



**THE DATASHEET OF  
DCP52-13**



### Features

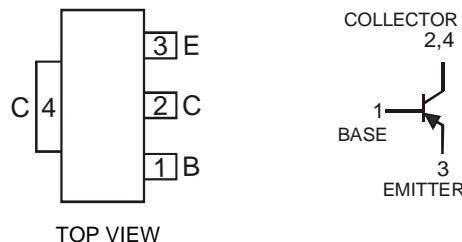
- Epitaxial Planar Die Construction
- Complementary NPN Type Available (DCP55)
- Ideally Suited for Automated Assembly Processes
- Ideal for Medium Power Switching or Amplification Applications
- **Lead Free By Design/RoHS Compliant (Note 1)**
- **"Green" Device (Note 2)**



SOT-223

### 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-020C
- Terminals: Finish – Matte Tin annealed over Copper leadframe (Lead Free Plating). Solderable per MIL-STD-202, Method 208
- Terminal Connections: See Diagram
- Marking & Type Code Information: See Page 3
- Ordering Information: See Page 3
- Weight: 0.115 grams (approximate)



Schematic and Pin Configuration

### Maximum Ratings @ T<sub>A</sub> = 25°C unless otherwise specified

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V <sub>CB0</sub>	-60	V
Collector-Emitter Voltage	V <sub>CEO</sub>	-60	V
Emitter-Base Voltage	V <sub>EBO</sub>	-5	V
Peak Pulse Current	I <sub>CM</sub>	-1.5	A
Continuous Collector Current	I <sub>C</sub>	-1	A

### Thermal Characteristics

Characteristic	Symbol	Value	Unit
Power Dissipation @ T <sub>A</sub> = 25°C	P <sub>d</sub>	1 (Note 3)	W
		2 (Note 4)	
Operating and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-55 to +150	°C
Thermal Resistance Junction to Ambient Air @ T <sub>A</sub> = 25°C (Note 3)	R <sub>θJA</sub>	125	°C/W

### Electrical Characteristics @ T<sub>A</sub> = 25°C unless otherwise specified

Characteristic	Symbol	Min	Typ	Max	Unit	Conditions
<b>OFF CHARACTERISTICS (Note 5)</b>						
Collector-Base Breakdown Voltage	V <sub>(BR)CBO</sub>	-60	—	—	V	I <sub>C</sub> = -100μA, I <sub>E</sub> = 0A
Collector-Emitter Breakdown Voltage	V <sub>(BR)CEO</sub>	-60	—	—	V	I <sub>C</sub> = -10mA, I <sub>B</sub> = 0A
Emitter-Base Breakdown Voltage	V <sub>(BR)EBO</sub>	-5	—	—	V	I <sub>E</sub> = -10μA, I <sub>C</sub> = 0A
Collector Cut-Off Current	I <sub>CBO</sub>	—	—	-100	nA	V <sub>CB</sub> = -30V, I <sub>E</sub> = 0A
Emitter Cut-Off Current	I <sub>EBO</sub>	—	—	-20	μA	V <sub>CB</sub> = -30V, I <sub>E</sub> = 0A, T <sub>A</sub> = 150°C
Emitter Cut-Off Current	I <sub>EBO</sub>	—	—	-10	μA	V <sub>EB</sub> = -5V, I <sub>C</sub> = 0A
<b>ON CHARACTERISTICS (Note 5)</b>						
Collector-Emitter Saturation Voltage	V <sub>CE(SAT)</sub>	—	—	-0.5	V	I <sub>C</sub> = -500mA, I <sub>B</sub> = -50mA
Base-Emitter Turn-On Voltage	V <sub>BE(ON)</sub>	—	—	-1.0	V	I <sub>C</sub> = -500mA, V <sub>CE</sub> = -2V
DC Current Gain	h <sub>FE</sub>	40	—	250	—	I <sub>C</sub> = -150mA, V <sub>CE</sub> = -2V
		25	—	—		I <sub>C</sub> = -500mA, V <sub>CE</sub> = -2V
		100	—	250		I <sub>C</sub> = -150mA, V <sub>CE</sub> = -2V
<b>SMALL SIGNAL CHARACTERISTICS</b>						
Transition Frequency	f <sub>T</sub>	—	200	—	MHz	I <sub>C</sub> = -50mA, V <sub>CE</sub> = -5V, f = 100MHz

