

## Description

This Bipolar Junction Transistor (BJT) is designed to meet the stringent requirements of automotive applications.

## Features

- $BV_{CEO} > -60V$
- $I_C = -4A$  High Continuous Collector Current
- $I_{CM} = -10A$  Peak Pulse Current
- Low Saturation Voltage  $-60mV$  Max @  $I_C = -1A$ .
- $R_{CE(sat)} = 45m\Omega$  at 1A for a Low Equivalent On-Resistance
- 1.2W Power Dissipation
- Complimentary NPN Type: ZXTN2018FQ
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **The ZXTP2027FQ 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: SOT23
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification 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 0.008 grams (Approximate)

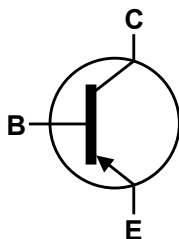
## Application

- Gate Driving MOSFETs and IGBTs
- Motor Drive
- Relay, Lamp and Solenoid Drive
- High Side Switches

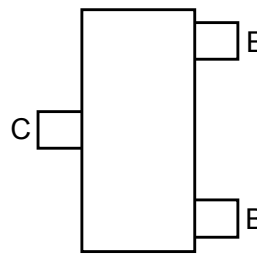
SOT23 (Type DN)



Top View



Device Symbol



Top View  
Pin-Out

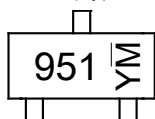
## Ordering Information (Note 4)

Part Number	Marking	Reel Size (inches)	Tape Width (mm)	Quantity per Reel
ZXTP2027FQTA	951	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. For packaging details, go to our website at <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

## Marking Information

SOT23 (Type DN)



951 = Product Type Marking Code  
 YM = Date Code Marking  
 Y = Year ex: 1 = 2021  
 M = Month ex: 9 = September

### Date Code Key

Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Code	H	I	J	K	L	M	N	O	P	R	S	T
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** (@  $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	$V_{CBO}$	-100	V
Collector-Emitter Voltage	$V_{CEV}$	-100	V
Collector-Emitter Voltage	$V_{CEO}$	-60	V
Emitter-Base Voltage	$V_{EBO}$	-7	V
Peak Pulse Collector Current	$I_{CM}$	-10	A
Continuous Collector Current	$I_C$	-4	A
Base Current	$I_B$	-1	A

