



**THE DATASHEET OF  
DXT222A-13**



## 40V NPN SURFACE MOUNT TRANSISTOR IN SOT89

### Features

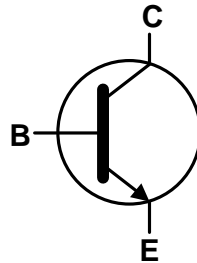
- $BV_{CEO} > 40V$
- $I_C = 600mA$  High Collector Current
- Complementary PNP Type: DXT2907A
- Ideal for Medium Power Switching or Amplification Applications
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**

### Mechanical Data

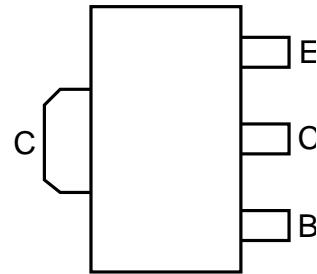
- Case: SOT89
- Case Material: Molded Plastic, "Green" Molding Compound; UL Flammability Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish - Matte Tin Plated Leads, Solderable per MIL-STD-202, Method 208 ③
- Weight: 0.072 grams (Approximate)



Top View



Device Symbol



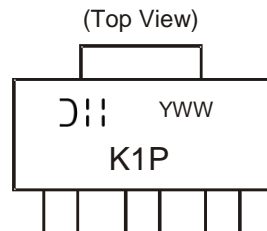
Top View Pin-Out

### Ordering Information (Note 4)

Product	Compliance	Marking	Reel size (inches)	Tape Width (mm)	Quantity per Reel
DXT2222A-13	AEC-Q101	K1P	13	12	2,500
DXT2222ATC	AEC-Q101	K1P	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



⤵⋮⋮ = Manufacturer's Code Marking  
 K1P = Product Type Marking Code  
 YWW = Date Code Marking  
 Y = Last Digit of Year ex: 5 = 2015  
 WW = Week Code 01 to 53

### Absolute Maximum Ratings (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V <sub>CBO</sub>	75	V
Collector-Emitter Voltage	V <sub>CEO</sub>	40	V
Emitter-Base Voltage	V <sub>EBO</sub>	6	V
Peak Pulse Current	I <sub>CM</sub>	800	mA
Continuous Collector Current	I <sub>C</sub>	600	mA

### Thermal Characteristics

Characteristic	Symbol	Value	Unit
Power Dissipation	P <sub>D</sub>	(Note 5)	0.75
		(Note 6)	1.2
Thermal Resistance, Junction to Ambient Air	R <sub>θJA</sub>	(Note 5)	166
		(Note 6)	104
Operating and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-55 to +150	°C

### ESD Ratings (Note 7)

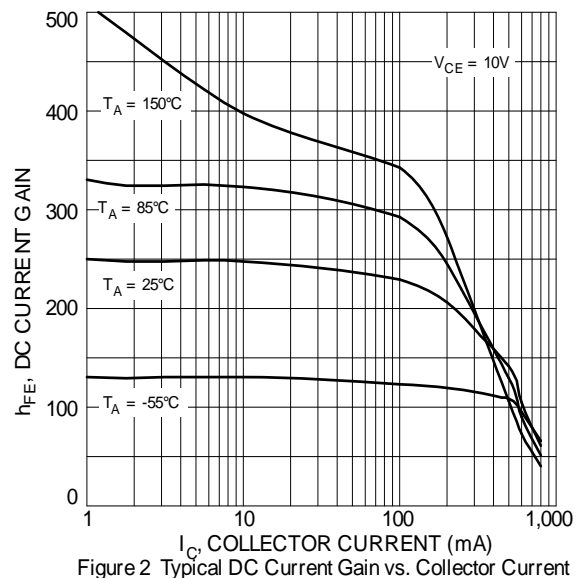
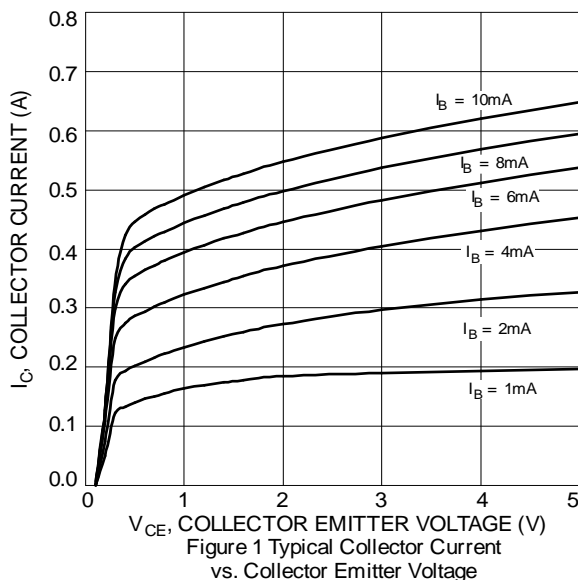
Characteristic	Symbol	Value	Unit	JEDEC Class
Electrostatic Discharge - Human Body Model	ESD HBM	4,000	V	3A
Electrostatic Discharge - Machine Model	ESD MM	400	V	C

