60V PNP MEDIUM POWER TRANSISTOR IN SOT23

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.
- $R_{CE(sat)}$ = 45mΩ 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

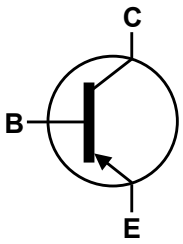
- Case: SOT23
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish – Matte Tin Plated Leads, Solderable per MIL-STD-202, Method 208 (e3)
- Weight 0.008 grams (Approximate)

Application

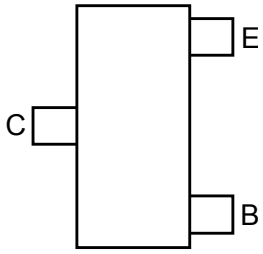
- Gate Driving MOSFETs and IGBTs
- Motor Drive
- Relay, Lamp and Solenoid Drive
- High Side Switches

SOT23 (Type DN)

Top View



Device Symbol



Top View
Pin-Out

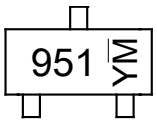
Ordering Information (Note 4)

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: I = 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°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°C, unless otherwise specified.)

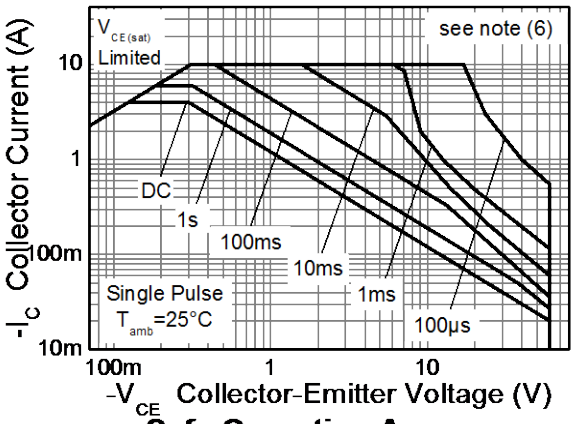
Characteristic	Symbol	Value	Unit
Power Dissipation (Note 5)	P_D	1.0	W
Power Dissipation (Note 6)	P_D	1.2	W
Power Dissipation (Note 7)	P_D	1.56	W
Thermal Resistance, Junction to Ambient Air (Note 5)	$R_{\theta JA}$	125	°C/W
Thermal Resistance, Junction to Ambient Air (Note 6)	$R_{\theta JA}$	104	°C/W
Thermal Resistance, Junction to Ambient Air (Note 7)	$R_{\theta JA}$	80	°C/W
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +150	°C

ESD Ratings (Note 8)

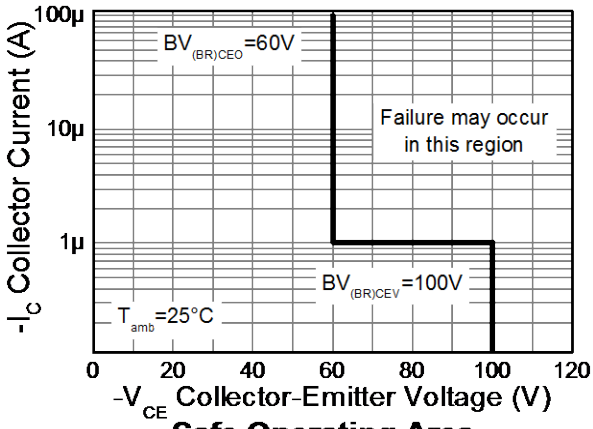
Characteristic	Symbol	Value	Unit	JEDEC Class
Electrostatic Discharge - Human Body Model	ESD HBM	4,000	V	3A
Electrostatic Discharge - Machine Model	ESD MM	400	V	C

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<5secs.
8. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

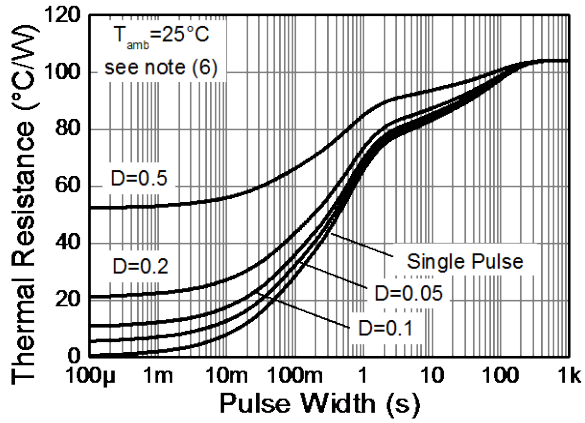
Thermal Characteristics and Derating Information