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

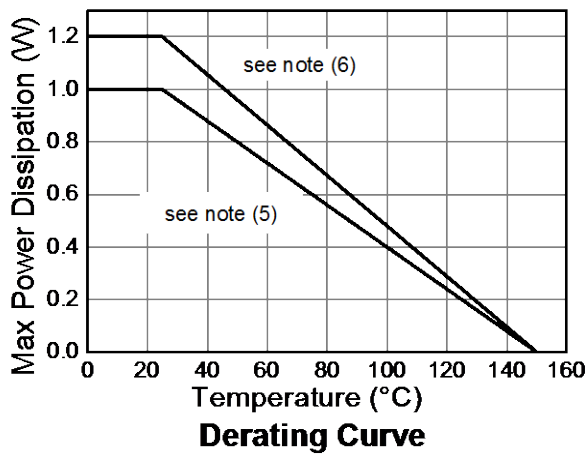
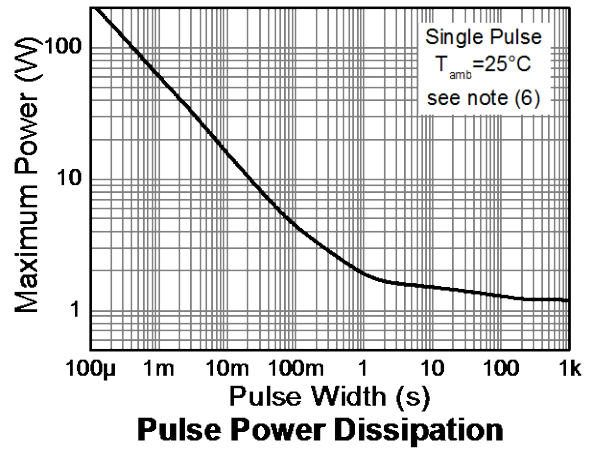
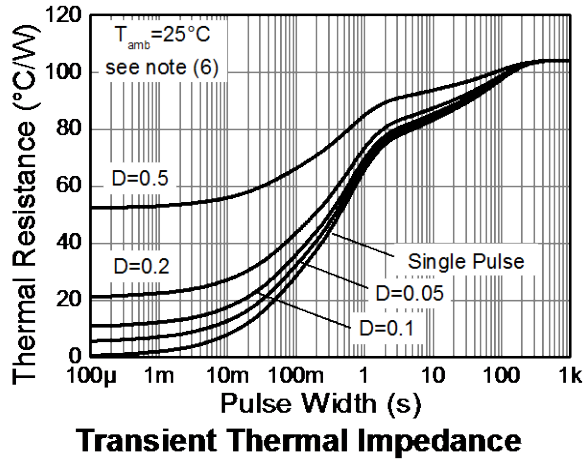
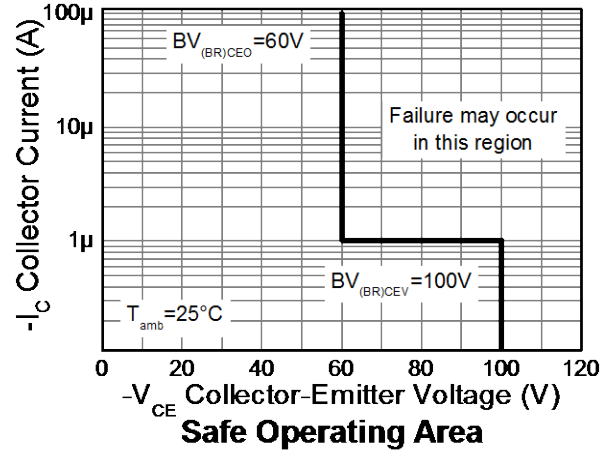
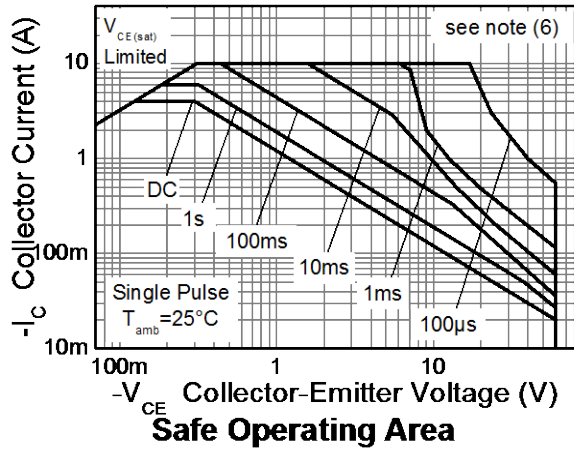
Characteristic	Symbol	Value	Unit
Power Dissipation (Note 5)	$P_D$	1.0	W
Power Dissipation (Note 6)	$P_D$	1.2	W
Power Dissipation (Note 7)	$P_D$	1.56	W
Thermal Resistance, Junction to Ambient Air (Note 5)	$R_{\theta JA}$	125	$^\circ\text{C/W}$
Thermal Resistance, Junction to Ambient Air (Note 6)	$R_{\theta JA}$	104	$^\circ\text{C/W}$
Thermal Resistance, Junction to Ambient Air (Note 7)	$R_{\theta JA}$	80	$^\circ\text{C/W}$
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	4,000	V	3A
Electrostatic Discharge - Machine Model	ESD MM	400	V	C

