



**THE DATASHEET OF**  
**DCX53-13**



### Features

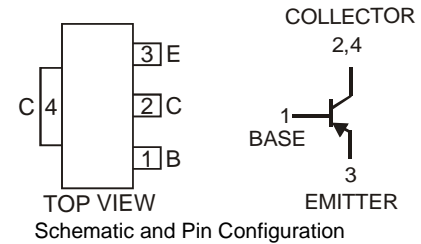
- Epitaxial Planar Die Construction
- Complementary NPN Type Available (DCX56)
- Ideally Suited for Automated Assembly Processes
- Ideal for Medium Power Switching or Amplification Applications
- **Lead Free By Design/RoHS Compliant (Note 1)**
- **"Green" Device (Note 2)**



SOT89-3L

### Mechanical Data

- Case: SOT89-3L
- 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
- Marking & Type Code Information: See Page 3
- Ordering Information: See Page 3
- Weight: 0.072 grams (approximate)



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

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	$V_{CB0}$	-100	V
Collector-Emitter Voltage	$V_{CEO}$	-80	V
Emitter-Base Voltage	$V_{EBO}$	-5	V
Peak Pulse Current	$I_{CM}$	-1.5	A
Continuous Collector Current	$I_C$	-1	A

### Thermal Characteristics

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

### Electrical Characteristics @ $T_A = 25^\circ\text{C}$ unless otherwise specified

Characteristic	Symbol	Min	Typ	Max	Unit	Test Conditions	
<b>OFF CHARACTERISTICS (Note 4)</b>							
Collector-Base Breakdown Voltage	$V_{(BR)CBO}$	-100	—	—	V	$I_C = -100\mu\text{A}, I_E = 0$	
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	-80	—	—	V	$I_C = -10\text{mA}, I_B = 0$	
Emitter-Base Breakdown Voltage	$V_{(BR)EBO}$	-5	—	—	V	$I_E = -10\mu\text{A}, I_C = 0$	
Collector Cutoff Current	$I_{CBO}$	—	—	-100 -20	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 4)</b>							
Collector-Emitter Saturation Voltage	$V_{CE(SAT)}$	—	—	-0.5	V	$I_C = -500\text{mA}, I_B = -50\text{mA}$	
Base-Emitter Turn-On Voltage	$V_{BE(SAT)}$	—	—	-1.0	V	$I_C = -500\text{mA}, V_{CE} = -2\text{V}$	
DC Current Gain	h <sub>FE</sub>	DCX53, DCX53-16	63	—	—	$I_C = -5\text{mA}, V_{CE} = -2\text{V}$	
			40	—	—	$I_C = -500\text{mA}, V_{CE} = -2\text{V}$	
		DCX53	63	—	250	—	$I_C = -150\text{mA}, V_{CE} = -2\text{V}$
			100	—	250	—	$I_C = -150\text{mA}, V_{CE} = -2\text{V}$
<b>SMALL SIGNAL CHARACTERISTICS</b>							
Current Gain-Bandwidth Product	$f_T$	—	200	—	MHz	$I_C = -50\text{mA}, V_{CE} = -5\text{V}, f = 100\text{MHz}$	
Output Capacitance	$C_{obo}$	—	—	25	pF	$V_{CB} = -10\text{V}, f = 1\text{MHz}$	

- 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](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>.
  4. Measured under pulsed conditions. Pulse width = 300 $\mu\text{s}$ . Duty cycle  $\leq 2\%$ .

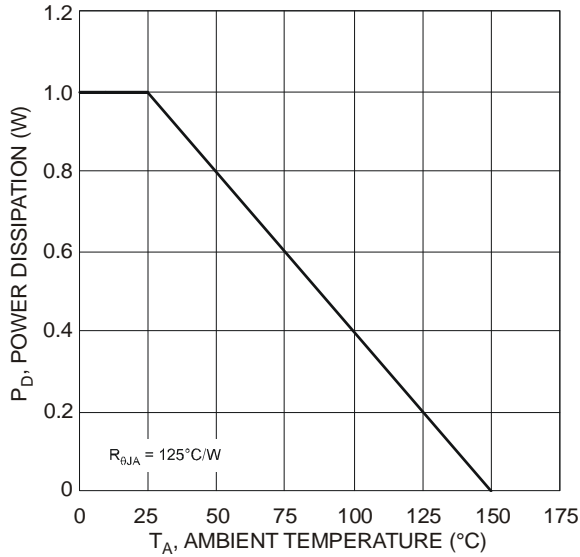


Fig. 1 Power Dissipation vs. Ambient Temperature (Note 3)

