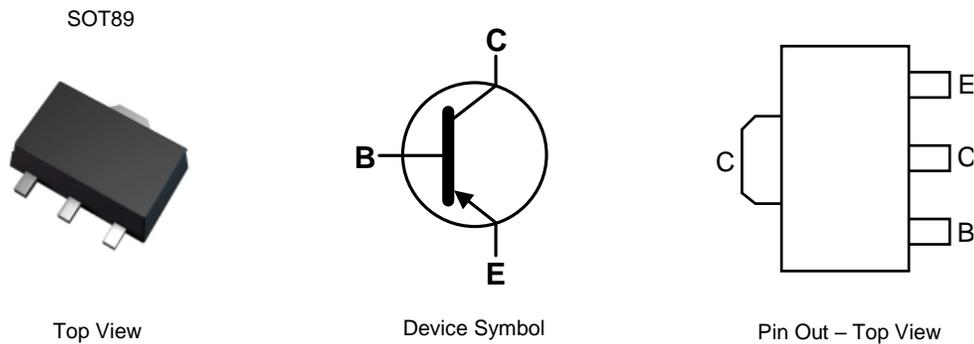


Features

- $BV_{CE0} > -32V$
- $I_C = -2A$ 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)**
- **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 refer to the related automotive grade (Q-suffix) part. A listing can be found at <https://www.diodes.com/products/automotive/automotive-products/>.**
- This part is qualified to JEDEC standards (as references in AEC-Q) for High Reliability. <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 [Ⓔ]
- Weight: 0.052 grams (Approximate)

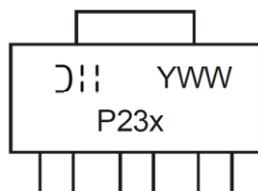


Ordering Information (Note 4)

Part Number	Status	Marking Code	Reel Size (inches)	Tape Width (mm)	Quantity per Reel
2DB1188P-13	Obsolete	P23P	13	12	2,500
2DB1188Q-13	Active	P23Q	13	12	2,500
2DB1188Q-13R	Active	P23Q	13	12	4,000
2DB1188R-13	Active	P23R	13	12	2,500

- 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



P23x = Product Type Marking Code
 Where P23P = 2DB1188P
 P23Q = 2DB1188Q
 P23R = 2DB1188R
 DII = Manufacturers' Code Marking
 YWW = Date Code Marking
 Y = Last Digit of Year (ex: 1 = 2021)
 WW = Week Code (01 to 53)

Maximum Ratings (@T_A = +25°C, unless otherwise specified.)

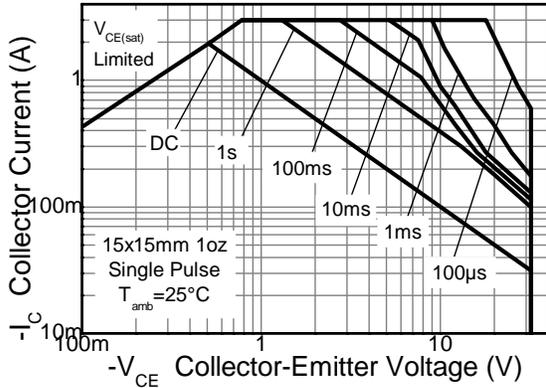
Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V _{CB0}	-40	V
Collector-Emitter Voltage	V _{CEO}	-32	V
Emitter-Base Voltage	V _{EBO}	-6	V
Continuous Collector Current	I _C	-2	A
Peak Pulse Collector Current	I _{CM}	-3	A
Base Current	I _B	-500	mA

Thermal Characteristics (@T_A = +25°C, unless otherwise specified.)

