

## Features

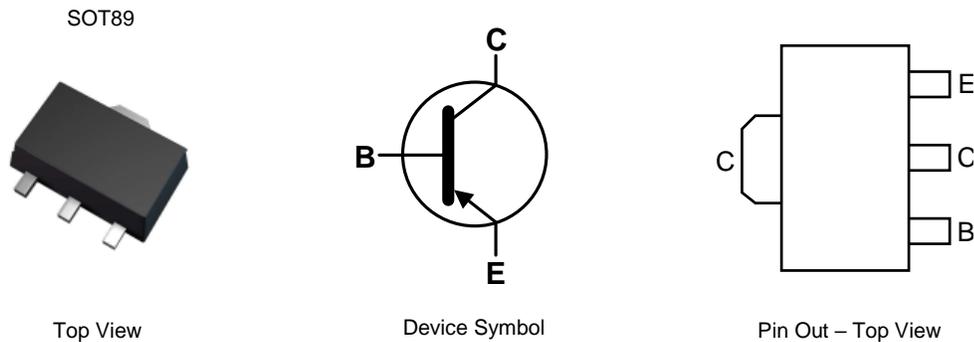
- $BV_{CEO} > -12V$
- $I_c = -3A$  High Continuous Current
- Low Saturation Voltage  $V_{CE(sat)} < -0.25V @ -1.5A$
- Complementary NPN Type: 2DD2678
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **For automotive applications requiring specific change control (i.e. parts qualified to AEC-Q100/101/104/200, PPAP capable, and manufactured in IATF 16949 certified facilities), please [contact us](mailto:contact@diodes.com) or your local Diodes representative. <https://www.diodes.com/quality/product-definitions/>**

## Mechanical Data

- Package: SOT89
- Package Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish — Matte Tin Plated Leads, Solderable per MIL-STD-202, Method 208 (e3)
- Weight: 0.052 grams (Approximate)

## Application

- Medium power switching
- Amplifications

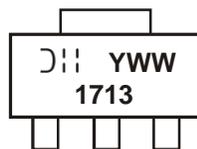


## Ordering Information (Note 4)

Part Number	Package	Marking	Reel Size (inches)	Tape Width (mm)	Packing	
					Qty.	Carrier
2DB1713-13	SOT89	1713	13	12	2500	Reel

- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
  2. See <https://www.diodes.com/quality/lead-free/> for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
  3. Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
  4. For packaging details, go to our website at <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

## Marking Information



- 1713 = Product Type Marking Code
- YWW = Date Code Marking
- Y or  $\bar{Y}$  = Last Digit of Year (ex: 3 = 2023)
- WW = Week Code (01 to 53)

**Absolute Maximum Ratings** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V <sub>CB0</sub>	-15	V
Collector-Emitter Voltage	V <sub>CEO</sub>	-12	V
Emitter-Base Voltage	V <sub>EB0</sub>	-6	V
Continuous Collector Current	I <sub>C</sub>	-3	A
Peak Pulse Current	I <sub>CM</sub>	-6	A

**Thermal Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 5)	P <sub>D</sub>	0.9	W
Thermal Resistance, Junction to Ambient Air (Note 5)	R <sub>θJA</sub>	139	°C/W
Power Dissipation (Note 6)	P <sub>D</sub>	2	W
Thermal Resistance, Junction to Ambient Air (Note 6)	R <sub>θJA</sub>	62.5	°C/W
Operating and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-55 to +150	°C

Notes: 5. Device mounted on FR-4 PCB with minimum recommended pad layout.  
6. Device mounted on FR-4 PCB with 1inch<sup>2</sup> copper pad layout.

