


60V NPN LOW SATURATION MEDIUM POWER TRANSISTOR IN SOT89

Features

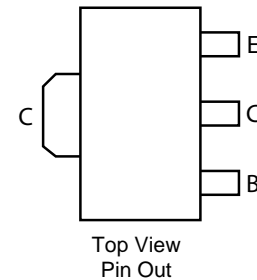
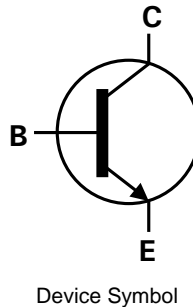
- $BV_{CEO} > 60V$
- High current capability Max Continuous Current $I_C = 5A$
- $R_{SAT} = 30m\Omega$ for a low equivalent On-Resistance
- Low saturation voltage $V_{CE(sat)} < 65mV @ I_C = 1A$
- h_{FE} specified up to 10A for high current gain hold up
- Complementary PNP type: ZXTP2012Z
- **Lead-Free 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 
- Weight: 0.05 grams (Approximate)

Application

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

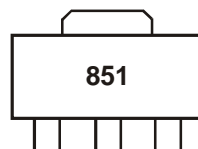


Ordering Information (Note 5)

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.)

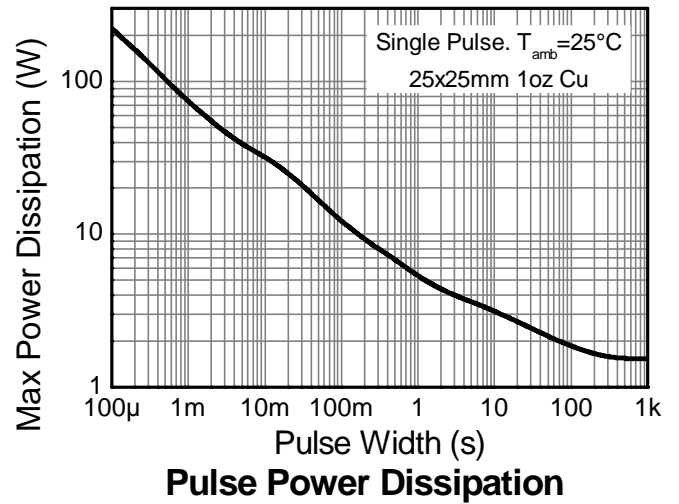
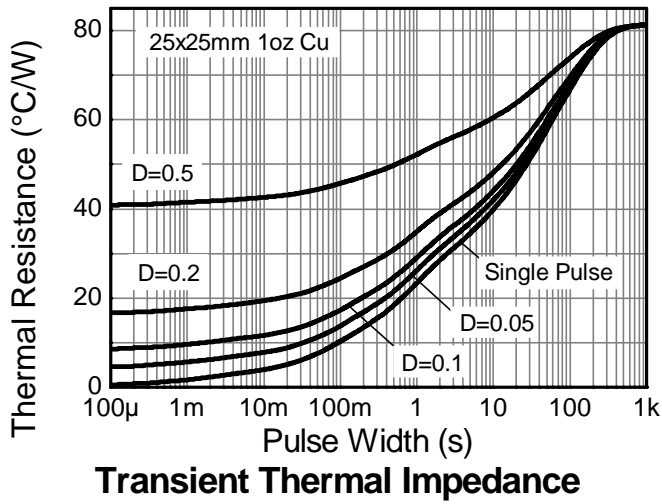
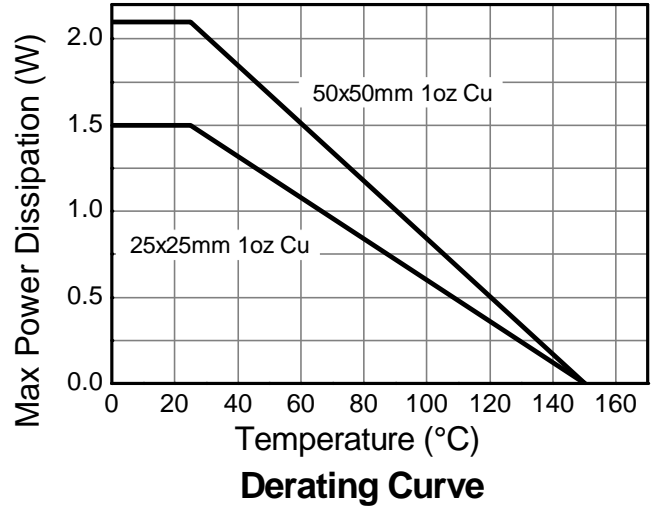
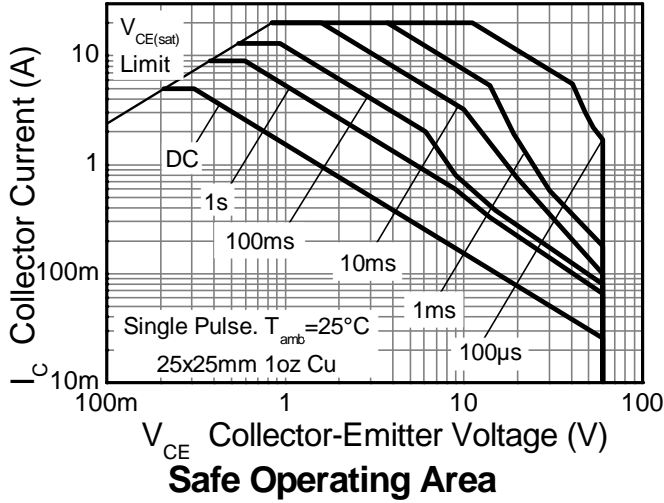
Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V _{CB0}	150	V
Collector-Emitter Voltage	V _{CEO}	60	V
Emitter-Base Voltage	V _{EB0}	7	V
Continuous Collector Current	I _C	5	A
Peak Pulse Current	I _{CM}	20	A

