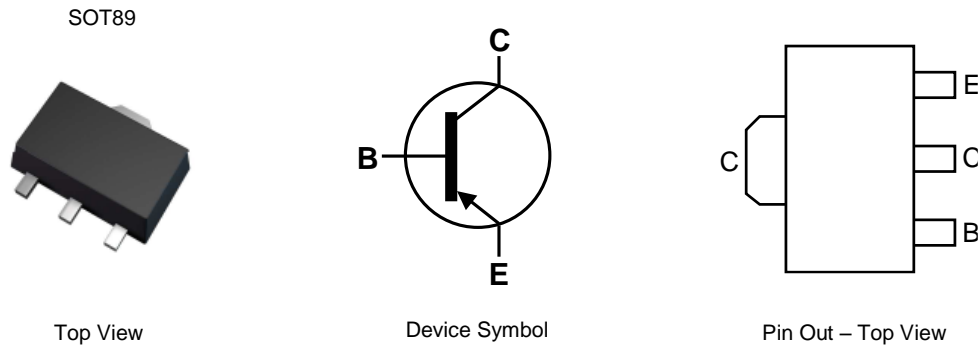


**Features**

- $BV_{CEO} > -20V$
- $I_C = -5A$  High Continuous Current
- Low Saturation Voltage  $V_{CE(sat)} < -1V @ -4A$
- Complementary NPN Type: 2DD2098
- **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-Q100/101/200, PPAP capable, and manufactured in IATF 16949 certified facilities), please [contact us](https://www.diodes.com) or your local Diodes representative. <https://www.diodes.com/quality/product-definitions/>**

**Mechanical Data**

- Case: SOT89
- 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 Plated Leads, Solderable per MIL-STD-202, Method 208 (3)
- Weight: 0.052 grams (Approximate)

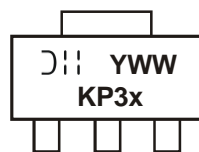



**Ordering Information** (Note 4)

Part Number	Compliance	Marking	Reel Size (inches)	Tape Width (mm)	Quantity per Reel
2DB1386Q-13	Standard	KP3Q	13	12	2,500
2DB1386Q-13R	Standard	KP3Q	13	12	4,000
2DB1386R-13	Standard	KP3R	13	12	2,500
2DB1386RTC	Standard	KP3R	13	12	4,000

- 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**



 = Manufacturer's Marking  
 KP3x = Product Type Marking Code,  
 where: KP3Q = 2DB1386Q  
 KP3R = 2DB1386R  
 YWW = Date Code Marking  
 Y = Last Digit of Year (ex: 0 = 2020)  
 WW = Week Code (01 to 53)

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

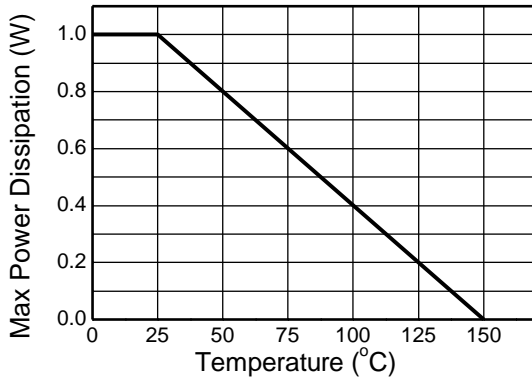
Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V <sub>CB0</sub>	-30	V
Collector-Emitter Voltage	V <sub>CEO</sub>	-20	V
Emitter-Base Voltage	V <sub>EBO</sub>	-6	V
Continuous Collector Current	I <sub>C</sub>	-5	A
Peak Pulse Collector Current (Single Pulse)	I <sub>CM</sub>	-10	A
Base Current	I <sub>B</sub>	-500	mA

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

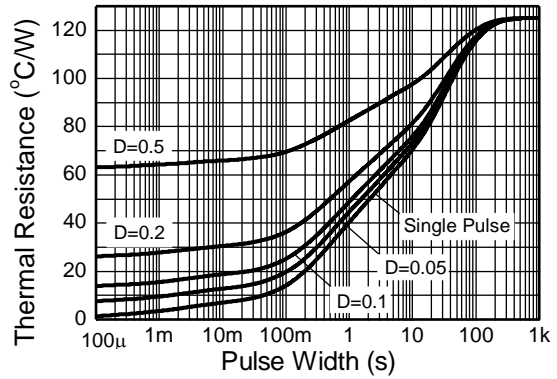
Characteristic	Symbol	Value	Unit
Power Dissipation (Note 5)	P <sub>D</sub>	1	W
Thermal Resistance, Junction to Ambient Air (Note 5)	R <sub>θJA</sub>	125	°C/W
Thermal Resistance, Junction to Leads (Note 6)	R <sub>θJL</sub>	19	°C/W
Operating and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-55 to +150	°C

Notes: 5. For a device surface mounted on 15mm x 15mm x 0.6mm FR4 PCB with high coverage of single sided 1 oz copper, in still air conditions; the device is measured when operating in steady state condition.  
6. Thermal resistance from junction to solder-point (on the exposed collector pad).

