

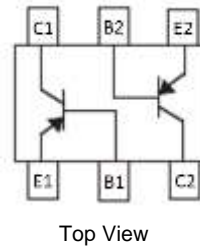
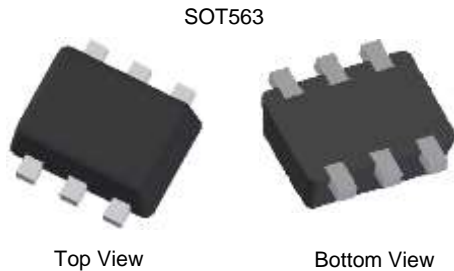
40V DUAL PNP SMALL SIGNAL TRANSISTOR IN SOT563

Features

- $BV_{CEO} > -40V$
- $I_C = -200mA$ High Collector Current
- Epitaxial Planar Die Construction
- Ideal for Low Power Amplification and Switching
- Ultra-Small Surface Mount Package
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**

Mechanical Data

- Case: SOT563
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish – Matte Tin Finish. Solderable per MIL-STD-202, Method 208
- Weight: 0.003 grams (Approximate)

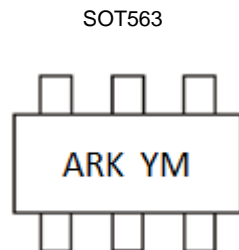


Ordering Information (Note 4)

| Product | Status | Compliance | Marking | Reel Size (inches) | Tape Width (mm) | Quantity per Reel |
|--------------|--------|------------|---------|--------------------|-----------------|-------------------|
| MMDT3906VC-7 | Active | AEC-Q101 | ARK | 7 | 8 | 3,000 |

- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
 2. See <https://www.diodes.com/quality/lead-free/> for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
 3. Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
 4. For packaging details, go to our website at <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

Marking Information



ARK = Product Type Marking Code
 YM = Date Code Marking
 Y or \bar{Y} = Year (ex: E = 2017)
 M or \bar{M} = Month (ex: 2 = February)

Date Code Key

| Year | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 |
|------|------|------|------|------|------|------|------|------|------|------|------|
| Code | E | F | G | H | I | J | K | L | M | N | O |

| 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 |

Absolute Maximum Ratings (@T_A = +25°C, unless otherwise specified.)

| Characteristic | Symbol | Value | Unit |
|---------------------------|------------------|-------|------|
| Collector-Base Voltage | V _{CBO} | -40 | V |
| Collector-Emitter Voltage | V _{CEO} | -40 | V |
| Emitter-Base Voltage | V _{EBO} | -6 | V |
| Collector Current | I _C | -200 | mA |

Thermal Characteristics

| Characteristic | Symbol | Value | Unit |
|--|-----------------------------------|-------------|------|
| Power Dissipation (Note 5) | P _D | 150 | mW |
| Thermal Resistance, Junction to Ambient (Note 5) | R _{θJA} | 833 | °C/W |
| Operating and Storage and Temperature Range | T _J , T _{STG} | -55 to +150 | °C |

ESD Ratings (Note 6)

| Characteristic | Symbol | Value | Unit | JEDEC Class |
|--|---------|-------|------|-------------|
| Electrostatic Discharge - Human Body Model | ESD HBM | 4,000 | V | 3A |
| Electrostatic Discharge - Machine Model | ESD MM | 400 | V | C |

- Notes:
- For the device mounted on minimum recommended pad layout FR4 PCB with high coverage of single sided 1oz copper, in still air conditions; the device is measured when operating in a steady-state condition.
 - Refer to JEDEC specification JESD22-A114 and JESD22-A115.

