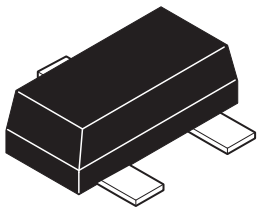
ZXTN04120HFF
120V, SOT23F, NPN medium power Darlington transistor

Summary



BV_{CEO} > 120V

$I_{C(cont)}$ = 1A

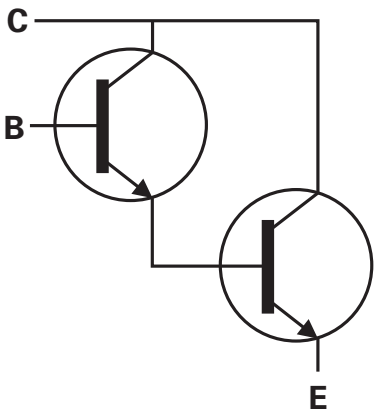
$V_{CE(sat)}$ < 1.5V @ 1A

P_D = 1.5W

Complementary part number ZXTP05120HFF

Description

This high performance NPN Darlington transistor is housed in the small outline SOT23 flat package for applications where space is at a premium.

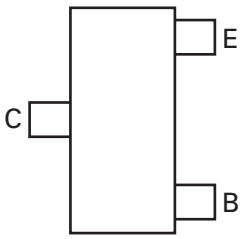


Features

- Darlington transistor
- 120 volt
- 1 amp continuous rating
- Small outline surface mount SOT23 flat package

Applications

- Lamp, relay and solenoid drive
- Lighting



Pinout - top view

Ordering information

Device	Reel size (inches)	Tape width (mm)	Quantity per reel
ZXTN04120HFFTA	7	8	3000

Device marking

1F6

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Absolute maximum ratings

Parameter	Symbol	Limit	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 (c)	I_C	1	A
Peak pulse current	I_{CM}	4	A
Base current	I_B	0.5	A
Power dissipation @ T_{amb} =25°C[a]	P_D	0.84	W
Linear derating factor		6.72	mW/°C
Power dissipation @ T_{amb} =25°C[b]	P_D	1.34	W
Linear derating factor		10.72	mW/°C
Power dissipation @ T_{amb} =25°C[c]	P_D	1.5	W
Linear derating factor		12.0	mW/°C
Power dissipation @ T_{amb} =25°C[d]	P_D	2.0	W
Linear derating factor		16.0	mW/°C
Operating and storage temperature range	T_j, T_{stg}	- 55 to 150	°C

Thermal resistance

Parameter	Symbol	Limit	Unit
Junction to ambient[a]	$R_{\Theta JA}$	149	°C/W
Junction to ambient[b]	$R_{\Theta JA}$	93	°C/W
Junction to ambient[c]	$R_{\Theta JA}$	83	°C/W
Junction to ambient[d]	$R_{\Theta JA}$	60	°C/W

NOTES:

(a) For a device surface mounted on 15mm x 15mm x 1.6mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions.

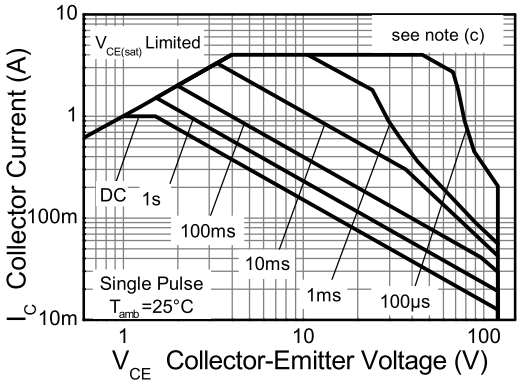
(b) Mounted on 25mm x 25mm x 1.6mm FR4 PCB with a high coverage of single sided 2oz copper in still air conditions.

(c) Mounted on 50mm x 50mm x 1.6mm FR4 PCB with a high coverage of single sided 2oz copper in still air conditions.

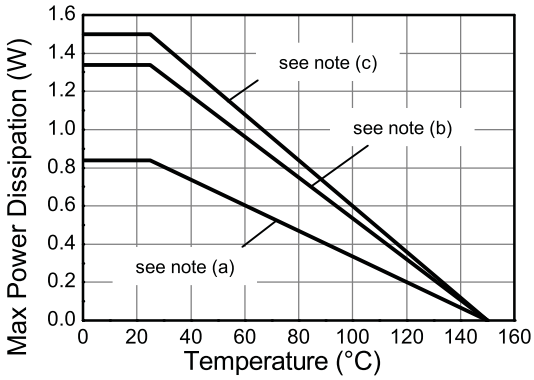
(d) As (c) above measured at t<5secs.

