

## Features

- $BV_{CEO} > -50V$
- $I_C = -2A$  high Continuous Collector Current
- High Gain Holds up
- **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

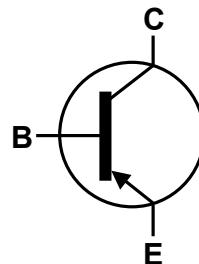
## Mechanical Data

- Case: SOT89
- Case material: Molded Plastic. "Green" Molding Compound.
- UL Flammability 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)

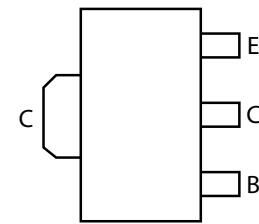
SOT89



Top View



Device Symbol



Top View  
Pin Out

## Ordering Information (Notes 4)

Product	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
2DA1213O-13	P25X	13	12	2,500
2DA1213Y-13	P25Y	13	12	2,500
2DA1213Y-13R	P25Y	13	12	4,000

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



xxxx = Product Type Marking Code:  
 P25X = 2DA1213O  
 P25Y = 2DA1213Y  
 YWW = Date Code Marking  
 Y = Last digit of year (ex: 1 = 2011)  
 WW = Week code 01 - 53

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

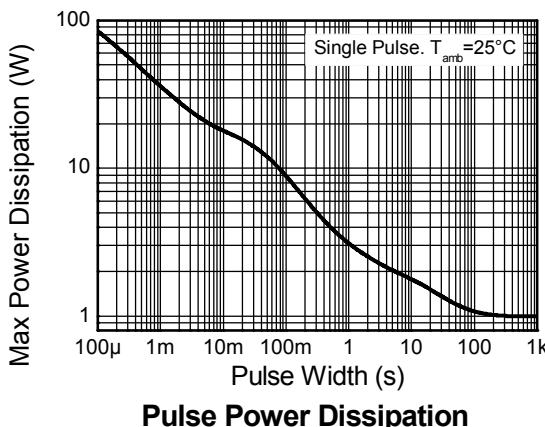
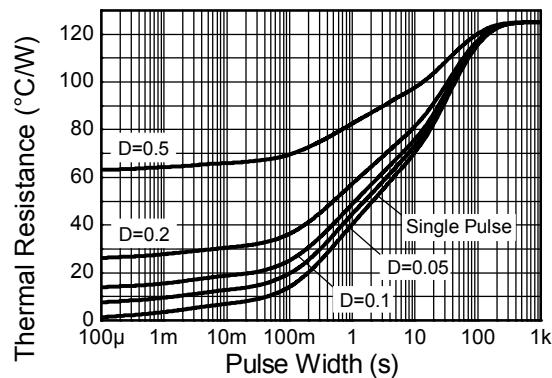
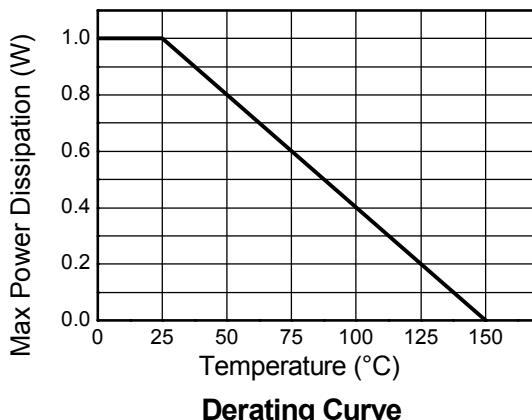
Characteristic	Symbol	Value	Unit
Collector-Base Voltage	$V_{CBO}$	-50	V
Collector-Emitter Voltage	$V_{CEO}$	-50	V
Emitter-Base Voltage	$V_{EBO}$	-6	V
Continuous Collector Current	$I_C$	-2	A
Peak Pulse Current	$I_{CM}$	-2.5	A
Base Current	$I_B$	-500	mA

