

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

**Features**

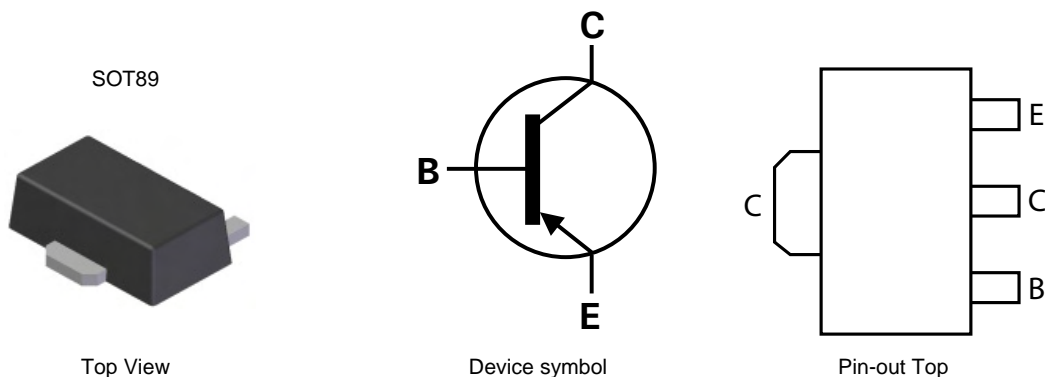
- $BV_{CEO} > -20V$
- High current capability Max Continuous Current  $I_C = -6A$
- Low saturation voltage  $V_{CE(sat)} < -47mV @ I_C = -1A$
- $R_{CE(sat)} = 28m\Omega$
- $P_D = 2.4W$
- Complementary part number ZXTN19020DZ
- **Lead Free, RoHS Compliant (Note 1)**
- **Halogen and Antimony Free, "Green"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

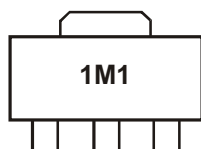


**Ordering Information** (Note 3)

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<sub>A</sub> = 25°C unless otherwise specified

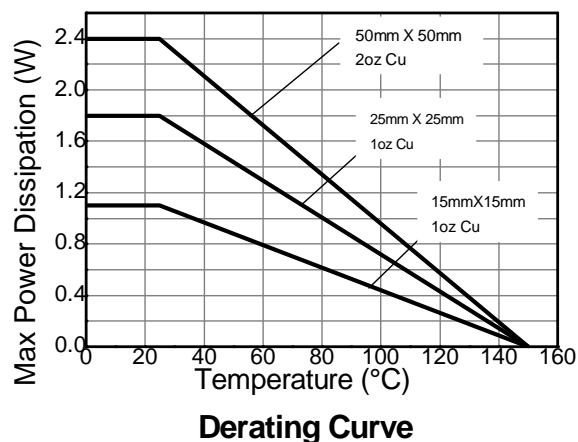
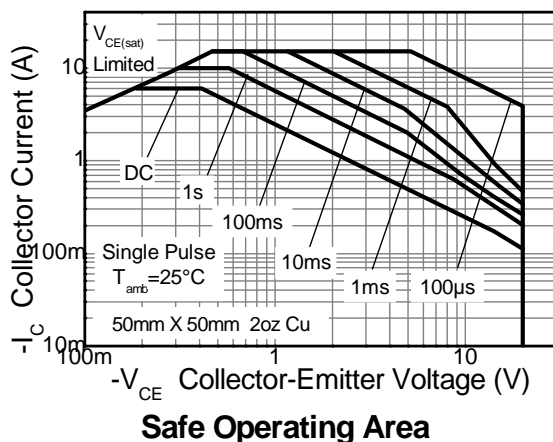
Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V <sub>CB0</sub>	-25	V
Collector-Emitter Voltage	V <sub>CEO</sub>	-20	V
Emitter-Base Voltage	V <sub>ECO</sub>	-4	V
Emitter-Base Voltage	V <sub>EBO</sub>	-7	V
Continuous Collector Current (Note 6)	I <sub>C</sub>	-6	A
Base current	I <sub>B</sub>	-1	A
Peak Pulse Current	I <sub>CM</sub>	-15	A

