

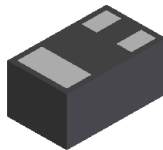
Features

- $BV_{CEO} > 40V$
- $I_C = 500mA$ High Collector Current
- $I_{CM} = 1A$ Peak Pulse Current
- $P_D = 100mW$ Power Dissipation
- Low Collector-Emitter Saturation Voltage, $V_{CE(sat)}$
- $0.60mm^2$ Package Footprint, 13 times Smaller than SOT23
- $0.5mm$ Height Package Minimizing Off-Board Profile
- Complementary NPN Type DSS3540M
- **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**

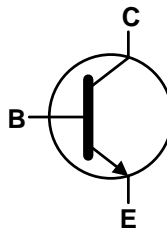
Mechanical Data

- Case: X1-DFN1006-3
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish — NiPdAu. Solderable per MIL-STD-202, Method 208 ^(e4)
- Weight: 0.0009 grams (Approximate)

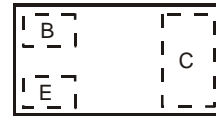
X1-DFN1006-3



Bottom View



Device Symbol


 Top View
Device Schematic

Ordering Information (Note 4)

| Product | Marking | Reel size (inches) | Tape width (mm) | Quantity per reel |
|-------------|---------|--------------------|-----------------|-------------------|
| DSS2540M-7 | TC | 7 | 8mm | 3,000 |
| DSS2540M-7B | TC | 7 | 8mm | 10,000 |

- 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>.

Marking Information

| | |
|--------------------|--|
| DSS2540M-7 | <p>Top View Dot Denotes Collector Side</p> <p>Top View Bar Denotes Base and Emitter Side</p> <p>From date code 1527 (YYWW), this changes to:</p> |
| DSS2540M-7B | <p>Top View Bar Denotes Base and Emitter Side</p> <p>TC = Product Type Marking Code</p> |

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

| Characteristic | Symbol | Value | Unit |
|--------------------------------|------------------|-------|------|
| Collector-Base Voltage | V _{CBO} | 40 | V |
| Collector-Emitter Voltage | V _{CEO} | 40 | V |
| Emitter-Base Voltage | V _{EBO} | 6 | V |
| Collector Current - Continuous | I _C | 500 | mA |
| Peak Pulse Collector Current | I _{CM} | 1 | A |
| Peak Base Current | I _{BM} | 100 | mA |

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

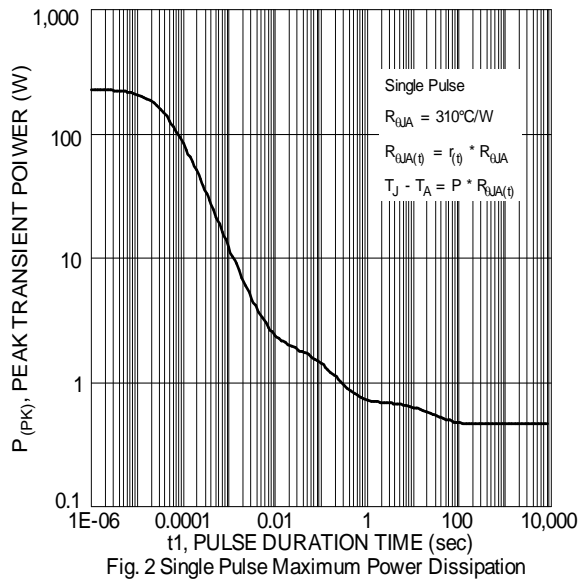
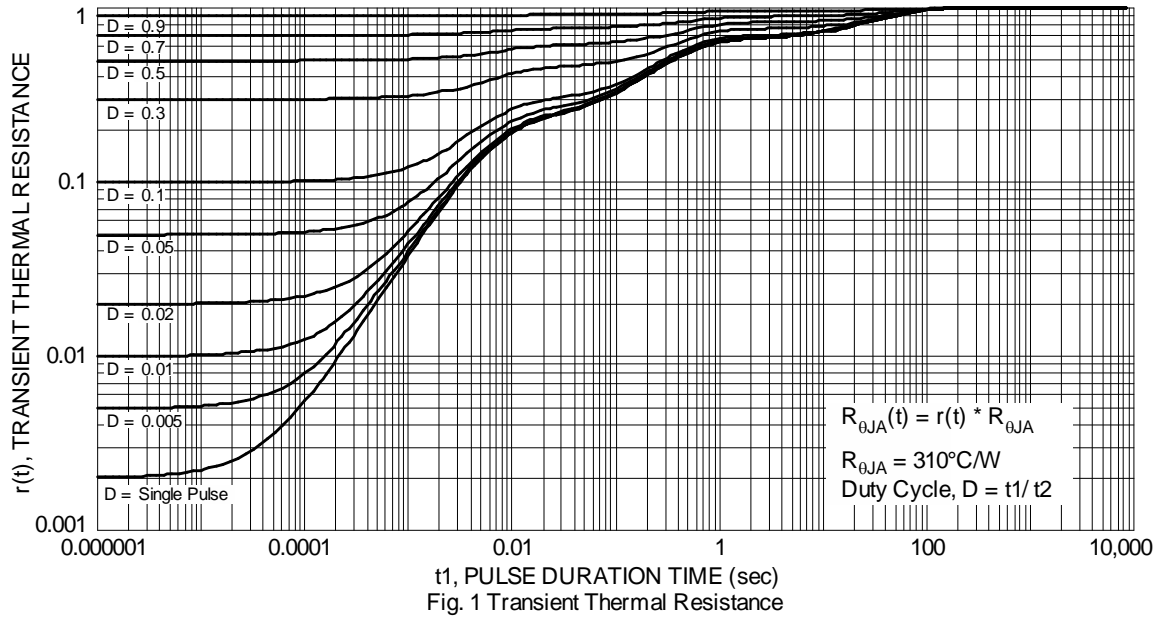
| Characteristic | Symbol | Value | Unit |
|---|-----------------------------------|------------------|------|
| Power Dissipation | P _D | (Note 5) 400 | mW |
| | | (Note 6) 1000 | |
| Thermal Resistance, Junction to Ambient | R _{θJA} | (Note 5) 310 | °C/W |
| | | (Note 6) 120 | |
| Thermal Resistance, Junction to Lead | R _{θJL} | 120 | °C/W |
| Operating and Storage and Temperature Range | T _J , T _{STG} | -55 to +150 | °C |

