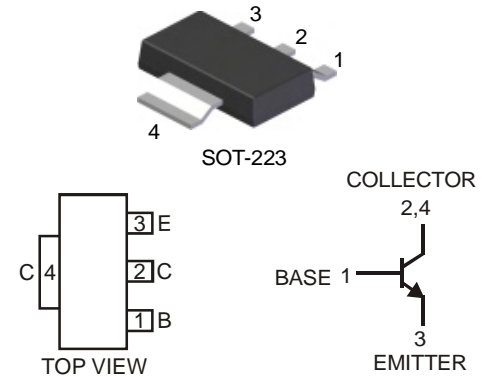


Features

- Epitaxial Planar Die Construction
- Low Collector-Emitter Saturation Resistance $R_{CE(SAT)} = 57.5\text{m}\Omega$ at 4A
- High DC Current Gain $h_{FE} > 400$ at $I_C = 3\text{A}$
- Complementary PNP Type Available (DPLS315E)
- Ideally Suited for Automated Assembly Processes
- Ideal for Medium Power Switching or Amplification Applications
- **Lead Free By Design/RoHS Compliant (Note 1)**
- **"Green" Device (Note 2)**

Mechanical Data

- Case: SOT-223
- 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
(Lead Free Plating). Solderable per MIL-STD-202, Method 208
- Marking Information: See Page 3
- Ordering Information: See Page 3
- Weight: 0.112 grams (approximate)



Schematic and Pin Configuration

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

| Characteristic | Symbol | Value | Unit |
|------------------------------|-----------|-------|------|
| Collector-Base Voltage | V_{CBO} | 12 | V |
| Collector-Emitter Voltage | V_{CEO} | 12 | V |
| Emitter-Base Voltage | V_{EBO} | 5 | V |
| Continuous Collector Current | I_C | 4 | A |
| Peak Pulse Current | I_{CM} | 10 | A |

Thermal Characteristics

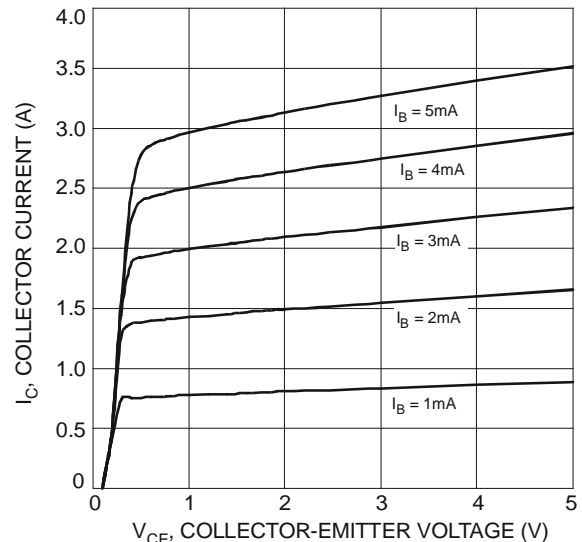
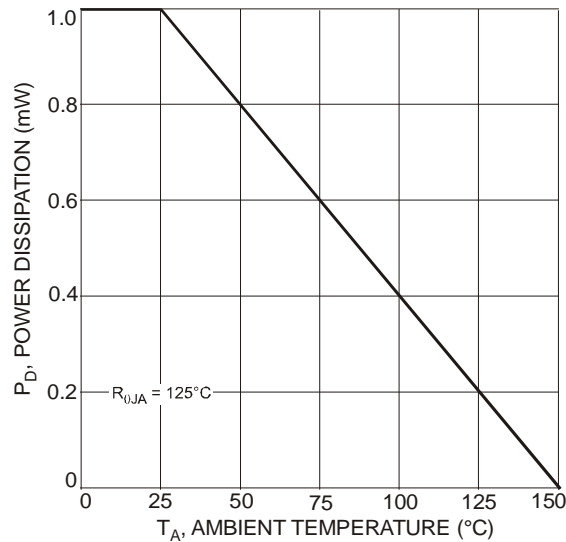
| Characteristic | Symbol | Value | Unit |
|---|-----------------|-------------|--------------------|
| Power Dissipation @ $T_A = 25^\circ\text{C}$ (Note 3) | P_D | 1 | W |
| Thermal Resistance, Junction to Ambient Air (Note 3) @ $T_A = 25^\circ\text{C}$ | $R_{\theta JA}$ | 125 | $^\circ\text{C/W}$ |
| Operating and Storage Temperature Range | T_J, T_{STG} | -55 to +150 | $^\circ\text{C}$ |