**Thermal Characteristics and Derating Information**

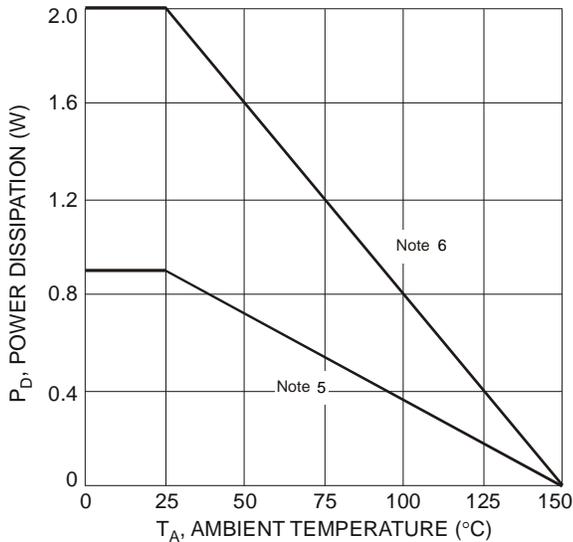


Figure 1. Power Dissipation vs. Ambient Temperature

**Electrical Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Conditions
<b>OFF CHARACTERISTICS (Note 7)</b>						
Collector-Base Breakdown Voltage	BV <sub>CB0</sub>	-15	—	—	V	I <sub>C</sub> = -10μA
Collector-Emitter Breakdown Voltage	BV <sub>CEO</sub>	-12	—	—	V	I <sub>C</sub> = -1mA
Emitter-Base Breakdown Voltage	BV <sub>EBO</sub>	-6	—	—	V	I <sub>E</sub> = -10μA
Collector Cut-Off Current	I <sub>CB0</sub>	—	—	-0.1	μA	V <sub>CB</sub> = -15V
Emitter Cut-Off Current	I <sub>EBO</sub>	—	—	-0.1	μA	V <sub>EB</sub> = -6V
<b>ON CHARACTERISTICS (Note 7)</b>						
Collector-Emitter Saturation Voltage	V <sub>CE(sat)</sub>	—	-120	-250	mV	I <sub>C</sub> = -1.5A, I <sub>B</sub> = -30mA
DC Current Gain	h <sub>FE</sub>	270	—	680	—	V <sub>CE</sub> = -2V, I <sub>C</sub> = -500mA
<b>SMALL SIGNAL CHARACTERISTICS</b>						
Output Capacitance	C <sub>obo</sub>	—	40	—	pF	V <sub>CB</sub> = -10V, I <sub>E</sub> = 0, f = 1MHz
Current Gain-Bandwidth Product	f <sub>t</sub>	—	180	—	MHz	V <sub>CE</sub> = -2V, I <sub>C</sub> = -100mA, f = 100MHz

Note: 7. Measured under pulsed conditions. Pulse width ≤ 300μs. Duty cycle ≤ 2%.

