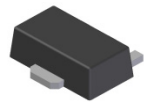


## Features

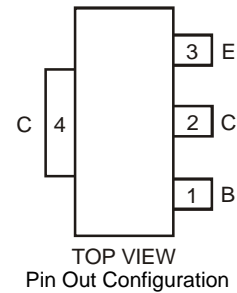
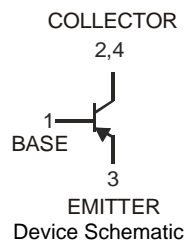
- Epitaxial Planar Die Construction
- Ideally Suited for Automated Assembly Processes
- Ideal for Medium Power Switching or Amplification Applications
- **Lead Free By Design/RoHS Compliant (Note 1)**
- **"Green" Device (Note 2)**

## Mechanical Data

- Case: SOT89-3L
- 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 annealed over Copper leadframe (Lead Free Plating). Solderable per MIL-STD-202, Method 208
- Marking Information: See Page 4
- Ordering Information: See Page 4
- Weight: 0.055 grams (approximate)



Top View



## Maximum Ratings @ $T_A = 25^\circ\text{C}$ unless otherwise specified

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	$V_{CB0}$	-50	V
Collector-Emitter Voltage	$V_{CEO}$	-50	V
Emitter-Base Voltage	$V_{EBO}$	-5	V
Continuous Collector Current	$I_C$	-2	A
Base Current	$I_B$	-0.4	A

## Thermal Characteristics

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 3) @ $T_A = 25^\circ\text{C}$	$P_D$	1	W
Thermal Resistance, Junction to Ambient Air (Note 3) @ $T_A = 25^\circ\text{C}$	$R_{\theta JA}$	125	$^\circ\text{C}/\text{W}$
Operating and Storage Temperature Range	$T_J, T_{STG}$	-55 to +150	$^\circ\text{C}$

- Notes:
1. No purposefully added lead.
  2. Diodes Inc.'s "Green" policy can be found on our website at [http://www.diodes.com/products/lead\\_free/index.php](http://www.diodes.com/products/lead_free/index.php).
  3. Device mounted on FR-4 PCB; pad layout as shown on page 4 or in Diodes Inc. suggested pad layout document AP02001, which can be found on our website at <http://www.diodes.com/datasheets/ap02001.pdf>.

**Electrical Characteristics** @ $T_A = 25^\circ\text{C}$  unless otherwise specified

Characteristic		Symbol	Min	Typ	Max	Unit	Conditions
<b>OFF CHARACTERISTICS (Note 4)</b>							
Collector-Base Breakdown Voltage		$V_{(BR)CBO}$	-50	—	—	V	$I_C = -100\mu\text{A}, I_E = 0$
Collector-Emitter Breakdown Voltage		$V_{(BR)CEO}$	-50	—	—	V	$I_C = -10\text{mA}, I_B = 0$
Emitter-Base Breakdown Voltage		$V_{(BR)EBO}$	-5	—	—	V	$I_E = -100\mu\text{A}, I_C = 0$
Collector Cut-Off Current		$I_{CBO}$	—	—	-0.1	$\mu\text{A}$	$V_{CB} = -50\text{V}, I_E = 0$
Emitter Cut-Off Current		$I_{EBO}$	—	—	-0.1	$\mu\text{A}$	$V_{EB} = -5\text{V}, I_C = 0$
<b>ON CHARACTERISTICS (Note 4)</b>							
Collector-Emitter Saturation Voltage		$V_{CE(SAT)}$	—	—	-0.5	V	$I_C = -1\text{A}, I_B = -50\text{mA}$
Base-Emitter Saturation Voltage		$V_{BE(SAT)}$	—	—	-1.2	V	$I_C = -1\text{A}, I_B = -50\text{mA}$
DC Current Gain	2DA1213O	$h_{FE}$	70	—	140	—	$V_{CE} = -2\text{V}, I_C = -0.5\text{A}$
	2DA1213Y		120	—	240	—	$V_{CE} = -2\text{V}, I_C = -0.5\text{A}$
	2DA1213O, 2DA1213Y		20	—	—	—	$V_{CE} = -2\text{V}, I_C = -2\text{A}$
<b>SMALL SIGNAL CHARACTERISTICS</b>							
Transition Frequency		$f_T$	—	160	—	MHz	$V_{CE} = -2\text{V}, I_C = -100\text{mA}, f = 100\text{MHz}$
Output Capacitance		$C_{obo}$	—	17	—	pF	$V_{CB} = -10\text{V}, I_E = 0, f = 1\text{MHz}$
<b>SWITCHING CHARACTERISTICS</b>							
Turn-On Time		$t_{on}$	—	25	—	ns	$V_{CE} = -2\text{V}, I_C = -1\text{A}, I_{B1} = -I_{B2} = -50\text{mA}$
Storage Time		$t_s$	—	130	—	ns	
Fall Time		$t_f$	—	12	—	ns	

