

## Description

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

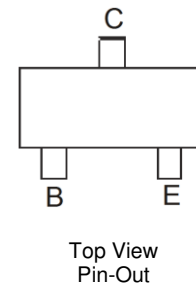
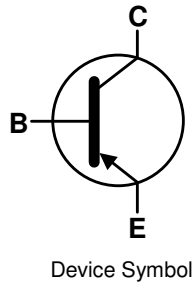
## Features and Benefits

- $BV_{CEO} > -150V$
- Maximum Continuous Collector Current  $I_C = -600mA$
- Excellent  $h_{FE}$  Characteristics up to  $I_C = -50mA$
- Low Saturation Voltages
- Complementary part number: ZXTN5551FLQ
- **Totally Lead-Free & Fully RoHS compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **The ZXTP5401FLQ 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

- Package: SOT23
- UL Flammability Rating 94V-0
- Case material: molded Plastic.
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Matte Tin Finish; Solderable per MIL-STD-202, Method 208
- Weight: 0.008 grams (Approximate)

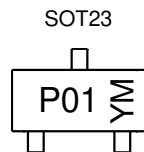


## Ordering Information (Note 4)

Product	Compliance	Marking	Reel size (inches)	Tape width (mm)	Quantity per reel
ZXTP5401FLQTA	Automotive	P01	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



P01 = Product Type Marking Code  
 YM = Date Code Marking  
 Y or  $\bar{Y}$  = Year (ex: 1 = 2021)  
 M = Month (ex: 9 = September)

### Date Code Key

Year	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Code	I	J	K	L	M	N	O	P	R	S	T	U

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

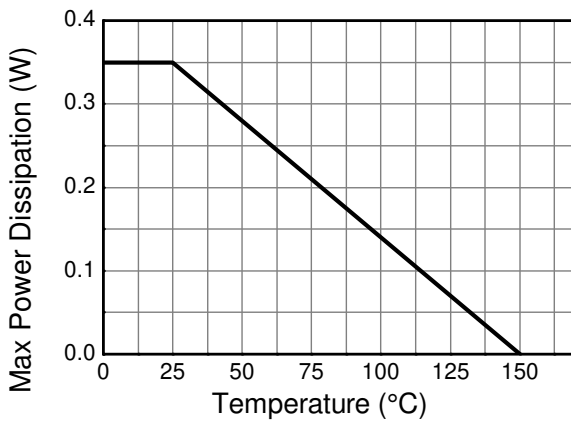
**Absolute Maximum Ratings** @  $T_A = 25^\circ\text{C}$  unless otherwise specified

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	$V_{CB0}$	-160	V
Collector-Emitter Voltage	$V_{CEO}$	-150	V
Emitter-Base Voltage	$V_{EBO}$	-5	V
Continuous Collector Current	$I_C$	-600	mA
Peak Pulse Current	$I_{CM}$	-1	A

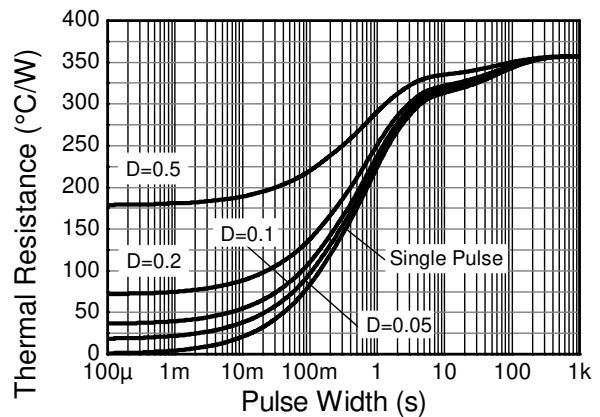
**Thermal Characteristics** @  $T_A = 25^\circ\text{C}$  unless otherwise specified

Characteristic	Symbol	Value	Unit
Collector Power Dissipation	$P_D$	310	mW
		(Note 6)	
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	403	$^\circ\text{C/W}$
		(Note 6)	
Thermal Resistance, Junction to Leads	$R_{\theta JL}$	350	$^\circ\text{C/W}$
Operating and Storage Temperature Range	$T_J, T_{STG}$	-55 to +150	$^\circ\text{C}$

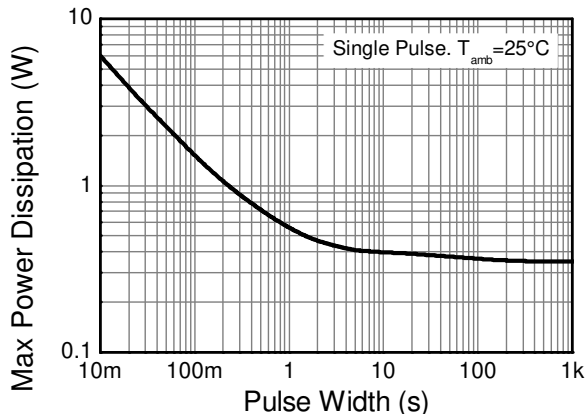
Notes: 5. For the device mounted on minimum recommended pad layout FR4 PCB with high coverage of single sided 1oz copper in still air condition.  
 6. Same as Note 5, expect the device is mounted on 15mm x 15mm x 1.6mm FR4 PCB.  
 7. Thermal resistance from junction to solder-point (at the end of the collector lead).



