |             |          | -      | 5.0   | $\mu\text{A}$ |
|                            |                 | $V = -1V$                              | CV7536 - CV7537 |             |          |        |       |               |
|                            |                 | $f = 1 \text{ Mc/s.}$                  | CV7538 - CV7550 |             |          |        |       |               |
|                            |                 |  | CV7540 - CV7541 |             |          |        |       |               |
|                            |                 |  | CV7542 - CV7543 |             |          |        |       |               |
|                            |                 |  | CV7544 - CV7545 |             |          |        |       |               |
|                            |                 |  | CV7546 - CV7547 |             |          |        |       |               |
|                            |                 |  | CV7548 - CV7550 |             |          |        |       |               |
|                            |                 |  |                 |             |          | C      | 40    | 90            |
|                            |                 |  |                 |             |          | 35     | 85    | pF            |
|                            |                 |  |                 |             |          | 30     | 80    | pF            |
|                            |                 |  |                 |             |          | 20     | 60    | pF            |
|                            |                 |  |                 |             |          | 10     | 4.5   | pF            |
|                            |                 |  |                 |             |          | 10     | 4.0   | pF            |
|                            |                 |  |                 |             |          | 8      | 25    | pF            |

**TABLE 2. GROUP B INSPECTION**  
**See Page 3. Quality Assurance Provisions**

| Examination or Test                       | K1007/NATO Ref.  | TEST CONDITIONS<br>Specific Conditions   | AQL % | Insp. Level | Sym-bol | LIMITS |      | Units |
|---|------------------|--|-------|-------------|---------|--------|------|-------|
|   |                  |  |       |             |         | Min.   | Max. |       |
| <u>SUB GROUP 1</u><br>Physical Dimensions | 5.1              | According to drawing Fig. 2<br>Page 11   | 6.5   | IC          |         |        |      |       |
| <u>SUB GROUP 2</u><br>Solderability       | 5.12             |  | 4.0   | IA          |         |        |      |       |
| Temperature Cycling                       | 5.5              | -40 to + 150°C   |       |             |         |        |      |       |
| Moisture Resistance                       | 5.3              |  |       |             |         |        |      |       |
| <u>SUB GROUP 3</u><br>Vibration Fatigue   | 5.15.1           |  | 4.0   | IA          |         |        |      |       |
| <u>SUB GROUP 4</u><br>Lead Fatigue        | 5.10.2           | 3 cycles   |       |             |         |        |      |       |
| Omitted                                   |                  |  |       |             |         |        |      |       |
| <u>SUB GROUP 7</u><br>High Temperature    | 6.2.1            | T <sub>stg</sub> = 150°C<br>Duration 1000 hrs.   | 4.0   | I           | Note 1  |        |      |       |
| <u>SUB GROUP 8</u><br>Operating Life      | 6.3<br>6.6.1.2.2 | T <sub>amb</sub> Any single temperature between 50°C and 150°C<br>P <sub>tot</sub> according to that shown on the derating curve Fig. 1. Page 10 for the chosen temperature.<br>Duration = 1000 hours. | 4.0   | IA          |         |        |      |       |

# CV 7536-50

**TABLE 2. GROUP B INSPECTION (Cont'd)**  
 See Page 3. Quality Assurance Provisions

| Examination or Test  | TEST CONDITIONS |  | AQL % | Insp. Level | Sym- bol | LIMITS |       | Units   |
|--|-----------------|--|-------|-------------|----------|--------|-------|---------|
|  | K1007/NATO Ref. | Specific Conditions  |       |             |          | Min.   | Max.  |         |
| <u>Post Test End Points</u><br><u>for SUB GROUPS 2</u><br><u>3, 7 and 8</u><br>Zener Voltage | 8A.2.4          | $I_R = 5 \text{ mA}$<br><br>CV7536<br>CV7537<br>CV7538<br>CV7539<br>CV7540<br>CV7541<br>CV7542<br>CV7543<br>CV7544<br>CV7545<br>CV7546<br>CV7547<br>CV7548<br>CV7549<br>CV7550 |       |             | $V_Z$    | 3.035  | 3.565 | V       |
|  |                 |  |       |             |          | 3.320  | 3.880 | "       |
|  |                 |  |       |             |          | 3.605  | 4.195 | "       |
|  |                 |  |       |             |          | 3.985  | 4.615 | "       |
|  |                 |  |       |             |          | 4.365  | 5.035 | "       |
|  |                 |  |       |             |          | 4.745  | 5.455 | "       |
|  |                 |  |       |             |          | 5.220  | 5.980 | "       |
|  |                 |  |       |             |          | 5.790  | 6.610 | "       |
|  |                 |  |       |             |          | 6.360  | 7.240 | "       |
|  |                 |  |       |             |          | 7.025  | 7.975 | "       |
|  |                 |  |       |             |          | 7.690  | 8.710 | "       |
|  |                 |  |       |             |          | 8.545  | 9.655 | "       |
|  |                 |  |       |             |          | 9.40   | 10.60 | "       |
|  |                 |  |       |             |          | 10.30  | 11.65 | "       |
|  |                 |  |       |             |          | 11.30  | 12.70 | "       |
| Reverse Current  | 8A.2.2          | $-CV7536 V_R = 0.5V$<br>$-CV7537 V_R = 0.5V$<br>$-CV7538 V_R = 1.0V$<br>$-CV7544 V_R = 1.0V$<br>$-CV7545 V_R = 3.0V$<br>$-CV7550 V_R = 3.0V$                                   |       |             | $I_R$    | -      | 1.5   | $\mu A$ |
|  |                 |  |       |             |          | -      | 1.5   | $\mu A$ |
|  |                 |  |       |             |          | -      | 0.15  | $\mu A$ |



