

| Type   | $V_{CBO}$<br>V<br>Max | $V_{EBO}$<br>V<br>Max | $V_{CE}$<br>V<br>Max |  | $I_{CBO}$<br>$\mu A$<br>Max<br>@ $V_{CB}$<br>V | $h_{FE}$<br>Min<br>Max | @ $I_C$<br>mA | $Cob$<br>pf<br>Max | fab<br>MHZ<br>Min | Pack<br>Outline | Power<br>Dissipation<br>@ 25°C<br>MW |     |
|--------|-----------------------|-----------------------|----------------------|--|------------------------------------------------|------------------------|---------------|--------------------|-------------------|-----------------|--------------------------------------|-----|
| 2N828A | 15                    | 2.5                   |                      |  | 6                                              | 3.0                    | 25-           | 10                 | 4.0               | 300             | TO-18'                               | 150 |
| 2N829  | 15                    | 2.5                   |                      |  | 6                                              | 3.0                    | 50-           | 10                 | 4.0               | 300             | TO-18'                               | 150 |
| 2N808  | 30                    | 2.5                   |                      |  | 15                                             | 10.0                   | 30-           | 10                 | 4.0               |                 | TO-18'                               | 150 |
| 2N960  | 15                    | 2.5                   | 7                    |  | 6                                              | 3.0                    | 20-           | 10                 | 4.0               | 300             | TO-18'                               | 150 |
| 2N961  | 12                    | 2.0                   | 7                    |  | 6                                              | 3.0                    | 20-           | 10                 | 4.0               | 300             | TO-18'                               | 150 |
| 2N962  | 12                    | 1.2                   | 7                    |  | 6                                              | 3.0                    | 20-           | 10                 | 4.0               | 300             | TO-18'                               | 150 |
| 2N962  | 12                    | 1.3                   | 7                    |  | 6                                              | 3.0                    | 20-           | 10                 | 5.0               | 300             | TO-18'                               | 150 |
| 2N963  | 12                    | 2.0                   |                      |  | 6                                              | 5.0                    | 20-           | 10                 | 5.0               | 300             | TO-18'                               | 300 |
