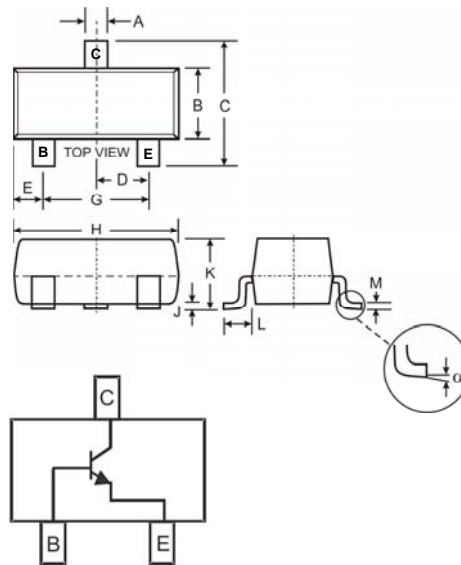


### Features

- Designed for VHF/UHF Amplifier Applications and High Output VHF Oscillators
- High Current Gain Bandwidth Product
- Ideal for Mixer and RF Amplifier Applications with collector currents in the 100 $\mu$ A - 30 mA Range
- **Lead Free/RoHS Compliant (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**

### Mechanical Data

- Case: SOT-23
- Case Material: Molded Plastic. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020C
- Terminals: Solderable per MIL-STD-202, Method 208
- Terminal Connections: See Diagram
- Lead Free Plating (Matte Tin Finish annealed over Alloy 42 leadframe).
- Marking Information: K3H, K3Y; See Page 3
- Ordering Information: See Page 3
- Weight: 0.008 grams (approximate)



| SOT-23               |       |       |
|----------------------|-------|-------|
| Dim                  | Min   | Max   |
| A                    | 0.37  | 0.51  |
| B                    | 1.20  | 1.40  |
| C                    | 2.30  | 2.50  |
| D                    | 0.89  | 1.03  |
| E                    | 0.45  | 0.60  |
| G                    | 1.78  | 2.05  |
| H                    | 2.80  | 3.00  |
| J                    | 0.013 | 0.10  |
| K                    | 0.903 | 1.10  |
| L                    | 0.45  | 0.61  |
| M                    | 0.085 | 0.180 |
| $\alpha$             | 0°    | 8°    |
| All Dimensions in mm |       |       |

### Maximum Ratings @ $T_A = 25^\circ\text{C}$ unless otherwise specified

| Characteristic                                   | Symbol          | Value       | Unit                      |
|--|-----------------|-------------|---------------------------|
| Collector-Base Voltage                           | $V_{CBO}$       | 30          | V                         |
| Collector-Emitter Voltage                        | $V_{CEO}$       | 25          | V                         |
| Emitter-Base Voltage                             | $V_{EBO}$       | 3.0         | V                         |
| Collector Current - Continuous (Note 1)          | $I_C$           | 50          | mA                        |
| Power Dissipation (Note 1)                       | $P_d$           | 300         | mW                        |
| Thermal Resistance, Junction to Ambient (Note 1) | $R_{\theta JA}$ | 417         | $^\circ\text{C}/\text{W}$ |
| Operating and Storage Temperature Range          | $T_J, T_{STG}$  | -55 to +150 | $^\circ\text{C}$          |

