

Description

This bipolar junction transistor (BJT) is designed to meet the stringent requirements of automotive applications.

Features

- $BV_{CEO} > -60V$
- $I_C = -6A$ Continuous Collector Current
- Low Saturation Voltage $V_{CE(sat)} < -95mV @ -1A$
- $R_{CE(sat)} = 40m\Omega$ for a low Equivalent On-Resistance
- h_{FE} Specified up to -10A for a High Current Gain Hold-Up
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **The ZX5T1951GQ is suitable for automotive applications requiring specific change control; this part is AEC-Q101 qualified, PPAP capable, and manufactured in IATF16949 certified facilities.**

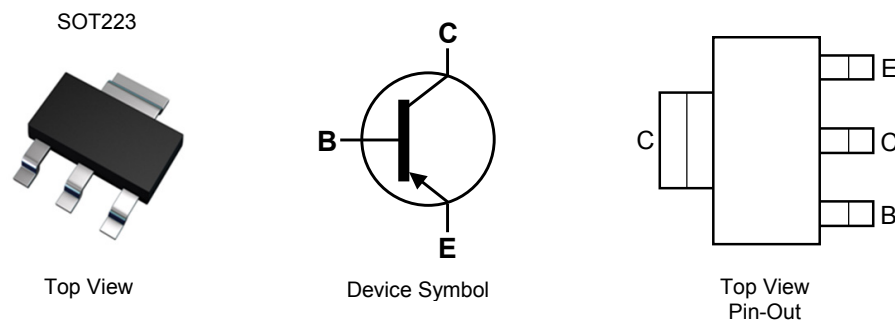
<https://www.diodes.com/quality/product-definitions/>

Mechanical Data

- Case: SOT223
- 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 @3
- Weight: 0.112 grams (Approximate)

Applications

- Motor Driving
- DC-DC Modules
- Backlight Inverters
- Actuator, Relay and Solenoid Drivers

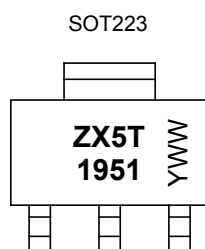


Ordering Information (Note 4)

Product	Marking	Reel Size (inches)	Tape Width (mm)	Quantity per Reel
ZX5T1951GQTA	ZX5T1951	7	12	1000

- Notes:
1. EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant. All applicable RoHS exemptions applied.
 2. See <https://www.diodes.com/quality/lead-free/> 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. For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

Marking Information



ZX5T1951 = Product Type Marking Code
 YWW = Date Code Marking
 Y or \bar{Y} = Last Digit of Year (ex: 0= 2020)
 WW or $\bar{W}W$ = Week Code (01~53)

Absolute Maximum Ratings (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V_{CBO}	-90	V
Collector-Emitter Voltage	V_{CES}	-90	V
Collector-Emitter Voltage	V_{CEO}	-60	V
Emitter-Base Voltage	V_{EBO}	-7	V
Continuous Collector Current (Note 5)	I_C	-6	A
Peak Pulse Current	I_{CM}	-15	A
Base Current	I_B	-1	A