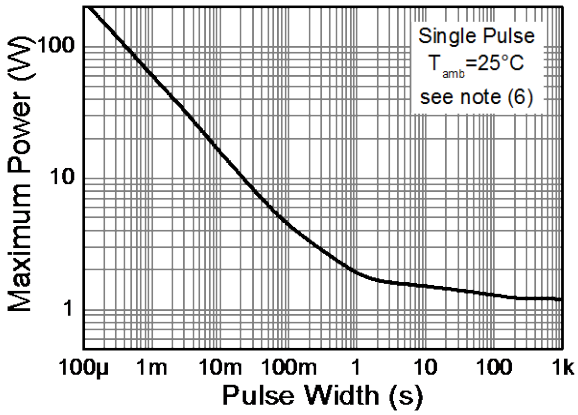
Safe Operating Area



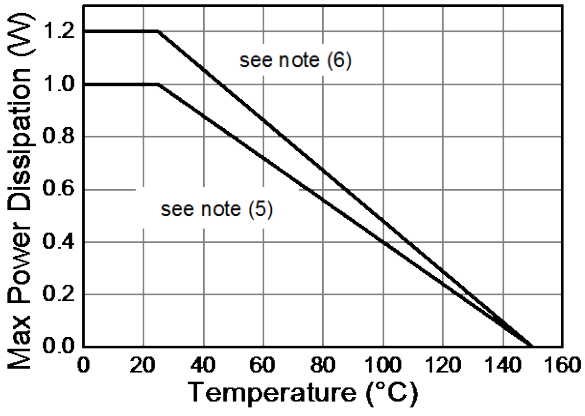
Safe Operating Area



Transient Thermal Impedance



Pulse Power Dissipation



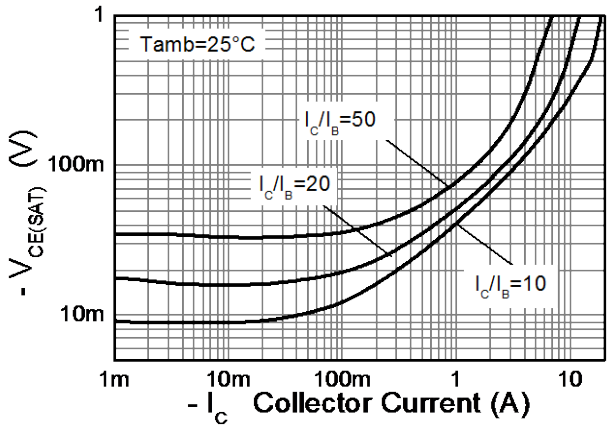
Derating Curve

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

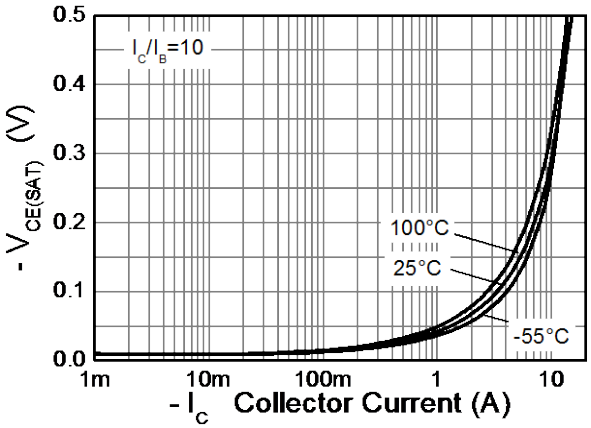
Characteristic	Symbol	Min	Typ	Max	Unit	Test Conditions
OFF CHARACTERISTICS						
Collector-Base Breakdown Voltage	BV_{CBO}	-100	-120	—	V	I_C = -100µA
Collector-Emitter Breakdown Voltage	BV_{CEV}	-100	-120	—	V	I_C = -1µA, 1V > V_{BE} > -0.3V
Collector-Emitter Breakdown Voltage (Note 9)	BV_{CEO}	-60	-75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

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

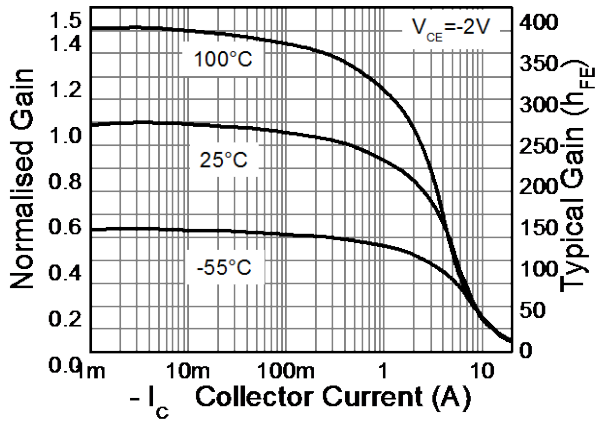
Typical Electrical Characteristics (@ T_A = +25°C, unless otherwise specified.)



