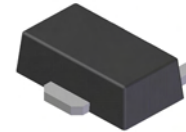


**Features**

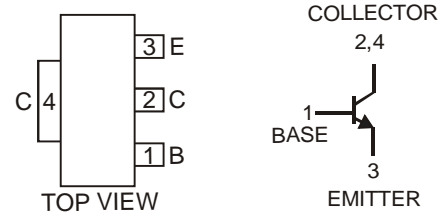
- Epitaxial Planar Die Construction
- Complementary PNP Type Available (2DB1188)
- Ideally Suited for Automated Assembly Processes
- Ideal for Medium Power Switching or Amplification Applications
- **Lead Free By Design/RoHS Compliant (Note 1)**
- **"Green" Device (Note 2)**



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)



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>	40	V
Collector-Emitter Voltage	V <sub>CEO</sub>	32	V
Emitter-Base Voltage	V <sub>EBO</sub>	5	V
Peak Pulse Current	I <sub>CM</sub>	2.5	A
Continuous Collector Current	I <sub>C</sub>	2	A

**Thermal Characteristics**

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

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

Characteristic	Symbol	Min	Typ	Max	Unit	Conditions	
<b>OFF CHARACTERISTICS (Note 4)</b>							
Collector-Base Breakdown Voltage	V <sub>(BR)CBO</sub>	40	—	—	V	I <sub>C</sub> = 50μA, I <sub>E</sub> = 0	
Collector-Emitter Breakdown Voltage	V <sub>(BR)CEO</sub>	32	—	—	V	I <sub>C</sub> = 1mA, I <sub>B</sub> = 0	
Emitter-Base Breakdown Voltage	V <sub>(BR)EBO</sub>	5	—	—	V	I <sub>E</sub> = 50μA, I <sub>C</sub> = 0	
Collector Cut-Off Current	I <sub>CBO</sub>	—	—	1	μA	V <sub>CB</sub> = 20V, I <sub>E</sub> = 0	
Emitter Cut-Off Current	I <sub>EBO</sub>	—	—	1	μA	V <sub>EB</sub> = 4V, I <sub>C</sub> = 0	
<b>ON CHARACTERISTICS (Note 4)</b>							
Collector-Emitter Saturation Voltage	V <sub>CE(SAT)</sub>	—	0.3	0.8	V	I <sub>C</sub> = 2A, I <sub>B</sub> = 0.2A	
DC Current Gain	h <sub>FE</sub>	2DD1766P	82	—	180	—	V <sub>CE</sub> = 3V, I <sub>C</sub> = 0.5A
		2DD1766Q	120	—	270	—	
		2DD1766R	180	—	390	—	
<b>SMALL SIGNAL CHARACTERISTICS</b>							
Transition Frequency	f <sub>T</sub>	—	220	—	MHz	V <sub>CE</sub> = 5V, I <sub>E</sub> = -50mA, f = 100MHz	
Output Capacitance	C <sub>ob</sub>	—	13	—	pF	V <sub>CB</sub> = 10V, I <sub>E</sub> = 0, f = 1MHz	

- 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 = 300μs. Duty cycle ≤2%.

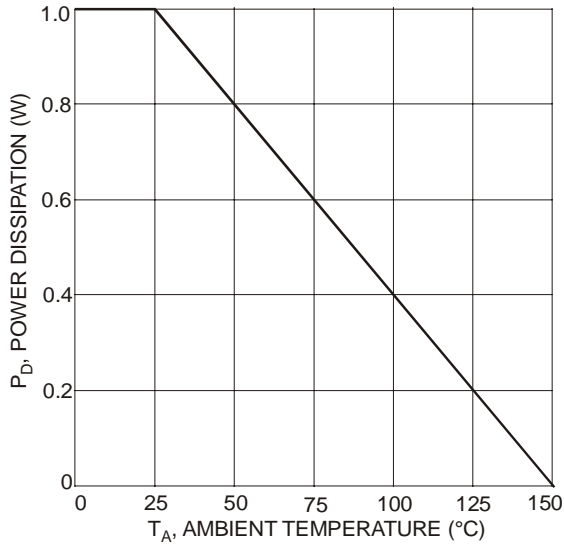


Fig. 1 Power Dissipation vs. Ambient Temperature (Note 3)

