

Features

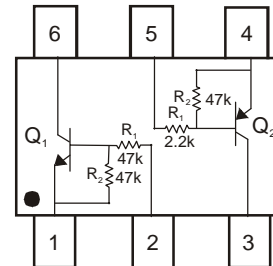
- Epitaxial Planar Die Construction
- Surface Mount Package Suited for Automated Assembly
- Simplifies Circuit Design and Reduces Board Space
- **Lead Free/RoHS Compliant (Note 1)**
- **"Green" Device (Note 2)**



SOT-563

Mechanical Data

- Case: SOT-563
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020C
- Terminals: Finish — Matte Tin Finish annealed over Copper leadframe. Solderable per MIL-STD-202, Method 208
- Marking Information: See Page 4
- Ordering Information: See Page 4
- Weight: 0.005 grams (approximate)



| Reference | Device Type | R1(Nom) | R2(Nom) |
|----------------|-------------|---------|---------|
| Q ₁ | NPN | 47kΩ | 47kΩ |
| Q ₂ | PNP | 2.2 kΩ | 47kΩ |

Maximum Ratings, Total Device @T_A = 25°C unless otherwise specified

| Characteristic | Symbol | Value | Unit |
|--|-----------------------------------|-------------|------|
| Power Dissipation (Note 3) | P _D | 300 | mW |
| Thermal Resistance, Junction to Ambient Air (Note 3) | R _{θJA} | 417 | °C/W |
| Operating and Storage Temperature Range | T _j , T _{STG} | -55 to +150 | °C |

Maximum Ratings, Pre-Biased NPN Transistor, Q₁ @T_A = 25°C unless otherwise specified

| Characteristic | Symbol | Value | Unit |
|---------------------------|------------------|------------|------|
| Collector-Base Voltage | V _{CBO} | 50 | V |
| Collector-Emitter Voltage | V _{CEO} | 50 | V |
| Emitter-Base Voltage | V _{EBO} | 10 | V |
| Input Voltage | V _{IN} | -10 to +40 | V |
| Output Current (DC) | I _O | 100 | mA |
| Peak Collector Current | I _{CM} | 100 | mA |

Maximum Ratings, Pre-Biased PNP Transistor, Q₂ @T_A = 25°C unless otherwise specified

| Characteristic | Symbol | Value | Unit |
|---------------------------|------------------|-----------|------|
| Collector-Base Voltage | V _{CBO} | -50 | V |
| Collector-Emitter Voltage | V _{CEO} | -50 | V |
| Emitter-Base Voltage | V _{EBO} | -10 | V |
| Input Voltage | V _{IN} | -12 to +5 | V |
| Output Current (DC) | I _O | -100 | mA |
| Peak Collector Current | I _{CM} | -100 | mA |

- Notes:
1. No purposefully added lead.
 2. Diodes Inc.'s "Green" policy can be found on our website at http://www.diodes.com/products/lead_free/index.php.
 3. Device mounted on FR-4 PCB; 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>.

Electrical Characteristics, Pre-Biased NPN Transistor, Q₁ @T_A = 25°C unless otherwise specified

| Characteristic | Symbol | Min | Typ | Max | Unit | Test Condition |
|--------------------------------------|--------------------------------|-----|-----|---------|------|--|
| Collector-Base Cut-Off Current | I _{CBO} | - | - | 100 | nA | V _{CB} = 50V, I _E = 0A |
| Collector-Emitter Cut-Off Current | I _{CEO} | - | - | 1 50 | μA | V _{CE} = 30V, I _B = 0A V _{CE} = 30V, I _B = 0A, T _A = 150°C |
| Emitter-Base Cut-Off Current | I _{EBO} | - | - | 90 | μA | V _{EB} = 5V, I _C = 0A |
| Input Voltage | V _{I(off)} | - | 1.2 | 0.8 | V | V _{CE} = 5V, I _O = 100μA |
| | V _{I(on)} | 3 | 1.6 | - | V | V _{CE} = 0.3V, I _O = 2mA |
| Collector-Emitter Saturation Voltage | V _{CE(SAT)} | - | - | 0.15 | V | I _C /I _B = 10mA/0.5mA |
| DC Current Gain | h _{FE} | 80 | - | - | - | V _{CE} = 5V, I _C = 5mA |
| Input Resistance | R ₁ | 33 | 47 | 61 | kΩ | - |
| Resistance Ratio | R ₂ /R ₁ | 0.8 | 1 | 1.2 | - | - |
| Collector Capacitance | C _C | - | - | 2.5 | pF | V _{CB} = 10V, I _E = 0, f = 1MHz |

