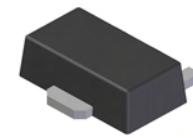


## Features

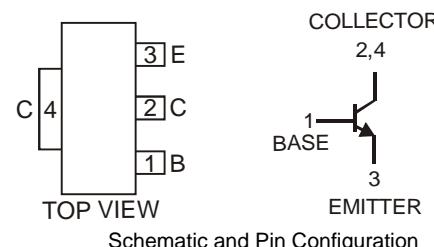
- Epitaxial Planar Die Construction
- Complementary PNP Type Available (2DB1188)
- Ideally Suited for Automated Assembly Processes
- Ideal for Medium Power Switching or Amplification Applications
- Lead Free By Design/RoHS Compliant (Note 1)**
- "Green" Device (Note 2)**



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	$V_{CBO}$	40	V
Collector-Emitter Voltage	$V_{CEO}$	32	V
Emitter-Base Voltage	$V_{EBO}$	5	V
Peak Pulse Current	$I_{CM}$	2.5	A
Continuous Collector Current	$I_C$	2	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 (Note 3) @ $T_A = 25^\circ\text{C}$	$R_{\theta JA}$	125	°C/W
Operating and Storage Temperature Range	$T_J, T_{STG}$	-55 to +150	°C

## 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	$V_{(BR)CBO}$	40	—	—	V	$I_C = 50\mu\text{A}, I_E = 0$
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	32	—	—	V	$I_C = 1\text{mA}, I_B = 0$
Emitter-Base Breakdown Voltage	$V_{(BR)EBO}$	5	—	—	V	$I_E = 50\mu\text{A}, I_C = 0$
Collector Cut-Off Current	$I_{CBO}$	—	—	1	μA	$V_{CB} = 20\text{V}, I_E = 0$
Emitter Cut-Off Current	$I_{EBO}$	—	—	1	μA	$V_{EB} = 4\text{V}, I_C = 0$
<b>ON CHARACTERISTICS (Note 4)</b>						
Collector-Emitter Saturation Voltage	$V_{CE(\text{SAT})}$	—	0.3	0.8	V	$I_C = 2\text{A}, I_B = 0.2\text{A}$
DC Current Gain	$h_{FE}$	82	—	180	—	$V_{CE} = 3\text{V}, I_C = 0.5\text{A}$
		120	—	270	—	
		180	—	390	—	
<b>SMALL SIGNAL CHARACTERISTICS</b>						
Transition Frequency	$f_T$	—	220	—	MHz	$V_{CE} = 5\text{V}, I_E = -50\text{mA}, f = 100\text{MHz}$
Output Capacitance	$C_{ob}$	—	13	—	pF	$V_{CB} = 10\text{V}, I_E = 0, f = 1\text{MHz}$

Notes:

- No purposefully added lead.
- 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).
- 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>.
- Measured under pulsed conditions. Pulse width = 300μs. Duty cycle ≤2%.

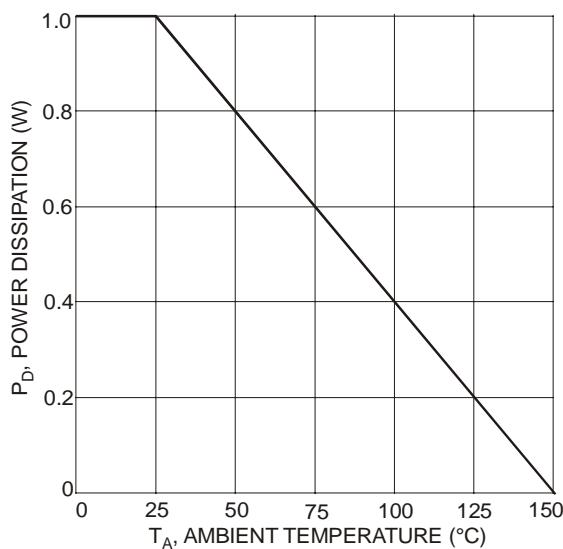


Fig. 1 Power Dissipation vs.  
Ambient Temperature (Note 3)

