60V NPN LOW SATURATION MEDIUM POWER TRANSISTOR IN SOT89

Features

- BV_{CEO} > 60V
- High current capability Max Continuous Current I_C = 5A
- R_{SAT} = 30mΩ for a low equivalent On-Resistance
- Low saturation voltage $V_{CE(sat)}$ < 65mV @ I_C = 1A
- h_{FE} specified up to 10A for high current gain hold up
- Complementary PNP type: ZXTP2012Z
- **Lead-Free Finish; RoHS compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**
- **PPAP capable (Note 4)**

Mechanical Data

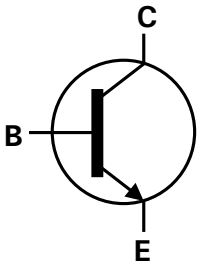
- Case: SOT89
- Case material: molded plastic. "Green" molding compound.
- UL Flammability Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish - Matte Tin Plated Leads, Solderable per MIL-STD-202, Method 208 e3
- Weight: 0.05 grams (Approximate)

Application

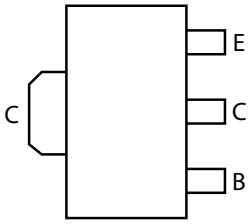
- Emergency lighting circuits
- Motor driving (including DC fans)
- Backlight inverters
- Power switches
- Gate driving MOSFETs and IGBTs

SOT89

Top View



Device Symbol



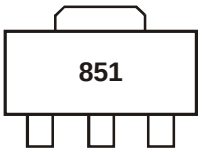
Top View
Pin Out

Ordering Information (Note 5)

Product	Compliance	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
ZXTN2010ZTA	AEC-Q101	851	7	12	1,000
ZXTN2010Z-13R	AEC-Q101	851	13	12	4,000
ZXTP2012ZQTA	Automotive	851	7	12	1,000

Notes:
1. EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant. All applicable RoHS exemptions applied.
2. See http://www.diodes.com 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. Automotive products are AEC-Q101 qualified and are PPAP capable. Automotive, AEC-Q101 and standard products are electrically and thermally the same, except where specified.
5. For packaging details, go to our website at http://www.diodes.com

Marking Information



851 = Product Type Marking Code

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

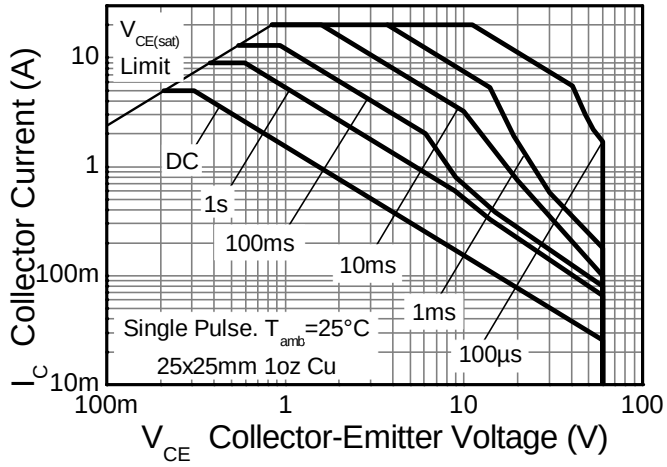
Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V_{CBO}	150	V
Collector-Emitter Voltage	V_{CEO}	60	V
Emitter-Base Voltage	V_{EBO}	7	V
Continuous Collector Current	I_C	5	A
Peak Pulse Current	I_{CM}	20	A