Electrical Characteristics, Pre-Biased PNP Transistor, Q₂ @T_A = 25°C unless otherwise specified

| Characteristic | Symbol | Min | Typ | Max | Unit | Test Condition |
|--------------------------------------|--------------------------------|------|-------|-----------|------|--|
| Collector-Base Cut-Off Current | I _{CBO} | - | - | -100 | nA | V _{CB} = -50V, I _E = 0A |
| Collector-Emitter Cut-Off Current | I _{CEO} | - | - | -1 -50 | μA | V _{CE} = -30V, I _B = 0A V _{CE} = -30V, I _B = 0A, T _A = 150°C |
| Emitter-Base Cut-Off Current | I _{EBO} | - | - | -180 | μA | V _{EB} = -5V, I _C = 0A |
| Input Voltage | V _{I(off)} | - | -0.6 | -0.5 | V | V _{CC} = -5V, I _O = -100μA |
| | V _{I(on)} | -1.1 | -0.75 | - | V | V _O = -0.3V, I _O = -5mA |
| Collector-Emitter Saturation Voltage | V _{CE(SAT)} | - | - | -0.1 | V | I _C /I _B = -5mA/-0.25mA |
| DC Current Gain | h _{FE} | 100 | - | - | - | V _{CE} = -5V, I _C = -10mA |
| Input Resistance | R ₁ | 1.54 | 2.2 | 2.86 | kΩ | - |
| Resistance Ratio | R ₂ /R ₁ | 17 | 21 | 26 | - | - |
| Collector Capacitance | C _C | - | - | 3.0 | pF | V _{CB} = -10V, I _E = 0, f = 1MHz |

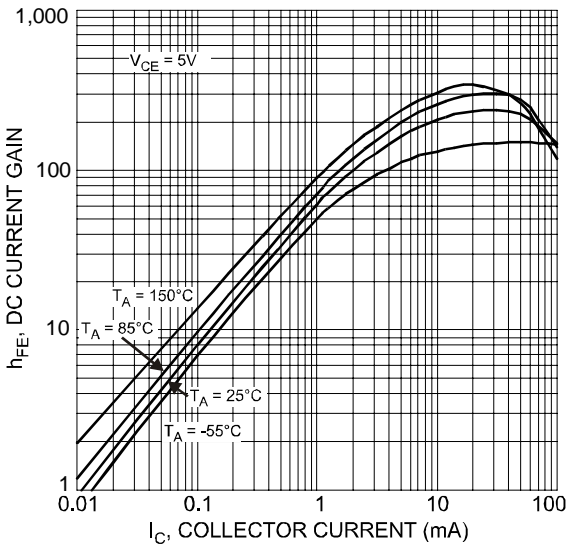


Fig. 1 Typical DC Current Gain vs. Collector Current (Q1, NPN)

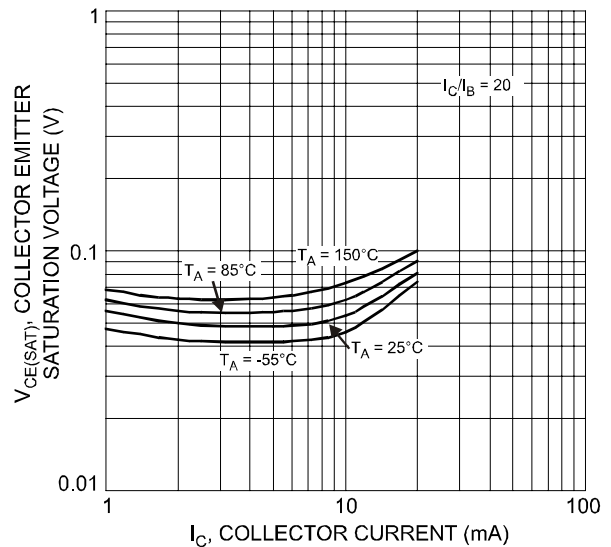


Fig. 2 Typical Collector-Emitter Saturation Voltage vs. Collector Current (Q1, NPN)

