



THE DATASHEET OF
2DA1213YQ-13



Description

This Bipolar Junction Transistor (BJT) is designed to meet the stringent requirement of Automotive Applications.

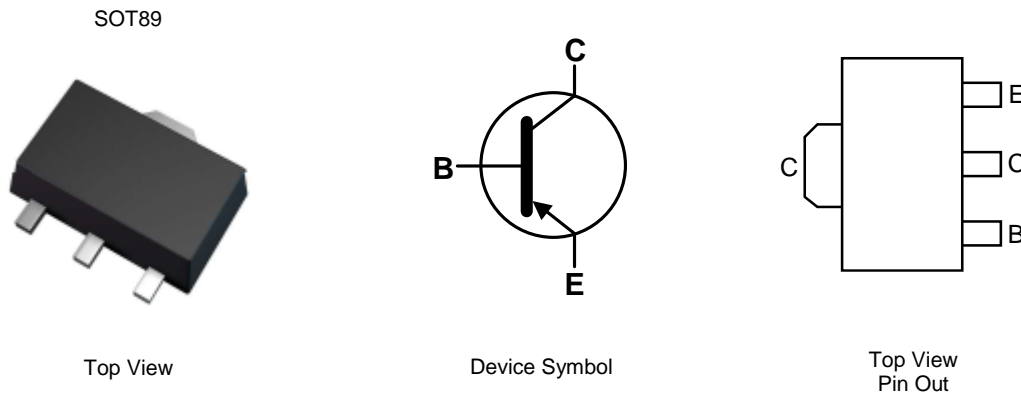
Features

- $BV_{CEO} > -50V$
- $I_c = -2A$ High Continuous Collector Current
- High Gain Hold up
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **The 2DA1213YQ is suitable for automotive applications requiring specific change control; this part is AEC-Q101 qualified, PPAP capable, and manufactured in IATF 16949 certified facilities.**

<https://www.diodes.com/quality/product-definitions/>

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)

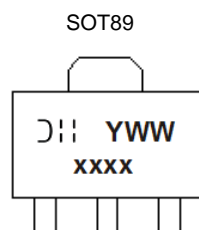


Ordering Information (Note 4)

Part Number	Marking	Reel Size (inches)	Tape Width (mm)	Quantity Per Reel
2DA1213YQ-13	P25Y	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



D|| = Manufacturer's Marking
 xxxx = P25Y = Product Type Marking Code
 YWW = Date Code Marking
 Y = Last Digit of Year (ex: 9 = 2019)
 WW = Week Code (01 to 53)

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

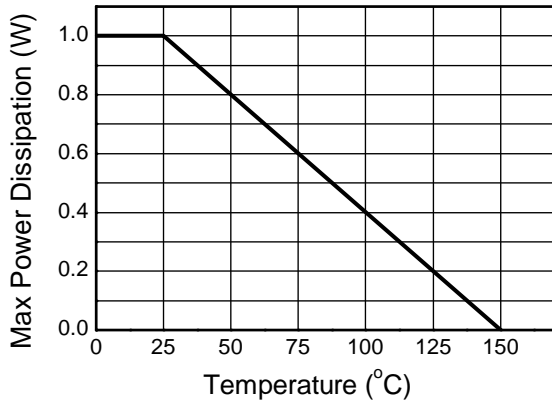
Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V _{CB0}	-50	V
Collector-Emitter Voltage	V _{CEO}	-50	V
Emitter-Base Voltage	V _{EBO}	-6	V
Continuous Collector Current	I _C	-2	A
Peak Pulse Current	I _{CM}	-2.5	A
Base Current	I _B	-500	mA