- Notes:
5. For a device mounted with the exposed collector pad on minimum recommended pad layout 1oz copper that is on a single-sided 1.6mm FR4 PCB; device is measured under still air conditions whilst operating in a steady-state.
  6. Same as Note 5, except the device is mounted with the exposed collector pad on 25mm x 25mm 1oz copper.
  7. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

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

Characteristic	Symbol	Min	Max	Unit	Test Conditions
<b>OFF CHARACTERISTICS (Note 8)</b>					
Collector-Base Breakdown Voltage	$BV_{CBO}$	75	—	V	$I_C = 10\mu\text{A}$
Collector-Emitter Breakdown Voltage	$BV_{CEO}$	40	—	V	$I_C = 10\text{mA}$
Emitter-Base Breakdown Voltage	$BV_{EBO}$	6.0	—	V	$I_E = 10\mu\text{A}$
Collector Cutoff Current	$I_{CBO}$	—	10	nA $\mu\text{A}$	$V_{CB} = 60\text{V}$ $V_{CB} = 60\text{V}, T_A = +150^\circ\text{C}$
Collector Cutoff Current	$I_{CEX}$	—	10	nA	$V_{CE} = 60\text{V}, V_{EB(OFF)} = 3.0\text{V}$
Emitter Cutoff Current	$I_{EBO}$	—	10	nA	$V_{EB} = 3.0\text{V}$
Base Cutoff Current	$I_{BL}$	—	20	nA	$V_{CE} = 60\text{V}, V_{EB(OFF)} = 3.0\text{V}$
<b>ON CHARACTERISTICS (Note 8)</b>					
DC Current Gain	$h_{FE}$	35	—	—	$I_C = 100\mu\text{A}, V_{CE} = 10\text{V}$ $I_C = 1.0\text{mA}, V_{CE} = 10\text{V}$ $I_C = 10\text{mA}, V_{CE} = 10\text{V}$ $I_C = 150\text{mA}, V_{CE} = 10\text{V}$ $I_C = 500\text{mA}, V_{CE} = 10\text{V}$ $I_C = 10\text{mA}, V_{CE} = 10\text{V}, T_A = -55^\circ\text{C}$ $I_C = 150\text{mA}, V_{CE} = 1.0\text{V}$
		50	—		
		75	—		
		100	300		
		40	—		
		35	—		
Collector-Emitter Saturation Voltage	$V_{CE(SAT)}$	—	0.3 1.0	V	$I_C = 150\text{mA}, I_B = 15\text{mA}$ $I_C = 500\text{mA}, I_B = 50\text{mA}$
Base-Emitter Saturation Voltage	$V_{BE(SAT)}$	0.6	1.2 2.0	V	$I_C = 150\text{mA}, I_B = 15\text{mA}$ $I_C = 500\text{mA}, I_B = 50\text{mA}$
<b>SMALL SIGNAL CHARACTERISTICS</b>					
Output Capacitance	$C_{obo}$	—	8	pF	$V_{CB} = 10\text{V}, f = 1.0\text{MHz}$
Input Capacitance	$C_{ibo}$	—	25	pF	$V_{EB} = 0.5\text{V}, f = 1.0\text{MHz}$
Current Gain-Bandwidth Product	$f_T$	300	—	MHz	$V_{CE} = 20\text{V}, I_C = 20\text{mA}, f = 100\text{MHz}$
Noise Figure	NF	—	4.0	dB	$V_{CE} = 10\text{V}, I_C = 150\mu\text{A}, R_S = 1.0\text{k}\Omega, f = 1.0\text{kHz}$
<b>SWITCHING CHARACTERISTICS</b>					
Delay Time	$t_d$	—	10	ns	$V_{CC} = 30\text{V}, I_C = 150\text{mA}, V_{EB(OFF)} = 0.5\text{V}, I_{B1} = 15\text{mA}$
Rise Time	$t_r$	—	25	ns	
Storage Time	$t_s$	—	225	ns	$V_{CC} = 30\text{V}, I_C = 150\text{mA}, I_{B1} = I_{B2} = 15\text{mA}$
Fall Time	$t_f$	—	60	ns	

Note: 8. Measured under pulsed conditions. Pulse width = 300 $\mu\text{s}$ . Duty cycle  $\leq 2\%$ .

