# Low Noise Transistors HXTR-6001 Chip

## Technical Data

**2N6617 (HXTR-6101, TX and TXV)**
**2N6742 (HXTR-6102, TX and TXV)**
**2N6618 (HXTR-6103, TX and TXV)**
**2N6743 (HXTR-6104, TX and TXV)**

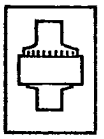
### Features

- **Low Noise Figure**
  1.7 dB Typical $NF_{MIN}$ at 2 GHz
  2.7 dB Typical $NF_{MIN}$ at 4 GHz
- **High Associated Gain**
  13.0 dB Typical $G_A$ at 2 GHz
  9.0 dB Typical $G_A$ at 4 GHz
- **Hermetic Package**

### Recommended Die Attach and Bonding Procedures

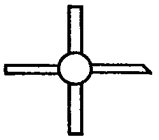
Eutectic Die Attach at a stage temperature of 410 ± 10°C under an $N_2$ ambient. Chip should be lightly scrubbed using a tweezer or collet and eutectic should flow within five seconds.

Thermocompression Wire Bond at a stage temperature of 310 ± 10°C, using a tip force of 30 ± 5 grams with 0.7 or 1.0 mil gold wire. A one mil minimum wire clearance at the passivation edge is recommended. (Ultrasonic bonding is not recommended.)



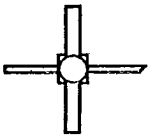
Generic Chip

**HXTR-6001**



HPAC-70GT

**HXTR-6101**
**HXTR-6102**



HPAC-100

**HXTR-6103**
**HXTR-6104**

**Note:** See the Package Outline section, page 16-7, for complete dimensions.

### Description

The HXTR-6001 is an NPN silicon bipolar transistor chip designed for use in hybrid applications requiring superior noise figure and associated gain performance at VHF, UHF, and microwave frequencies. The chip is protected by silicon nitride passivation, and is provided with gold bonding pads for ease of use in most hybrid applications.

The HXTR-6001 chip is available in two package styles. The HXTR-6101 and HXTR-6102 are supplied in the HPAC-70GT, and the HXTR-6103 and HXTR-6104 are supplied in the HPAC-100. Both the HPAC-70GT and the HPAX-100 are rugged metal/ceramic hermetic packages, and are capable of meeting the environmental requirements of MIL-S-19500 and the test requirements of MIL-STD-750/883.

## Electrical Specifications (HXTR-6001, HXTR-6101, HXTR-6102)

| Symbol | Parameters and Test Conditions | Test Method MIL-STD-750 | Units | HXTR-6001[1] | | | HXTR-6101[2] | | | HXTR-6102[2] | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | Min. | Typ. | Max. | Min. | Typ. | Max. |
| $BV_{CES}$ | Collector-Emitter Breakdown Voltage at $I_C$ = 100 μA | 3011* | V | 30 | | | 30 | | | 30 | | |
| $I_{CEO}$ | Collector-Emitter Leakage Current at $V_{CE}$ = 10 V | 3041** | nA | | | 500 | | | 500 | | | 500 |
| $I_{CBO}$ | Collector Cutoff Current at $V_{CB}$ = 10 V | 3036** | nA | | | 100 | | | 100 | | | 100 |
| $h_{FE}$ | Forward Current Transfer Ratio at $V_{CE}$ = 10 V, $I_C$ = 4 mA | 3076* | | 50 | 100 | 250 | 50 | 100 | 250 | 50 | 150 | 250 |
| $NF_{MIN}$ | Minimum Noise Figure f = 2 GHz<br>4 GHz<br>$V_{CE}$ = 10 V, $I_C$ = 4 mA | 3246 | dB | | 1.7<br>2.7 | | | 1.6<br>2.8 | 3.0 | | 1.6<br>2.5 | 2.7 |
| $G_A$ | Associated Gain f = 2 GHz<br>4 GHz<br>$V_{CE}$ = 10 V, $I_C$ = 4 mA | 3246 | dB | | 13.0<br>9.0 | | 8.0 | 13.5<br>9.0 | | 8.0 | 13.5<br>9.0 | |
| $C_{cb}$ | Reverse Transfer Capacitance $I_C$ = 0 mA; $V_{CB}$ = 10 V; f = 1 MHz | | pF | | | | | 0.11 | | | | |

