

MILITARY SPECIFICATION
CV 7124-6, CV 7499
SEMICONDUCTOR DEVICE DIODE

Description:- This specification covers the detail requirements for High Voltage Silicon Diode Rectifiers and is in accordance with K1007, Issue 3 except as otherwise stated.

Mechanical Dimensions and Outline:- See drawing Page 9 Fig. 3

Connections:- See drawing Page 9 Fig. 3

Absolute Maximum Ratings:-

| Rating | I _o | I _o | I _o | I _o | I _{FRM} | I _{FSM} | T _{stg} | T _{op} | Shock | Vib. |
|--------|----------------|----------------|----------------|----------------|------------------|------------------|------------------|-----------------|-------|------|
| Unit | mA | mA | mA | mA | A | A | °C | °C | g | g |
| Min. | - | - | - | - | - | - | -55 | -55 | - | - |
| Max. | 350 | 150 | 280 | 120 | 2.8 | 30 | +150 | +150 | 1500 | 20 |
| Notes | A,C | B,C | A,D | B,D | | E | | | F | |

| Type | CV7124 | CV7125 | CV7126 | CV7499 |
|------------------|--------|--------|--------|--------|
| V _{RWM} | 5.0 kV | 7.5 kV | 10 kV | 16 kV |

- Notes
- A. T_{amb} = 25°C
 - B. T_{amb} = 100°C
 - C. Resistive or Inductive Load
 - D. Capacitor Load
 - E. 10 mSec.
 - F. Duration 0.5 µSec
 - G. Commercial Equivalents
 - CV7124 = HS30
 - CV7125 = HS31
 - CV7126 = HS32
 - CV7499 = HS33

CV7124-6 CV7499

Primary Electrical Characteristics

| Characteristic | | I_R | V_F | I_R | Stored Charge |
|----------------|--------------------------------------|--------------------------------|-------|--------------------------------|------------------------|
| Unit | | μA | V | μA | C |
| CV7124 | Min. | - | - | - | 0.5×10^{-8} |
| | Max. | 2.0 | 13.5 | 40 | 5.0×10^{-8} |
| CV7125 | Min. | - | - | - | 0.5×10^{-8} |
| | Max. | 2.5 | 19.5 | 45 | 5.0×10^{-8} |
| CV7126 | Min. | - | - | - | 0.5×10^{-8} |
| | Max. | 3.0 | 23 | 50 | 5.0×10^{-8} |
| CV7499 | Min. | - | - | - | 0.5×10^{-8} |
| | Max. | 4.0 | 34 | 60 | 5.0×10^{-8} |
| CONDITIONS | T_{amb} °C | 25 | 25 | 100 | 25 |
| | I_F mA | - | 350 | - | 10 |
| | V_R V | | - | | See Sub Group 4 Page 4 |
| | CV7124 CV7125 CV7126 CV7499 | 5.0kV 7.5kV 10kV 16kV | | 5.0kV 7.5kV 10kV 16kV | |

Reliability Assurance Provisions:- Under discussion

Requirements:-

Marking

The device shall be marked as K1007 Section B
1.3.4. Essential marking requirements are
1.3.4.1 (a) (b) (c).

Quality Assurance Provisions:-

Destructive Tests

The tests listed in Table 2 Group B
Inspection, Sub Groups 2 and 3 and Table
3 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:-

| | | |
|--------|---|------------------|
| CV7124 | = | 5960-99-037-2294 |
| CV7125 | = | 5960-99-037-2295 |
| CV7126 | = | 5960-99-037-2296 |
| CV7499 | = | 5960-99-037-3762 |

