

## Features

- $BV_{CEO} > -20V$
- $BV_{ECO} > -4V$
- $I_C = -5.5A$  Continuous Collector Current
- $I_{CM} = -15A$  Peak Current
- Guaranteed Gain at  $I_C$  of -10A
- $V_{CE(SAT)} < -44mV @ -1A$
- $R_{CE(SAT)} = 26m\Omega$
- 1.5W Power Dissipation
- Complementary PNP Type: ZXTN19020DFF
- **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**

## Description

Advanced process capability and package design have been used to maximize the power handling and performance of this small outline transistor. The compact size and ratings of this device make it ideally suited to applications where space is at a premium.

## Mechanical Data

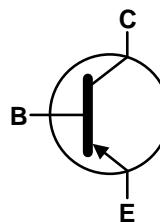
- Case: SOT23F
- Case Material: Molded Plastic. "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish – Matte Tin Plated Leads, Solderable per MIL-STD-202, Method 208 (E3)
- Weight: 0.012 grams (Approximate)

## Applications

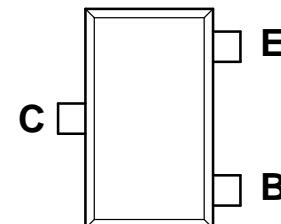
- MOSFET and IGBT Gate Driving
- Power Switches
- Motor Control



Top View



Device Symbol


 Top View  
 Pin Configuration

## Ordering Information (Note 4)

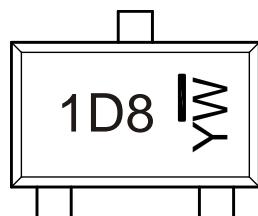
Part Number	Compliance	Marking	Reel Size (inches)	Tape Width (mm)	Quantity per Reel
ZXTP19020DFFTA	AEC-Q101	1D8	7	8	3,000

Notes:

1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
2. See [http://www.diodes.com/quality/lead\\_free.html](http://www.diodes.com/quality/lead_free.html) 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 <http://www.diodes.com/products/packages.html>.

## Marking Information

SOT23F



1D8 = Product Type Marking Code  
 YW = Date Code Marking  
 Y = Year: 0~9  
 W = Week: A~Z: 1~26  
 a~z: 27~52  
 z represents 52 & 53 week

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

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	$V_{CBO}$	-25	V
Collector-Emitter Voltage (Base Open)	$V_{CEO}$	-20	V
Emitter – Collector Voltage (Reverse Blocking)	$V_{ECO}$	-4	V
Emitter-Base Voltage	$V_{EBO}$	-7	V
Continuous Collector Current	$I_C$	-5.5	A
Peak Pulse Current	$I_{CM}$	-15	A
Base Current	$I_B$	-1	A

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

Characteristic	Symbol	Value	Unit
Power Dissipation Linear Derating Factor	$P_D$	0.84	W mW/°C
		6.72	
		1.34	
		10.72	
Thermal Resistance, Junction to Ambient	$R_{\theta JA}$	1.50	°C/W
		12.0	
		2.0	
		16.0	
Thermal Resistance, Junction to Lead	$R_{\theta JL}$	149	°C/W
Operating and Storage Temperature Range		93	
		83	
		60	
(Note 9)		43.8	°C/W
		-55 to +150	°C

