60V NPN LOW SATURATION TRANSISTOR IN SOT23

Features

- BV_{CEO} > 60V
- Maximum Continuous Collector Current I_C = 5A
- $V_{CE(sat)}$ < 45mV @ 1A
- $R_{CE(sat)}$ = 25mΩ
- High Power Dissipation SOT23 (Type DN) Package
- I_{CM} = 12A Peak Pulse Current
- 140V Forward Blocking Voltage
- Complementary Part Number ZXTP2027F
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **An automotive-compliant part is available under a separate datasheet (ZXTN2018FQ)**

Mechanical Data

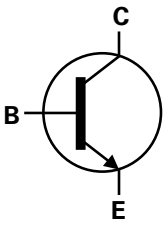
- Package: SOT23
- Package Material: Molded Plastic. "Green" Molding Compound. UL Flammability Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish – Matte Tin Plated Leads, Solderable per MIL-STD-202, Method 208 e3
- Weight: 0.008 grams (Approximate)

Applications

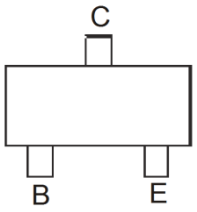
- MOSFET and IGBT gate driving
- Motor drives
- Relays, lamps and solenoid drives

SOT23 (Type DN)

Top View



Device Symbol



Top View
Pinout

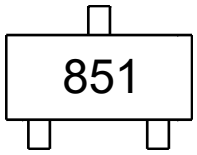
Ordering Information (Note 4)

Orderable Part Number	Package	Marking	Reel Size (inches)	Tape Width (mm)	Packing	
					Qty.	Carrier
ZXTN2018FTA	SOT23 (Type DN)	851	7	8	3,000	Reel

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)



851 = Product Type Marking Code

Absolute Maximum Ratings (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V_{CBO}	140	V
Collector-Emitter Voltage	V_{CEV}	140	V
Collector-Emitter Voltage	V_{CEO}	60	V
Emitter-Base Voltage	V_{EBO}	7	V
Continuous Collector Current	I_C	5	A
Base Current	I_B	1	A
Peak Pulse Current	I_{CM}	12	A

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

Characteristic		Symbol	Value	Unit
Power Dissipation Linear Derating Factor	(Note 5)	P_D	1 8	W mW/°C
	(Note 6)		1.2 9.6	
	(Note 7)		1.56 12.5	
Thermal Resistance, Junction to Ambient	(Note 5)	$R_{\theta JA}$	125	°C/W
	(Note 6)		104	
	(Note 7)		80	
Thermal Resistance, Junction to Case	(Note 8)	$R_{\theta JC}$	32	°C/W
Operating and Storage Temperature Range		T_J, T_{STG}	-55 to +150	°C

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:
5. For a device mounted with the collector lead on 15mm x 15mm 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.
6. Same as Note 5, except the device is mounted on 25mm x 25mm 2oz copper.
7. Same as Note 6, except measured at t < 5 seconds.
8. Thermal resistance from junction to the top of the case.
9. Refer to JEDEC specifications JESD22-A114 and JESD22-A115.