Notes: 4. Measured under pulsed conditions. Pulse width = 300 $\mu\text{s}$ . Duty cycle  $\leq 2\%$ .

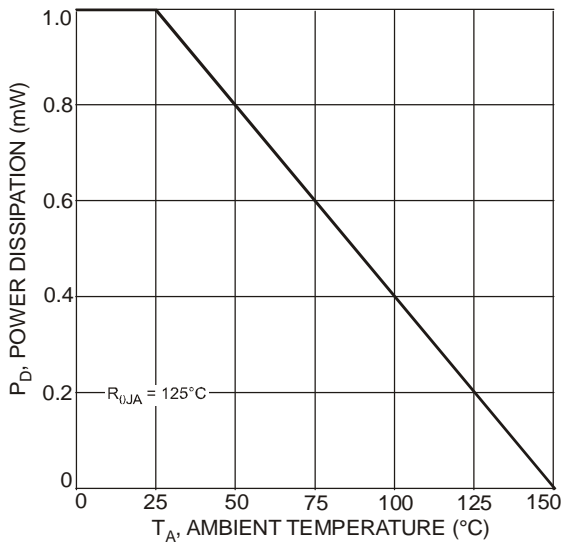


Fig. 1 Power Dissipation vs. Ambient Temperature

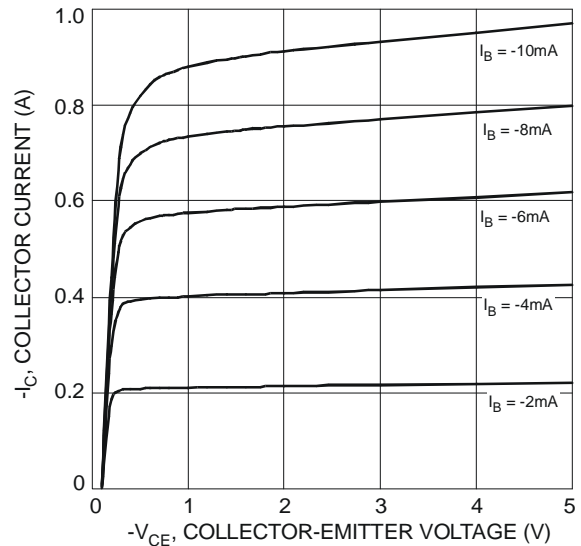


Fig. 2 Typical Collector Current vs. Collector-Emitter Voltage

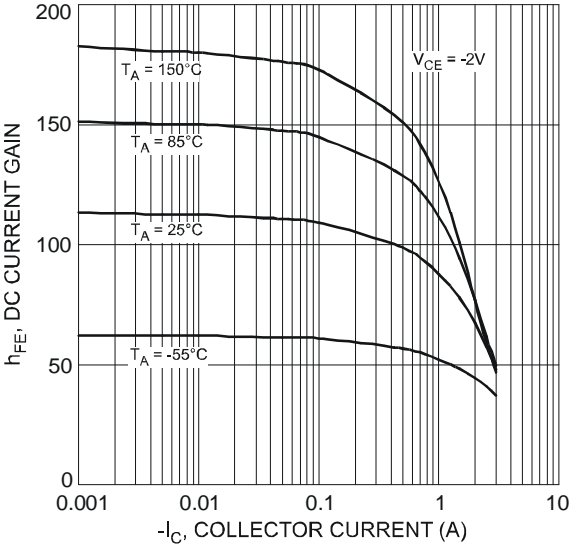


Fig. 3 Typical DC Current Gain vs. Collector Current (2DA12130)