| 2N964  | 15                    | 2.5                   | 7                    |  | 6                                              | 3.0                    | 40-           | 10                 | 4.0               | 300             | TO-18'                               | 150 |
| 2N964  | 15                    | 2.5                   | 7                    |  | 6                                              | 3.0                    | 40-           | 10                 | 5.0               | 300             | TO-18'                               | 150 |
| 2N964A | 15                    | 2.5                   | 7                    |  | 6                                              | 3.0                    | 48-           | 10                 | 4.0               | 300             | TO-18'                               | 150 |
| 2N965  | 12                    | 2.0                   | 7                    |  | 6                                              | 3.0                    | 40-           | 10                 | 4.0               | 300             | TO-18'                               | 150 |
| 2N966  | 12                    | 1.2                   | 7                    |  | 6                                              | 3.0                    | 40-           | 10                 | 4.0               | 300             | TO-18'                               | 150 |
| 2N967  | 12                    | 2.0                   |                      |  | 6                                              | 5.0                    | 40-           | 10                 | 4.0               | 300             | TO-18'                               | 300 |
| 2N968  | 15                    | 2.5                   |                      |  | 6                                              | 3.0                    | 17-           | 10                 | 8.0               | 300             | TO-18'                               | 150 |
| 2N969  | 12                    | 2.0                   |                      |  | 6                                              | 3.0                    | 17-           | 10                 | 8.0               | 300             | TO-18'                               | 150 |
| 2N970  | 12                    | 1.2                   |                      |  | 6                                              | 3.0                    | 17-           | 10                 | 8.0               | 300             | TO-18'                               | 150 |
| 2N971  | 7                     | 1.2                   |                      |  | 6                                              | 10.0                   | 17-           | 10                 | 8.0               | 300             | TO-18'                               | 150 |