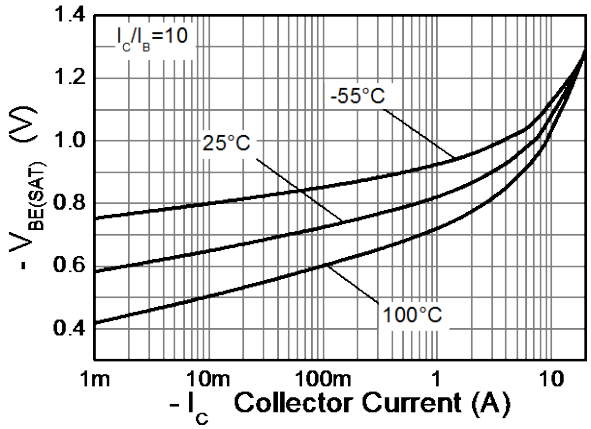
$V_{CE(SAT)}$ v I_C



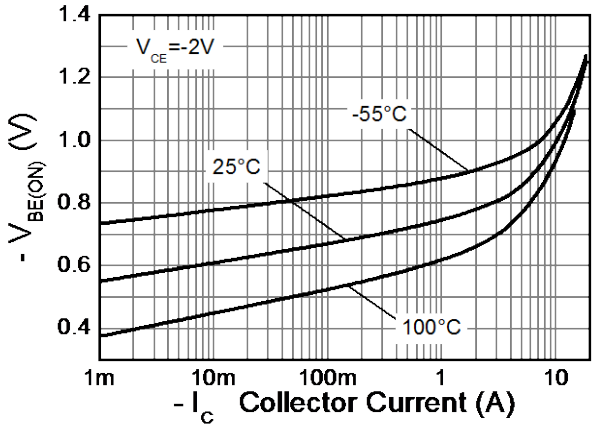
$V_{CE(SAT)}$ v I_C



h_{FE} v I_C



$V_{BE(SAT)}$ v I_C

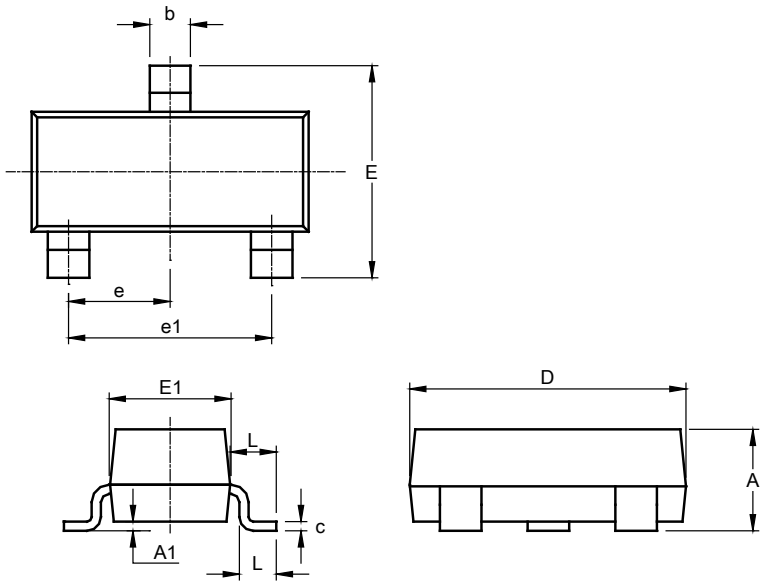


$V_{BE(ON)}$ v I_C

Package Outline Dimensions

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

SOT23 (Type DN)

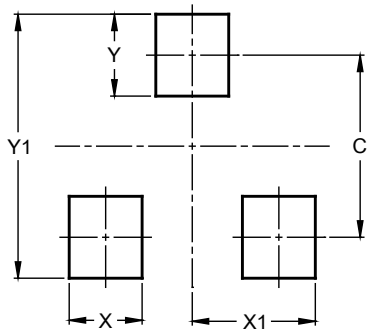


SOT23 (Type DN)			
Dim	**Min**	**Max**	**Typ**
A	0.89	1.12	1.00
A1	0.01	0.10	0.05
b	0.30	0.51	0.45
c	0.08	0.20	0.10
D	2.80	3.04	3.00
E	2.10	2.64	2.42
E1	1.20	1.40	1.37
e	0.95 REF		
e1	1.90 REF		
L	0.25	0.60	0.30
L1	0.45	0.62	0.54
All Dimensions in mm			

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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