ESD Ratings (Note 8)

| Characteristic | Symbol | Value | Unit | JEDEC Class |
|--|---------|-------|------|-------------|
| Electrostatic Discharge - Human Body Model | ESD HBM | 4,000 | V | 3A |
| Electrostatic Discharge - Machine Model | ESD MM | 400 | V | B |

- Notes:
5. For the device mounted on minimum recommended pad layout 1oz copper that is on a single-sided 1.6mm FR4 PCB; device is measured under still air conditions whilst operating in steady state condition. The entire exposed collector pad is attached to the heatsink.
 6. Same as Note 5, except the exposed collector pad is mounted on 25mm x 25mm 2oz copper.
 7. Thermal resistance from junction to solder-point (on the exposed collector pad).
 8. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

Thermal Characteristics



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

| Characteristic | Symbol | Min | Typ | Max | Unit | Test Condition |
|--|----------------------|------------------|------------------|-------------------------|----------|---|
| OFF CHARACTERISTICS | | | | | | |
| Collector-Base Breakdown Voltage | BV _{CBO} | 40 | — | — | V | I _C = 100μA, I _E = 0 |
| Collector-Emitter Breakdown Voltage (Note 9) | BV _{CEO} | 40 | — | — | V | I _C = 10mA, I _B = 0 |
| Emitter-Base Breakdown Voltage | BV _{EBO} | 6 | — | — | V | I _E = 100μA, I _C = 0 |
| Collector Cutoff Current | I _{CBO} | — | — | 100 50 | nA μA | V _{CB} = 30V, I _E = 0 V _{CB} = 30V, I _E = 0, T _A = +150°C |
| Emitter Cutoff Current | I _{EBO} | — | — | 100 | nA | V _{EB} = 5V, I _C = 0 |
| ON CHARACTERISTICS (Note 9) | | | | | | |
| DC Current Gain | h _{FE} | 200 150 50 | — — — | — — — | — | V _{CE} = 2V, I _C = 10mA V _{CE} = 2V, I _C = 100mA V _{CE} = 2V, I _C = 500mA |
| Collector-Emitter Saturation Voltage | V _{CE(sat)} | — — — — | — — — — | 50 100 200 250 | mV | I _C = 10mA, I _B = 0.5mA I _C = 100mA, I _B = 5mA I _C = 200mA, I _B = 10mA I _C = 500mA, I _B = 50mA |
| Collector-Emitter Saturation Resistance | R _{CE(sat)} | — | — | 500 | mΩ | I _C = 500mA, I _B = 50mA |
| Base-Emitter Saturation Voltage | V _{BE(sat)} | — | — | 1.2 | V | I _C = 500mA, I _B = 50mA |
| Base-Emitter Turn On Voltage | V _{BE(on)} | — | — | 1.1 | V | V _{CE} = 2V, I _C = 100mA |
| SMALL SIGNAL CHARACTERISTICS | | | | | | |
| Output Capacitance | C _{obo} | — | — | 6 | pF | V _{CB} = 10V, f = 1.0MHz |
| Current Gain-Bandwidth Product | f _T | 250 | 300 | — | MHz | V _{CE} = 5V, I _C = 100mA, f = 100MHz |

Note: 9. Measured under pulsed conditions. Pulse width ≤ 300μs. Duty cycle ≤ 2%.