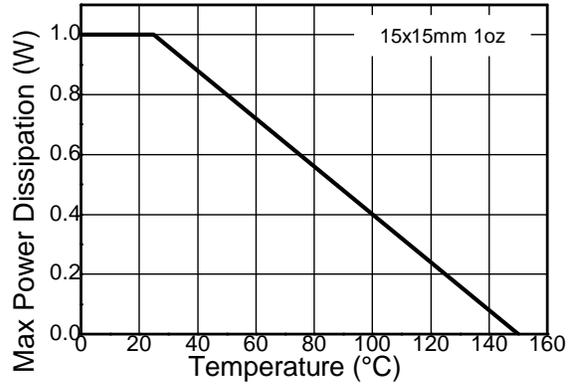
Characteristic	Symbol	Value	Unit
Power Dissipation (Note 5)	P _D	1	W
Thermal Resistance, Junction to Ambient (Note 5)	R _{θJA}	125	°C/W
Thermal Resistance, Junction to Leads (Note 6)	R _{θJL}	19	°C/W
Operating and Storage Temperature Range	T _J , T _{STG}	-55 to +150	°C

- 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).

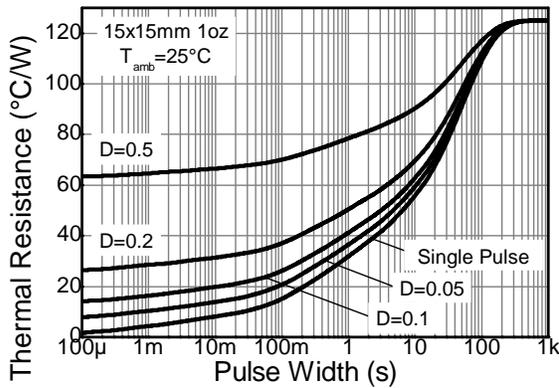
Thermal Characteristics and Derating Information



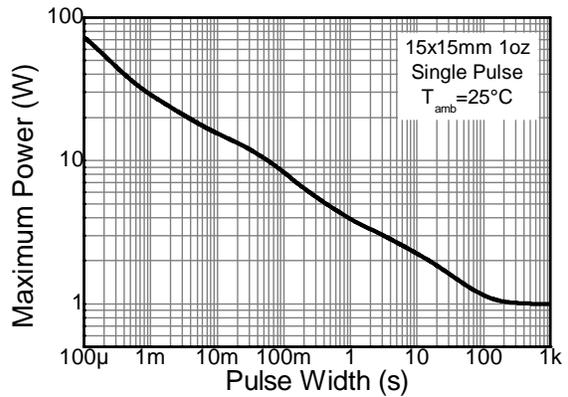
Safe Operating Area



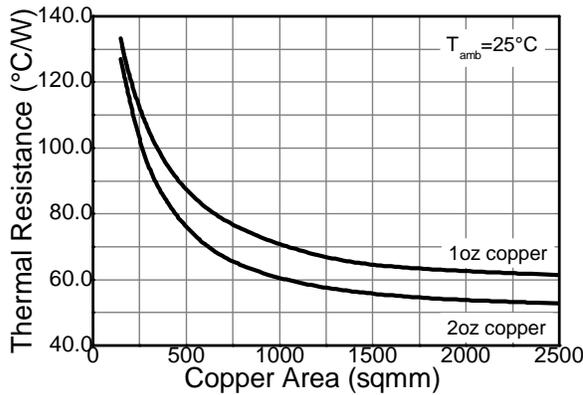
Derating Curve



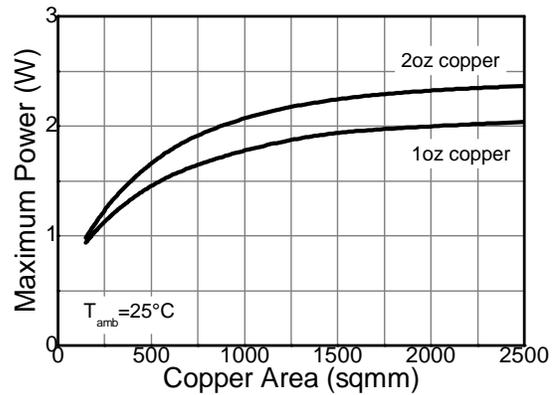
Transient Thermal Impedance



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
OFF CHARACTERISTICS (Note 7)						
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	$V_{EB} = -5\text{V}, I_C = 0$
ON CHARACTERISTICS (Note 7)						
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		
SMALL SIGNAL CHARACTERISTICS						
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	$V_{CB} = -10\text{V}, f = 1\text{MHz}$

