

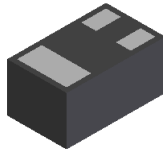
## Features

- $BV_{CEO} > 40V$
- $I_C = 500mA$  High Collector Current
- $I_{CM} = 1A$  Peak Pulse Current
- $P_D = 1000mW$  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)**
- **For automotive applications requiring specific change control (i.e.: parts qualified to AEC-Q100/101/104/200, PPAP capable, and manufactured in IATF 16949 certified facilities), please refer to the related automotive grade (Q-suffix) part. A listing can be found at <https://www.diodes.com/products/automotive/automotive-products/>.**
- **This part is qualified to JEDEC standards (as references in AEC-Q) for High Reliability. <https://www.diodes.com/quality/product-definitions/>**

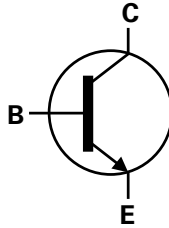
## Mechanical Data

- Package: X1-DFN1006-3
- Package 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 <sup>Ⓔ4</sup>
- Weight: 0.0009 grams (Approximate)

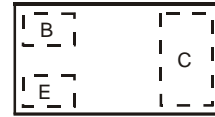
X1-DFN1006-3



Bottom View



Device Symbol

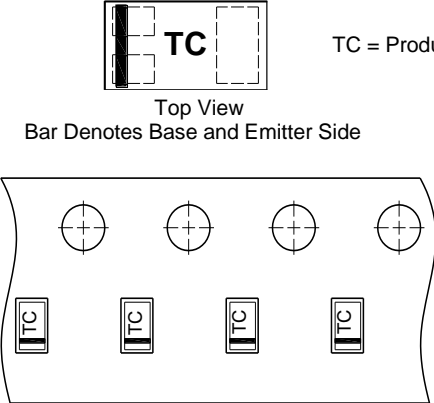
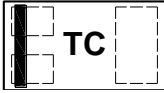
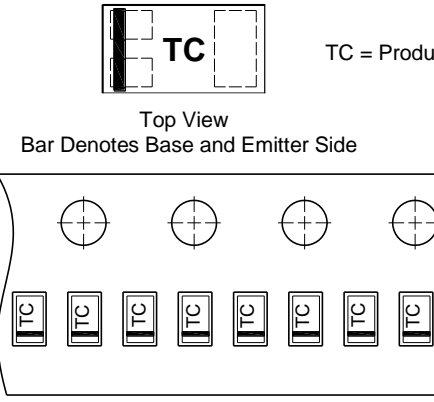
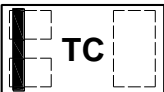

 Top View  
Device Schematic

## Ordering Information (Note 4)

Orderable Part Number	Package	Marking Code	Reel Size (inches)	Tape Width (mm)	Packing	
					Qty.	Carrier
DSS2540M-7	X1-DFN1006-3	TC	7	8mm	3,000	Reel
DSS2540M-7B	X1-DFN1006-3	TC	7	8mm	10,000	Reel

- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
  2. See <https://www.diodes.com/quality/lead-free/> 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 <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

**Marking Information**

<p><b>DSS2540M-7</b></p>	 <p>  <span style="margin-left: 10px;">TC = Product Type Marking Code</span> </p> <p>             Top View              Bar Denotes Base and Emitter Side         </p>
<p><b>DSS2540M-7B</b></p>	 <p>  <span style="margin-left: 10px;">TC = Product Type Marking Code</span> </p> <p>             Top View              Bar Denotes Base and Emitter Side         </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.)