## Electrical Specifications (HXTR-6103, HXTR-6104)

| Symbol | Parameters and Test Conditions | Test Method MIL-STD-750 | Units | HXTR-6103[2] | | | HXTR-6104[2] | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Min. | Typ. | Max. | Min. | Typ. | Max. |
| $BV_{CES}$ | Collector-Emitter Breakdown Voltage at $I_C$ = 100 μA | 3011* | V | 30 | | | 30 | | |
| $I_{CEO}$ | Collector-Emitter Leakage Current at $V_{CE}$ = 10 V | 3041** | nA | | | 500 | | | 500 |
| $I_{CBO}$ | Collector-Cutoff Current at $V_{CB}$ = 10 V | 3036** | nA | | | 100 | | | 100 |
| $h_{FE}$ | Forward Current Transfer Ratio at $V_{CE}$ = 10 V, $I_C$ = 4 mA | 3076* | | 50 | 100 | 250 | 50 | 100 | 250 |
| $NF_{MIN}$ | Minimum Noise Figure f = 1.5 GHz<br>2 GHz<br>$V_{CE}$ = 10 V, $I_C$ = 3 mA | 3246 | dB | | 1.8 | 2.2 | | 1.4 | 1.6 |
| $G_A$ | Associated Gain f = 1.5 GHz<br>2 GHz<br>$V_{CE}$ = 10 V, $I_C$ = 3 mA | 3246 | dB | 11.0 | 12.0 | | 13.0 | 14.0 | |
| $C_{cb}$ | Reverse Transfer Capacitance $I_C$ = 0 mA; $V_{CB}$ = 10 V; f = 1 MHz | | pF | | 0.14 | | | | |

*300 μs wide pulse measurement at ≤ 2% duty cycle
**Measured under low ambient light conditions, for chip only.

Notes:
1. $T_A$ = 25°C
2. $T_{CASE}$ = 25°C

## Absolute Maximum Ratings*

| Symbol | Parameter | HXTR-6001[1] ($T_A$ = 25°C) | HXTR-6101/2/3/4[2] ($T_{CASE}$ = 25°C) |
|---|---|---|---|
| $V_{CBO}$ | Collector to Base Voltage | 35 V | 35 V |
| $V_{CEO}$ | Collector to Emitter Voltage | 20 V | 20 V |
| $V_{EBO}$ | Emitter to Base Voltage | 1.5 V | 1.5 V |
| $I_C$ | DC Collector Current | 20 mA | 20 mA |
| $P_T$ | Total Device Dissipation | 300 mW | 300 mW |
| $T_J$ | Junction Temperature | 200°C | 200°C |
| $T_{STG}$ | Storage Temperature | -65°C to 300°C | -65°C to 200°C |
| – | Lead Temperature (Soldering 10 seconds each lead) | | +250°C |

*Operation in excess of any one of these conditions may result in permanent damage to this device.

**Notes:**
1. Power dissipation derating should include a $\theta_{JB}$ (Junction-to-Back contact thermal resistance) of 100°C/W. Total $\theta_{JA}$ (Junction to Ambient) will be dependent upon the heat sinking provided in the individual application.
2. For the 2N6617 (HXTR-6101TX) and the 2N6742 (HXTR-6102) a $\theta_{JC}$ = 160°C maximum should be used for derating and junction temperature calculations. For the 2N6618 (HXTR-6103) and the 2N6743 (HXTR-6104) a $\theta_{JC}$ = 150°C/W maximum should be used for calculating junction temperature $T_J = P_D \times \theta_{JC} + T_{CASE}$.

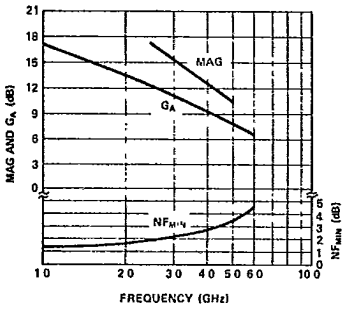



**Figure 1. Typical MAG, Noise Figure ($NF_{MIN}$), and Associated Gain vs. Frequency ($V_{CE}$ = 10 V, $I_C$ = 4 mA), for the HXTR-6001.**

