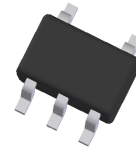


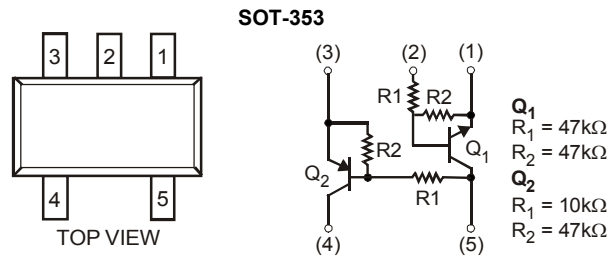
Features

- 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)**



Mechanical Data

- Case: SOT-353
- Case Material: Molded Plastic. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020C
- Terminal Connections: See Diagram
- Terminals: Finish – Matte Tin Annealed Over Alloy 42 Leadframe. Solderable per MIL-STD-202, Method 208
- Marking Information: See Page 4
- Ordering Information: See Page 4
- Weight: 0.006 grams (approximate)



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

| Characteristic | Symbol | Value | Unit |
|--|-----------------|-------------|--------------------|
| Power Dissipation (Note 3) | P_D | 150 | mW |
| Thermal Resistance, Junction to Ambient Air (Note 3) | $R_{\theta JA}$ | 833 | $^\circ\text{C/W}$ |
| Operating and Storage Temperature Range | T_j, T_{STG} | -55 to +150 | $^\circ\text{C}$ |

Maximum Ratings, Pre-Biased NPN Transistor, Q_1 @ $T_A = 25^\circ\text{C}$ unless otherwise specified

| Characteristic | Symbol | Value | Unit |
|-------------------|--------------|------------|------|
| Supply Voltage | V_{CC} | 50 | V |
| Input Voltage | V_{IN} | -10 to +40 | V |
| Output Current | I_O | 30 | mA |
| Collector Current | $I_{C(MAX)}$ | 100 | mA |

Maximum Ratings, Pre-Biased PNP Transistor, Q_2 @ $T_A = 25^\circ\text{C}$ unless otherwise specified

| Characteristic | Symbol | Value | Unit |
|-------------------|--------------|-----------|------|
| Supply Voltage | V_{CC} | -50 | V |
| Input Voltage | V_{IN} | -40 to +6 | V |
| Output Current | I_O | -100 | mA |
| Collector Current | $I_{C(MAX)}$ | -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 |
|------------------------|--------------------------------|------|-----|------|------|---|
| Input Voltage | V _{I(off)} | — | — | 0.5 | V | V _{CC} = 5V, I _O = 100μA |
| | V _{I(on)} | 3 | — | — | V | V _O = 0.3V, I _O = 2mA |
| Output Voltage | V _{O(on)} | — | 0.1 | 0.3 | V | I _O /I _I = 10mA/0.5 mA |
| Input Current | I _I | — | — | 0.18 | mA | V _I = 5V |
| Output Current | I _{O(off)} | — | — | 0.5 | μA | V _{CC} = 50V, V _I = 0V |
| DC Current Gain | G _I | 68 | — | — | — | V _O = 5V, I _O = 5mA |
| Gain-Bandwidth Product | f _T | — | 250 | — | MHz | V _{CE} = 10V, I _E = -5mA, f = 100MHz* |
| Input Resistance | R ₁ | 32.9 | 47 | 61.1 | kΩ | — |
| Resistance Ratio | R ₂ /R ₁ | 0.8 | 1 | 1.2 | — | — |

*Characteristic of Transistor – for reference only.

