

**20V PNP HIGH GAIN TRANSISTOR IN SOT89**

**Features**

- $BV_{CEO} > -20V$
- High current capability Max Continuous Current  $I_C = -6A$
- Low saturation voltage  $V_{CE(sat)} < -47mV @ I_C = -1A$
- $R_{CE(sat)} = 28m\Omega$
- $P_D = 2.4W$
- Complementary part number ZXTN19020DZ
- **Lead Free, RoHS Compliant (Note 1)**
- **Halogen and Antimony Free, "Green" Device (Note 2)**
- **Qualified to AEC-Q101 Standards for High Reliability**

**Mechanical Data**

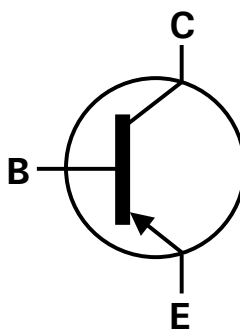
- Case: SOT89
- Moisture Sensitivity: Level 1 per J-STD-020
- UL Flammability Rating 94V-0
- Terminals: Matte Tin Finish
- Weight: 0.052 grams (Approximate)

**Application**

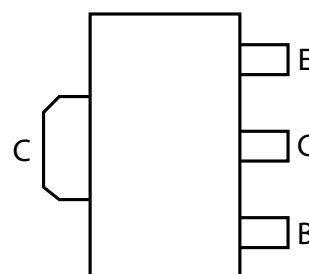
- Power disconnect switch
- Battery chargers
- High side drivers
- Motor drive



Top View



Device symbol



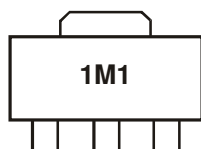
Pin-out Top

**Ordering Information** (Note 3)

Product	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
ZXTP19020DZTA	1M1	7	12	1,000

- Notes:
1. No purposefully added lead.
  2. Halogen and Antimony Free. Diodes Inc's "Green" Policy can be found on our website at <http://www.diodes.com>
  3. For packaging details, go to our website at <http://www.diodes.com>

**Marking Information**



1M1 = Product Type Marking Code

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

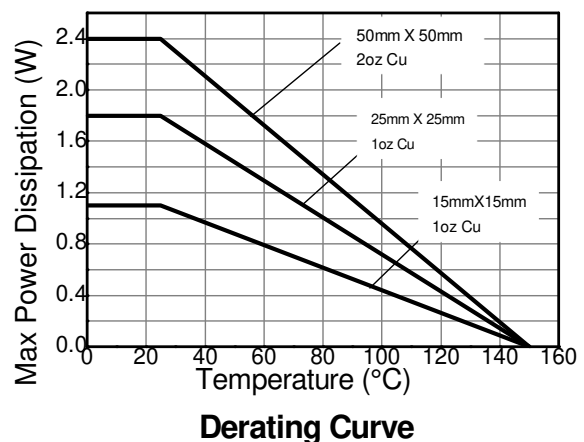
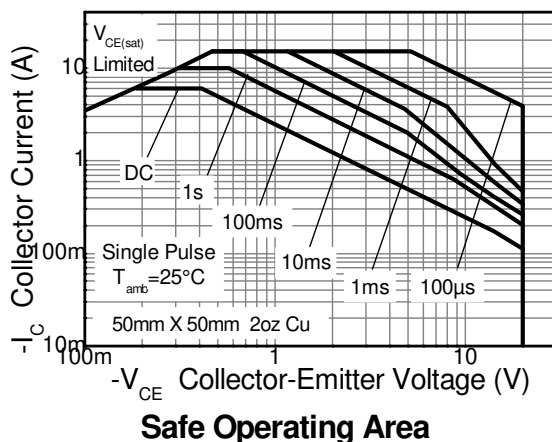
Characteristic	Symbol	Value	Unit
Collector-Base Voltage	$V_{CBO}$	-25	V
Collector-Emitter Voltage	$V_{CEO}$	-20	V
Emitter-Base Voltage	$V_{ECO}$	-4	V
Emitter-Base Voltage	$V_{EBO}$	-7	V
Continuous Collector Current (Note 6)	$I_C$	-6	A
Base current	$I_B$	-1	A
Peak Pulse Current	$I_{CM}$	-15	A