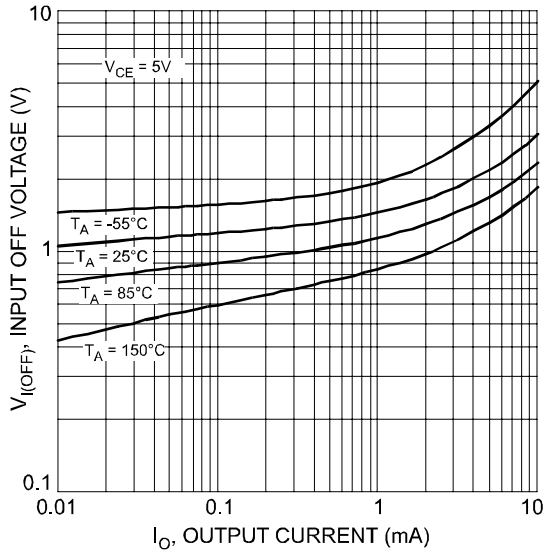


Fig. 3 Typical Input Off Voltage vs. Output Current (Q1, NPN)

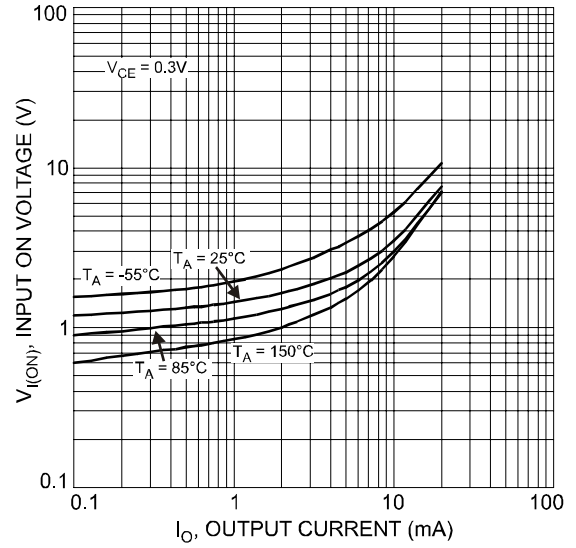


Fig. 4 Typical Input ON Voltage vs. Output Current (Q1, NPN)

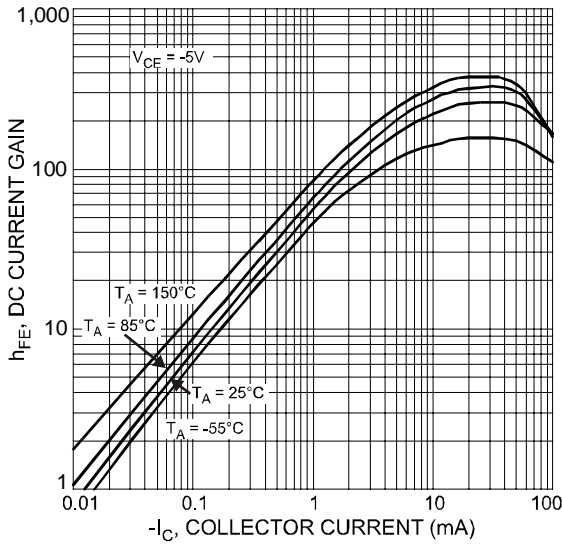


Fig. 5 Typical DC Current Gain vs. Collector Current (Q2, PNP)

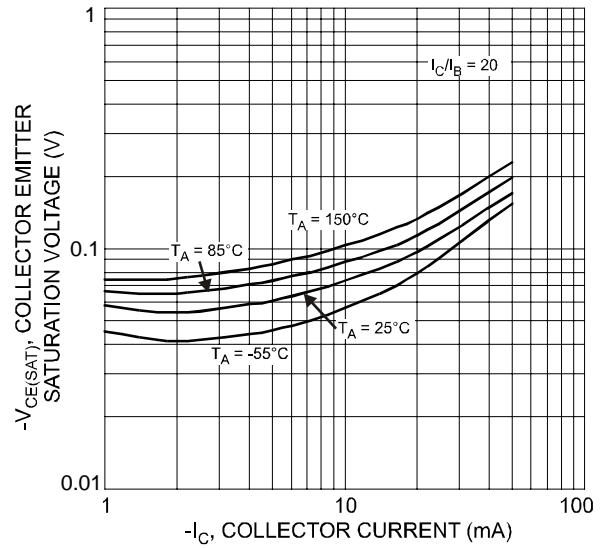


Fig. 6 Typical Collector-Emitter Saturation Voltage vs. Collector Current (Q2, PNP)

