


Features

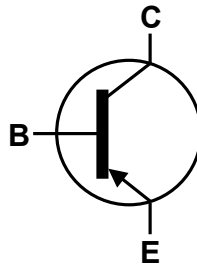
- $BV_{CEO} > -50V$
- $I_C = -2A$ high Continuous Collector Current
- High Gain Holds up
- **Totally Lead-Free & Fully RoHS compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**

Mechanical Data

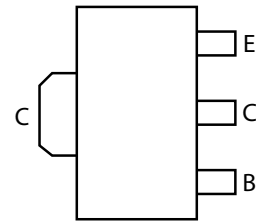
- Case: SOT89
- Case material: Molded Plastic. "Green" Molding Compound.
- UL Flammability Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish - Matte Tin Plated Leads, Solderable per MIL-STD-202, Method 208 
- Weight: 0.052 grams (Approximate)



Top View



Device Symbol



Top View
Pin Out

Ordering Information (Notes 4)

| Product | Marking | Reel size (inches) | Tape width (mm) | Quantity per reel |
|--------------|---------|--------------------|-----------------|-------------------|
| 2DA12130-13 | P25X | 13 | 12 | 2,500 |
| 2DA1213Y-13 | P25Y | 13 | 12 | 2,500 |
| 2DA1213Y-13R | P25Y | 13 | 12 | 4,000 |

- 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 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



xxxx = Product Type Marking Code:
 P25X = 2DA12130
 P25Y = 2DA1213Y
 YWW = Date Code Marking
 Y = Last digit of year (ex: 1 = 2011)
 WW = Week code 01 - 53

Maximum Ratings (@T_A = +25°C, unless otherwise specified.)

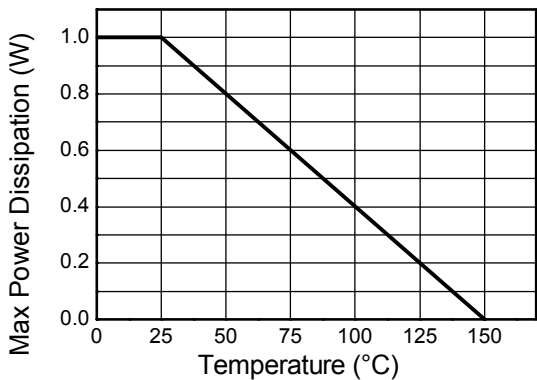
| Characteristic | Symbol | Value | Unit |
|------------------------------|------------------|-------|------|
| Collector-Base Voltage | V _{CBO} | -50 | V |
| Collector-Emitter Voltage | V _{CEO} | -50 | V |
| Emitter-Base Voltage | V _{EBO} | -6 | V |
| Continuous Collector Current | I _C | -2 | A |
| Peak Pulse Current | I _{CM} | -2.5 | A |
| Base Current | I _B | -500 | mA |

Thermal Characteristics (@T_A = +25°C, unless otherwise specified.)

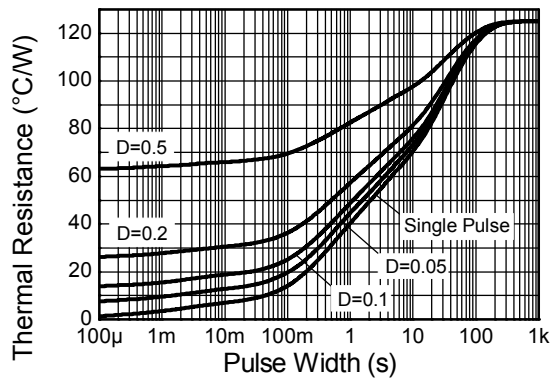
| Characteristic | Symbol | Value | Unit |
|--------------------------------------------------|-----------------------------------|-------------|------|
| Power Dissipation (Note 5) | P _D | 1 | W |
| Thermal Resistance, Junction to Ambient (Note 5) | R _{θJA} | 125 | °C/W |
| Thermal Resistance, Junction to Leads (Note 6) | R _{θJL} | 18.3 | °C/W |
| Operating and Storage Temperature Range | T _J , T _{STG} | -55 to +150 | °C |

Notes: 5. For a device surface mounted on 15mm x 15mm x 0.6mm FR4 PCB with high coverage of single sided 1 oz copper, in still air conditions; the device is measured when operating in steady state condition.
6. Thermal resistance from junction to solder-point (on the exposed collector pad).

