

## Description

This Bipolar Junction Transistor (BJT) is designed to meet the stringent requirement of Automotive Applications.

## Features

- $BV_{CEO} > 60V$
- Maximum Continuous Collector Current  $I_C = 5A$
- $V_{CE(SAT)} < 45mV @ 1A$
- $R_{CE(SAT)} = 25m\Omega$
- High Power Dissipation SOT23 (Type DN) Package
- High Peak Current
- Low Saturation Voltage
- 140V Forward Blocking Voltage
- Complementary Part Number ZXTP2027FQ
- **Totally Lead-Free & Fully 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)**

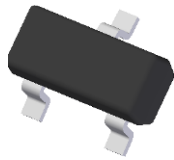
## Mechanical Data

- Case: SOT23
- 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 208③
- Weight: 0.008 grams (Approximate)

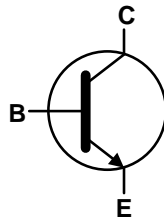
## Applications

- MOSFET and IGBT Gate Driving
- Motor Drive
- Relay, Lamp and Solenoid Drive

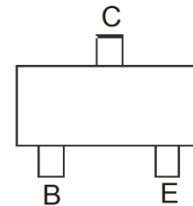
SOT23 (Type DN)



Top View



Device Symbol



Top View  
Pin-Out

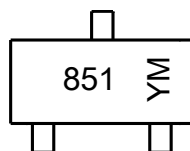
## Ordering Information (Note 5)

Part Number	Compliance	Marking	Reel Size (inches)	Tape Width (mm)	Quantity per Reel
ZXTN2018FQTA	Automotive	851	7	8	3,000

- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
  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. Automotive products are AEC-Q101 qualified and are PPAP capable. Refer to <https://www.diodes.com/quality/>.
  5. For packaging details, go to our website at <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

## Marking Information

SOT23 (Type DN)



851 = Product Type Marking Code  
 YM = Date Code Marking  
 Y = Year ex: G = 2019  
 M = Month ex: 9 = September

### Date Code Key

Year	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Code	F	G	H	I	J	K	L	M	N	O	P	Q

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Code	1	2	3	4	5	6	7	8	9	O	N	D

**Absolute Maximum Ratings** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V <sub>CBO</sub>	140	V
Collector-Emitter Voltage	V <sub>CEV</sub>	140	V
Collector-Emitter Voltage	V <sub>CEO</sub>	60	V
Emitter-Base Voltage	V <sub>EBO</sub>	7	V
Continuous Collector Current	I <sub>C</sub>	5	A
Base Current	I <sub>B</sub>	1	A
Peak Pulse Current	I <sub>CM</sub>	12	A