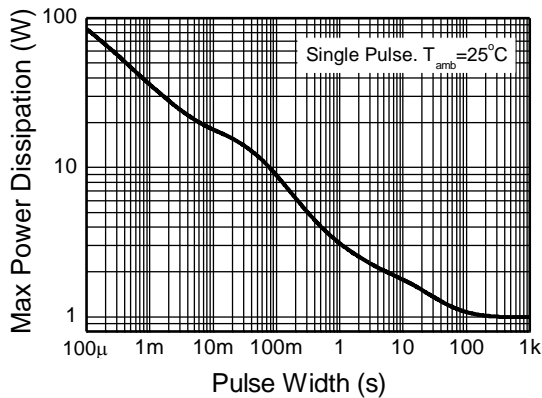
**Thermal Characteristics and Derating Information**



**Derating Curve**



**Transient Thermal Impedance**



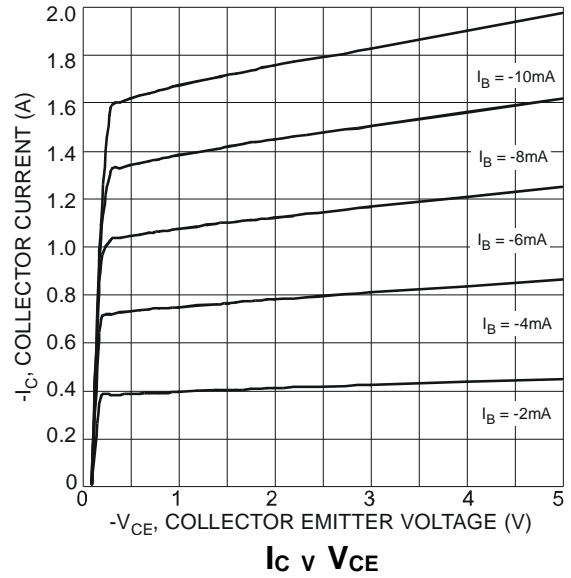
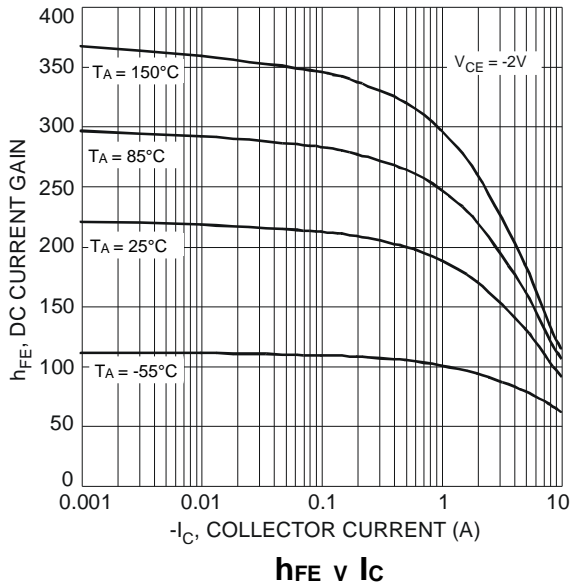
**Pulse Power Dissipation**