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

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

TABLE 1 GROUP A INSPECTION

| Examination or Test | K1007/NATO Ref. | TEST CONDITIONS Specific Conditions | AQL % | Insp. Level | Sym-bol | LIMITS | | Units |
|--|-----------------|---|-------|-------------|---------|--------|--|--|
| | | | | | | Min. | Max. | |
| <u>SUB GROUP 1</u> Visual and Mechanical Inspection | 5.1.1 | | 0.65 | I | | | | |
| <u>SUB GROUP 2</u> Forward Voltage Drop | 8A.3.2 | $I_F = 350\text{mA}$ CV7124 CV7125 CV7126 CV7499 | 0.65 | II | V_F | | 13.5 19.5 23.0 34.0 | V V V V |
| Reverse Current (1) | 8A.2.2 | V_R CV7124 = 5.0kV CV7125 = 7.5kV CV7126 = 10kV CV7499 = 16kV | | | I_R | | 2.0 2.5 3.0 4.0 | μA μA μA μA |
| <u>SUB GROUP 3</u> Reverse Current (2) | 8A.2.2 | $T_{\text{amb}} = 100^\circ\text{C}$ V_R CV7124 = 5.0kV CV7125 = 7.5kV CV7126 = 10kV CV7499 = 16kV | 2.5 | I | I_R | | 40 45 50 60 | μA μA μA μA |
| <u>SUB GROUP 4</u> Stored Charge | 8A.6.2 | $C_1 = C_2 = .04\mu\text{F}$, $R_1 = 100\text{ohms}$ $D_1 = \text{CV7110}$, $D_2 = \text{CV7050}$ Pulse amplitude = 20V Pulse duration = 5 μs min. PRF = 10 kc/s. Pulse rise time not greater than 10ns over 10-90% amplitude | 4.0 | I | | | 0.5X 10 ⁻⁸ 5.0X 10 ⁻⁸ | C |

TABLE 2 GROUP B INSPECTION

See Page 3: Quality Assurance Provisions

| Examination or Test | TEST CONDITIONS | | Insp. Level | Sym- bol | LIMITS | | Units |
|--|--------------------|---|-------------|----------|--------|------|-------|
| | K1007/NATO Ref. | Specific Conditions | | | Min. | Max. | |
| <u>SUB GROUP 1</u> Physical Dimensions | 5.1.2 | As per drawing Page 9 Fig. 3 | IC | | | | |
| <u>SUB GROUP 2</u> Temperature Cycling Moisture Resistance | 5.5 5.3.1 | -55°C to +100°C | IC | | | | |
| <u>SUB GROUP 3</u> Vibration Fatigue | 5.15 | Non-operating | IC | | | | |
| <u>SUB GROUP 4, 5 and 6</u> Omitted | | | | | | | |
| <u>SUB GROUP 7</u> High Temperature Life | 6.2.1 6.6.1.2.2 | T _{stg} = 100°C Duration = 1000 hours | IC | | | | |
| <u>SUB GROUP 8</u> Operating Life | 6.3 6.6.1.2.2 | Half wave rectifier circuit with resistive load at maximum P.I.V. f = 50 c/s. Forward current not less than the value corresponding to the chosen T _{amb} according to the derating curve. Fig. 1 Page 8 | (Note 1) | | | | |

CV7124-6, CV7499

TABLE 2 GROUP B INSPECTION (Cont'd.)

| Examination or Test | TEST CONDITIONS | | AQL % | Insp. Level | Sym- bol | LIMITS | | Units |
|---|-----------------|--|-------|-------------|----------|--------|------|---------------|
| | K1007/NATO Ref. | Specific Conditions | | | | Min. | Max. | |
| <u>Post Test End Points for Sub Groups 2, 3 and 8</u> Forward Voltage Drop | 8A.3.2 | $I_F = 350\text{mA}$ CV7124 CV7125 CV7126 CV7499 | | | V_F | - | 13.5 | V |
| | | - | | | | 19.5 | V | |
| Reverse Current (2) | 8A.2.2 | $T_{amb} = 100^\circ\text{C}$ V_R | | | I_R | - | 40 | μA |
| | | CV7124 = 5.0kV | | | | - | 45 | μA |
| | | CV7125 = 7.5kV | | | | - | 50 | μA |
| | | CV7126 = 10kV CV7499 = 16kV | | | | - | 60 | μA |

TABLE 3 GROUP C INSPECTION
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>SUB GROUP 1</u> Omitted | | | | | | | | |
| <u>SUB GROUP 2</u> Shock | 5.17.1 | Non-operating. 5 blows in each of three mutually perpendicular directions | 6.5 | IC | | | | |
| <u>Post Test End Points</u> Forward Voltage Drop | 8A.3.2 | $I_F = 350\text{mA}$ CV7124 CV7125 CV7126 CV7499 | | | V _F | - | 13.5 19.5 23.0 34.0 | V V V V |
| Reverse Current (2) | 8A.2.2 | $T_{\text{amb}} = 100^\circ\text{C}$ V_R CV7124 = 5.0kV CV7125 = 7.5kV CV7126 = 10kV CV7499 = 16kV | | | I _R | - | 40 45 50 60 | μA μA μA μA |

NOTES

1. The Inspection levels, sampling plans, acceptance and rejection conditions shall be in accordance with Appendix A. Pages 10 and 11.

