

120V NPN MEDIUM POWER DARLINGTON TRANSISTOR IN SOT23F

Features

- $BV_{CEO} > 120V$
- $I_C = 1A$ Continuous Collector Current
- $V_{CE(SAT)} < 1.5V @ 1A$
- $R_{CE(SAT)} = 38m\Omega$
- 1.5W Power Dissipation
- Complementary PNP Type: ZXTN05120FF
- **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

This high performance NPN Darlington transistor is housed in the small outline SOT23 flat package for 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 208③
- Weight: 0.012 grams (Approximate)

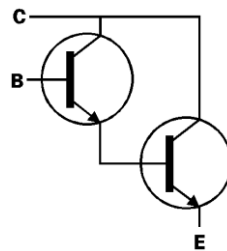
Applications

- Lamp, Relay and Solenoid Drive
- Lighting

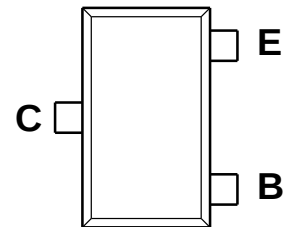
SOT23F



Top View



Device Symbol



Top View
Pin Configuration

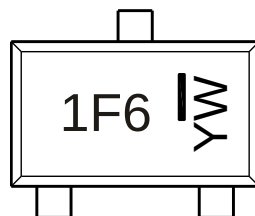
Ordering Information (Note 4)

Part Number	Compliance	Marking	Reel Size (inches)	Tape Width (mm)	Quantity per Reel
ZXTN04120HFFTA	AEC-Q101	1F6	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 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