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

Characteristic	Symbol	Value	Unit
Power Dissipation (Note 6)	P _D	1.5	W
Linear derating factor		12	mW/°C
Power Dissipation (Note 7)	P _D	2.1	W
Linear derating factor		16.8	mW/°C
Thermal Resistance, Junction to Ambient (Note 6)	R _{θJA}	83	°C/W
Thermal Resistance, Junction to Ambient (Note 7)	R _{θJA}	60	°C/W
Thermal Resistance, Junction to Leads (Note 8)	R _{θJL}	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

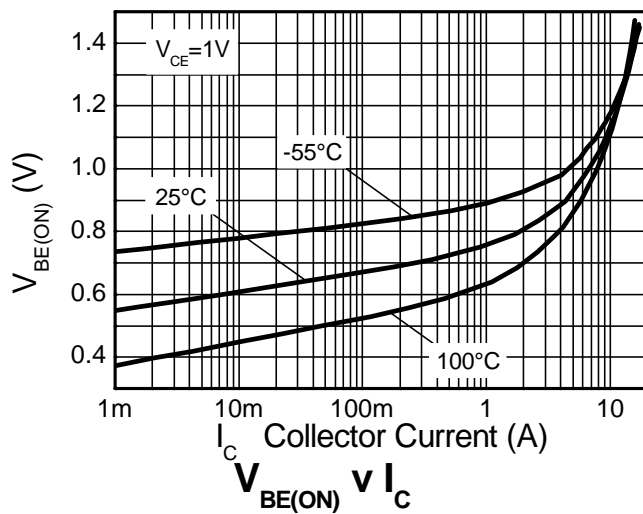
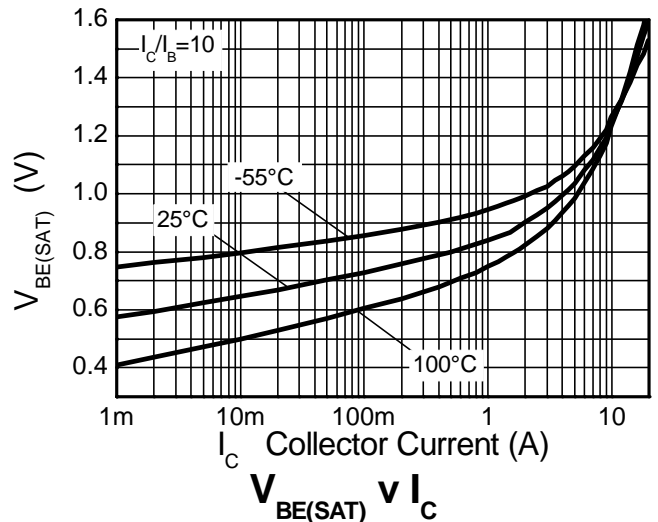
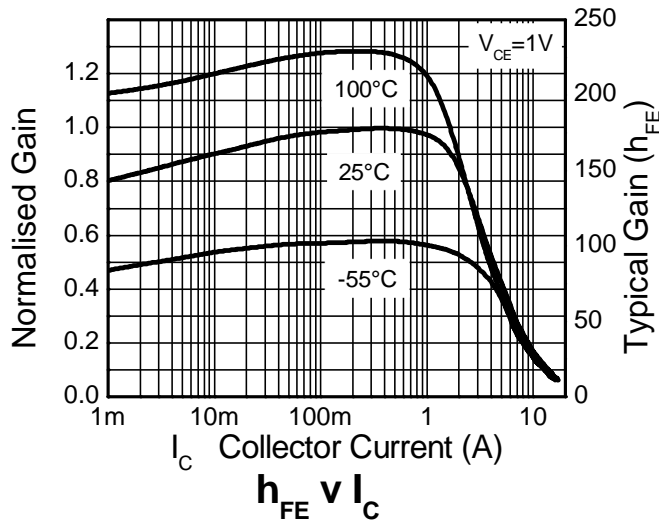
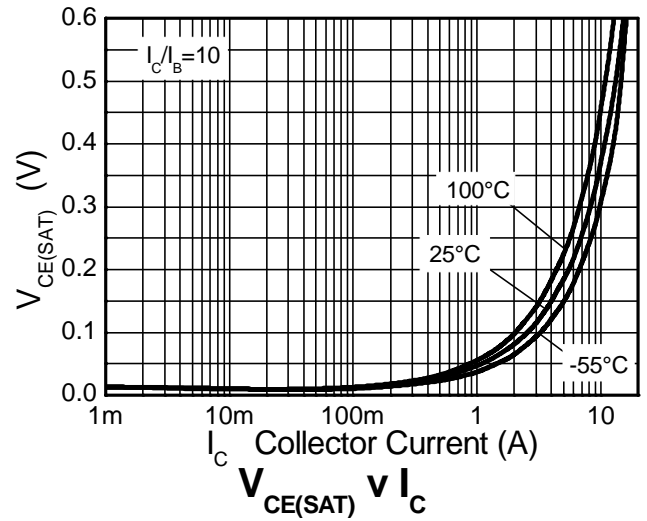