| 2N972  | 15                    | 2.5                   |                      |  | 6                                              | 3.0                    | 40-           | 10                 | 8.0               | 300             | TO-18'                               | 150 |
| 2N973  | 12                    | 2.0                   |                      |  | 6                                              | 3.0                    | 40-           | 10                 | 8.0               | 300             | TO-18'                               | 150 |
| 2N974  | 12                    | 1.2                   |                      |  | 6                                              | 3.0                    | 40-           | 10                 | 8.0               | 300             | TO-18'                               | 150 |
| 2N975  | 7                     | 1.2                   |                      |  | 6                                              | 10.0                   | 40-           | 10                 | 8.0               | 300             | TO-18'                               | 150 |
| 2N985  | 15                    | 3.0                   | 7                    |  | 5                                              | 3.0                    | 40-           | 10                 | 6.0               |                 | TO-18'                               | 300 |
| 2N2635 | 30                    | 2.5                   | 15                   |  | 25                                             | 5.0                    | 30-           | 10                 | 5.0               |                 | TO-18'                               | 300 |
| 2N3449 | 15                    | 1.5                   | 6                    |  | 6                                              | 3.0                    | 20-           | 10                 | 5.0               |                 | TO-18'                               | 150 |

<sup>1</sup>grounded collector

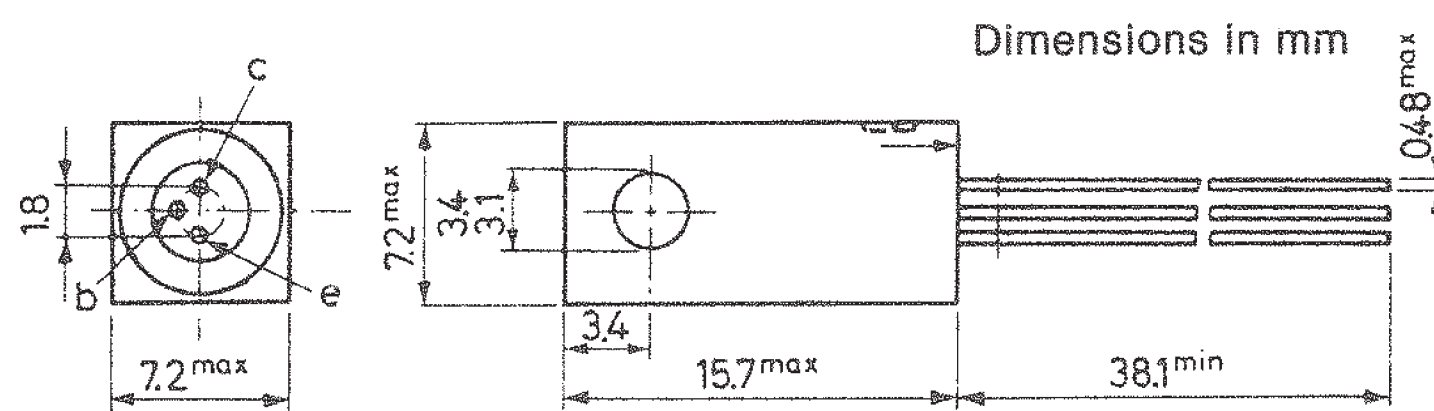
GERMANIUM PNP SMALL SIGNAL TRANSISTORS

| Type                                        | $V_{CBO}$<br>V<br>Max        | $V_{EBO}$<br>V<br>Max      | $V_{CE}$<br>V<br>Max         | $I_{CBO}$<br>$\mu A$<br>Max<br>@ $V_{CB}$<br>V | $h_{FE}$<br>Min<br>Max     | $I_C$<br>mA<br>@ $I_C$<br>mA                   | $Cob$<br>pf<br>Max         | fab<br>MHZ<br>Min                       | Outline                                | Power<br>Dissipation<br>@ 25°C<br>MW |
|---------------------------------------------|------------------------------|----------------------------|------------------------------|------------------------------------------------|----------------------------|------------------------------------------------|----------------------------|-----------------------------------------|----------------------------------------|--------------------------------------|