**TABLE 3. GROUP C INSPECTION (Cont'd)**  
 See Page 3. Quality Assurance Provisions

| Examination or Test                           | TEST CONDITIONS |  | AQI % | Insp. Level | Sym- bol       | LIMITS   |   | Units  |
|---|-----------------|--|-------|-------------|----------------|--|---|--|
|   | K1007/NATO Ref. | Specific Conditions  |       |             |                | Min.   | Max.  |  |
| <u>SUB GROUP 1</u><br>Omitted                 |                 |  |       |             |                |  |   |  |
| <u>SUB GROUP 2</u><br>Shock                   | 5.17            | 5 blows in each of three mutually perpendicular directions   | 6.5   | IA          |                |  |   |  |
| <u>Post Shock End Points</u><br>Zener Voltage | 8A.2.4          | $I_R = 5 \text{ mA}$<br><br>CV7536<br>CV7537<br>CV7538<br>CV7539<br>CV7540<br>CV7541<br>CV7542<br>CV7543<br>CV7544<br>CV7545<br>CV7546<br>CV7547<br>CV7548<br>CV7549<br>CV7550 |       |             | V <sub>Z</sub> | 3.035<br>3.320<br>3.605<br>3.985<br>4.365<br>4.745<br>5.220<br>5.790<br>6.360<br>7.025<br>7.690<br>8.345<br>9.40<br>10.30<br>11.30 | 3.565<br>3.880<br>4.195<br>4.615<br>5.035<br>5.455<br>5.980<br>6.610<br>7.240<br>7.975<br>8.710<br>9.655<br>10.60<br>11.65<br>12.70 | V<br>"<br>"<br>"<br>"<br>"<br>"<br>"<br>"<br>"<br>"<br>"<br>"<br>"<br>"<br>" |
| <u>Reverse Current</u>                        | 8A.2.2          | CV7536 $V_R = 0.5V$<br>CV7538 $V_R = 1.0V$<br>CV7545 $V_R = 3.0V$  |       |             | I <sub>R</sub> | -<br>-<br>-  | 1.5<br>1.5<br>0.15  | $\mu\text{A}$<br>$\mu\text{A}$<br>$\mu\text{A}$                              |