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

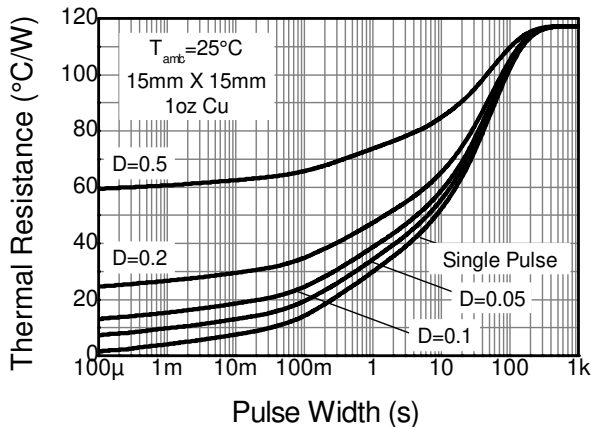
Characteristic	Symbol	Value	Unit
Power Dissipation (Note 4)	$P_D$	1.1	W
Linear derating factor		8.8	mW/ $^\circ\text{C}$
Power Dissipation (Note 5)	$P_D$	1.8	W
Linear derating factor		14.4	mW/ $^\circ\text{C}$
Power Dissipation (Note 6)	$P_D$	2.4	W
Linear derating factor		19.2	mW/ $^\circ\text{C}$
Power Dissipation (Note 7)	$P_D$	4.46	W
Linear derating factor		35.7	mW/ $^\circ\text{C}$
Power Dissipation (Note 8)	$P_D$	26.7	W
Linear derating factor		213	mW/ $^\circ\text{C}$
Thermal Resistance, Junction to Ambient (Note 4)	$R_{\theta JA}$	117	$^\circ\text{C}/\text{W}$
Thermal Resistance, Junction to Ambient (Note 5)	$R_{\theta JA}$	68	$^\circ\text{C}/\text{W}$
Thermal Resistance, Junction to Ambient (Note 6)	$R_{\theta JA}$	51	$^\circ\text{C}/\text{W}$
Thermal Resistance, Junction to Ambient (Note 7)	$R_{\theta JA}$	117	$^\circ\text{C}/\text{W}$
Thermal Resistance, Junction to Leads (Note 8)	$R_{\theta JL}$	4.69	$^\circ\text{C}/\text{W}$
Operating and Storage Temperature Range	$T_J, T_{STG}$	-55 to +150	$^\circ\text{C}$

- Notes:
- For a device surface mounted on 15mm x 15mm x 0.6mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions.
  - Mounted on 25mm x 25mm x 0.6mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions.
  - Mounted on 50mm x 50mm x 0.6mm FR4 PCB with high coverage of single sided 2oz copper, in still air conditions.
  - As note 6 above measured at  $t < 5$  seconds.
  - Junction to case (collector tab). Typical

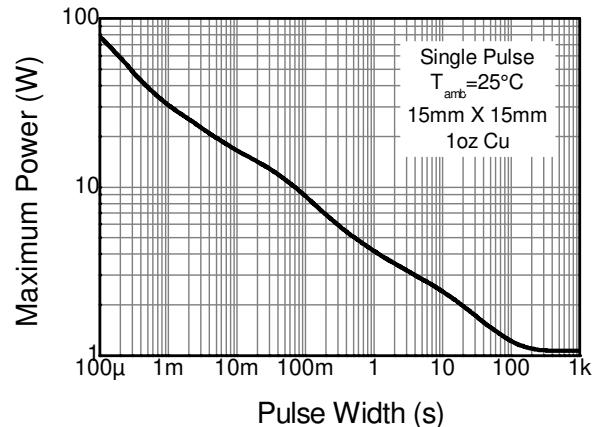
**Thermal Characteristics**



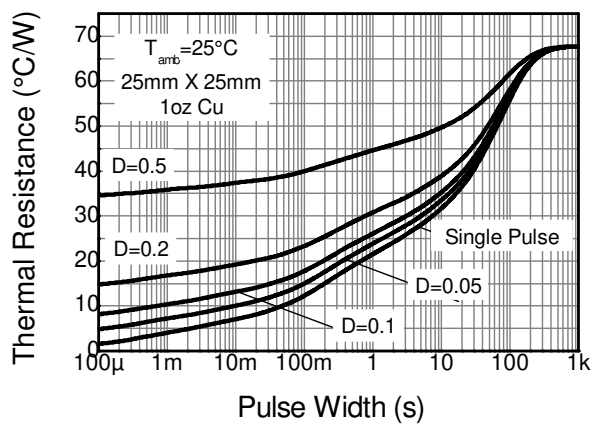
**Thermal Characteristics (- Continued)**