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

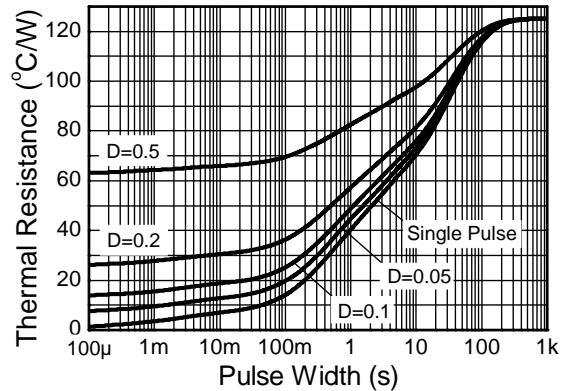
Characteristic	Symbol	Value	Unit
Power Dissipation (Note 5)	P _D	1	W
Thermal Resistance, Junction to Ambient (Note 5)	R _{θJA}	125	°C/W
Thermal Resistance, Junction to Leads (Note 6)	R _{θJL}	18.3	°C/W
Operating and Storage Temperature Range	T _J , T _{STG}	-55 to +150	°C

Notes: 5. For a device surface mounted on 15mm x 15mm x 0.6mm FR-4 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).

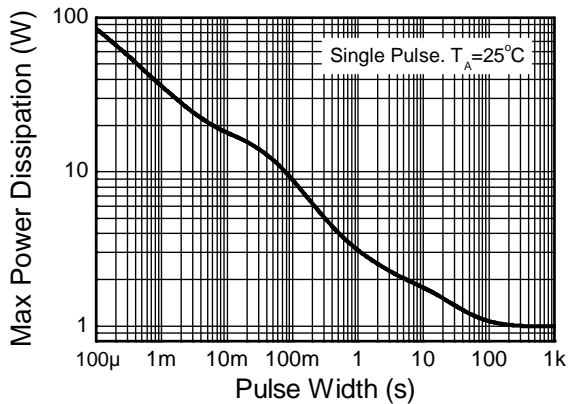
Thermal Characteristics and Derating Information



Derating Curve



Transient Thermal Impedance



Pulse Power Dissipation

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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV_{CBO}	-50	—	—	V	$I_C = -100\mu\text{A}$
Collector-Emitter Breakdown Voltage (Note 7)	BV_{CEO}	-50	—	—	V	$I_C = -10\text{mA}$
Emitter-Base Breakdown Voltage	BV_{EBO}	-6	—	—	V	$I_E = -100\mu\text{A}$
Collector Cut-off Current	I_{CBO}	—	—	-100	nA	$V_{CB} = -50\text{V}$
Emitter Cut-off Current	I_{EBO}	—	—	-100	nA	$V_{EB} = -5\text{V}$
DC Current Gain (Note 7)	h_{FE}	120	—	240	—	$I_C = -500\text{mA}, V_{CE} = -2\text{V}$
		20		—		$I_C = -2\text{A}, V_{CE} = -2\text{V}$
Collector-Emitter Saturation Voltage (Note 7)	$V_{CE(sat)}$	—	—	-0.5	V	$I_C = -1\text{A}, I_B = -50\text{mA}$
Base-Emitter Saturation Voltage (Note 7)	$V_{BE(sat)}$	—	—	-1.2	V	$I_C = -1\text{A}, I_B = -50\text{mA}$
Transition Frequency	f_T	—	160	—	MHz	$I_C = -100\text{mA}, V_{CE} = -2\text{V}, f = 100\text{MHz}$
Output Capacitance	C_{obo}	—	17	—	pF	$V_{CB} = -10\text{V}, I_E = 0, f = 1\text{MHz}$
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	

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.)