**Thermal Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

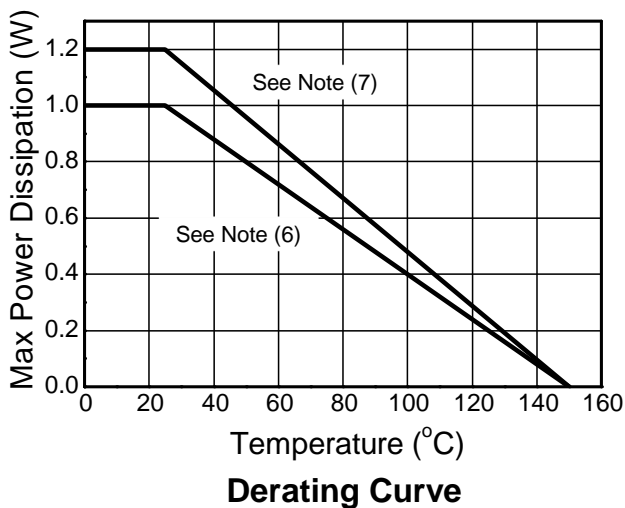
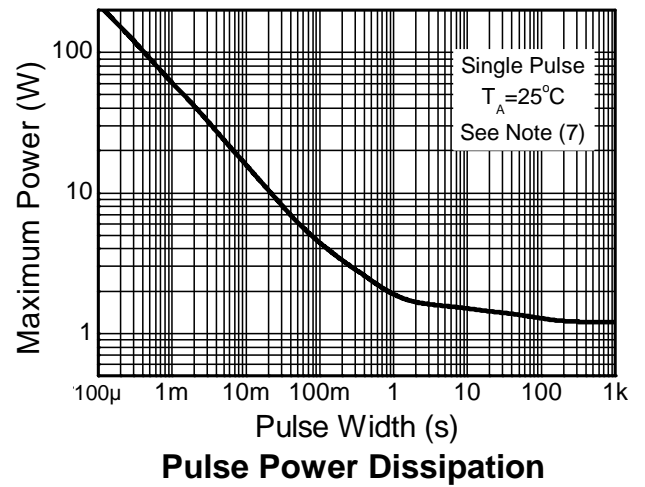
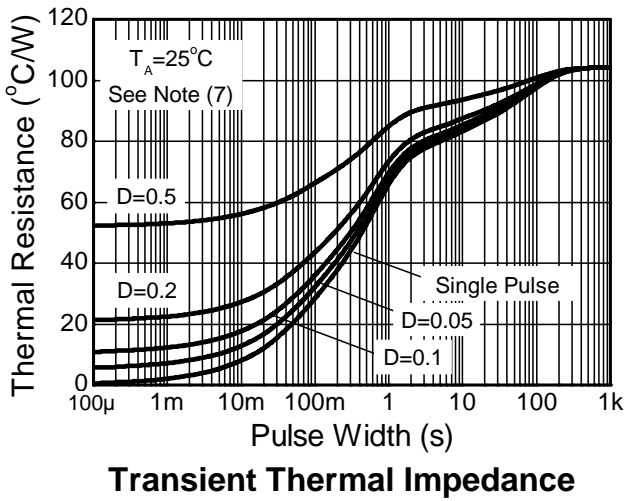
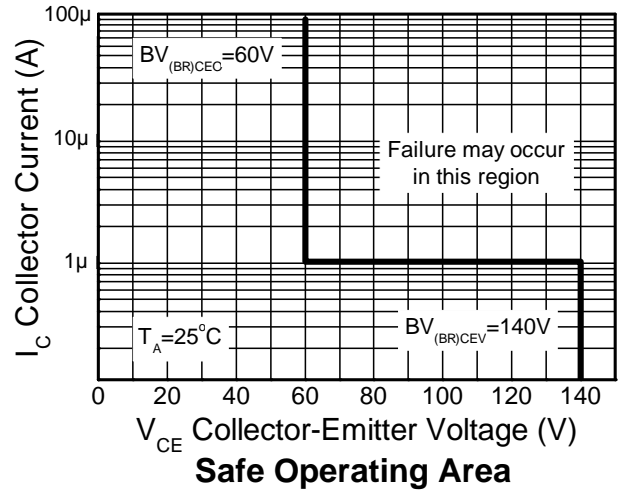
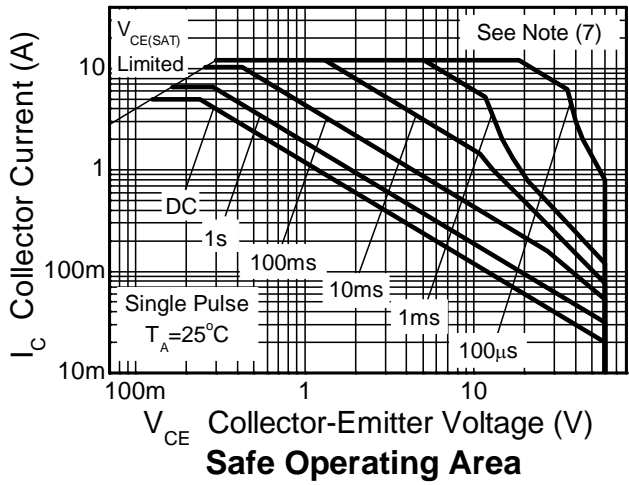
Characteristic	Symbol	Value	Unit
Power Dissipation Linear Derating Factor	P <sub>D</sub>	1.0	W mW/°C
		8.0	
		1.2	
		9.6	
Thermal Resistance, Junction to Ambient	R <sub>θJA</sub>	1.56	°C/W
		12.5	
		125	
		104	
Operating and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	80	°C
		-55 to +150	