FIG 1

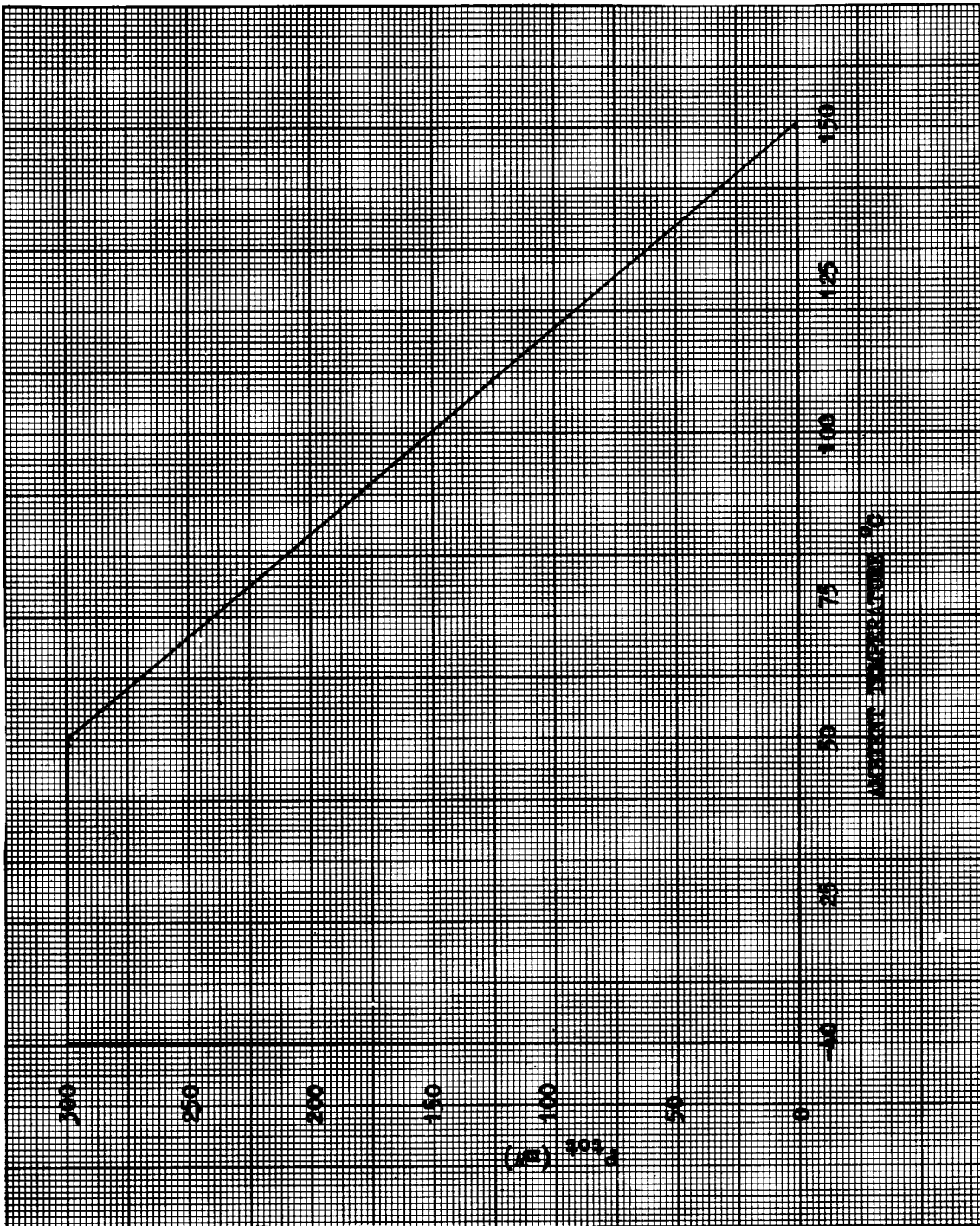
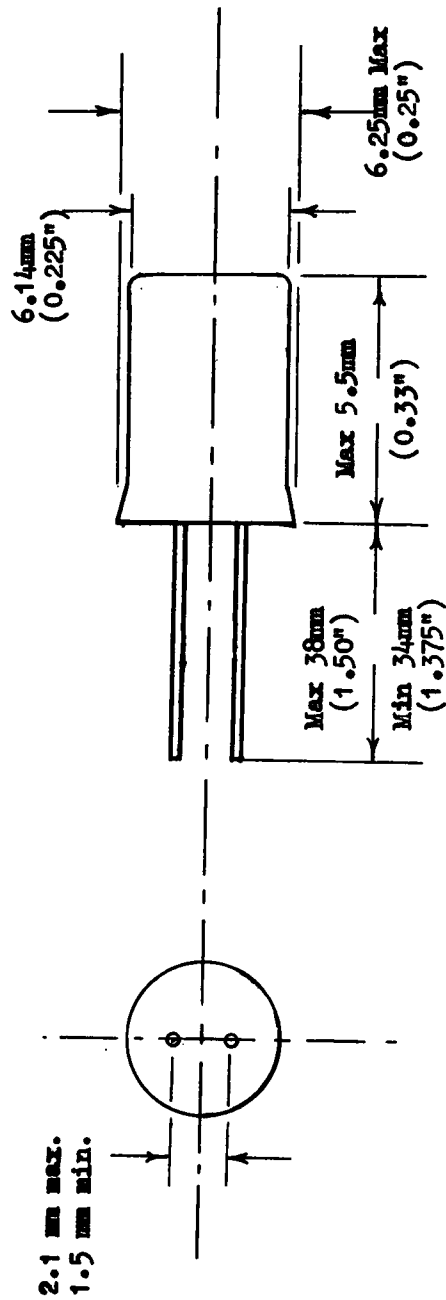


Fig 2



27th May, 1964