**Typical Electrical Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

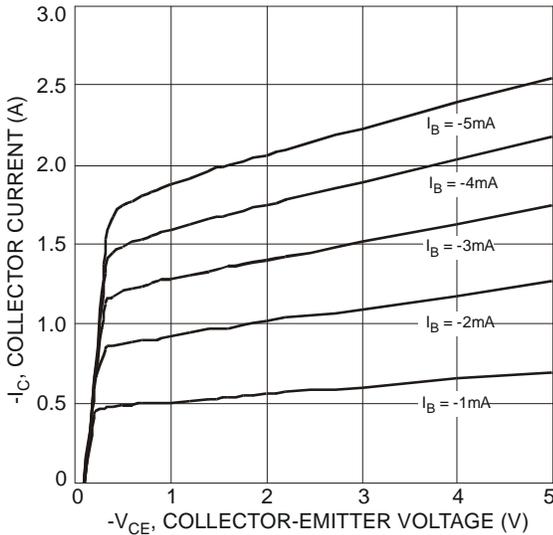


Figure 2. Typical Collector Current vs. Collector-Emitter Voltage

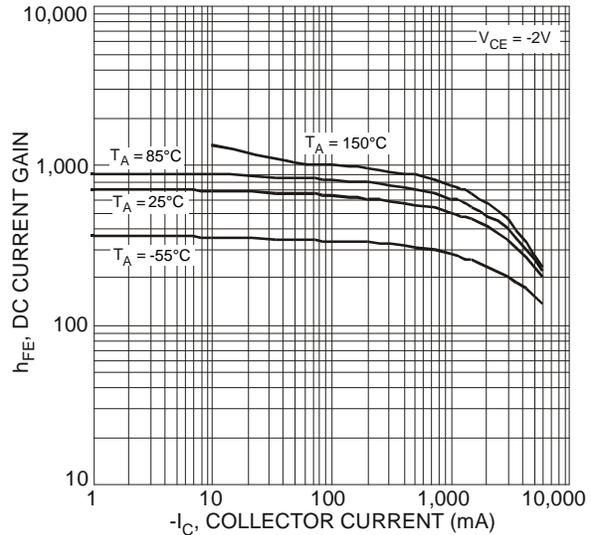


Figure 3. Typical DC Current Gain vs. Collector Current

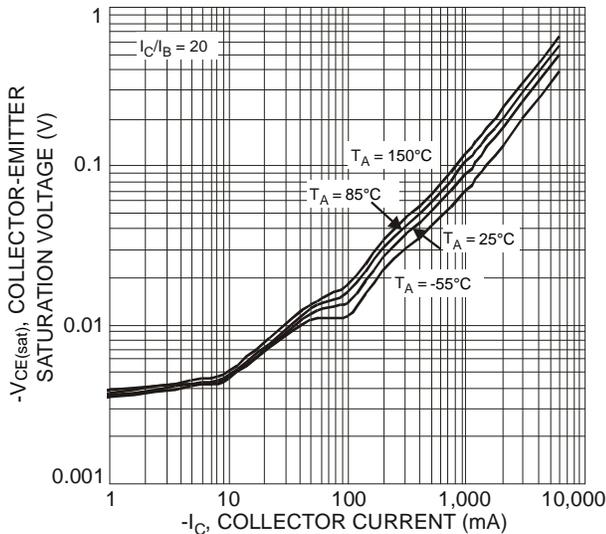


Figure 4. Typical Collector-Emitter Saturation Voltage vs. Collector Current

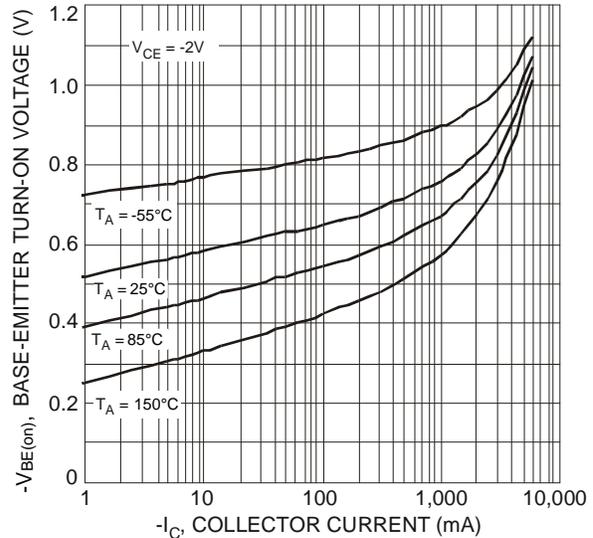


Figure 5. Typical Base-Emitter Turn-On Voltage vs. Collector Current

**Typical Electrical Characteristics** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.) (continued)

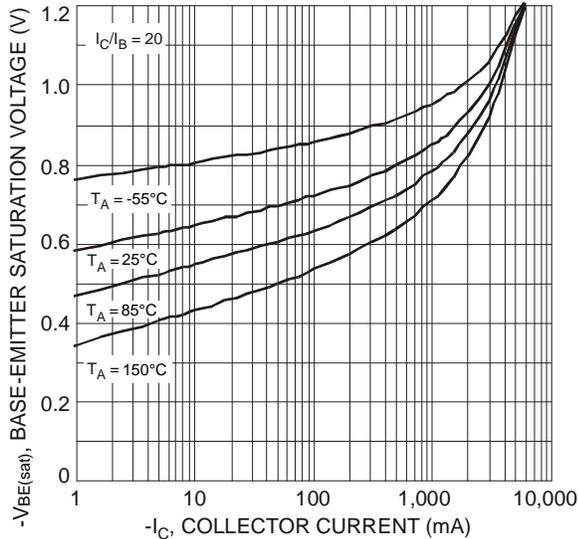


Figure 6. Typical Base-Emitter Saturation Voltage vs. Collector Current

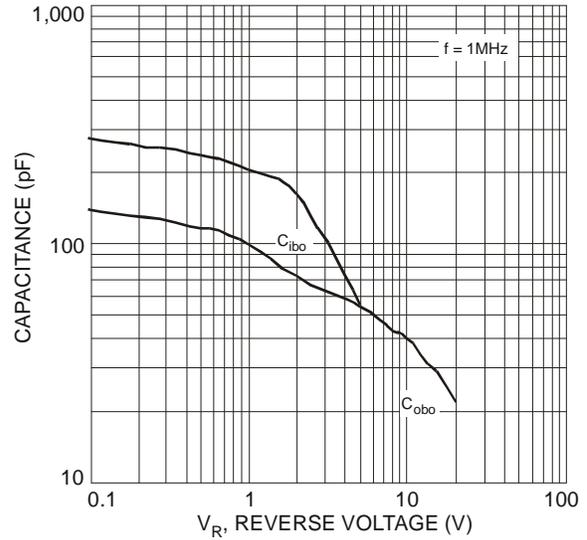


Figure 7. Typical Capacitance Characteristics

