

## Features

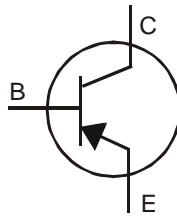
- Epitaxial Planar Die Construction
- Complementary NPN Type Available (DCP68)
- Ideally Suited for Automated Assembly Processes
- Ideal for Medium Power Switching or Amplification Applications
- **Totally Lead-Free & Fully RoHS compliant (Note 1)**
- **Halogen and Antimony Free. "Green" Device (Note 2)**
- **Qualified to AEC-Q101 Standards for High Reliability**

## Mechanical Data

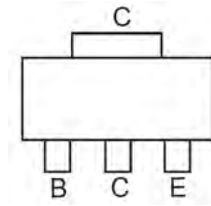
- Case: SOT223
- Case Material: Molded Plastic, "Green Molding" Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish - Matte Tin
- Solderable per MIL-STD -202, Method 208
- Weight: 0.112 grams (approximate)



Top View



Device Schematic



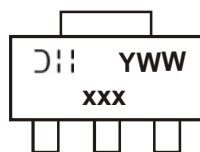
Top View  
Pin Out Configuration

## Ordering Information (Note 3)

| Part Number | Marking | Reel size (inches) | Tape width (mm) | Quantity per reel |
|-------------|---------|--------------------|-----------------|-------------------|
| DCP69-13    | P12     | 13                 | 12              | 2500              |
| DCP69-16-13 | P12-16  | 13                 | 12              | 2500              |
| DCP69-25-13 | P12-25  | 13                 | 12              | 2500              |

- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
  2. Halogen and Antimony free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
  3. For packaging details, go to our website at <http://www.diodes.com>.

## Marking Information



- xxx = Product Type Marking Code  
 P12 = DCP69  
 P12-16 = DCP69-16  
 P12-25 = DCP69-25  
 Ⓜ = Manufacturer's code marking  
 YWW = Date Code Marking  
 Y = Last digit of year (ex: 1 = 2011)  
 WW = Week code (01 – 53)

**Maximum Ratings** @T<sub>A</sub> = 25°C unless otherwise specified

| Characteristic            | Symbol           | Value | Units |
|---------------------------|------------------|-------|-------|
| Collector-Base Voltage    | V <sub>CBO</sub> | -25   | V     |
| Collector-Emitter Voltage | V <sub>CEO</sub> | -20   | V     |
| Emitter-Base Voltage      | V <sub>EBO</sub> | -5.0  | V     |
| Collector Current         | I <sub>C</sub>   | -1.0  | A     |
| Peak Pulse Current        | I <sub>CM</sub>  | -2.0  | A     |

**Thermal Characteristics** @T<sub>A</sub> = 25°C unless otherwise specified

| Characteristic                                       | Symbol                            | Value       | Unit |
|--|-----------------------------------|-------------|------|
| Power Dissipation (Note 4)                           | P <sub>D</sub>                    | 1           | W    |
| Thermal Resistance, Junction to Ambient Air (Note 4) | R <sub>θJA</sub>                  | 125         | °C/W |
| Power Dissipation (Note 5)                           | P <sub>D</sub>                    | 2           | W    |
| Thermal Resistance, Junction to Ambient Air (Note 5) | R <sub>θJA</sub>                  | 62.5        | °C/W |
| Operating and Storage Temperature Range              | T <sub>J</sub> , T <sub>STG</sub> | -55 to +150 | °C   |

