

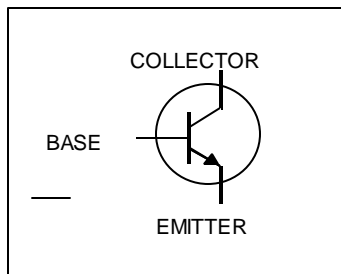
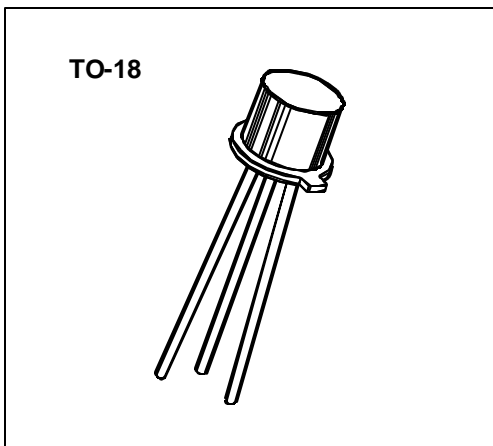
2N2222A

Features

- Meets MIL 19500 /255
- Collector - Base Voltage 75 V
- Collector - Current 800 mA
- High Speed, Medium Current Bipolar Transistor

**SWITCHING
 TRANSISTOR
 JAN, JANTX, JANTXV**

**SMALL SIGNAL
 BIPOLAR
 NPN SILICON**



Maximum Ratings

| RATING | SYMBOL | VALUE | UNIT |
|---|----------------|---------------|----------------------|
| Collector - Emitter Voltage | V_{CEO} | 50 | Vdc |
| Collector - Base Voltage | V_{CBO} | 75 | Vdc |
| Emitter - Base Voltage | V_{EBO} | 6 | Vdc |
| Collector Current -- Continuous | I_C | 800 | mA dc |
| Total Device Dissipation @ $T_A = 25\text{ }^\circ\text{C}$ | P_D | 500 | mW |
| Derate above 25 $^\circ\text{C}$ | | 2.85 | mW/ $^\circ\text{C}$ |
| Total Device Dissipation @ $T_C = 25\text{ }^\circ\text{C}$ | P_D | 1.8 | WATTS |
| Derate above 25 $^\circ\text{C}$ | | 10.3 | mW/ $^\circ\text{C}$ |
| Operating Junction & Storage Temperature Range | T_J, T_{stg} | - 65 to + 200 | $^\circ\text{C}$ |

Thermal Characteristics

| CHARACTERISTIC | SYMBOL | MAX | UNIT |
|---|-----------------|-----|---------------------------|
| Thermal Resistance, Junction to Ambient | $R_{\theta JA}$ | 350 | $^\circ\text{C}/\text{W}$ |

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Electrical Characteristics (T_A = 25°C unless otherwise noted)

| OFF CHARACTERISTIC | SYMBOL | MIN | MAX | UNIT |
|--|----------------------|-----|----------|--------------|
| Collector - Emitter Breakdown Voltage (1) (I _C = 10 mA dc, I _B = 0) | V(BR) _{CEO} | 50 | | Vdc |
| Collector - Base Breakdown Voltage (1) (I _C = 10 mAdc, I _E = 0) | V(BR) _{CBO} | 75 | | Vdc |
| Emitter - Base Breakdown Voltage (1) (I _E = 10 mAdc, I _C = 0) | V(BR) _{EBO} | 6 | | Vdc |
| Collector - Emitter Cutoff Current (V _{CE} = 50 Vdc, V _{BE(off)} = 0 V) | I _{CES} | | 50 | nAdc |
| Collector - Base Cutoff Current (V _{CB} = 60 Vdc, I _E = 0) (V _{CB} = 60 Vdc, I _E = 0, T _A = 150 °C) | I _{CBO} | | 10 10 | nAdc mAdc |
| Emitter - Base Cutoff Current (V _{EB} = 4 Vdc) | I _{EBO} | | 10 | nAdc |