### Electrical Characteristics @ $T_A = 25^\circ\text{C}$ unless otherwise specified

| Characteristic                       | Symbol        | Min | Max  | Unit | Test Condition  |
|--------------------------------------|---------------|-----|------|------|---|
| <b>OFF CHARACTERISTICS (Note 2)</b>  |               |     |      |      |   |
| Collector-Emitter Breakdown Voltage  | $V_{(BR)CEO}$ | 25  | —    | V    | $I_C = 1\text{mA}, I_B = 0$                                 |
| Collector-Base Breakdown Voltage     | $V_{(BR)CBO}$ | 30  | —    | V    | $I_C = 100\mu\text{A}, I_E = 0$                             |
| Emitter-Base Breakdown Voltage       | $V_{(BR)EBO}$ | 3.0 | —    | V    | $I_E = 10\mu\text{A}, I_C = 0$                              |
| Collector Cutoff Current             | $I_{CBO}$     | —   | 100  | nA   | $V_{CB} = 25\text{V}, I_E = 0$                              |
| Emitter Cutoff Current               | $I_{EBO}$     | —   | 100  | nA   | $V_{EB} = 2\text{V}, I_C = 0$                               |
| <b>ON CHARACTERISTICS (Note 2)</b>   |               |     |      |      |   |
| DC Current Gain                      | $h_{FE}$      | 60  | —    | —    | $I_C = 4\text{mA}, V_{CE} = 10.0\text{V}$                   |
| Collector-Emitter Saturation Voltage | $V_{CE(SAT)}$ | —   | 0.5  | V    | $I_C = 4\text{mA}, I_B = 400\mu\text{A}$                    |
| Base-Emitter On Voltage              | $V_{BE(SAT)}$ | —   | 0.95 | V    | $I_C = 4\text{mA}, V_{CE} = 10.0\text{V}$                   |
| <b>SMALL SIGNAL CHARACTERISTICS</b>  |               |     |      |      |   |
| Current Gain-Bandwidth Product       | $f_T$         | 650 | —    | MHz  | $V_{CE} = 10\text{V}, f = 100\text{MHz}, I_C = 4\text{mA}$  |
| Collector-Base Capacitance           | $C_{CB}$      | —   | 0.7  | pF   | $V_{CB} = 10\text{V}, f = 1.0\text{MHz}, I_E = 0$           |
| Collector-Base Feedback Capacitance  | $C_{RB}$      | —   | 0.65 | pF   | $V_{CB} = 10\text{V}, f = 1.0\text{MHz}, I_E = 0$           |
| Collector-Base Time Constant         | $R_b'C_c$     | —   | 9    | ps   | $V_{CB} = 10\text{V}, f = 31.8\text{MHz}, I_C = 4\text{mA}$ |

- Notes:
1. Device mounted on FR-4 PCB, 1 inch x 0.85 inch x 0.062 inch, pad layout as shown on Diodes Inc. suggested pad layout document AP02001, which can be found on our website at <http://www.diodes.com/datasheets/ap02001.pdf>.
  2. Short duration pulse test used to minimize self-heating effect.
  3. No purposefully added lead.