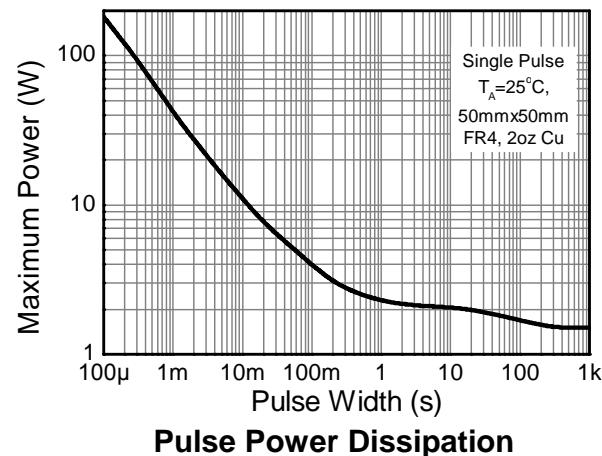
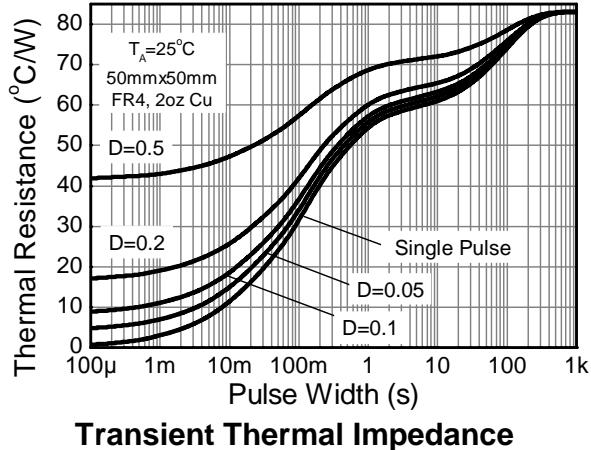
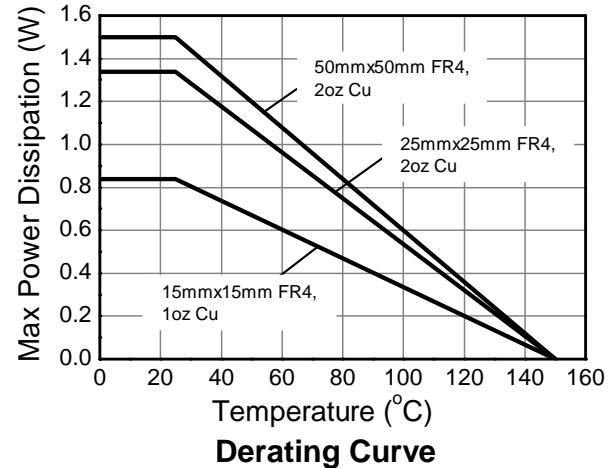
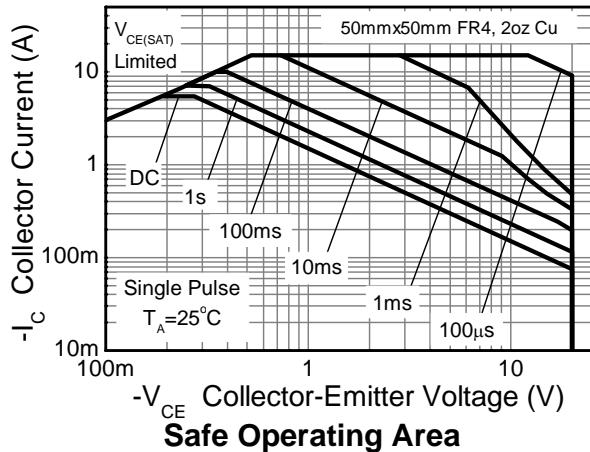
**ESD Ratings** (Note 10)

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 exposed collector pad on 15mm x 15mm 1oz copper that is on a single-sided 1.6mm FR4 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 25mm x 25mm 2oz copper.
7. Same as Note 5, except the device is mounted on 50mm x 50mm 2oz copper.
8. Same as Note 7, whilst measured at  $t < 5$  seconds.
9. Thermal resistance from junction to solder-point (at the end of the collector lead).
10. Refer to JEDEC specification JESD22-A114 and JESD22-A115.