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

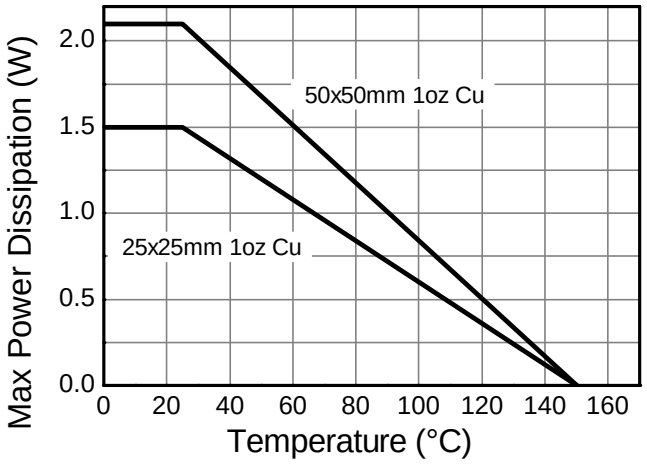
Characteristic	Symbol	Value	Unit
Power Dissipation (Note 6) Linear derating factor	P_D	1.5 12	W mW/°C
Power Dissipation (Note 7) Linear derating factor	P_D	2.1 16.8	W mW/°C
Thermal Resistance, Junction to Ambient (Note 6)	$R_{\theta JA}$	83	°C/W
Thermal Resistance, Junction to Ambient (Note 7)	$R_{\theta JA}$	60	°C/W
Thermal Resistance, Junction to Leads (Note 8)	$R_{\theta JL}$	3.23	°C/W
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +150	°C

Notes: 6. For a device surface mounted on 25mm x 25mm x 1.6mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions; device measured when operating in steady state condition.
7. Same as note (6), except the device is mounted on 50mm X 50mm single sided 1oz weight copper.
8. Thermal resistance from junction to solder-point (on the exposed collector pad).

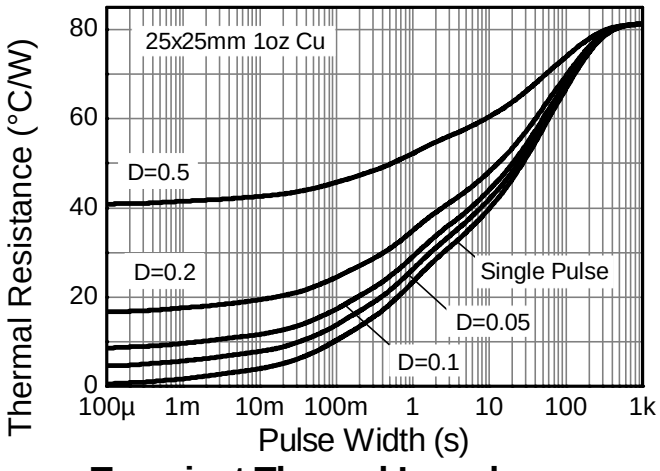
Thermal Characteristics and Derating Information