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

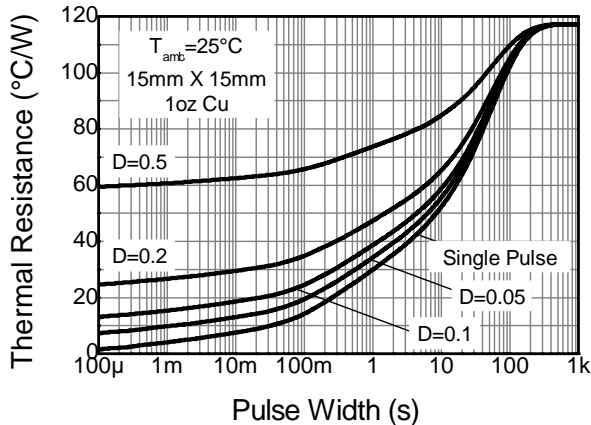
Characteristic	Symbol	Value	Unit
Power Dissipation (Note 4)	P <sub>D</sub>	1.1	W
Linear derating factor		8.8	mW/°C
Power Dissipation (Note 5)	P <sub>D</sub>	1.8	W
Linear derating factor		14.4	mW/°C
Power Dissipation (Note 6)	P <sub>D</sub>	2.4	W
Linear derating factor		19.2	mW/°C
Power Dissipation (Note 7)	P <sub>D</sub>	4.46	W
Linear derating factor		35.7	mW/°C
Power Dissipation (Note 8)	P <sub>D</sub>	26.7	W
Linear derating factor		213	mW/°C
Thermal Resistance, Junction to Ambient (Note 4)	R <sub>θJA</sub>	117	°C/W
Thermal Resistance, Junction to Ambient (Note 5)	R <sub>θJA</sub>	68	°C/W
Thermal Resistance, Junction to Ambient (Note 6)	R <sub>θJA</sub>	51	°C/W
Thermal Resistance, Junction to Ambient (Note 7)	R <sub>θJA</sub>	117	°C/W
Thermal Resistance, Junction to Leads (Note 8)	R <sub>θJL</sub>	4.69	°C/W
Operating and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-55 to +150	°C

- Notes:
4. 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.
  5. Mounted on 25mm x 25mm x 0.6mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions.
  6. Mounted on 50mm x 50mm x 0.6mm FR4 PCB with high coverage of single sided 2oz copper, in still air conditions.
  7. As note 6 above measured at t<5 seconds.
  8. Junction to case (collector tab). Typical

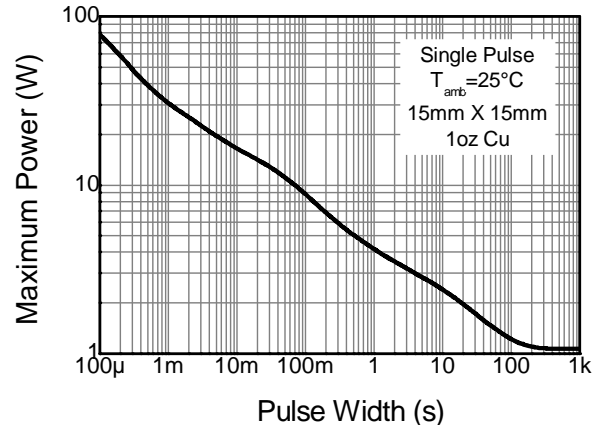
**Thermal Characteristics**



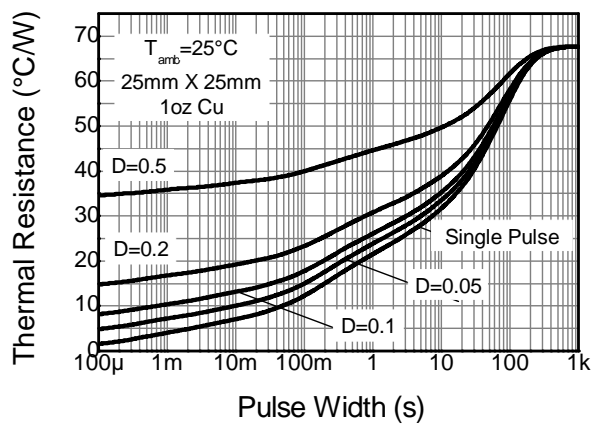
**Thermal Characteristics (- Continued)**



