

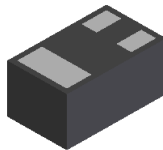
## Features

- $BV_{CEO} > 40V$
- $I_C = 500mA$  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**

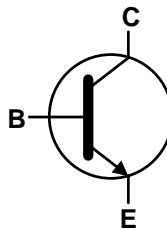
## Mechanical Data

- 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 ④
- Weight: 0.0009 grams (Approximate)

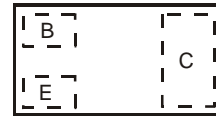
X1-DFN1006-3



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](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

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

**Absolute Maximum Ratings** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V <sub>CBO</sub>	40	V
Collector-Emitter Voltage	V <sub>CEO</sub>	40	V
Emitter-Base Voltage	V <sub>EBO</sub>	6	V
Collector Current - Continuous	I <sub>C</sub>	500	mA
Peak Pulse Collector Current	I <sub>CM</sub>	1	A
Peak Base Current	I <sub>BM</sub>	100	mA

**Thermal Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

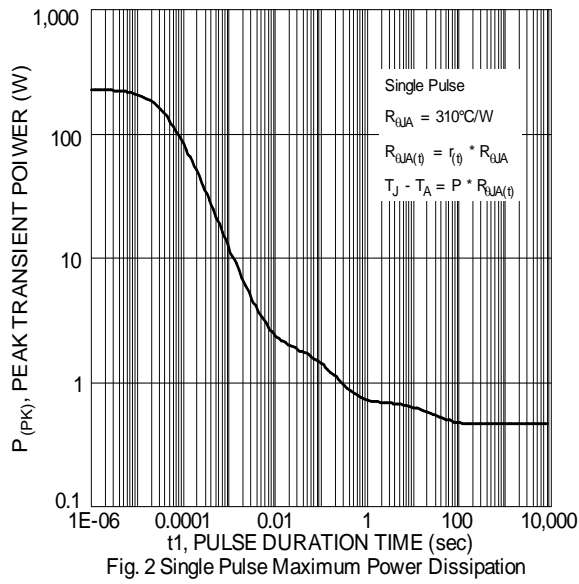
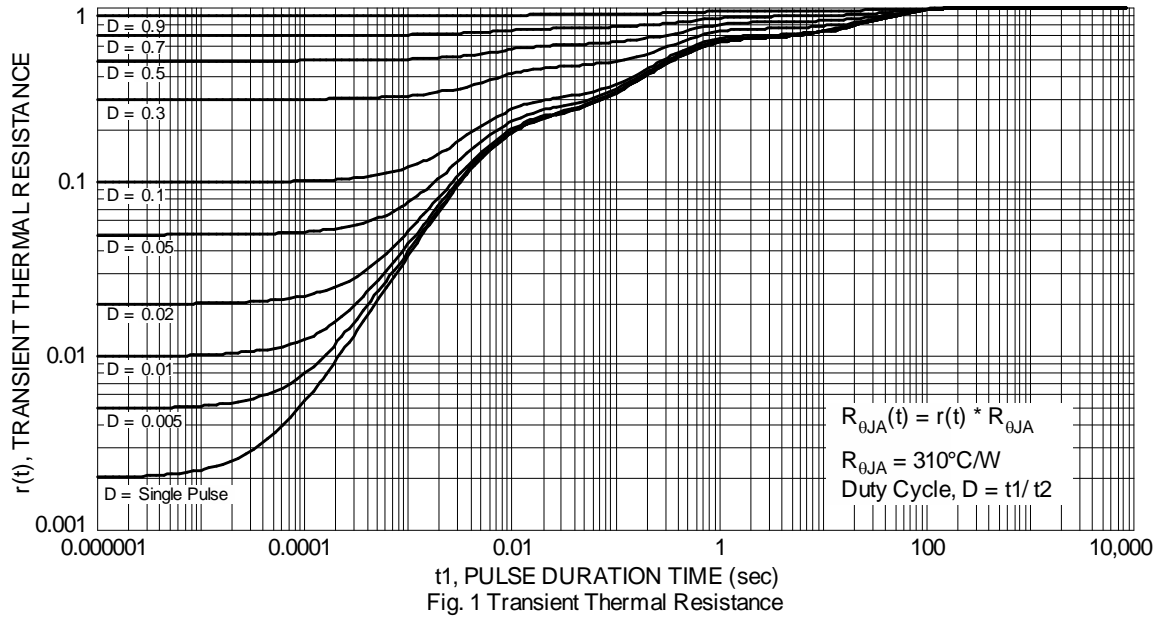
Characteristic	Symbol	Value	Unit
Power Dissipation	P <sub>D</sub>	(Note 5) 400	mW
		(Note 6) 1000	
Thermal Resistance, Junction to Ambient	R <sub>θJA</sub>	(Note 5) 310	°C/W
		(Note 6) 120	
Thermal Resistance, Junction to Lead	R <sub>θJL</sub>	120	°C/W
Operating and Storage and Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-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:
- 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.
  - Same as Note 5, except the exposed collector pad is mounted on 25mm x 25mm 2oz copper.
  - Thermal resistance from junction to solder-point (on the exposed collector pad).
  - Refer to JEDEC specification JESD22-A114 and JESD22-A115.