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


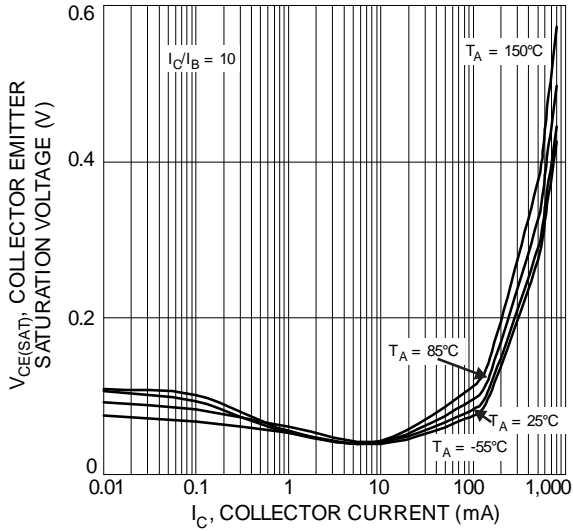


Figure 3 Typical Collector Emitter Saturation Voltage vs. Collector Current

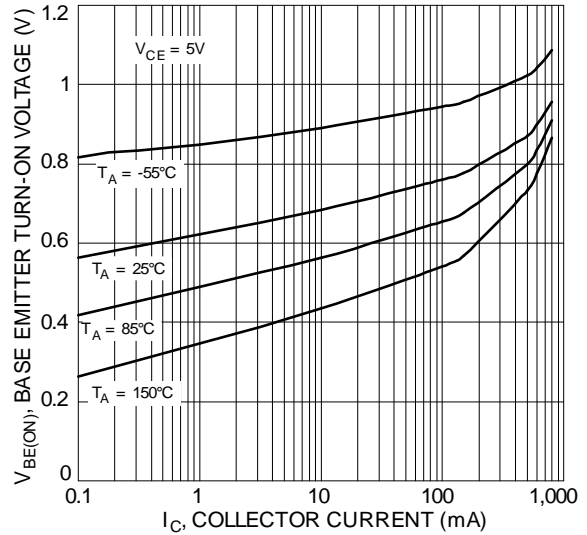


Figure 4 Typical Base Emitter Turn-On Voltage vs. Collector Current

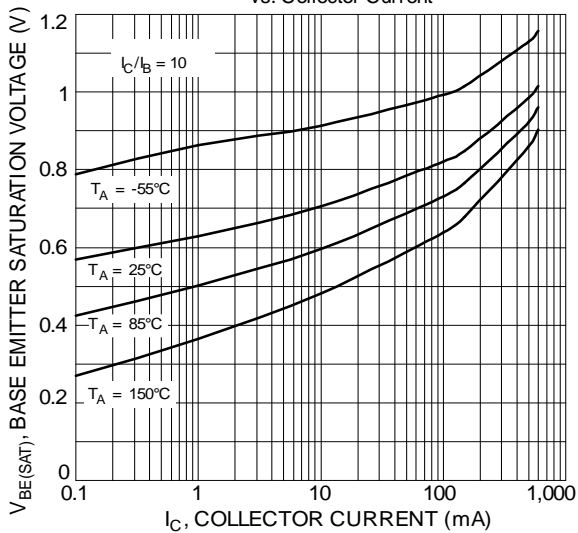


Figure 5 Typical Base Emitter Saturation Voltage vs. Collector Current

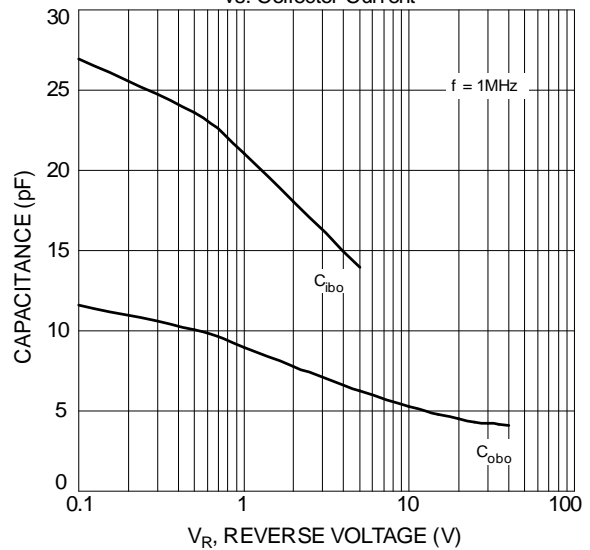


Figure 6 Typical Capacitance Characteristics

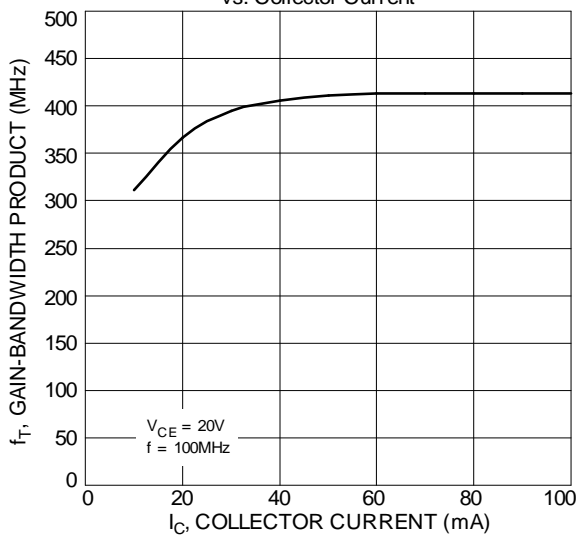
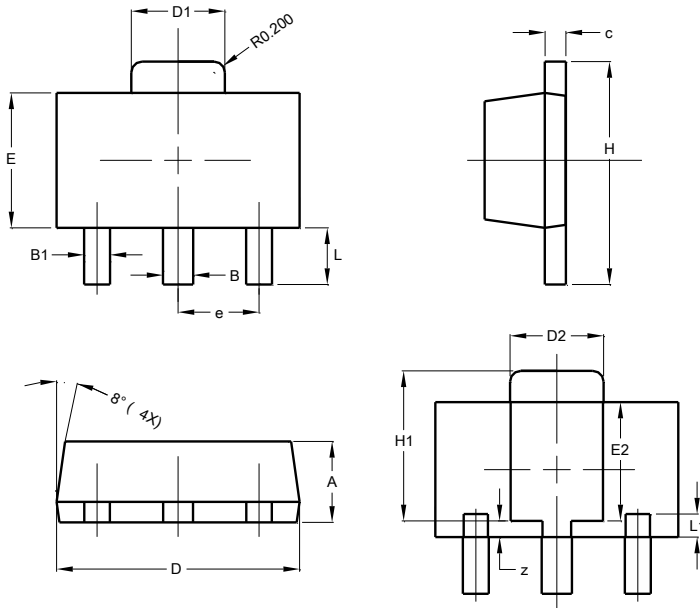


