

### Features

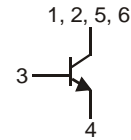
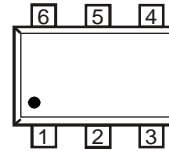
- Epitaxial Planar Die Construction
- Complementary PNP Type Available (DPLS160V)
- Surface Mount Package Suited for Automated Assembly
- Ultra-Small Surface Mount Package
- **Lead Free/RoHS Compliant (Note 1)**
- **"Green Device" (Note 2)**
- **Qualified to AEC-Q 101 Standards for High Reliability**



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-020D
- Terminals: Finish — Matte Tin annealed over Copper leadframe. Solderable per MIL-STD-202, Method 208
- Marking Information: See Page 4
- Ordering Information: See Page 4
- Weight: 0.003 grams (approximate)



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

| Characteristic                 | Symbol    | Value | Unit |
|--------------------------------|-----------|-------|------|
| Collector-Base Voltage         | $V_{CBO}$ | 80    | V    |
| Collector-Emitter Voltage      | $V_{CEO}$ | 60    | V    |
| Emitter-Base Voltage           | $V_{EBO}$ | 5     | V    |
| Collector Current - Continuous | $I_C$     | 1     | A    |
| Peak Pulse Collector Current   | $I_{CM}$  | 2     | A    |
| Base Current (DC)              | $I_B$     | 300   | mA   |

### Thermal Characteristics

| Characteristic  | Symbol          | Value       | Unit               |
|---|-----------------|-------------|--------------------|
| Power Dissipation (Note 3) @ $T_A = 25^\circ\text{C}$                       | $P_D$           | 300         | mW                 |
| Thermal Resistance, Junction to Ambient (Note 3) @ $T_A = 25^\circ\text{C}$ | $R_{\theta JA}$ | 417         | $^\circ\text{C/W}$ |
| Operating and Storage Temperature Range                                     | $T_J, T_{STG}$  | -55 to +150 | $^\circ\text{C}$   |

- Notes:
1. No purposefully added lead.
  2. Diode's Inc.'s "Green" policy can be found on our website at [http://www.diodes.com/products/lead\\_free/index.php](http://www.diodes.com/products/lead_free/index.php).
  3. Device mounted on FR-4 PCB, 1 inch x 0.85 inch x 0.062 inch; pad layout as shown on page 4 or in Diodes Inc. suggested pad layout document AP02001, which can be found on our website at <http://www.diodes.com/datasheets/ap02001.pdf>.