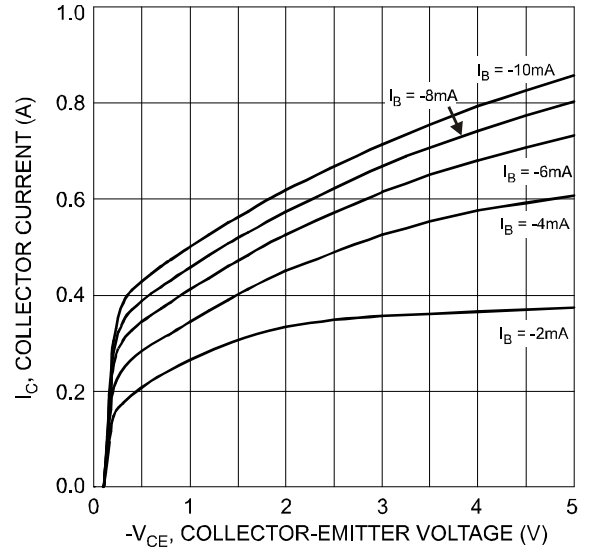


Fig. 2 Typical Collector Current vs. Collector-Emitter Voltage

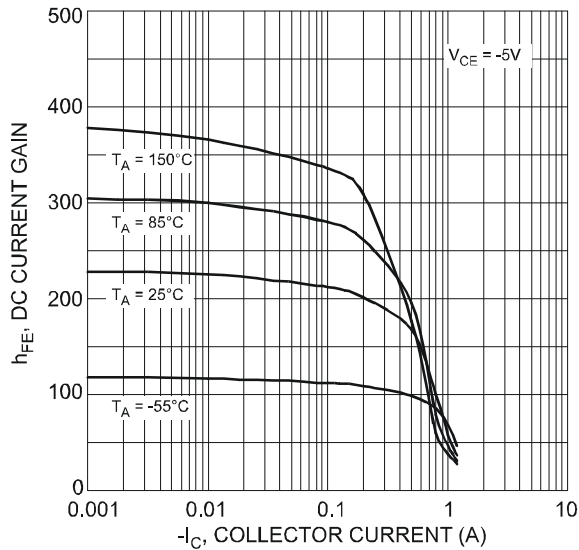


Fig. 3 Typical DC Current Gain vs. Collector Current

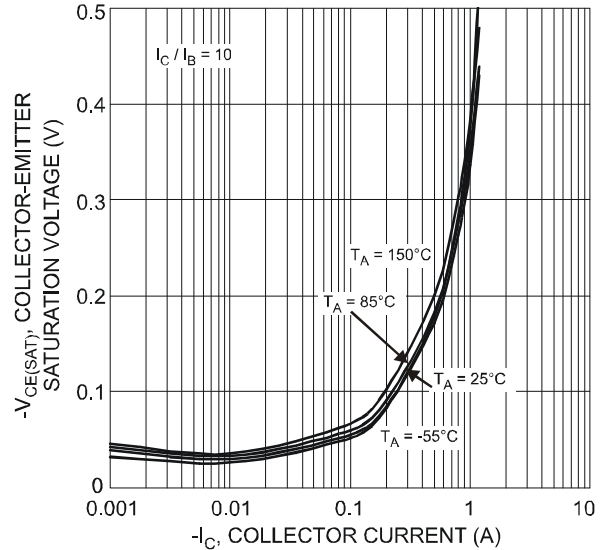


Fig. 4 Typical Collector-Emitter Saturation Voltage vs. Collector Current

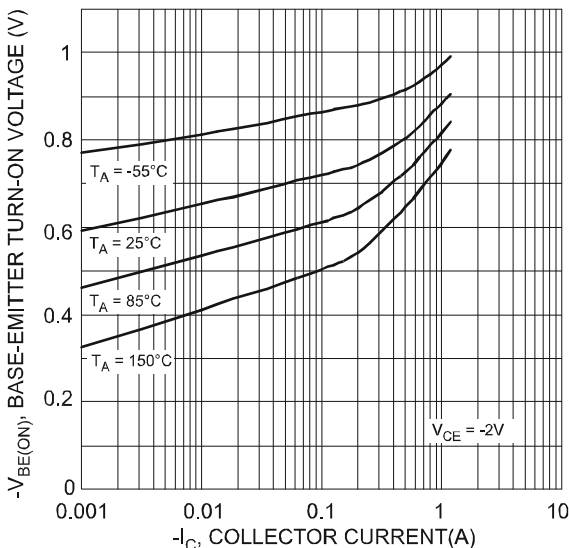


Fig. 5. Typical Base-Emitter Turn-On Voltage vs. Collector Current

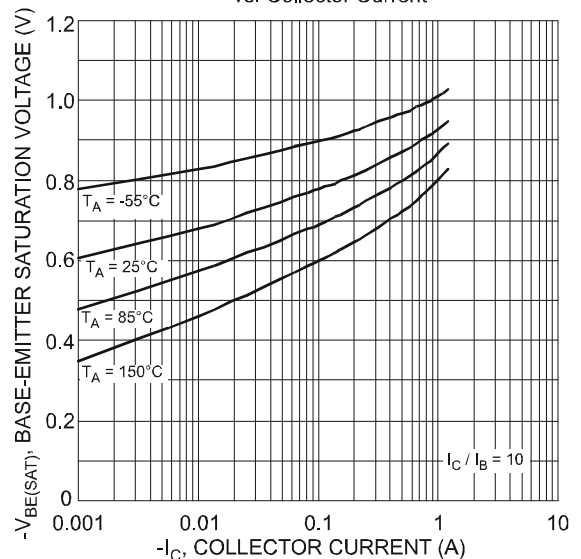


Fig. 6 Typical Base-Emitter Saturation Voltage vs. Collector Current

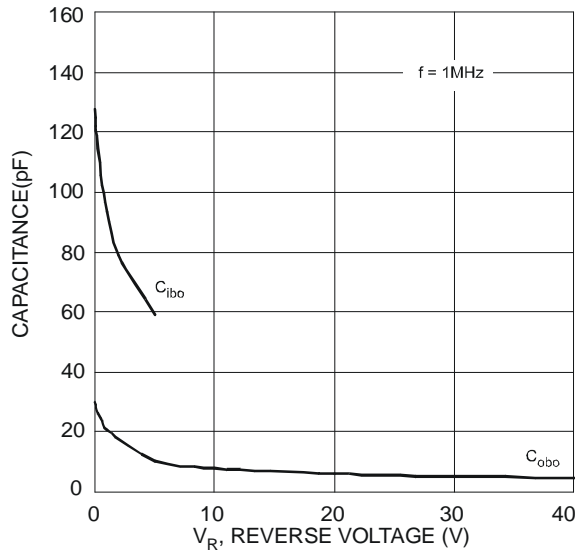


Fig. 7 Typical Capacitance Characteristics

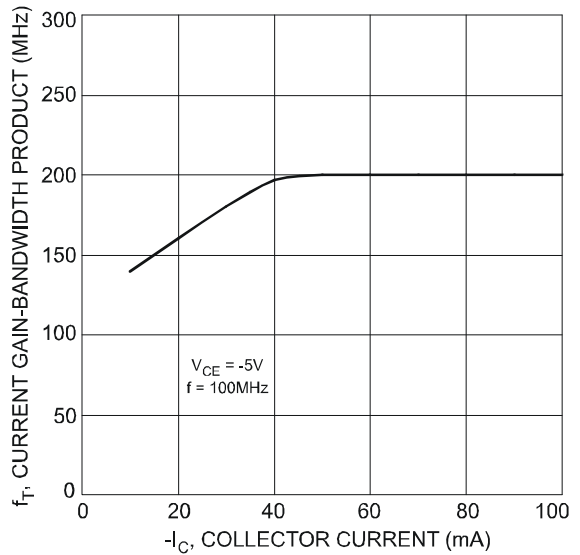


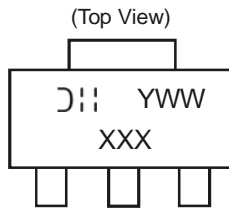
Fig. 8 Typical Gain-Bandwidth Product vs. Collector Current

**Ordering Information** (Note 5)

Device	Packaging	Shipping