Figure 7 Typical Gain-Bandwidth Product vs. Collector Current

**Package Outline Dimensions**

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

**SOT89**

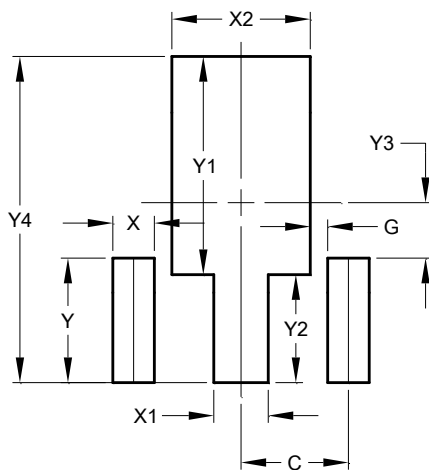


SOT89			
Dim	Min	Max	Typ
A	1.40	1.60	1.50
B	0.50	0.62	0.56
B1	0.42	0.54	0.48
c	0.35	0.43	0.38
D	4.40	4.60	4.50
D1	1.62	1.83	1.733
D2	1.61	1.81	1.71
E	2.40	2.60	2.50
E2	2.05	2.35	2.20
e	-	-	1.50
H	3.95	4.25	4.10
H1	2.63	2.93	2.78
L	0.90	1.20	1.05
L1	0.327		
z	0.20		
All Dimensions in mm			

**Suggested Pad Layout**

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