1F6 = 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°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Collector-Base Voltage	V _{CBO}	140	V
Collector-Emitter Voltage	V _{CEO}	120	V
Emitter-Base Voltage	V _{EBO}	10	V
Continuous Collector Current	I _C	1	A
Peak Pulse Current	I _{CM}	4	A
Base Current	I _B	0.5	A

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

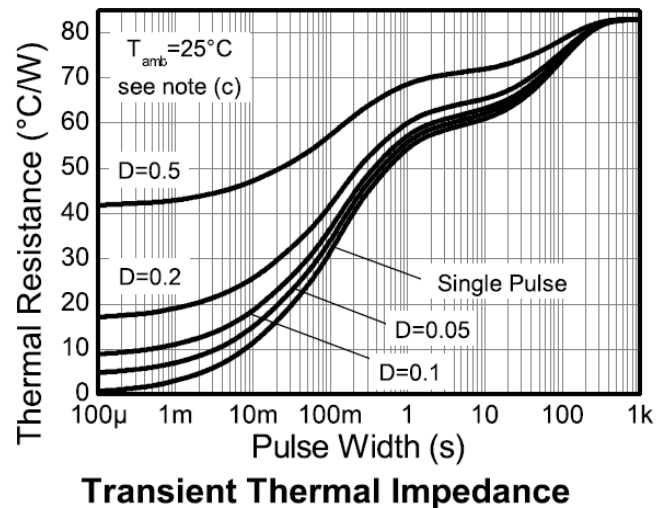
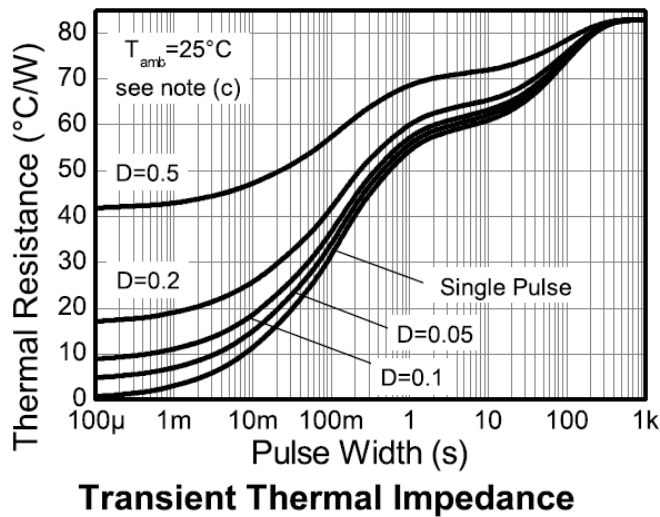
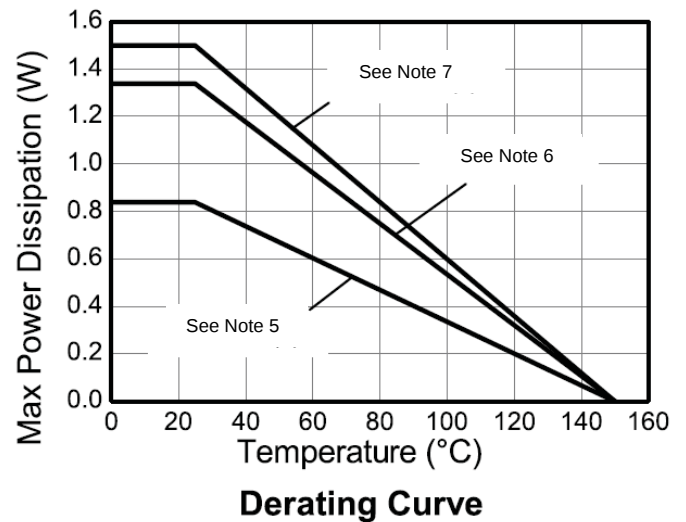
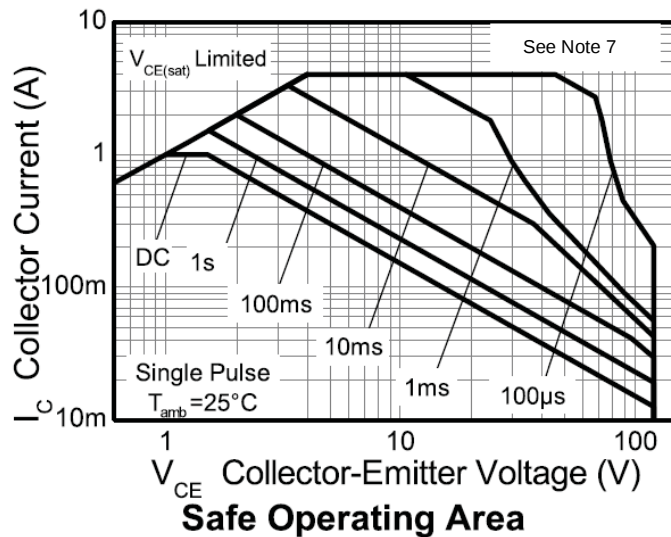
Characteristic	Symbol	Value	Unit
Power Dissipation Linear Derating Factor	P _D	0.84	W mW/°C
		6.72	
		1.34	
		10.72	
		1.50	
Thermal Resistance, Junction to Ambient	R _{θJA}	12.0	°C/W
		2.0	
		16.0	
		149	
		93	
Thermal Resistance, Junction to Lead	R _{θJL}	83	°C/W
		60	
		43.8	
Operating and Storage Temperature Range	T _J , T _{STG}	-55 to +150	°C