**ESD Ratings** (Note 9)

Characteristic	Symbol	Value	Unit	JEDEC Class
Electrostatic Discharge - Human Body Model	ESD HBM	4,000	V	3A
Electrostatic Discharge - Machine Model	ESD MM	400	V	C

- Notes:
6. For a device mounted with the collector lead on 18mm × 18mm 2oz copper that is on a single-sided 1.6mm FR-4 PCB; device is measured under still air conditions whilst operating in steady-state.
  7. Same as note (6), except the device is mounted on 30mm × 30mm 2oz copper.
  8. Same as note (6), except measured at t < 5 seconds.
  9. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

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

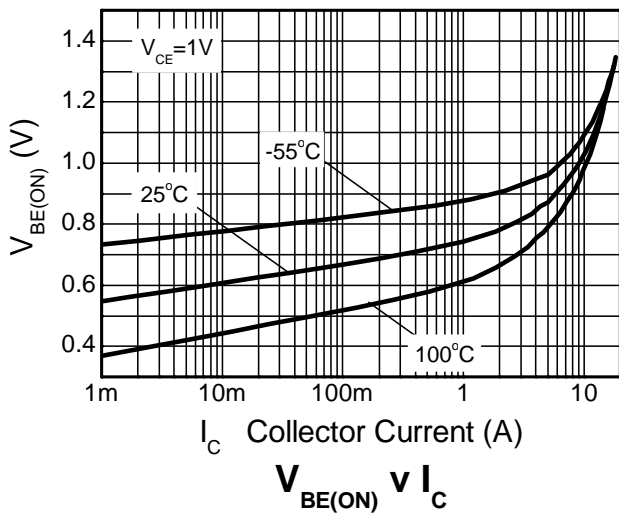
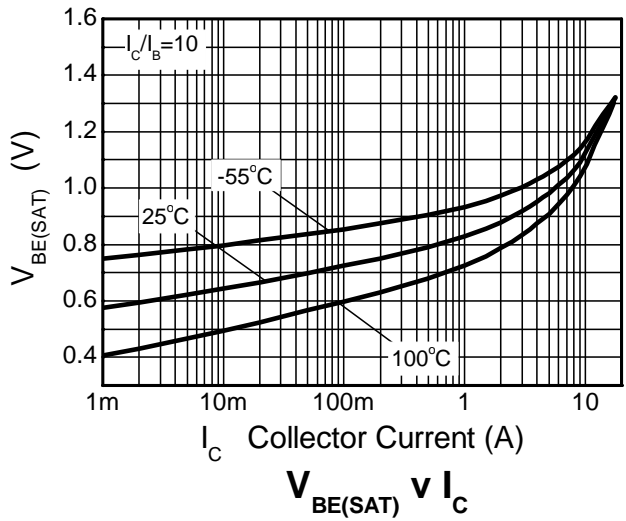
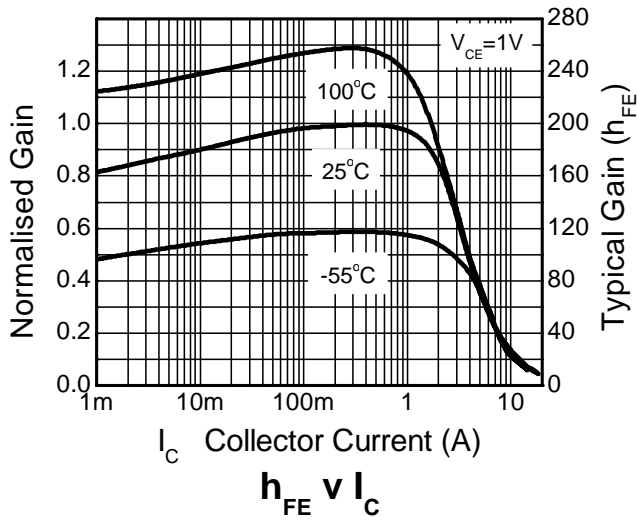
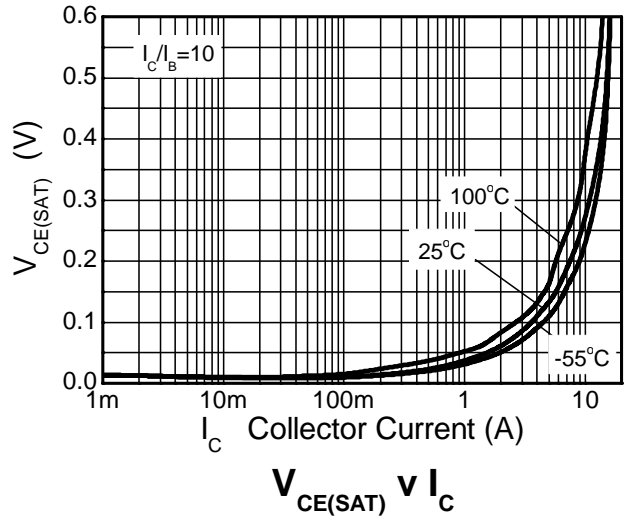
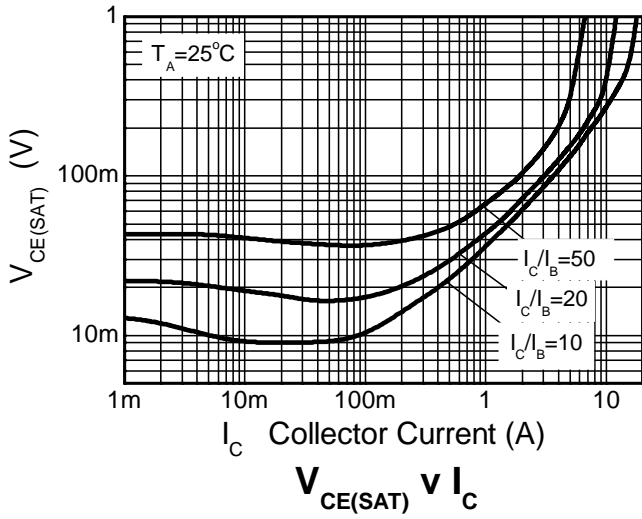