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

| Characteristic                               | Symbol               | Min                          | Typ                   | Max                         | Unit     | Test Condition   |
|--|----------------------|------------------------------|-----------------------|-----------------------------|----------|--|
| <b>OFF CHARACTERISTICS</b>                   |                      |                              |                       |                             |          |  |
| Collector-Base Breakdown Voltage             | BV <sub>CBO</sub>    | -25                          | —                     | —                           | V        | I <sub>C</sub> = -100μA, I <sub>E</sub> = 0  |
| Collector-Emitter Breakdown Voltage (Note 6) | BV <sub>CEO</sub>    | -20                          | —                     | —                           | V        | I <sub>C</sub> = -10mA, I <sub>B</sub> = 0   |
| Emitter-Base Breakdown Voltage               | BV <sub>EBO</sub>    | -5.0                         | —                     | —                           | V        | I <sub>E</sub> = -100μA, I <sub>C</sub> = 0  |
| Collector-Base Cutoff Current                | I <sub>CBO</sub>     | —                            | —                     | -100<br>-10                 | nA<br>μA | V <sub>CB</sub> = -25V, I <sub>E</sub> = 0<br>V <sub>CB</sub> = -25V, I <sub>E</sub> = 0, T <sub>A</sub> = 150°C |
| Emitter-Base Cutoff Current                  | I <sub>EBO</sub>     | —                            | —                     | -100                        | nA       | V <sub>EB</sub> = -5.0V, I <sub>C</sub> = 0  |
| <b>ON CHARACTERISTICS (Note 6)</b>           |                      |                              |                       |                             |          |  |
| DC Current Gain                              | h <sub>FE</sub>      | 50<br>60<br>85<br>100<br>160 | —<br>—<br>—<br>—<br>— | —<br>—<br>375<br>250<br>375 | —        | V <sub>CE</sub> = -10V, I <sub>C</sub> = -5.0mA  |
|  |                      |                              |                       |                             |          | V <sub>CE</sub> = -1.0V, I <sub>C</sub> = -1.0A  |
|  |                      |                              |                       |                             |          | V <sub>CE</sub> = -1.0V, I <sub>C</sub> = -500mA   |
|  |                      |                              |                       |                             |          | V <sub>CE</sub> = -1.0V, I <sub>C</sub> = -500mA   |
| Collector-Emitter Saturation Voltage         | V <sub>CE(sat)</sub> | —                            | —                     | -0.5                        | V        | I <sub>C</sub> = -1.0A, I <sub>B</sub> = -100mA  |
| Base-Emitter Turn-On Voltage                 | V <sub>BE(on)</sub>  | —                            | —                     | -0.7<br>-1.0                | V        | V <sub>CE</sub> = -10V, I <sub>C</sub> = -5.0mA<br>V <sub>CE</sub> = -1.0V, I <sub>C</sub> = -1.0A               |
| <b>SMALL SIGNAL CHARACTERISTICS</b>          |                      |                              |                       |                             |          |  |
| Current Gain-Bandwidth Product               | f <sub>T</sub>       | 40                           | 200                   | —                           | MHz      | V <sub>CE</sub> = -5.0V, I <sub>C</sub> = -50mA, f = 100MHz  |
| Output Capacitance                           | C <sub>obo</sub>     | —                            | 17                    | —                           | pF       | V <sub>CB</sub> = -10V, f = 1 MHz  |

- Notes:
- Device mounted on FR-4 PCB; pad layout as shown on in Diodes Inc. suggested pad layout document, which can be found on our website at <http://www.diodes.com>
  - Device mounted on FR-4 PCB with 1in<sup>2</sup> copper pad layout
  - Measured under pulsed conditions. Pulse width = 300μS. Duty cycle ≤ 2%.