FIG 2
SURGE RATING CURVE

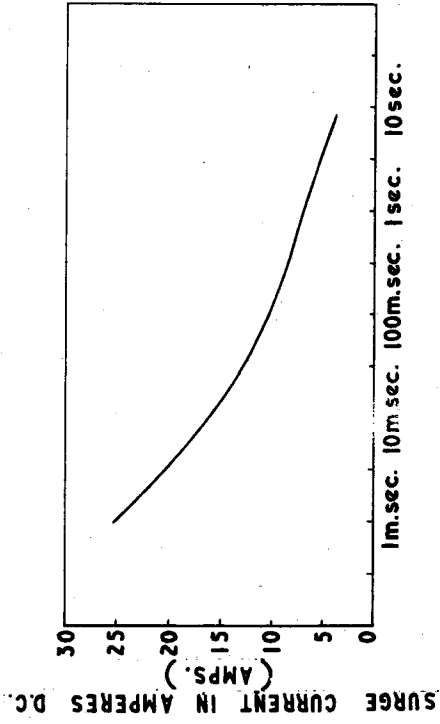


FIG 1
DERATING CURVE

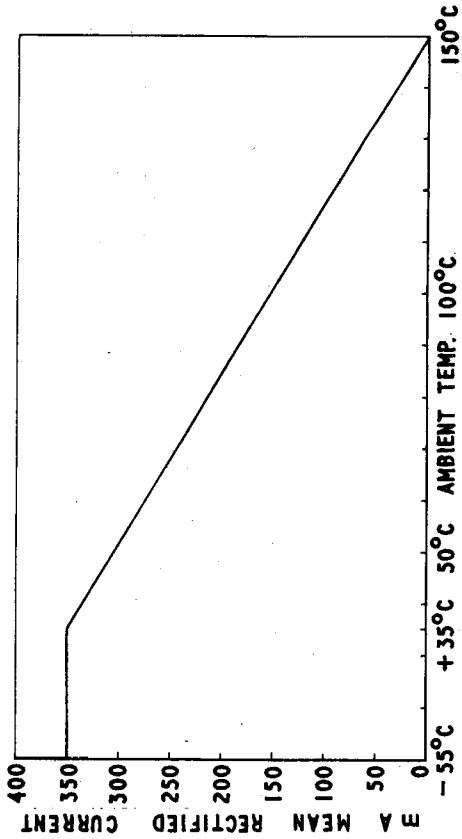
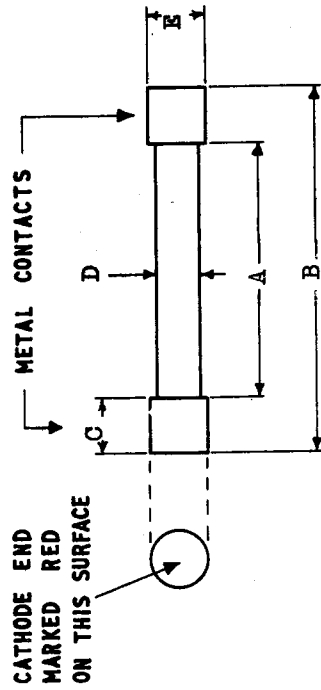


FIG 3

DIMENSIONAL DRAWING



M/M Dimensions derived from INCHES

| TYPE | DIMENSIONS | | | | |
|--------|-------------|--------------|-------------|-------------|-------------|
| | A | B | C | D | E |
| CV7124 | 24.0 - 26.5 | 43.5 - 46.5 | 8.8 - 10.8 | 11.0 - 11.5 | 12.2 - 13.5 |
| | 0.94 / 1.04 | 1.71 / 1.83 | 0.35 / 0.43 | 0.43 / 0.45 | 0.48 / 0.53 |
| CV7125 | 36.0 - 39.0 | 56.0 - 59.0 | 8.8 - 10.8 | 11.0 - 11.5 | 12.2 - 13.5 |
| | 1.00 / 1.57 | 2.20 / 2.32 | 0.35 / 0.43 | 0.43 / 0.45 | 0.48 / 0.53 |
| CV7126 | 49.0 - 52.0 | 68.5 - 71.5 | 8.8 - 10.8 | 11.0 - 11.5 | 12.2 - 13.5 |
| | 1.93 / 2.00 | 2.69 / 2.81 | 0.35 / 0.43 | 0.43 / 0.45 | 0.48 / 0.53 |
| CV7499 | 77.0 - 80.0 | 97.0 - 100.0 | 8.8 - 10.8 | 11.0 - 11.5 | 12.2 - 13.5 |
| | 3.03 / 3.15 | 3.82 / 3.93 | 0.35 / 0.43 | 0.43 / 0.45 | 0.48 / 0.53 |