## Electrical Characteristics @T<sub>A</sub> = 25°C unless otherwise specified

| Characteristic                          | Symbol               | Min               | Typ               | Max               | Unit     | Test Condition   |
|---|----------------------|-------------------|-------------------|-------------------|----------|--|
| <b>OFF CHARACTERISTICS (Note 4)</b>     |                      |                   |                   |                   |          |  |
| Collector-Base Breakdown Voltage        | V <sub>(BR)CBO</sub> | 80                | —                 | —                 | V        | I <sub>C</sub> = 100μA, I <sub>E</sub> = 0   |
| Collector-Emitter Breakdown Voltage     | V <sub>(BR)CEO</sub> | 60                | —                 | —                 | V        | I <sub>C</sub> = 10mA, I <sub>B</sub> = 0  |
| Emitter-Base Breakdown Voltage          | V <sub>(BR)EBO</sub> | 5                 | —                 | —                 | V        | I <sub>E</sub> = 100μA, I <sub>C</sub> = 0   |
| Collector Cutoff Current                | I <sub>CBO</sub>     | —                 | —                 | 100<br>50         | nA<br>μA | V <sub>CB</sub> = 60V, I <sub>E</sub> = 0<br>V <sub>CB</sub> = 60V, I <sub>E</sub> = 0, T <sub>A</sub> = 150°C                               |
| Collector Cutoff Current                | I <sub>CES</sub>     | —                 | —                 | 100               | nA       | V <sub>CE</sub> = 60V, V <sub>BE</sub> = 0   |
| Emitter Cutoff Current                  | I <sub>EBO</sub>     | —                 | —                 | 100               | nA       | V <sub>EB</sub> = 5V, I <sub>C</sub> = 0   |
| <b>ON CHARACTERISTICS (Note 4)</b>      |                      |                   |                   |                   |          |  |
| DC Current Gain                         | h <sub>FE</sub>      | 250<br>200<br>100 | 320<br>280<br>165 | —                 | V        | V <sub>CE</sub> = 5V, I <sub>C</sub> = 1mA<br>V <sub>CE</sub> = 5V, I <sub>C</sub> = 500mA<br>V <sub>CE</sub> = 5V, I <sub>C</sub> = 1A      |
| Collector-Emitter Saturation Voltage    | V <sub>CE(SAT)</sub> | —                 | 80<br>80<br>140   | 110<br>140<br>250 | mV       | I <sub>C</sub> = 100mA, I <sub>B</sub> = 1mA<br>I <sub>C</sub> = 500mA, I <sub>B</sub> = 50mA<br>I <sub>C</sub> = 1A, I <sub>B</sub> = 100mA |
| Collector-Emitter Saturation Resistance | R <sub>CE(SAT)</sub> | —                 | 140               | 250               | mΩ       | I <sub>C</sub> = 1A, I <sub>B</sub> = 100mA  |
| Base-Emitter Saturation Voltage         | V <sub>BE(SAT)</sub> | —                 | 0.91              | 1.1               | V        | I <sub>C</sub> = 1A, I <sub>B</sub> = 50mA   |
| Base-Emitter Turn On Voltage            | V <sub>BE(ON)</sub>  | —                 | 0.81              | 0.9               | V        | V <sub>CE</sub> = 5V, I <sub>C</sub> = 1A  |
| <b>SMALL SIGNAL CHARACTERISTICS</b>     |                      |                   |                   |                   |          |  |
| Output Capacitance                      | C <sub>obo</sub>     | —                 | 7                 | 10                | pF       | V <sub>CB</sub> = 10V, f = 1.0MHz  |
| Current Gain-Bandwidth Product          | f <sub>T</sub>       | 150               | 270               | —                 | MHz      | V <sub>CE</sub> = 10V, I <sub>C</sub> = 50mA, f = 100MHz   |
| <b>SWITCHING CHARACTERISTICS</b>        |                      |                   |                   |                   |          |  |
| Turn-On Time                            | t <sub>on</sub>      | —                 | 90                | —                 | ns       | V <sub>CC</sub> = 10V<br>I <sub>C</sub> = 0.5A, I <sub>B1</sub> = I <sub>B2</sub> = 25mA   |
| Delay Time                              | t <sub>d</sub>       | —                 | 17                | —                 | ns       |  |
| Rise Time                               | t <sub>r</sub>       | —                 | 73                | —                 | ns       |  |
| Turn-Off Time                           | t <sub>off</sub>     | —                 | 300               | —                 | ns       |  |
| Storage Time                            | t <sub>s</sub>       | —                 | 220               | —                 | ns       |  |
| Fall Time                               | t <sub>f</sub>       | —                 | 80                | —                 | ns       |  |

Notes: 4. Measured under pulsed conditions. Pulse width = 300μs. Duty cycle ≤2%.

