

MILITARY SPECIFICATION

CV7193-7276

SEMICONDUCTOR DEVICE

Description:- This specification covers the detail requirements for Silicon Voltage - regulator Diodes, and is in accordance with K1007, except as otherwise specified.

Mechanical Dimensions and Outlines:- K1007, Section B, 10.3.3.2 (10-32 UNF 2A thread).

Connections:- CV7193-7274, Stud Anode
CV7235-7276, Stud Cathode

Absolute Maximum Ratings:-

| Rating | P _{tot} | T _{stud} | T _{opp} | T _{stg} | Shook | Vibration | |
|--------|------------------|-------------------|------------------|------------------|-------|-----------|--|
| Unit | W | °C | °C | °C | g | g | |
| Min. | - | - | -55 | -55 | - | - | |
| Max. | 10 | 150 | 150 | 150 | 1500 | 20 | |
| Note | 1 | | | | 2 | | |

- NOTES:-
1. See derating curve Fig. 1 page 11.
 2. Duration 0.5 mS.

CV7193 - 7276

Primary Electrical Characteristics

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | |
|------------|-------------------|------------------|-------------------|---------------|------------------------|---------------|----------------------|-----|
| | | V(BR) nominal | V(BR) min. | V(BR) max. | I _R test | Z(BR) max. | Z(BR) max. | |
| Stud Anode | Stud Cathode | V | V | V | mA | Ω | Ω | |
| CV7193 | CV7235 | 3.9 | 3.7 | 4.1 | 500 | 12 | - | |
| CV7194 | CV7236 | 4.3 | 4.0 | 4.5 | 500 | 12 | - | |
| CV7195 | CV7237 | 4.7 | 4.4 | 5.0 | 500 | 12 | - | |
| CV7196 | CV7238 | 5.1 | 4.8 | 5.4 | 500 | 8 | - | |
| CV7197 | CV7239 | 5.6 | 5.3 | 6.0 | 500 | 8 | - | |
| CV7198 | CV7240 | 6.2 | 5.8 | 6.6 | 500 | 4 | 800 | |
| CV7199 | CV7241 | 6.8 | 6.4 | 7.2 | 200 | 4 | 500 | |
| CV7200 | CV7242 | 7.5 | 7.1 | 7.9 | 200 | 2.5 | 250 | |
| CV7201 | CV7243 | 8.2 | 7.7 | 8.7 | 200 | 2.5 | 250 | |
| CV7202 | CV7244 | 9.1 | 8.6 | 9.6 | 200 | 2.5 | 250 | |
| CV7203 | CV7245 | 10.0 | 9.4 | 10.6 | 200 | 2.5 | 250 | |
| CV7204 | CV7246 | 11.0 | 10.4 | 11.6 | 200 | 2.5 | 250 | |
| CV7205 | CV7247 | 12.0 | 11.4 | 12.6 | 200 | 2.5 | 250 | |
| CV7206 | CV7248 | 13.0 | 12.4 | 14.1 | 200 | 2.5 | 250 | |
| CV7207 | CV7249 | 15.0 | 13.9 | 15.6 | 100 | 5.0 | 250 | |
| CV7208 | CV7250 | 16.0 | 15.4 | 17.1 | 100 | 5 | 250 | |
| CV7209 | CV7251 | 18.0 | 16.9 | 19.1 | 100 | 5 | 250 | |
| CV7210 | CV7252 | 20.0 | 18.9 | 21.2 | 100 | 5 | 250 | |
| CV7211 | CV7253 | 22.0 | 20.8 | 23.3 | 100 | 5 | 250 | |
| CV7212 | CV7254 | 24.0 | 22.7 | 25.9 | 100 | 5 | 250 | |
| CV7213 | CV7255 | 27.0 | 25.1 | 28.9 | 100 | 5 | 250 | |
| CV7214 | CV7256 | 30.0 | 28.0 | 32.0 | 100 | 8 | 300 | |
| CV7215 | CV7257 | 33.0 | 31.0 | 35.0 | 50 | 8 | 300 | |
| CV7216 | CV7258 | 36.0 | 34.0 | 38.0 | 50 | 8 | 300 | |
| CV7217 | CV7259 | 39.0 | 37.0 | 41.0 | 50 | 8 | 300 | |
| CV7218 | CV7260 | 43.0 | 40.0 | 45.0 | 50 | 10 | 400 | |
| CV7219 | CV7261 | 47.0 | 44.0 | 50.0 | 50 | 10 | 400 | |
| CV7220 | CV7262 | 51.0 | 48.0 | 54.0 | 50 | 10 | 500 | |
| CV7221 | CV7263 | 56.0 | 53.0 | 60.0 | 50 | 10 | 500 | |
| CV7222 | CV7264 | 62.0 | 58.0 | 66.0 | 50 | 15 | 600 | |
| CV7223 | CV7265 | 68.0 | 64.0 | 72.0 | 20 | 50 | 600 | |
| CV7224 | CV7266 | 75.0 | 71.0 | 79.0 | 20 | 50 | 600 | |
| CV7225 | CV7267 | 82.0 | 77.0 | 87.0 | 20 | 50 | 700 | |
| CV7226 | CV7268 | 91.0 | 86.0 | 96.0 | 20 | 60 | 800 | |
| CV7227 | CV7269 | 100.0 | 94.0 | 106.0 | 20 | 60 | 900 | |
| CV7228 | CV7270 | 110.0 | 104.0 | 116.0 | 20 | 60 | 1100 | |
| CV7229 | CV7271 | 120.0 | 114.0 | 126.0 | 20 | 80 | 1200 | |
| CV7230 | CV7272 | 130.0 | 124.0 | 141.0 | 20 | 80 | 1300 | |
| CV7231 | CV7273 | 150.0 | 139.0 | 156.0 | 10 | 180 | 1500 | |
| CV7232 | CV7274 | 160.0 | 154.0 | 171.0 | 10 | 200 | 1600 | |
| CV7233 | CV7275 | 180.0 | 169.0 | 191.0 | 10 | 250 | 1850 | |
| CV7234 | CV7276 | 200.0 | 189.0 | 212.0 | 10 | 300 | 2000 | |
| Conditions | I _R | mA | See Col. 6 Page 2 | | | | See Col. 6 page 2 | 1.0 |
| | T _{stud} | °C | 100 | | | | 25 | 25 |
| | | | | | | | | |