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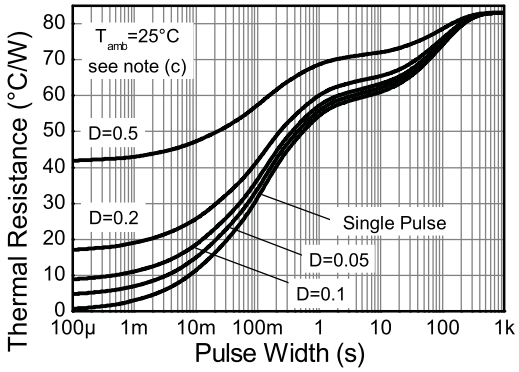
Characteristics



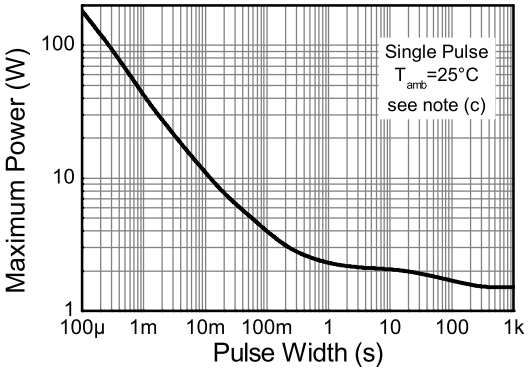
Safe Operating Area



Derating Curve



Transient Thermal Impedance



Pulse Power Dissipation

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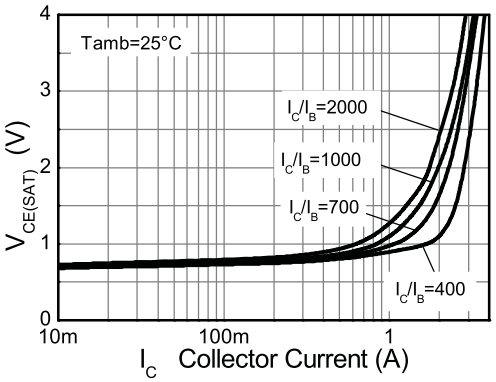
Electrical characteristics (at T_{amb} = 25°C unless otherwise stated)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Collector-base breakdown voltage	BV_{CBO}	140	300		V	I_C = 100μA
Collector-emitter breakdown voltage (base open)	BV_{CEO}	120	140		V	I_C = 10mA (*)
Emitter-base breakdown voltage	BV_{EBO}	10	16		V	I_E = 100μA
Collector-base cut-off current	I_{CBO}		<1	100	nA	V_{CB} = 120V
				10	μA	V_{CB} = 120V, T_{amb}= 100°C
Collector-emitter cut-off current	I_{CES}		<0.1	10	μA	V_{CE} = 120V
Emitter-base cut-off current	I_{EBO}		<1	100	nA	V_{EB} = 8V
Collector-emitter saturation voltage	$V_{CE(sat)}$		0.8	0.9	V	I_C = 250mA, I_B = 0.25mA(*)
			1.1	1.5	V	I_C = 1A, I_B = 1mA(*)
			1.1	1.5	V	I_C = 2A, I_B = 5mA(*)
Base-emitter saturation voltage	$V_{BE(sat)}$		1.55	1.70	V	I_C = 1A, I_B = 1mA(*)
Base-emitter turn-on voltage	$V_{BE(on)}$		1.45	1.70	V	I_C = 1A, V_{CE} = 5V(*)
Static forward current transfer ratio	h_{FE}	3K	11k			I_C = 50mA, V_{CE} = 5V(*)
		3K	12k			I_C = 500mA, V_{CE} = 5V(*)
		3K	10k	30K		I_C = 1A, V_{CE} = 5V(*)
		1K	5k			I_C = 2A, V_{CE} = 5V(*)
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	

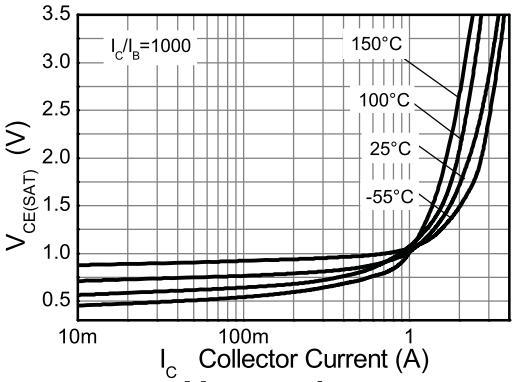
NOTES:
(*) Measured under pulsed conditions. Pulse width ≤300μs; duty cycle ≤2%.