| ON CHARACTERISTIC | SYMBOL | MIN | MAX | UNIT |
|---|----------------------|------------------------------------|------------|------|
| DC Current Gain (I _C = 100 mA dc, V _{CE} = 10 Vdc) (I _C = 1 mA dc, V _{CE} = 10 Vdc) (I _C = 10 mA dc, V _{CE} = 10 Vdc) (I _C = 150 mA dc, V _{CE} = 10 Vdc) (1) (I _C = 500 mA dc, V _{CE} = 10 Vdc) (1) (I _C = 10 mA dc, V _{CE} = 10 Vdc, T _J = -55°C) | h _{FE} | 50 75 100 100 30 35 | 325 | |
| Collector - Emitter Saturation Voltage (I _C = 150 mAdc, I _B = 15 mAdc) (1) (I _C = 500 mAdc, I _B = 50 mAdc) (1) | V _{CE(sat)} | | 0.3 1.0 | Vdc |
| Base - Emitter Saturation Voltage (I _C = 150 mAdc, I _B = 15 mAdc) (1) (I _C = 500 mAdc, I _B = 50 mAdc) (1) | V _{BE(sat)} | 0.6 | 1.2 2.0 | Vdc |

1. Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle ≤ 2.0%

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Electrical Characteristics (T_A = 25°C unless otherwise noted)

| SMALL - SIGNAL CHARACTERISTICS | SYMBOL | MIN | MAX | UNIT |
|---|------------------------|-----|-----|------|
| Output Capacitance | C_{obo} | | | |
| (V _{CB} = 10 Vdc, I _E = 0, 100kHz ≤ f ≤ 1 MHz) | | | 8 | pF |
| Input Capacitance | C_{ibo} | | | |
| (V _{EB} = 0.5 Vdc, I _C = 0, 100kHz ≤ f ≤ 1 MHz) | | | 25 | pF |

| SWITCHING CHARACTERISTICS | SYMBOL | MIN | MAX | UNIT |
|---|------------------------|-----|-----|------|
| Turn - On Time | t_{on} | | | |
| (V _{CC} = 30 Vdc, I _C = 150 mAdc, I _{B1} = 15 mAdc) (See FIGURE 1) | | | 35 | ns |
| Turn - Off Time | t_{off} | | | |
| (V _{CC} = 30 Vdc, I _C = 150 mAdc, I _{B1} = - I _{B2} = 15 mAdc) (See FIGURE 2) | | | 300 | ns |

Small - Signal AC Characteristics (T_A = 25°C)

| LOW FREQUENCY | SYMBOL | MIN | MAX | UNIT |
|---|-------------------------|-----|-----|------|
| Common - Emitter Forward Current Transfer Ratio | h_{fe} | | | |
| (I _C = 1 mA, V _{CE} = 10 V, f = 1kHz) | | 50 | | |
| HIGH FREQUENCY | | | | |
| Common - Emitter Forward Current Transfer Ratio | h_{fe} | | | |
| (I _C = 20 mA, V _{CE} = 20 V, f = 100 MHz) | | 2.5 | | |