| 1 | 2 | 3 | 4 | 5 | 6 | |
|------------|-------------------|---------------|---------------------|---------------|-------------------|-----|
| | | S_z min. | S_z min. | S_z max. | $Z(B.R.)$ max. | |
| Stud Anode | Stud Cathode | %/°C | %/°C | %/°C | Ω | |
| CV7193 | CV7235 | -0.10 | -0.06 | -0.02 | - | |
| CV7194 | CV7235 | -0.08 | -0.04 | 0.00 | - | |
| CV7195 | CV7237 | -0.06 | -0.02 | 0.02 | - | |
| CV7196 | CV7238 | -0.045 | -0.005 | 0.035 | - | |
| CV7197 | CV7239 | -0.03 | 0.01 | 0.05 | - | |
| CV7198 | CV7240 | -0.01 | 0.03 | 0.07 | 1200 | |
| CV7199 | CV7241 | -0.01 | 0.03 | 0.07 | 750 | |
| CV7200 | CV7242 | 0.00 | 0.04 | 0.08 | 375 | |
| CV7201 | CV7243 | 0.00 | 0.04 | 0.08 | 375 | |
| CV7202 | CV7244 | 0.01 | 0.05 | 0.09 | 375 | |
| CV7203 | CV7245 | 0.01 | 0.05 | 0.09 | 375 | |
| CV7204 | CV7246 | 0.01 | 0.05 | 0.09 | 375 | |
| CV7205 | CV7247 | 0.015 | 0.055 | 0.095 | 375 | |
| CV7206 | CV7248 | 0.015 | 0.055 | 0.095 | 375 | |
| CV7207 | CV7249 | 0.02 | 0.06 | 0.10 | 375 | |
| CV7208 | CV7250 | 0.02 | 0.06 | 0.10 | 375 | |
| CV7209 | CV7251 | 0.02 | 0.06 | 0.10 | 375 | |
| CV7210 | CV7252 | 0.02 | 0.06 | 0.10 | 375 | |
| CV7211 | CV7253 | 0.02 | 0.06 | 0.10 | 375 | |
| CV7212 | CV7254 | 0.02 | 0.06 | 0.10 | 375 | |
| CV7213 | CV7255 | 0.02 | 0.06 | 0.10 | 375 | |
| CV7214 | CV7256 | 0.02 | 0.06 | 0.10 | 450 | |
| CV7215 | CV7257 | 0.02 | 0.06 | 0.10 | 450 | |
| CV7216 | CV7258 | 0.03 | 0.07 | 0.11 | 450 | |
| CV7217 | CV7259 | 0.03 | 0.07 | 0.11 | 450 | |
| CV7218 | CV7260 | 0.03 | 0.07 | 0.11 | 600 | |
| CV7219 | CV7261 | 0.03 | 0.07 | 0.11 | 600 | |
| CV7220 | CV7262 | 0.04 | 0.08 | 0.12 | 750 | |
| CV7221 | CV7263 | 0.04 | 0.08 | 0.12 | 750 | |
| CV7222 | CV7264 | 0.04 | 0.08 | 0.12 | 900 | |
| CV7223 | CV7265 | 0.04 | 0.08 | 0.12 | 900 | |
| CV7224 | CV7266 | 0.05 | 0.09 | 0.13 | 900 | |
| CV7225 | CV7267 | 0.05 | 0.09 | 0.13 | 1050 | |
| CV7226 | CV7268 | 0.06 | 0.10 | 0.14 | 1200 | |
| CV7227 | CV7269 | 0.06 | 0.10 | 0.14 | 1350 | |
| CV7228 | CV7270 | 0.06 | 0.10 | 0.14 | 1650 | |
| CV7229 | CV7271 | 0.06 | 0.10 | 0.14 | 1800 | |
| CV7230 | CV7272 | 0.06 | 0.10 | 0.14 | 1950 | |
| CV7231 | CV7273 | 0.06 | 0.10 | 0.14 | 2250 | |
| CV7232 | CV7274 | 0.06 | 0.10 | 0.14 | 2400 | |
| CV7233 | CV7275 | 0.06 | 0.10 | 0.14 | 2775 | |
| CV7234 | CV7276 | 0.06 | 0.10 | 0.14 | 3000 | |
| Conditions | IR | mA | See Cal. 6, page 2. | | | 1.0 |
| | T _{stud} | °C | 25 - 100 | | | 25 |