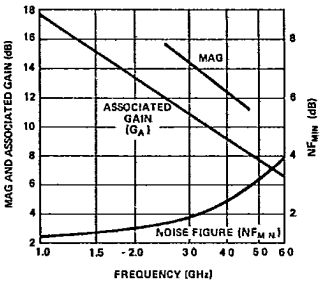



**Figure 2. Typical MAG, Noise Figure ($NF_{MIN}$) and Associated Gain vs. Frequency ($V_{CE}$ = 10 V, $I_C$ = 4 mA), for the HXTR-6101 and HXTR-6102.**

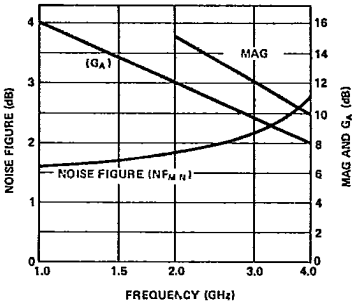



**Figure 3. Typical MAG, Noise Figure ($NF_{MIN}$) and Associated Gain vs. Frequency ($V_{CE}$ = 10 V, $I_C$ = 3 mA), for the HXTR-6103.**

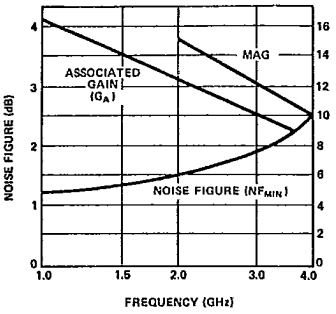



Figure 4. Typical MAG, $NF_{MIN}$ and Associated Gain vs. Frequency ($V_{CE}$ = 10 V, $I_C$ = 3 mA), for the HXTR-6104.

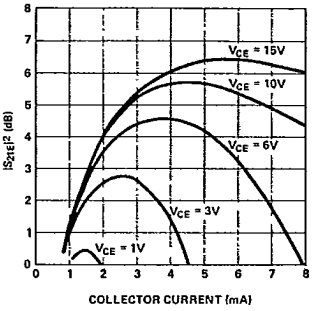



Figure 5. Typical $|S_{21E}|^2$ vs. Bias at 4 GHz, for the HXTR-6001.

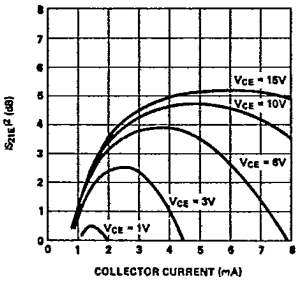



Figure 6. Typical $|S_{21E}|^2$ vs. Bias at 4 GHz, for the HXTR-6101 and HXTR-6102.

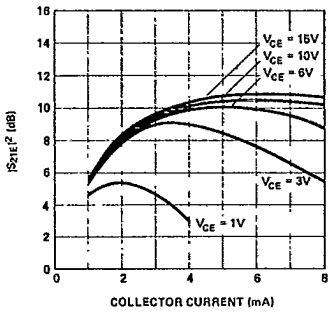



Figure 7. Typical $|S_{21E}|^2$ vs. Bias at 2 GHz, for the HXTR-6103.

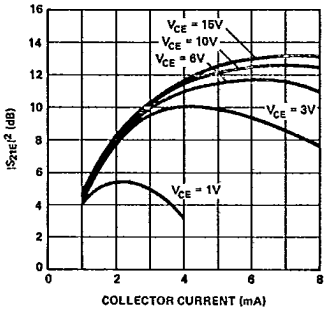



Figure 8. Typical $|S_{21E}|^2$ vs. Bias at 1.5 GHz for the HXTR-6104.

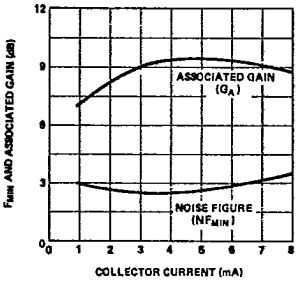



Figure 9. $NF_{MIN}$ and $G_A$ vs. Collector Current at 4 GHz for $V_{CE}$ = 10 V, for the HXTR-6101 and HXTR-6102.