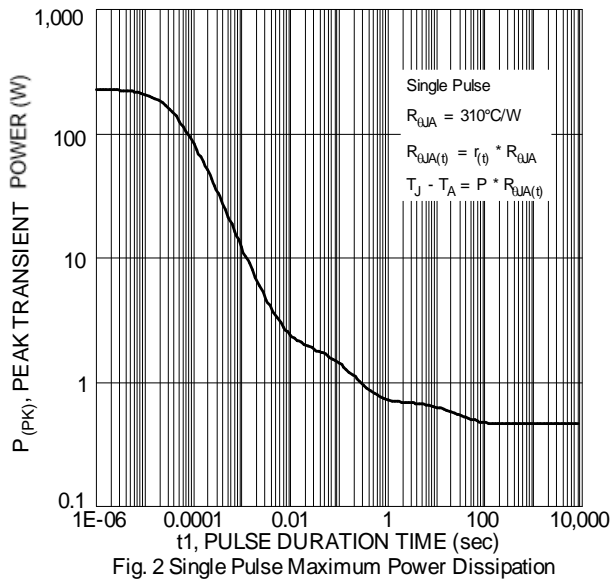
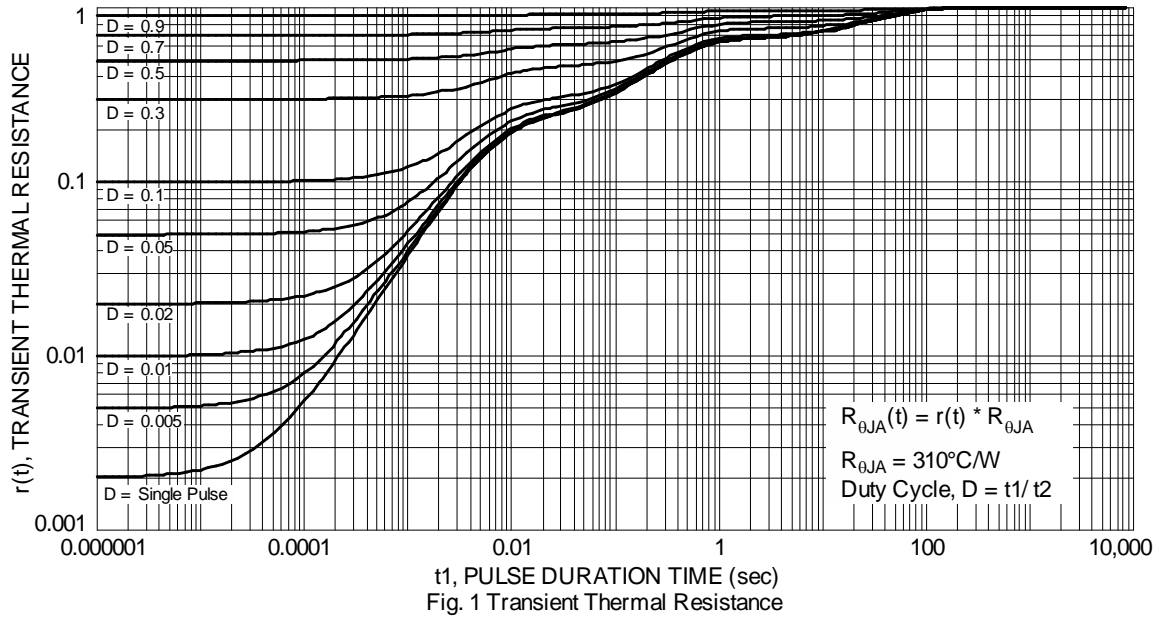
Characteristic	Symbol	Value	Unit
Power Dissipation	P <sub>D</sub>	(Note 5) 400	mW
		(Note 6) 1000	
Thermal Resistance, Junction to Ambient	R <sub>θJA</sub>	(Note 5) 310	°C/W
		(Note 6) 120	
Thermal Resistance, Junction to Lead	R <sub>θJL</sub>	120	°C/W
Operating and Storage and Temperature Range	T <sub>J</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:
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** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS</b>						
Collector-Base Breakdown Voltage	$BV_{CB0}$	40	—	—	V	$I_C = 100\mu\text{A}, I_E = 0$
Collector-Emitter Breakdown Voltage (Note 9)	$BV_{CEO}$	40	—	—	V	$I_C = 10\text{mA}, I_B = 0$
Emitter-Base Breakdown Voltage	$BV_{EBO}$	6	—	—	V	$I_E = 100\mu\text{A}, I_C = 0$
Collector Cutoff Current	$I_{CBO}$	—	—	100 50	nA $\mu\text{A}$	$V_{CB} = 30\text{V}, I_E = 0$ $V_{CB} = 30\text{V}, I_E = 0, T_A = +150^\circ\text{C}$
Emitter Cutoff Current	$I_{EBO}$	—	—	100	nA	$V_{EB} = 5\text{V}, I_C = 0$
<b>ON CHARACTERISTICS (Note 9)</b>						
DC Current Gain	$h_{FE}$	200 150 50	— — —	— — —	—	$V_{CE} = 2\text{V}, I_C = 10\text{mA}$ $V_{CE} = 2\text{V}, I_C = 100\text{mA}$ $V_{CE} = 2\text{V}, I_C = 500\text{mA}$
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	— — — —	— — — —	50 100 200 250	mV	$I_C = 10\text{mA}, I_B = 0.5\text{mA}$ $I_C = 100\text{mA}, I_B = 5\text{mA}$ $I_C = 200\text{mA}, I_B = 10\text{mA}$ $I_C = 500\text{mA}, I_B = 50\text{mA}$
Collector-Emitter Saturation Resistance	$R_{CE(sat)}$	—	—	500	$\text{m}\Omega$	$I_C = 500\text{mA}, I_B = 50\text{mA}$
Base-Emitter Saturation Voltage	$V_{BE(sat)}$	—	—	1.2	V	$I_C = 500\text{mA}, I_B = 50\text{mA}$
Base-Emitter Turn On Voltage	$V_{BE(on)}$	—	—	1.1	V	$V_{CE} = 2\text{V}, I_C = 100\text{mA}$
<b>SMALL SIGNAL CHARACTERISTICS</b>						
Output Capacitance	$C_{obo}$	—	—	6	pF	$V_{CB} = 10\text{V}, f = 1.0\text{MHz}$
Current Gain-Bandwidth Product	$f_T$	250	300	—	MHz	$V_{CE} = 5\text{V}, I_C = 100\text{mA}, f = 100\text{MHz}$