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

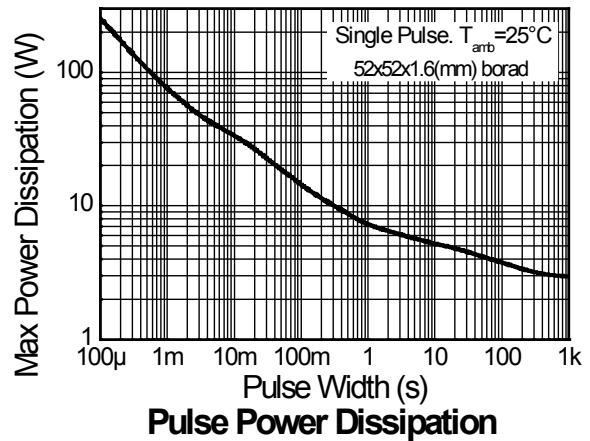
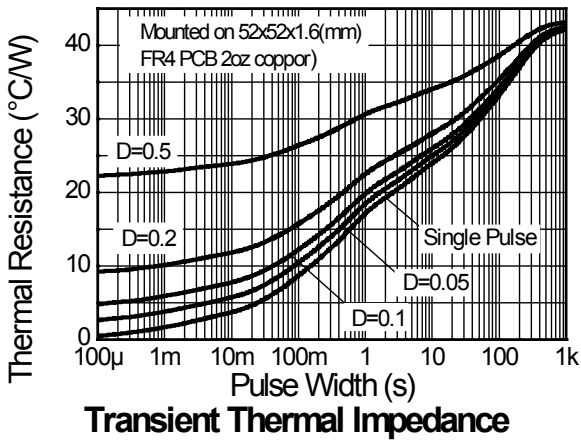
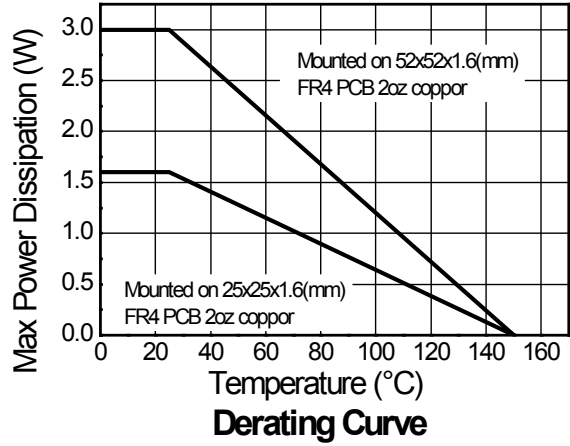
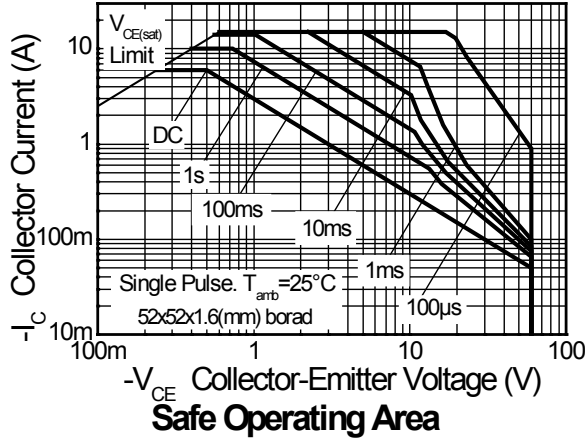
Characteristic	Symbol	Value	Unit
Power Dissipation Linear Derating Factor	P_D	3.0	W
		24	
		1.6	
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	12.8	$^\circ\text{C/W}$
		42	
		78	
Thermal Resistance Junction to Lead	$R_{\theta JL}$	12.3	$^\circ\text{C/W}$
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +150	$^\circ\text{C}$

ESD Ratings (Note 8)

Characteristic	Symbol	Value	Unit	JEDEC Class
Electrostatic Discharge - Human Body Model	ESD HBM	4000	V	3A
Electrostatic Discharge - Machine Model	ESD MM	400	V	C

- Notes:
5. For a device mounted with the collector lead on 52mm × 52mm 2oz copper that is on a single-sided 1.6mm FR4 PCB; device is measured under still air conditions whilst operating in a steady-state.
 6. Same as Note 6, except the device is mounted on 25mm × 25mm 1oz copper.
 7. Thermal resistance from junction to solder-point (at the end of the collector lead).
 8. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