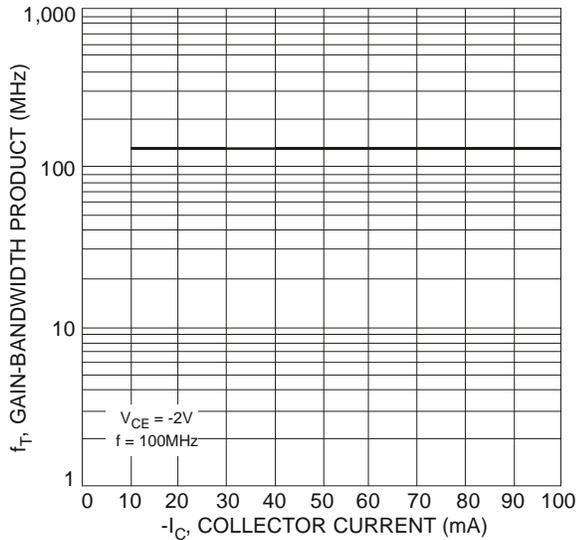
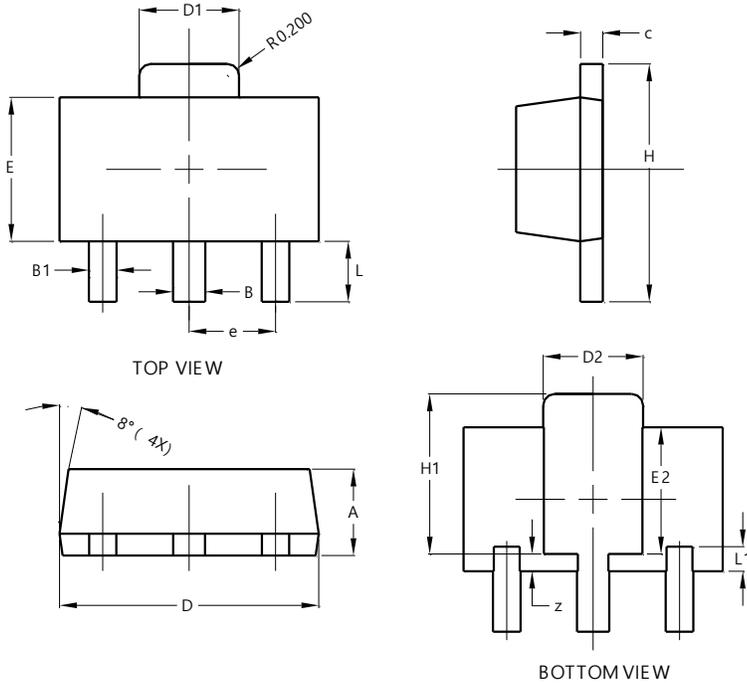


Figure 8. Typical Gain-Bandwidth Product vs. Collector Current

## Package Outline Dimensions

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

### SOT89

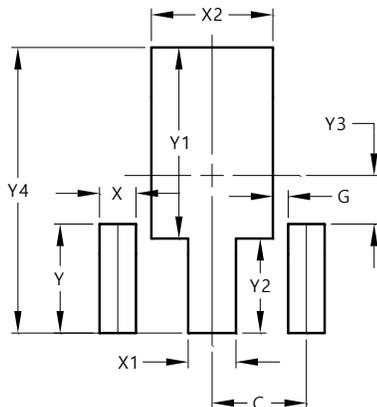


SOT89			
Dim	Min	Max	Typ
A	1.40	1.60	1.50
B	0.50	0.62	0.56
B1	0.42	0.54	0.48
c	0.35	0.43	0.38
D	4.40	4.60	4.50
D1	1.62	1.83	1.733
D2	1.61	1.81	1.71
E	2.40	2.60	2.50
E2	2.05	2.35	2.20
e	-	-	1.50
H	3.95	4.25	4.10
H1	2.63	2.93	2.78
L	0.90	1.20	1.05
L1	0.327	0.527	0.427
z	0.20	0.40	0.30
All Dimensions in mm			

## Suggested Pad Layout

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

### SOT89



Dimensions	Value (in mm)
C	1.500
G	0.244
X	0.580
X1	0.760
X2	1.933
Y	1.730
Y1	3.030
Y2	1.500
Y3	0.770
Y4	4.530

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