- Note:
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](http://www.diodes.com/products/lead_free/index.php).
  3. Device mounted on FR-4 PCB pad layout as shown on page 4 or on Diodes, Inc. suggested pad layout document AP02001, which can be found on our website at <http://www.diodes.com/datasheets/ap02001.pdf>.
  4. Device mounted on Polyimide PCB with a copper area of 1.8cm<sup>2</sup>.
  5. Measured under pulsed conditions. Pulse width = 300μs. Duty cycle ≤2%
  - 6.

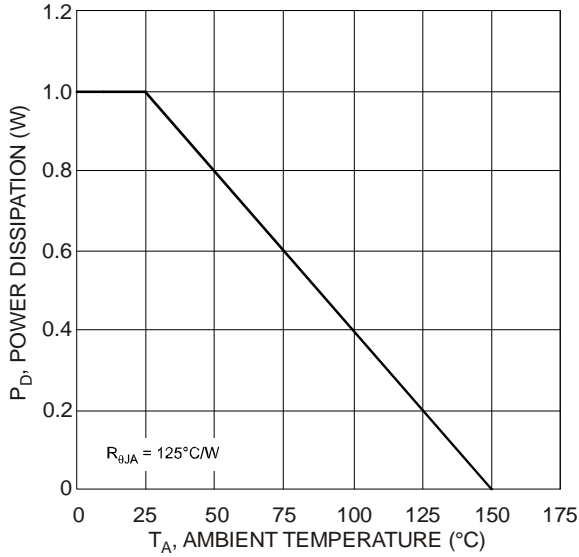


Fig. 1 Power Dissipation vs. Ambient Temperature (Note 3)