T.V.C. Information Sheets Nos. 9 and 10.

Requirements:-

Marking. K1007, Section B, 1.3.4. Minimum requirements 1.3.4.1 (a) and (b).

Quality Assurance Provisions:-

Destructive Tests. The tests listed on Table II Group B Inspection, Subgroups 2, and 3, and in Table III Group C Inspection, Subgroup 2 are considered destructive.

Group C Inspection. Inspection shall be conducted on the initial lot and thereafter every 90 days or every fifth lot whichever occurs first.

Preparation for Delivery:-

Packaging. The devices shall be packed according to K1007, Section A, 1.2 (c). Items 1 to 6 inclusive shown in Fig. 2 page 12 shall be packed with each device.

Joint Service Catalogue Numbers:-

| | | | |
|--------|------------------|--------|------------------|
| CV7193 | 5960-99-037-2600 | CV7208 | 5960-99-037-2615 |
| CV7194 | 5960-99-037-2601 | CV7209 | 5960-99-037-2616 |
| CV7195 | 5960-99-037-2602 | CV7210 | 5960-99-037-2617 |
| CV7196 | 5960-99-037-2603 | CV7211 | 5960-99-037-2618 |
| CV7197 | 5960-99-037-2604 | CV7212 | 5960-99-037-2619 |
| CV7198 | 5960-99-037-2605 | CV7213 | 5960-99-037-2620 |
| CV7199 | 5960-99-037-2606 | CV7214 | 5960-99-037-2621 |
| CV7200 | 5960-99-037-2607 | CV7215 | 5960-99-037-2622 |
| CV7201 | 5960-99-037-2608 | CV7216 | 5960-99-037-2623 |
| CV7202 | 5960-99-037-2609 | CV7217 | 5960-99-037-2624 |
| CV7203 | 5960-99-037-2610 | CV7218 | 5960-99-037-2625 |
| CV7204 | 5960-99-037-2611 | CV7219 | 5960-99-037-2626 |
| CV7205 | 5960-99-037-2612 | CV7220 | 5960-99-037-2627 |
| CV7206 | 5960-99-037-2613 | CV7221 | 5960-99-037-2628 |
| CV7207 | 5960-99-037-2614 | CV7222 | 5960-99-037-2629 |