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

**Thermal Characteristics and Derating Information**

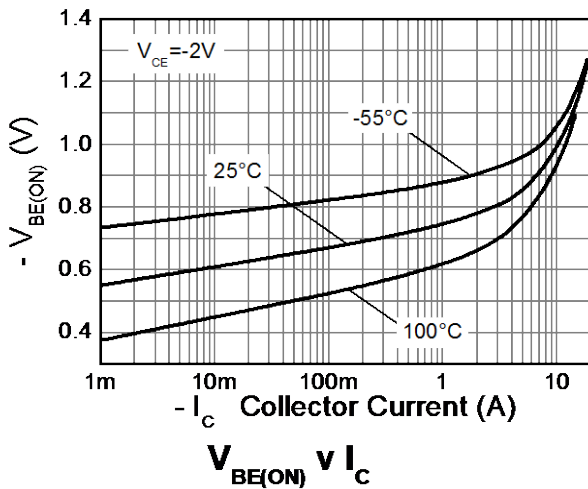
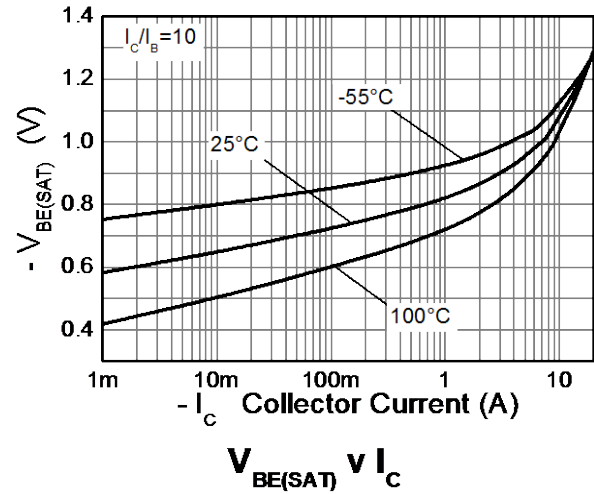
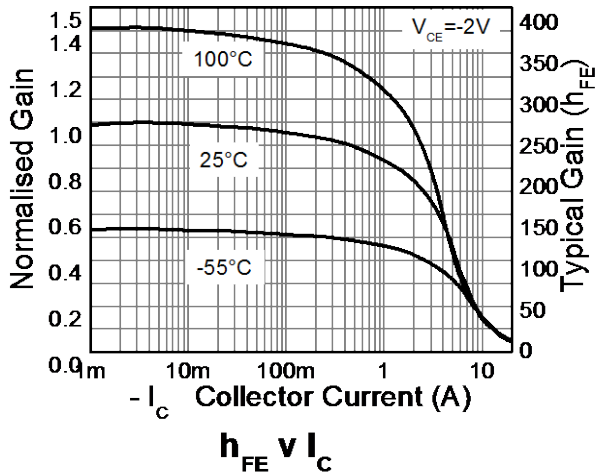
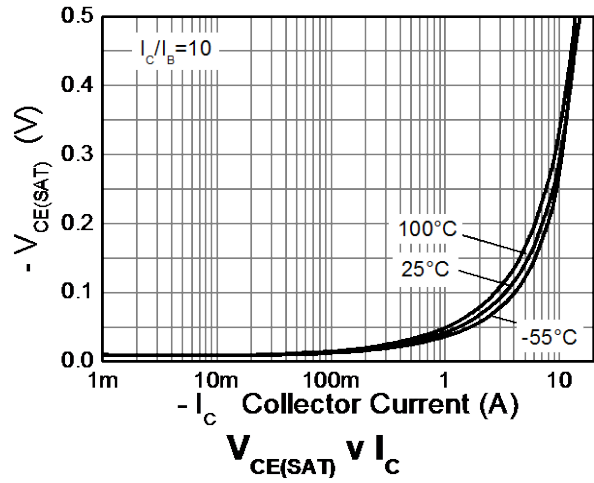
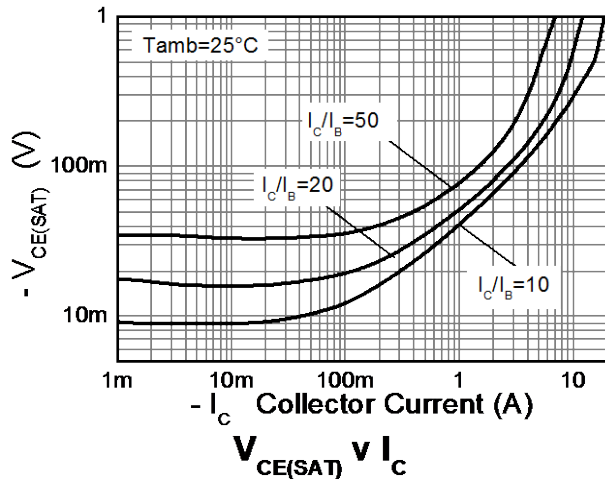