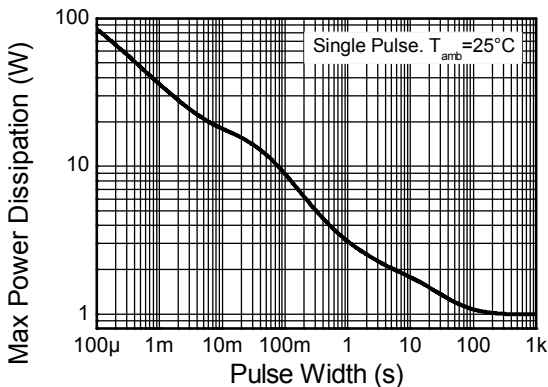
Thermal Characteristics and Derating Information



Derating Curve



Transient Thermal Impedance



Pulse Power Dissipation

Electrical Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

| Characteristic | Symbol | Min | Typ | Max | Unit | Test Condition |
|-----------------------------------------------|--------------------|-----|-----|------|------|--------------------------------------------------------------------------|
| Collector-Base Breakdown Voltage | BV_{CBO} | -50 | — | — | V | $I_C = -100\mu\text{A}$ |
| Collector-Emitter Breakdown Voltage (Note 7) | BV_{CEO} | -50 | — | — | V | $I_C = -10\text{mA}$ |
| Emitter-Base Breakdown Voltage | BV_{EBO} | -6 | — | — | V | $I_E = -100\mu\text{A}$ |
| Collector Cut-off Current | I_{CBO} | — | — | -100 | nA | $V_{CB} = -50\text{V}$ |
| Emitter Cut-off Current | I_{EBO} | — | — | -100 | nA | $V_{EB} = -5\text{V}$ |
| DC Current Gain (Note 8) | 2DA12130 | 70 | — | 140 | — | $I_C = -500\text{mA}, V_{CE} = -2\text{V}$ |
| | 2DA1213Y | 120 | — | 240 | — | $I_C = -500\text{mA}, V_{CE} = -2\text{V}$ |
| | 2DA12130, 2DA1213Y | 20 | — | — | — | $I_C = -2\text{A}, V_{CE} = -2\text{V}$ |
| Collector-Emitter Saturation Voltage (Note 7) | $V_{CE(sat)}$ | — | — | -0.5 | V | $I_C = -1\text{A}, I_B = -50\text{mA}$ |
| Base-Emitter Turn-On Voltage (Note 7) | $V_{BE(sat)}$ | — | — | -1.2 | V | $I_C = -1\text{A}, I_B = -50\text{mA}$ |
| Transition Frequency | f_T | — | 160 | — | MHz | $I_C = -100\text{mA}, V_{CE} = -2\text{V}, f = 100\text{MHz}$ |
| Output Capacitance | C_{obo} | — | 17 | — | pF | $V_{CB} = -10\text{V}, I_E = 0, f = 1\text{MHz}$ |
| Turn-On Time | t_{on} | — | 25 | — | ns | $V_{CE} = -2\text{V}, I_C = -1\text{A}, I_{B1} = -I_{B2} = -50\text{mA}$ |
| Storage Time | $t_{(s)}$ | — | 130 | — | ns | |
| Fall Time | $t_{(f)}$ | — | 12 | — | ns | |

Note: 7. Measured under pulsed conditions. Pulse width $\leq 300\mu\text{s}$. Duty cycle $\leq 2\%$.