**Electrical Characteristics** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	$BV_{CBO}$	140	180	—	V	$I_C = 100\mu\text{A}$
Collector-Emitter Breakdown Voltage	$BV_{CEV}$	140	180	—	V	$I_C = 1\mu\text{A}$ , $-1\text{V} < V_{BE} < +0.3\text{V}$
Collector-Emitter Breakdown Voltage (Note 10)	$BV_{CEO}$	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 Cutoff Current	$I_{CBO}$	—	< 1	50	nA	$V_{CB} = 110\text{V}$
Collector-Emitter Cutoff Current	$I_{CEV}$	—	< 1	100	nA	$V_{CB} = 110\text{V}$ , $V_{BE} = -1\text{V}$
Emitter-Base Cutoff Current	$I_{EBO}$	—	< 1	10	nA	$V_{EB} = 6\text{V}$
Static Forward Current Transfer Ratio (Note 10)	$h_{FE}$	100	220	—	—	$I_C = 10\text{mA}$ , $V_{CE} = 1\text{V}$
		100	200	300		$I_C = 2\text{A}$ , $V_{CE} = 1\text{V}$
		40	65	—		$I_C = 5\text{A}$ , $V_{CE} = 1\text{V}$
		15	25	—		$I_C = 10\text{A}$ , $V_{CE} = 1\text{V}$
Collector-Emitter Saturation Voltage (Note 10)	$V_{CE(SAT)}$	—	15	30	mV	$I_C = 0.1\text{A}$ , $I_B = 5\text{mA}$
		—	35	45		$I_C = 1\text{A}$ , $I_B = 100\text{mA}$
		—	40	55		$I_C = 1\text{A}$ , $I_B = 50\text{mA}$
		—	85	110		$I_C = 2\text{A}$ , $I_B = 50\text{mA}$
		—	145	170		$I_C = 5\text{A}$ , $I_B = 250\text{mA}$
		—	170	210		$I_C = 6\text{A}$ , $I_B = 300\text{mA}$
Base-Emitter Saturation Voltage (Note 10)	$V_{BE(SAT)}$	—	0.92	1.00	V	$I_C = 5\text{A}$ , $I_B = 250\text{mA}$
Base-Emitter Saturation Voltage (Note 10)	$V_{BE(ON)}$	—	0.85	0.95	V	$I_C = 5\text{A}$ , $V_{CE} = 1\text{V}$
Output Capacitance	$C_{OBO}$	—	28	—	pF	$V_{CB} = 10\text{V}$ , $f = 1\text{MHz}$
Transition Frequency	$f_T$	—	130	—	MHz	$V_{CE} = 10\text{V}$ , $I_C = 100\text{mA}$ , $f = 50\text{MHz}$
Turn-On Time	$t_{ON}$	—	33	—	ns	$V_{CC} = 10\text{V}$ , $I_C = 1\text{A}$ ,
Turn-Off Time	$t_{OFF}$	—	668	—	ns	$I_{B1} = -I_{B2} = 100\text{mA}$