- Notes:
1. No purposefully added lead.
 2. Diodes Inc.'s "Green" policy can be found on our website at http://www.diodes.com/products/lead_free/index.php.
 3. Device mounted on FR-4 PCB, 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_A = 25°C unless otherwise specified

| Characteristic | Symbol | Min | Typ | Max | Unit | Test Condition |
|--------------------------------------|----------------------|-----|------|------|------|--|
| Off Characteristics | | | | | | |
| Collector-Base Breakdown Voltage | V _{(BR)CBO} | 12 | — | — | V | I _C = 100μA, I _E = 0 |
| Collector-Emitter Breakdown Voltage | V _{(BR)CEO} | 12 | — | — | V | I _C = 10mA, I _B = 0 |
| Emitter-Base Breakdown Voltage | V _{(BR)EBO} | 5 | — | — | V | I _E = 100μA, I _C = 0 |
| Collector Cutoff Current | I _{CBO} | — | — | 100 | nA | V _{CB} = 10V, I _E = 0 |
| Emitter Cutoff Current | I _{EBO} | — | — | 100 | nA | V _{EB} = 4V, I _C = 0 |
| On Characteristics (Note 4) | | | | | | |
| Collector-Emitter Saturation Voltage | V _{CE(SAT)} | — | 0.02 | 0.04 | V | I _C = 0.1A, I _B = 1mA |
| | | — | 0.03 | 0.06 | | I _C = 0.1A, I _B = 0.5mA |
| | | — | 0.06 | 0.18 | | I _C = 1A, I _B = 50mA |
| | | — | 0.20 | 0.35 | | I _C = 3A, I _B = 20mA |
| | | — | 0.23 | 0.40 | | I _C = 4A, I _B = 50mA |
| Base-Emitter Saturation Voltage | V _{BE(SAT)} | — | — | 1.1 | V | I _C = 3A, I _B = 20mA |
| Base-Emitter Turn-On Voltage | V _{BE(ON)} | — | — | 1.0 | V | V _{CE} = 2V, I _C = 3A |
| DC Current Gain | h _{FE} | 500 | — | — | — | V _{CE} = 2V, I _C = 0.1A |
| | | 400 | — | — | | V _{CE} = 2V, I _C = 3A |
| | | 100 | — | — | | V _{CE} = 2V, I _C = 10A |
| AC Characteristics | | | | | | |
| Transition Frequency | f _T | 150 | — | — | MHz | V _{CE} = 5V, I _C = 50mA, f = 50MHz |
| Input Capacitance | C _{ibo} | — | 240 | — | pF | V _{EB} = 0.5V, f = 1MHz |
| Output Capacitance | C _{obo} | — | 35 | — | pF | V _{CB} = 10V, f = 1MHz |
| Switching Times | t _{on} | — | 40 | — | ns | V _{CC} = 10V, I _C = 500mA |
| | t _{off} | — | 500 | — | ns | I _{B1} = -I _{B2} = 50mA |

Notes: 4. Pulse Test: Pulse width ≤300μs. Duty cycle ≤2.0%.