**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	°C/W
Thermal Resistance, Junction to Leads (Note 6)	$R_{\theta JL}$	18.3	°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 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**


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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	$\text{BV}_{\text{CBO}}$	-50	—	—	V	$I_C = -100\mu\text{A}$
Collector-Emitter Breakdown Voltage (Note 7)	$\text{BV}_{\text{CEO}}$	-50	—	—	V	$I_C = -10\text{mA}$
Emitter-Base Breakdown Voltage	$\text{BV}_{\text{EBO}}$	-6	—	—	V	$I_E = -100\mu\text{A}$
Collector Cut-off Current	$I_{\text{CBO}}$	—	—	-100	nA	$V_{\text{CB}} = -50\text{V}$
Emitter Cut-off Current	$I_{\text{EBO}}$	—	—	-100	nA	$V_{\text{EB}} = -5\text{V}$
DC Current Gain (Note 8)	2DA1213O	70	—	140	—	$I_C = -500\text{mA}, V_{\text{CE}} = -2\text{V}$
	2DA1213Y	120	—	240	—	$I_C = -500\text{mA}, V_{\text{CE}} = -2\text{V}$
	2DA1213O, 2DA1213Y	20	—	—	—	$I_C = -2\text{A}, V_{\text{CE}} = -2\text{V}$
Collector-Emitter Saturation Voltage (Note 7)	$V_{\text{CE(sat)}}$	—	—	-0.5	V	$I_C = -1\text{A}, I_B = -50\text{mA}$
Base-Emitter Turn-On Voltage (Note 7)	$V_{\text{BE(sat)}}$	—	—	-1.2	V	$I_C = -1\text{A}, I_B = -50\text{mA}$
Transition Frequency	$f_T$	—	160	—	MHz	$I_C = -100\text{mA}, V_{\text{CE}} = -2\text{V}, f = 100\text{MHz}$
Output Capacitance	$C_{\text{obo}}$	—	17	—	pF	$V_{\text{CB}} = -10\text{V}, I_E = 0, f = 1\text{MHz}$
Turn-On Time	$t_{\text{on}}$	—	25	—	ns	
Storage Time	$t_{\text{(s)}}$	—	130	—	ns	$V_{\text{CE}} = -2\text{V}, I_C = -1\text{A}, I_{B1} = -I_{B2} = -50\text{mA}$
Fall Time	$t_{\text{(f)}}$	—	12	—	ns	

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

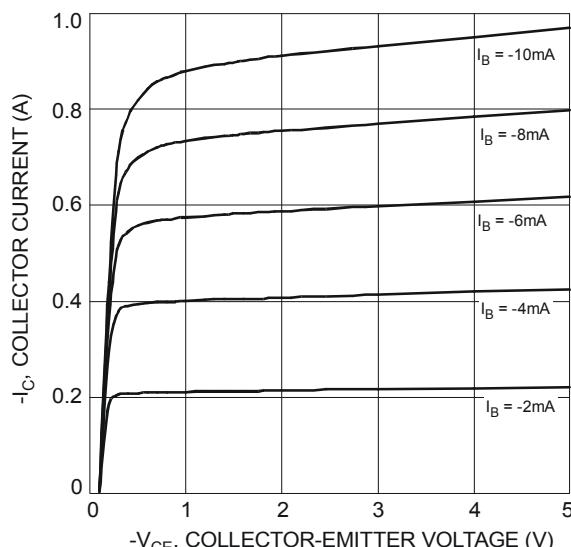
**Typical Electrical Characteristics** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)