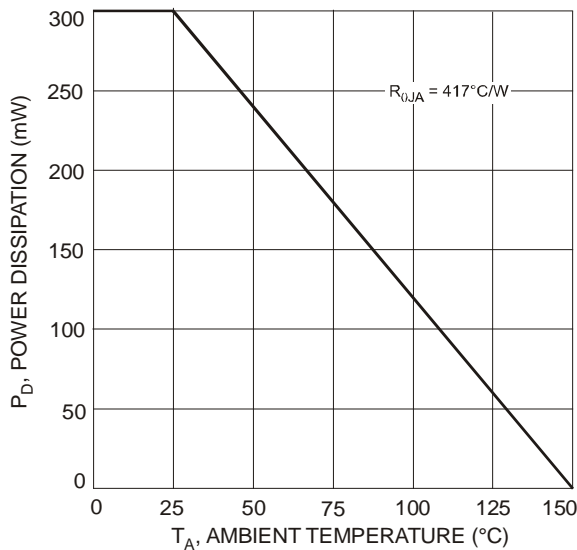


Fig. 1 Maximum Power Dissipation vs. Ambient Temperature

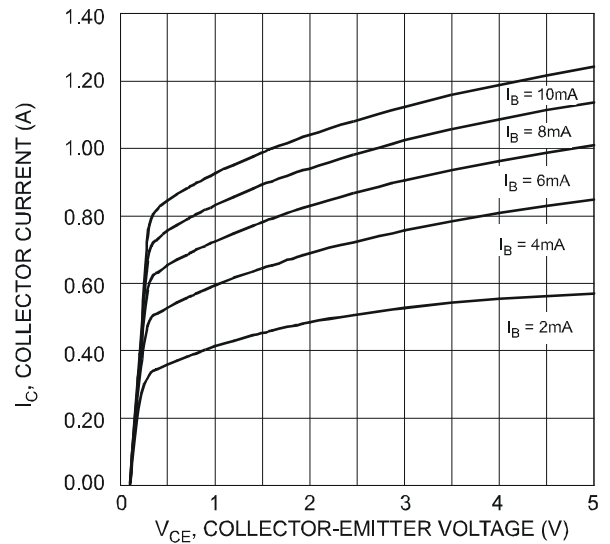


Fig. 2 Typical Collector Current vs. Collector-Emitter Voltage

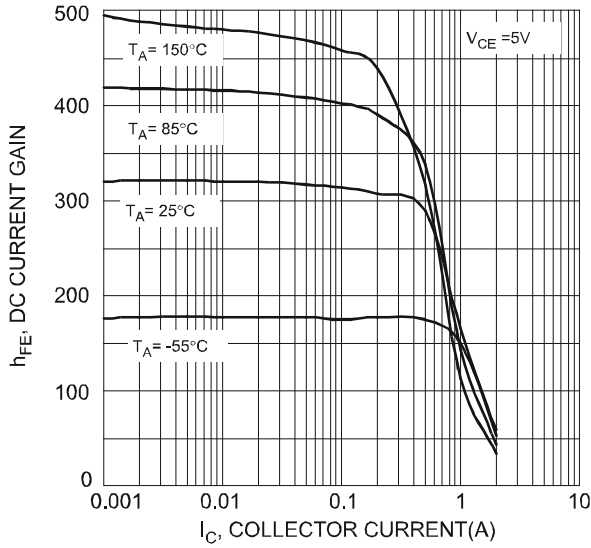


Fig. 3 Typical DC Current Gain vs. Collector Current

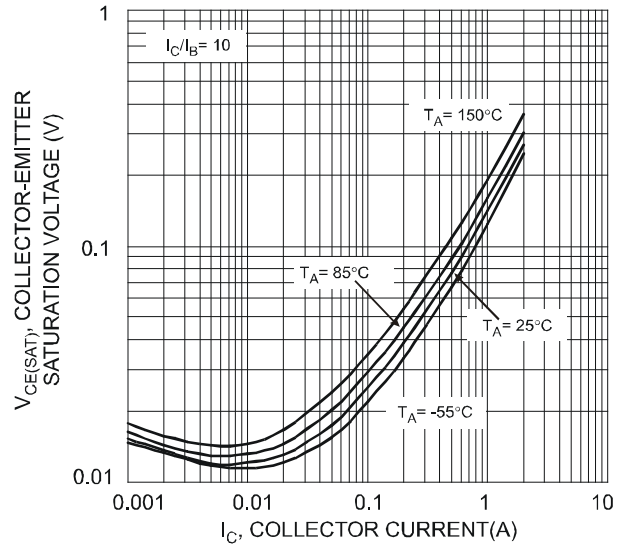


Fig. 4 Typical Collector-Emitter Saturation Voltage vs. Collector Current

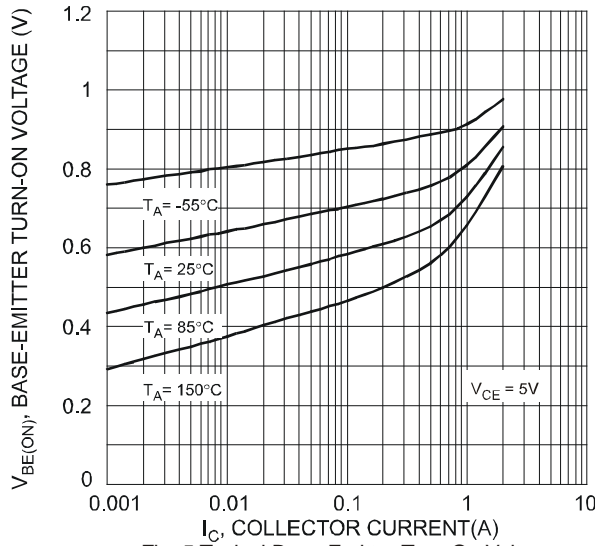


Fig. 5 Typical Base-Emitter Turn-On Voltage vs. Collector Current

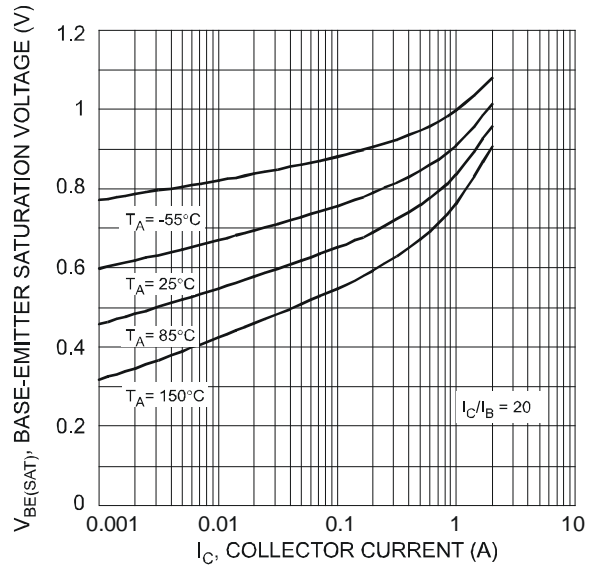


Fig. 6 Typical Base-Emitter Saturation Voltage vs. Collector Current

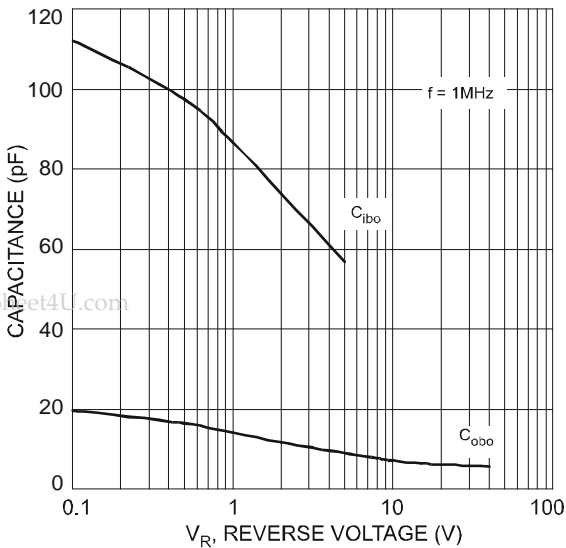


Fig. 7 Typical Capacitance Characteristics

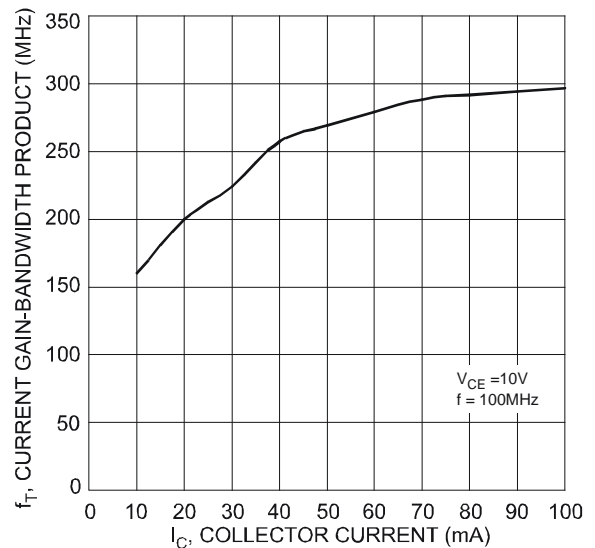


Fig. 8 Typical Current Gain-Bandwidth Product vs. Collector Current

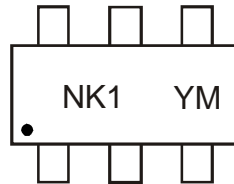
www.DataSheet4U.com