Note: 10. Measured under pulsed conditions. Pulse width  $\leq 300\mu\text{s}$ . Duty cycle  $\leq 2\%$ .

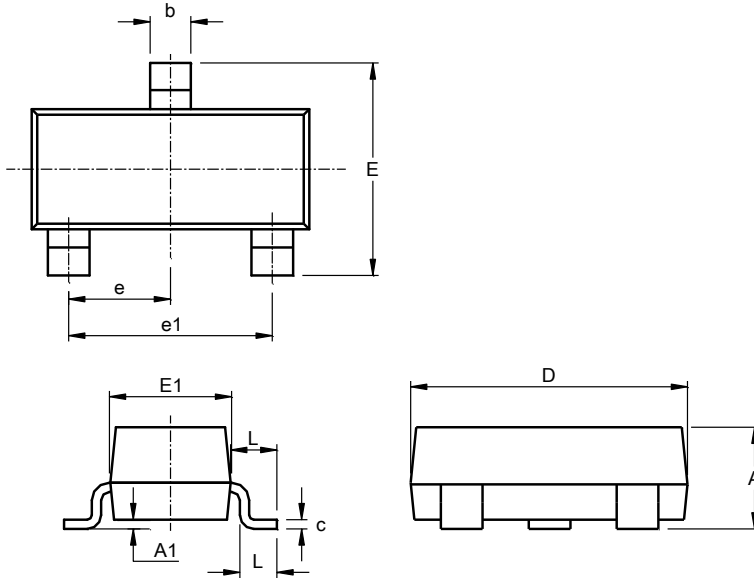
**Typical Electrical Characteristics** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)



**Package Outline Dimensions**

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

**SOT23 (Type DN)**

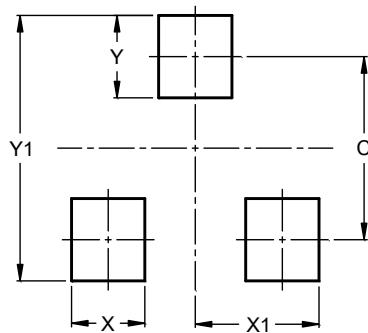


SOT23 (Type DN)			
Dim	Min	Max	Typ
A	0.89	1.12	1.00
A1	0.01	0.10	0.05
b	0.30	0.51	0.45
c	0.08	0.20	0.10
D	2.80	3.04	3.00
E	2.10	2.64	2.42
E1	1.20	1.40	1.37
e	0.95 REF		
e1	1.90 REF		
L	0.25	0.60	0.30
L1	0.45	0.62	0.54
All Dimensions in mm			

**Suggested Pad Layout**

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

**SOT23 (Type DN)**



Dimensions	Value (in mm)
C	2.0
X	0.8
X1	1.35
Y	0.9
Y1	2.9

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