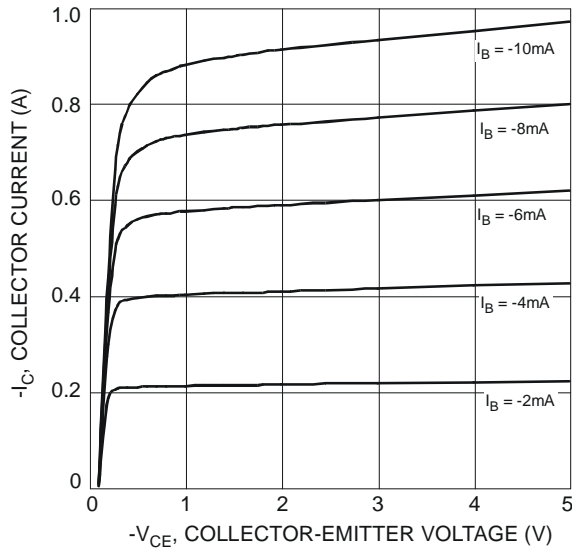


Figure 1 Typical Collector Current vs. Collector-Emitter Voltage

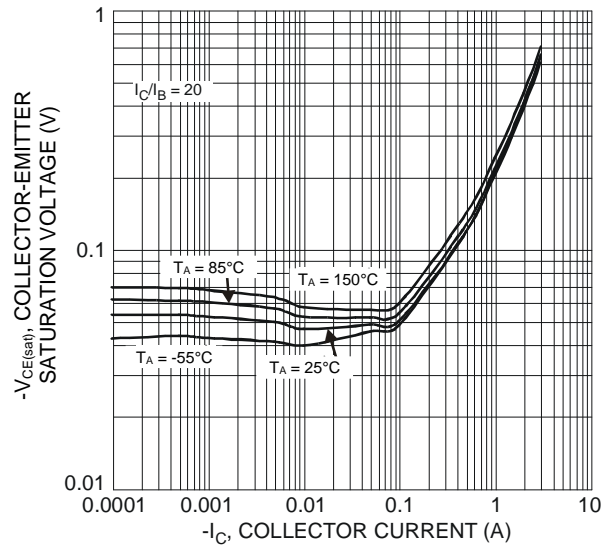


Figure 2 Typical Collector-Emitter Saturation Voltage vs. Collector Current

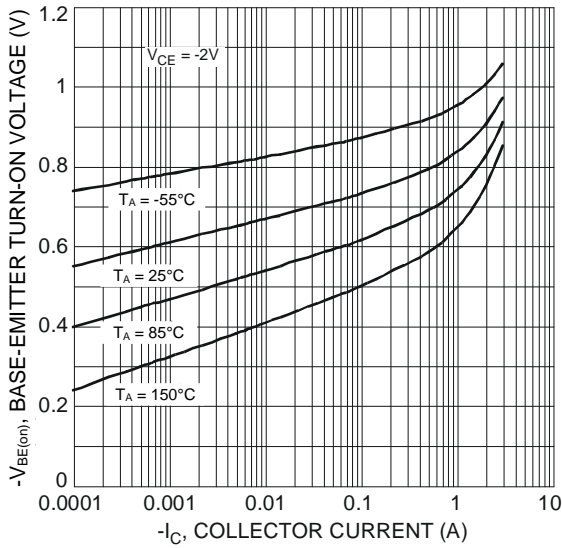


Figure 3 Typical Base-Emitter Turn-On Voltage vs. Collector Current

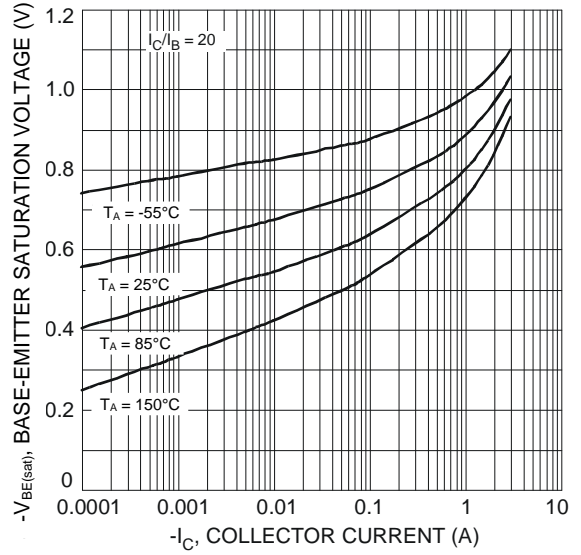


Figure 4 Typical Base-Emitter Saturation Voltage vs. Collector Current

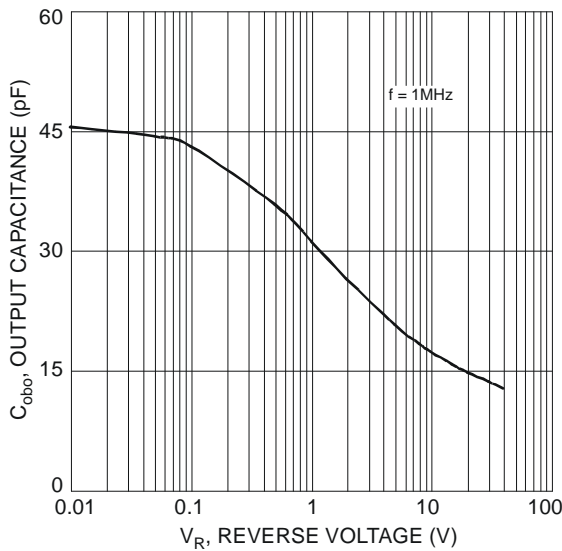


Figure 5 Typical Output Capacitance Characteristics

