

**PNP PRE-BIASED SMALL SIGNAL DUAL SURFACE MOUNT TRANSISTOR**
**Features**

- Epitaxial Planar Die Construction
- Complementary NPN Types Available (DDC)
- Built-In Biasing Resistors
- **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**
- **PPAP Capable (Note 4)**

| Part Number | R1 (NOM) | R2 (NOM) |
|-------------|----------|----------|
| DDA124EU    | 22kΩ     | 22kΩ     |
| DDA144EU    | 47kΩ     | 47kΩ     |
| DDA114YU    | 10kΩ     | 47kΩ     |
| DDA123JU    | 2.2kΩ    | 47kΩ     |
| DDA114EU    | 10kΩ     | 10kΩ     |

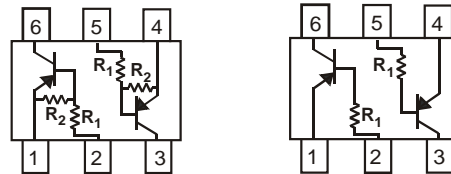
**Mechanical Data**

- Case: SOT363
- 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 Plated Leads, Solderable per MIL-STD-202, Method 208 Ⓢ3
- Weight: 0.006 grams (Approximate)

| Part Number | R1 Only |
|-------------|---------|
| DDA113TU    | 1kΩ     |
| DDA143TU    | 4.7kΩ   |
| DDA114TU    | 10kΩ    |



Top View



R1, R2

R1 Only

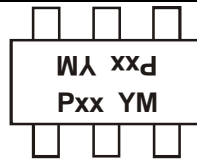
Device Schematic

**Ordering Information** (Notes 4, 5 & 6)

| Product        | Status               | Compliance | Marking | Reel Size (inches) | Tape Width (mm) | Quantity per Reel |
|----------------|----------------------|------------|---------|--------------------|-----------------|-------------------|
| DDA124EU-7-F   | Active               | AEC-Q101   | P17     | 7                  | 8               | 3,000             |
| DDA124EUQ-7-F  | Active               | Automotive | P17     | 7                  | 8               | 3,000             |
| DDA124EUQ-13-F | Active               | Automotive | P17     | 13                 | 8               | 10,000            |
| DDA144EU-7-F   | Active               | AEC-Q101   | P20     | 7                  | 8               | 3,000             |
| DDA144EUQ-7-F  | Active               | Automotive | P20     | 7                  | 8               | 3,000             |
| DDA114YU-7-F   | Active               | AEC-Q101   | P14     | 7                  | 8               | 3,000             |
| DDA114YUQ-7-F  | NRND (Use ADA114YUQ) | Automotive | P14     | 7                  | 8               | 3,000             |
| DDA123JU-7-F   | Active               | AEC-Q101   | P06     | 7                  | 8               | 3,000             |
| DDA114EU-7-F   | Active               | AEC-Q101   | P13     | 7                  | 8               | 3,000             |
| DDA114EUQ-7-F  | NRND (Use ADA114EUQ) | Automotive | P13     | 7                  | 8               | 3,000             |
| DDA113TU-7-F   | Active               | AEC-Q101   | P01     | 7                  | 8               | 3,000             |
| DDA143TU-7-F   | Active               | AEC-Q101   | P07     | 7                  | 8               | 3,000             |
| DDA143TUQ-7-F  | Active               | Automotive | P07     | 7                  | 8               | 3,000             |
| DDA143TUQ-13-F | Active               | Automotive | P07     | 13                 | 8               | 10,000            |
| DDA114TU-7-F   | Active               | AEC-Q101   | P12     | 7                  | 8               | 3,000             |
| DDA114TUQ-7-F  | Active               | Automotive | P12     | 7                  | 8               | 3,000             |
| DDA114TUQ-13-F | Active               | Automotive | P12     | 13                 | 8               | 10,000            |

- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) 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. Automotive products are AEC-Q101 qualified and are PPAP capable. Automotive, AEC-Q101 and standard products are electrically and thermally the same, except where specified. For more information, please refer to <http://www.diodes.com/quality/>.
  5. For packaging details, go to our website at <https://www.diodes.com/design/support/packageing/diodes-packaging/>.
  6. NRND = Not Recommended for New Design.