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

| Characteristic | Symbol | Min | Typ | Max | Unit | Test Condition |
|------------------------|--------------------------------|------|------|-------|------|---|
| Input Voltage | V _{I(off)} | — | — | -0.3 | V | V _{CC} = -5V, I _O = -100μA |
| | V _{I(on)} | -1.4 | — | — | V | V _O = -0.3V, I _O = -1mA |
| Output Voltage | V _{O(on)} | — | -0.1 | -0.3 | V | I _O /I _I = -5mA/-0.25 mA |
| Input Current | I _I | — | — | -0.88 | mA | V _I = -5V |
| Output Current | I _{O(off)} | — | — | -0.5 | μA | V _{CC} = -50V, V _I = 0V |
| DC Current Gain | G _I | 68 | — | — | — | V _O = -5V, I _O = -5mA |
| Gain-Bandwidth Product | f _T | — | 250 | — | MHz | V _{CE} = -10V, I _E = 5mA, f = 100MHz* |
| Input Resistance | R ₁ | 7 | 10 | 13 | kΩ | — |
| Resistance Ratio | R ₂ /R ₁ | 3.7 | 4.7 | 5.7 | — | — |

*Characteristic of Transistor – for reference only.

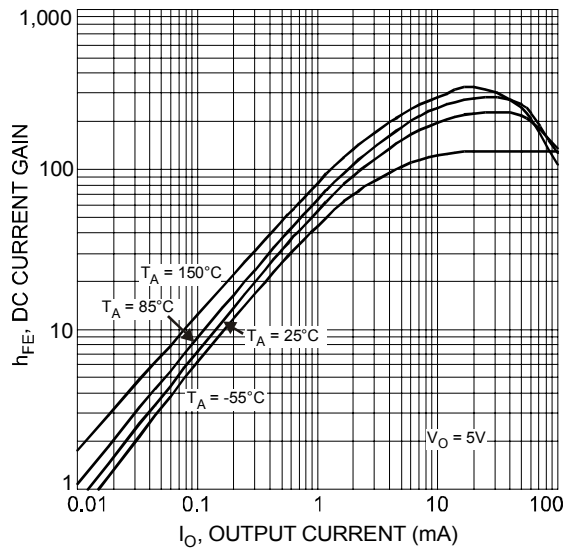


Fig. 1 Typical DC Current Gain vs. Output Current (Q₁, NPN)

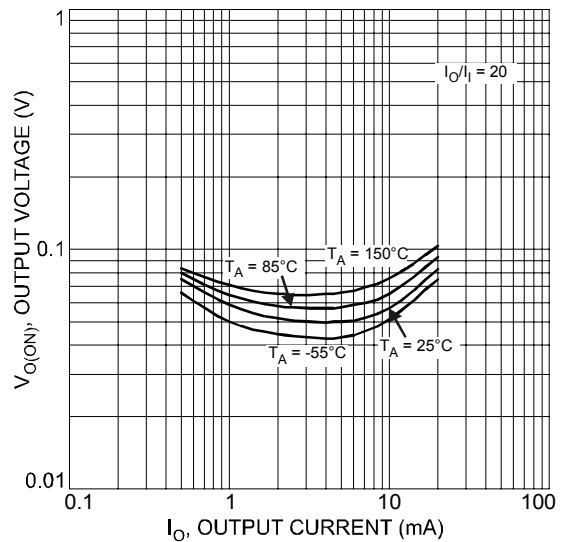


Fig. 2 Typical Output Voltage vs. Output Current (Q₁, NPN)

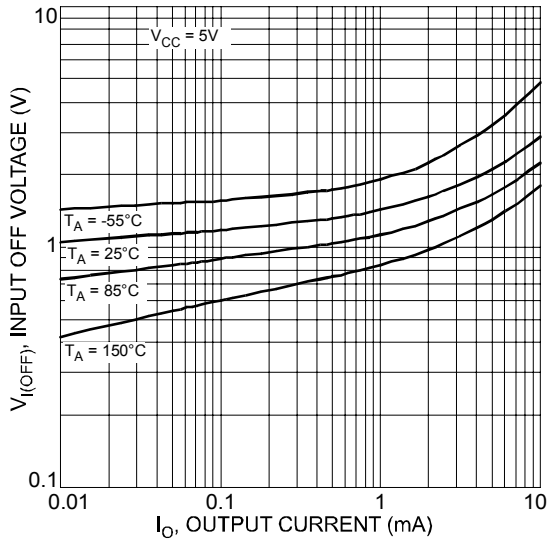


Fig. 3 Typical Input OFF Voltage vs. Output Current (Q1, NPN)