Thermal Characteristics

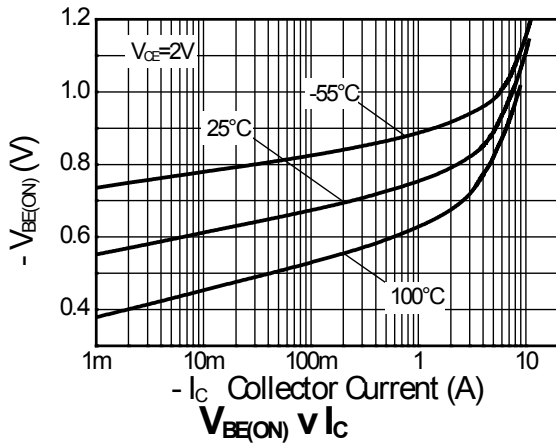
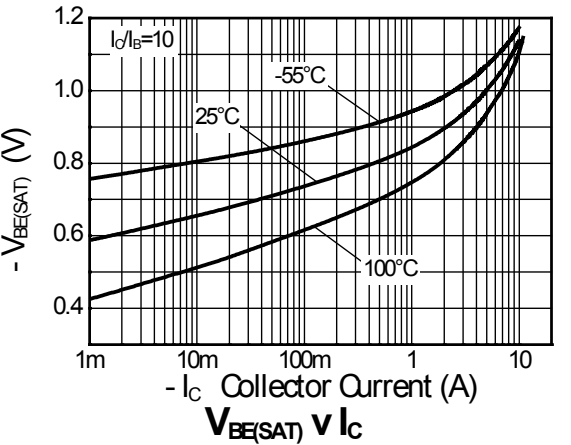
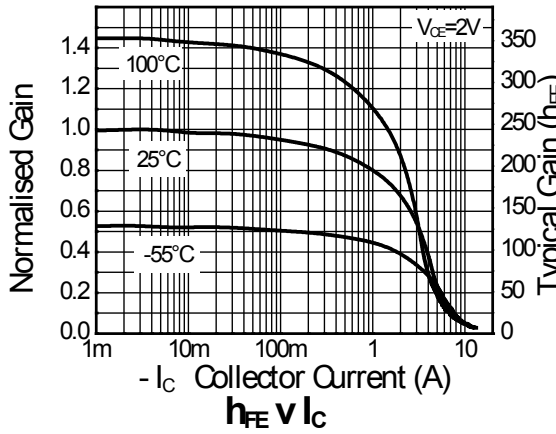
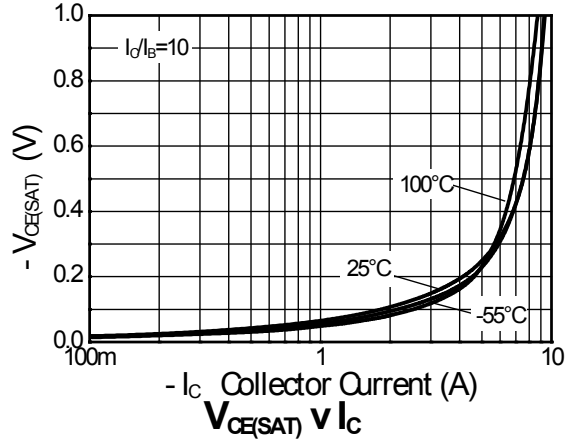
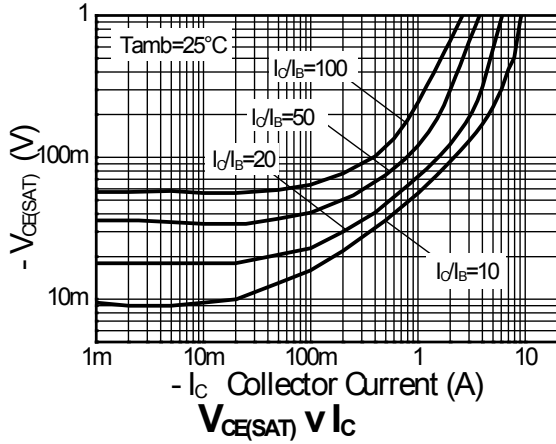