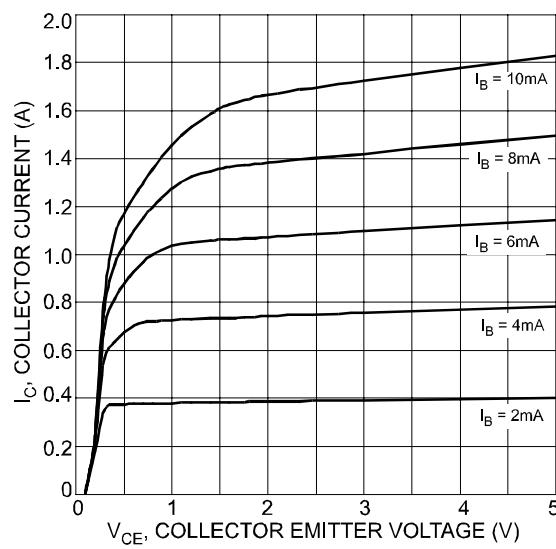


Fig. 2 Typical Collector Current  
vs. Collector-Emitter Voltage

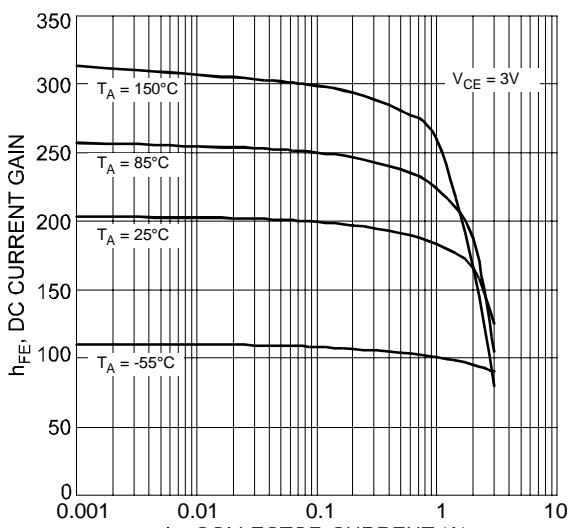


Fig. 3 Typical DC Current Gain  
vs. Collector Current (2DD1766Q)