## Marking Information



Pxx = Product Type Marking Code (See Ordering Information)  
 YM = Date Code Marking  
 Y = Year (ex: F = 2018)  
 M = Month (ex: 9 = September)

### Date Code Key

| Year  | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 | 2031 |
|-------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Code  | F    | G    | H    | I    | J    | K    | L    | M    | N    | O    | P    | Q    | R    | S    |
| 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<sub>A</sub> = +25°C, unless otherwise specified.)

| Characteristic                           | Symbol              | Value   | Unit |
|--|---------------------|---|------|
| Supply Voltage (1) to (6) and (4) to (3) | V <sub>CC</sub>     | -50   | V    |
| Input Voltage (1) to (2) and (4) to (5)  | V <sub>IN</sub>     | +10 to -40<br>+10 to -40<br>+6 to -40<br>+5 to -12<br>+10 to -40<br>+5V Max<br>+5V Max<br>+5V Max | V    |
| Output Current                           | I <sub>O</sub>      | -30<br>-30<br>-70<br>-100<br>-50<br>-100<br>-100<br>-100  | mA   |
| Output Current                           | I <sub>C(MAX)</sub> | -100  | mA   |

## Thermal Characteristics (@T<sub>A</sub> = +25°C, unless otherwise specified.)

| Characteristic                                       | Symbol                            | Value       | Unit |
|--|-----------------------------------|-------------|------|
| Power Dissipation (Notes 7 & 8)                      | P <sub>D</sub>                    | 200         | mW   |
| Thermal Resistance, Junction to Ambient Air (Note 7) | R <sub>θJA</sub>                  | 625         | °C/W |
| Operating and Storage Temperature Range              | T <sub>J</sub> , T <sub>STG</sub> | -55 to +150 | °C   |

Notes: 7. Mounted on FR-4 PC Board with minimum recommended pad layout.  
 8. 150mW per element must not be exceeded.

**Electrical Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

| Characteristic<br>(DDA113TU & DDA143TU & DDA114TU only) | Symbol               | Min        | Typ      | Max      | Unit | Test Condition  |
|---|----------------------|------------|----------|----------|------|---|
| Collector-Base Breakdown Voltage                        | BV <sub>CBO</sub>    | -50        | —        | —        | V    | I <sub>C</sub> = -50μA  |
| Collector-Emitter Breakdown Voltage                     | BV <sub>CEO</sub>    | -50        | —        | —        | V    | I <sub>C</sub> = -1mA   |
| Emitter-Base Breakdown Voltage                          | BV <sub>EBO</sub>    | -5         | —        | —        | V    | I <sub>E</sub> = -50μA  |
| Collector Cutoff Current                                | I <sub>CBO</sub>     | —          | —        | -0.5     | μA   | V <sub>CB</sub> = -50V  |
| Emitter Cutoff Current                                  | I <sub>EBO</sub>     | —          | —        | -0.5     | μA   | V <sub>EB</sub> = -4V   |
| Collector-Emitter Saturation Voltage                    | V <sub>CE(SAT)</sub> | —          | —        | -0.3     | V    | I <sub>C</sub> /I <sub>B</sub> = -2.5mA / -0.25mA DDA143TU<br>I <sub>C</sub> /I <sub>B</sub> = -1mA / -0.1mA DDA114TU<br>I <sub>C</sub> /I <sub>B</sub> = -10mA / -1mA DDA113TU |
| DC Current Transfer Ratio                               | h <sub>FE</sub>      | 100<br>160 | 250<br>— | 600<br>— | —    | I <sub>C</sub> = -1mA, V <sub>CE</sub> = -5V<br>I <sub>C</sub> = -1mA, V <sub>CE</sub> = -5V DDA143TUQ  |
| Input Resistor (R <sub>1</sub> ) Tolerance              | ΔR <sub>1</sub>      | -30        | —        | +30      | %    | —   |
| Gain-Bandwidth Product (Note 9)                         | f <sub>T</sub>       | —          | 250      | —        | MHz  | V <sub>CE</sub> = -10V, I <sub>E</sub> = 5mA, f = 100MHz  |

