

20V PNP HIGH GAIN TRANSISTOR IN SOT89

Features

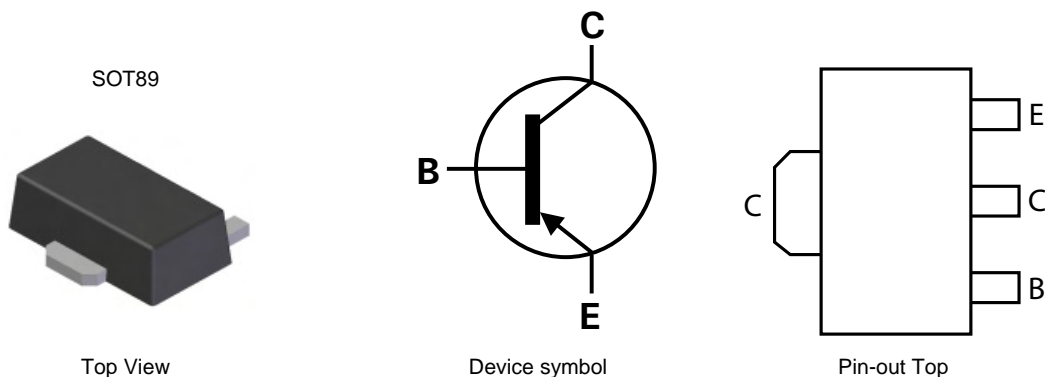
- $BV_{CEO} > -20V$
- High current capability Max Continuous Current $I_C = -6A$
- Low saturation voltage $V_{CE(sat)} < -47mV @ I_C = -1A$
- $R_{CE(sat)} = 28m\Omega$
- $P_D = 2.4W$
- Complementary part number ZXTN19020DZ
- **Lead Free, RoHS Compliant (Note 1)**
- **Halogen and Antimony Free, "Green"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

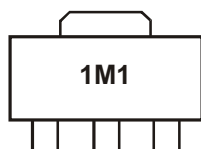


Ordering Information (Note 3)

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_A = 25°C unless otherwise specified

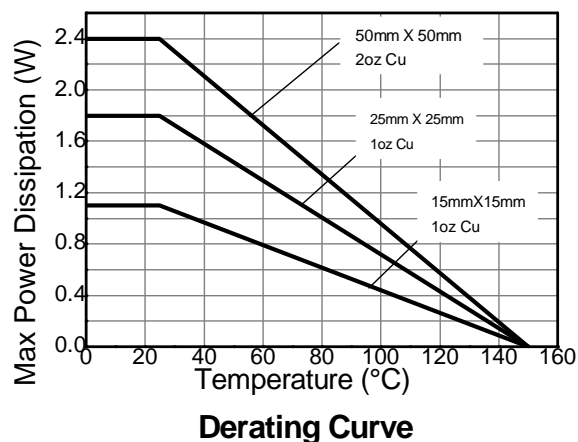
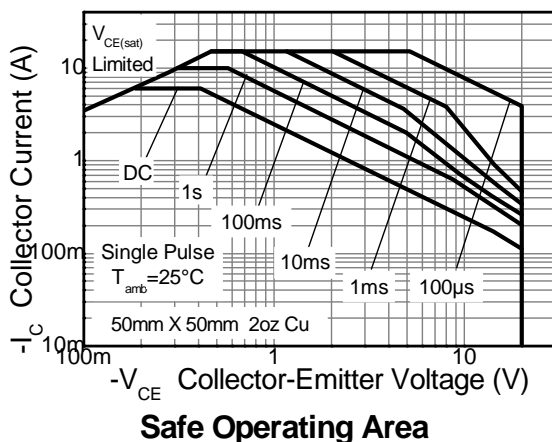
Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V _{CB0}	-25	V
Collector-Emitter Voltage	V _{CEO}	-20	V
Emitter-Base Voltage	V _{ECO}	-4	V
Emitter-Base Voltage	V _{EBO}	-7	V
Continuous Collector Current (Note 6)	I _C	-6	A
Base current	I _B	-1	A
Peak Pulse Current	I _{CM}	-15	A