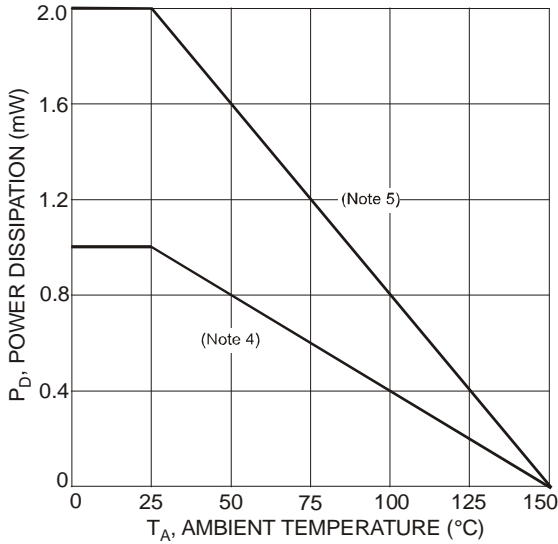


Fig. 1 Power Dissipation vs. Ambient Temperature

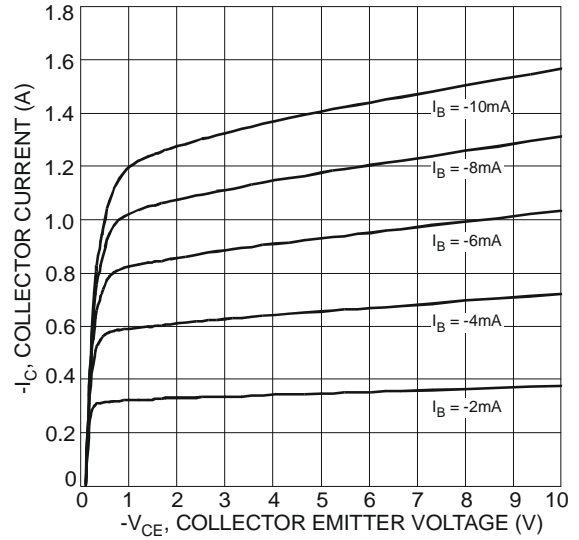


Fig. 2 Typical Collector Current vs. Collector-Emitter Voltage

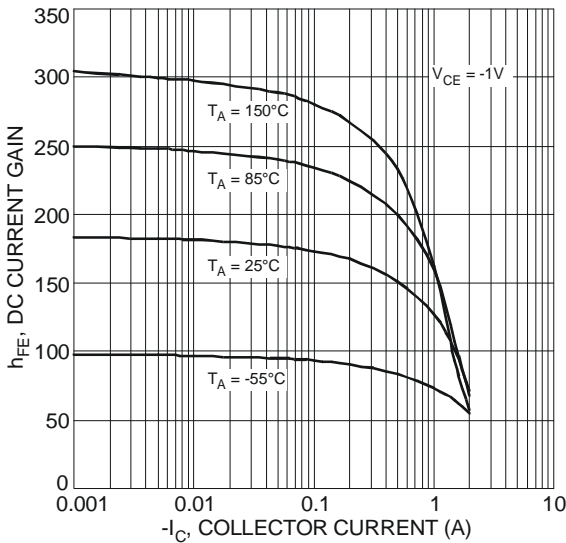


Fig. 3 Typical DC Current Gain vs. Collector Current (DCP69-16)