| 2N43A<br>2N44A<br>2N45<br>2N186A<br>2N187A  | 45<br>45<br>25<br>25<br>25   | 5<br>5<br>5<br>5<br>5      | 30<br>30<br>25<br>25<br>25   | 45<br>45<br>45<br>25<br>25                     | 16<br>16<br>16<br>16<br>16 | 34-65<br>18-43<br>18-43<br>19-31<br>25-42      | 20<br>20<br>20<br>20<br>20 | 0.5<br>0.5<br>0.5<br>0.8†<br>1.0†       | R-32<br>R-32<br>R-32<br>R-32<br>R-32   | 240<br>240<br>155<br>200<br>200      |
| 2N188A<br>2N190<br>2N191<br>2N192<br>2N241A | 25<br>25<br>25<br>25<br>25   | 5<br>5<br>5<br>5<br>5      | 25<br>25<br>25<br>25<br>25   | 25<br>25<br>25<br>25<br>25                     | 16<br>16<br>16<br>16<br>16 | 34-65<br>34-65<br>53-121<br>52-176<br>50-125   | 20<br>20<br>20<br>20<br>20 | 1.2†<br>1.0†<br>1.2†<br>1.5†<br>1.3†    | R-32<br>R-32<br>R-32<br>R-32<br>R-32   | 200<br>200<br>200<br>200<br>200      |
| 2N319<br>2N320<br>2N321<br>2N322<br>2N323   | 25<br>25<br>25<br>16<br>16   | 3<br>3<br>3<br>10<br>10    | 20<br>20<br>20<br>18<br>18   | 25<br>25<br>25<br>16<br>16                     | 16<br>16<br>16<br>16<br>16 | 25-42<br>34-65<br>53-121<br>34-65<br>53-125    | 20<br>20<br>20<br>20<br>20 | 30<br>30<br>30<br>1.0<br>1.5            | TO-5<br>TO-5<br>TO-5<br>TO-5<br>TO-5   | 225<br>225<br>225<br>200<br>200      |
| 2N324<br>2N394<br>2N394A<br>2N395<br>2N396  | 16<br>30<br>30<br>30<br>30   | 10<br>20<br>20<br>20<br>20 | 18<br>15<br>15<br>15<br>20   | 16<br>10<br>12<br>15<br>20                     | 16<br>6<br>6<br>6<br>6     | 72-198<br>20-150<br>30-120<br>20-150<br>30-150 | 20<br>10<br>10<br>10<br>10 | 30<br>20<br>7.0†<br>7.0†<br>6.0†<br>5.0 | TO-5<br>TO-5<br>TO-5<br>TO-5<br>TO-5   | 200<br>150<br>150<br>200<br>200      |
| 2N396A<br>2N397<br>2N398<br>2N398A<br>2N404 | 30<br>30<br>105<br>105<br>25 | 20<br>20<br>50<br>50<br>12 | 20<br>15<br>105<br>105<br>24 | 20<br>15<br>105<br>105<br>12                   | 6<br>6<br>12<br>50<br>5    | 30-150<br>40-150<br>20<br>20<br>30             | 10<br>10<br>5<br>5<br>12   | 5.0<br>10.0<br>1.0†<br>1.0†<br>4.0      | TO-5<br>TO-5<br>TO-5*<br>TO-5*<br>TO-5 | 200<br>200<br>50<br>150<br>150       |
| 2N404A<br>2N413<br>2N414<br>2N426<br>2N427  | 40<br>30<br>30<br>30<br>30   | 25<br>20<br>20<br>20<br>20 | 35<br>18<br>15<br>10<br>15   | 12<br>12<br>12<br>30<br>30                     | 5<br>5<br>5<br>25<br>25    | 30<br>32-300<br>32-300<br>30-60<br>40-80       | 12<br>10<br>10<br>1<br>1   | 20<br>5.5<br>5.5<br>6.0<br>5.0          | TO-5<br>TO-5<br>TO-5<br>TO-5<br>TO-5   | 150<br>150<br>150<br>175<br>175      |