Thermal Characteristic and Derating Information

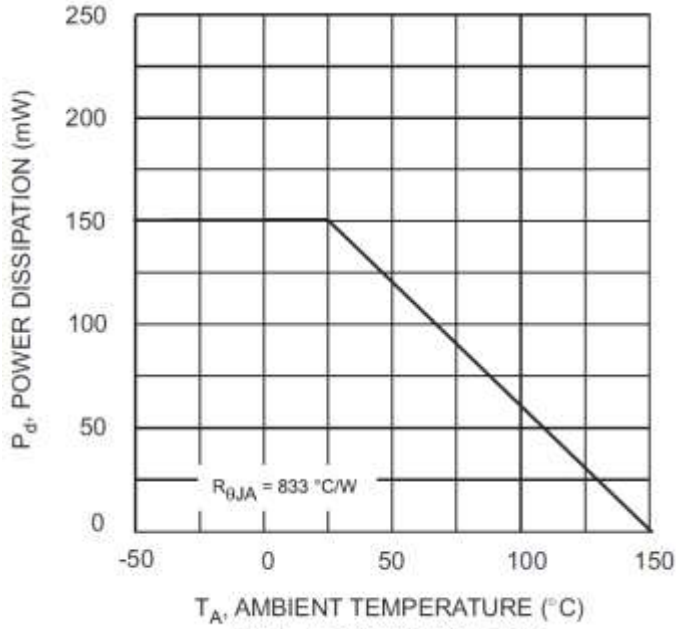


Fig. 1, Derating Curve - Total

Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

| Characteristic | Symbol | Min | Max | Unit | Test Condition |
|--------------------------------------|----------------------|-------|----------------|--------------------|--|
| OFF CHARACTERISTICS | | | | | |
| Collector-Base Breakdown Voltage | BV _{CB0} | -40 | — | V | I _C = -100μA, I _E = 0 |
| Collector-Emitter Breakdown Voltage | BV _{CEO} | -40 | — | V | I _C = -1mA, I _B = 0 |
| Emitter-Base Breakdown Voltage | BV _{EBO} | -6 | — | V | I _E = -100μA, I _C = 0 |
| Collector Cut-Off Current | I _{CEX} | — | -50 | nA | V _{CE} = -30V, V _{EB(OFF)} = -3V |
| Base Cut-Off Current | I _{BL} | — | -50 | nA | V _{CE} = -30V, V _{EB(OFF)} = -3V |
| Emitter-Base Cut-Off Current | I _{EBO} | — | -20 | nA | V _{EB} = -6V, I _C = 0 |
| ON CHARACTERISTICS (Note 7) | | | | | |
| DC Current Gain | h _{FE} | 60 | — | — | I _C = -100μA, V _{CE} = -1V |
| | | 80 | — | | I _C = -1mA, V _{CE} = -1V |
| | | 100 | 300 | | I _C = -10mA, V _{CE} = -1V |
| | | 60 | — | | I _C = -50mA, V _{CE} = -1V |
| | | 30 | — | | I _C = -100mA, V _{CE} = -1V |
| Collector-Emitter Saturation Voltage | V _{CE(SAT)} | — | -0.25 -0.4 | V | I _C = -10mA, I _B = -1mA I _C = -50mA, I _B = -5mA |
| Base-Emitter Saturation Voltage | V _{BE(SAT)} | -0.65 | -0.85 -0.95 | V | I _C = -10mA, I _B = -1mA I _C = -50mA, I _B = -5mA |
| SMALL SIGNAL CHARACTERISTICS | | | | | |
| Output Capacitance | C _{OBO} | — | 4.5 | pF | V _{CB} = -5V, f = 1MHz, I _E = 0 |
| Input Capacitance | C _{IBO} | — | 10 | pF | V _{EB} = -0.5V, f = 1MHz, I _C = 0 |
| Input Impedance | h _{IE} | 2 | 12 | kΩ | V _{CE} = 10V, I _C = 1mA, f = 1kHz |
| Voltage Feedback Ratio | h _{RE} | 0.1 | 10 | x 10 ⁻⁴ | |
| Small Signal Current Gain | h _{FE} | 100 | 400 | — | |
| Output Admittance | h _{OE} | 3 | 60 | μS | |
| Current Gain-Bandwidth Product | f _T | 250 | — | MHz | V _{CE} = -20V, I _C = -10mA, f = 100MHz |
| Noise Figure | NF | — | 4 | dB | V _{CE} = -5V, I _C = -100μA, R _S = 1kΩ, f = 1kHz |
| SWITCHING CHARACTERISTICS | | | | | |
| Delay Time | t _D | — | 35 | ns | V _{CC} = -3V, I _C = -10mA, -I _{B1} = I _{B2} = -1.0mA |
| Rise Time | t _R | — | 35 | ns | |
| Storage Time | t _S | — | 200 | ns | |
| Fall Time | t _F | — | 50 | ns | |