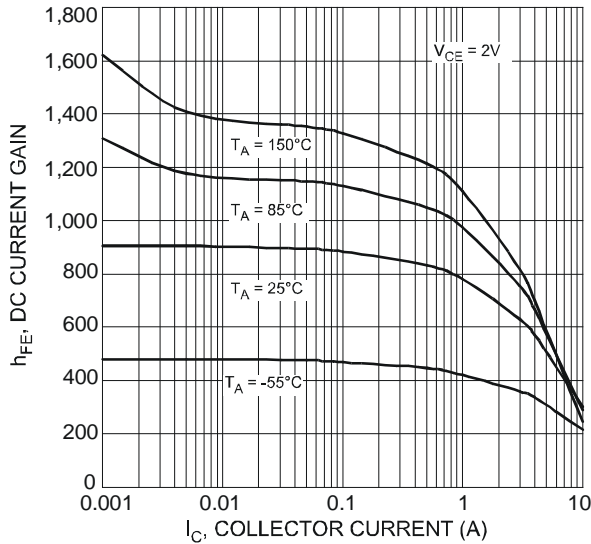


Fig. 3 Typical DC Current Gain vs. Collector Current

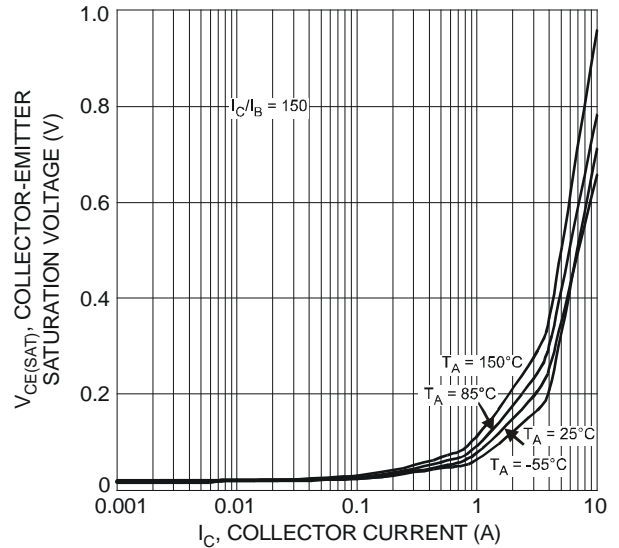


Fig. 4 Typical Collector-Emitter Saturation Voltage vs. Collector Current

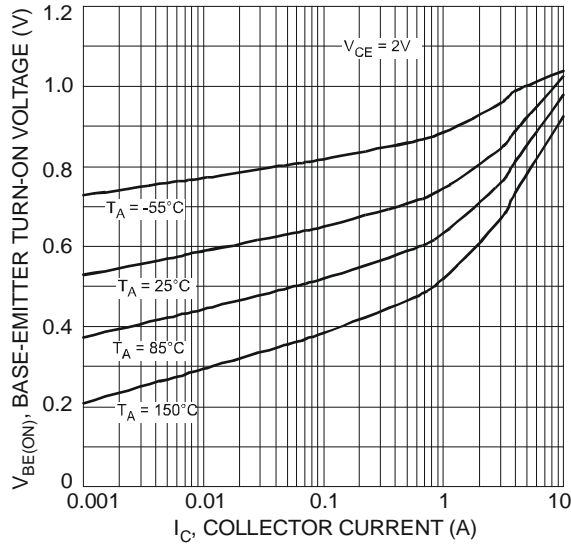


Fig. 5 Typical Base-Emitter Turn-On Voltage vs. Collector Current

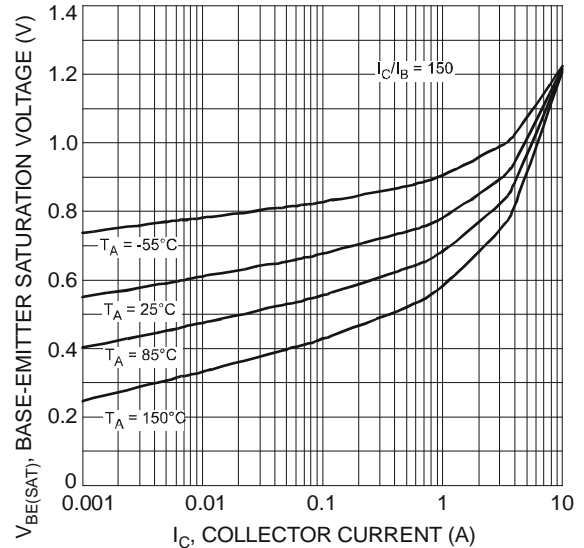


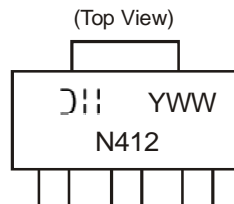
Fig. 6 Typical Base-Emitter Saturation Voltage vs. Collector Current

Ordering Information (Note 5)

| Device | Packaging | Shipping |
|-------------|-----------|------------------|
| DNLS412E-13 | SOT-223 | 2500/Tape & Reel |

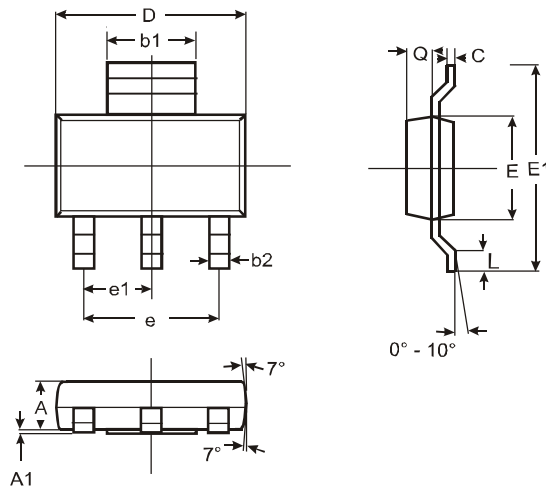
Notes: 5. For packaging details, go to our website at <http://www.diodes.com/ap2007.pdf>.

Marking Information



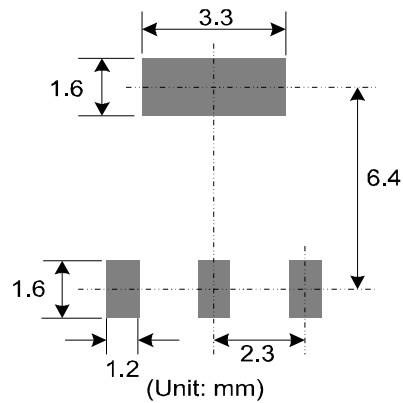
N412 = Product Type Marking Code
 YWW = Date Code Marking
 Y = Last digit of year ex: 7 = 2007
 WW = Week code 01 - 52

Package Outline Dimensions



| SOT-223 | | | |
|----------------------|-------|------|------|
| 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:



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