## Ordering Information (Note 5)

| Device     | Packaging | Shipping         |
|------------|-----------|------------------|
| DNLS160V-7 | SOT-563   | 3000/Tape & Reel |

Notes: 5. For packaging details, go to our website at <http://www.diodes.com/datasheets/ap02007.pdf>.

## Marking Information



NK1 = Product Type Marking Code  
 YM = Date Code Marking  
 Y = Year ex: V = 2008  
 M = Month ex: 9 = September

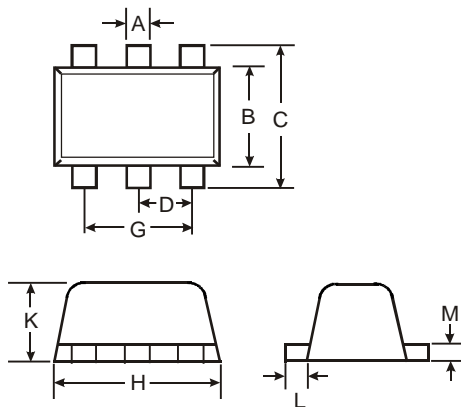
### Date Code Key

| Year | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 |
|------|------|------|------|------|------|------|------|------|
| Code | V    | W    | X    | Y    | Z    | A    | B    | C    |

| 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   |

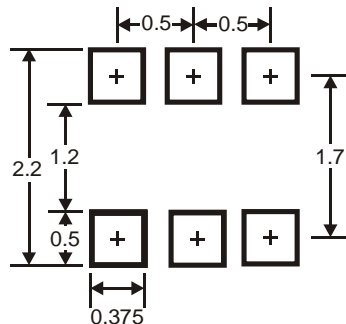
## Package Outline Dimensions



| 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

## Suggested Pad Layout (in mm)



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