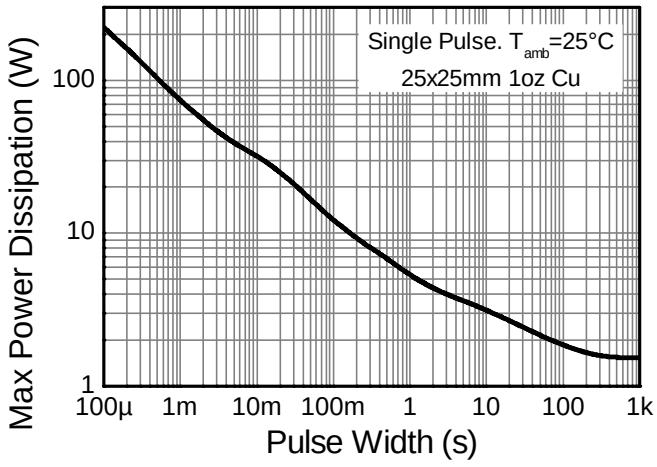
Safe Operating Area



Derating Curve



Transient Thermal Impedance



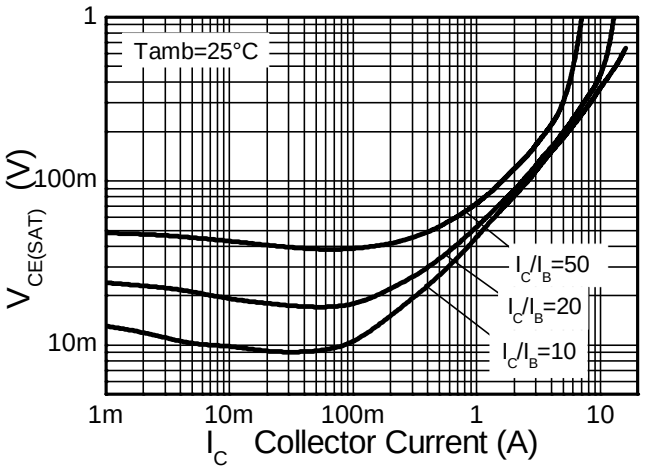
Pulse Power Dissipation

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

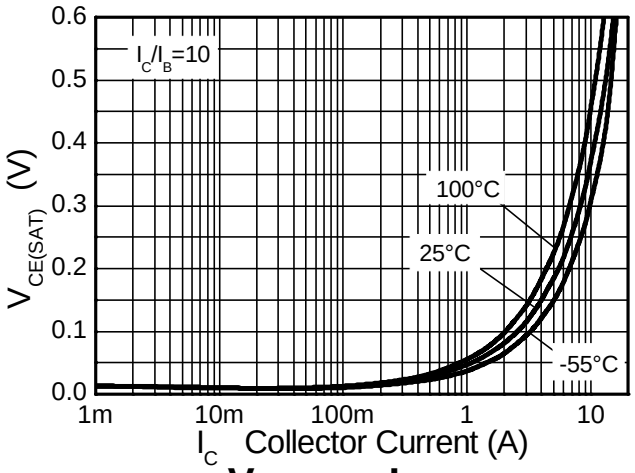
Characteristic	Symbol	Min	Typ.	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV_{CBO}	150	190	-	V	I_C = 100µA
Collector-Emitter Breakdown Voltage (Notes 9)	BV_{CER}	150	190	-	V	I_C = 1µA, $R_B \leq 1k\Omega$
Collector-Emitter Breakdown Voltage (Notes 9)	BV_{CEO}	60	80	-	V	I_C = 10mA
Emitter-Base Breakdown Voltage	BV_{EBO}	7	8.1	-	V	I_E = 100µA
Collector Cutoff Current	I_{CBO}	-	< 1 	50 500	nA nA	V_{CB} = 120V V_{CB} = 120V, T_A = +100°C
Collector Cutoff Current	I_{CER} R ≤1kΩ	-	< 1 	100 500	nA nA	V_{CB} = 120V V_{CB} = 120V, T_A = +100°C
Emitter Cutoff Current	I_{EBO}	-	< 1	10	nA	V_{EB} = 6V
DC current transfer Static ratio (Notes 9)	h_{FE}	100	200	-	-	I_C = -10mA, V_{CE} = -1V
		100	200	300		I_C = -2A, V_{CE} = -1V
		55	105	-		I_C = -5A, V_{CE} = -1V
		20	40	-		I_C = -10A, V_{CE} = -1V
Collector-Emitter Saturation Voltage (Notes 9)	$V_{CE(sat)}$	-	17	30	mV	I_C = 100mA, I_B = 5mA
		-	35	55		I_C = 1A, I_B = 100mA
		-	40	65		I_C = 1A, I_B = 50mA
		-	90	125		I_C = 2A, I_B = 50mA
		-	170	230		I_C = 6A, I_B = 300mA
Base-Emitter Saturation Voltage (Notes 9)	$V_{BE(sat)}$	-	970	1100	mV	I_C = 6A, I_B = 300mA
Base-Emitter Turn-on Voltage (Notes 9)	$V_{BE(on)}$	-	910	1050	mV	I_C = 6A, V_{CE} = 1V
Transitional Frequency	f_T	-	130	-	MHz	I_C = 100mA, V_{CE} = 10V, f = 50MHz
Output capacitance	C_{obo}	-	31	-	pF	V_{CB} = 10V, f = 1MHz,
Switching Time	t_{ON}	-	42	-	ns	V_{CC} = 10V, I_C = 1A, I_{B1} = I_{B2} = 100mA
	t_{OFF}		760			

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

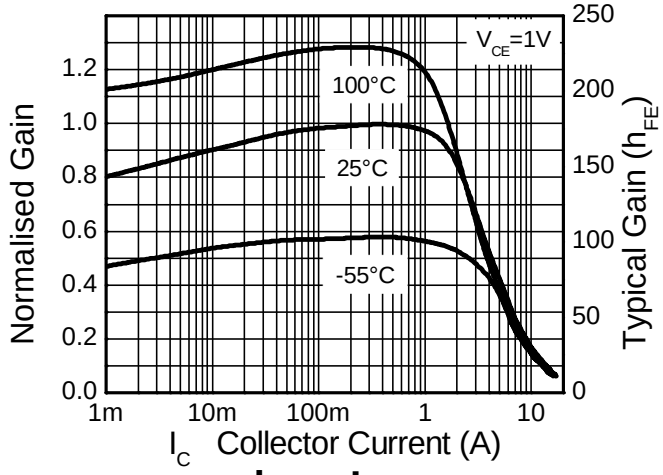
Typical Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)