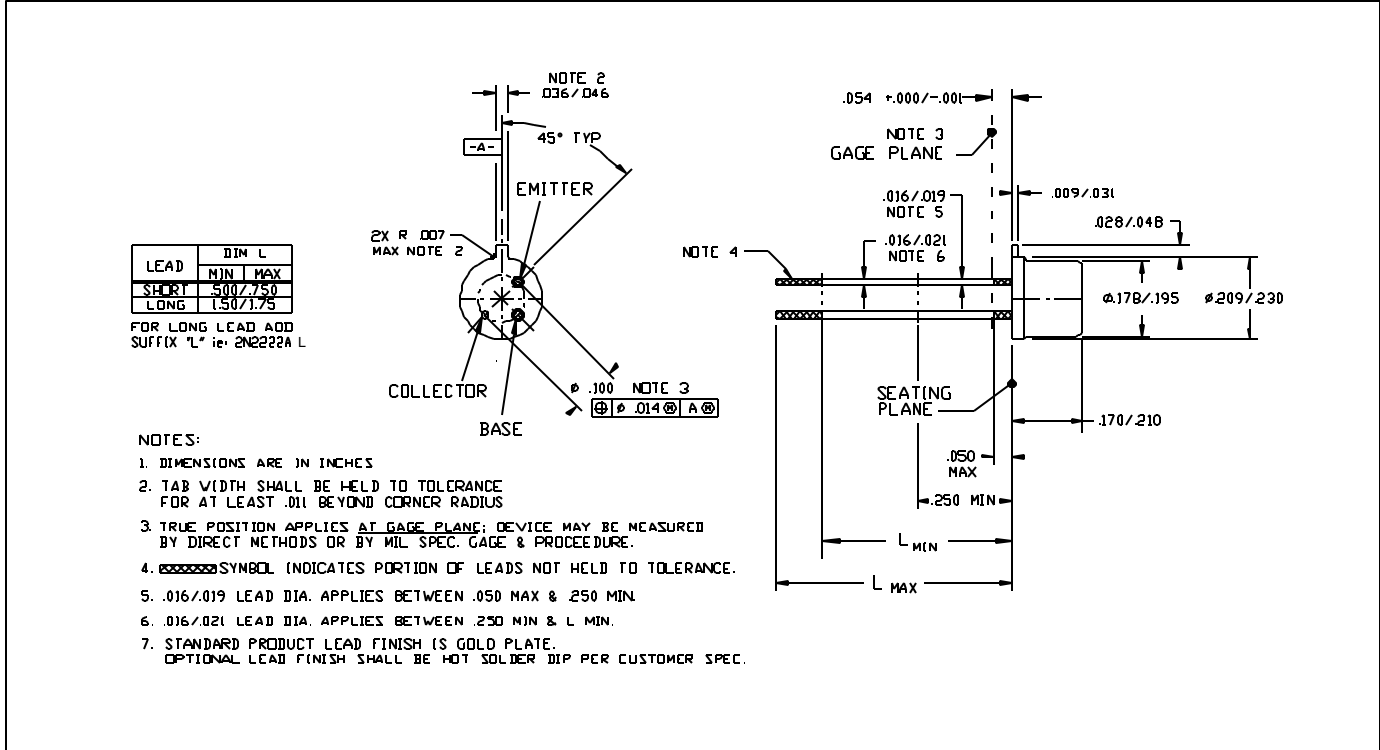
Spice Model (based upon typical device characteristics) *1