| Characteristic                             | Symbol                         | Min                              | Typ  | Max                                      | Unit | Test Condition   |   |
|--|--------------------------------|----------------------------------|------|--|------|--|---|
| Input Voltage                              | V <sub>I(OFF)</sub>            | DDA124EU                         | -0.5 | -1.1                                     | —    | V  | V <sub>CC</sub> = -5V, I <sub>O</sub> = -100μA  |
|  |                                | DDA144EU                         | -0.5 | -1.1                                     |      |  |   |
| DDA114YU                                   |                                | -0.3                             | —    |  |      |  |   |
| DDA123JU                                   |                                | -0.5                             | —    |  |      |  |   |
| DDA114EU                                   |                                | -0.5                             | -1.1 |  |      |  |   |
|  | V <sub>I(ON)</sub>             | DDA124EU                         | —    | -1.9                                     | -3.0 | V  | V <sub>O</sub> = -0.3, I <sub>O</sub> = -5mA<br>V <sub>O</sub> = -0.3, I <sub>O</sub> = -2mA<br>V <sub>O</sub> = -0.3, I <sub>O</sub> = -1mA<br>V <sub>O</sub> = -0.3, I <sub>O</sub> = -5mA<br>V <sub>O</sub> = -0.3, I <sub>O</sub> = -10mA |
|  |                                | DDA144EU                         | —    | -1.9                                     | -3.0 |  |   |
|  |                                | DDA114YU                         | —    | —  | -1.4 |  |   |
|  |                                | DDA123JU                         | —    | —  | -1.1 |  |   |
|  |                                | DDA114EU                         | —    | -1.9                                     | -3.0 |  |   |
| Output Voltage                             | V <sub>O(ON)</sub>             | —                                | -0.1 | -0.3                                     | V    | I <sub>O</sub> /I <sub>I</sub> = -10mA / -0.5mA<br>I <sub>O</sub> /I <sub>I</sub> = -10mA / -0.5mA<br>I <sub>O</sub> /I <sub>I</sub> = -5mA / -0.25mA<br>I <sub>O</sub> /I <sub>I</sub> = -5mA / -0.25mA<br>I <sub>O</sub> /I <sub>I</sub> = -10mA / -0.5mA                              |   |
| Input Current                              | I <sub>I</sub>                 | —                                | —    | -0.36<br>-0.18<br>-0.88<br>-3.6<br>-0.88 | mA   | V <sub>I</sub> = -5V   |   |
| Output Current                             | I <sub>O(OFF)</sub>            | —                                | —    | -0.5                                     | μA   | V <sub>CC</sub> = -50V, V <sub>I</sub> = -0V   |   |
| DC Current Gain                            | G <sub>I</sub>                 | 56<br>60<br>68<br>68<br>80<br>30 | —    | —  | —    | V <sub>O</sub> = -5V, I <sub>O</sub> = -5mA<br>V <sub>O</sub> = -5V, I <sub>O</sub> = -5mA<br>V <sub>O</sub> = -5V, I <sub>O</sub> = -5mA<br>V <sub>O</sub> = -5V, I <sub>O</sub> = -10mA<br>V <sub>O</sub> = -5V, I <sub>O</sub> = -10mA<br>V <sub>O</sub> = -5V, I <sub>O</sub> = -5mA |   |
| Input Resistor (R <sub>1</sub> ) Tolerance | ΔR <sub>1</sub>                | -30                              | —    | +30                                      | %    | —  |   |
| Resistance Ratio Tolerance                 | R <sub>2</sub> /R <sub>1</sub> | -20                              | —    | +20                                      | %    | —  |   |
| Gain-Bandwidth Product                     | f <sub>T</sub>                 | —                                | 250  | —  | MHz  | V <sub>CE</sub> = -10V, I <sub>E</sub> = -5mA, f = 100MHz  |   |

Note: 9. Transistor - For Reference Only.