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

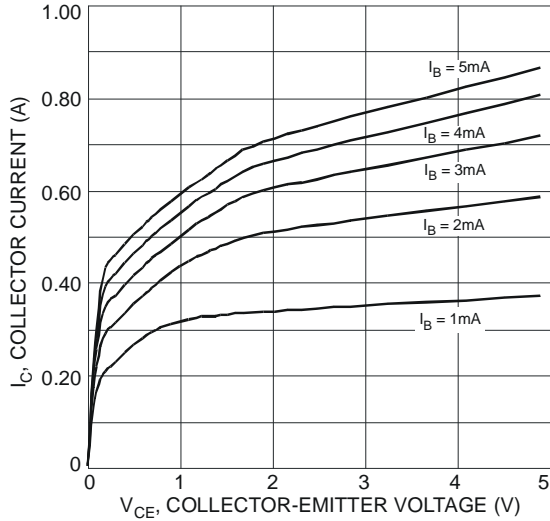


Fig. 4 Typical Collector Current vs. Collector-Emitter Voltage

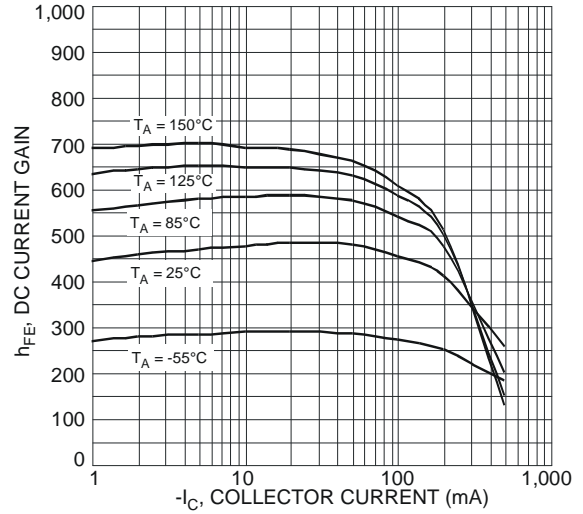


Fig. 5 Typical DC Current Gain vs. Collector Current

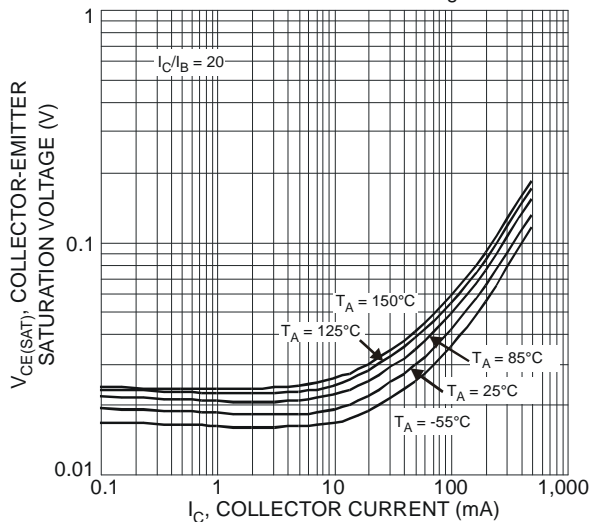


Fig. 6 Typical Collector-Emitter Saturation Voltage vs. Collector Current

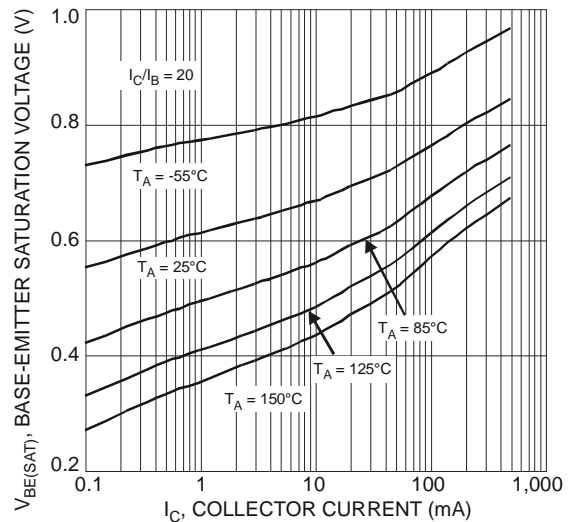


Fig. 7 Typical Base-Emitter Saturation Voltage vs. Collector Current

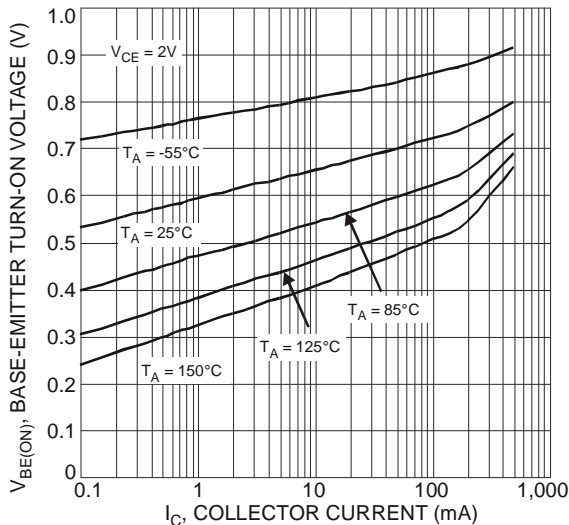


Fig. 8 Typical Base-Emitter Turn-On Voltage vs. Collector Current

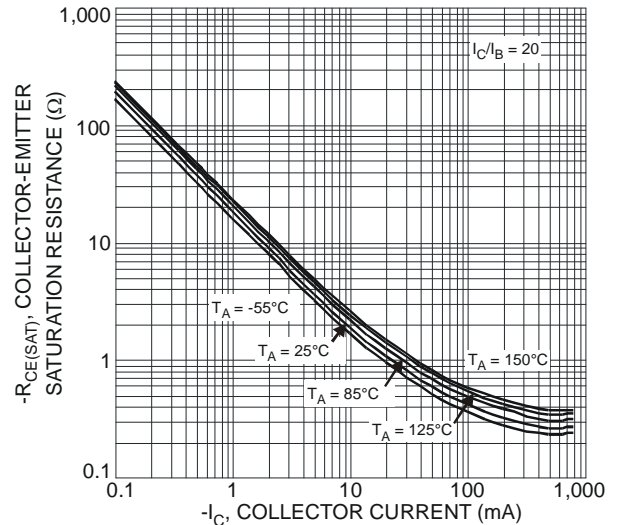
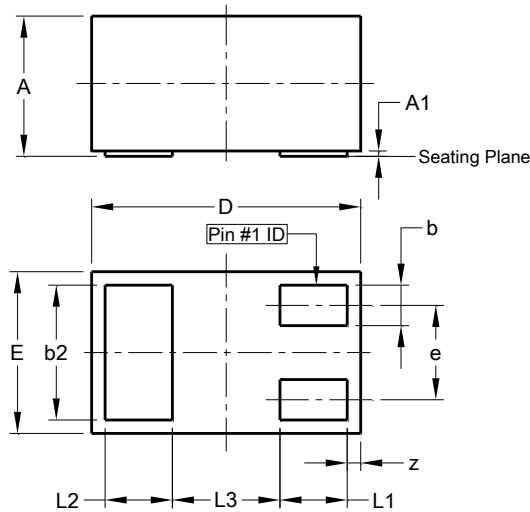


Fig. 9 Typical Collector-Emitter Saturation Resistance vs. Collector Current

