

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

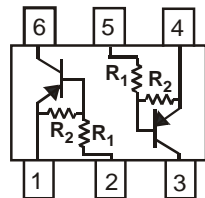
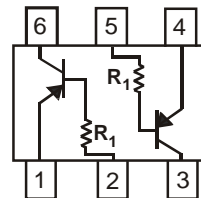
- Epitaxial Planar Die Construction
- Complementary NPN Types Available (DDC)
- Built-In Biasing Resistors
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**

| P/N      | R1 (NOM) | R2 (NOM) |
|----------|----------|----------|
| DDA124EH | 22kΩ     | 22kΩ     |
| DDA144EH | 47kΩ     | 47kΩ     |
| DDA143EH | 4.7kΩ    | 4.7kΩ    |
| DDA114YH | 10kΩ     | 47kΩ     |
| DDA123JH | 2.2kΩ    | 47kΩ     |
| DDA114EH | 10kΩ     | 10kΩ     |
| DDA143TH | 4.7kΩ    | —        |
| DDA114TH | 10kΩ     | —        |

**Mechanical Data**

- Case: SOT563
- Case Material: Molded Plastic UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish – Matte Tin Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208 (E3)
- Terminal Connections: See Diagram
- Weight: 0.005 grams (Approximate)

SCHEMATIC DIAGRAM, TOP VIEW


 R<sub>1</sub>, R<sub>2</sub> Device Schematic

 R<sub>1</sub> Only Device Schematic

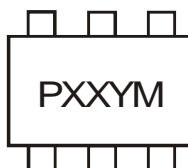
**Ordering Information** (Note 4)

| Product    | Compliance | Marking | Reel Size (inches) | Tape Width (mm) | Quantity per Reel |
|------------|------------|---------|--------------------|-----------------|-------------------|
| DDA124EH-7 | AEC-Q101   | P17     | 7                  | 8               | 3,000             |
| DDA144EH-7 | AEC-Q101   | P20     | 7                  | 8               | 3,000             |
| DDA143EH-7 | AEC-Q101   | P08     | 7                  | 8               | 3,000             |
| DDA114YH-7 | AEC-Q101   | P14     | 7                  | 8               | 3,000             |
| DDA123JH-7 | AEC-Q101   | P06     | 7                  | 8               | 3,000             |
| DDA114EH-7 | AEC-Q101   | P13     | 7                  | 8               | 3,000             |
| DDA143TH-7 | AEC-Q101   | P07     | 7                  | 8               | 3,000             |
| DDA114TH-7 | AEC-Q101   | P12     | 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 [http://www.diodes.com/quality/lead\\_free.html](http://www.diodes.com/quality/lead_free.html) 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 <http://www.diodes.com/products/packages.html>.

**Marking Information**

SOT563



PXX = Product Type Marking Code  
 YM = Date Code Marking  
 Y = Year ex: C = 2015  
 M = Month ex: 9 = September

Date Code Key

| Year | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 |
|------|------|------|------|------|------|------|------|------|------|------|
| Code | C    | D    | E    | F    | G    | H    | I    | J    | K    | L    |

| 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   |

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

| Characteristic                                       | Symbol                            | Value  | Unit |
|--|-----------------------------------|--|------|
| Supply Voltage                                       | V <sub>CC</sub>                   | -50  | V    |
| Input Voltage  | V <sub>IN</sub>                   | +10 to -40<br>+10 to -40<br>+10 to -30<br>+6 to -40<br>+5 to -12<br>+10 to -40<br>+5V Max<br>+5V Max | V    |
| Output Current                                       | I <sub>O</sub>                    | -30<br>-30<br>-100<br>-70<br>-100<br>-50<br>-100<br>-100   | mA   |
| Output Current                                       | I <sub>C</sub> (Max)              | -100   | mA   |
| Power Dissipation                                    | P <sub>D</sub>                    | 150  | mW   |
| Thermal Resistance, Junction to Ambient Air (Note 5) | R <sub>θJA</sub>                  | 833  | °C/W |
| Operating and Storage Temperature Range              | T <sub>J</sub> , T <sub>STG</sub> | -55 to +150  | °C   |

Note: 5. Mounted on FR4 Board with recommended pad layout at <http://www.diodes.com/package-outlines.html>.