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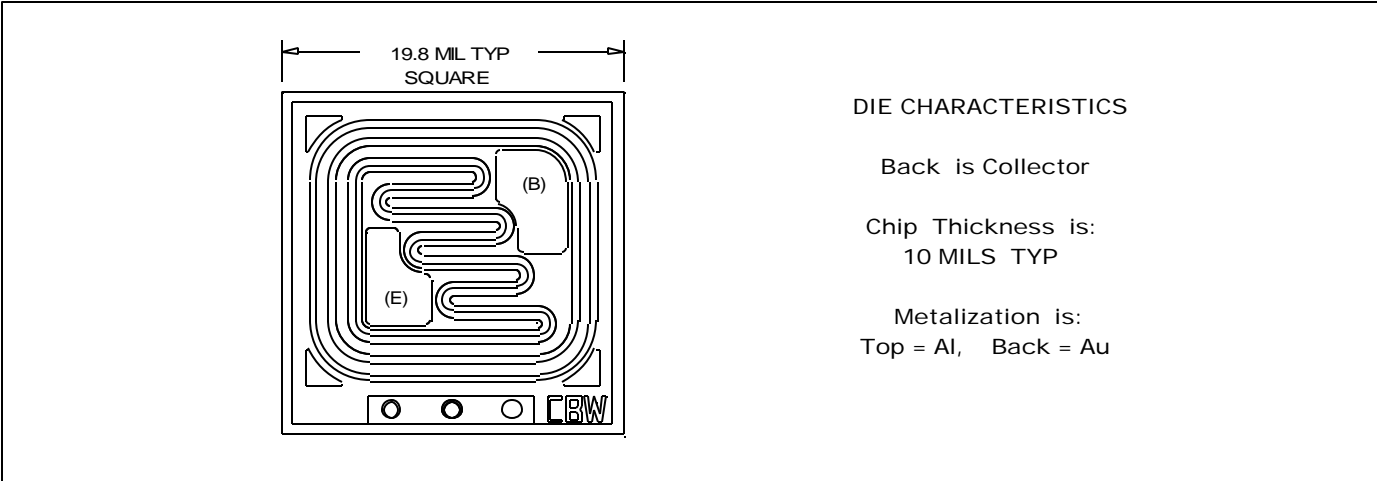
Q2N2222A NPN ( IS = 19.34n XT = 3.0 EG = 1.11 VAF=250.3 BF = 163.8 ISE =174.3f
+ NE = 1.647 IKF = 3.0 NK = 0.3052 XTB = 1.5 BR = 11.49 ISC = 19.9f
+ NC = 1.88 IKR = 10.75 RC = 0.3567 CJC = 11.02p VJC = 0.3869 MJC = 0.3292
+ FC = 0.5 CJE = 29.31p VJE = 0.9036 MJE = 0.4101 TR = 38.32n TF =361.8p
+ ITF = 5.282 XTF = 249.9 VTF=10 )
  
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*1. Microsemi Corp. claims no responsibility for misapplication of Spice Model information. Spice modeling should be used as a precursor guide to in-circuit performance. Actual performance is the responsibility of the user/designer.