## Thermal Characteristics and Derating Information

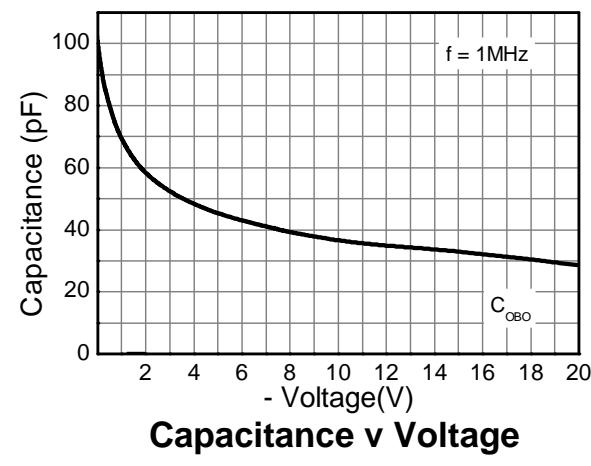
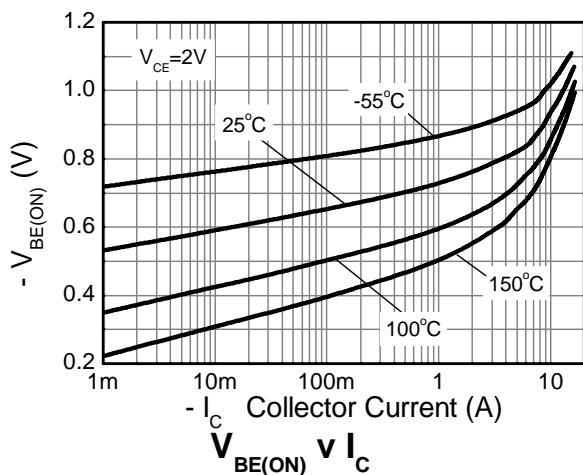
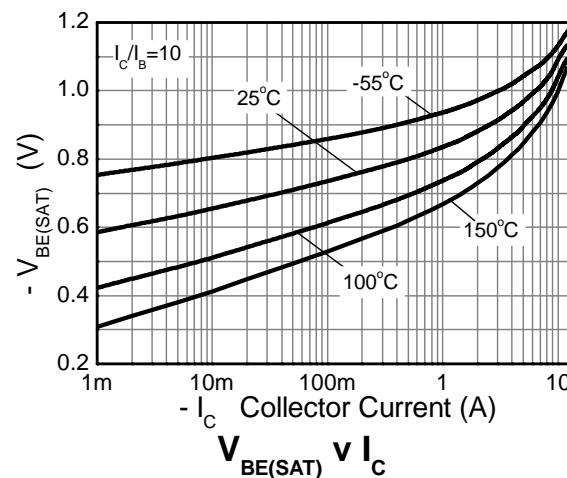
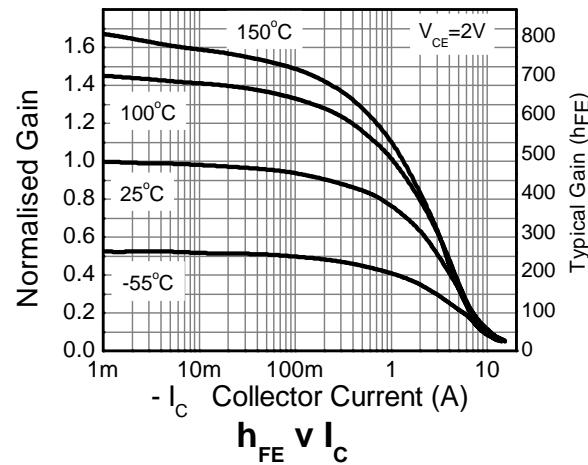
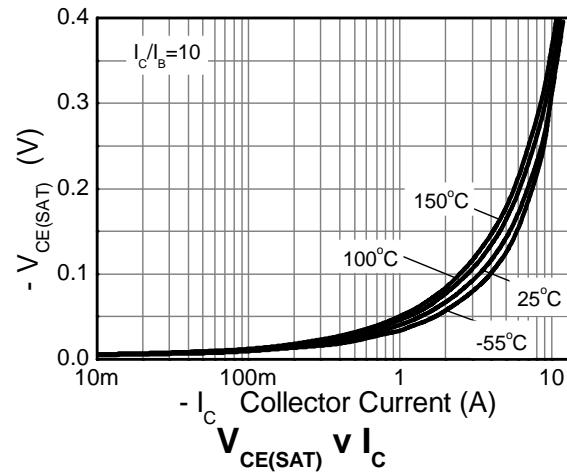
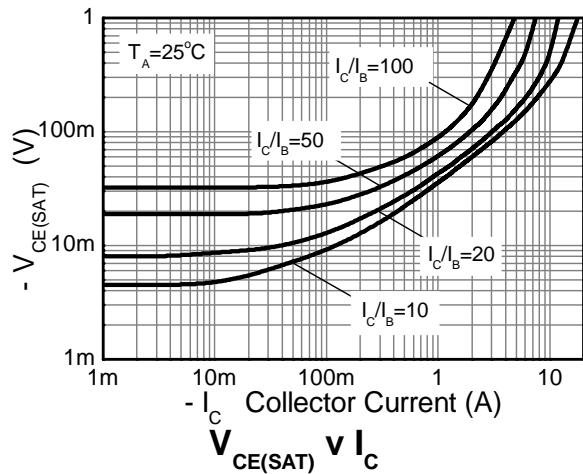