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

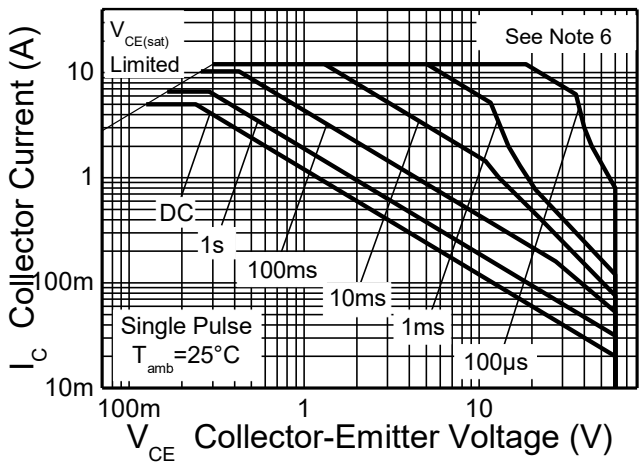


Fig. 1 Safe Operating Area

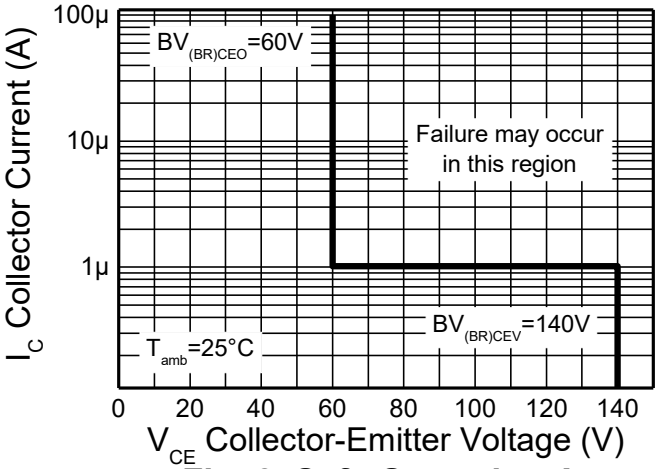


Fig. 2 Safe Operating Area

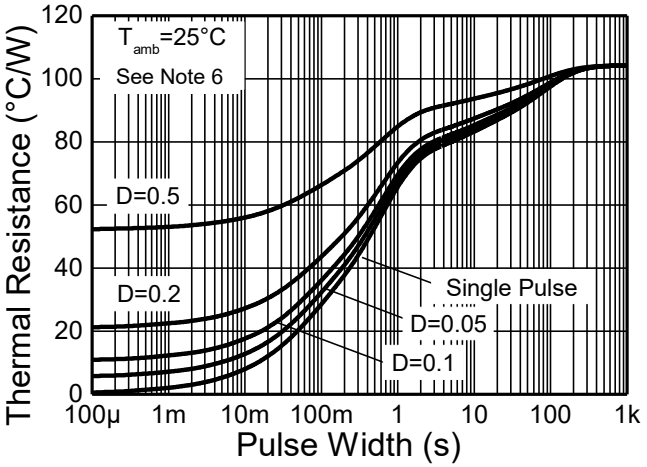


Fig. 3 Transient Thermal Impedance

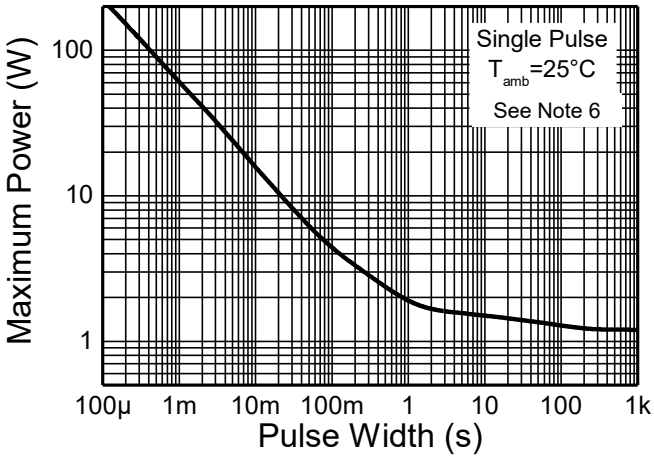


Fig. 4 Pulse Power Dissipation

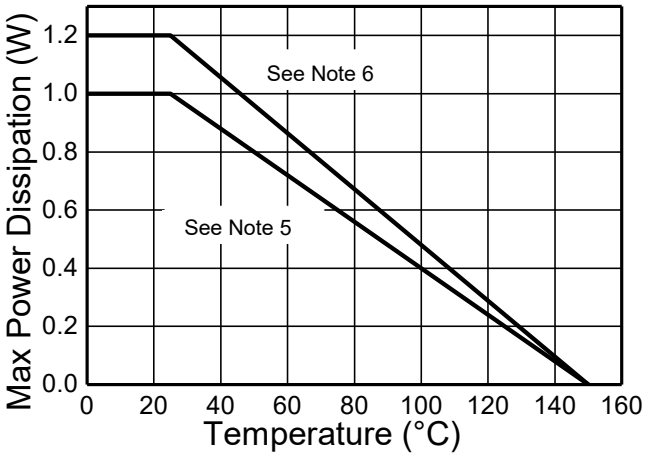


Fig. 5 Derating Curve

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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
Collector-Base Breakdown Voltage	BV_{CBO}	140	180	—	V	I_C = 100µA
Collector-Emitter Breakdown Voltage	BV_{CEV}	140	180	—	V	I_C = 1µA, -1V < V_{BE} < +0.3V
Collector-Emitter Breakdown Voltage (Note 10)	BV_{CEO}	60	80	—	V	I_C = 10mA
Emitter-Base Breakdown Voltage	BV_{EBO}	7	8	—	V	I_E = 100µA
Collector-Base Cutoff Current	I_{CBO}	—	1	50	nA	V_{CB} = 110V
Collector-Emitter Cutoff Current	I_{CEV}	—	1	100	nA	V_{CB} = 110V, V_{BE} = -1V
Emitter-Base Cutoff Current	I_{EBO}	—	1	10	nA	V_{EB} = 6V