Typical Electrical Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

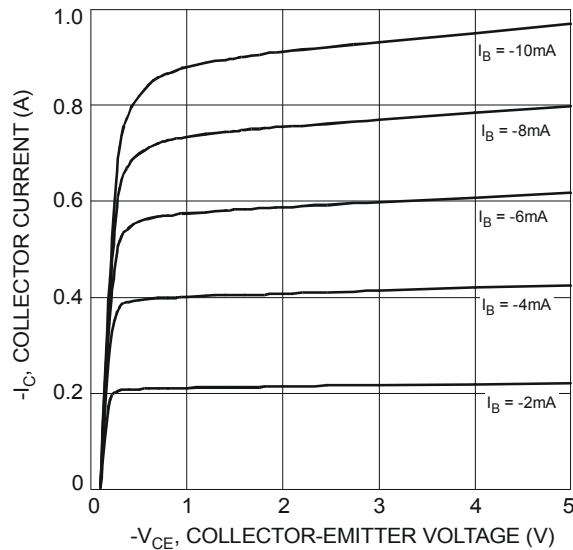


Figure 1 Typical Collector Current vs. Collector-Emitter Voltage

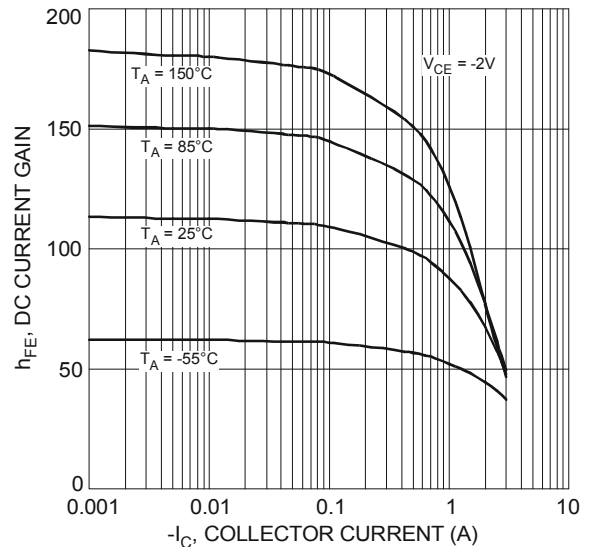


Figure 2 Typical DC Current Gain vs. Collector Current (2DA12130)