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TO 18 CASE OUTLINE



DIE OUTLINE

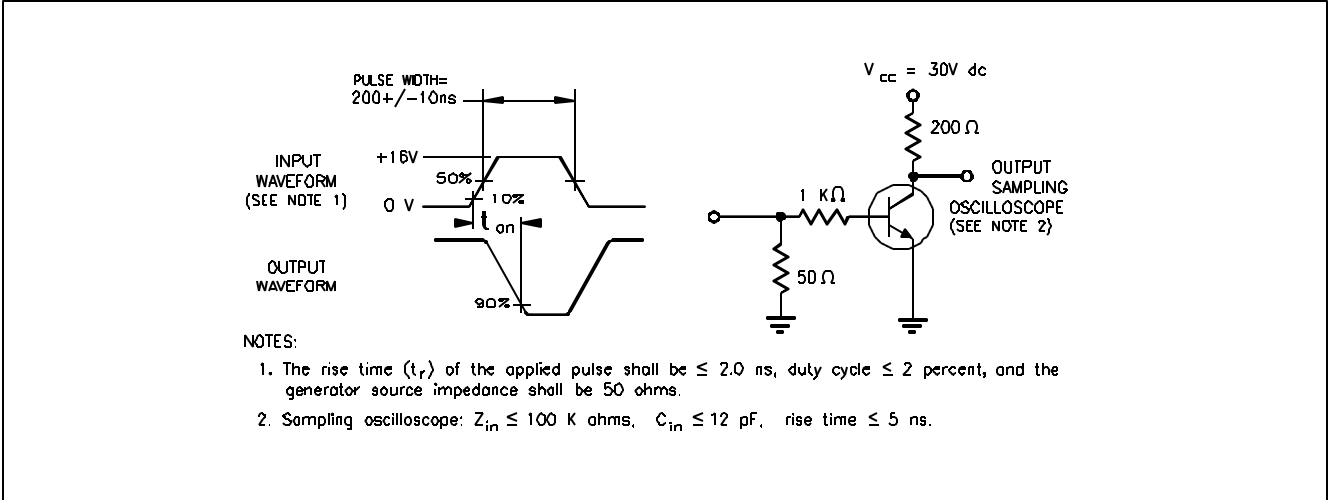


FIGURE 1 Saturated Turn-on Time Test Circuit

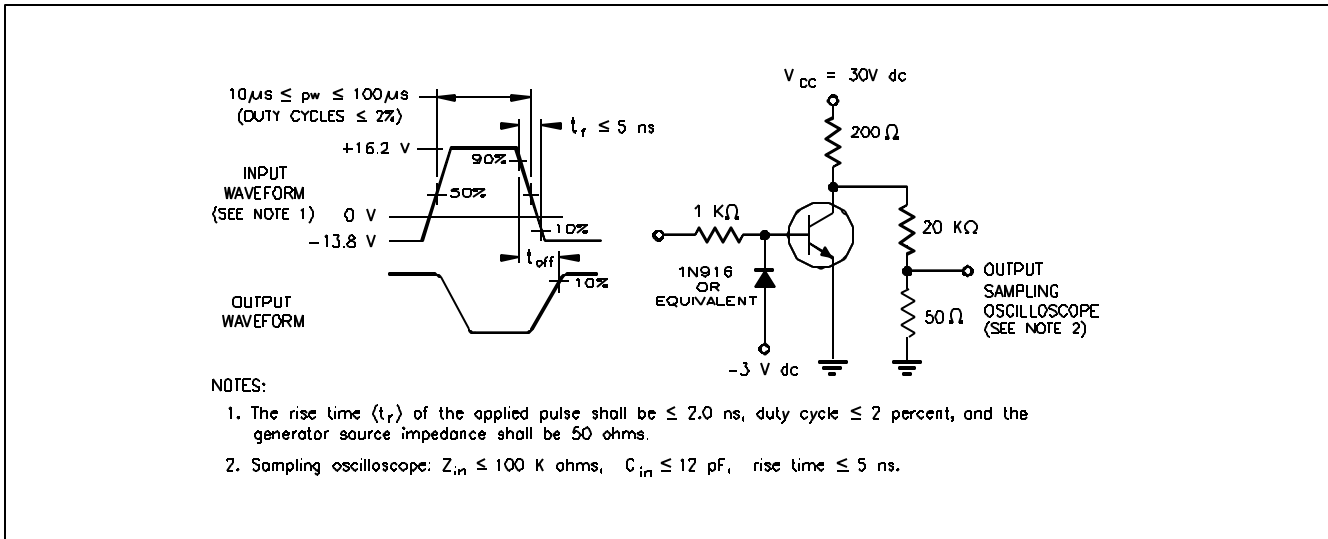