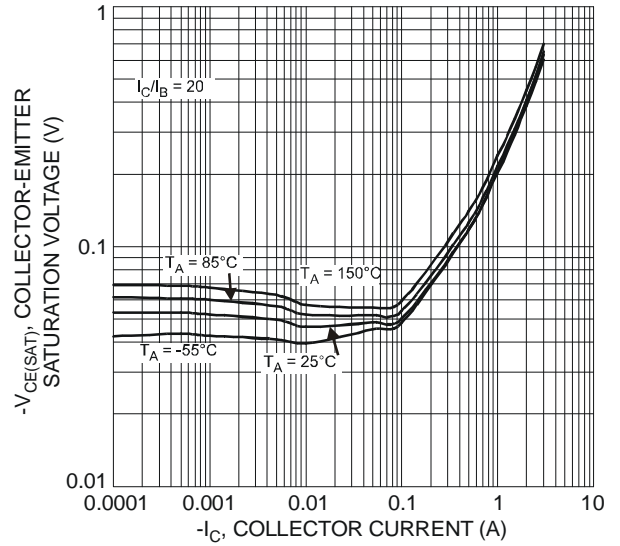


Fig. 4 Typical Collector-Emitter Saturation Voltage vs. Collector Current

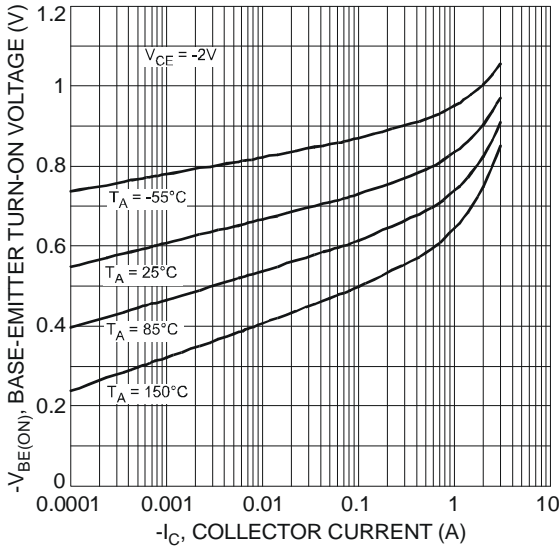


Fig. 5 Typical Base-Emitter Turn-On Voltage vs. Collector Current

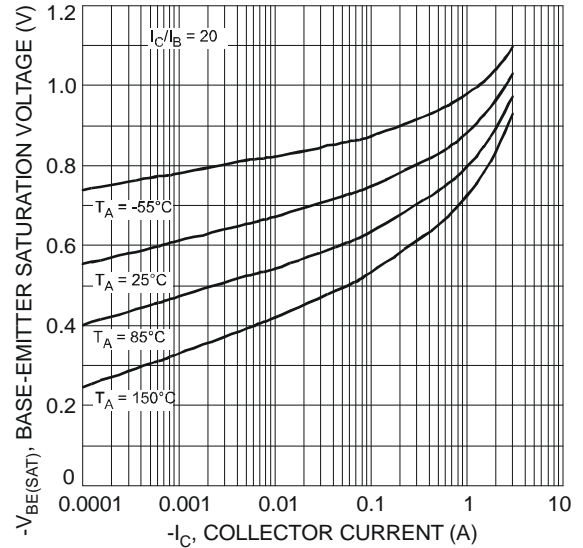


Fig. 6 Typical Base-Emitter Saturation Voltage vs. Collector Current

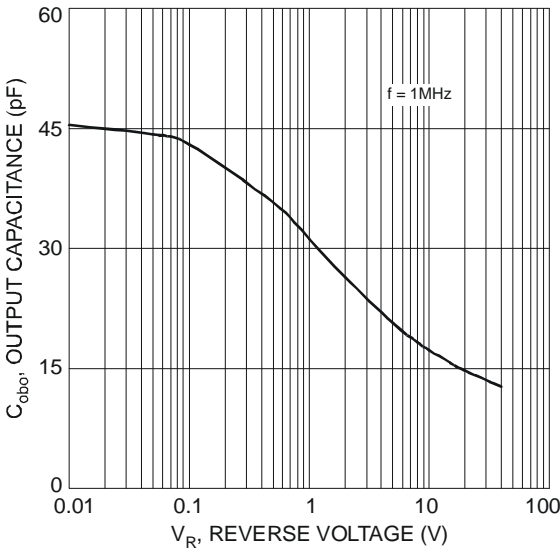


Fig. 7 Typical Output Capacitance Characteristics

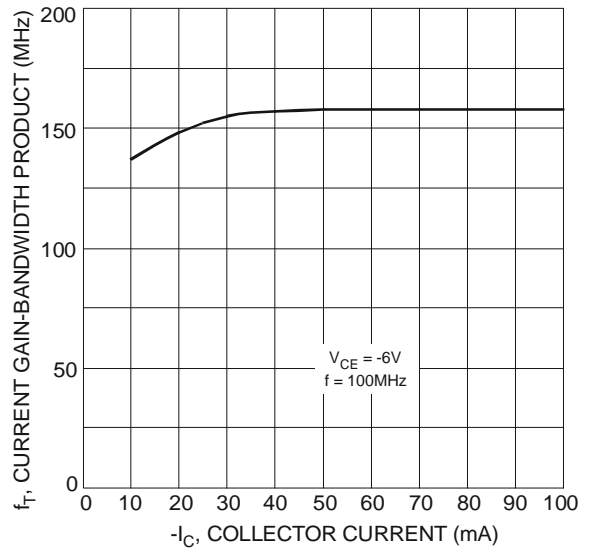


Fig. 8 Typical Gain-Bandwidth Product vs. Collector Current

### Ordering Information (Note 5)

Part Number	Case	Packaging
2DA12130-13	SOT89-3L	2500/Tape & Reel
2DA1213Y-13	SOT89-3L	2500/Tape & Reel

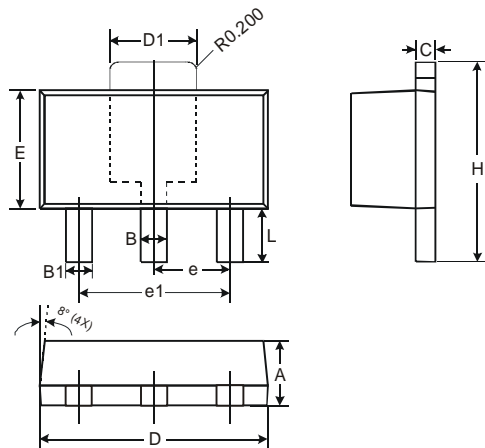
Notes: 5. For packaging details, go to our website at <http://www.diodes.com/datasheets/ap02007.pdf>.