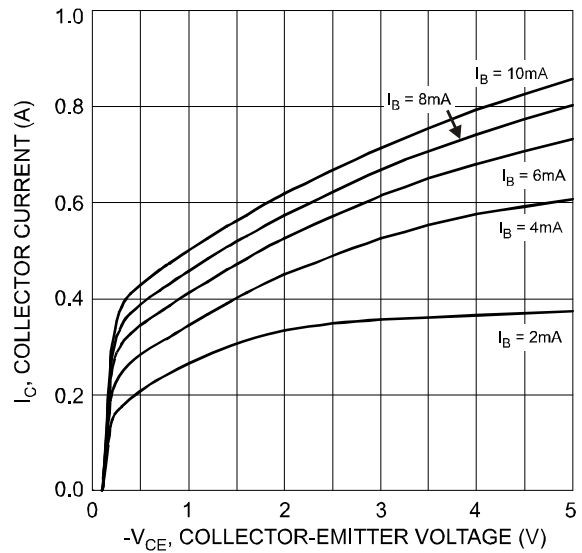


Fig. 2 Typical Collector Current vs. Collector-Emitter Voltage

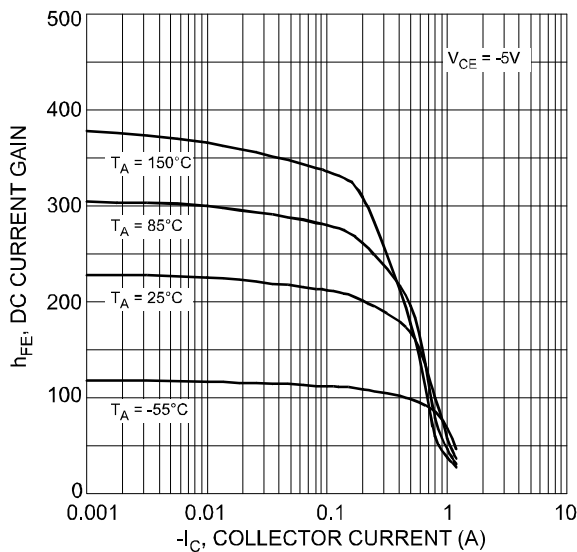


Fig. 3 Typical DC Current Gain vs. Collector Current

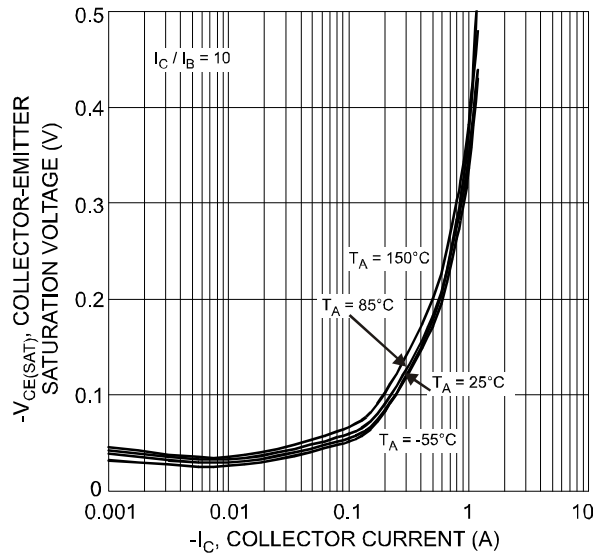


Fig. 4 Typical Collector-Emitter Saturation Voltage vs. Collector Current

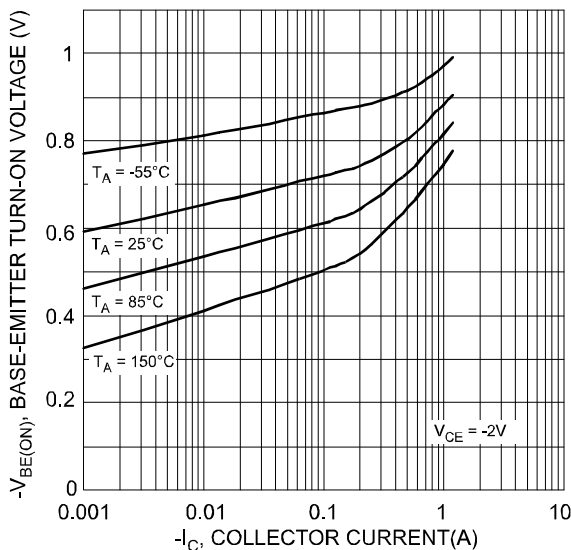


Fig. 5. Typical Base-Emitter Turn-On Voltage vs. Collector Current

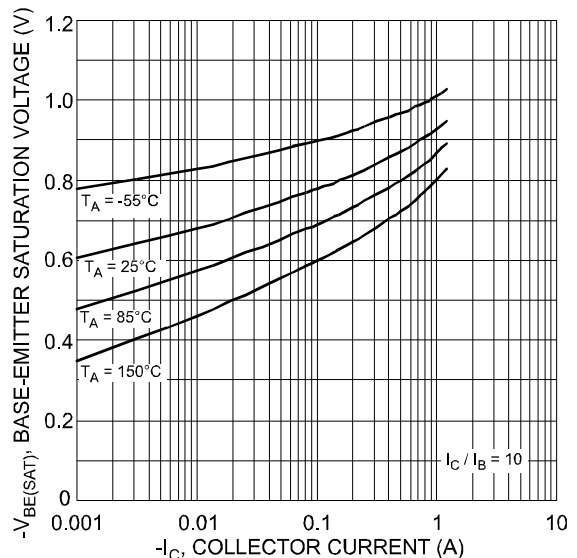
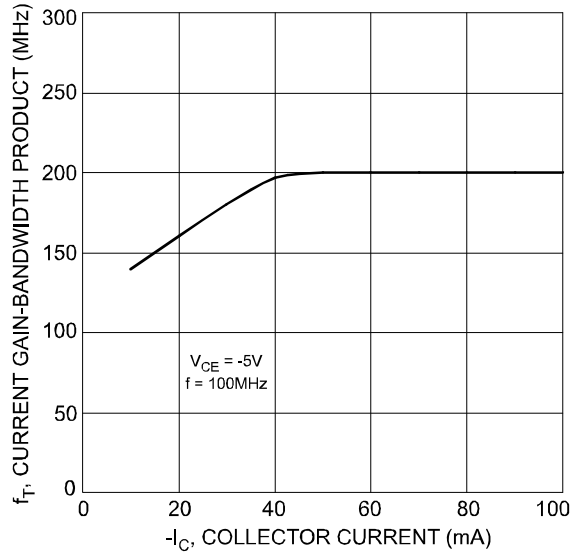
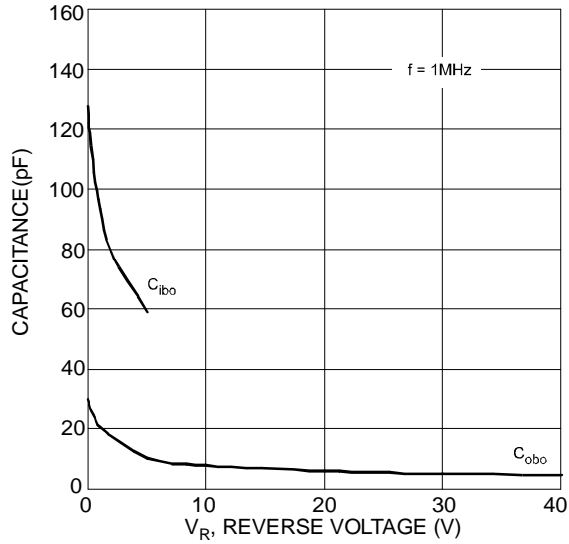