Figure 1 Typical Collector Current vs. Collector-Emitter Voltage

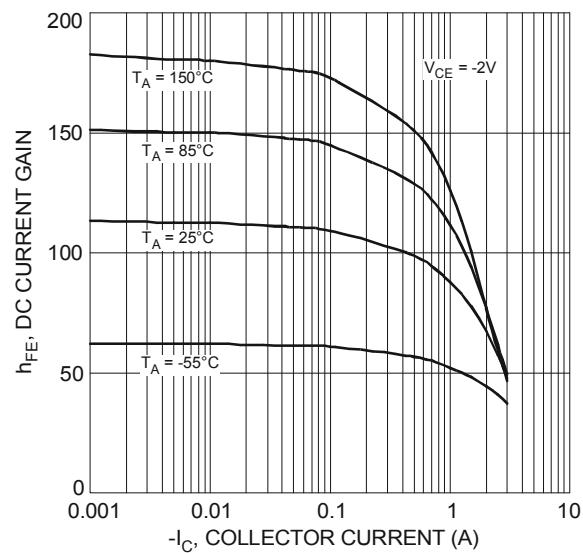


Figure 2 Typical DC Current Gain vs. Collector Current (2DA1213O)

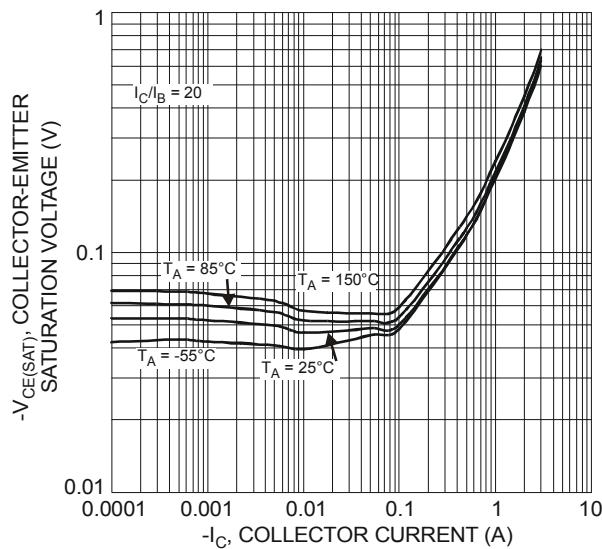


Figure 3 Typical Collector-Emitter Saturation Voltage vs. Collector Current

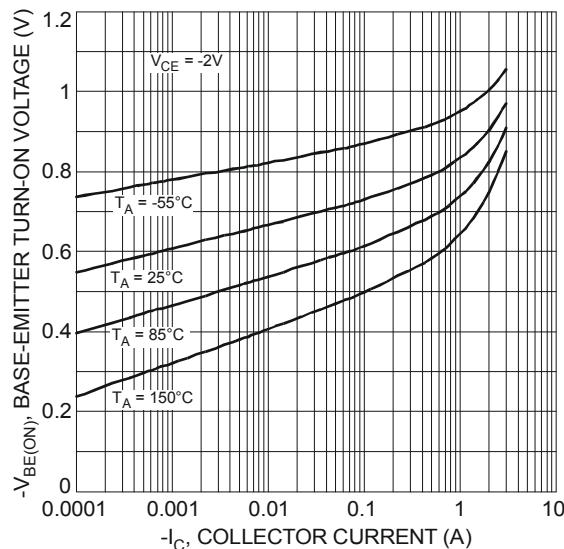


Figure 4 Typical Base-Emitter Turn-On Voltage vs. Collector Current

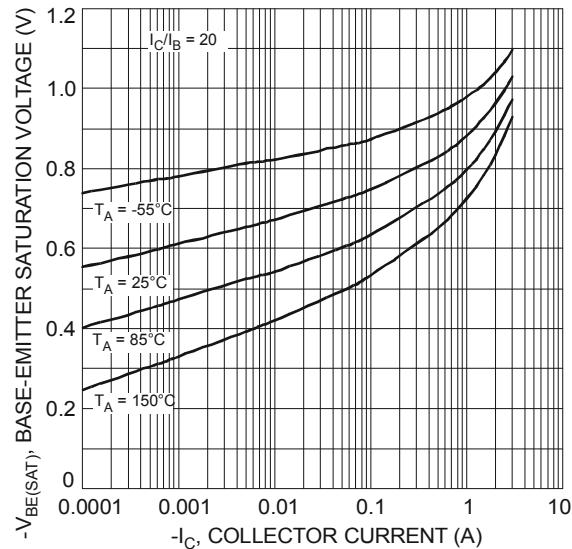


Figure 5 Typical Base-Emitter Saturation Voltage vs. Collector Current