Note: 9. 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.)

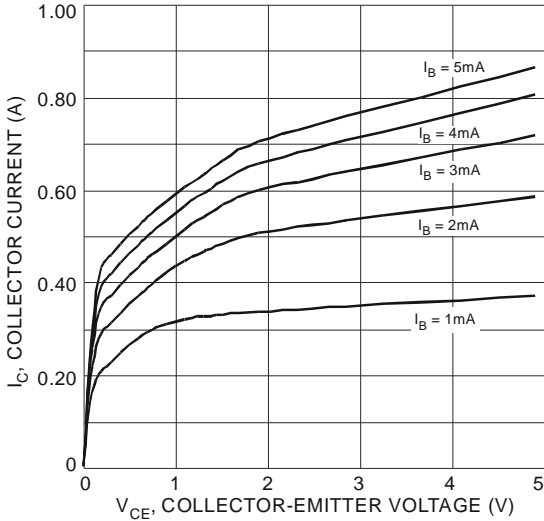


Fig. 3 Typical Collector Current vs. Collector-Emitter Voltage

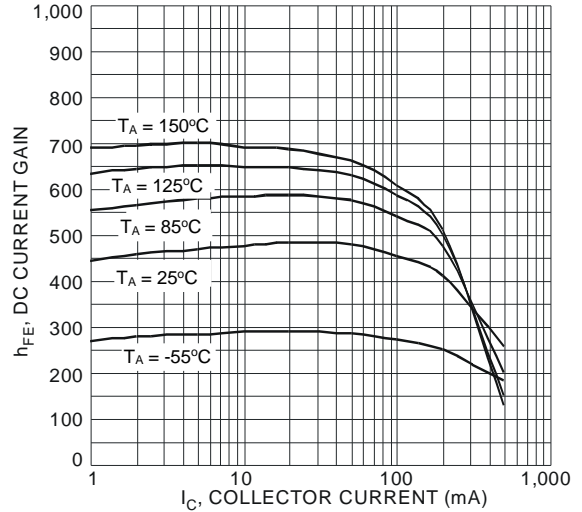


Fig. 4 Typical DC Current Gain vs. Collector Current

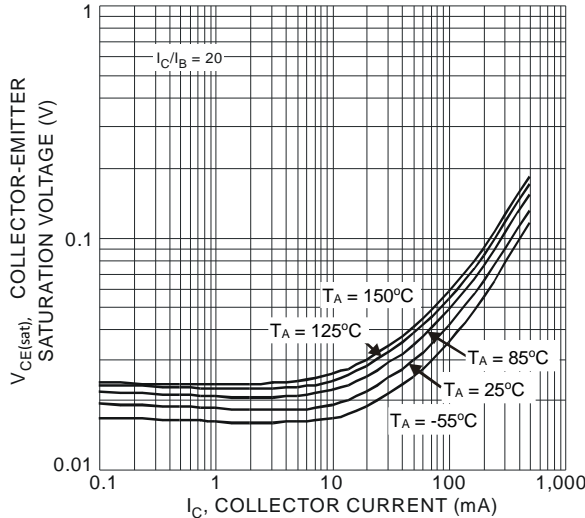


Fig. 5 Typical Collector-Emitter Saturation Voltage vs. Collector Current

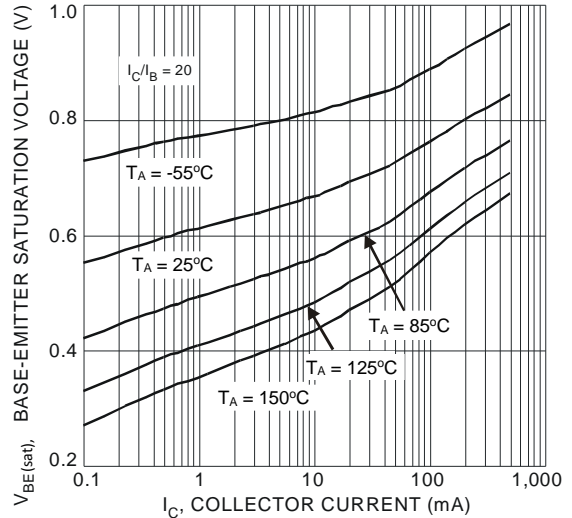


Fig. 6 Typical Base-Emitter Saturation Voltage vs. Collector Current

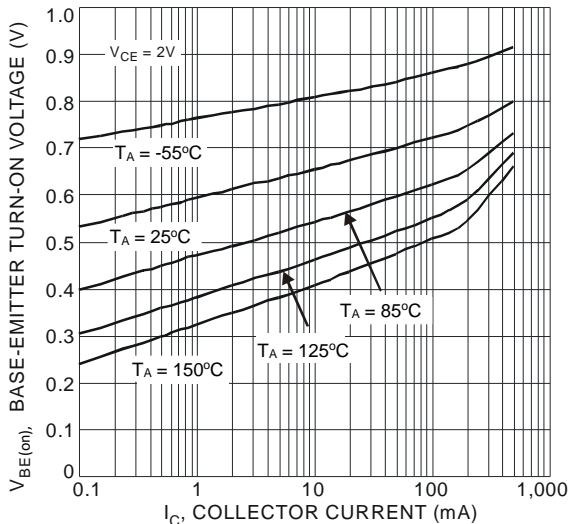


Fig. 7 Typical Base-Emitter Turn-On Voltage vs. Collector Current

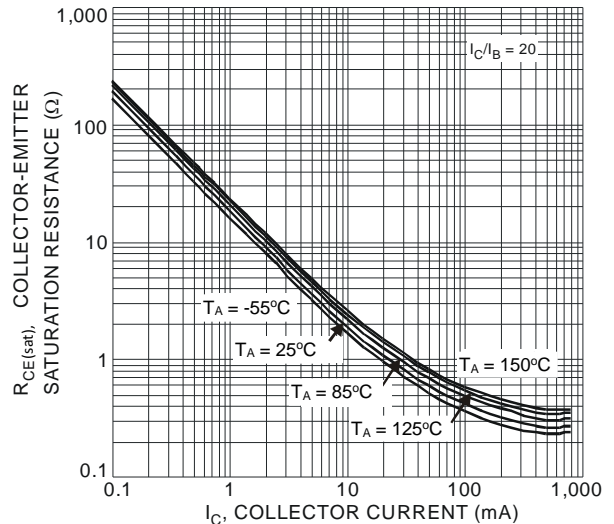
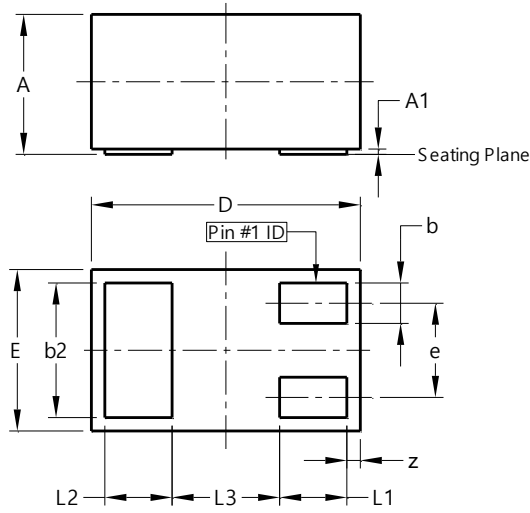


Fig. 8 Typical Collector-Emitter Saturation Resistance vs. Collector Current

**Package Outline Dimensions**

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

**X1-DFN1006-3**

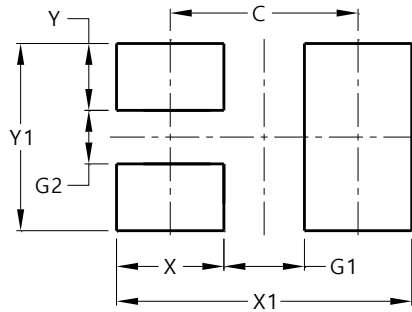


X1-DFN1006-3			
Dim	Min	Max	Typ
A	0.47	0.53	0.50
A1	0.00	0.05	0.03
b	0.10	0.20	0.15
b2	0.45	0.55	0.50
D	0.95	1.075	1.00
E	0.55	0.675	0.60
e	-	-	0.35
L1	0.20	0.30	0.25
L2	0.20	0.30	0.25
L3	-	-	0.40
z	0.02	0.08	0.05
<b>All Dimensions in mm</b>			

**Suggested Pad Layout**

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

**X1-DFN1006-3**



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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