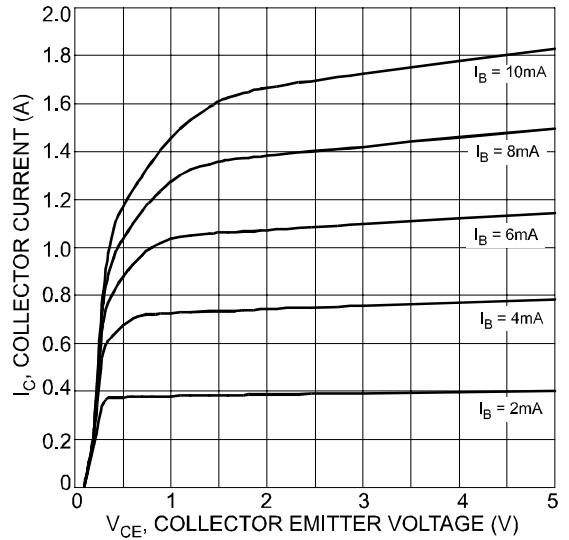


Fig. 2 Typical Collector Current vs. Collector-Emitter Voltage

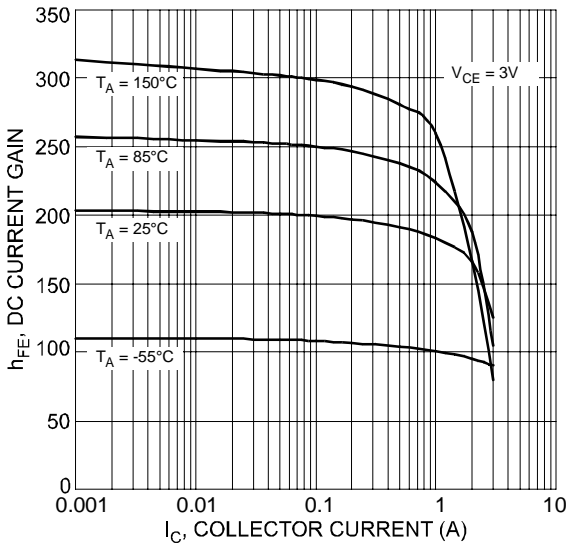


Fig. 3 Typical DC Current Gain vs. Collector Current (2DD1766Q)