FIGURE 2 Saturated Turn-off Time Test Circuit

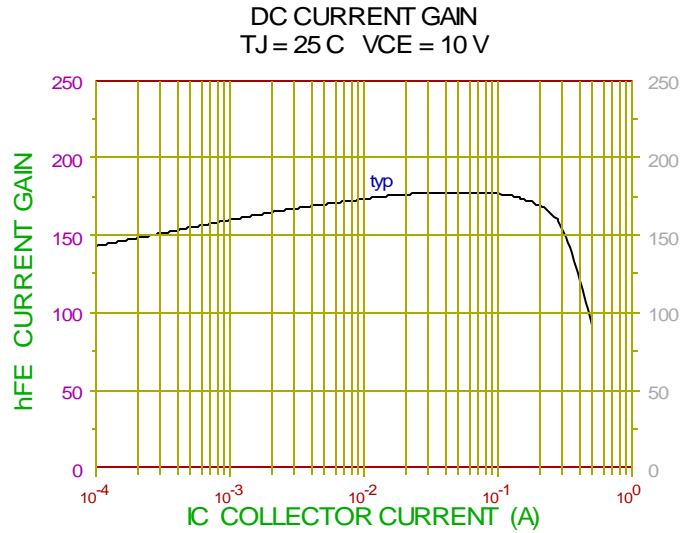


FIGURE 3

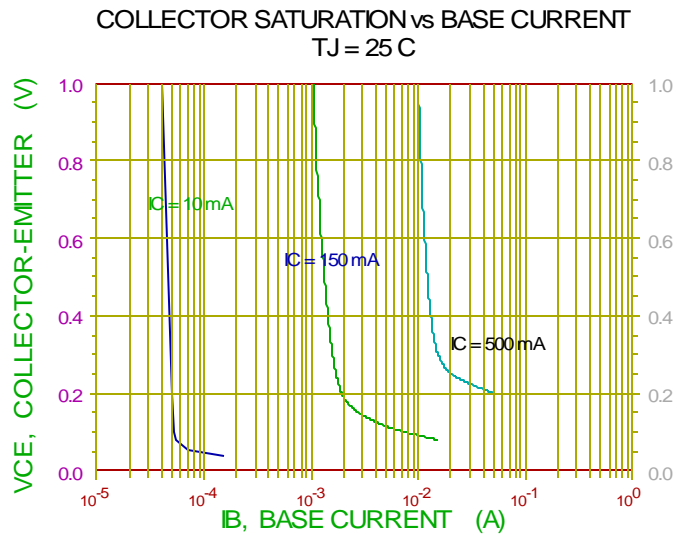


FIGURE 4

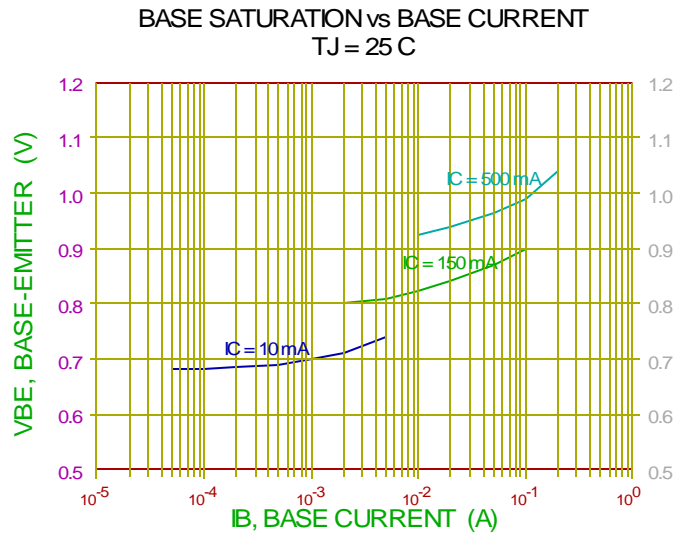


FIGURE 5