**Electrical Characteristics** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS</b>						
Collector-Base Breakdown Voltage	$\text{BV}_{\text{CBO}}$	-25	-55	—	V	$I_C = -100\mu\text{A}$
Collector-Emitter Breakdown Voltage (Base Open) (Note 11)	$\text{BV}_{\text{CEO}}$	-20	-50	—	V	$I_C = -10\text{mA}$
Emitter-Base Breakdown Voltage	$\text{BV}_{\text{EBO}}$	-7	-8.6	—	V	$I_E = -100\mu\text{A}$
Emitter – Collector Breakdown Voltage (Reverse Blocking)	$\text{BV}_{\text{ECX}}$	-4	-8.6	—	V	$I_E = -100\mu\text{A}, R_{BC} < 1\text{k}\Omega$ , or $0.25\text{V} > V_{BC} > -0.25\text{V}$
Emitter – Collector Breakdown Voltage (Base Open)	$\text{BV}_{\text{ECO}}$	-4	-8.6	—	V	$I_E = -100\mu\text{A}$
Collector-Base Cut-off Current	$I_{\text{CBO}}$	—	<-1	-50 -0.5	nA $\mu\text{A}$	$V_{\text{CB}} = -25\text{V}$ $V_{\text{CB}} = -25\text{V}, T_A = +100^\circ\text{C}$
Emitter-Base Cut-off Current	$I_{\text{EBO}}$	—	<-1	-50	nA	$V_{\text{EB}} = -5.6\text{V}$
<b>ON CHARACTERISTICS</b> (Note 11)						
Static Forward Current Transfer Ratio	$h_{\text{FE}}$	300 200 85 25 —	450 310 130 50 20	900	—	$I_C = -0.1\text{A}, V_{\text{CE}} = -2\text{V}$ $I_C = -2\text{A}, V_{\text{CE}} = -2\text{V}$ $I_C = -5.5\text{A}, V_{\text{CE}} = -2\text{V}$ $I_C = -10\text{A}, V_{\text{CE}} = -2\text{V}$ $I_C = -15\text{A}, V_{\text{CE}} = -2\text{V}$
Collector-Emitter Saturation Voltage	$V_{\text{CE}(\text{SAT})}$	—	-37 -90 -105 -160 -145	-44 -125 -140 -210 -175	mV	$I_C = -1\text{A}, I_B = -100\text{mA}$ $I_C = -1\text{A}, I_B = -10\text{mA}$ $I_C = -2\text{A}, I_B = -40\text{mA}$ $I_C = -5\text{A}, I_B = -250\text{mA}$ $I_C = -5.5\text{A}, I_B = -550\text{mA}$
Base-Emitter Saturation Voltage	$V_{\text{BE}(\text{SAT})}$	—	-975	-1050	mV	$I_C = -5.5\text{A}, I_B = -550\text{mA}$
Base-Emitter On Voltage	$V_{\text{BE}(\text{ON})}$	—	-830	-900	mV	$I_C = -5.5\text{A}, V_{\text{CE}} = -2\text{V}$
<b>SMALL SIGNAL CHARACTERISTICS</b>						
Transition Frequency	$f_T$	—	176	—	MHz	$I_C = -50\text{mA}, V_{\text{CE}} = -10\text{V},$ $f = 50\text{MHz}$
Input Capacitance	$C_{\text{IBO}}$	—	—	400	pF	$V_{\text{EB}} = -0.5\text{V}, f = 1\text{MHz}$
Output Capacitance	$C_{\text{OBO}}$	—	36	45	pF	$V_{\text{CB}} = -10\text{V}, f = 1\text{MHz}$
Delay Time	$t_D$	—	23	—	ns	$V_{\text{CC}} = -10\text{V},$ $I_C = -1\text{A},$ $I_{B1} = -I_{B2} = 50\text{mA}$
Rise Time	$t_R$	—	18	—	ns	
Storage Time	$t_S$	—	266	—	ns	
Fall Time	$t_F$	—	50	—	ns	