**Thermal Characteristics**



**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>	40	—	—	V	I <sub>C</sub> = 100μA, I <sub>E</sub> = 0
Collector-Emitter Breakdown Voltage (Note 9)	BV <sub>CEO</sub>	40	—	—	V	I <sub>C</sub> = 10mA, I <sub>B</sub> = 0
Emitter-Base Breakdown Voltage	BV <sub>EBO</sub>	6	—	—	V	I <sub>E</sub> = 100μA, I <sub>C</sub> = 0
Collector Cutoff Current	I <sub>CBO</sub>	—	—	100 50	nA μA	V <sub>CB</sub> = 30V, I <sub>E</sub> = 0 V <sub>CB</sub> = 30V, I <sub>E</sub> = 0, T <sub>A</sub> = +150°C
Emitter Cutoff Current	I <sub>EBO</sub>	—	—	100	nA	V <sub>EB</sub> = 5V, I <sub>C</sub> = 0
<b>ON CHARACTERISTICS (Note 9)</b>						
DC Current Gain	h <sub>FE</sub>	200 150 50	— — —	— — —	—	V <sub>CE</sub> = 2V, I <sub>C</sub> = 10mA V <sub>CE</sub> = 2V, I <sub>C</sub> = 100mA V <sub>CE</sub> = 2V, I <sub>C</sub> = 500mA
Collector-Emitter Saturation Voltage	V <sub>CE(sat)</sub>	— — — —	— — — —	50 100 200 250	mV	I <sub>C</sub> = 10mA, I <sub>B</sub> = 0.5mA I <sub>C</sub> = 100mA, I <sub>B</sub> = 5mA I <sub>C</sub> = 200mA, I <sub>B</sub> = 10mA I <sub>C</sub> = 500mA, I <sub>B</sub> = 50mA
Collector-Emitter Saturation Resistance	R <sub>CE(sat)</sub>	—	—	500	mΩ	I <sub>C</sub> = 500mA, I <sub>B</sub> = 50mA
Base-Emitter Saturation Voltage	V <sub>BE(sat)</sub>	—	—	1.2	V	I <sub>C</sub> = 500mA, I <sub>B</sub> = 50mA
Base-Emitter Turn On Voltage	V <sub>BE(on)</sub>	—	—	1.1	V	V <sub>CE</sub> = 2V, I <sub>C</sub> = 100mA
<b>SMALL SIGNAL CHARACTERISTICS</b>						
Output Capacitance	C <sub>obo</sub>	—	—	6	pF	V <sub>CB</sub> = 10V, f = 1.0MHz
Current Gain-Bandwidth Product	f <sub>T</sub>	250	300	—	MHz	V <sub>CE</sub> = 5V, I <sub>C</sub> = 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.)