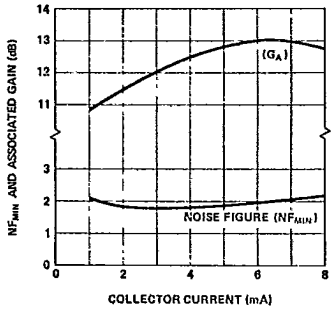



Figure 10. Typical $NF_{MIN}$ and Associated Gain vs. Collector Current at 2 GHz for $V_{CE}$ = 10 V (Tuned for $NF_{MIN}$), for the HXTR-6103.

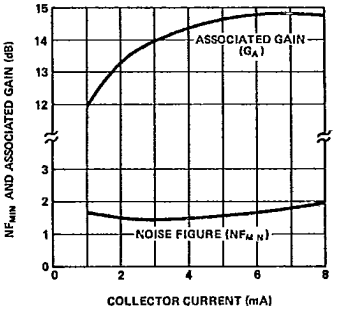



Figure 11. Typical Noise Figure and Associated Gain vs. $I_C$ at 1.5 GHz for $V_{CE}$ = 10 V (Tuned for $NF_{MIN}$) for the HXTR-6104.

## Typical Noise Parameters

**HXTR-6101 and HXTR-6102 ($V_{CE}$ = 10 V, $I_C$ = 4 mA)**

| Freq. (MHz) | $\Gamma_O$ (Mag./Ang.) | $R_N$ (Ohms) | $NF_{MIN}$ (dB) |
|---|---|---|---|
| 1000 | 0.480/23° | 23.31 | 1.45 |
| 1500 | 0.450/61° | 15.57 | 1.58 |
| 2000 | 0.410/88° | 15.73 | 1.72 |
| 3000 | 0.425/121° | 10.72 | 2.18 |
| 4000 | 0.475/166° | 3.50 | 2.75 |
| 5000 | 0.530/-164° | 2.81 | 3.67 |
| 6000 | 0.520/-131° | 7.23 | 4.78 |

**HXTR-6103 ($V_{CE}$ = 10 V, $I_C$ = 3 mA)**

| Freq. (MHz) | $\Gamma_O$ (Mag./Ang.) | $R_N$ (Ohms) | $NF_{MIN}$ (dB) |
|---|---|---|---|
| 1000 | 0.465/36° | 25.1 | 1.55 |
| 1500 | 0.369/67° | 22.5 | 1.65 |
| 2000 | 0.323/94° | 23.3 | 1.80 |

**HXTR-6104 ($V_{CE}$ = 10 V, $I_C$ = 3 mA)**

| Freq. (MHz) | $\Gamma_O$ (Mag./Ang.) | $R_N$ (Ohms) | $NF_{MIN}$ (dB) |
|---|---|---|---|
| 1000 | 0.465/36° | 25.09 | 1.20 |
| 1500 | 0.369/67° | 22.47 | 1.40 |
| 2000 | 0.323/94° | 23.31 | 1.50 |

**HXTR-6102 Low Power Bias Performance, Noise Parameters at 1000 MHz**

| Bias | | | | | |
|---|---|---|---|---|---|
| $V_{CE}$ (V) | $I_C$ (mA) | $NF_{MIN}$ (dB) | $G_A$ (dB) | $R_N$ (Ohms) | $\Gamma_O$ (Mag./Ang.) |
| 3 | 0.25 | 2.25 | 8.5 | 60.5 | 0.805/31° |
| 3 | 0.50 | 1.87 | 12.7 | 25.5 | 0.713/38° |
| 3 | 1.00 | 1.55 | 15.7 | 13.9 | 0.571/39° |

**HXTR-6102 Noise Performance vs. Frequency and Bias**

| Bias | | Frequency | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 1000 MHz | | 1500 MHz | | 2000 MHz | | 3000 MHz | |
| $V_{CE}$ (V) | $I_C$ (mA) | $NF_{MIN}$ (dB) | $G_A$ (dB) | $NF_{MIN}$ (dB) | $G_A$ (dB) | $NF_{MIN}$ (dB) | $G_A$ (dB) | $NF_{MIN}$ (dB) | $G_A$ (dB) |
| 3 | 0.25 | 2.25 | 8.5 | 2.67 | 5.0 | 2.83 | 4.7 | 3.88 | 4.1 |
| 3 | 0.50 | 1.87 | 12.7 | 2.06 | 9.9 | 2.23 | 7.9 | 2.93 | 6.4 |
| 3 | 1.00 | 1.55 | 15.7 | 1.73 | 11.7 | 1.79 | 10.2 | 2.38 | 8.1 |