Static Forward Current Transfer Ratio (Note 10)	h_{FE}	100	220	—	—	I_C = 10mA, V_{CE} = 1V
		100	200	300		I_C = 2A, V_{CE} = 1V
		40	65	—		I_C = 5A, V_{CE} = 1V
		15	25	—		I_C = 10A, V_{CE} = 1V
Collector-Emitter Saturation Voltage (Note 10)	$V_{CE(sat)}$	—	15	30	mV	I_C = 0.1A, I_B = 5mA
		—	35	45		I_C = 1A, I_B = 100mA
		—	40	55		I_C = 1A, I_B = 50mA
		—	85	110		I_C = 2A, I_B = 50mA
		—	145	170		I_C = 5A, I_B = 250mA
		—	170	210		I_C = 6A, I_B = 300mA
Base-Emitter Saturation Voltage (Note 10)	$V_{BE(sat)}$	—	0.92	1.00	V	I_C = 5A, I_B = 250mA
Base-Emitter Saturation Voltage (Note 10)	$V_{BE(on)}$	—	0.85	0.95	V	I_C = 5A, V_{CE} = 1V
Output Capacitance	C_{obo}	—	28	—	pF	V_{CB} = 10V, f = 1MHz
Transition Frequency	f_T	—	130	—	MHz	V_{CE} = 10V, I_C = 100mA f = 50MHz
Turn-On Time	t_{on}	—	33	—	ns	V_{CC} = 10V, I_C = 1A
Turn-Off Time	t_{off}	—	668	—	ns	I_{B1} = -I_{B2} = 100mA

Note: 10. Measured under pulsed conditions. Pulse width ≤ 300µs. Duty cycle ≤ 2%.