CV7223 5960-99-037-2630
 CV7224 5960-99-037-2631
 CV7225 5960-99-037-2632
 CV7226 5960-99-037-2633
 CV7227 5960-99-037-2634

CV7228 5960-99-037-2635
 CV7229 5960-99-037-2636
 CV7230 5960-99-037-2637
 CV7231 5960-99-037-2638
 CV7232 5960-99-037-2639

CV7233 5960-99-037-2640
 CV7234 5960-99-037-2641
 CV7235 5960-99-037-2642
 CV7236 5960-99-037-2643
 CV7237 5960-99-037-2644

CV7238 5960-99-037-2645
 CV7239 5960-99-037-2646
 CV7240 5960-99-037-2647
 CV7241 5960-99-037-2648
 CV7242 5960-99-037-2649

CV7243 5960-99-037-2650
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CV7258 5960-99-037-2665
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 CV7261 5960-99-037-2668
 CV7262 5960-99-037-2669

CV7263 5960-99-037-2670
 CV7264 5960-99-037-2671
 CV7265 5960-99-037-2672
 CV7266 5960-99-037-2673
 CV7267 5960-99-037-2674

CV7268 5960-99-037-2675
 CV7269 5960-99-037-2676
 CV7270 5960-99-037-2677
 CV7271 5960-99-037-2678
 CV7272 5960-99-037-2679

CV7273 5960-99-037-2680
 CV7274 5960-99-037-2681
 CV7275 5960-99-037-2682
 CV7276 5960-99-037-2683

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

Admiralty Surface Weapons Establishment,
 Portsdown, Cosham, Portsmouth, Hants., England.

GROUP A INSPECTION

Table I

| Examination or Test | Test Conditions | | Insp. Level | Sym- bol | Limits | | Units |
|--|---------------------|---|----------------|----------------|------------------|------------------|-------|
| | K1007/ NATO Ref. | Specific Conditions | | | Min. | Max. | |
| <u>SUBGROUP 1</u> Visual and Mechanical Inspection | 5.1 | Excluding Physical Dimensions | II | | | | |
| <u>SUBGROUP 2</u> Breakdown Voltage | 8A.2.4 | T _{stud} = 100°C + 2°C. IR = Col. 6 page 2. Single shot pulse, 0.1 sec duration, max. t _r and t _f = 10 nS. | II | V(BR) | Col. 4 page 2 | Col. 5 page 2 | V |
| Forward Volt Drop | 8A.3.2 | T _{stud} = 25°C. I _F = 2A. | | V _F | | 1.5 | V |
| Small Signal Breakdown Impedance (1) | 8A.4.1 | T _{stud} = 25°C. IR = Col. 6 page 2. Measurement to be made between 5 and 10 secs after the application of reverse current. | | Z(BR) | | Col. 7 page 2 | Ω |
| <u>SUBGROUP 3</u> Small Signal Breakdown Impedance (2) | 8A.4.1 | T _{stud} = 25°C IR = 1 mA. CV7199-CV7234 and CV7241-CV7276 only. | I | Z(BR) | | Col. 8 page 2 | Ω |

GROUP A INSPECTION (Cont'd.)