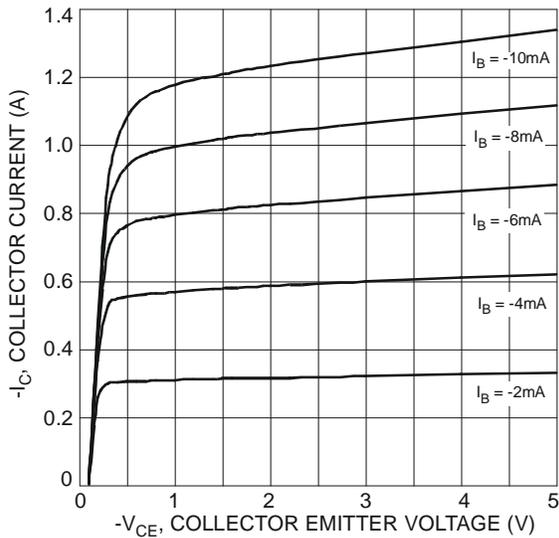
 Note: 7. Measured under pulsed conditions. Pulse width $\leq 300\mu\text{s}$. Duty cycle $\leq 2\%$.


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

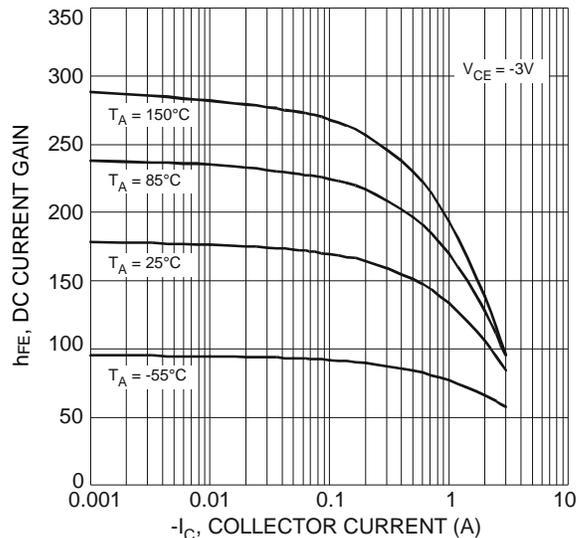


Figure 2. Typical DC Current Gain vs. Collector Current (2DB1188Q)