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

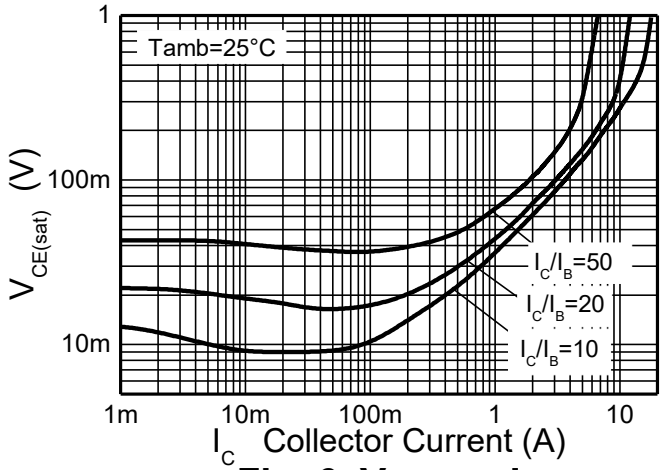


Fig. 6 $V_{CE(sat)}$ v I_C

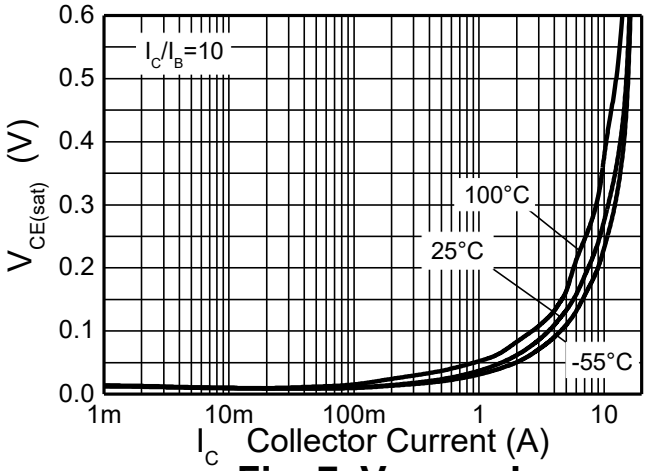


Fig. 7 $V_{CE(sat)}$ v I_C

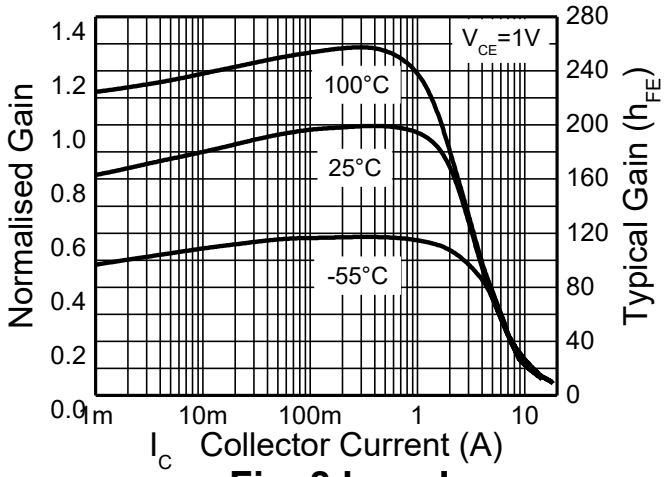


Fig. 8 h_{FE} v I_C

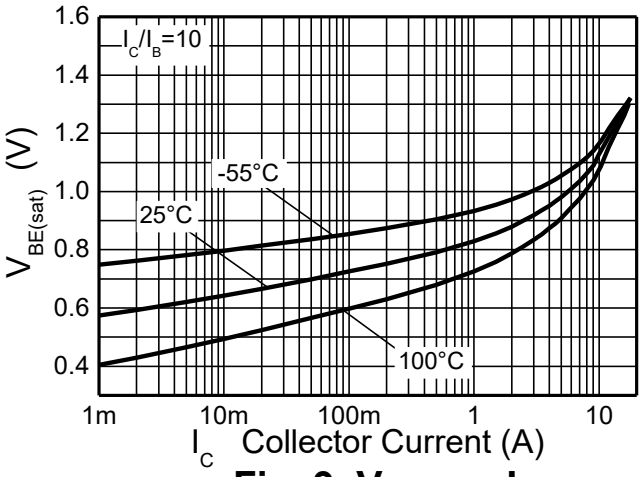


Fig. 9 $V_{BE(sat)}$ v I_C

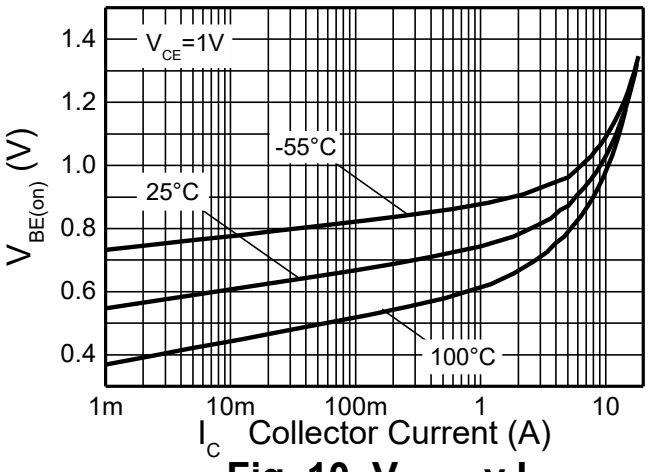
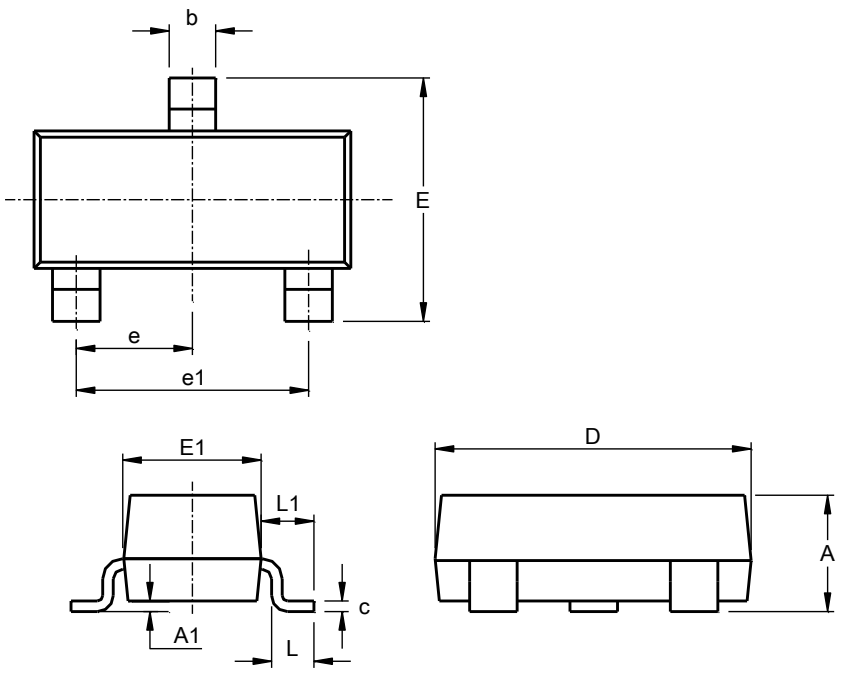


Fig. 10 $V_{BE(on)}$ v I_C

Package Outline Dimensions

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

SOT23 (Type DN)

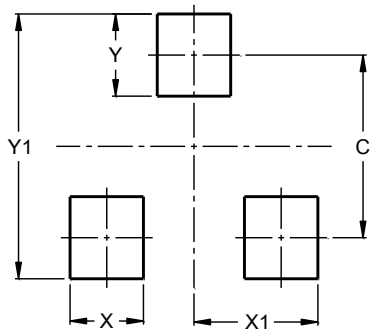


SOT23 (Type DN)			
Dim	**Min**	**Max**	**Typ**
A	0.89	1.12	1.00
A1	0.01	0.10	0.05
b	0.30	0.51	0.45
c	0.08	0.20	0.10
D	2.80	3.04	3.00
E	2.10	2.64	2.42
E1	1.20	1.40	1.37
e	0.95 REF		
e1	1.90 REF		
L	0.25	0.60	0.30
L1	0.45	0.62	0.54
All Dimensions in mm			

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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