**Electrical Characteristics** (@  $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Conditions
<b>OFF CHARACTERISTICS</b>						
Collector-Base Breakdown Voltage	$BV_{CBO}$	-100	-120	—	V	$I_C = -100\mu\text{A}$
Collector-Emitter Breakdown Voltage	$BV_{CEV}$	-100	-120	—	V	$I_C = -1\mu\text{A}$ , $1V > V_{BE} > -0.3V$
Collector-Emitter Breakdown Voltage (Note 9)	$BV_{CEO}$	-60	-75	—	V	$I_C = -10\text{mA}$
Emitter-Base Breakdown Voltage	$BV_{EBO}$	-7.0	-8.2	—	V	$I_E = -100\mu\text{A}$
Collector-Emitter Cutoff Current	$I_{CEV}$	—	—	-20	nA	$V_{CE} = -80V$ , $V_{BE} = 1V$
Collector-Base Cutoff Current	$I_{CBO}$	—	—	-20	nA	$V_{CB} = -80V$ , $I_E = 0$
Emitter-Base Cutoff Current	$I_{EBO}$	—	—	-10	nA	$V_{EB} = -6V$ , $I_C = 0$
<b>ON CHARACTERISTICS</b> (Note 9)						
DC Current Gain	$h_{FE}$	100	250	—	—	$V_{CE} = -2V$ , $I_C = -10\text{mA}$
		100	200	300		$V_{CE} = -2V$ , $I_C = -2A$
		80	145	—		$V_{CE} = -2V$ , $I_C = -4A$
		20	40	—		$V_{CE} = -2V$ , $I_C = -10A$
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	—	-15	-25	mV	$I_C = -100\text{mA}$ , $I_B = -10\text{mA}$
		—	-45	-60		$I_C = -1A$ , $I_B = -100\text{mA}$
		—	-70	-95		$I_C = -2A$ , $I_B = -200\text{mA}$
		—	-155	-240		$I_C = -4A$ , $I_B = -200\text{mA}$
Base-Emitter Saturation Voltage	$V_{BE(sat)}$	—	-0.89	-1.0	V	$I_C = -4A$ , $I_B = -200\text{mA}$
Base-Emitter Turn-On Voltage	$V_{BE(on)}$	—	-0.81	-0.95	V	$V_{CE} = -2V$ , $I_C = -4A$
<b>SMALL SIGNAL CHARACTERISTICS</b>						
Switching times	$t_d$	—	12.6	—	ns	$V_{CC} = -10V$ , $I_C = -2A$ , $-I_{B1} = I_{B2} = -200\text{mA}$
	$t_r$	—	10.2	—		
	$t_s$	—	220	—		
	$t_f$	—	21	—		
Transition Frequency	$f_t$	—	165	—	MHZ	$V_{CE} = -10V$ , $I_C = -100\text{mA}$ , $f = 50\text{MHZ}$
Output Capacitance	$C_{obo}$	—	44	—	pF	$V_{CB} = -10V$ , $f = 1\text{MHZ}$

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

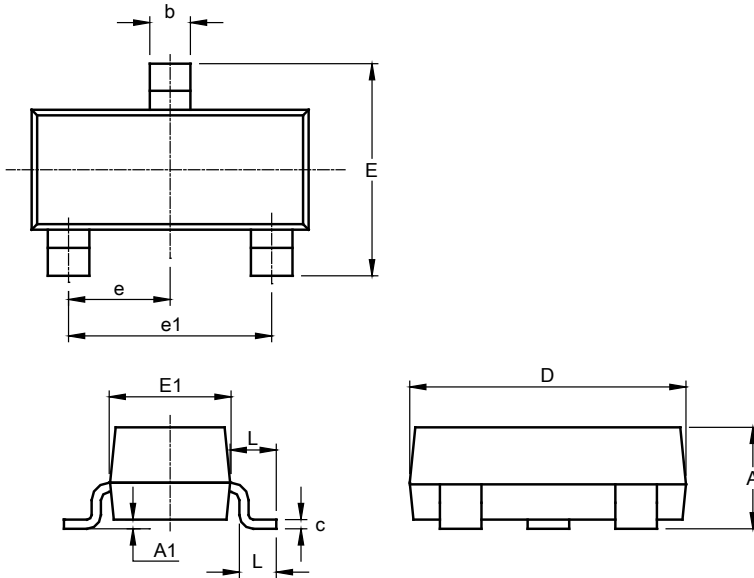
**Typical Electrical Characteristics** (@  $T_A = +25^\circ\text{C}$ , unless otherwise specified.)



**Package Outline Dimensions**

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

**SOT23 (Type DN)**

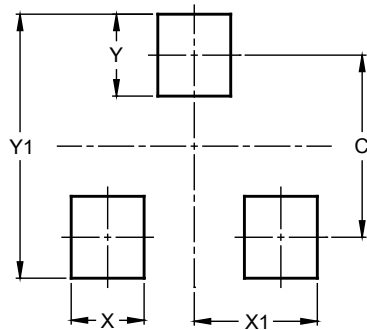


SOT23 (Type DN)			
Dim	Min	Max	Typ
A	0.89	1.12	1.00
A1	0.01	0.10	0.05
b	0.30	0.51	0.45
c	0.08	0.20	0.10
D	2.80	3.04	3.00
E	2.10	2.64	2.42
E1	1.20	1.40	1.37
e	0.95 REF		
e1	1.90 REF		
L	0.25	0.60	0.30
L1	0.45	0.62	0.54
All Dimensions in mm			

**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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