Note: 7. Measured under pulsed conditions. Pulse width ≤ 300μs. Duty cycle ≤ 2%.

Typical Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

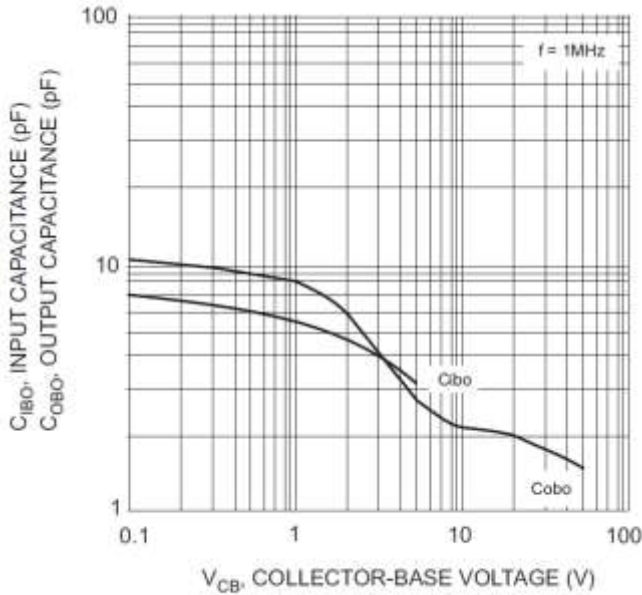


Fig. 2, Input and Output Capacitance vs. Collector-Base Voltage

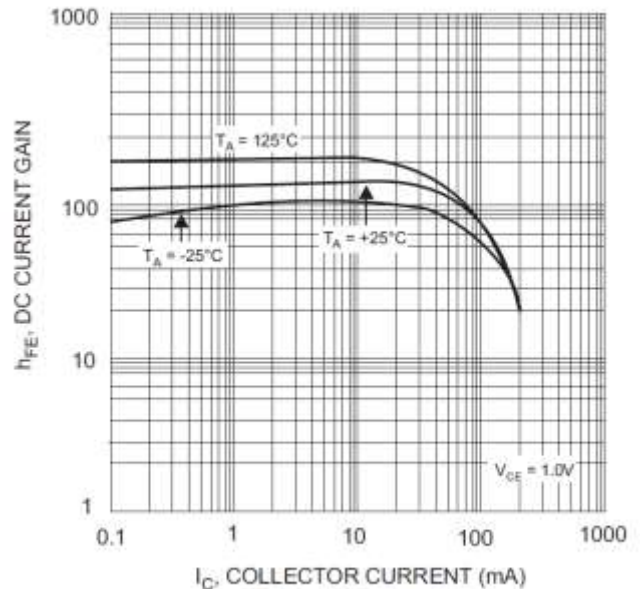


Fig. 3, Typical DC Current Gain vs. Collector Current

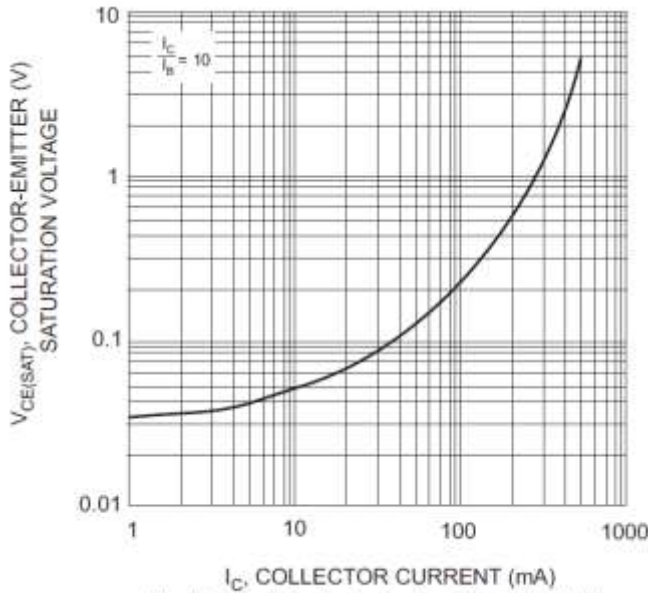


Fig. 4, Typical Collector-Emitter Saturation Voltage vs. Collector Current

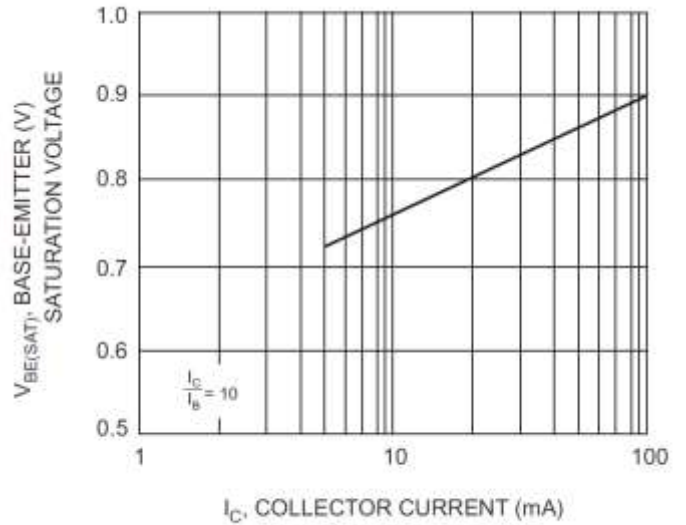
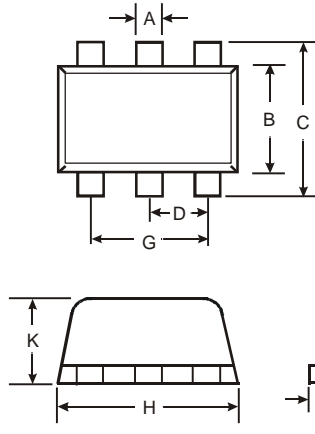


Fig. 5, Typical Base-Emitter Saturation Voltage vs. Collector Current

Package Outline Dimensions

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

SOT563

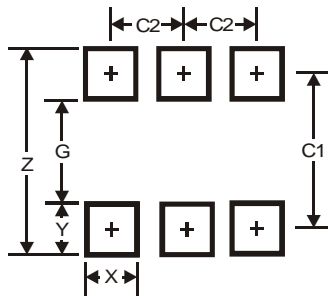


| SOT563 | | | |
|----------------------|------|------|------|
| Dim | Min | Max | Typ |
| A | 0.15 | 0.30 | 0.20 |
| B | 1.10 | 1.25 | 1.20 |
| C | 1.55 | 1.70 | 1.60 |
| D | - | - | 0.50 |
| G | 0.90 | 1.10 | 1.00 |
| H | 1.50 | 1.70 | 1.60 |
| K | 0.55 | 0.60 | 0.60 |
| L | 0.10 | 0.30 | 0.20 |
| M | 0.10 | 0.18 | 0.11 |
| All Dimensions in mm | | | |

Suggested Pad Layout

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

SOT563



| Dimensions | SOT563 |
|------------|--------|
| Z | 2.2 |
| G | 1.2 |
| X | 0.375 |
| Y | 0.5 |
| C1 | 1.7 |
| C2 | 0.5 |

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