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

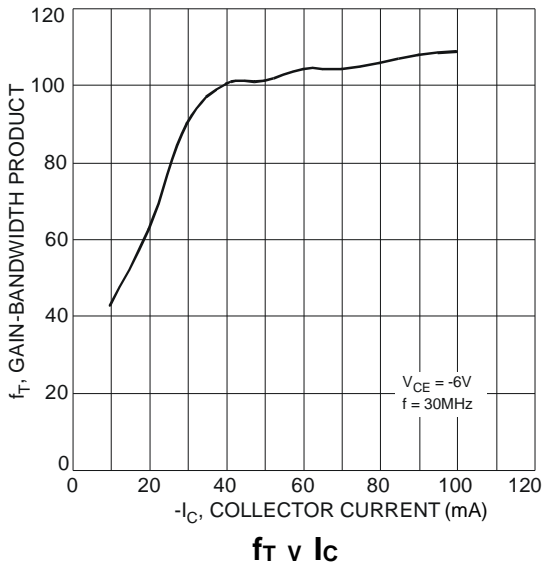
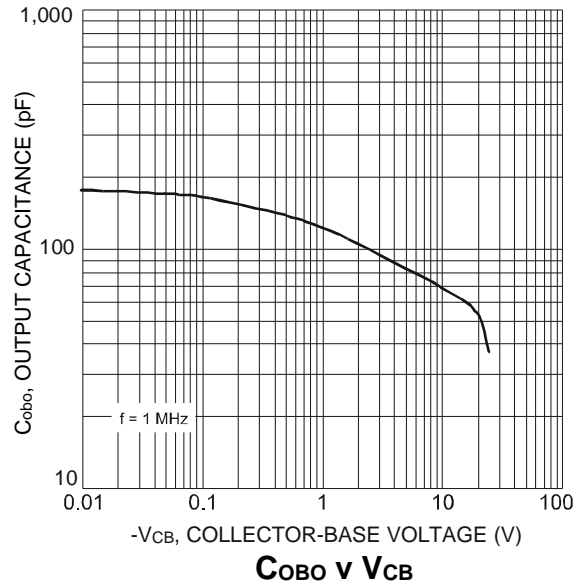
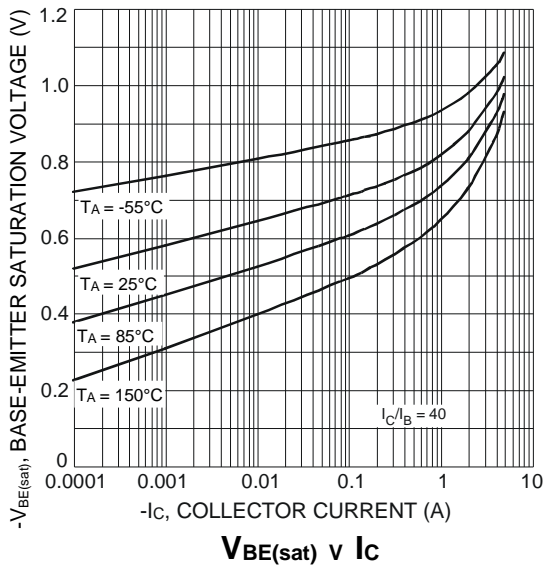
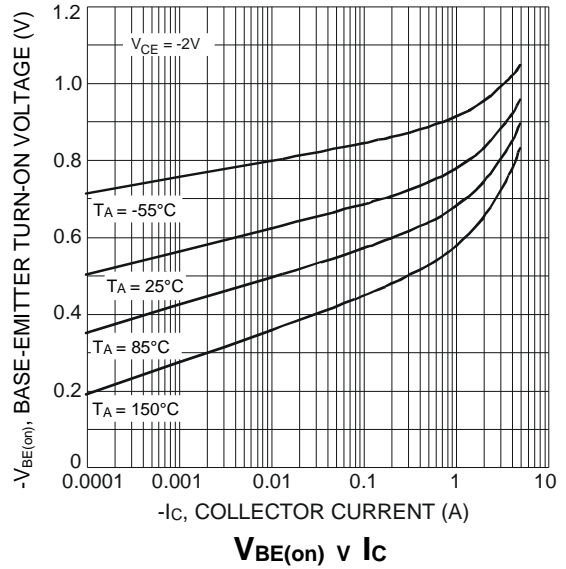
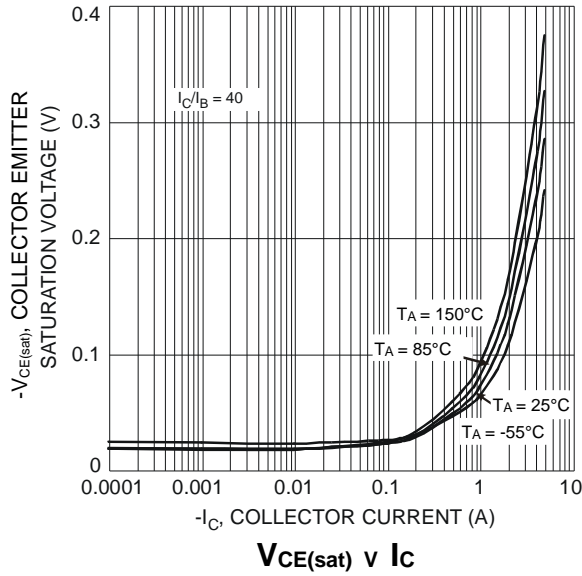
Characteristic	Symbol	Min	Typ	Max	Unit	Conditions	
<b>OFF CHARACTERISTICS (Note 7)</b>							
Collector-Base Breakdown Voltage	BV <sub>CBO</sub>	-30	—	—	V	I <sub>C</sub> = -50μA, I <sub>E</sub> = 0	
Collector-Emitter Breakdown Voltage	BV <sub>CEO</sub>	-20	—	—	V	I <sub>C</sub> = -1mA, I <sub>B</sub> = 0	
Emitter-Base Breakdown Voltage	BV <sub>EBO</sub>	-6	—	—	V	I <sub>E</sub> = -50μA, I <sub>C</sub> = 0	
Collector Cut-Off Current	I <sub>CBO</sub>	—	—	-0.5	μA	V <sub>CB</sub> = -20V, I <sub>E</sub> = 0	
Emitter Cut-Off Current	I <sub>EBO</sub>	—	—	-0.5	μA	V <sub>EB</sub> = -5V, I <sub>C</sub> = 0	
<b>ON CHARACTERISTICS (Note 7)</b>							
Collector-Emitter Saturation Voltage	V <sub>CE(sat)</sub>	—	-0.25	-1.0	V	I <sub>C</sub> = -4A, I <sub>B</sub> = -0.1A	
DC Current Gain	2DB1386Q	h <sub>FE</sub>	120	—	270	—	I <sub>C</sub> = -0.5A, V <sub>CE</sub> = -2V
	2DB1386R		180	—	390		
<b>SMALL SIGNAL CHARACTERISTICS</b>							
Output Capacitance	C <sub>obo</sub>	—	55	—	pF	V <sub>CB</sub> = -20V, I <sub>E</sub> = 0, f = 1MHz	
Current Gain-Bandwidth Product	f <sub>T</sub>	—	100	—	MHz	V <sub>CE</sub> = -6V, I <sub>E</sub> = 50mA, f = 30MHz	