Table I

| Examination or Test | K1007/ NATO Ref. | Test Conditions | | AQL % | Insp. Level | Sym- bol | Limits | | Units |
|--|---------------------|---|--|----------|----------------|-------------|------------------|------------------|-------|
| | | Specific Conditions | | | | | Min. | Max. | |
| <u>SUBGROUP 4</u> Temperature Coefficient of Operating Voltage | 8A.7.3 | IR = Col. 6 page 2. T ₁ = 25°C + 5°C. T ₂ = 100°C + 5°C. Single shot pulse, 0.1 sec duration, max. tr and tf = 10 mS. Note:- Measured values of T ₁ and T ₂ to be used in calculating Sz. | | 4.0 | IA | Sz | Col. 3 page 3 | Col. 5 page 3 | %/°C |

See Page 4 Quality Assurance Provisions

| Examination or Test | Test Conditions | | AQL % | Insp. Level | Sym- bol | Limits | | Units |
|---|---------------------|---|----------|----------------|-------------|--------|------|-------|
| | K1007/ NATO Ref. | Specific Conditions | | | | Min. | Max. | |
| <u>SUBGROUP 1</u> Physical Dimensions | 5.1 | According to drawing 10.3.3.2 and Fig. 2, page 12. | 6.5 | IC | | | | |
| <u>SUBGROUP 2</u> Solderability | 5.13 | | 6.5 | IC | | | | |
| Temperature Cycling | 5.5 | -55°C to +150°C | | | | | | |
| Moisture Resistance | 5.3 | | | | | | | |
| <u>SUBGROUP 3</u> Vibration Fatigue | 5.15 | Non-operating | | | | | | |
| <u>SUBGROUP 4</u> Omitted. | | | | | | | | |
| <u>SUBGROUP 5</u> Omitted. | | | | | | | | |
| <u>SUBGROUP 6</u> Omitted. | | | | | | | | |
| <u>SUBGROUP 7</u> High Temperature Life (Non-operating) | 6.2.1 6.6.1.2.2 | Tamb = 150°C. t = 1000 hrs. | 6.5 | IC | | | | |

Table II
GROUP B INSPECTION (Cont'd.)

| Examination or Test | Test Conditions | | AQL % | Insp. Level | Symbol | Limits | | Units |
|--|-----------------------------|---|-------|-------------|--------|---------------|---------------|-------|
| | K1007/ NATO Ref. | Specific Conditions | | | | Min. | Max. | |
| SUBGROUP 8 Operating Life | 6.3 | T stud not greater than 140°C. IR to give dissipation not less than the value corresponding to the chosen T stud, according to the derating curve Fig. 1, page 11. | 4.0 | IA | | | | |
| | 6.5 6.6.1.1 6.6.1.2.2 | | | | | | | |
| Post Test End Points for Subgroups 2, 3, 7 and 8 | | | | | | | | |
| Breakdown Voltage | 8A.2.4 | As in Group A Inspection, Subgroup 2. | | | V(BR) | Col. 4 page 2 | Col. 5 page 2 | V |
| Small Signal Breakdown Impedance (2) | 8A.4.1 | As in Group A Inspection, Subgroup 3. | | | Z(BR) | | Col. 6 page 3 | Ω |

Table III

GROUP C INSPECTION

See Page 4 Quality Assurance Provisions

| Examination or Test | Test Conditions | | AQL % | Insp. Level | Sym- bol | Limits | | Units |
|---|---------------------|---|----------|----------------|-------------|-----------------|-----------------|----------|
| | K1007/ NATO Ref. | Specific Conditions | | | | Min. | Max. | |
| <u>SUBGROUP 1</u> Omitted. | | | | | | | | |
| <u>SUBGROUP 2</u> Shock | 5.17 | Non-operating Five blows each orientation : Y1, Y2, X and Z | 6.5 | IA | | | | |
| <u>Post Test End Points</u> <u>for Subgroup 2</u> Breakdown Voltage | 8A.2.4 | As in Group A Inspection, Subgroup 2. | | | V(BR) | Col.4 page 2 | Col.5 page 2 | V |
| Small Signal Breakdown Impedance (2) | 8A.4.1 | As in Group A Inspection, Subgroup 3. | | | Z(BR) | | Col.6 page 3 | Ω |