| 2N428<br>2N461<br>2N464                     | 30<br>45<br>45               | 20<br>10<br>12             | 12<br>33<br>40               | 30<br>45<br>20                                 | 25<br>15<br>15             | 60<br>32-100<br>14-26                          | 1<br>20<br>1               | 10.0<br>4.0†<br>0.7†                    | TO-5<br>TO-5<br>TO-5                   | 175<br>200<br>150                    |

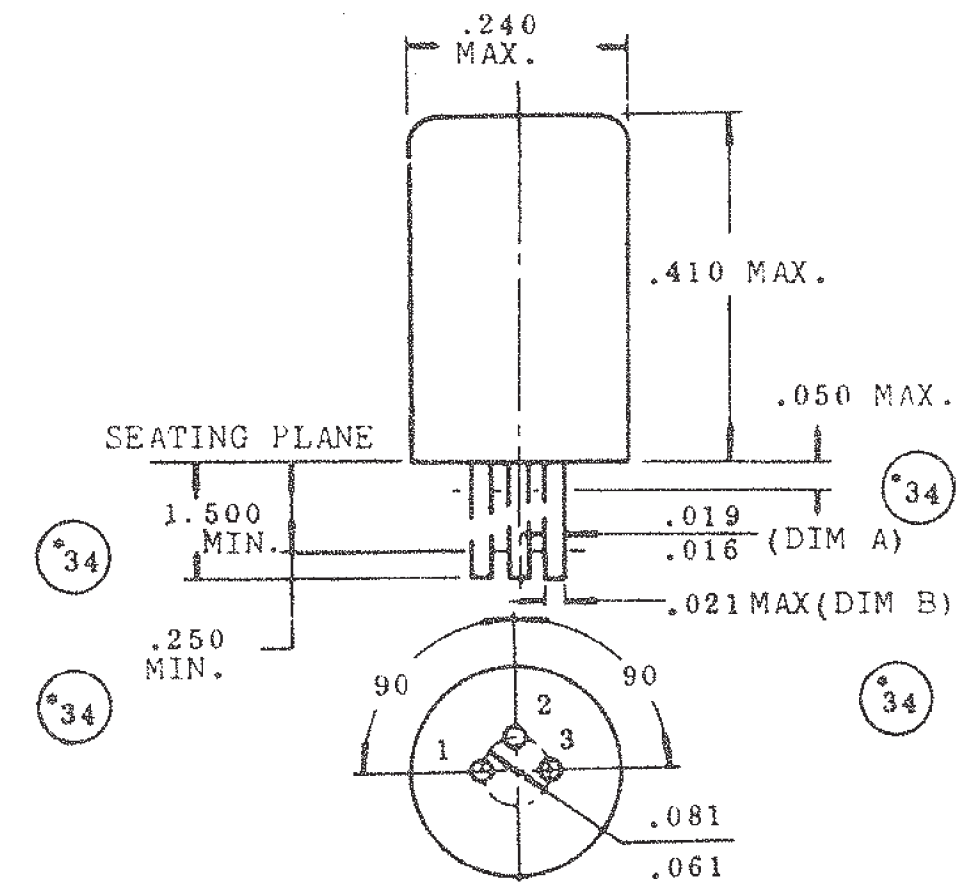
| Type                                            | $V_{CBO}$<br>V<br>Max        | $V_{EBO}$<br>V<br>Max      | $V_{CE}$<br>V<br>Max         | $I_{CBO}$<br>@ $V_{CB}$<br>V<br>$\mu A$<br>Max | $h_{FE}$<br>Min<br>Max     | @ $I_C$<br>mA                                   | $Cob$<br>pf<br>Max             | fab<br>MHZ<br>Min                 | Outline*                             | Power<br>Dissipation<br>@ 25°C<br>MW  |                                 |
|-------------------------------------------------|------------------------------|----------------------------|------------------------------|------------------------------------------------|----------------------------|-------------------------------------------------|--------------------------------|-----------------------------------|--------------------------------------|---------------------------------------|---------------------------------|
| 2N465<br>2N466                                  | 45<br>35                     | 12<br>12                   | 30<br>20                     | 20<br>20                                       | 15<br>15                   | 27-45<br>56-90                                  | 1<br>1                         | 0.8†<br>1.0†                      | TO-5<br>TO-5                         | 150<br>150                            |                                 |
| 2N467<br>2N508<br>2N508A<br>2N522<br>2N524      | 35<br>20<br>30<br>15<br>30   | 12<br>10<br>10<br>10<br>15 | 15<br>18<br>25<br>8<br>30    | 20<br>20<br>25<br>15<br>30                     | 15<br>6<br>7<br>2<br>10    | 112-180<br>99-198<br>100-200<br>120<br>25-42    | 1<br>20<br>20<br>1<br>20       | 1.2†<br>2.5<br>2.5<br>15.0<br>0.8 | TO-5<br>TO-5<br>TO-5<br>TO-5<br>TO-5 | 150<br>200<br>200<br>100<br>225       |                                 |
| 2N525<br>2N526<br>2N527<br>2N580<br>2N581       | 45<br>45<br>45<br>20<br>18   | 15<br>15<br>15<br>12<br>10 | 30<br>30<br>30<br>15<br>15   | 30<br>30<br>30<br>20<br>15                     | 10<br>10<br>10<br>5<br>6   | 34-65<br>53-90<br>72-121<br>30<br>20            | 20<br>20<br>20<br>400<br>20    | 40<br>40<br>40<br>30<br>30        | 1.0<br>1.3<br>1.5<br>10.0<br>4.0     | TO-5<br>TO-5<br>TO-5<br>TO-5<br>TO-5  | 225<br>225<br>225<br>120<br>80  |