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

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



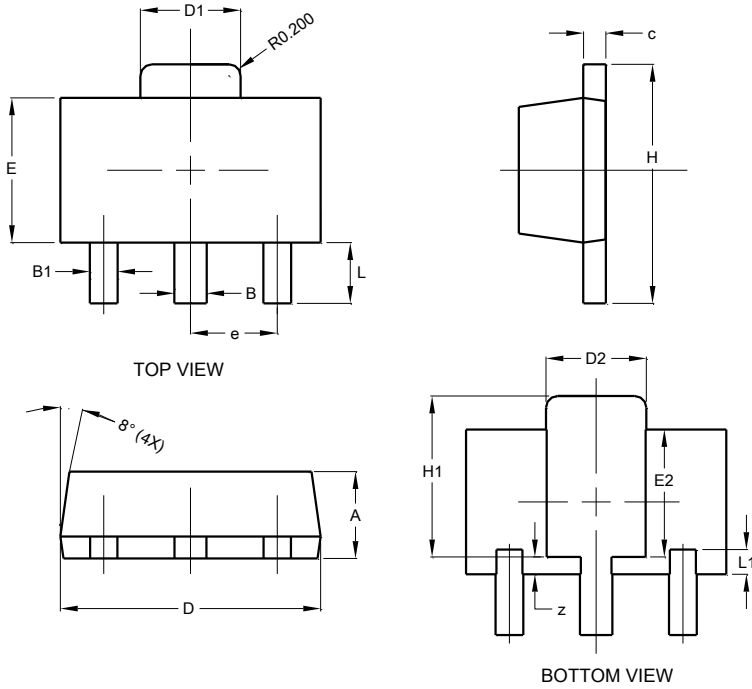
**Typical Electrical Characteristics** (Continued)



**Package Outline Dimensions**

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

**SOT89**

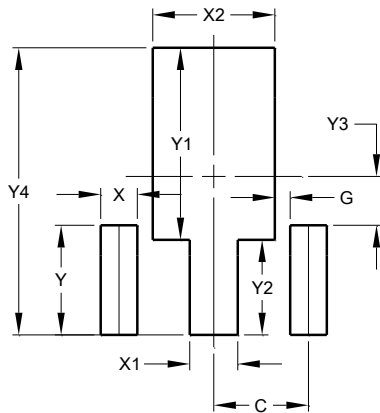


SOT89			
Dim	Min	Max	Typ
A	1.40	1.60	1.50
B	0.50	0.62	0.56
B1	0.42	0.54	0.48
c	0.35	0.43	0.38
D	4.40	4.60	4.50
D1	1.62	1.83	1.733
D2	1.61	1.81	1.71
E	2.40	2.60	2.50
E2	2.05	2.35	2.20
e	-	-	1.50
H	3.95	4.25	4.10
H1	2.63	2.93	2.78
L	0.90	1.20	1.05
L1	0.327	0.527	0.427
z	0.20	0.40	0.30
<b>All Dimensions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

**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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