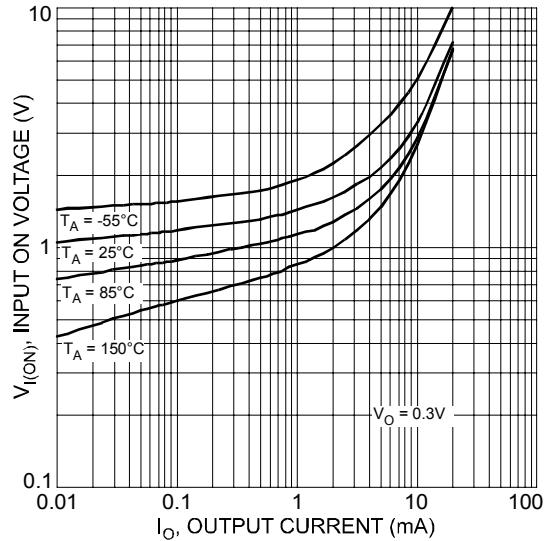


Fig. 4 Typical Input ON Voltage vs. Output Current (Q1, NPN)

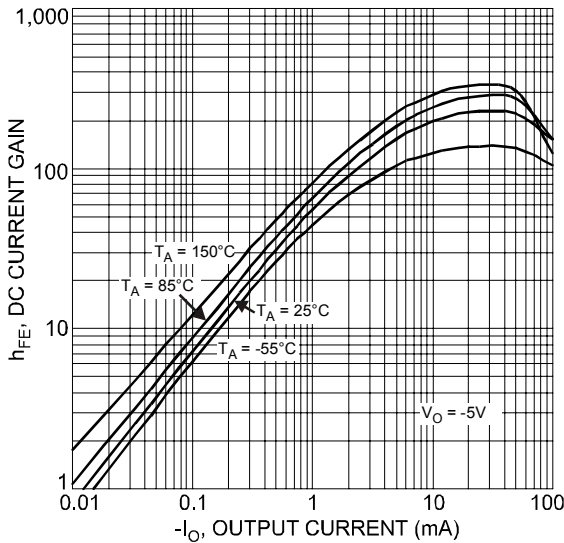


Fig. 5 Typical DC Current Gain vs. Output Current (Q2, PNP)

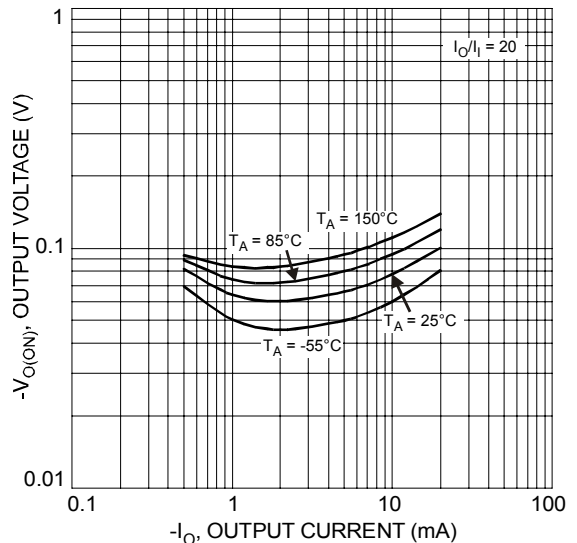


Fig. 6 Typical Output Voltage vs. Output Current (Q2, PNP)