**HXTR-6001 Typical Common-Emitter S-Parameters ($V_{CE}$ = 10 V, $I_C$ = 4 mA)***

| Freq. (MHz) | $S_{11}$ | | $S_{21}$ | | | $S_{12}$ | | | $S_{22}$ | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Mag. | Ang. | (dB) | Mag. | Ang. | (dB) | Mag. | Ang. | Mag. | Ang. |
| 100 | 0.87 | -16 | 22.0 | 12.60 | 170 | -46 | 0.005 | 82 | 0.99 | -3 |
| 200 | 0.85 | -30 | 21.7 | 12.10 | 160 | -40 | 0.010 | 75 | 0.98 | -5 |
| 300 | 0.82 | -44 | 21.1 | 11.40 | 151 | -36 | 0.015 | 68 | 0.95 | -7 |
| 400 | 0.79 | -57 | 20.5 | 10.60 | 144 | -35 | 0.018 | 63 | 0.93 | -9 |
| 500 | 0.76 | -68 | 19.8 | 9.77 | 137 | -34 | 0.021 | 58 | 0.91 | -10 |
| 600 | 0.73 | -78 | 19.1 | 9.00 | 131 | -32 | 0.024 | 55 | 0.89 | -10 |
| 700 | 0.70 | -86 | 18.5 | 8.37 | 126 | -32 | 0.025 | 52 | 0.87 | -11 |
| 800 | 0.68 | -94 | 17.6 | 7.62 | 121 | -31 | 0.027 | 50 | 0.85 | -11 |
| 900 | 0.66 | -100 | 17.0 | 7.05 | 118 | -31 | 0.028 | 48 | 0.84 | -11 |
| 1000 | 0.65 | -106 | 16.3 | 6.54 | 114 | -31 | 0.029 | 47 | 0.82 | -11 |
| 1500 | 0.60 | -126 | 13.5 | 4.73 | 102 | -29 | 0.034 | 45 | 0.79 | -12 |
| 2000 | 0.58 | -139 | 11.3 | 3.67 | 93 | -29 | 0.037 | 45 | 0.78 | -13 |
| 2500 | 0.57 | -146 | 9.5 | 2.99 | 87 | -28 | 0.041 | 47 | 0.77 | -14 |
| 3000 | 0.56 | -152 | 8.1 | 2.53 | 82 | -27 | 0.045 | 49 | 0.77 | -15 |
| 3500 | 0.56 | -156 | 6.8 | 2.19 | 77 | -26 | 0.049 | 51 | 0.76 | -16 |
| 4000 | 0.55 | -159 | 5.7 | 1.93 | 72 | -26 | 0.053 | 52 | 0.76 | -18 |
| 4500 | 0.55 | -162 | 4.8 | 1.73 | 68 | -25 | 0.057 | 53 | 0.76 | -19 |
| 5000 | 0.55 | -164 | 3.9 | 1.57 | 65 | -24 | 0.062 | 54 | 0.76 | -21 |
| 5500 | 0.55 | -165 | 3.2 | 1.44 | 61 | -24 | 0.066 | 55 | 0.76 | -23 |
| 6000 | 0.54 | -167 | 2.5 | 1.34 | 57 | -23 | 0.071 | 55 | 0.76 | -24 |
| 7000 | 0.54 | -169 | 1.4 | 1.17 | 51 | -22 | 0.080 | 56 | 0.77 | -28 |

*Values do not include any parasitic bonding inductances and were generated by use of a computer model.

