


## Features

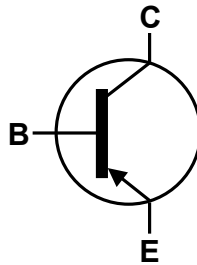
- $BV_{CEO} > -32V$
- $I_C = -2A$  high Continuous Current
- Low saturation voltage  $V_{CE(sat)} < 800mV @ 2A$
- Complementary NPN Type: 2DD1766
- **Totally Lead-Free & Fully RoHS compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**

## Mechanical Data

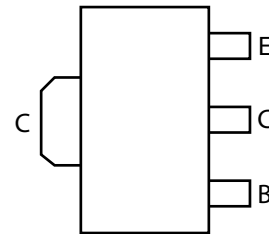
- Case: SOT89
- Case material: Molded Plastic, "Green" Molding Compound.
- UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish - Matte Tin Plated Leads, Solderable per MIL-STD-202, Method 208 
- Weight: 0.052 grams (approximate)



Top View



Device Symbol



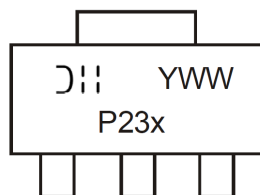
Pin Out – Top View

## Ordering Information (Note 4)

Part Number	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
2DB1188P-13	P23P	13	12	2,500
2DB1188Q-13	P23Q	13	12	2,500
2DB1188Q-13R	P23Q	13	12	4,000
2DB1188R-13	P23R	13	12	2,500

- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
  2. See [http://www.diodes.com/quality/lead\\_free.html](http://www.diodes.com/quality/lead_free.html) 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 <http://www.diodes.com/products/packages.html>

## Marking Information



P23x = Product Type Marking Code  
 Where P23P = 2DB1188P  
 P23Q = 2DB1188Q  
 P23R = 2DB1188R  
 D|| = Manufacturers' code marking  
 YWW = Date Code Marking  
 Y = Last Digit of Year (ex: 1 = 2011)  
 WW = Week Code (01 – 53)

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**Maximum Ratings** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	$V_{CB0}$	-40	V
Collector-Emitter Voltage	$V_{CEO}$	-32	V
Emitter-Base Voltage	$V_{EBO}$	-6	V
Continuous Collector Current	$I_C$	-2	A
Peak Pulse Collector Current	$I_{CM}$	-3	A
Base Current	$I_B$	-500	mA

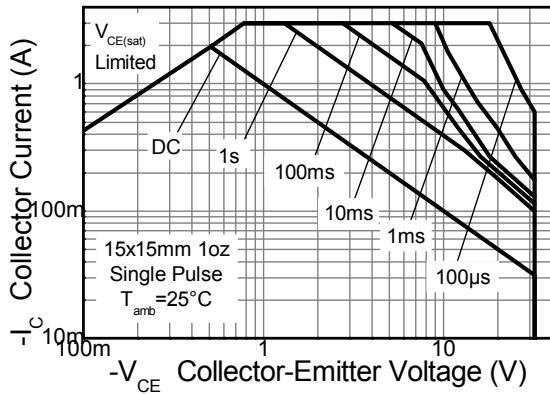
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**Thermal Characteristics** (@ $T_A = +25^\circ\text{C}$  unless otherwise specified.)

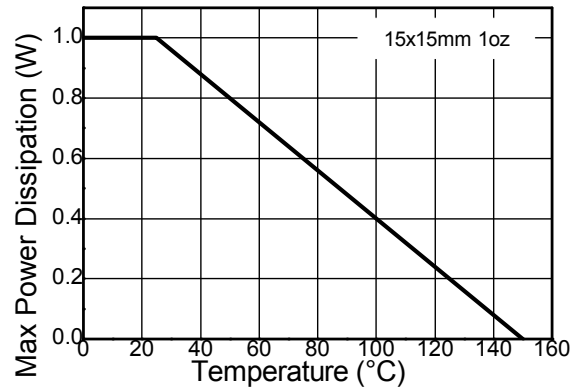
Characteristic	Symbol	Value	Unit
Power Dissipation (Note 5)	$P_D$	1	W
Thermal Resistance, Junction to Ambient (Note 5)	$R_{\theta JA}$	125	$^\circ\text{C/W}$
Thermal Resistance, Junction to Leads (Note 6)	$R_{\theta JL}$	19	$^\circ\text{C/W}$
Operating and Storage Temperature Range	$T_J, T_{STG}$	-55 to +150	$^\circ\text{C}$