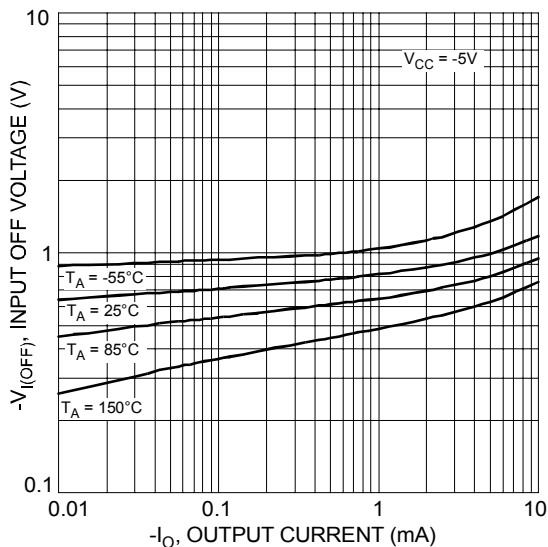


Fig. 7 Typical Input OFF Voltage vs. Output Current (Q2, PNP)

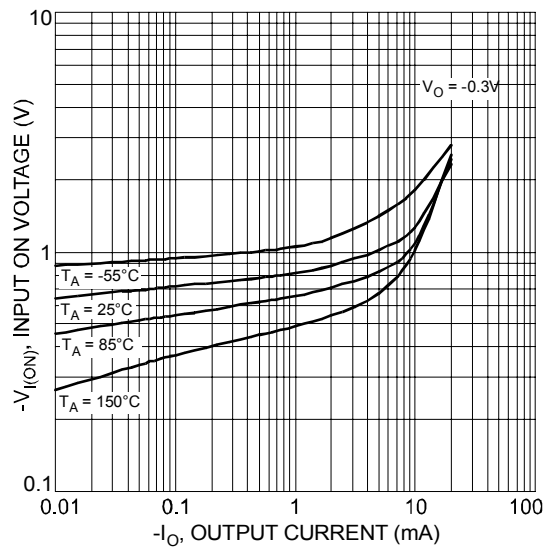


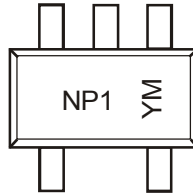
Fig. 8 Typical Input ON Voltage vs. Output Current (Q2, PNP)

Ordering Information (Note 4)

| Device | Packaging | Shipping |
|---------|-----------|------------------|
| UMC4N-7 | SOT-353 | 3000/Tape & Reel |

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

Marking Information



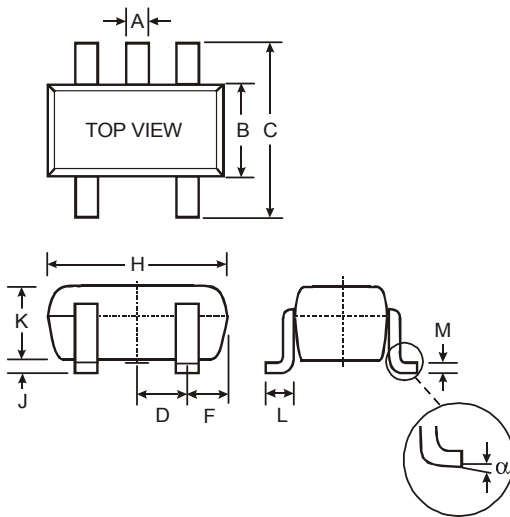
NP1 = Product Type Marking Code
 YM = Date Code Marking
 Y = Year ex: U = 2007
 M = Month ex: 9 = September

Date Code Key

| Year Code | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 |
|-----------|------|------|------|------|------|------|
| Year Code | U | V | W | X | Y | Z |

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

Package Outline Dimensions



| SOT-353 | | |
|----------------------|--------------|------|
| Dim | Min | Max |
| A | 0.10 | 0.30 |
| B | 1.15 | 1.35 |
| C | 2.00 | 2.20 |
| D | 0.65 Nominal | |
| F | 0.30 | 0.40 |
| H | 1.80 | 2.20 |
| J | — | 0.10 |
| K | 0.90 | 1.00 |
| L | 0.25 | 0.40 |
| M | 0.10 | 0.25 |
| α | 0° | 8° |
| All Dimensions in mm | | |

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