## RF Equivalent Circuit See page 3-7.

**HXTR-6101 and HXTR-6102 Typical Common-Emitter S-Parameters ($V_{CE}$ = 10 V, $I_C$ = 4 mA)**

| Freq. (MHz) | $S_{11}$ | | $S_{21}$ | | $S_{12}$ | | $S_{22}$ | |
|---|---|---|---|---|---|---|---|---|
| | Mag. | Ang. | Mag. | Ang. | Mag. | Ang. | Mag. | Ang. |
| 100 | 0.91 | -11 | 7.14 | 168 | 0.007 | 79 | 0.99 | -4 |
| 500 | 0.78 | -54 | 6.27 | 135 | 0.026 | 54 | 0.90 | -18 |
| 1000 | 0.63 | -98 | 5.03 | 113 | 0.037 | 33 | 0.78 | -30 |
| 1500 | 0.59 | -127 | 3.88 | 87 | 0.039 | 28 | 0.76 | -35 |
| 2000 | 0.58 | -149 | 3.14 | 71 | 0.042 | 26 | 0.75 | -43 |
| 2500 | 0.57 | -163 | 2.64 | 59 | 0.042 | 25 | 0.76 | -50 |
| 3000 | 0.57 | -173 | 2.20 | 48 | 0.043 | 25 | 0.77 | -58 |
| 3500 | 0.56 | 180 | 1.94 | 37 | 0.046 | 25 | 0.79 | -64 |
| 4000 | 0.54 | 173 | 1.66 | 29 | 0.049 | 24 | 0.81 | -71 |
| 4500 | 0.53 | 167 | 1.45 | 20 | 0.053 | 24 | 0.85 | -76 |
| 5000 | 0.51 | 160 | 1.34 | 11 | 0.058 | 23 | 0.86 | -84 |
| 5500 | 0.50 | 152 | 1.21 | -1 | 0.060 | 22 | 0.88 | -92 |
| 6000 | 0.48 | 146 | 1.07 | -7 | 0.063 | 20 | 0.87 | -99 |
| 7000 | 0.49 | 132 | 0.89 | -23 | 0.069 | 15 | 0.87 | -108 |

**HXTR-6103 and HXTR-6104 Typical Common-Emitter S-Parameters ($V_{CE}$ = 10 V, $I_C$ = 3 mA)**

| Freq. (MHz) | $S_{11}$ | | $S_{21}$ | | | $S_{12}$ | | | $S_{22}$ | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Mag. | Ang. | (dB) | Mag. | Ang. | (dB) | Mag. | Ang. | Mag. | Ang. |
| 100 | 0.93 | -11.5 | 16.2 | 6.46 | 168.0 | -42.0 | 0.01 | 77.0 | 0.99 | -4.0 |
| 200 | 0.89 | -23.0 | 17.1 | 7.13 | 158.0 | -37.0 | 0.01 | 77.0 | 0.97 | -8.0 |
| 300 | 0.86 | -34.0 | 16.4 | 6.58 | 149.0 | -34.0 | 0.02 | 66.0 | 0.94 | -12.0 |
| 400 | 0.83 | -44.0 | 15.9 | 6.26 | 142.0 | -32.0 | 0.03 | 60.0 | 0.92 | -16.0 |
| 500 | 0.79 | -54.0 | 15.6 | 6.02 | 135.0 | -30.0 | 0.03 | 55.0 | 0.89 | -19.0 |
| 600 | 0.75 | -65.0 | 15.4 | 5.91 | 128.0 | -29.0 | 0.04 | 51.0 | 0.87 | -21.0 |
| 700 | 0.71 | -73.0 | 15.0 | 5.62 | 121.0 | -29.0 | 0.04 | 48.0 | 0.85 | -24.0 |
| 800 | 0.68 | -81.0 | 14.4 | 5.25 | 116.0 | -28.0 | 0.04 | 45.0 | 0.84 | -25.0 |
| 900 | 0.65 | -91.0 | 14.0 | 4.99 | 111.0 | -28.0 | 0.04 | 43.0 | 0.83 | -27.0 |
| 1000 | 0.62 | -97.0 | 13.5 | 4.72 | 106.0 | -27.0 | 0.04 | 41.0 | 0.81 | -28.0 |
| 1500 | 0.52 | -129.0 | 11.4 | 3.71 | 84.0 | -27.0 | 0.05 | 32.0 | 0.74 | -35.0 |
| 2000 | 0.50 | -151.0 | 9.3 | 2.93 | 69.0 | -26.0 | 0.05 | 31.0 | 0.72 | -43.0 |
| 2500 | 0.50 | -169.0 | 7.8 | 2.45 | 55.0 | -26.0 | 0.05 | 31.0 | 0.69 | -51.0 |
| 3000 | 0.49 | 175.0 | 6.5 | 2.12 | 42.0 | -26.0 | 0.06 | 33.0 | 0.68 | -57.0 |
| 3500 | 0.54 | 165.0 | 5.4 | 1.87 | 29.0 | -25.0 | 0.06 | 35.0 | 0.65 | -68.0 |
| 4000 | 0.52 | 156.0 | 4.5 | 1.67 | 19.0 | -24.0 | 0.06 | 37.0 | 0.68 | -76.0 |
| 5000 | 0.53 | 140.0 | 2.6 | 1.35 | -3.0 | -23.0 | 0.08 | 35.0 | 0.71 | -96.0 |
| 6000 | 0.48 | 120.0 | 0.9 | 1.11 | -22.0 | -21.0 | 0.09 | 34.0 | 0.73 | -112.0 |

## High Reliability Testing*

Two basic levels of High-Reliability testing are offered.