Thermal Characteristics @T_A = 25°C unless otherwise specified

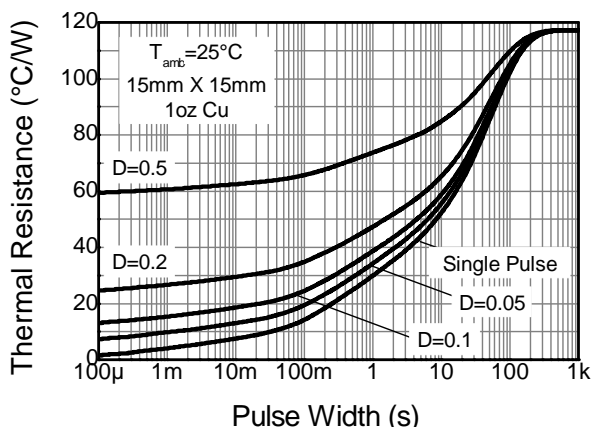
Characteristic	Symbol	Value	Unit
Power Dissipation (Note 4)	P _D	1.1	W
Linear derating factor		8.8	mW/°C
Power Dissipation (Note 5)	P _D	1.8	W
Linear derating factor		14.4	mW/°C
Power Dissipation (Note 6)	P _D	2.4	W
Linear derating factor		19.2	mW/°C
Power Dissipation (Note 7)	P _D	4.46	W
Linear derating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

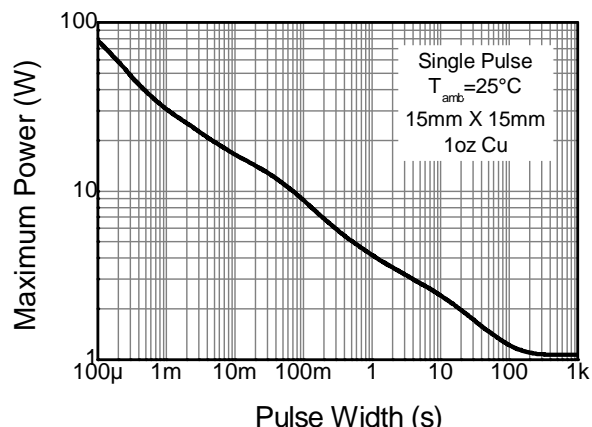
Thermal Characteristics



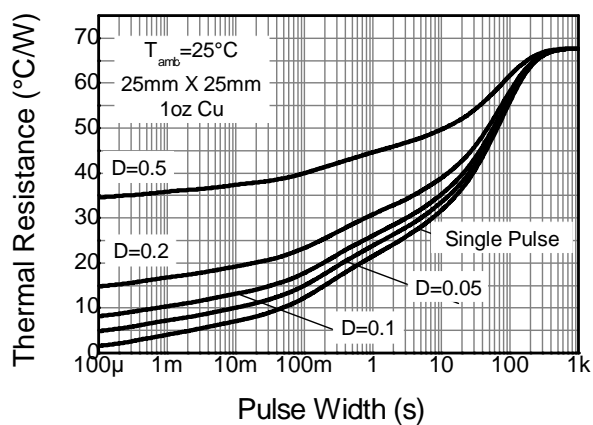
Thermal Characteristics (- Continued)