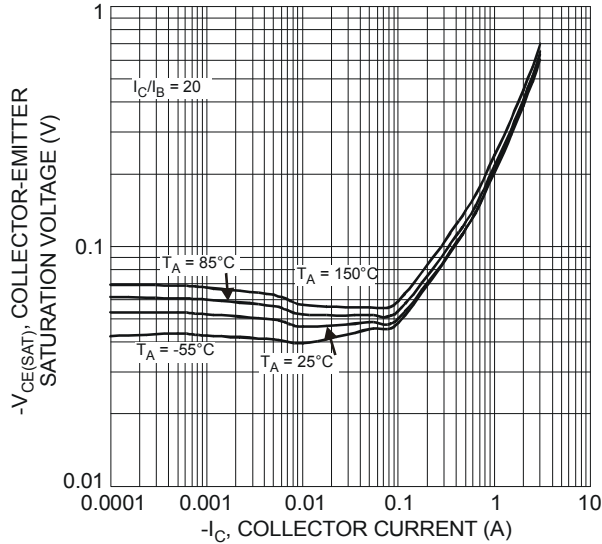


Figure 3 Typical Collector-Emitter Saturation Voltage vs. Collector Current

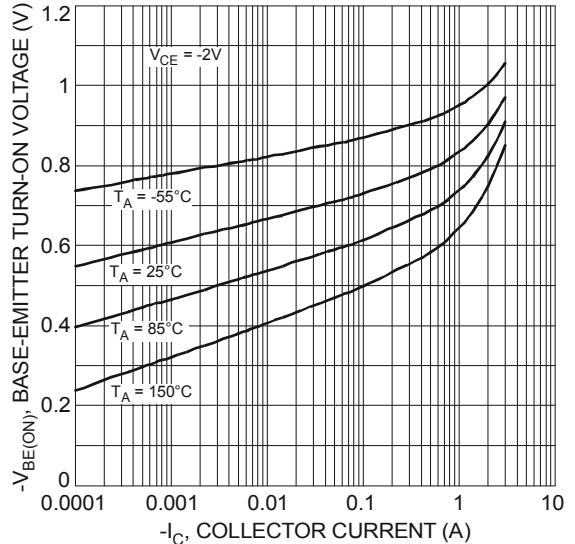


Figure 4 Typical Base-Emitter Turn-On Voltage vs. Collector Current

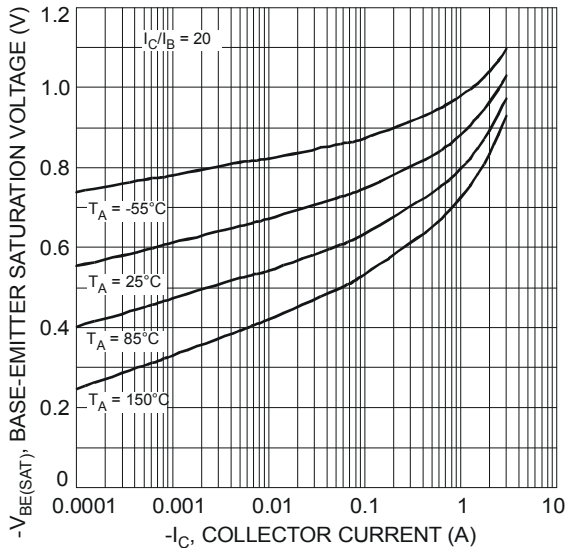


Figure 5 Typical Base-Emitter Saturation Voltage vs. Collector Current

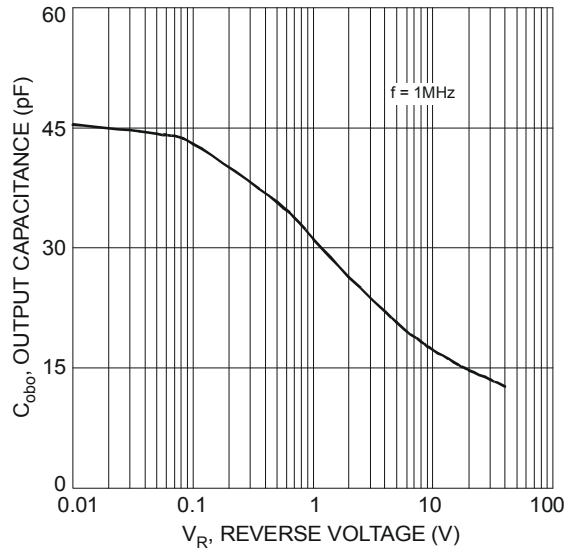


Figure 6 Typical Output Capacitance Characteristics

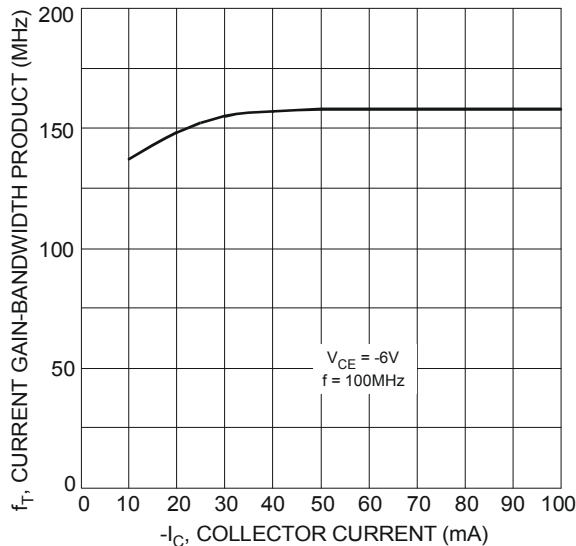
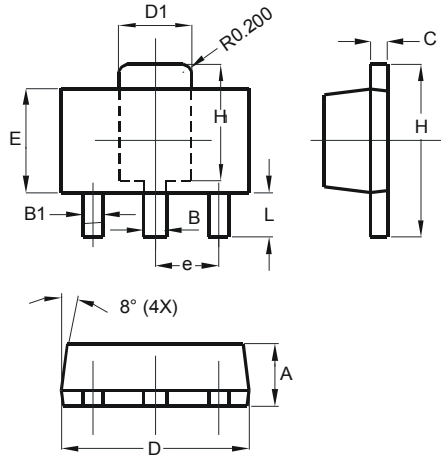


Figure 7 Typical Gain-Bandwidth Product vs. Collector Current

Package Outline Dimensions

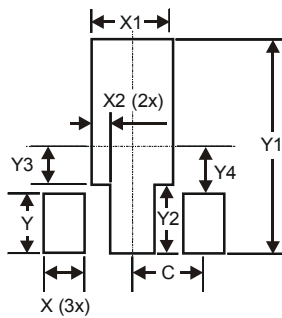
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.



| SOT89 | | |
|----------------------|----------|------|
| Dim | Min | Max |
| A | 1.40 | 1.60 |
| B | 0.44 | 0.62 |
| B1 | 0.35 | 0.54 |
| C | 0.35 | 0.44 |
| D | 4.40 | 4.60 |
| D1 | 1.62 | 1.83 |
| E | 2.29 | 2.60 |
| e | 1.50 Typ | |
| H | 3.94 | 4.25 |
| H1 | 2.63 | 2.93 |
| L | 0.89 | 1.20 |
| All Dimensions in mm | | |

Suggested Pad Layout

Please see AP02001 at <http://www.diodes.com/datasheets/ap02001.pdf> for the latest version.



| Dimensions | Value (in mm) |
|------------|---------------|
| X | 0.900 |
| X1 | 1.733 |
| X2 | 0.416 |
| Y | 1.300 |
| Y1 | 4.600 |
| Y2 | 1.475 |
| Y3 | 0.950 |
| Y4 | 1.125 |
| C | 1.500 |

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