1. The TX suffix indicates a part that is preconditioned and screened to the program shown in Table II and III, and is marked with an orange dot.
2. The TXV suffix indicates that an internal visual inspection per MIL-STD-750 Method 2072 is included as part of the preconditioning screening and is marked with a green dot.

Group B quality conformance inspections are performed on each inspection lot in accordance with Table IVb. Group C quality conformance inspections are performed periodically at six month intervals in accordance with Table V.

## Part Number System for Order and RFQ Information

| Part Number Prefix | Screening Level |
|---|---|
| 2N6617 (HXTR-6101)<br>2N6742 (HXTR-6102)<br>2N6618 (HXTR-6103)<br>2N6743 (HXTR-6104) | Commercial |
| 2N6617TX (HXTR-6101TX)<br>2N6742TX (HXTR-6102TX)<br>2N6618TX (HXTR-6103TX)<br>2N6743TX (HXTR-6104TX) | 100% Screen<br>(per Tables II and III) |
| 2N6617TXV (HXTR-6101TXV)<br>2N6742TXV (HXTR-6102TXV)<br>2N6618TXV (HXTR-6103TXV)<br>2N6743TXV (HXTR-6104TXV) | 100% Screen<br>Internal Visual |

*Please refer to MIL-S-19500 for Tables II, III, IVb, and V.

| | | |
|---|---|---|
| 100% Screen | Screened per MIL-S-19500, Table II, TX or TXV, with the following specified tests and conditions: | |
| | Pre Burn In Tests (Screen 11)* | All DC parameters; $BV_{CES}$, $I_{CEO}$, $I_{CBO}$ and $h_{FE}$ at 25°C, per data sheet Electrical Specifications table |
| | Burn In Conditions (Screen 12)* | $P_T$ = 150 mW, $T_A$ = 25°C |
| | Post Burn In Tests and Deltas (Screen 13)* | All DC parameters; $BV_{CES}$, $I_{CEO}$, $I_{CBO}$ and $h_{FE}$ at 25°C, per data sheet Electrical Specifications table<br>Delta Limits: $\Delta I_{CBO} = \pm 25$ nA or 100%, whichever is greater<br>$\Delta h_{FE} = \pm 25\%$ |
| Group A | Per MIL-S-19500, Table III, and the following: | |
| | Subgroup 2 | $BV_{CES}$, $I_{CEO}$, $I_{CBO}$ and $h_{FE}$ per data sheet Electrical Specifications table |
| | Subgroup 3 | $T_A$ = +150°C, $I_{CBO}$ = 10 µA at $V_{CB}$ = 10 V |
| | | HXTR-6101 HXTR-6102 $T_A$ = -55°C, $h_{FE}$ = 10 minimum at $I_C$ = 4 mA, $V_{CE}$ = 10 V |
| | | HXTR-6103 HXTR-6104 $T_A$ = -55°C, $h_{FE}$ = 20 minimum at $I_C$ = 3 mA, $V_{CE}$ = 10 V |
| | Subgroup 4 | $NF_{MIN}$ and $G_A$ per data sheet Electrical Specifications table |
| | Subgroups 5, 6, and 7 are not applicable. | |
| Group B | Per MIL-S-19500, Table IVb. End point tests per Group A Subgroup2, and with the following conditions and exceptions: | |
| | Subgroup 3 | Operating Life conditions same as 100% burn-in. |
| | except Subgroup 4 | SEM, done prior to assembly |
| | except Subgroup 5 | Thermal resistance, per MIL-STD-750 Method 3151 |
| Group C | Per MIL-S-19500, Table V. No exceptions. End point tests per Group A Subgroup 2, with the following conditions: | |
| | Subgroup 6 | Operating Life conditions same as 100% burn-in. |

*Refer to MIL-S-19500 screen numbers.