| 2N650<br>2N651<br>2N652<br>2N653<br>2N654       | 45<br>45<br>45<br>30<br>30   | 30<br>30<br>30<br>25<br>25 | 30<br>30<br>30<br>25<br>25   | 30<br>30<br>30<br>25<br>25                     | 10<br>10<br>10<br>15<br>15 | 33<br>45<br>80<br>20<br>40                      | 10<br>10<br>10<br>10<br>10     | 25<br>25<br>25<br>25<br>25        | 0.75<br>1.0<br>1.25<br>1.5†<br>2.0†  | TO-5<br>TO-5*<br>TO-5<br>TO-5<br>TO-5 | 200<br>200<br>200<br>200<br>200 |
| 2N655<br>2N658<br>2N659<br>2N660<br>2N661       | 30<br>25<br>25<br>25<br>25   | 25<br>12<br>12<br>12<br>12 | 25<br>16<br>14<br>11<br>9    | 25<br>25<br>25<br>25<br>25                     | 15<br>25<br>25<br>25<br>25 | 70<br>25-80<br>40-110<br>60-150<br>75           | 10<br>10<br>10<br>10<br>10     | 25<br>12<br>12<br>12<br>12        | 2.5†<br>2.5<br>5.0<br>10.0<br>15.0   | TO-5<br>TO-5<br>TO-5<br>TO-5<br>TO-5  | 200<br>167<br>167<br>167<br>167 |
| 2N662<br>2N1057<br>2N1097<br>2N1098<br>2N1144   | 25<br>45<br>16<br>18<br>16   | 12<br>5<br>5<br>5<br>5     | 11<br>45<br>18<br>18<br>16   | 25<br>45<br>16<br>16<br>16                     | 25<br>16<br>16<br>16<br>16 | 50<br>34-90<br>34-90<br>25-90<br>34-90          | 10<br>20<br>20<br>20<br>20     | 12<br>60<br>35<br>35<br>40        | 4.0<br>0.5<br>1.0<br>1.0<br>1.0      | TO-5<br>R-32<br>TO-5<br>TO-5<br>R-32  | 167<br>240<br>200<br>200<br>175 |
| 2N1145<br>2N1175<br>2N1175A<br>2N1273<br>2N1274 | 16<br>35<br>35<br>15<br>25   | 10<br>10<br>10<br>10<br>10 | 16<br>25<br>25<br>15<br>15   | 16<br>30<br>30<br>15<br>25                     | 16<br>12<br>12<br>14<br>14 | 25-90<br>70-140<br>70-140<br>27-165<br>27-165   | 20<br>20<br>20<br>50<br>50     | 40<br>40<br>40<br>40<br>40        | 1.0<br>1.5<br>1.5<br>1.5<br>1.5      | R-32<br>TO-5<br>TO-5<br>TO-5<br>TO-5  | 175<br>200<br>200<br>250<br>250 |
| 2N1303<br>2N1305<br>2N1307<br>2N1309<br>2N1370  | 30<br>30<br>30<br>30<br>25   | 25<br>25<br>25<br>25<br>10 | 25<br>20<br>15<br>15<br>25   | 25<br>25<br>25<br>25<br>20                     | 6<br>6<br>6<br>6<br>14     | 20<br>40-200<br>60-300<br>80<br>45-165          | 10<br>10<br>10<br>10<br>50     | 20<br>20<br>20<br>20<br>20        | 3.0<br>5.0<br>10.0<br>15.0<br>2.0    | TO-5<br>TO-5<br>TO-5<br>TO-5<br>TO-5  | 150<br>150<br>150<br>150<br>225 |
| 2N1371<br>2N1372<br>2N1373<br>2N1374<br>2N1375  | 45<br>25<br>45<br>25<br>45   | 10<br>15<br>25<br>15<br>25 | 45<br>25<br>45<br>25<br>45   | 20<br>20<br>20<br>20<br>20                     | 14<br>7<br>7<br>7<br>7     | 45-165<br>27-105<br>27-105<br>45-165<br>45-165  | 50<br>50<br>50<br>50<br>50     | 2.0<br>2.0<br>2.0<br>2.0<br>2.0   | TO-5<br>TO-5<br>TO-5<br>TO-5<br>TO-5 | 250<br>250<br>250<br>250<br>250       |                                 |