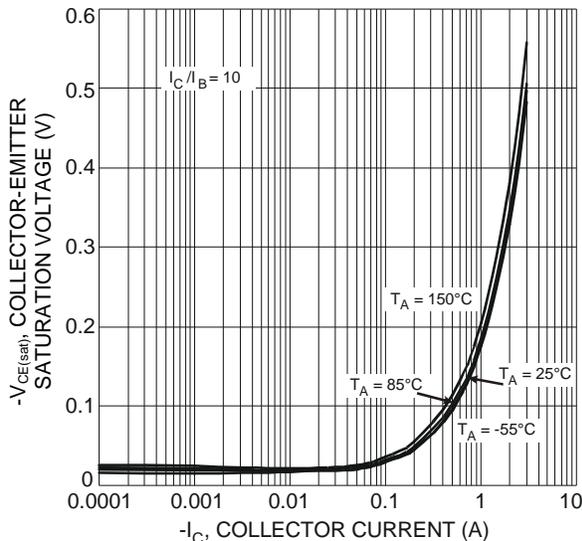


Figure 3. Typical Collector-Emitter Saturation Voltage vs. Collector Current

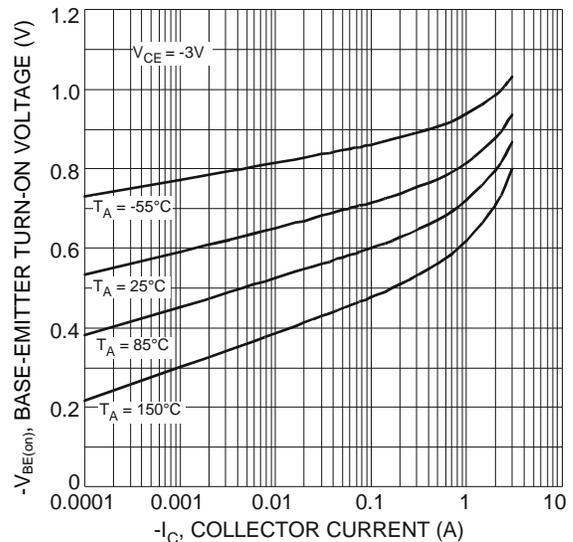


Figure 4. Typical Base-Emitter Turn-On Voltage vs. Collector Current

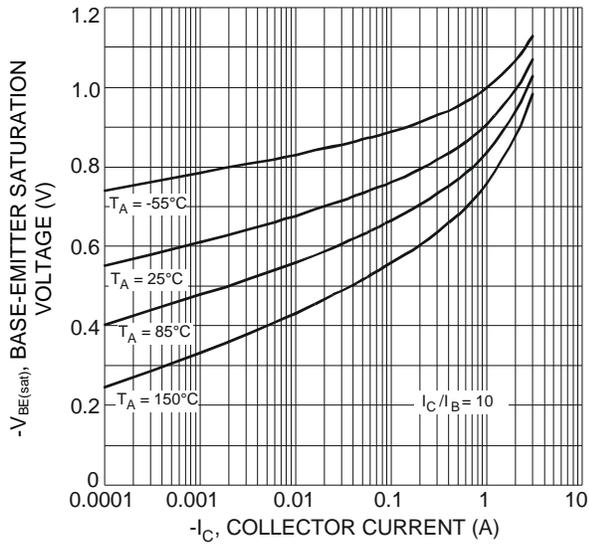


Figure 5. Typical Base-Emitter Saturation Voltage vs. Collector Current

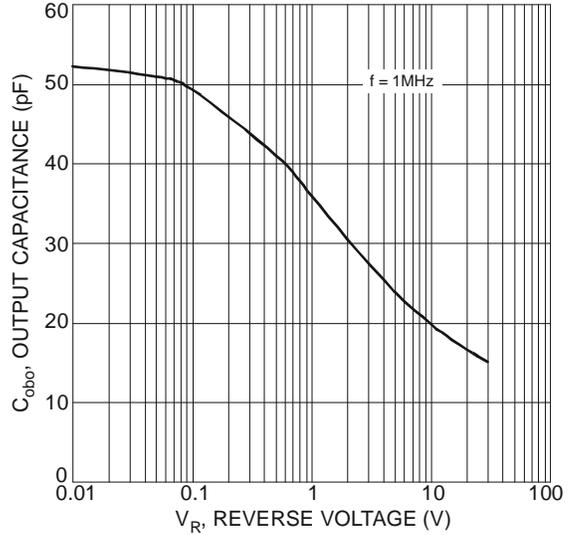


Figure 6. Typical Output Capacitance Characteristics

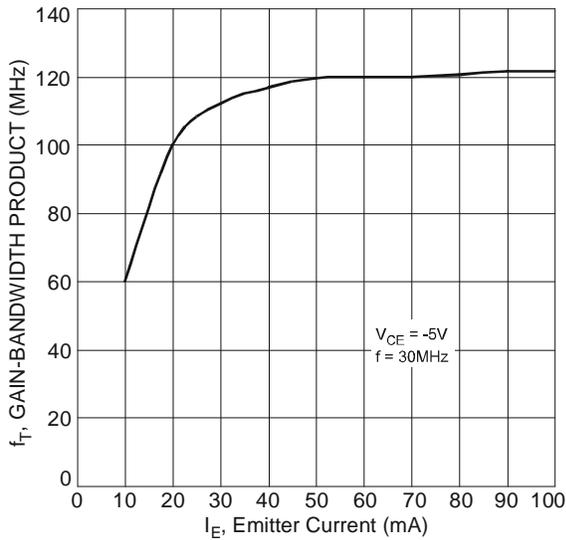
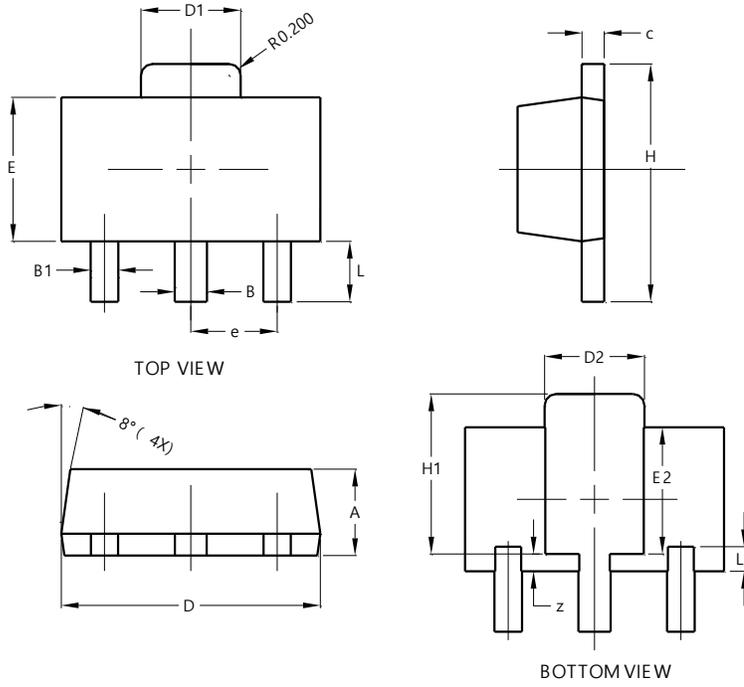