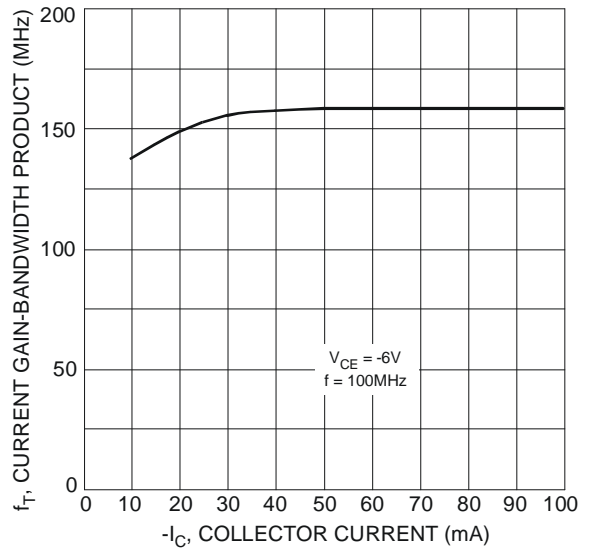
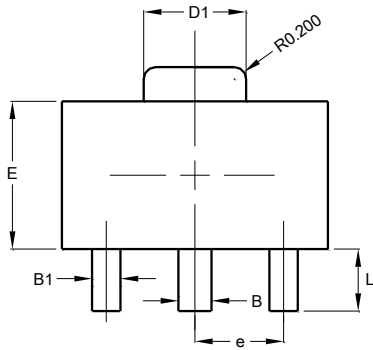


Figure 6 Typical Gain-Bandwidth Product vs. Collector Current

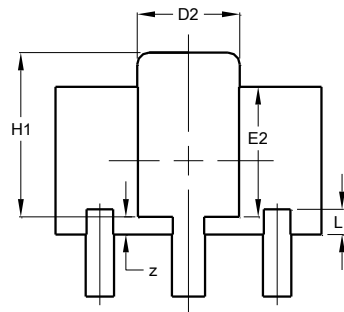
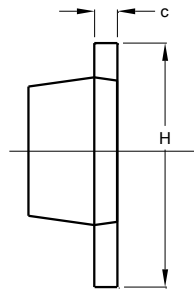
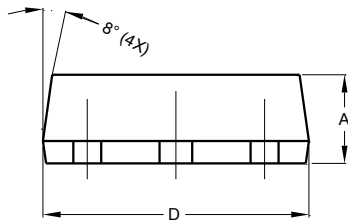
Package Outline Dimensions

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

SOT89



TOP VIEW



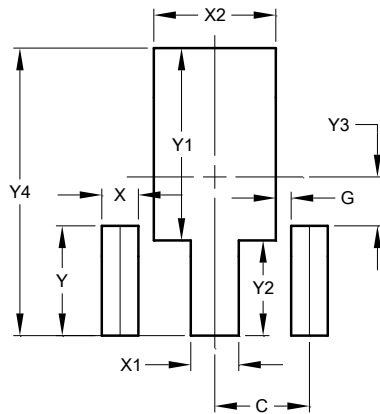
BOTTOM VIEW

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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