| 2N1376<br>2N1377<br>2N1378<br>2N1379<br>2N1380  | 25<br>45<br>12<br>25<br>12   | 15<br>25<br>7<br>15<br>7   | 25<br>45<br>12<br>25<br>12   | 20<br>20<br>12<br>20<br>12                     | 7<br>7<br>7<br>7<br>14     | 67-165<br>67-165<br>85-330<br>85-330<br>27-330  | 60<br>50<br>50<br>50<br>50     | 2.0<br>2.0<br>2.0<br>2.0<br>2.0   | TO-5<br>TO-5<br>TO-5<br>TO-5<br>TO-5 | 250<br>250<br>250<br>250<br>250       |                                 |
| 2N1381<br>2N1382<br>2N1383<br>2N1404<br>2N1413  | 25<br>25<br>25<br>25<br>35   | 15<br>15<br>15<br>20<br>10 | 25<br>25<br>25<br>25<br>25   | 20<br>20<br>20<br>25<br>30                     | 14<br>14<br>14<br>5<br>12  | 27-330<br>40-165<br>27-165<br>100<br>35-42      | 50<br>50<br>50<br>24<br>20     | 2.0<br>2.0<br>2.0<br>4.0<br>0.8   | TO-5<br>TO-5<br>TO-5<br>TO-5<br>TO-5 | 250<br>250<br>250<br>150<br>200       |                                 |
| 2N1414<br>2N1415<br>2N1614<br>2N1924<br>2N1925  | 35<br>35<br>70<br>60<br>60   | 10<br>10<br>12<br>25<br>25 | 25<br>25<br>60<br>40<br>40   | 30<br>30<br>70<br>45<br>45                     | 12<br>12<br>23<br>10<br>10 | 34-65<br>53-90<br>18-43<br>34-65<br>53-90       | 20<br>20<br>20<br>20<br>20     | 40<br>40<br>60<br>30<br>30        | 1.0<br>1.3<br>0.5<br>1.0<br>1.3      | TO-5<br>TO-5<br>R-32<br>TO-5<br>TO-5  | 200<br>200<br>240<br>225<br>225 |
| 2N1926<br>2N1997<br>2N1998<br>2N1999<br>2N2000  | 60<br>45<br>35<br>30<br>50   | 25<br>45<br>30<br>20<br>20 | 40<br>40<br>35<br>20<br>15   | 45<br>45<br>35<br>30<br>30                     | 10<br>25<br>25<br>25<br>10 | 72-121<br>40-200<br>70-225<br>100-350<br>50-300 | 20<br>100<br>100<br>100<br>100 | 30<br>20<br>20<br>20<br>35        | 1.5<br>3.0<br>5.6<br>10.0<br>2.0     | TO-5<br>TO-5<br>TO-5<br>TO-5<br>TO-5  | 225<br>250<br>250<br>250<br>300 |
| 2N2001<br>2N2042<br>2N2043<br>2N2374<br>2N2375  | 30<br>105<br>105<br>35<br>35 | 20<br>75<br>75<br>35<br>35 | 15<br>105<br>105<br>35<br>35 | 15<br>105<br>105<br>35<br>35                   | 6<br>25<br>25<br>5<br>5    | 100<br>20-50<br>400-100<br>100-300<br>35-110    | 100<br>5<br>5<br>100<br>100    | 35<br>25<br>25<br>14<br>20        | 6.0<br>0.5<br>0.75<br>15.0<br>15.0   | TO-5<br>TO-5<br>TO-5<br>TO-5<br>TO-5  | 300<br>200<br>200<br>250<br>250 |
| 2N2376                                          | 35                           | 35                         | 35                           | 35                                             | 5                          | 35-110                                          | 100                            | 20                                |                                      | TO-5                                  | 250                             |

# CASE OUTLINE DRAWINGS & DIMENSIONS

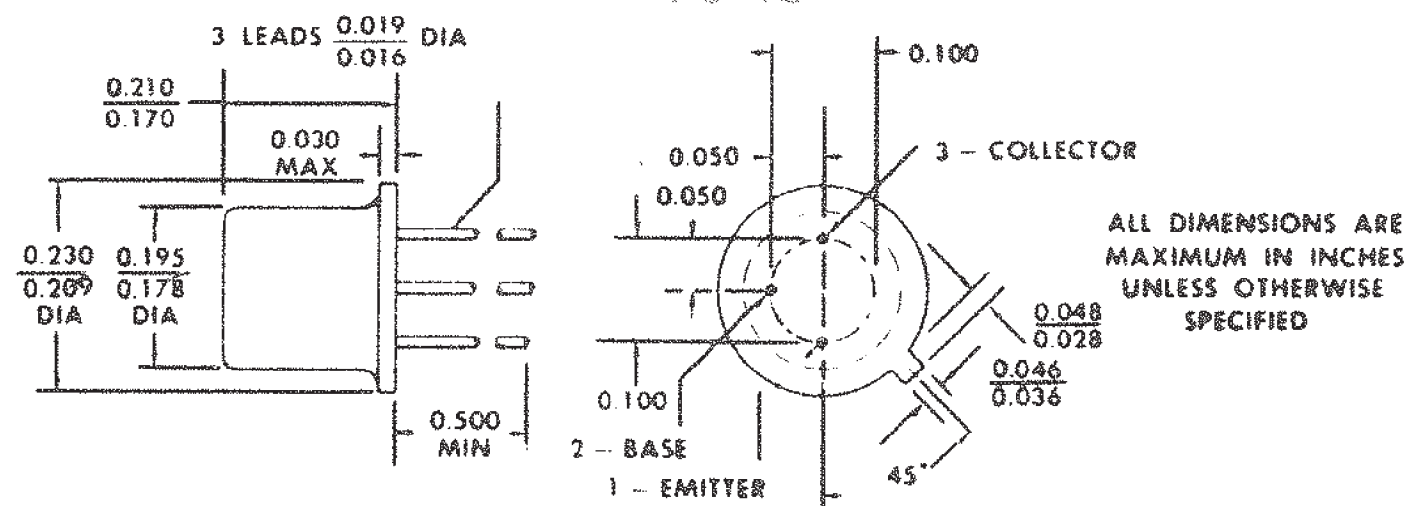
NS257



TO-1



TO-18



THE COLLECTOR IS ELECTRICAL  
CONTACT WITH THE CASE.

ALL JEDEC TO-18 DIMENSIONS  
AND NOTES ARE APPLICABLE.