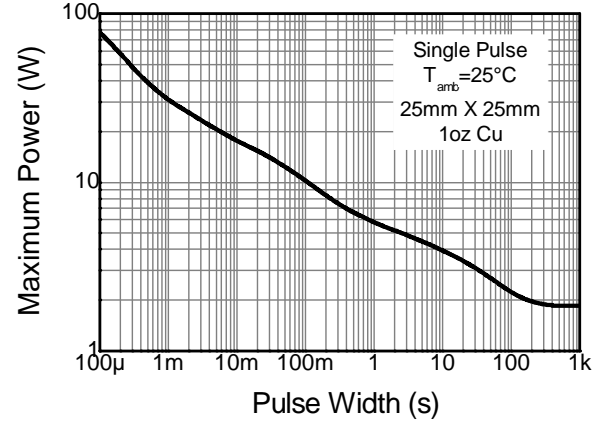
**Transient Thermal Impedance**



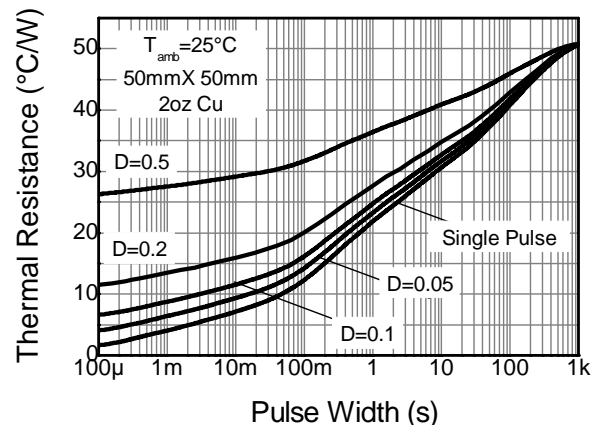
**Pulse Power Dissipation**



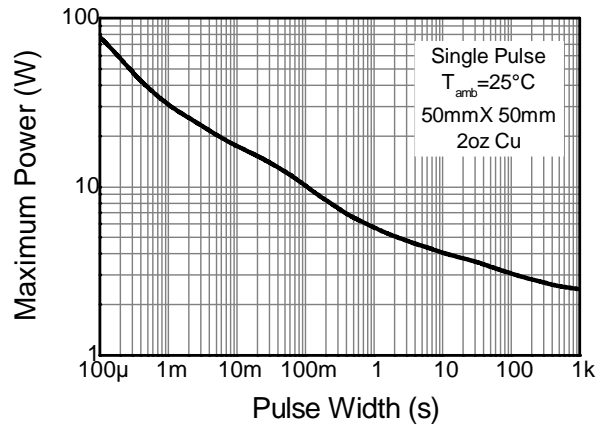
**Transient Thermal Impedance**



**Pulse Power Dissipation**



**Transient Thermal