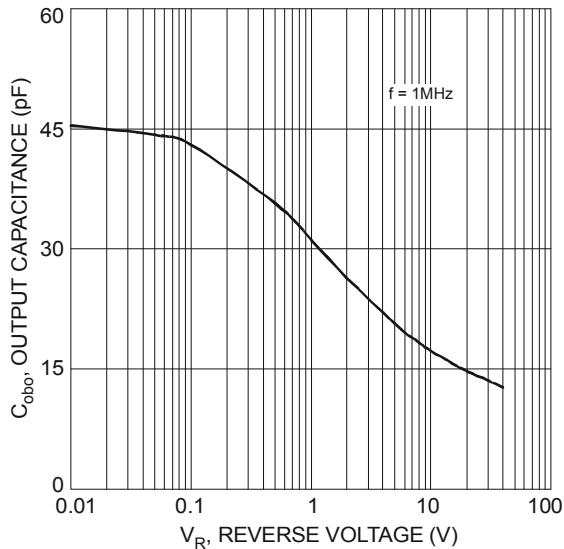


Figure 6 Typical Output Capacitance Characteristics

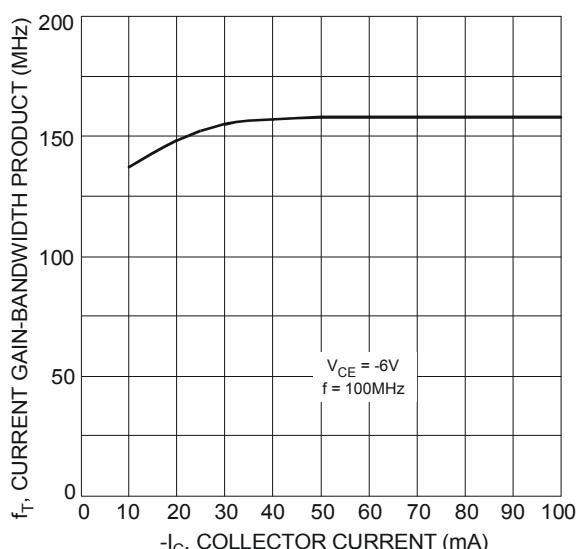
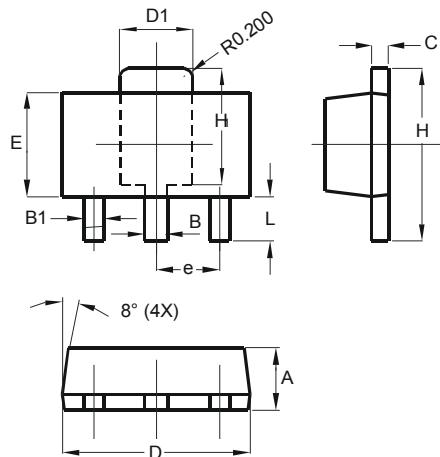


Figure 7 Typical Gain-Bandwidth Product vs. Collector Current

## Package Outline Dimensions

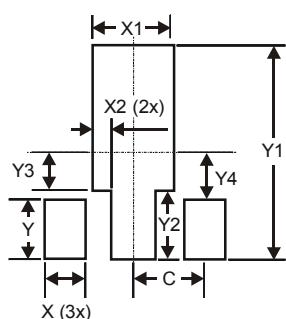
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.



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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