ESD Ratings (Note 10)

Characteristic	Symbol	Value	Unit	JEDEC Class
Electrostatic Discharge – Human Body Model	ESD HBM	2,000	V	2
Electrostatic Discharge – Machine Model	ESD MM	200	V	B

- Notes:
- 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.
 - Same as Note 5, except the device is mounted on 25mm x 25mm 2oz copper.
 - Same as Note 5, except the device is mounted on 50mm x 50mm 2oz copper.
 - Same as Note 7, whilst measured at t < 5 seconds.
 - Thermal resistance from junction to solder-point (at the end of the collector lead).
 - Refer to JEDEC specification JESD22-A114 and JESD22-A115.

Thermal Characteristics and Derating Information

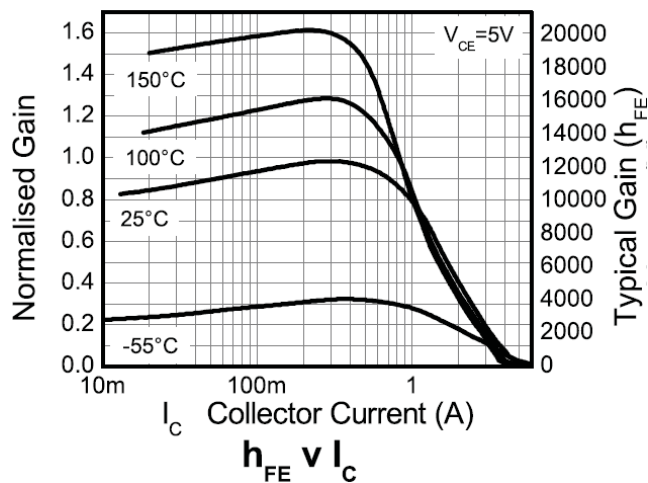
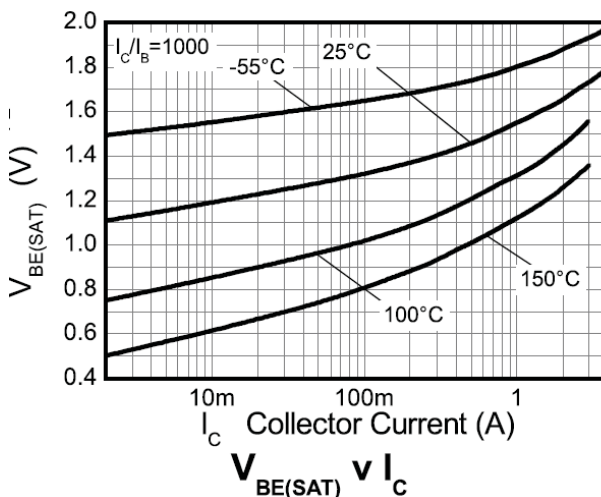
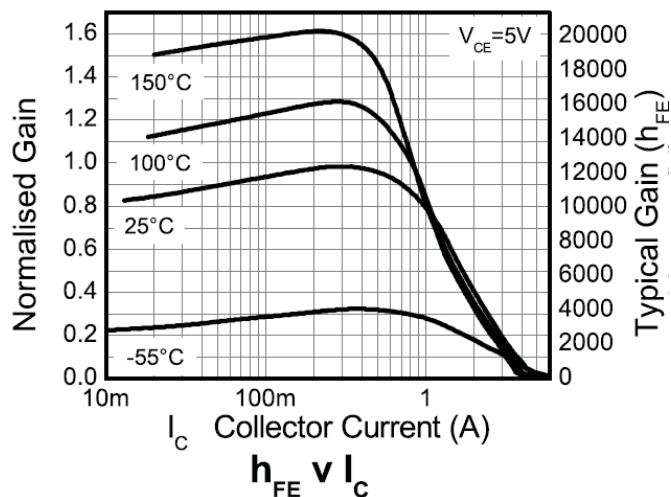
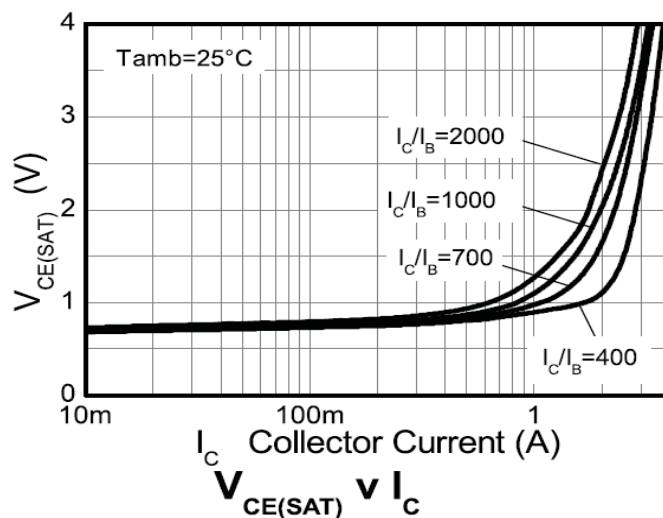
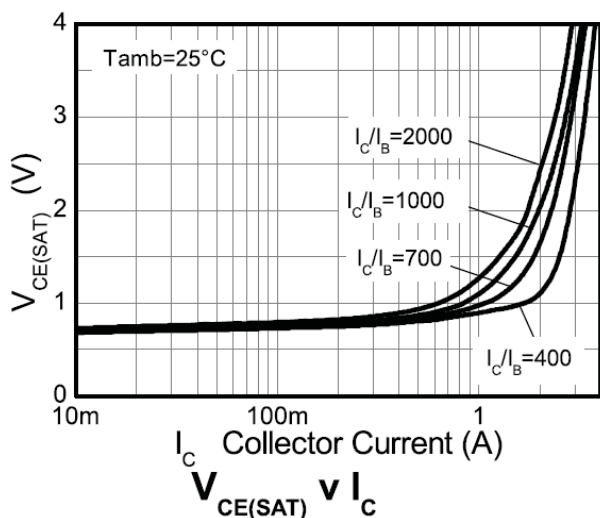


Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS						
Collector-Base Breakdown Voltage	BV _{CBO}	140	300	—	V	I _C = 100μA
Collector-Emitter Breakdown Voltage (Base Open) (Note 11)	BV _{CEO}	120	140	—	V	I _C = 10mA
Emitter-Base Breakdown Voltage	BV _{EBO}	10	16	—	V	I _E = 100μA
Collector-Base Cutoff Current	I _{CBO}	—	<1	100	nA	V _{CB} = 120V
Collector-Emitter Cutoff Current	I _{CES}	—	<0.1	10	μA	V _{CB} = 120V, T _A = +100°C
Emitter-Base Cutoff Current	I _{EBO}	—	<1	100	nA	V _{CE} = 120V
ON CHARACTERISTICS (Note 11)						
Static Forward Current Transfer Ratio	h _{FE}	3k 3k 3k 1k	11k 12k 10k 5k	— — 30k —	—	I _C = 50mA, V _{CE} = 5V I _C = 500mA, V _{CE} = 5V I _C = 1A, V _{CE} = 5V I _C = 2A, V _{CE} = 5V
Collector-Emitter Saturation Voltage	V _{CE(SAT)}	—	0.8 1.1 1.1	0.9 1.5 1.5	V	I _C = 250mA, I _B = 25mA I _C = 1A, I _B = 1mA I _C = 2A, I _B = 5mA
Base-Emitter Saturation Voltage	V _{BE(SAT)}	—	1.55	1.7	V	I _C = 1A, I _B = 1mA
Base-Emitter On Voltage	V _{BE(ON)}	—	1.45	1.7	V	I _C = 1A, V _{CE} = 5V
SMALL SIGNAL CHARACTERISTICS						
Transition Frequency	f _T	—	120	—	MHz	I _C = 100mA, V _{CE} = 10V, f = 20MHz
Input Capacitance	C _{IBO}	—	68	90	pF	V _{EB} = 500mV, f = 1MHz
Output Capacitance	C _{OBO}	—	12.8	25	pF	V _{CB} = 10V, f = 1MHz
Delay Time	t _D	—	507	—	ns	V _{CC} = 10V, I _C = 500mA, I _{B1} = -I _{B2} = 0.5mA
Rise Time	t _R	—	136	—	ns	
Storage Time	t _S	—	910	—	ns	
Fall Time	t _F	—	369	—	ns	

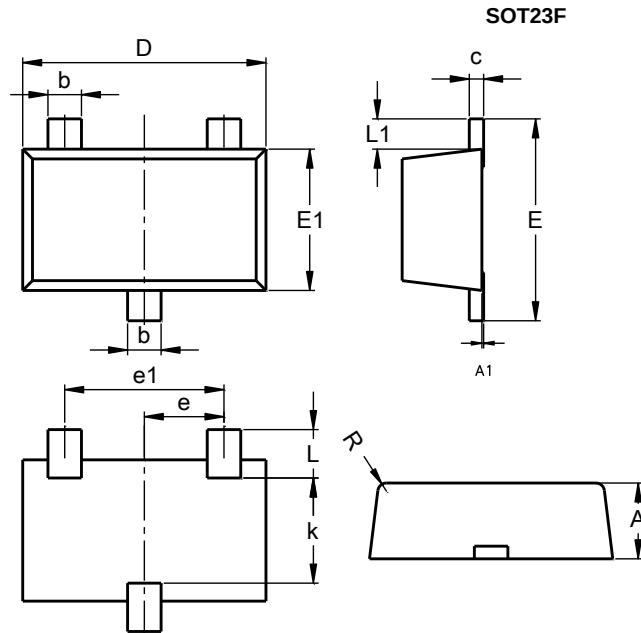
Note: 11. Measured under pulsed conditions. Pulse width ≤ 300μs. Duty cycle ≤ 2%.

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



Package Outline Dimensions

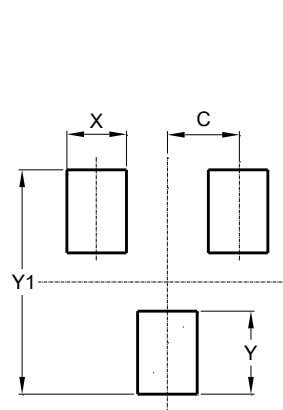
Please see <http://www.diodes.com/package-outlines.html> for the latest version.



SOT23F			
Dim	Min	Max	Typ
A	0.80	1.00	0.90
b	0.35	0.50	0.44
c	0.10	0.20	0.16
D	2.80	3.00	2.90
e	0.95 REF		
e1	0.190 REF		
E	2.30	2.50	2.40
E1	1.50	1.70	1.65
k	1.20	—	—
L	0.30	0.65	0.50
L1	0.30	0.50	0.40
R	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)
C	0.95
X	0.80
Y	1.110
Y1	3.000

Note: For high voltage applications, the appropriate industry sector guidelines should be considered with regards to creepage and clearance distances between device Terminals and PCB tracking.

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