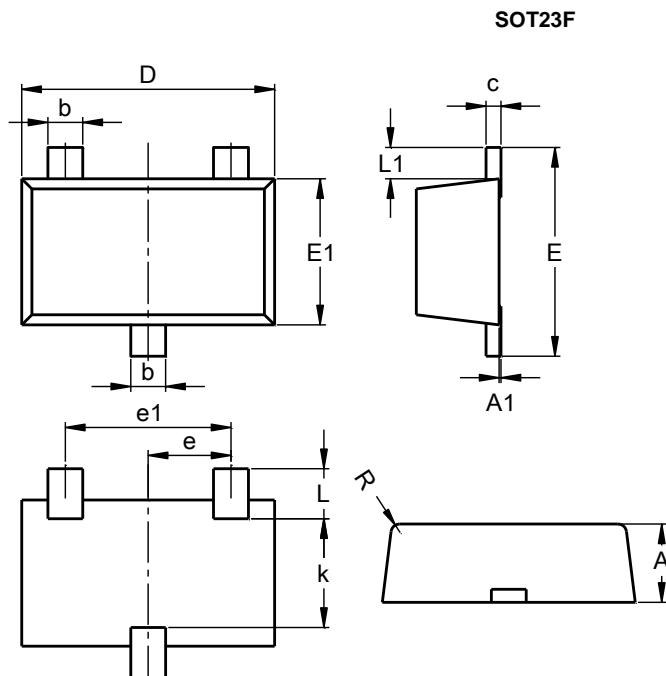
Note: 11. Measured under pulsed conditions. Pulse width  $\leq 300\mu\text{s}$ . Duty cycle  $\leq 2\%$ .

**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.

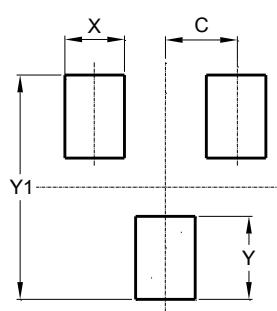


SOT23F			
Dim	Min	Max	Typ
<b>A</b>	0.80	1.00	0.90
<b>A1</b>	0.00	0.10	0.01
<b>b</b>	0.35	0.50	0.44
<b>c</b>	0.10	0.20	0.16
<b>D</b>	2.80	3.00	2.90
<b>e</b>	0.95 REF		
<b>e1</b>	1.90 REF		
<b>E</b>	2.30	2.50	2.40
<b>E1</b>	1.50	1.70	1.65
<b>k</b>	1.20	-	-
<b>L</b>	0.30	0.65	0.50
<b>L1</b>	0.30	0.50	0.40
<b>R</b>	0.05	0.15	-

All Dimensions in mm

## Suggested Pad Layout

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



Dimensions	Value (in mm)
<b>C</b>	0.95
<b>X</b>	0.80
<b>Y</b>	1.110
<b>Y1</b>	3.000

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