



MMBTA42

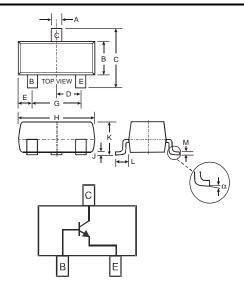
NPN SMALL SIGNAL SURFACE MOUNT TRANSISTOR

Features

- Epitaxial Planar Die Construction
- Complementary PNP Type Available (MMBTA92)
- Ideal for Low Power Amplification and Switching
- Lead, Halogen and Antimony Free, RoHS Compliant "Green" Device (Notes 4 and 5)
- 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
- Terminal Connections: See Diagram
- Terminals: Solderable per MIL-STD-202, Method 208
- Lead Free Plating (Matte Tin Finish annealed over Alloy 42 leadframe).
- Marking (See Page 2): K3M
- Ordering & Date Code Information: See Page 2
- Weight: 0.008 grams (approximate)



| SOT-23 | | | | | | | | | | |
|---------|----------------------|-------|--|--|--|--|--|--|--|--|
| Dim | Min | Max | | | | | | | | |
| Α | 0.37 | 0.51 | | | | | | | | |
| В | 1.20 | 1.40 | | | | | | | | |
| С | 2.30 | 2.50 | | | | | | | | |
| D | 0.89 | 1.03 | | | | | | | | |
| E | 0.45 | 0.60 | | | | | | | | |
| G | 1.78 | 2.05 | | | | | | | | |
| Н | 2.80 | 3.00 | | | | | | | | |
| J | 0.013 | 0.10 | | | | | | | | |
| K | 0.903 | 1.10 | | | | | | | | |
| L | 0.45 | 0.61 | | | | | | | | |
| М | 0.085 | 0.180 | | | | | | | | |
| α | 0° | 8° | | | | | | | | |
| All Din | All Dimensions in mm | | | | | | | | | |

Maximum Ratings @T_A = 25°C unless otherwise specified

| Characteristic | Symbol | Value | Unit | | |
|--|-----------------------------------|-------------|------|--|--|
| Collector-Base Voltage | V_{CBO} | 300 | V | | |
| Collector-Emitter Voltage | V _{CEO} | 300 | V | | |
| Emitter-Base Voltage | V _{EBO} | 6.0 | V | | |
| Collector Current (Note 1) (Note 3) | Ic | 500 | mA | | |
| Power Dissipation (Note 1) | P _d | 300 | mW | | |
| Thermal Resistance, Junction to Ambient (Note 1) | $R_{	hetaJA}$ | 417 | °C/W | | |
| Operating and Storage and Temperature Range | T _i , T _{STG} | -55 to +150 | °C | | |

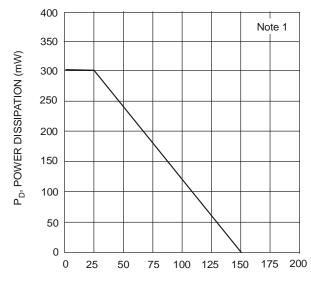
Electrical Characteristics @TA = 25°C unless otherwise specified

| Characteristic | Symbol | Min | Max | Unit | Test Condition | | | |
|--------------------------------------|----------------------|----------|-----|------|---|--|--|--|
| OFF CHARACTERISTICS (Note 2) | | | | | | | | |
| Collector-Base Breakdown Voltage | V _{(BR)CBO} | 300 | | V | $I_C = 100 \mu A, I_E = 0$ | | | |
| Collector-Emitter Breakdown Voltage | V _{(BR)CEO} | 300 | | ٧ | $I_C = 1.0 \text{mA}, I_B = 0$ | | | |
| Emitter-Base Breakdown Voltage | V _{(BR)EBO} | 6.0 | _ | V | $I_E = 100 \mu A, I_C = 0$ | | | |
| Collector Cutoff Current | I _{CBO} | _ | 100 | nA | $V_{CB} = 200V, I_{E} = 0$ | | | |
| Collector Cutoff Current | I _{EBO} | _ | 100 | nA | $V_{CE} = 6.0V, I_{C} = 0$ | | | |
| ON CHARACTERISTICS (Note 2) | | | | | | | | |
| | | 25 | | | $I_C = 1.0 \text{mA}, V_{CE} = 10 \text{V}$ | | | |
| DC Current Gain | h _{FE} | 40 40 | _ | | $I_C = 10mA, V_{CE} = 10V$ | | | |
| | | | | | $I_C = 30mA, V_{CE} = 10V$ | | | |
| Collector-Emitter Saturation Voltage | V _{CE(SAT)} | | 0.5 | V | $I_C = 20 \text{mA}, I_B = 2.0 \text{mA}$ | | | |
| Base- Emitter Saturation Voltage | V _{BE(SAT)} | _ | 0.9 | V | $I_C = 20 \text{mA}, I_B = 2.0 \text{mA}$ | | | |
| SMALL SIGNAL CHARACTERISTICS | • | | , | | | | | |
| Output Capacitance | C _{cb} | _ | 3.0 | pF | $V_{CB} = 20V, f = 1.0MHz, I_E = 0$ | | | |
| Current Gain-Bandwidth Product | f _T | 50 | _ | MHz | $V_{CE} = 20V, I_{C} = 10mA,$ f = 100MHz | | | |