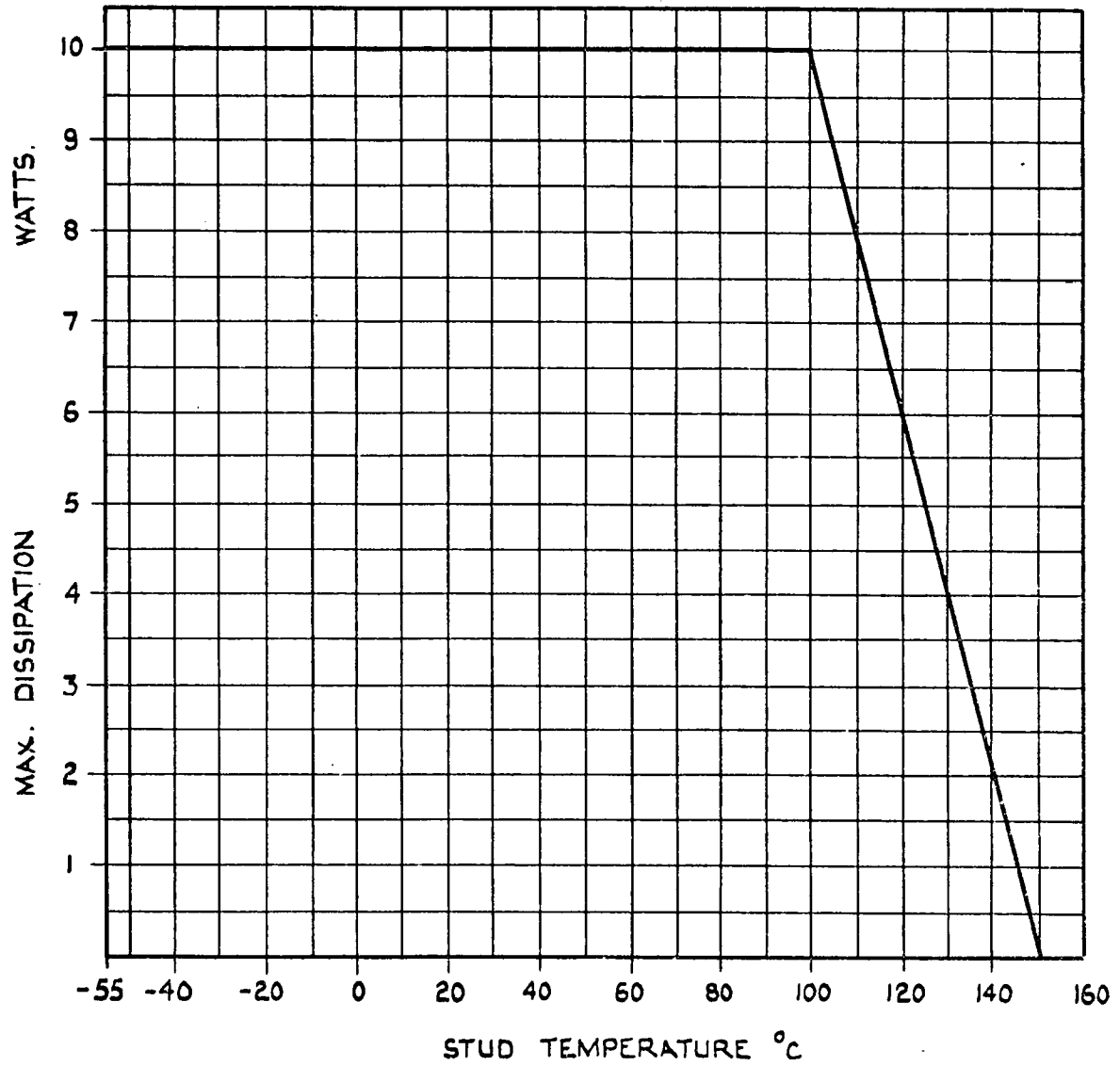
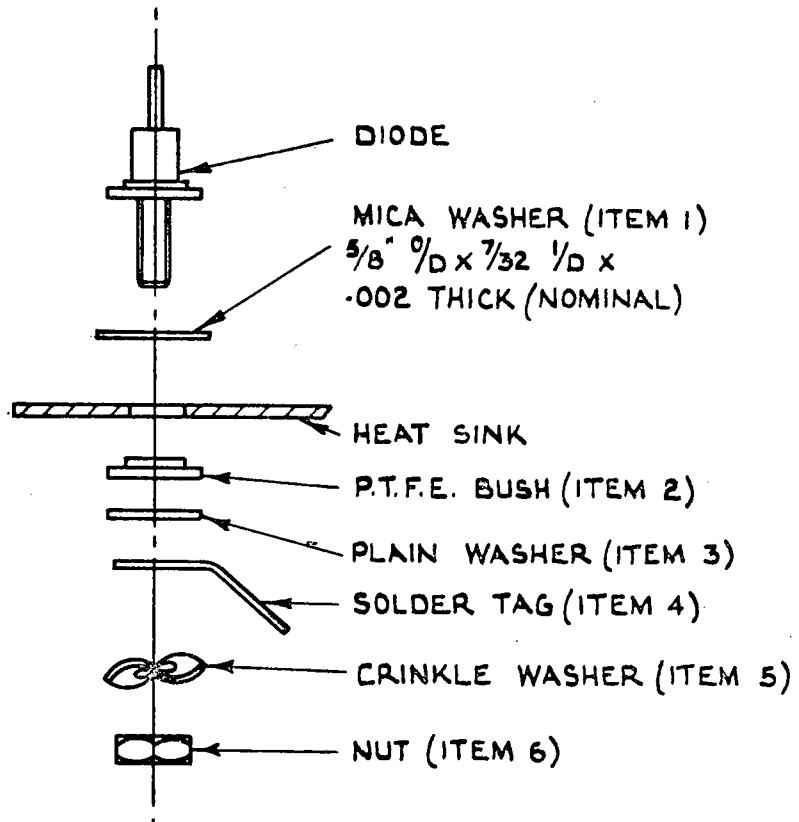
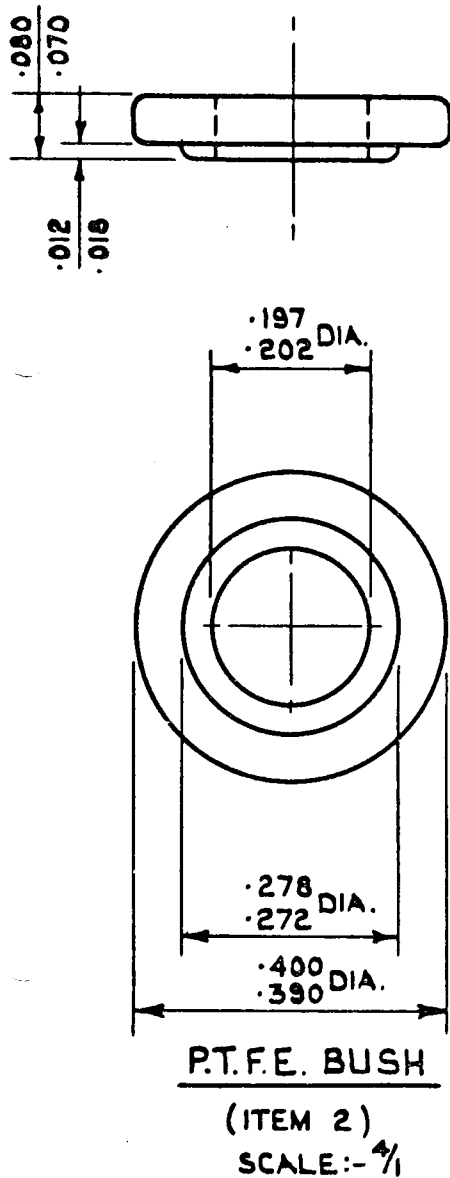


FIG. 1
POWER DERATING



TYPICAL ASSEMBLY

SCALE 1/1

ALL METAL PARTS TO
BE TINNED

MOUNTING TORQUE, WITH DRY
THREAD = 12 IN. LBS. MIN.,
15 IN. LBS. MAX.

FIG. 2