Figure 7. Typical Gain-Bandwidth Product vs. Emitter Current

Package Outline Dimensions

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

SOT89

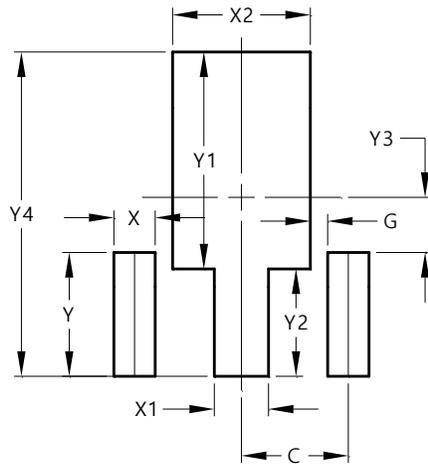


SOT89			
Dim	Min	Max	Typ
A	1.40	1.60	1.50
B	0.50	0.62	0.56
B1	0.42	0.54	0.48
c	0.35	0.43	0.38
D	4.40	4.60	4.50
D1	1.62	1.83	1.733
D2	1.61	1.81	1.71
E	2.40	2.60	2.50
E2	2.05	2.35	2.20
e	-	-	1.50
H	3.95	4.25	4.10
H1	2.63	2.93	2.78
L	0.90	1.20	1.05
L1	0.327	0.527	0.427
z	0.20	0.40	0.30
All Dimensions in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