**Typical Curves – DDA123JU** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

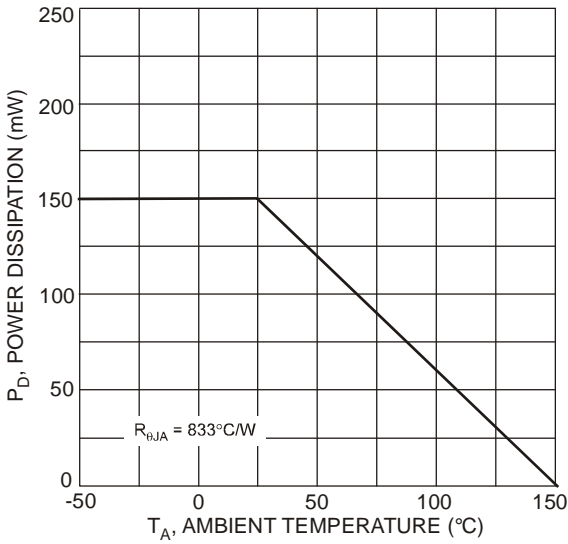


Fig. 1 Power Dissipation vs. Ambient Temperature

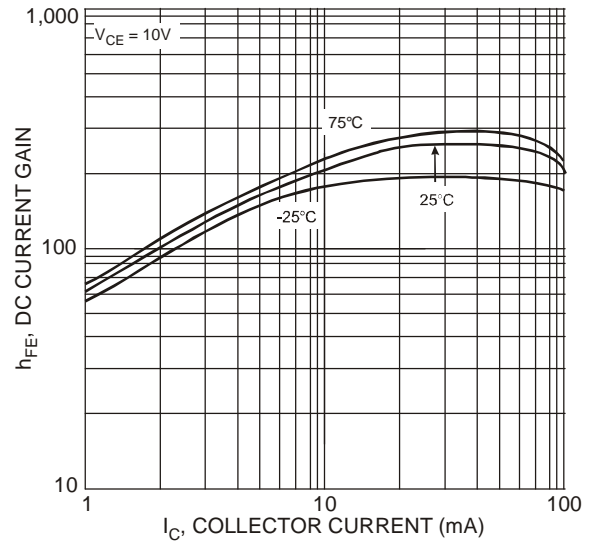


Fig. 2 Typical DC Current Gain vs. Collector Current

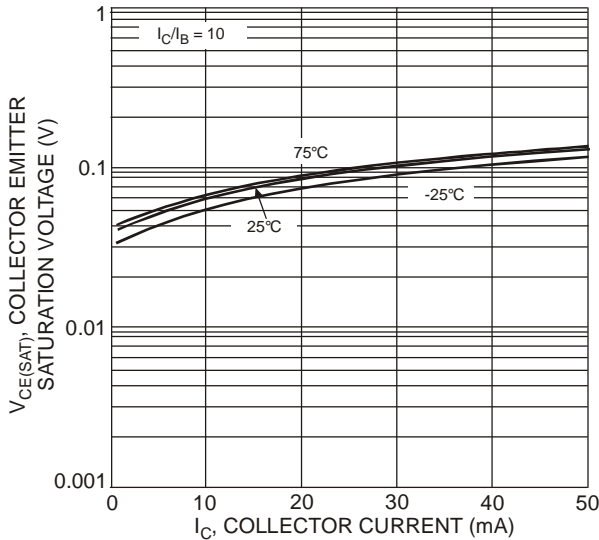


Fig. 3 Typical Collector Emitter Saturation Voltage vs. Collector Current

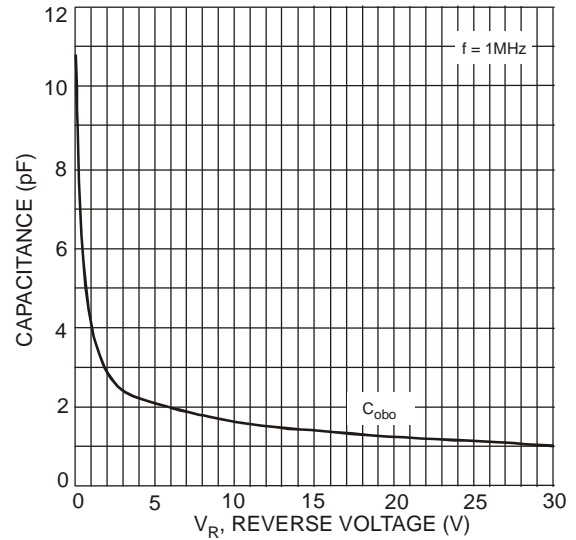


Fig. 4 Typical Capacitance Characteristics

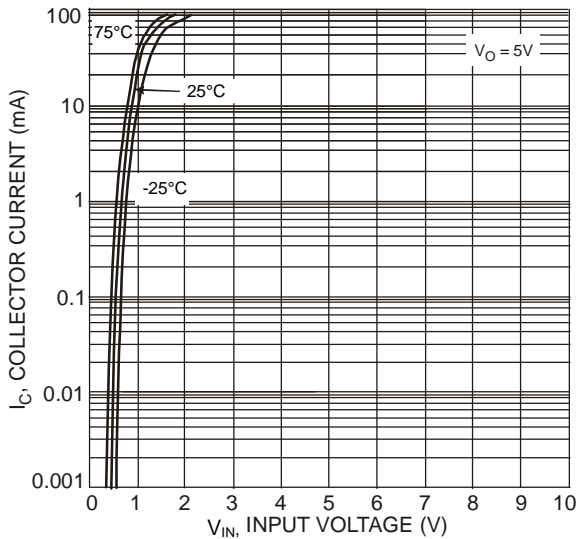


Fig. 5 Collector Current vs. Input Voltage

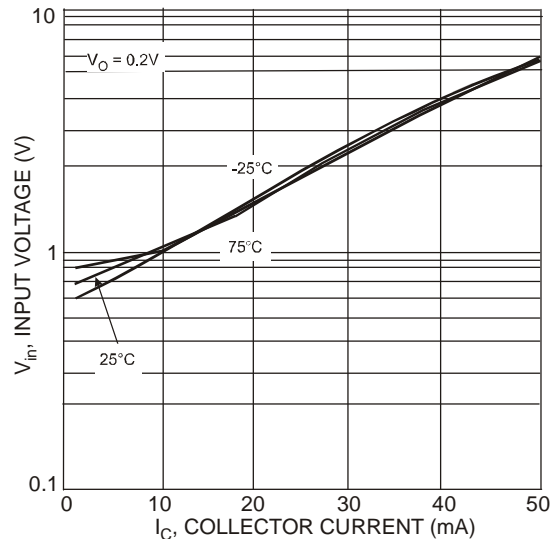


Fig. 6 Input Voltage vs. Collector Current