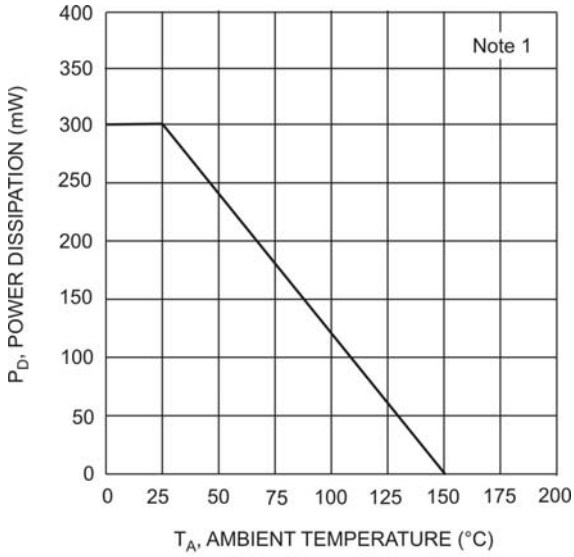


Fig. 1, Max Power Dissipation vs Ambient Temperature

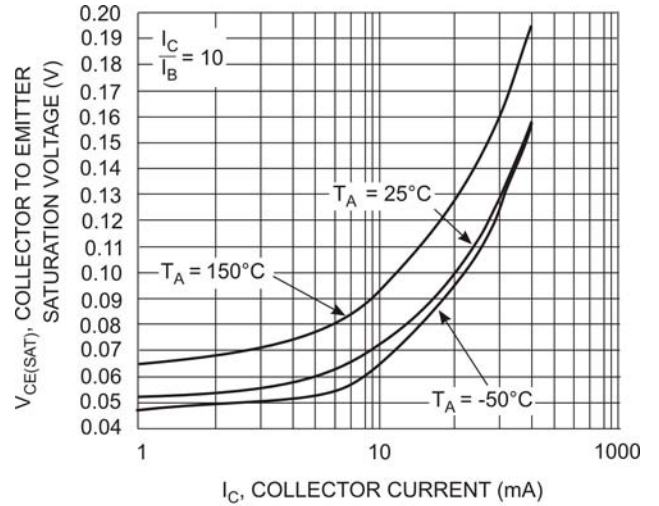


Fig. 2 Collector Emitter Saturation Voltage vs. Collector Current

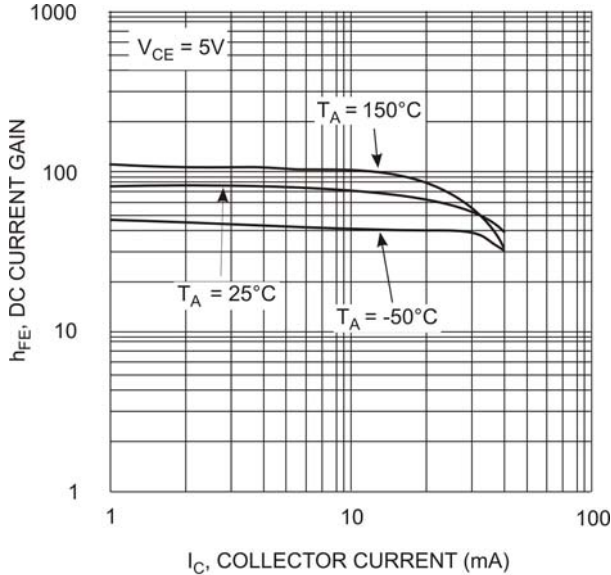


Fig. 3, DC Current Gain vs. Collector Current

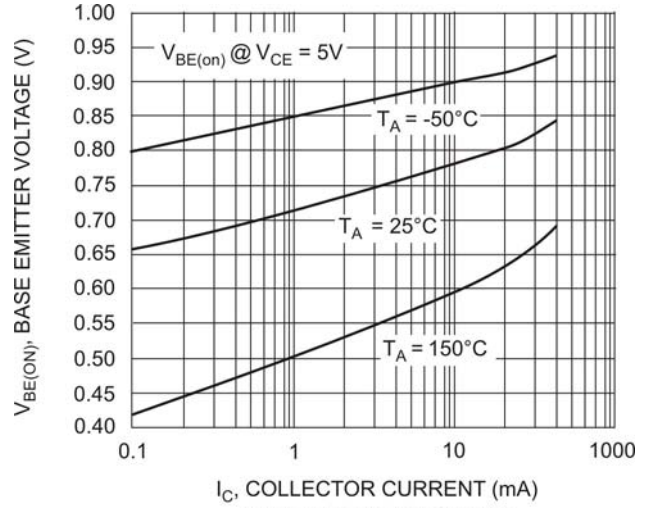


Fig. 4 Base Emitter Voltage vs. Collector Current

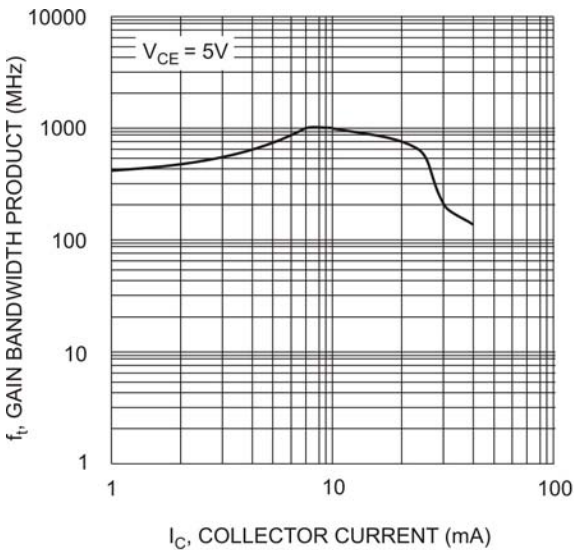


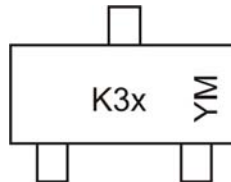
Fig. 5, Gain Bandwidth Product vs Collector Current

## Ordering Information (Note 4)

| Device      | Packaging | Shipping         |
|-------------|-----------|------------------|
| MMBTH10-7-F | SOT-23    | 3000/Tape & Reel |

Notes: 4. For Packaging Details, go to our website at <http://www.diodes.com/datasheets/ap02007.pdf>.

## Marking Information



K3x = Product Type Marking Code, e.g. K3H

YM = Date Code Marking

Y = Year ex: N = 2002

M = Month ex: 9 = September

### Date Code Key

| Year | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 |
|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Code | J    | K    | L    | M    | N    | P    | R    | S    | T    | U    | V    | W    | X    | Y    | Z    |

| Month | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Code  | 1   | 2   | 3   | 4   | 5   | 6   | 7   | 8   | 9   | O   | N   | D   |

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