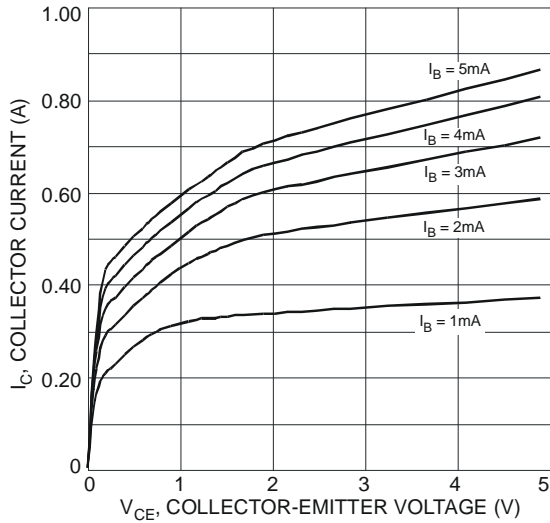


Fig. 4 Typical Collector Current vs. Collector-Emitter Voltage

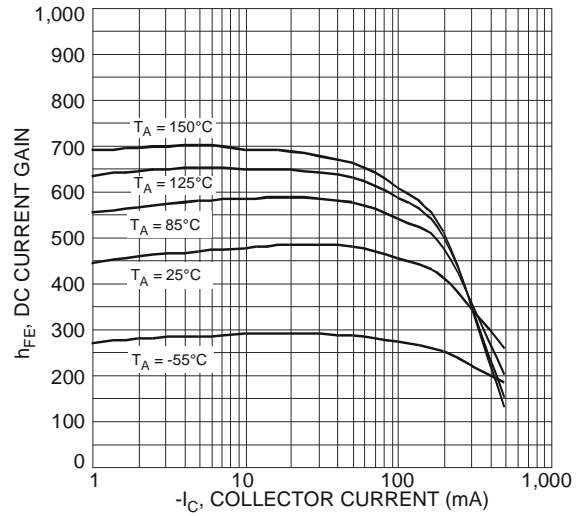


Fig. 5 Typical DC Current Gain vs. Collector Current

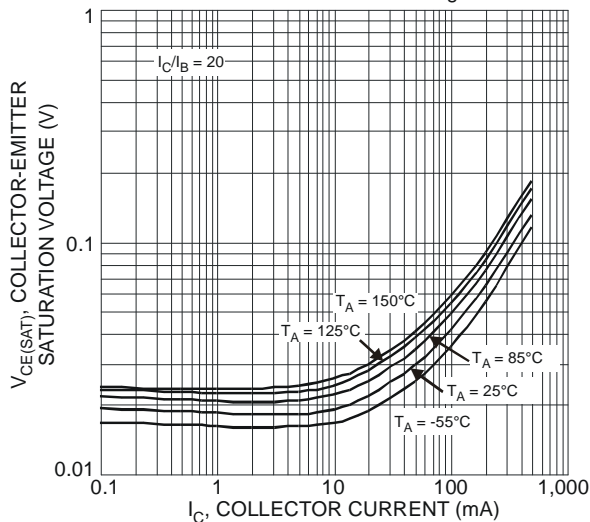


Fig. 6 Typical Collector-Emitter Saturation Voltage vs. Collector Current

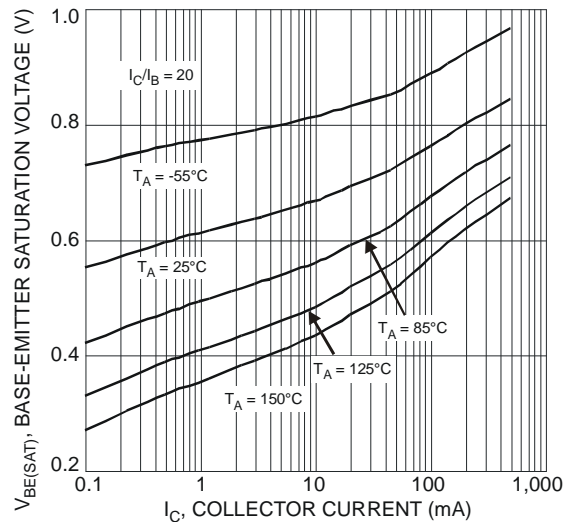


Fig. 7 Typical Base-Emitter Saturation Voltage vs. Collector Current

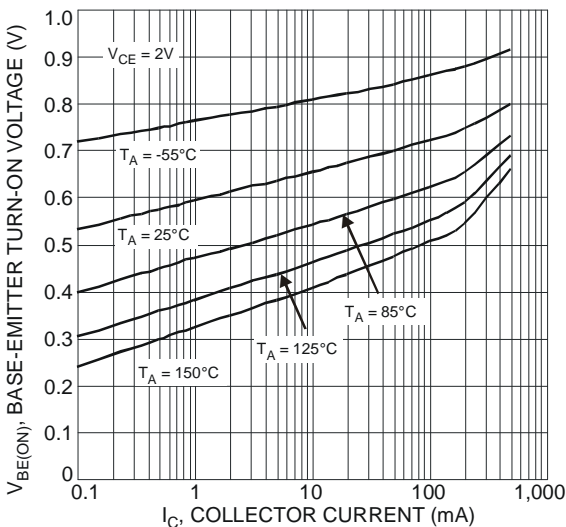