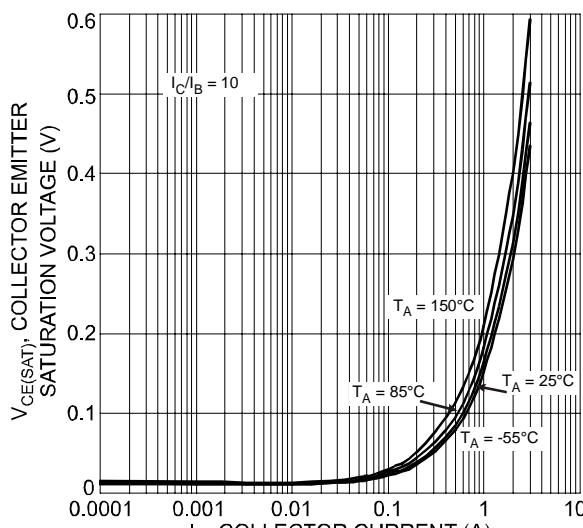


Fig. 4 Typical Collector-Emitter Saturation Voltage  
vs. Collector Current

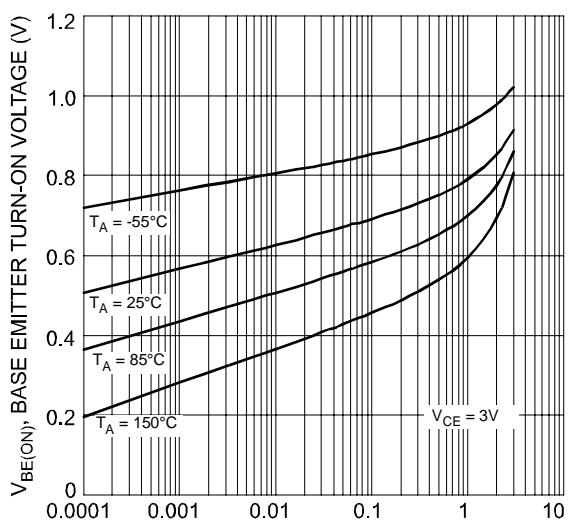


Fig. 5 Typical Base-Emitter Turn-On Voltage  
vs. Collector Current

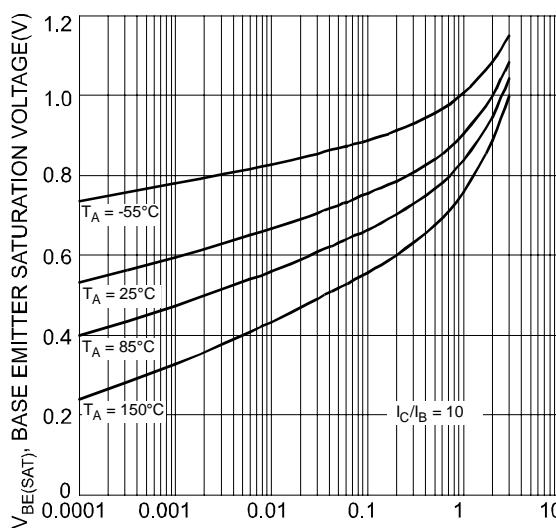


Fig. 6 Typical Base-Emitter Saturation Voltage  
vs. Collector Current

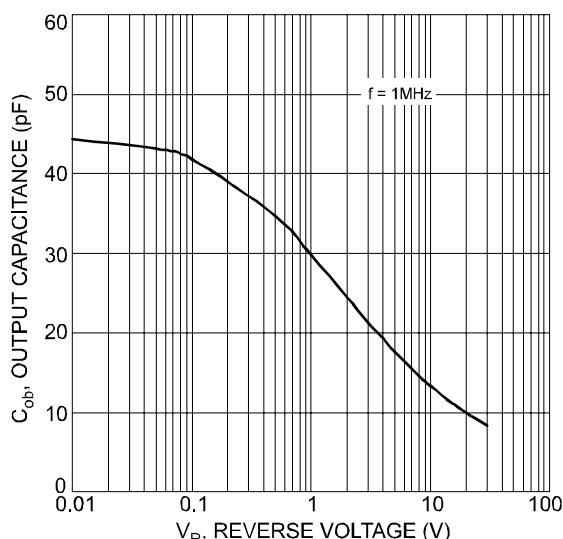


Fig. 7 Typical Output Capacitance Characteristics

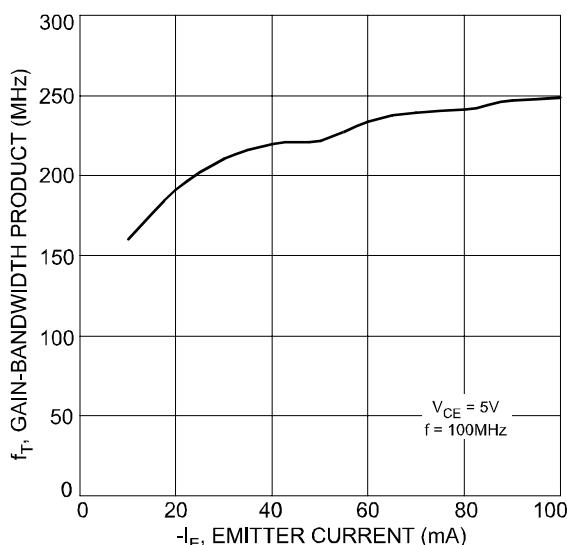


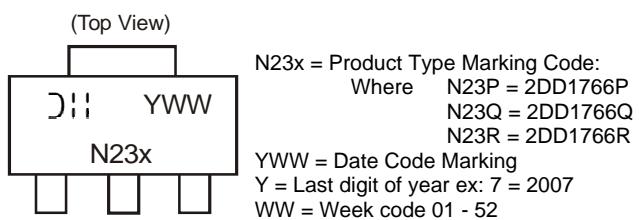
Fig. 8 Typical Gain-Bandwidth Product vs. Emitter Current

### Ordering Information (Note 5)

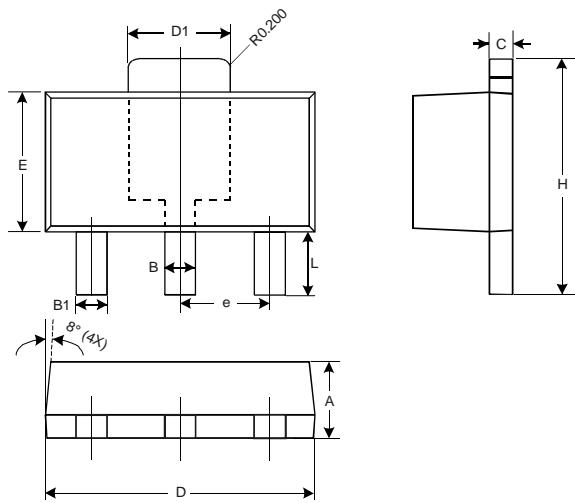
Device	Packaging	Shipping
2DD1766P-13	SOT89-3L	2500/Tape & Reel
2DD1766Q-13	SOT89-3L	2500/Tape & Reel
2DD1766R-13	SOT89-3L	2500/Tape & Reel

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

### Marking Information

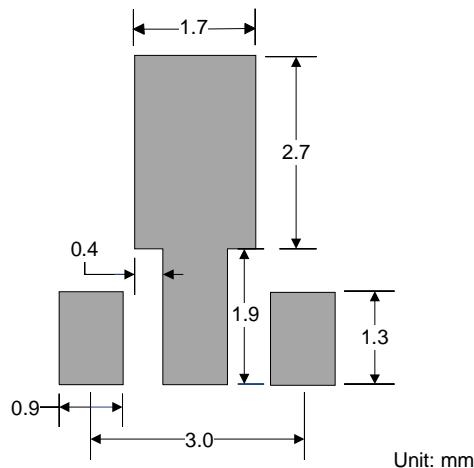


### Package Outline Dimensions



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

All Dimensions in mm

**Suggested Pad Layout****IMPORTANT NOTICE**

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