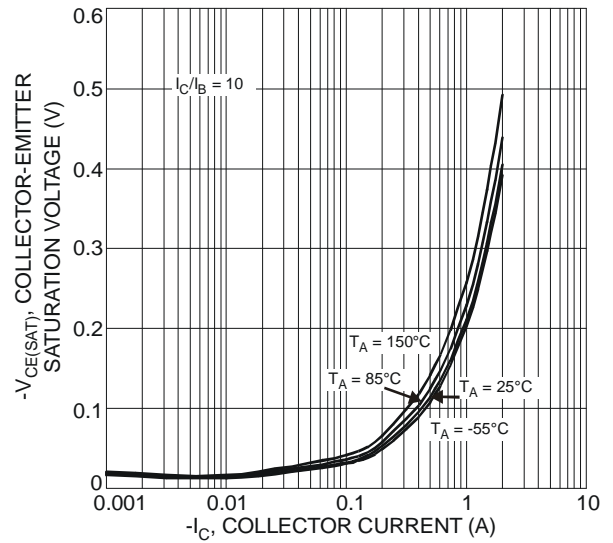


Fig. 4 Typical Collector-Emitter Saturation Voltage vs. Collector Current

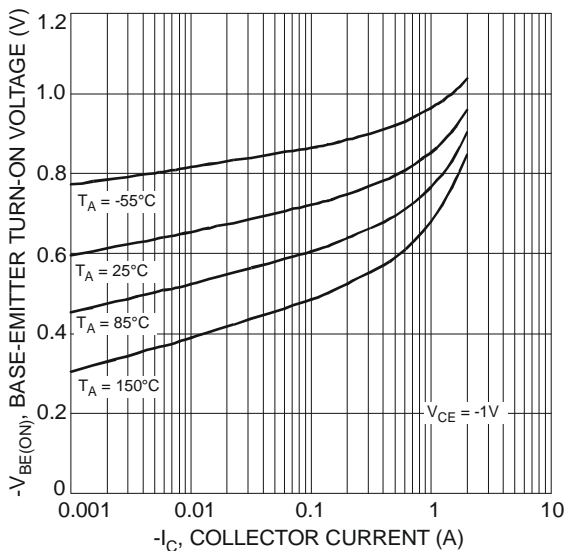


Fig. 5 Typical Base-Emitter Turn-On Voltage vs. Collector Current

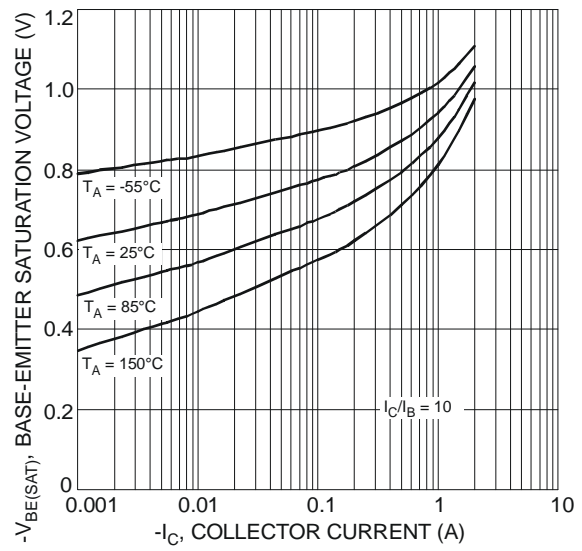


Fig. 6 Typical Base-Emitter Saturation Voltage vs. Collector Current

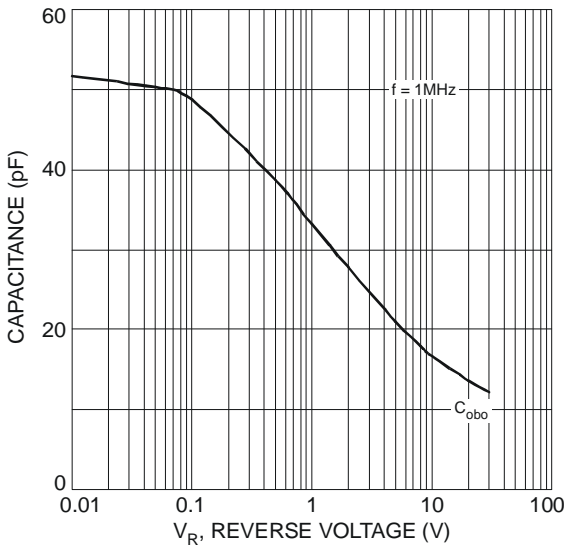


Fig. 7 Typical Output Capacitance Characteristics

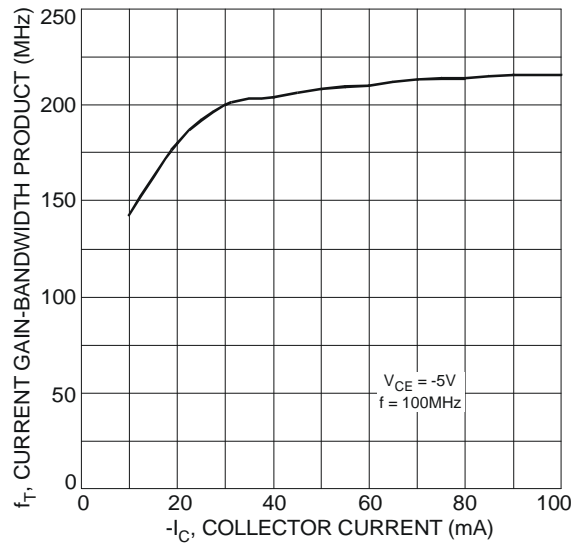
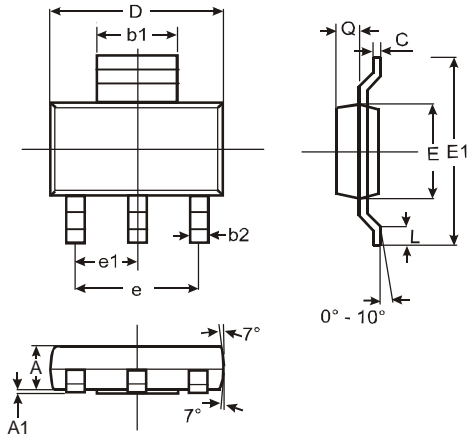


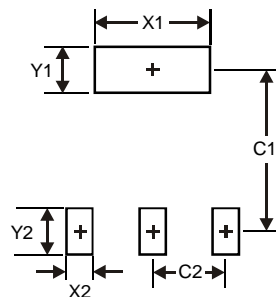
Fig. 8 Typical Gain-Bandwidth Product vs. Collector Current

**Package Outline Dimensions**



| SOT223               |       |      |      |
|----------------------|-------|------|------|
| Dim                  | Min   | Max  | Typ  |
| A                    | 1.55  | 1.65 | 1.60 |
| A1                   | 0.010 | 0.15 | 0.05 |
| b1                   | 2.90  | 3.10 | 3.00 |
| b2                   | 0.60  | 0.80 | 0.70 |
| C                    | 0.20  | 0.30 | 0.25 |
| D                    | 6.45  | 6.55 | 6.50 |
| E                    | 3.45  | 3.55 | 3.50 |
| E1                   | 6.90  | 7.10 | 7.00 |
| e                    | —     | —    | 4.60 |
| e1                   | —     | —    | 2.30 |
| L                    | 0.85  | 1.05 | 0.95 |
| Q                    | 0.84  | 0.94 | 0.89 |
| All Dimensions in mm |       |      |      |

**Suggested Pad Layout**



| Dimensions | Value (in mm) |
|------------|---------------|
| X1         | 3.3           |
| X2         | 1.2           |
| Y1         | 1.6           |
| Y2         | 1.6           |
| C1         | 6.4           |
| C2         | 2.3           |

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