

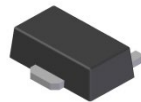
**LOW  $V_{CE(SAT)}$  NPN SURFACE MOUNT TRANSISTOR**

**Features**

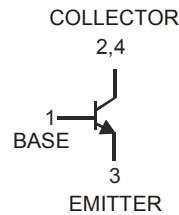
- Epitaxial Planar Die Construction
- Low Collector-Emitter Saturation Resistance  $R_{CE(SAT)} = 75m\Omega$  at 4A
- Complementary PNP Type Available (2DB1386)
- Ideally Suited for Automated Assembly Processes
- Ideal for Medium Power Switching or Amplification Applications
- **Lead Free By Design/RoHS Compliant (Note 1)**
- **"Green" Device (Note 2)**

**Mechanical Data**

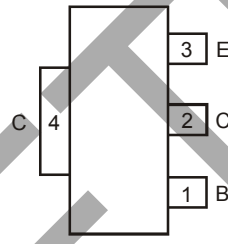
- Case: SOT89-3L
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish — Matte Tin annealed over Copper leadframe (Lead Free Plating). Solderable per MIL-STD-202, Method 208
- Marking Information: See Page 3
- Ordering Information: See Page 3
- Weight: 0.055 grams (approximate)



Top View



Device Schematic



Top View  
Pin Out Configuration

**Maximum Ratings** @ $T_A = 25^\circ C$  unless otherwise specified

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	$V_{CBO}$	50	V
Collector-Emitter Voltage	$V_{CEO}$	20	V
Emitter-Base Voltage	$V_{EBO}$	6	V
Peak Pulse Current	$I_{CM}$	10	A
Continuous Collector Current	$I_C$	5	A

**Thermal Characteristics**

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

- 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 Diodes Inc. suggested pad layout document AP02001, which can be found on our website at <http://www.diodes.com/datasheets/ap02001.pdf>.

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

Characteristic	Symbol	Min	Typ	Max	Unit	Conditions
<b>OFF CHARACTERISTICS (Note 4)</b>						
Collector-Base Breakdown Voltage	$V_{(BR)CBO}$	50	—	—	V	$I_C = 50\mu\text{A}, I_E = 0$
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	20	—	—	V	$I_C = 1\text{mA}, I_B = 0$
Emitter-Base Breakdown Voltage	$V_{(BR)EBO}$	6	—	—	V	$I_E = 50\mu\text{A}, I_C = 0$
Collector Cut-Off Current	$I_{CBO}$	—	—	0.5	$\mu\text{A}$	$V_{CB} = 40\text{V}, I_E = 0$
Emitter Cut-Off Current	$I_{EBO}$	—	—	0.5	$\mu\text{A}$	$V_{EB} = 5\text{V}, I_C = 0$
<b>ON CHARACTERISTICS (Note 4)</b>						
Collector-Emitter Saturation Voltage	$V_{CE(SAT)}$	—	0.3	1.0	V	$I_C = 4\text{A}, I_B = 0.1\text{A}$
DC Current Gain	$h_{FE}$	180	—	390	—	$I_C = 0.5\text{A}, V_{CE} = 2\text{V}$
<b>SMALL SIGNAL CHARACTERISTICS</b>						
Transition Frequency	$f_T$	—	220	—	MHz	$V_{CE} = 6\text{V}, I_E = -50\text{mA}$ $f = 100\text{MHz}$
Output Capacitance	$C_{ob}$	—	14	—	pF	$V_{CB} = 20\text{V}, I_E = 0$ , $f = 1\text{MHz}$

Notes: 4. Measured under pulsed conditions. Pulse width = 300 $\mu\text{s}$ . Duty cycle  $\leq 2\%$ .

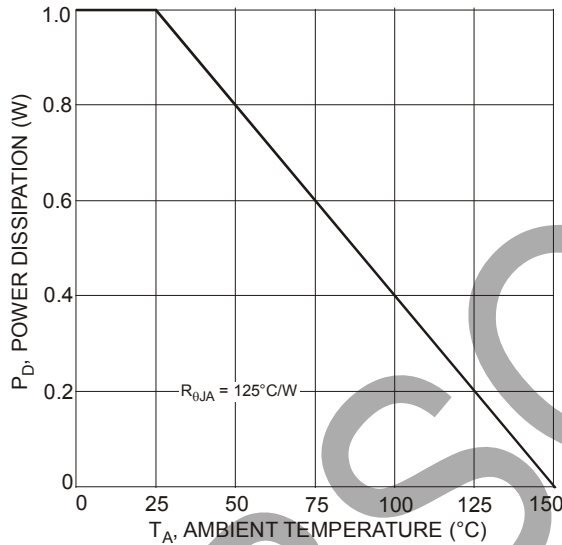


Fig. 1 Power Dissipation vs. Ambient Temperature (Note 3)