**Derating Curve**



**Transient Thermal Impedance**



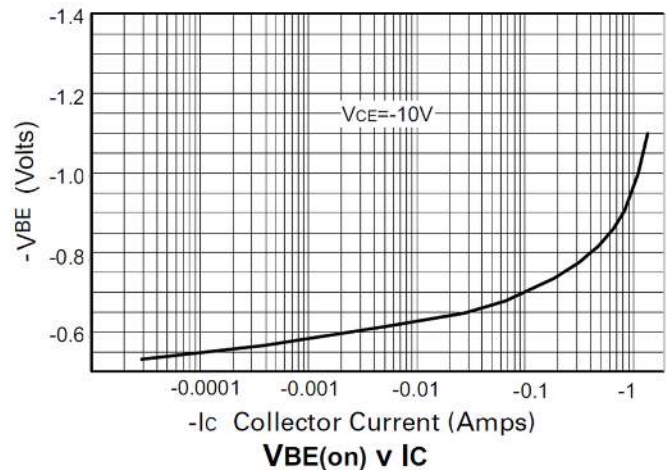
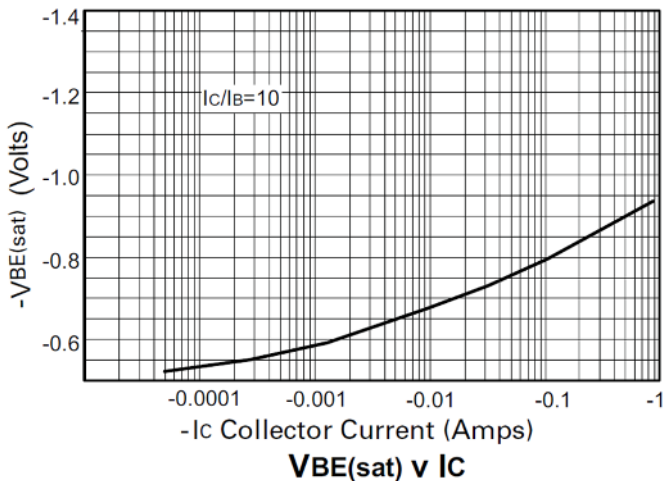
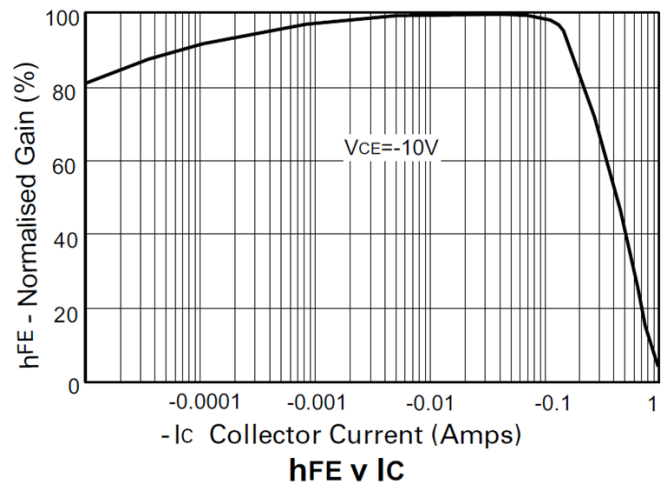
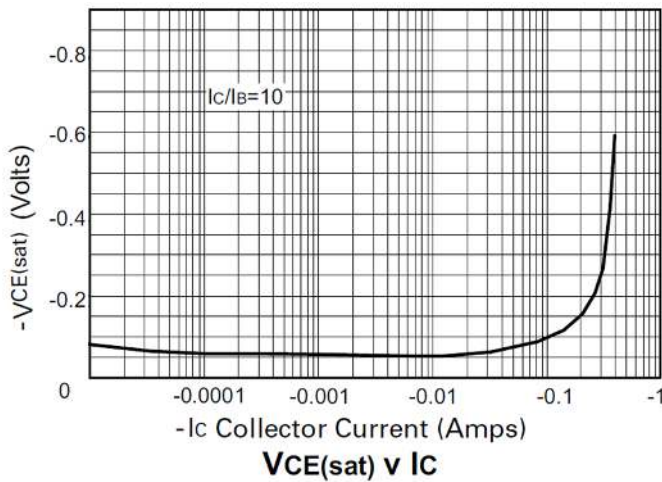
**Pulse Power Dissipation**