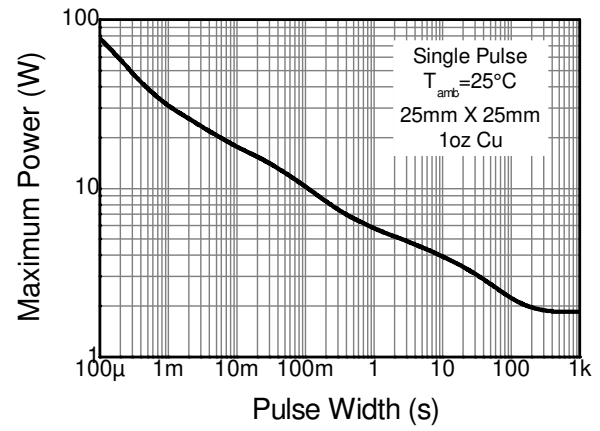
**Transient Thermal Impedance**



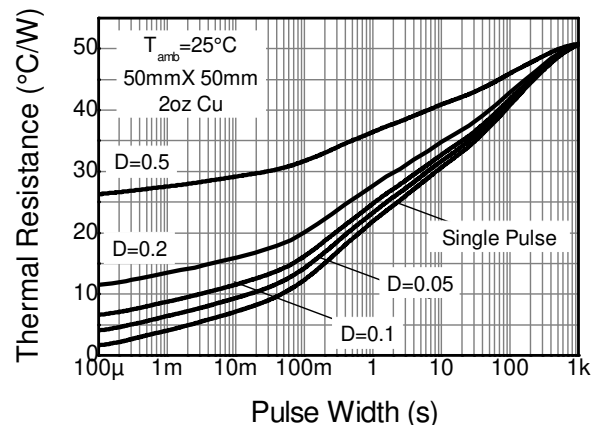
**Pulse Power Dissipation**



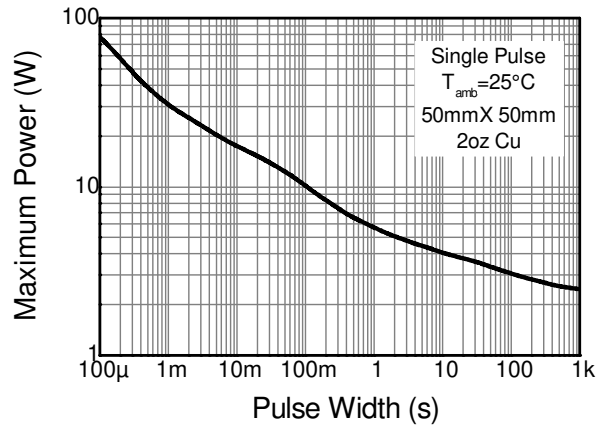
**Transient Thermal Impedance**



**Pulse Power Dissipation**



**Transient Thermal