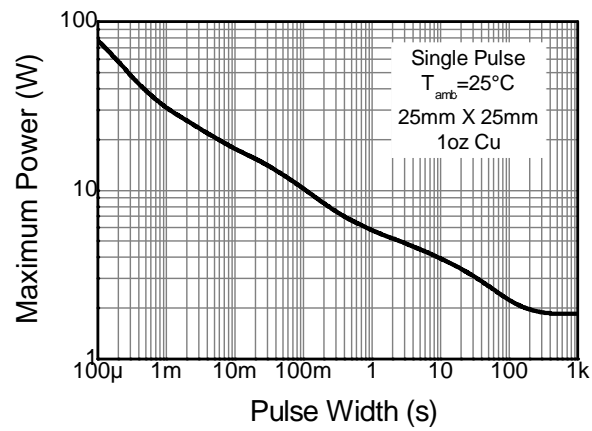
Transient Thermal Impedance



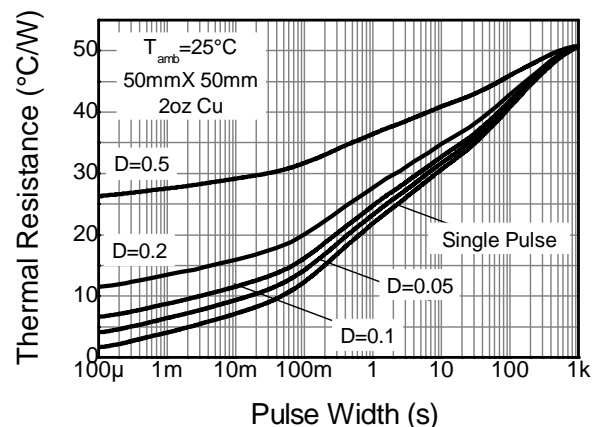
Pulse Power Dissipation



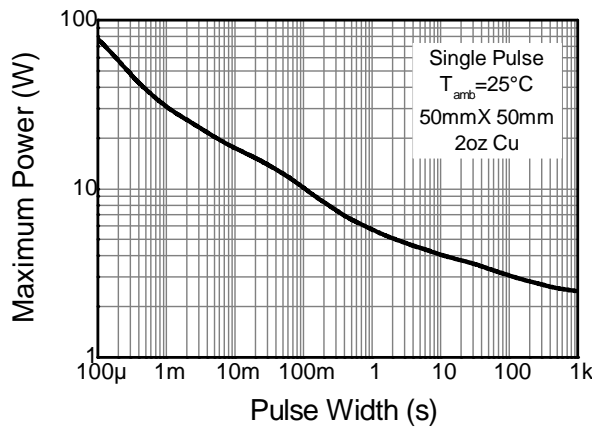
Transient Thermal Impedance



Pulse Power Dissipation



Transient Thermal Impedance



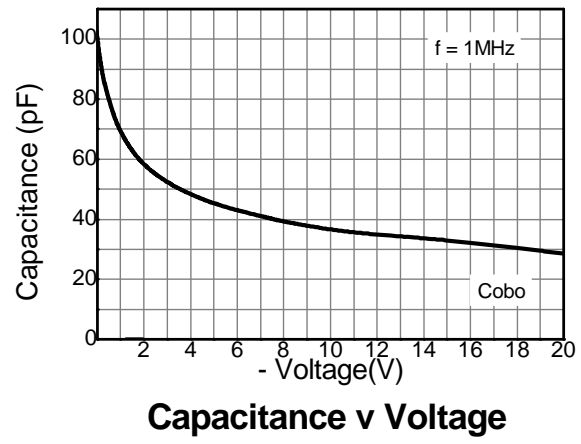
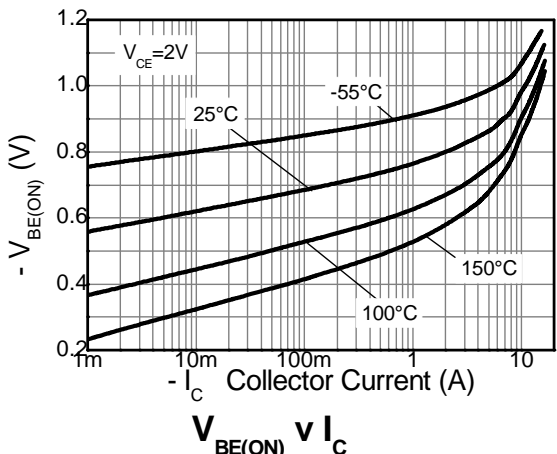
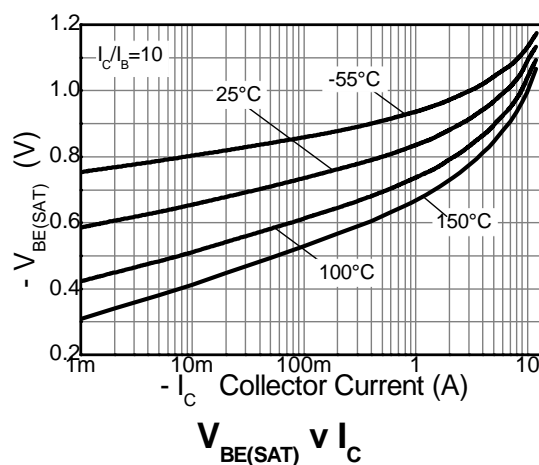
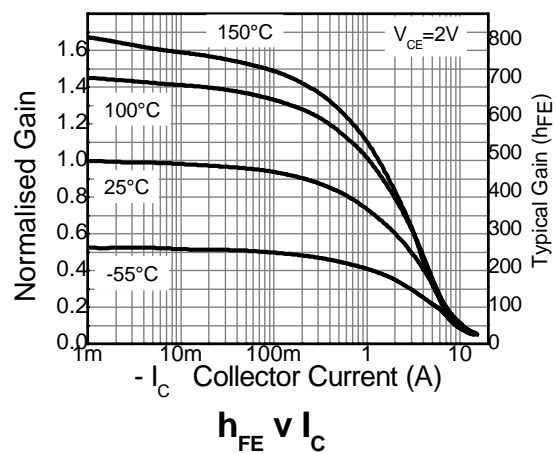
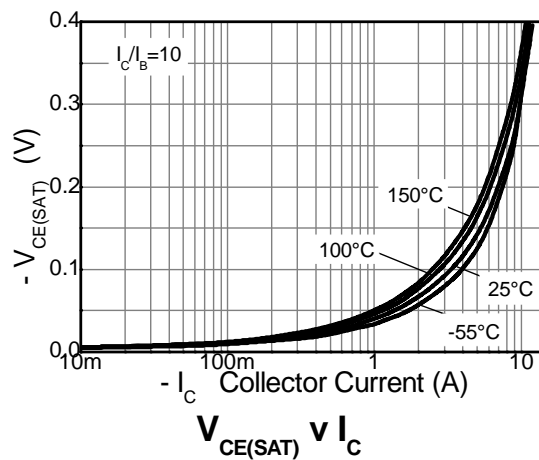
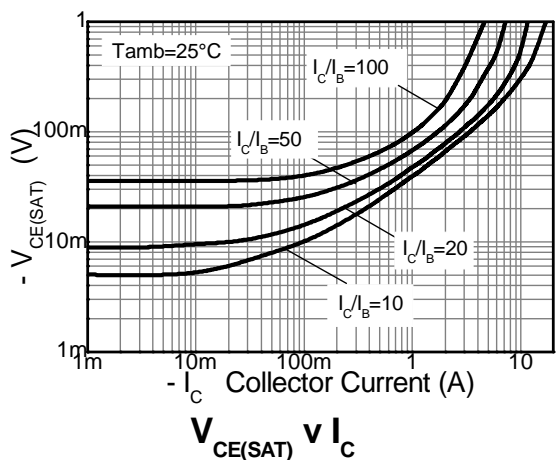
Pulse Power Dissipation

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