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

| Characteristic (DDA143TH & DDA114TH 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 Cut-Off Current                 | I <sub>CBO</sub>     | —   | —   | -0.5 | μA   | V <sub>CB</sub> = -50V  |
| Emitter Cut-Off 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 DDA143TH<br>I <sub>C</sub> /I <sub>B</sub> = -1mA / -0.1mA DDA114TH |
| DC Current Transfer Ratio                 | h <sub>FE</sub>      | 100 | 250 | 600  | —    | I <sub>C</sub> = -1mA, V <sub>CE</sub> = -5V  |
| Gain-Bandwidth Product*                   | 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           | DDA124EH<br>DDA144EH<br>DDA143EH<br>DDA114YH<br>DDA123JH<br>DDA114EH | V <sub>L(OFF)</sub> | -0.5<br>-0.5<br>-0.5<br>-0.3<br>-0.5<br>-0.5 | -1.1<br>-1.1<br>-1.1<br>—<br>—<br>-1.1 | —  | V    | V <sub>CC</sub> = -5V, I <sub>O</sub> = -100μA   |
|                         | DDA124EH<br>DDA144EH<br>DDA143EH<br>DDA114YH<br>DDA123JH<br>DDA114EH | V <sub>L(ON)</sub>  | —  | —<br>—<br>—<br>—<br>-1.9               | -1.9<br>-1.9<br>-1.9<br>-1.4<br>-1.1<br>-3.0     | V    | V <sub>O</sub> = -0.3V, I <sub>O</sub> = -5mA<br>V <sub>O</sub> = -0.3V, I <sub>O</sub> = -2mA<br>V <sub>O</sub> = -0.3V, I <sub>O</sub> = -20mA<br>V <sub>O</sub> = -0.3V, I <sub>O</sub> = -1mA<br>V <sub>O</sub> = -0.3V, I <sub>O</sub> = -5mA<br>V <sub>O</sub> = -0.3V, I <sub>O</sub> = -10mA           |
| Output Voltage          | DDA124EH<br>DDA144EH<br>DDA143EH<br>DDA114YH<br>DDA123JH<br>DDA114EH | V <sub>O(ON)</sub>  | —  | -0.1                                   | -0.3   | V    | I <sub>O</sub> /I <sub>L</sub> = -10mA / -0.5mA<br>I <sub>O</sub> /I <sub>L</sub> = -10mA / -0.5mA<br>I <sub>O</sub> /I <sub>L</sub> = -10mA / -0.5mA<br>I <sub>O</sub> /I <sub>L</sub> = -5mA / -0.25mA<br>I <sub>O</sub> /I <sub>L</sub> = -5mA / -0.25mA<br>I <sub>O</sub> /I <sub>L</sub> = -10mA / -0.5mA |
| Input Current           | DDA124EH<br>DDA144EH<br>DDA143EH<br>DDA114YH<br>DDA123JH<br>DDA114EH | I <sub>L</sub>      | —  | —                                      | -0.36<br>-0.18<br>-1.8<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         | DDA124EH<br>DDA144EH<br>DDA143EH<br>DDA114YH<br>DDA123JH<br>DDA114EH | G <sub>L</sub>      | 56<br>68<br>20<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> = -10mA<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                      |
| Gain-Bandwidth Product* |  | f <sub>T</sub>      | —  | 250                                    | —  | MHz  | V <sub>CE</sub> = -10V, I <sub>E</sub> = -5mA, f = 100MHz  |