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

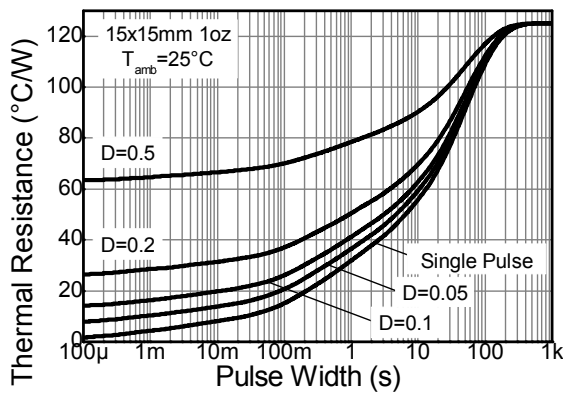
**Thermal Characteristics and Derating Information**



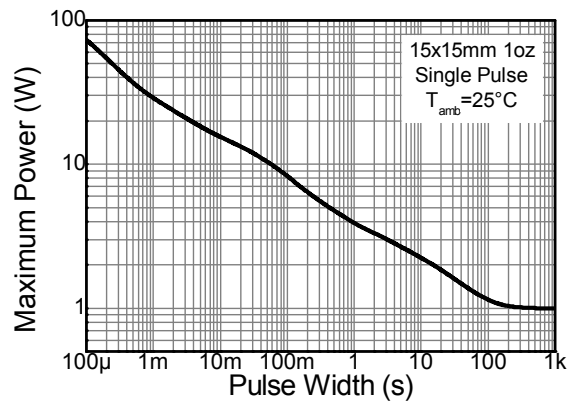
**Safe Operating Area**



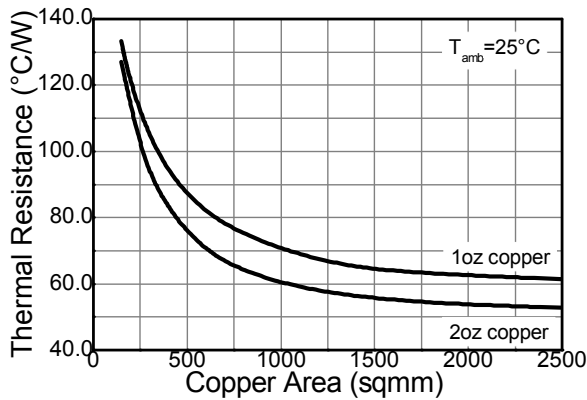
**Derating Curve**



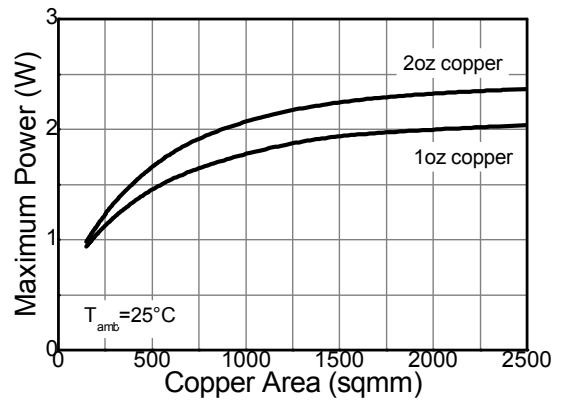
**Transient Thermal Impedance**



**Pulse Power Dissipation**



**$R_{TH}$  vs Area**



**$P_D$  vs Area**

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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS (Note 7)</b>						
Collector-Base Breakdown Voltage	$BV_{CBO}$	-40	—	—	V	$I_C = -100\mu\text{A}, I_E = 0$
Collector-Emitter Breakdown Voltage	$BV_{CEO}$	-32	—	—	V	$I_C = -10\text{mA}, I_B = 0$
Emitter-Base Breakdown Voltage	$BV_{EBO}$	-6	—	—	V	$I_E = -100\mu\text{A}, I_C = 0$
Collector Cutoff Current	$I_{CBO}$	—	—	-100	nA	$V_{CB} = -20\text{V}, I_E = 0$