**Electrical Characteristics @ T<sub>A</sub> = 25°C unless otherwise specified**

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV <sub>CBO</sub>	-160	-270	-	V	I <sub>C</sub> = -100μA
Collector-Emitter Breakdown Voltage (Note 8)	BV <sub>CEO</sub>	-150	-240	-	V	I <sub>C</sub> = -1mA
Emitter-Base Breakdown Voltage	BV <sub>EBO</sub>	-5	-8.1	-	V	I <sub>E</sub> = -100μA
Collector Cutoff Current	I <sub>CBO</sub>	-	< -1	-50	nA	V <sub>CB</sub> = -120V
			-	-50	μA	V <sub>CB</sub> = -120V, T <sub>amb</sub> = 100°C
Static Forward Current Transfer Ratio (Note 8)	h <sub>FE</sub>	50	135	-	-	I <sub>C</sub> = -1mA, V <sub>CE</sub> = -5V
		60	135	240	-	I <sub>C</sub> = -10mA, V <sub>CE</sub> = -5V
		50	130	-	-	I <sub>C</sub> = -50mA, V <sub>CE</sub> = -5V
Collector-Emitter Saturation Voltage (Note 8)	V <sub>CE(sat)</sub>	-	-50	-200	mV	I <sub>C</sub> = -10mA, I <sub>B</sub> = -1mA
		-	-70	-500	mV	I <sub>C</sub> = -50mA, I <sub>B</sub> = -5mA
Base-Emitter Saturation Voltage (Note 8)	V <sub>BE(sat)</sub>	-	-700	-1000	mV	I <sub>C</sub> = -10mA, I <sub>B</sub> = -1mA
		-	-750	-1000	mV	I <sub>C</sub> = -50mA, I <sub>B</sub> = -5mA
Output Capacitance	C <sub>obo</sub>	-	-	10	pF	V <sub>CB</sub> = -10V, f = 1MHz
Transition Frequency	f <sub>T</sub>	-	100	-	MHz	V <sub>CE</sub> = -10V, I <sub>C</sub> = -10mA, f = 100MHz
Delay Time	t <sub>d</sub>	-	386	-	ns	V <sub>CC</sub> = -50V, I <sub>C</sub> = -100mA, I <sub>B1</sub> = -I <sub>B2</sub> = -10mA
Rise Time	t <sub>r</sub>	-	202	-	ns	
Storage Time	t <sub>s</sub>	-	1720	-	ns	
Fall Time	t <sub>f</sub>	-	275	-	ns	

Notes: 8. Measured under pulsed conditions. Pulse width ≤ 300 μs. Duty cycle ≤ 2%

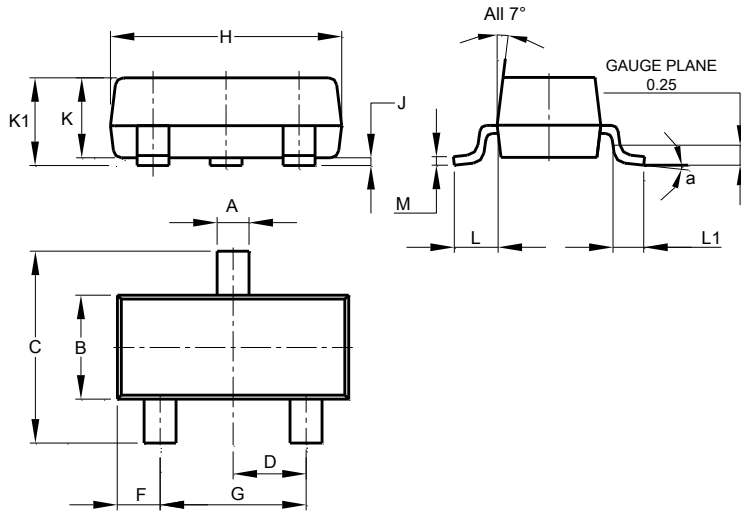
**Typical Electrical Characteristics @ T<sub>A</sub> = 25°C unless otherwise specified**



**Package Outline Dimensions**

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

**SOT23**

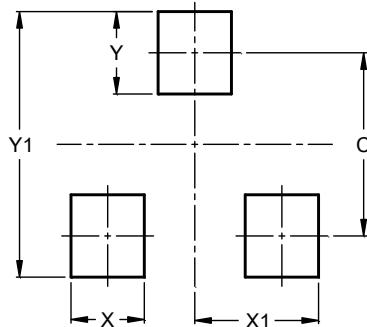


SOT23			
Dim	Min	Max	Typ
A	0.37	0.51	0.40
B	1.20	1.40	1.30
C	2.30	2.50	2.40
D	0.89	1.03	0.915
F	0.45	0.60	0.535
G	1.78	2.05	1.83
H	2.80	3.00	2.90
J	0.013	0.10	0.05
K	0.890	1.00	0.975
K1	0.903	1.10	1.025
L	0.45	0.61	0.55
L1	0.25	0.55	0.40
M	0.085	0.150	0.110
a	0°	8°	--
All Dimensions in mm			

**Suggested Pad Layout**

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

**SOT23**



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

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