DCX53-13	SOT89-3L	2500/Tape & Reel
DCX53-16-13	SOT89-3L	2500/Tape & Reel

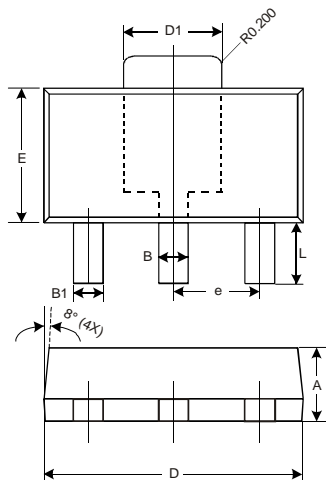
Notes: 5. For packaging details, go to our website at <http://www.diodes.com/ap02007.pdf>.

**Marking Information**



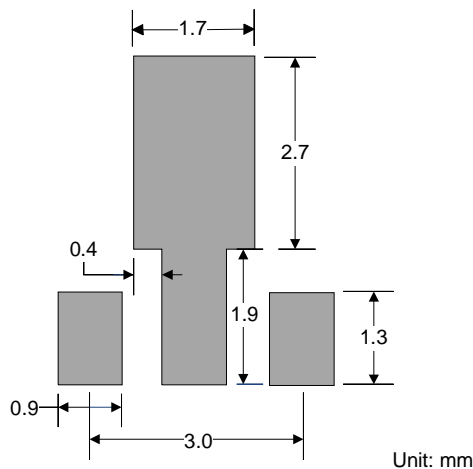
DIII = Manufacturer's code marking  
 XXX = Product type marking code Ex: P18 = DCX53  
 P18-16 = DCX53 -16  
 YWW = Date code marking  
 Y = Last digit of year ex: 7 = 2007  
 WW = Week code 01 - 52

**Package Outline Dimensions**



SOT89-3L			
Dim	Min	Max	Typ
A	1.40	1.60	1.50
B	0.45	0.55	0.50
B1	0.37	0.47	0.42
C	0.35	0.43	0.38
D	4.40	4.60	4.50
D1	1.50	1.70	1.60
E	2.40	2.60	2.50
e	—	—	1.50
H	3.95	4.25	4.10
L	0.90	1.20	1.05
All Dimensions in mm			

## Suggested Pad Layout



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