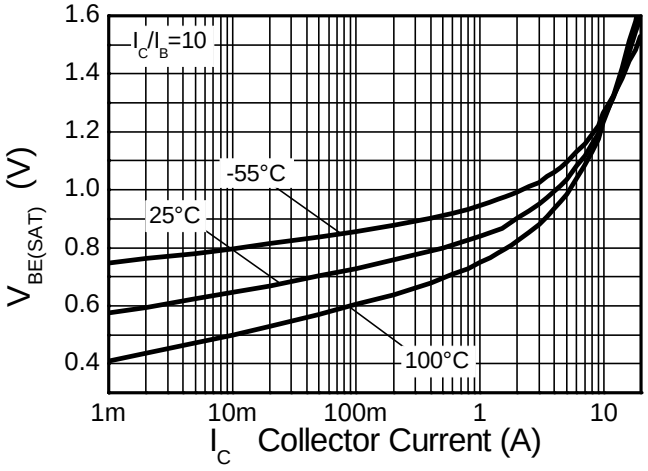
$V_{CE(SAT)}$ v I_C



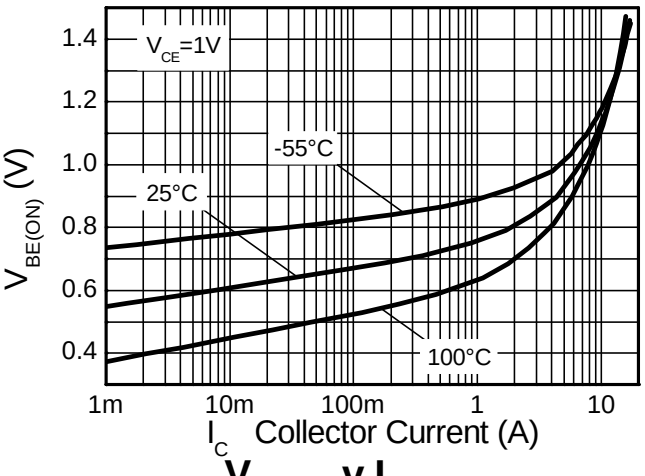
$V_{CE(SAT)}$ v I_C



h_{FE} v I_C



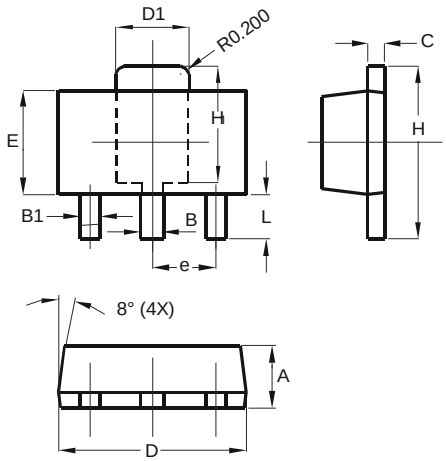
$V_{BE(SAT)}$ v I_C



$V_{BE(ON)}$ v I_C

Package Outline Dimensions

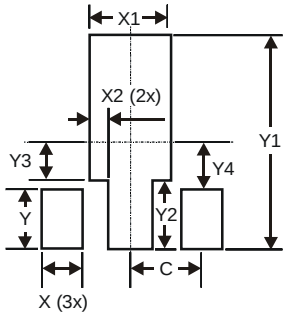
Please see AP02002 at http://www.diodes.com/datasheets/ap02002.pdf for latest version.



SOT89		
Dim	**Min**	**Max**
A	1.40	1.60
B	0.44	0.62
B1	0.35	0.54
C	0.35	0.44
D	4.40	4.60
D1	1.62	1.83
E	2.29	2.60
e	1.50 Typ	
H	3.94	4.25
H1	2.63	2.93
L	0.89	1.20
All Dimensions in mm		

Suggested Pad Layout

Please see AP02001 at http://www.diodes.com/datasheets/ap02001.pdf for the latest version.



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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