Impedance**



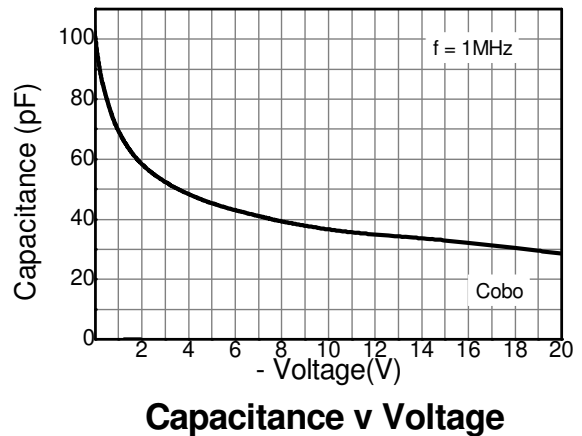
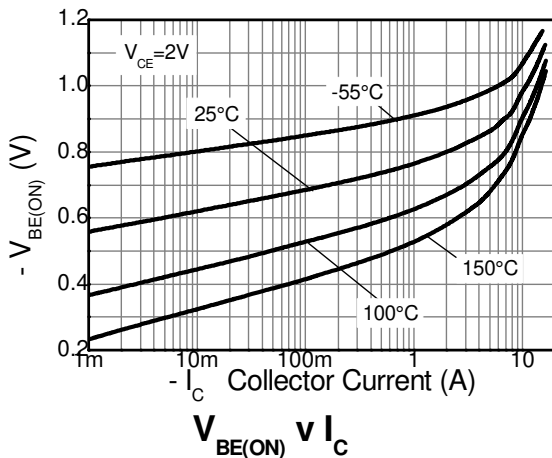
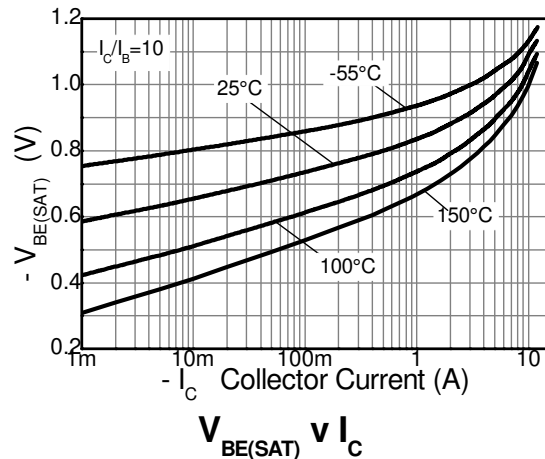
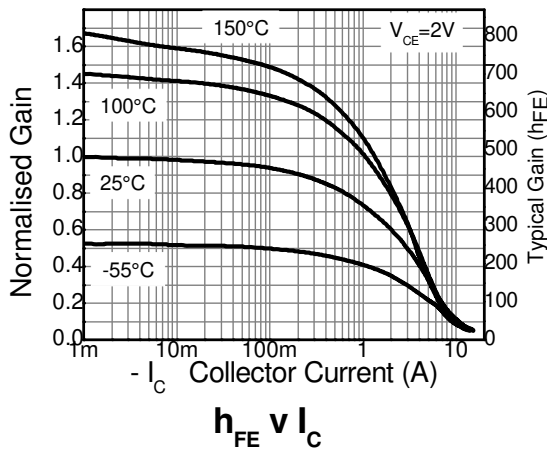
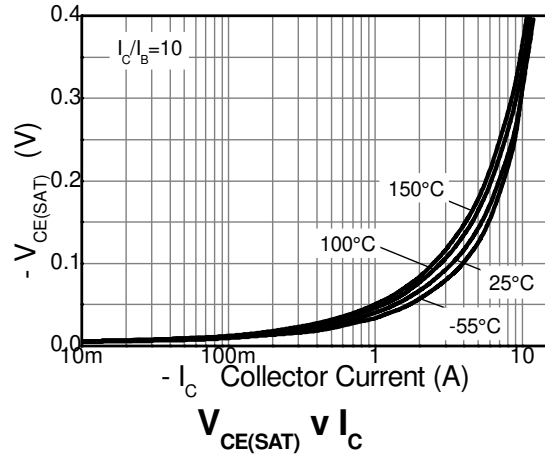
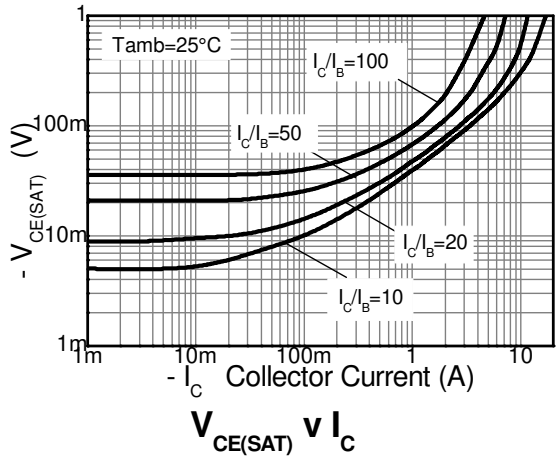
**Pulse Power Dissipation**