Fig. 6 Typical Base-Emitter Saturation Voltage vs. Collector Current

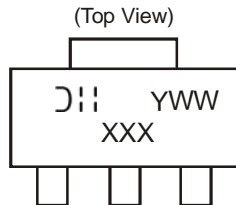


### Ordering Information (Note 6)

Part Number	Case	Packaging
DCP52-13	SOT-223	2500 / Tape & Reel
DCP52-16-13	SOT-223	2500 / Tape & Reel

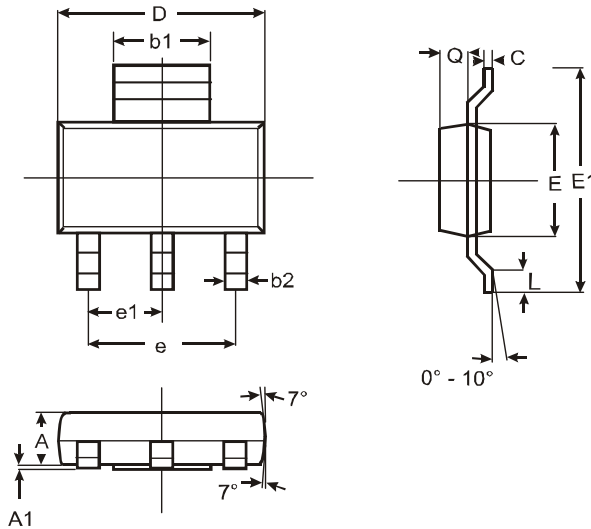
Note: 6. For packaging details, please visit our website at <http://www.diodes.com/datasheets/ap02007.pdf>.

### Marking Information

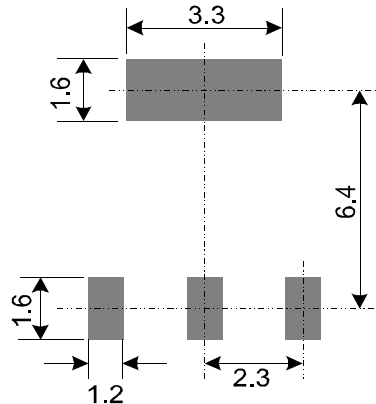


$\text{D}|||$  = Manufacturer's code marking  
 XXX = Product type marking code Ex: P16 = DCP52  
 P16-16 = DCP52-16  
 YWW = Date code marking  
 Y = Last digit of year ex: 7 = 2007  
 WW = Week code 01 - 52

### 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: (Based on IPC-SM-782)**

(Unit:mm)

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