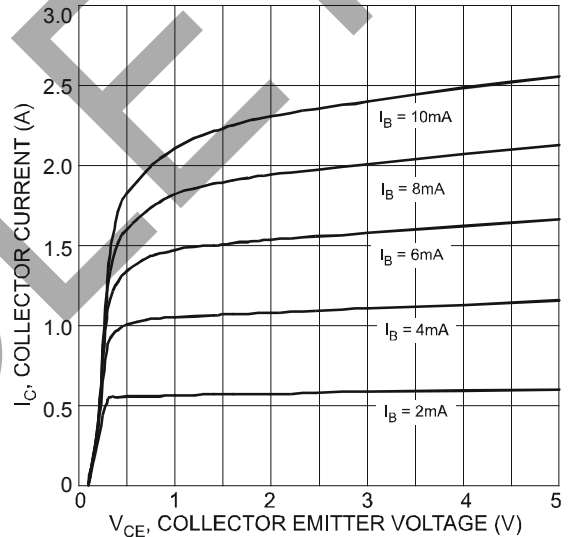


Fig. 2 Typical Collector Current vs. Collector-Emitter Voltage

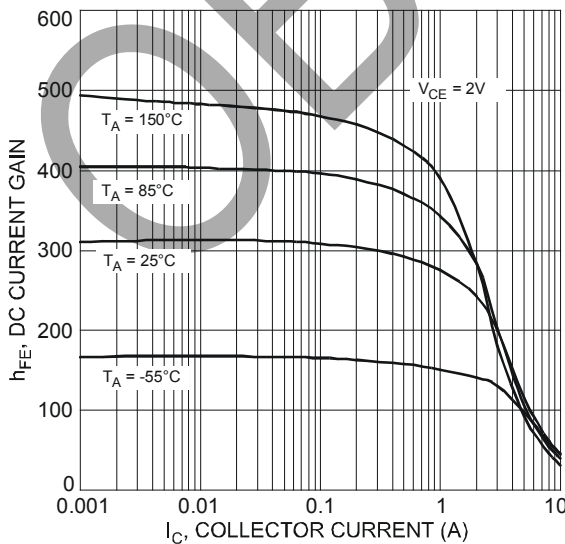


Fig. 3 Typical DC Current Gain vs. Collector Current

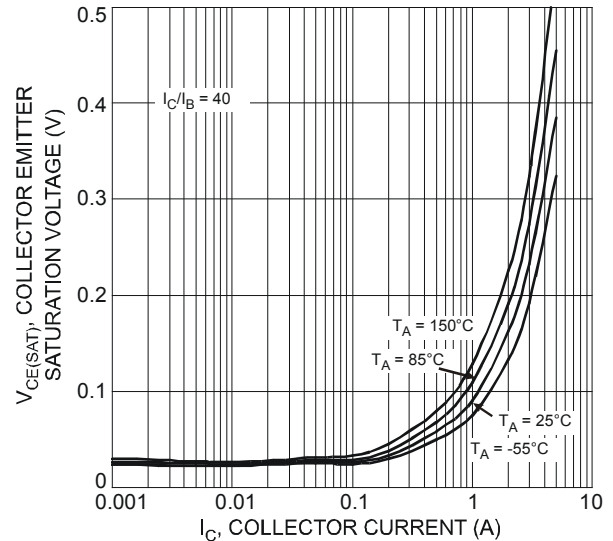


Fig. 4 Typical Collector-Emitter Saturation Voltage vs. Collector Current

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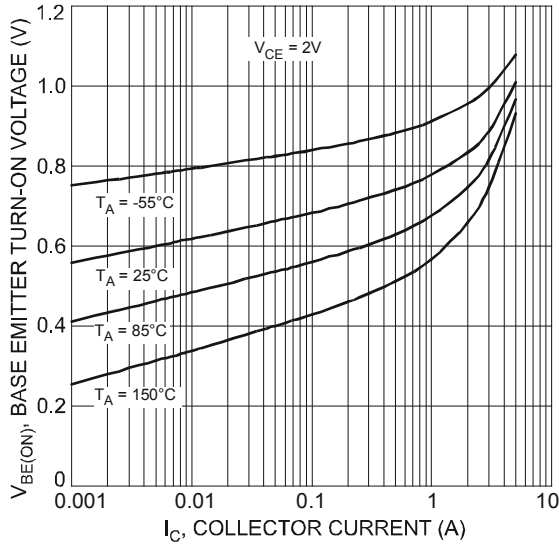