Impedance**



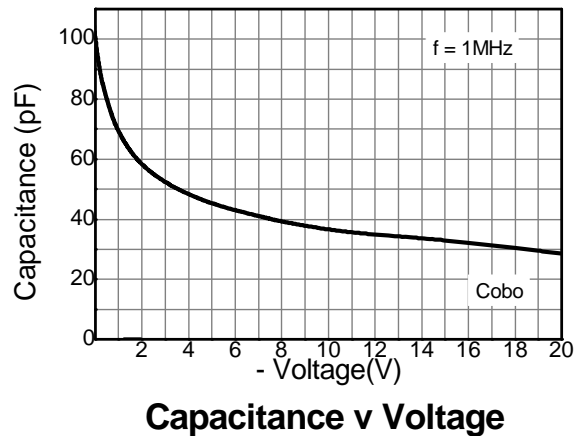
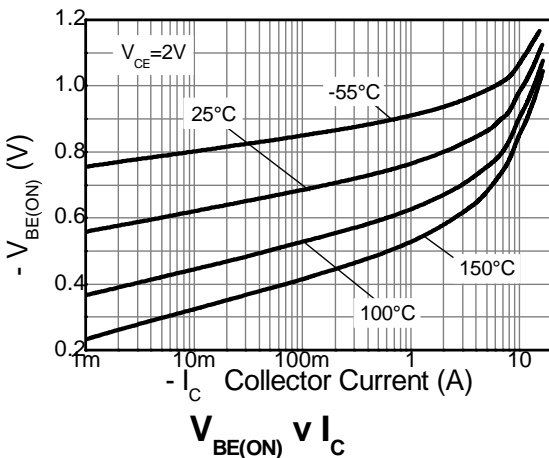
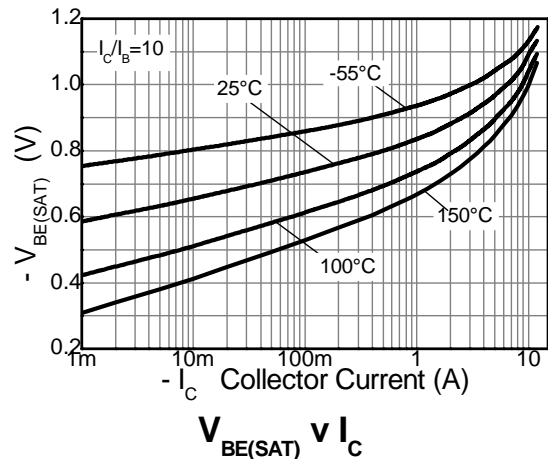
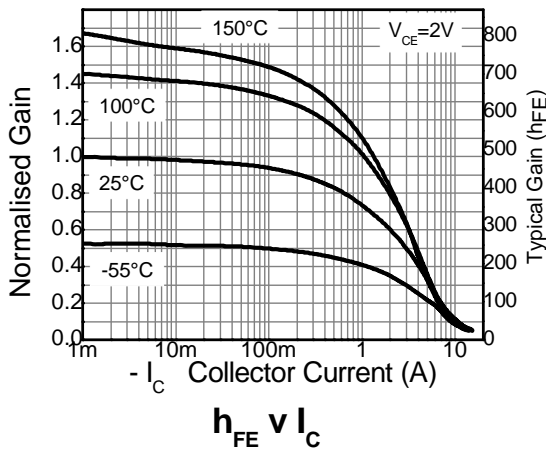
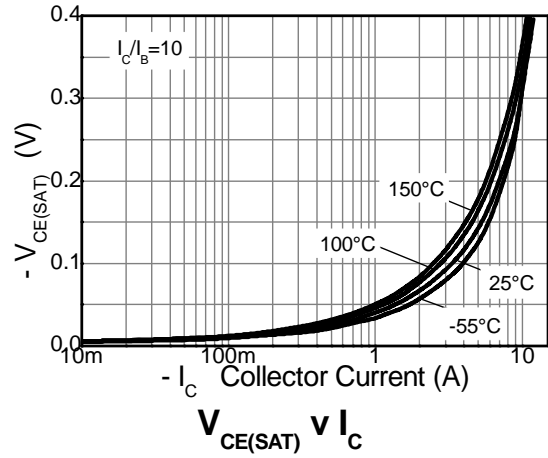
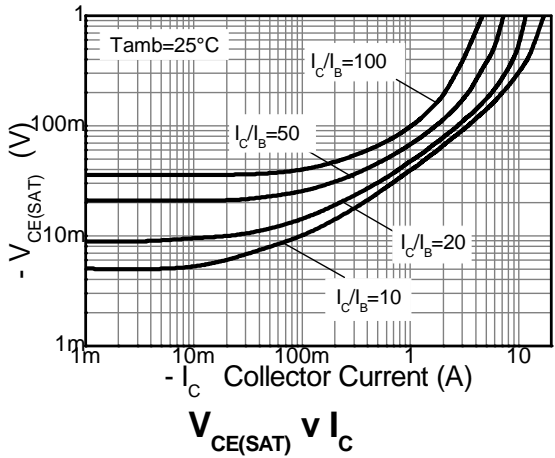
**Pulse Power Dissipation**