Fig. 8 Typical Base-Emitter Turn-On Voltage vs. Collector Current

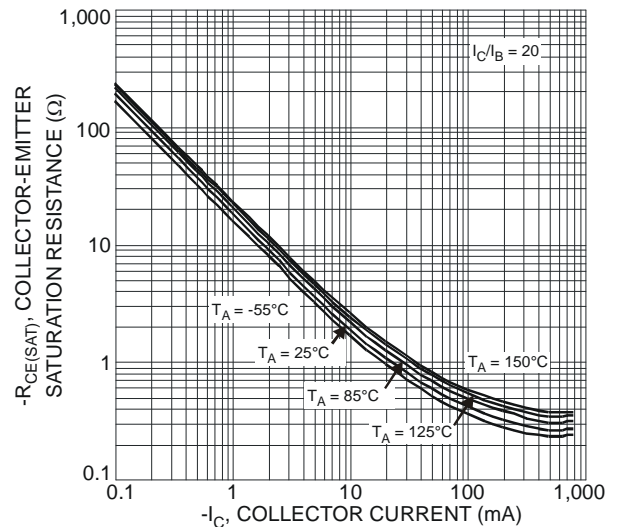
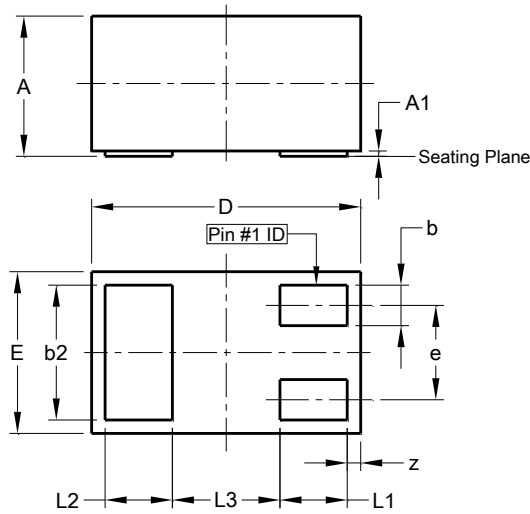


Fig. 9 Typical Collector-Emitter Saturation Resistance vs. Collector Current

### Package Outline Dimensions

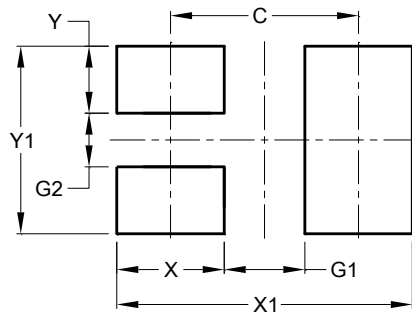
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for the latest version.



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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