**Typical Curves – DDA114TU** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

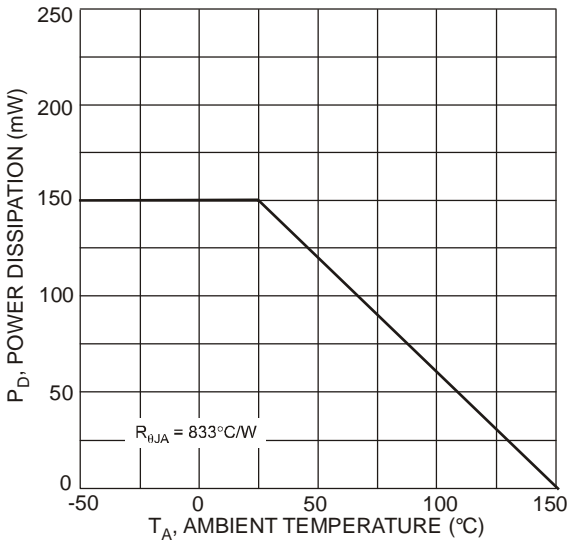


Fig.7 Power Dissipation vs. Ambient Temperature

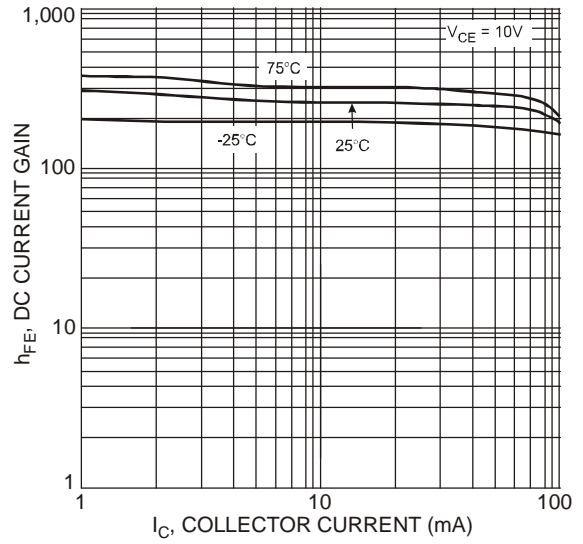


Fig.8 Typical DC Current Gain vs. Collector Current

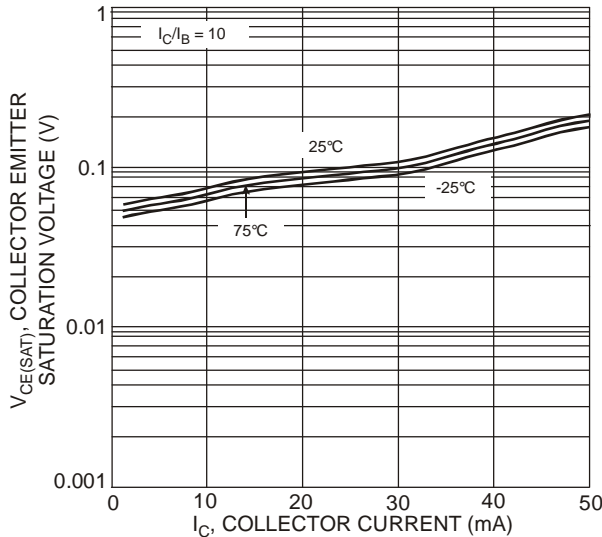


Fig.9 Typical Collector Emitter Saturation Voltage vs. Collector Current

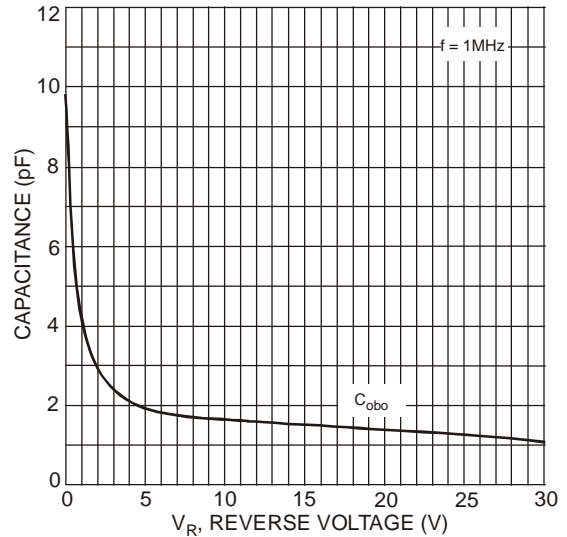


Fig.10 Typical Capacitance Characteristics

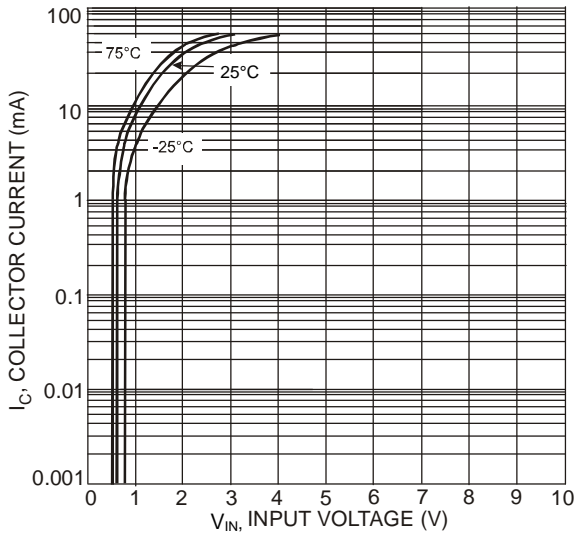


Fig.11 Collector Current vs. Input Voltage

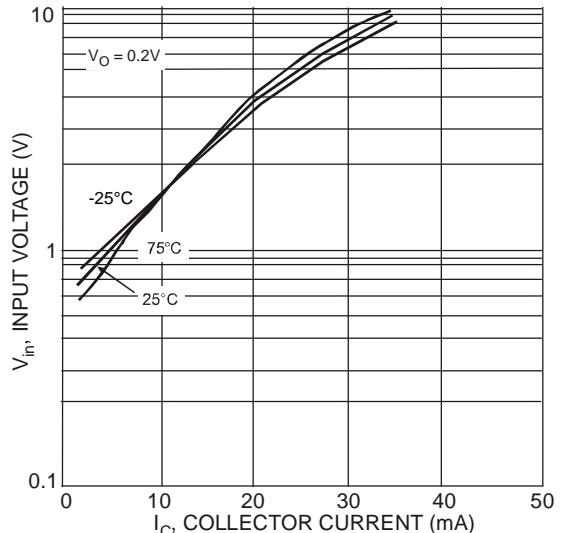
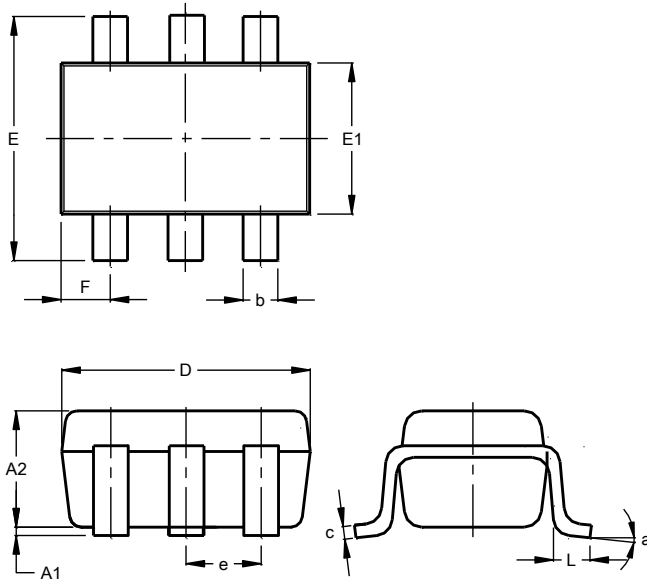