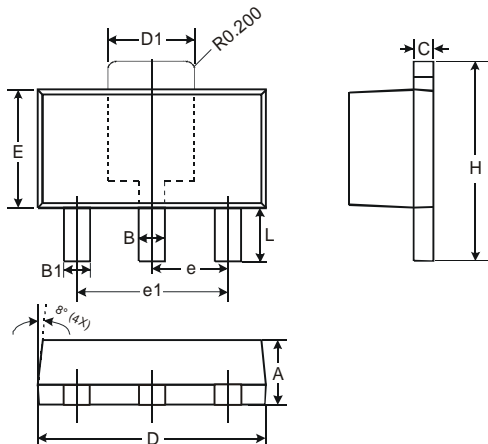
Characteristic	Symbol	Min	Typ.	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV_{CBO}	-25	-55	-	V	$I_C = -100\mu\text{A}$
Collector-Emitter Breakdown Voltage (Notes 9)	BV_{CEO}	-20	-50	-	V	$I_C = -10\text{mA}$
Emitter-Collector breakdown voltage (reverse blocking)	BV_{ECX}	-4	-8.6	-	V	$I_E = -100\mu\text{A}$, $R_{BC} < 1\text{k}\Omega$ 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

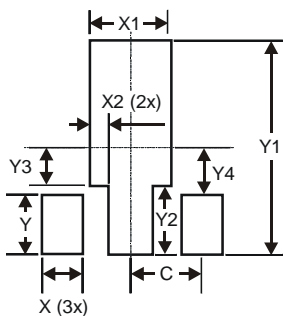


Package Outline Dimensions



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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