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

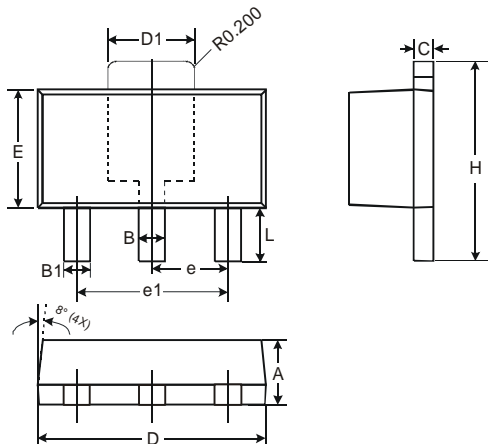
Characteristic	Symbol	Min	Typ.	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	$BV_{CBO}$	-25	-55	-	V	$I_C = -100\mu\text{A}$
Collector-Emitter Breakdown Voltage (Notes 9)	$BV_{CEO}$	-20	-50	-	V	$I_C = -10\text{mA}$
Emitter-Collector breakdown voltage (reverse blocking)	$BV_{ECX}$	-4	-8.6	-	V	$I_E = -100\mu\text{A}$ , $R_{BC} < 1\text{k}\Omega$ or $0.25\text{V} > V_{BC} > -0.25\text{V}$
Emitter-Collector breakdown voltage (reverse blocking)	$BV_{ECO}$	-4	-8.6	-	V	$I_E = -100\mu\text{A}$
Emitter-Base Breakdown Voltage	$BV_{EBO}$	-7	-8.2	-	V	$I_E = -100\mu\text{A}$
Collector Cutoff Current	$I_{CBO}$	-	< -1	-50	nA	$V_{CB} = -25\text{V}$
		-	-	-500		$V_{CB} = -25\text{V}$ , $T_A = 100^\circ\text{C}$
Emitter Cutoff Current	$I_{EBO}$	-	< -1	-50	nA	$V_{EB} = -5.6\text{V}$
DC current transfer Static ratio (Notes 9)	$h_{FE}$	300	450	900	-	$I_C = -100\text{mA}$ , $V_{CE} = -2\text{V}$
		200	290	-		$I_C = -2\text{A}$ , $V_{CE} = -2\text{V}$
		65	110	-		$I_C = -6\text{A}$ , $V_{CE} = -2\text{V}$
		-	25	-		$I_C = -15\text{A}$ , $V_{CE} = -2\text{V}$
Collector-Emitter Saturation Voltage (Notes 9)	$V_{CE(sat)}$	-	-40	-47	mV	$I_C = -1\text{A}$ , $I_B = -100\text{mA}$
		-	-100	-130		$I_C = -1\text{A}$ , $I_B = -10\text{mA}$
		-	-115	-145		$I_C = -2\text{A}$ , $I_B = -40\text{mA}$
		-	-225	-275		$I_C = -6\text{A}$ , $I_B = -300\text{mA}$
Base-Emitter Saturation Voltage (Notes 9)	$V_{BE(sat)}$	-	-1000	-1100	mV	$I_C = -6\text{A}$ , $I_B = -300\text{mA}$
Base-Emitter Turn-on Voltage (Notes 9)	$V_{BE(on)}$	-	-865	-1000	mV	$I_C = -6\text{A}$ , $V_{CE} = -2\text{V}$
Transitional Frequency (Notes 9)	$f_T$	-	176	-	MHz	$I_C = -50\text{mA}$ , $V_{CE} = -10\text{V}$ , $f = 50\text{MHz}$
Input Capacitance	$C_{ibo}$	-	-	400	pF	$V_{EB} = -0.5\text{V}$ , $f = 1\text{MHz}$
Output capacitance	$C_{obo}$	-	36	45	pF	$V_{CB} = -10\text{V}$ , $f = 1\text{MHz}$
Delay time	$t_d$	-	23	-	ns	$V_{CC} = -10\text{V}$ , $I_C = -1\text{A}$ , $I_{B1} = -I_{B2} = -50\text{mA}$
Rise time	$t_r$	-	18.4	-	ns	
Storage time	$t_s$	-	266	-	ns	
Fall time	$t_f$	-	49.6	-	ns	

Notes: 9. Measured under pulsed conditions. Pulse width  $\leq 300\mu\text{s}$ . Duty cycle  $\leq 2\%$ .

**Typical Electrical Characteristics**

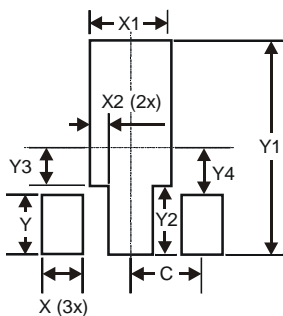


**Package Outline Dimensions**



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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