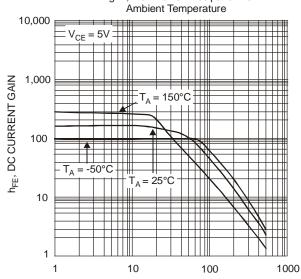
Notes:

- 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.
- When operated under collector-emitter saturation conditions within the safe operating area defined by the thermal resistance rating (R_{0JA}), power dissipation rating (P_d) and power derating curve (figure 1).
- 4. No purposefully added lead. Halogen and Antimony Free.
- Product manufactured with Data Code V9 (week 33, 2008) and newer are built with Green Molding Compound. Product manufactured prior to Date Code V9 are built with Non-Green Molding Compound and may contain Halogens or Sb₂O₃ Fire Retardants.

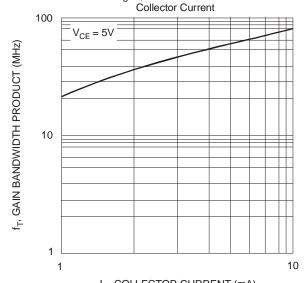




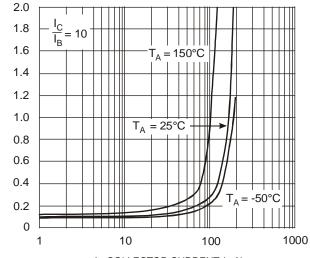
T_A, AMBIENT TEMPERATURE (°C) Fig. 1, Max Power Dissipation vs



I_C, COLLECTOR CURRENT (mA) Fig. 3, DC Current Gain vs

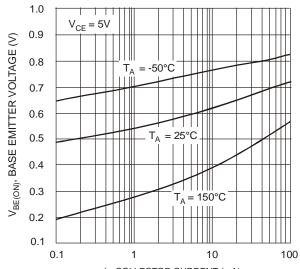


 $I_{\rm C}$, COLLECTOR CURRENT (mA) Fig. 5, Gain Bandwidth Product vs Collector Current



V_{CE(SAT)}, COLLECTOR TO EMITTER SATURATION VOLTAGE (V)

 $\rm I_{c}$, COLLECTOR CURRENT (mA) Fig. 2, Collector Emitter Saturation Voltage vs. Collector Current



 I_{c} , COLLECTOR CURRENT (mA) Fig. 4, Base Emitter Voltage vs Collector Current

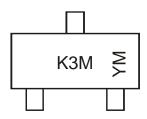


Ordering Information (Note 6)

| Device | Packaging | Shipping | | | |
|--------------|-----------|------------------|--|--|--|
| MMBTA 42-7-F | SOT-23 | 3000/Tape & Reel | | | |

6. For packaging details, go to our website at http://www.diodes.com/datasheets/ap02007.pdf. Notes:

Marking Information



K3M = Product Type Marking Code YM = Date Code Marking Y = Year ex: N = 2002M = 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 | М | N | Р | R | S | T | U | V | W | Х | Υ | Z |
| N | /lonth | | Jan | Feb | Mar | Apr | May | Jun | Ju | ı Au | ıg | Sep | Oct | Nov | Dec |
| Code | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 3 | 9 | 0 | N | D |

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