Fig. 5 Typical Base-Emitter Turn-On Voltage vs. Collector Current

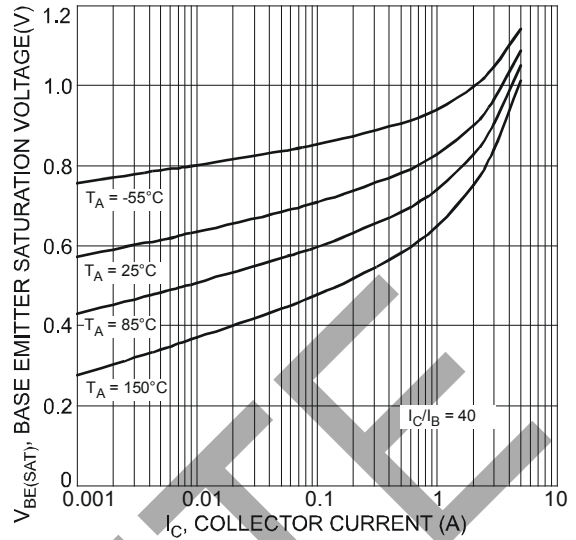


Fig. 6 Typical Base-Emitter Saturation Voltage vs. Collector Current

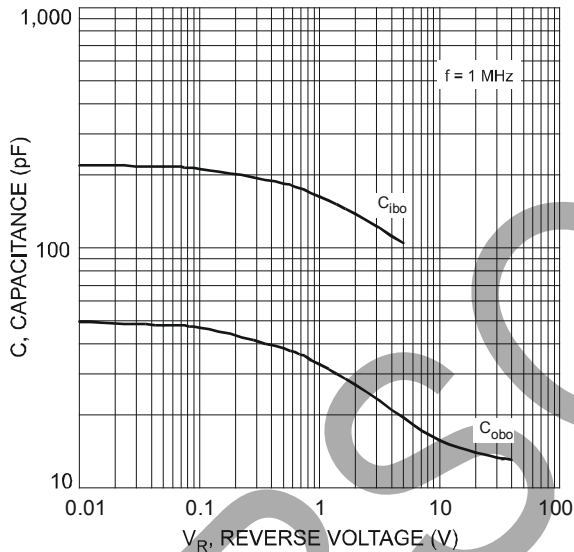


Fig. 7 Typical Junction Capacitance Characteristics

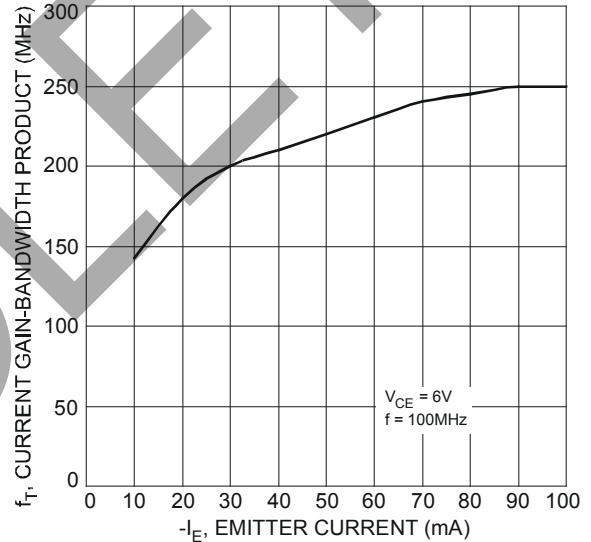


Fig. 8 Typical Gain-Bandwidth Product vs. Emitter Current

**Ordering Information** (Note 5)

Part Number	Case	Packaging
2DD2098R-13	SOT89-3L	2500/Tape & Reel

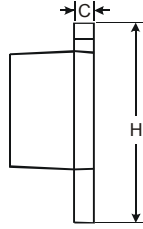
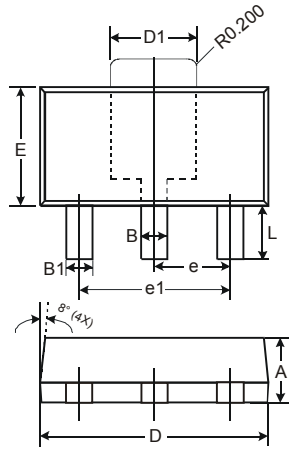
Notes: 5. For packaging details, go to our website at <http://www.diodes.com/datasheets/ap02007.pdf>.

**Marking Information**



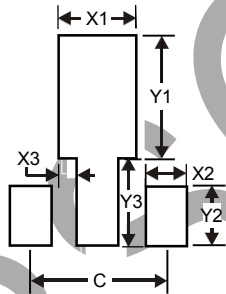
KN3R = Product Type Marking Code  
YWW = Date Code Marking  
Y = Last digit of year (ex: 7 = 2007)  
WW = Week code (01 - 53)

**Package Outline Dimensions**



SOT89-3L		
Dim	Min	Max
A	1.40	1.60
B	0.44	0.62
B1	0.35	0.54
C	0.35	0.43
D	4.40	4.60
D1	1.52	1.83
E	2.29	2.60
e	1.50 Typ	
e1	3.00 Typ	
H	3.94	4.25
L	0.89	1.20
All Dimensions in mm		

**Suggested Pad Layout**



Dimensions	Value (in mm)
X1	1.7
X2	0.9
X3	0.4
Y1	2.7
Y2	1.3
Y3	1.9
C	3.0

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