**Electrical Characteristics** @T<sub>A</sub> = 25°C unless otherwise specified

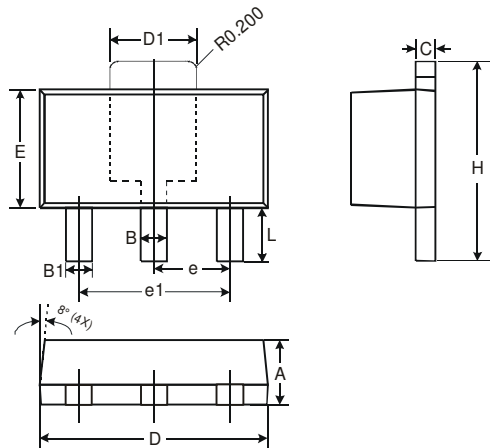
Characteristic	Symbol	Min	Typ.	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV <sub>CB0</sub>	-25	-55	-	V	I <sub>C</sub> = -100μA
Collector-Emitter Breakdown Voltage (Notes 9)	BV <sub>CEO</sub>	-20	-50	-	V	I <sub>C</sub> = -10mA
Emitter-Collector breakdown voltage (reverse blocking)	BV <sub>ECX</sub>	-4	-8.6	-	V	I <sub>E</sub> = -100μA, R <sub>BC</sub> < 1kΩ or 0.25V > V <sub>BC</sub> > -0.25V
Emitter-Collector breakdown voltage (reverse blocking)	BV <sub>ECO</sub>	-4	-8.6	-	V	I <sub>E</sub> = -100μA
Emitter-Base Breakdown Voltage	BV <sub>EBO</sub>	-7	-8.2	-	V	I <sub>E</sub> = -100μA
Collector Cutoff Current	I <sub>CB0</sub>	-	< -1	-50	nA	V <sub>CB</sub> = -25V
		-	-	-500		V <sub>CB</sub> = -25V, T <sub>A</sub> = 100°C
Emitter Cutoff Current	I <sub>EBO</sub>	-	< -1	-50	nA	V <sub>EB</sub> = -5.6V
DC current transfer Static ratio (Notes 9)	h <sub>FE</sub>	300	450	900	-	I <sub>C</sub> = -100mA, V <sub>CE</sub> = -2V
		200	290	-		I <sub>C</sub> = -2A, V <sub>CE</sub> = -2V
		65	110	-		I <sub>C</sub> = -6A, V <sub>CE</sub> = -2V
		-	25	-		I <sub>C</sub> = -15A, V <sub>CE</sub> = -2V
Collector-Emitter Saturation Voltage (Notes 9)	V <sub>CE(sat)</sub>	-	-40	-47	mV	I <sub>C</sub> = -1A, I <sub>B</sub> = -100mA
		-	-100	-130		I <sub>C</sub> = -1A, I <sub>B</sub> = -10mA
		-	-115	-145		I <sub>C</sub> = -2A, I <sub>B</sub> = -40mA
		-	-225	-275		I <sub>C</sub> = -6A, I <sub>B</sub> = -300mA
Base-Emitter Saturation Voltage (Notes 9)	V <sub>BE(sat)</sub>	-	-1000	-1100	mV	I <sub>C</sub> = -6A, I <sub>B</sub> = -300mA
Base-Emitter Turn-on Voltage (Notes 9)	V <sub>BE(on)</sub>	-	-865	-1000	mV	I <sub>C</sub> = -6A, V <sub>CE</sub> = -2V
Transitional Frequency (Notes 9)	f <sub>T</sub>	-	176	-	MHz	I <sub>C</sub> = -50mA, V <sub>CE</sub> = -10V, f = 50MHz
Input Capacitance	C <sub>ibo</sub>	-	-	400	pF	V <sub>EB</sub> = -0.5V, f = 1MHz
Output capacitance	C <sub>obo</sub>	-	36	45	pF	V <sub>CB</sub> = -10V, f = 1MHz
Delay time	t <sub>d</sub>	-	23	-	ns	V <sub>CC</sub> = -10V, I <sub>C</sub> = -1A, I <sub>B1</sub> = -I <sub>B2</sub> = -50mA
Rise time	t <sub>r</sub>	-	18.4	-	ns	
Storage time	t <sub>s</sub>	-	266	-	ns	
Fall time	t <sub>f</sub>	-	49.6	-	ns	

Notes: 9. Measured under pulsed conditions. Pulse width ≤ 300μs. Duty cycle ≤ 2%.

**Typical Electrical Characteristics**

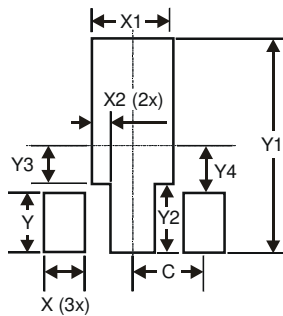


**Package Outline Dimensions**



SOT89		
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)
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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