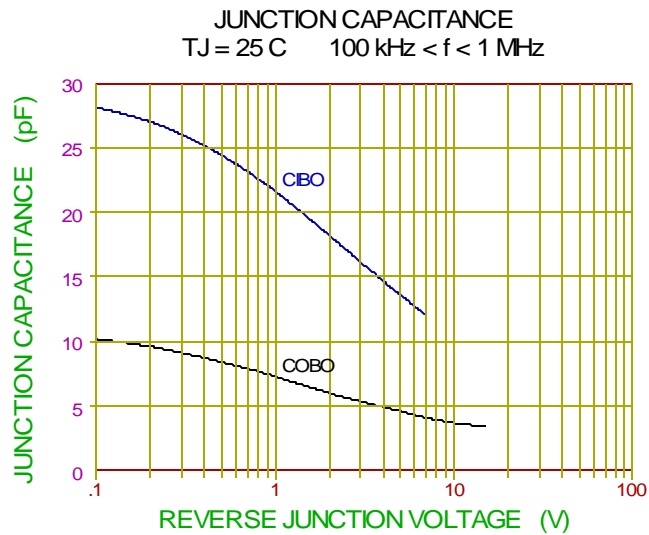


FIGURE 6

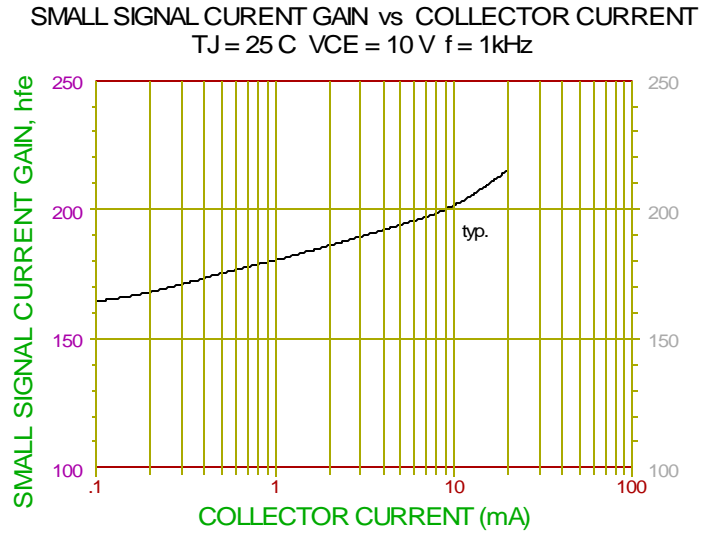


FIGURE 7

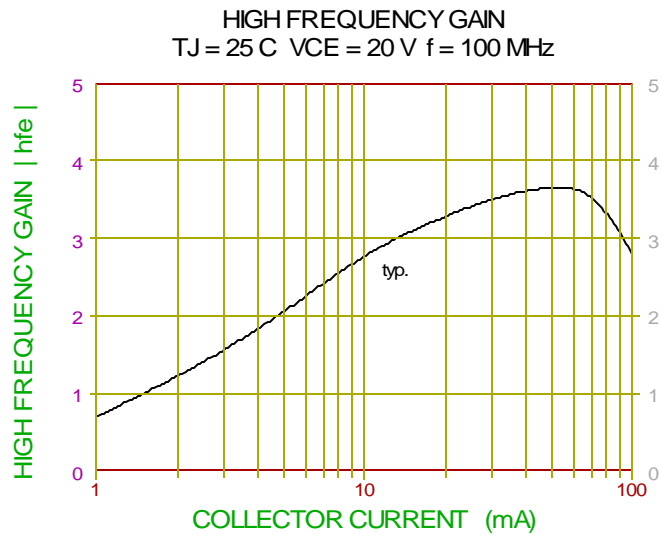


FIGURE 8

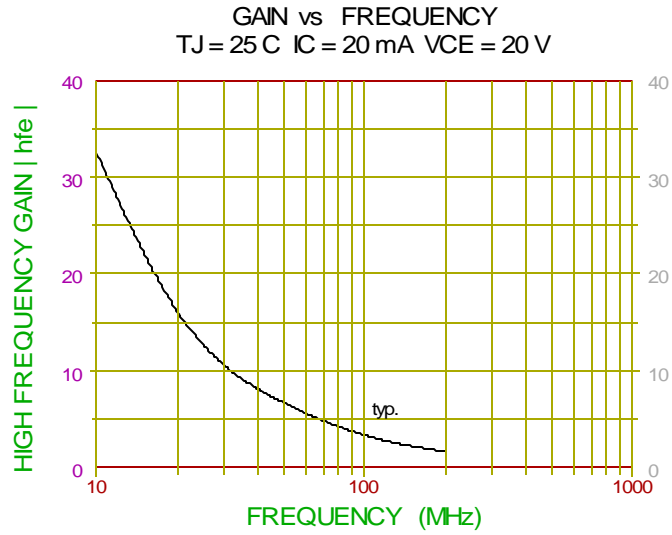


FIGURE 9