Emitter Cutoff Current	$I_{EBO}$	—	—	-100	nA	$V_{EB} = -5\text{V}, I_C = 0$
<b>ON CHARACTERISTICS (Note 7)</b>						
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	—	-0.35	-0.8	V	$I_C = -2\text{A}, I_B = -0.2\text{A}$
DC Current Gain	2DB1188P	82	—	180	—	$V_{CE} = -3\text{V}, I_C = -0.5\text{A}$
	2DB1188Q	120	—	270	—	
	2DB1188R	180	—	390	—	
<b>SMALL SIGNAL CHARACTERISTICS</b>						
Current Gain-Bandwidth Product	$f_T$	—	120	—	MHz	$V_{CE} = -5\text{V}, I_C = -0.1\text{A}, f = 30\text{MHz}$
Output Capacitance	$C_{obo}$	—	20	—	pF	$V_{CB} = -10\text{V}, f = 1\text{MHz}$

Notes: 7. Measured under pulsed conditions. Pulse width  $\leq 300\mu\text{s}$ . Duty cycle  $\leq 2\%$ .

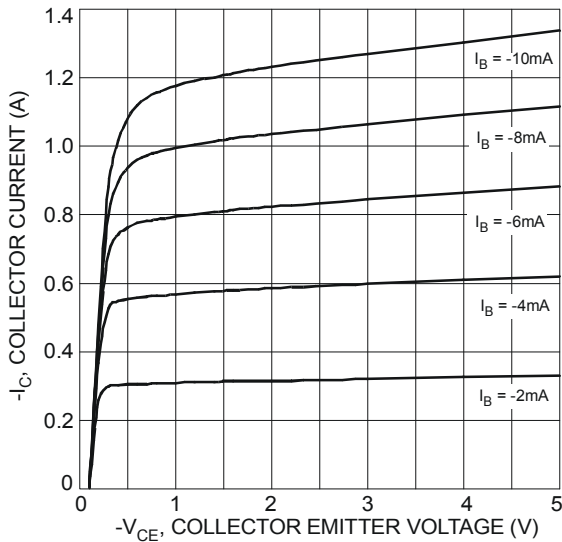


Figure 1. Typical Collector Current vs. Collector-Emitter Voltage

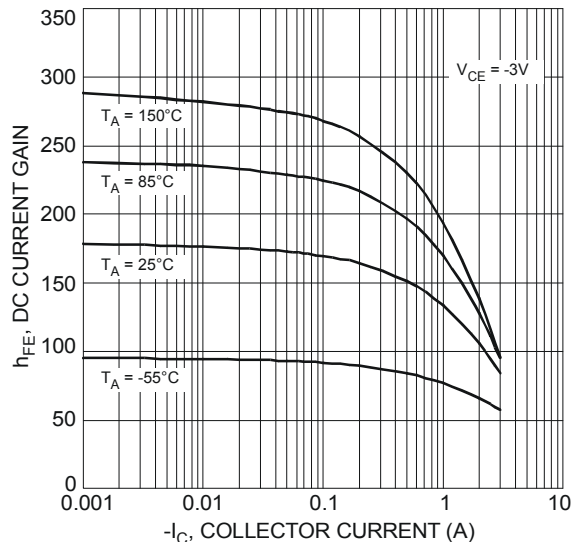


Figure 2. Typical DC Current Gain vs. Collector Current (2DB1188Q)