Package Outline Dimensions

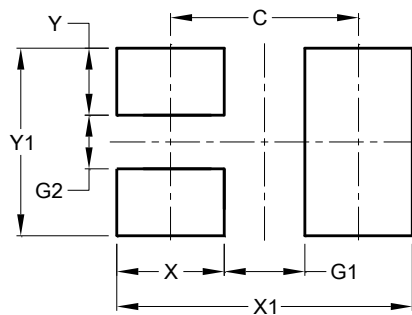
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for the latest version.



| X1-DFN1006-3 | | | |
|----------------------|------|-------|------|
| Dim | Min | Max | Typ |
| A | 0.47 | 0.53 | 0.50 |
| A1 | 0.00 | 0.05 | 0.03 |
| b | 0.10 | 0.20 | 0.15 |
| b2 | 0.45 | 0.55 | 0.50 |
| D | 0.95 | 1.075 | 1.00 |
| E | 0.55 | 0.675 | 0.60 |
| e | - | - | 0.35 |
| L1 | 0.20 | 0.30 | 0.25 |
| L2 | 0.20 | 0.30 | 0.25 |
| L3 | - | - | 0.40 |
| z | 0.02 | 0.08 | 0.05 |
| 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) |
|------------|---------------|
| C | 0.70 |
| G1 | 0.30 |
| G2 | 0.20 |
| X | 0.40 |
| X1 | 1.10 |
| Y | 0.25 |
| Y1 | 0.70 |

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