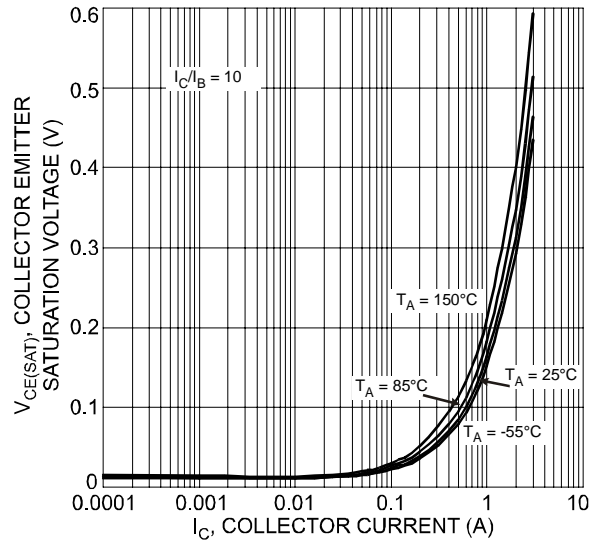


Fig. 4 Typical Collector-Emitter Saturation Voltage vs. Collector Current

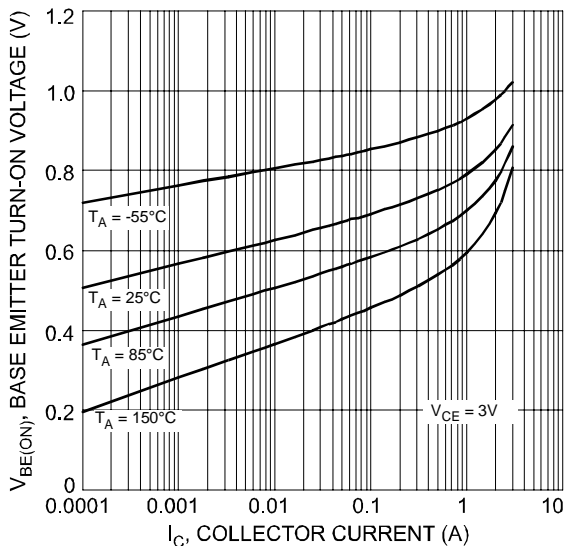


Fig. 5 Typical Base-Emitter Turn-On Voltage vs. Collector Current

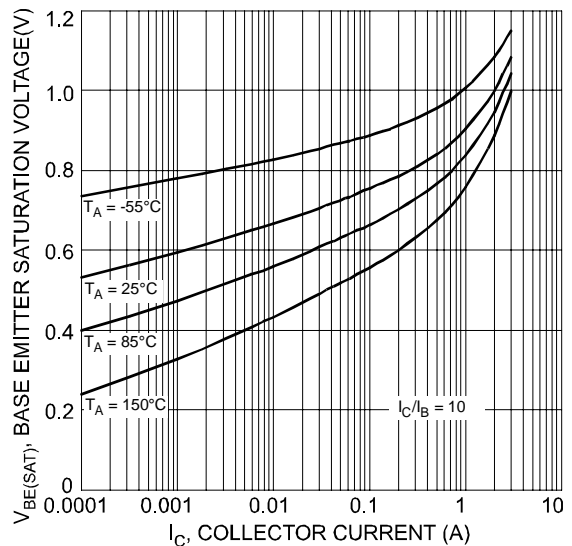


Fig. 6 Typical Base-Emitter Saturation Voltage vs. Collector Current

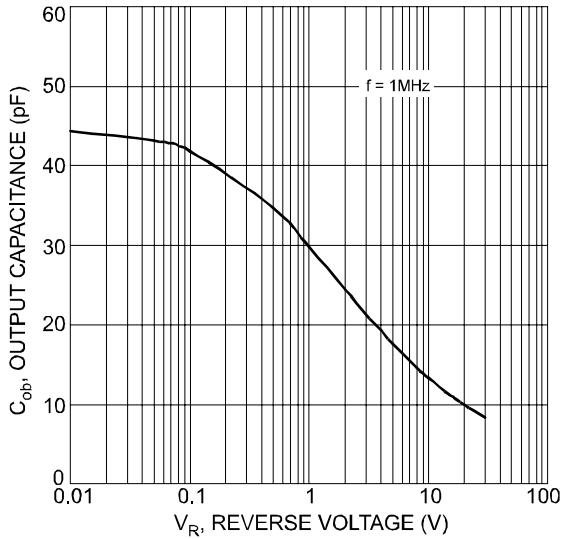


Fig. 7 Typical Output Capacitance Characteristics

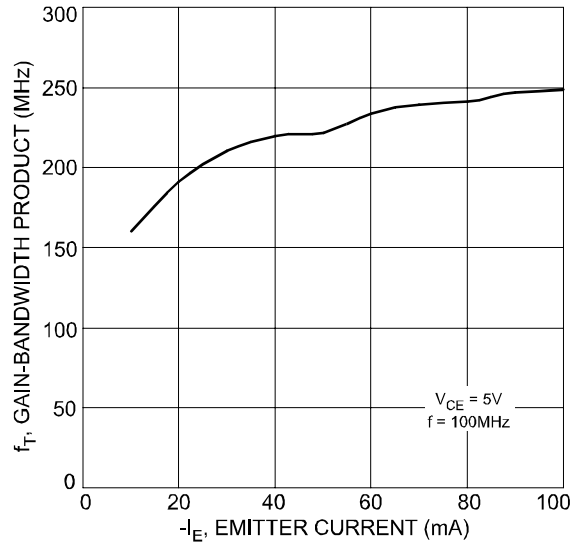


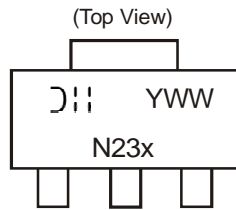
Fig. 8 Typical Gain-Bandwidth Product vs. Emitter Current

## 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

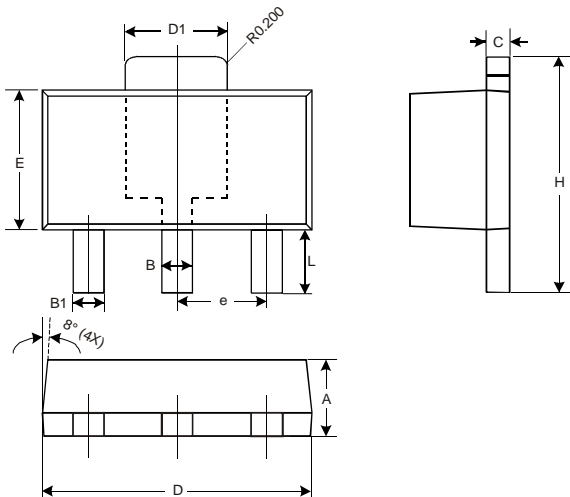
Notes: 5. For packaging details, go to our website at <http://www.diodes.com/ap02007.pdf>.

## Marking Information



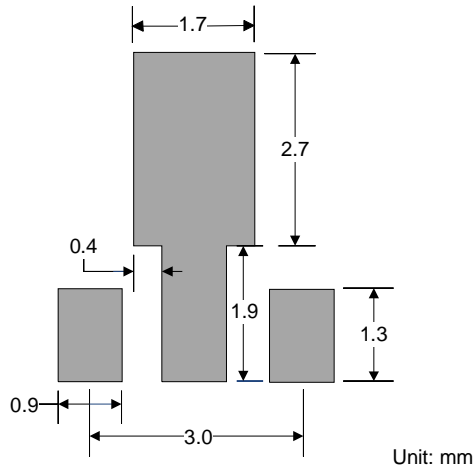
N23x = Product Type Marking Code:  
 Where N23P = 2DD1766P  
 N23Q = 2DD1766Q  
 N23R = 2DD1766R  
 YWW = Date Code Marking  
 Y = Last digit of year ex: 7 = 2007  
 WW = Week code 01 - 52

## 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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