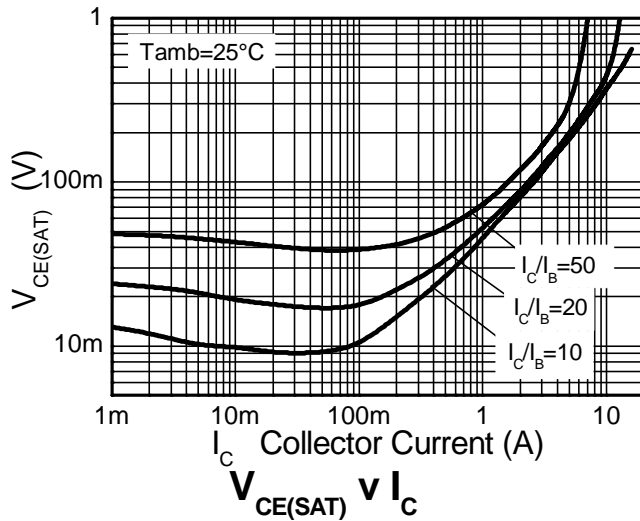


Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

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 ≤ 1kΩ
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	-		

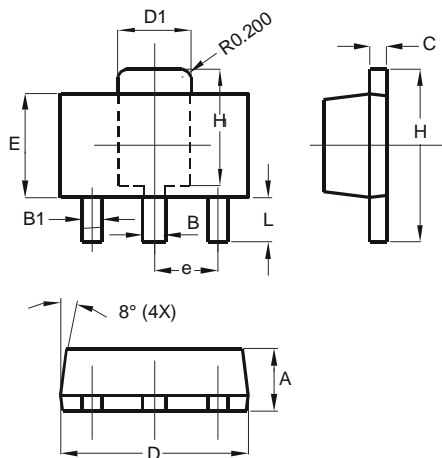
Notes: 9. Measured under pulsed conditions. Pulse width ≤ 300μs. Duty cycle ≤ 2%.

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



Package Outline Dimensions

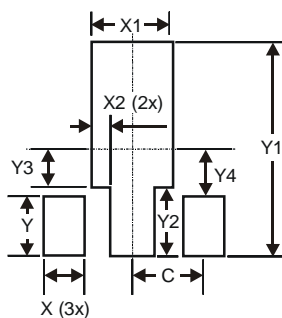
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.



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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