Fig.12 Input Voltage vs. Collector Current

## Package Outline Dimensions

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

### SOT363

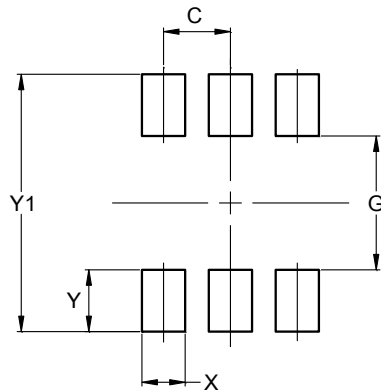


| SOT363               |           |      |       |
|----------------------|-----------|------|-------|
| Dim                  | Min       | Max  | Typ   |
| A1                   | 0.00      | 0.10 | 0.05  |
| A2                   | 0.90      | 1.00 | 0.95  |
| b                    | 0.10      | 0.30 | 0.25  |
| c                    | 0.10      | 0.22 | 0.11  |
| D                    | 1.80      | 2.20 | 2.15  |
| E                    | 2.00      | 2.20 | 2.10  |
| E1                   | 1.15      | 1.35 | 1.30  |
| e                    | 0.650 BSC |      |       |
| F                    | 0.40      | 0.45 | 0.425 |
| L                    | 0.25      | 0.40 | 0.30  |
| a                    | 0°        | 8°   | --    |
| All Dimensions in mm |           |      |       |

## Suggested Pad Layout

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

### SOT363



| Dimensions | Value (in mm) |
|------------|---------------|
| C          | 0.650         |
| G          | 1.300         |
| X          | 0.420         |
| Y          | 0.600         |
| Y1         | 2.500         |

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