\* Transistor - For Reference Only

**Typical Curves - DDA143EH**

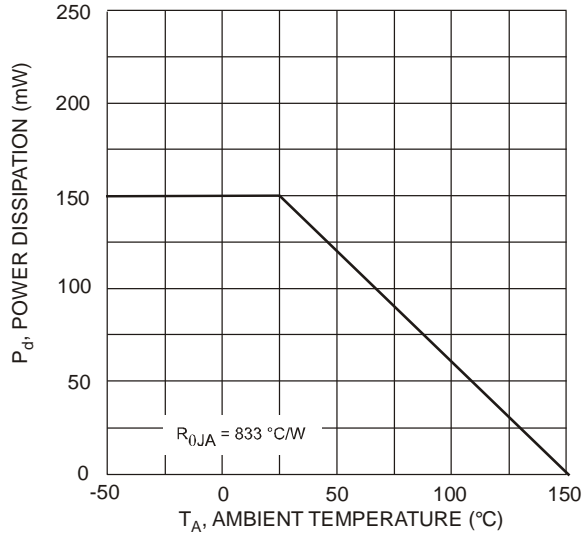


Fig. 1 Derating Curve

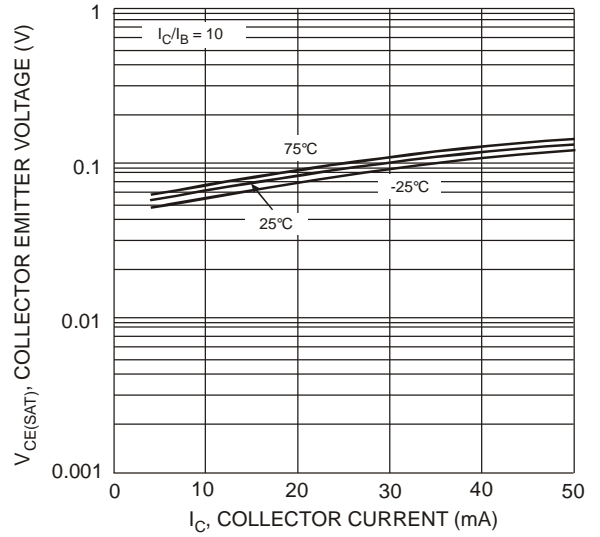


Fig. 2  $V_{CE(SAT)}$  vs.  $I_C$

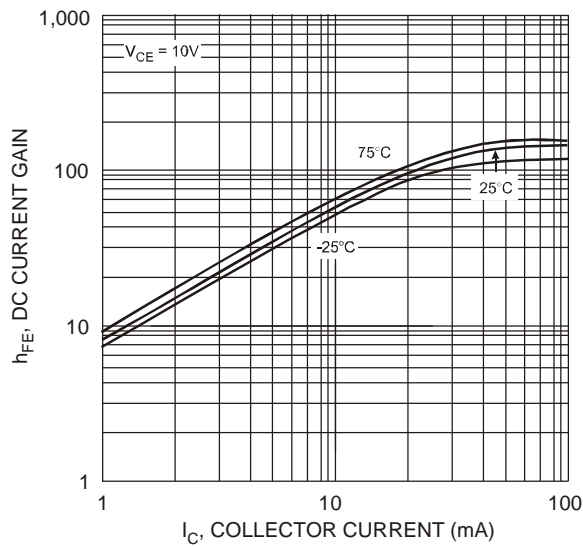


Fig. 3 DC Current Gain

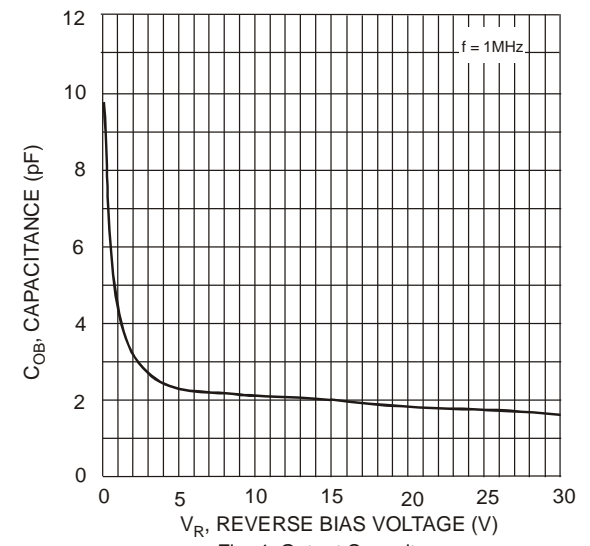


Fig. 4 Output Capacitance

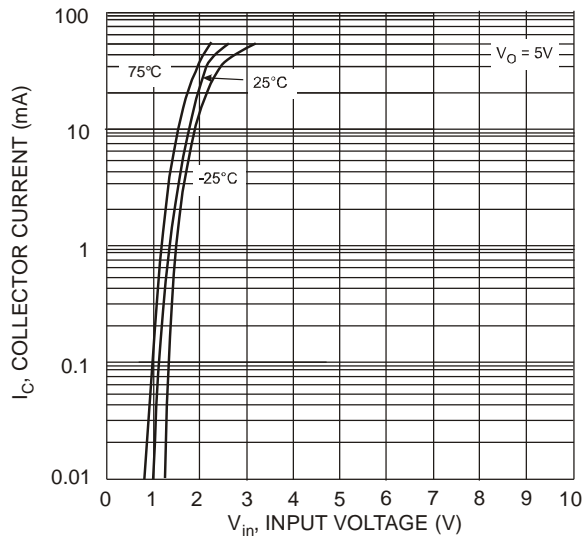


Fig. 5 Collector Current vs. Input Voltage

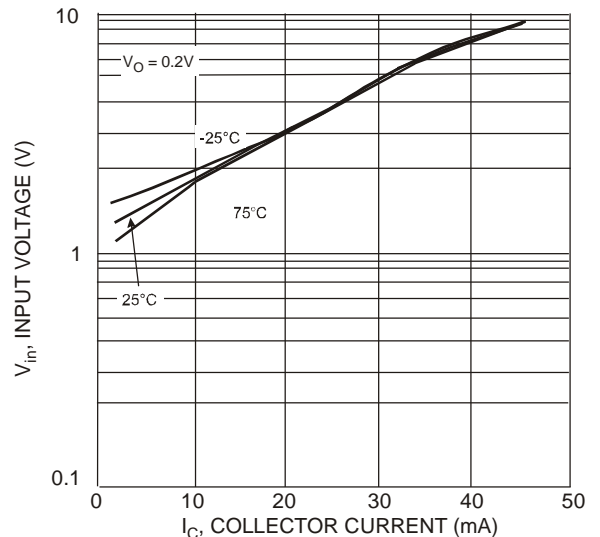
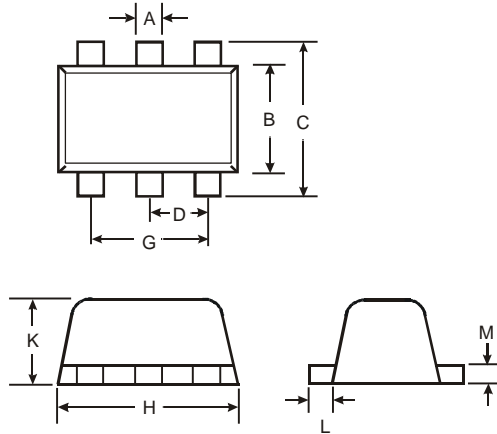


Fig. 6 Input Voltage vs. Collector Current

## Package Outline Dimensions

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

SOT563

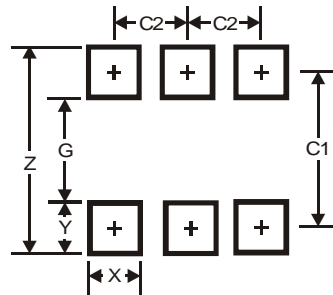


| SOT563               |      |      |      |
|----------------------|------|------|------|
| Dim                  | Min  | Max  | Typ  |
| A                    | 0.15 | 0.30 | 0.20 |
| B                    | 1.10 | 1.25 | 1.20 |
| C                    | 1.55 | 1.70 | 1.60 |
| D                    | -    | -    | 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 | Value (in mm) |
|------------|---------------|
| Z          | 2.2           |
| G          | 1.2           |
| X          | 0.375         |
| Y          | 0.5           |
| C1         | 1.7           |
| C2         | 0.5           |

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