Electrical Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV_{CBO}	-90	-120	—	V	$I_C = -100\mu\text{A}$
Collector-Emitter Breakdown Voltage	BV_{CES}	-90	-120	—	V	$I_C = -100\mu\text{A}$
Collector-Emitter Breakdown Voltage (Note 9)	BV_{CEO}	-60	-80	—	V	$I_C = -10\text{mA}$
Emitter-Base Breakdown Voltage	BV_{EBO}	-7	-8	—	V	$I_E = -100\mu\text{A}$
Collector-Base Cut-Off Current	I_{CBO}	—	-1	-50	nA	$V_{CB} = -72\text{V}$
Collector-Emitter Cut-Off Current	I_{CES}	—	-1	-50	nA	$V_{CB} = -72\text{V}$
Emitter Cutoff Current	I_{EBO}	—	-1	-10	nA	$V_{EB} = -6\text{V}$
Static Forward Current Transfer Ratio (Note 9)	h_{FE}	100	240	—	—	$I_C = -10\text{mA}, V_{CE} = -2\text{V}$
		100	180	300		$I_C = -2\text{A}, V_{CE} = -2\text{V}$
		40	70	—		$I_C = -5\text{A}, V_{CE} = -2\text{V}$
		5	14	—		$I_C = -10\text{A}, V_{CE} = -2\text{V}$
Collector-Emitter Saturation Voltage (Note 9)	$V_{CE(sat)}$	—	-16	-30	mV	$I_C = -100\text{mA}, I_B = -10\text{mA}$
		—	-55	-95		$I_C = -1\text{A}, I_B = -100\text{mA}$
		—	-85	-130		$I_C = -2\text{A}, I_B = -200\text{mA}$
		—	-200	-260		$I_C = -5\text{A}, I_B = -500\text{mA}$
Base-Emitter Saturation Voltage (Note 9)	$V_{BE(sat)}$	—	-1	-1.15	V	$I_C = -5\text{A}, I_B = -500\text{mA}$
Base-Emitter Turn-On Voltage (Note 9)	$V_{BE(on)}$	—	-0.89	-1.0	V	$I_C = -5\text{A}, V_{CE} = -2\text{V}$
Output Capacitance (Note 9)	C_{obo}	—	33	70	pF	$V_{CB} = -10\text{V}, f = 1\text{MHz}$
Transition Frequency	f_T	—	120	—	MHz	$V_{CE} = -10\text{V}, I_C = -100\text{mA}$ $f = 50\text{MHz}$
Switching Time	t_{on}	—	33	80	ns	$V_{CC} = -10\text{V}, I_C = -2\text{A}$ $I_{B1} = -I_{B2} = -200\text{mA}$
	t_{off}	—	215	300		

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

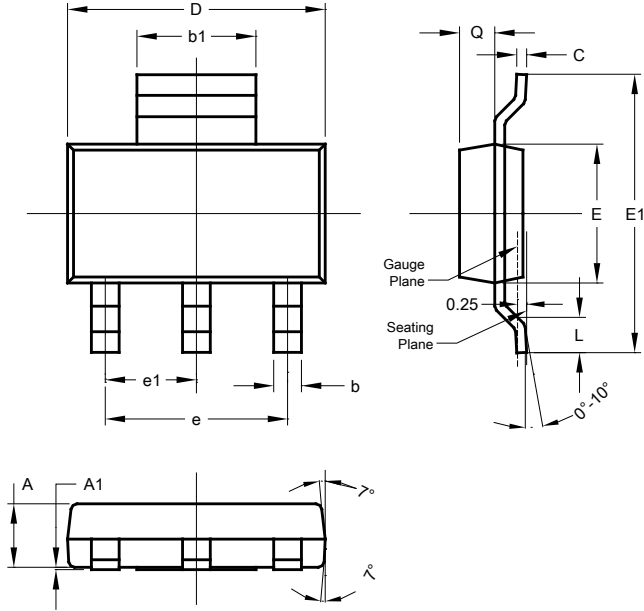
Typical Electrical Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)



Package Outline Dimensions

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

SOT223

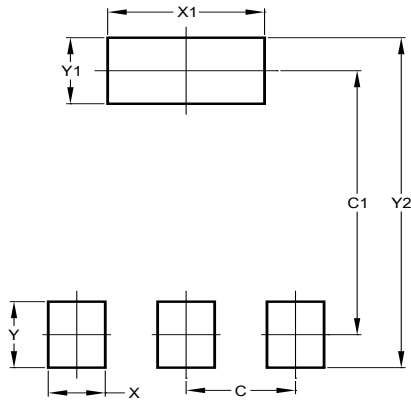


SOT223			
Dim	Min	Max	Typ
A	1.55	1.65	1.60
A1	0.010	0.15	0.05
b	0.60	0.80	0.70
b1	2.90	3.10	3.00
C	0.20	0.30	0.25
D	6.45	6.55	6.50
E	3.45	3.55	3.50
E1	6.90	7.10	7.00
e	-	-	4.60
e1	-	-	2.30
L	0.85	1.05	0.95
Q	0.84	0.94	0.89
All Dimensions in mm			

Suggested Pad Layout

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

SOT223



Dimensions	Value (in mm)
C	2.30
C1	6.40
X	1.20
X1	3.30
Y	1.60
Y1	1.60
Y2	8.00

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