### Marking Information



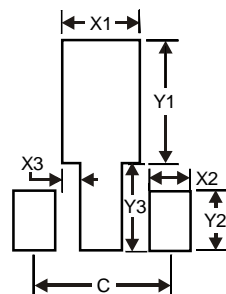
xxxx = Product Type Marking Code:  
 P25X = 2DA1213O  
 P25Y = 2DA1213Y  
 YWW = Date Code Marking  
 Y = Last digit of year (ex: 7 = 2007)  
 WW = Week code 01 - 53

### Package Outline Dimensions



SOT89-3L		
Dim	Min	Max
A	1.40	1.60
B	0.44	0.62
B1	0.35	0.54
C	0.35	0.43
D	4.40	4.60
D1	1.52	1.83
E	2.29	2.60
e	1.50 Typ	
e1	3.00 Typ	
H	3.94	4.25
L	0.89	1.20
All Dimensions in mm		

### Suggested Pad Layout



Dimensions	Value (in mm)
X1	1.7
X2	0.9
X3	0.4
Y1	2.7
Y2	1.3
Y3	1.9
C	3.0

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Телефон: 8 (812) 309-75-97 (многоканальный)

Факс: 8 (812) 320-03-32

Электронная почта: [ocean@oceanchips.ru](mailto:ocean@oceanchips.ru)

Web: <http://oceanchips.ru/>

Адрес: 198099, г. Санкт-Петербург, ул. Калинина, д. 2, корп. 4, лит. А