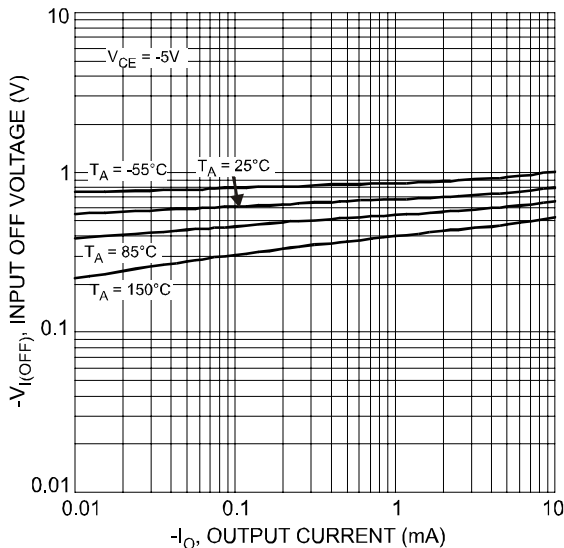


Fig. 7 Typical Input Off Voltage vs. Output Current (Q2, PNP)

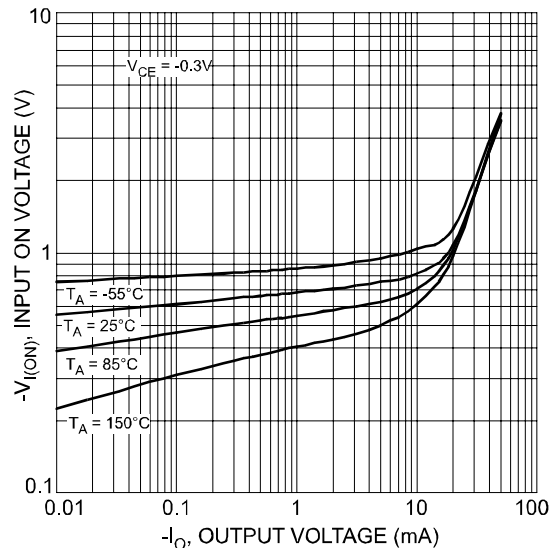


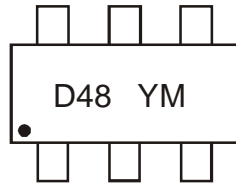
Fig. 8 Typical Input ON Voltage vs. Output Current (Q2, PNP)

Ordering Information (Note 4)

| Device | Packaging | Shipping |
|----------|-----------|------------------|
| DEMD48-7 | SOT-563 | 3000/Tape & Reel |

Note: 4. For packaging details, go to our website at <http://www.diodes.com/datasheets/ap02007.pdf>.

Marking Information



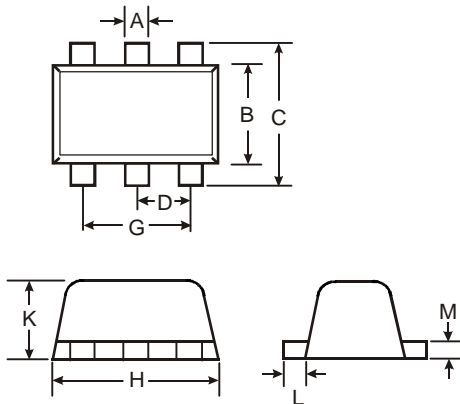
D48 = Product Type Marking Code
 YM = Date Code Marking
 Y = Year ex: U = 2007
 M = Month ex: 9 = September

Date Code Key

| Year | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 |
|------|------|------|------|------|------|------|
| Code | 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 |

Package Outline Dimensions



| SOT-563 | | | |
|----------------------|------|------|------|
| 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 | | | |

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