APPENDIX 'A'Inspection Level

For lot sizes up to 200, at least one rectifier shall be taken from each lot and life tested for 1000 hours.
For lot sizes 201 and over, at least two rectifiers shall be taken from each lot and life tested for 1000 hours.

Merit Life

Merit Life is defined as the ratio of the actual life hours for one or more rectifiers to the total life hours that would have occurred had there been no failures, expressed as a percentage:-

$$\text{Merit Life} = \frac{\text{Actual hours run}}{\text{Total possible hours}} \times 100\%$$

Classification of failures

The end point limits of the specification shall be the criterion of failure and the merit life shall be computed from the number of hours in which the devices have not deteriorated outside these limits.

Procedure of continuous production

When 1000 hours have elapsed since the sample drawn from the first lot was placed on life test, there should be at least four additional samples undergoing life test, with various numbers of hours on test. The Merit Life shall be computed for the first five lots. If the Merit Life exceeds 90% the first lot is acceptable. When 1000 hours have elapsed since the sample from the second lot was placed on life test, the merit life shall be computed using the test results from the first five lots. If this exceeds 90% the second lot is acceptable. The acceptability of the third, fourth and fifth lots is determined from the first five lots.

If, when the sample from one of the first five lots have been life tested for 1000 hours, the computed Merit Life is 90% or less, the lot from which the sample was drawn shall be held in store. If when the sample from the subsequent lot has been life tested for 1000 hours, the computed Merit Life exceeds 90%, both lots shall be accepted. If the Merit Life is 90% or less, both lots shall be held. When the sample from the fifth lot has been life tested for 1000 hours, if the computed Merit Life for all five samples exceed 90% all lots being held shall be accepted. If the Merit Life is 90% or less, all lots being held shall be rejected.

3rd February 1964

When the sample from the sixth lot has been life tested for 1000 hours, the Merit Life shall be computed for the samples from lots 2 to 6. If this exceeds 90%, lot 6 shall be accepted; if it is 90% or less, lot 6 shall be rejected. A similar procedure shall apply for subsequent lots, the Merit Life being computed on the combined results of the completed life test of the lot under consideration and the previous consecutive lots.

When any sample has passed the prescribed life test period or has failed it shall be removed from test.

Reduced Duration

When five consecutive lots have been accepted without any of them having been held due to failure to meet the 90% merit life requirement, reduced duration life testing is applicable and the Merit Life shall then be computed after the sample from a lot has been life tested for 240 hours. If when a sample from a given lot has been life tested for 240 hours the computed Merit Life is 90% or less, the lot shall be held in store and the life test of that sample and subsequent samples shall continue to 1000 hours, the Merit Life being computed after 1000 hours for each sample. Reduced duration testing shall be again applicable after five consecutive lots have been accepted.

Single Lot or non-continuous production

If production is not continuous (see section 6.6) the above procedure cannot be used. In this case the manufacturer shall place at least five rectifiers on life test from a given lot. After 1000 hours the Merit Life for the sample shall be computed and if this exceeds 90% the lot shall be accepted. If it is 90% or less the lot shall be rejected.

If production is continuous (section 6.6), but an interval of more than one week occurs between any two lots at the start of a production run, either the manufacturer shall place additional rectifiers on life test from one or more lots, or lots shall be held in store for a period after the sample has completed 1000 hours of life test, so that the Merit Life is computed from the results of life test on not less than five rectifiers before a determination of acceptability is made.

Additional samples

The manufacturer may place on life test any number of additional samples from each lot, provided the minimum requirement of 1, 2 or 5 (as the case may be) is met. In addition, after the life test has started for any lot, the manufacturer may add an additional quantity to the initial life test sample, but this may be done once only for any life test lot.