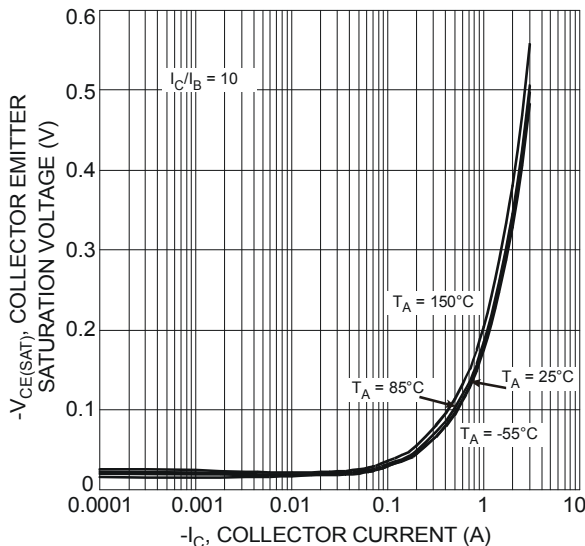


Figure 3. Typical Collector-Emitter Saturation Voltage vs. Collector Current

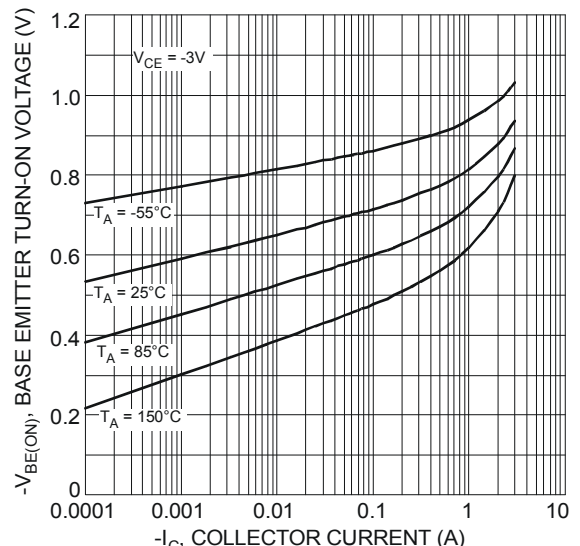


Figure 4. Typical Base-Emitter Turn-On Voltage vs. Collector Current

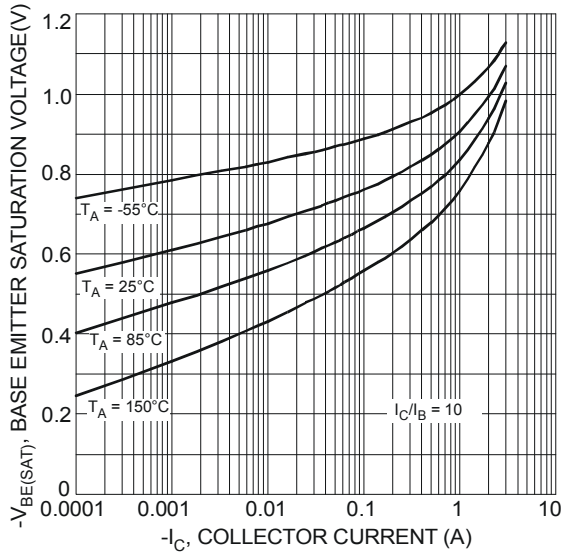


Figure 5. Typical Base-Emitter Saturation Voltage vs. Collector Current

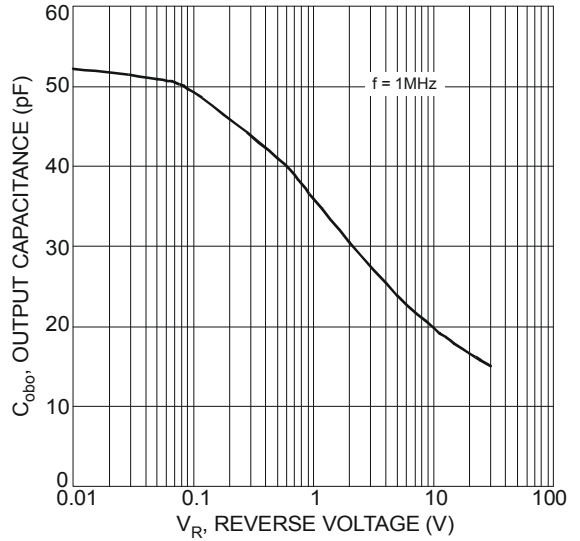


Figure 6. Typical Output Capacitance Characteristics

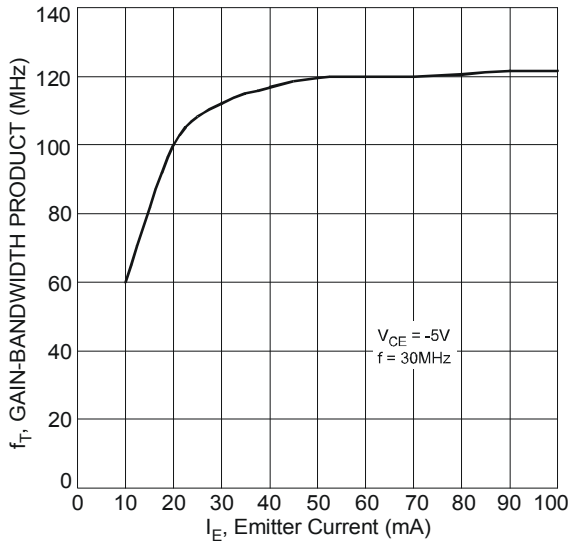
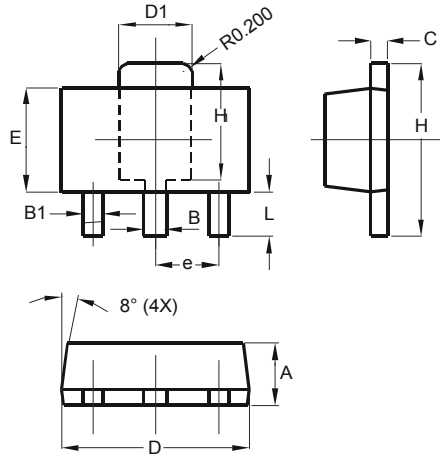


Figure 7. Typical Gain-Bandwidth Product vs. Emitter Current

## Package Outline Dimensions

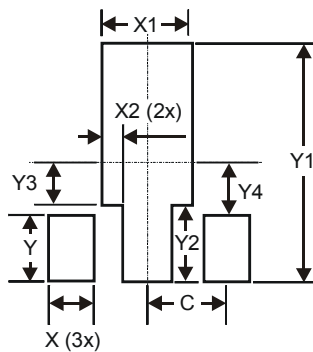
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.



SOT89		
Dim	Min	Max
A	1.40	1.60
B	0.44	0.62
B1	0.35	0.54
C	0.35	0.44
D	4.40	4.60
D1	1.62	1.83
E	2.29	2.60
e	1.50 Typ	
H	3.94	4.25
H1	2.63	2.93
L	0.89	1.20
All Dimensions in mm		

## Suggested Pad Layout

Please see AP02001 at <http://www.diodes.com/datasheets/ap02001.pdf> for the latest version.



Dimensions	Value (in mm)
X	0.900
X1	1.733
X2	0.416
Y	1.300
Y1	4.600
Y2	1.475
Y3	0.950
Y4	1.125
C	1.500

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