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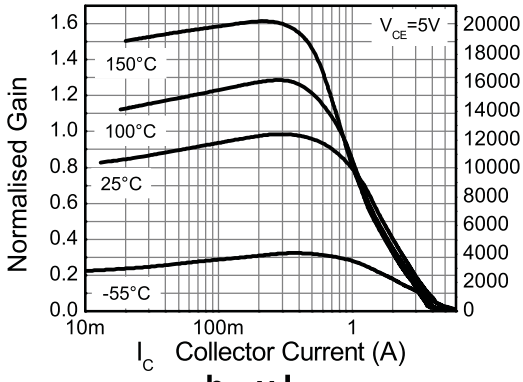
Typical characteristics



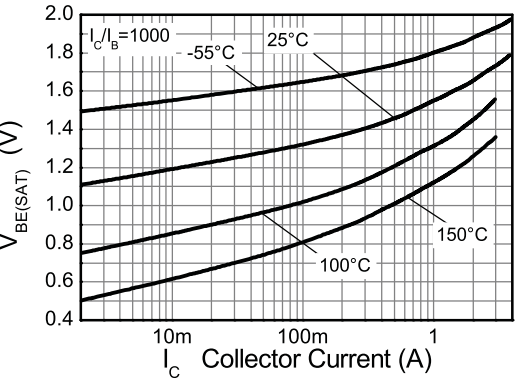
$V_{CE(SAT)}$ v I_C



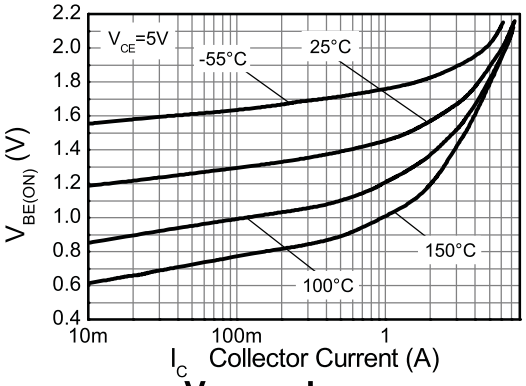
$V_{CE(SAT)}$ v I_C



h_{FE} v I_C



$V_{BE(SAT)}$ v I_C



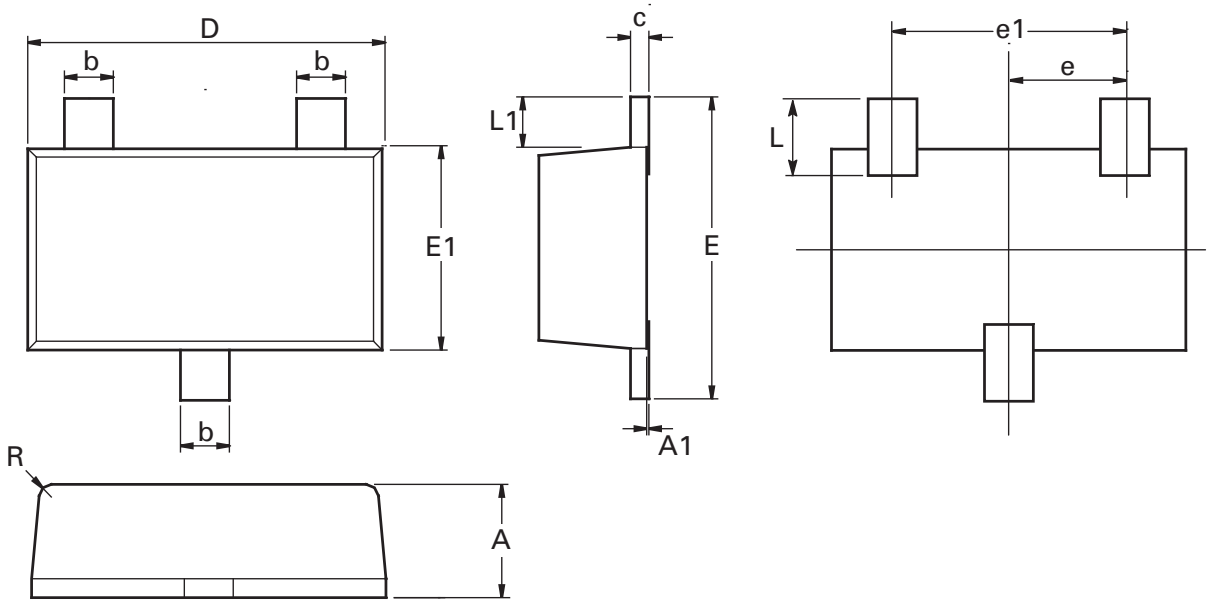
$V_{BE(ON)}$ v I_C

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Package outline - SOT23F



Dim.	Millimeters		Inches		Dim.	Millimeters		Inches	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	0.80	1.00	0.0315	0.0394	E	2.30	2.50	0.0906	0.0984
A1	0.00	0.10	0.00	0.0043	E1	1.50	1.70	0.0590	0.0669
b	0.35	0.45	0.0153	0.0161	L	0.48	0.68	0.0189	0.0268
c	0.10	0.20	0.0043	0.0079	L1	0.30	0.50	0.0153	0.0161
D	2.80	3.00	0.1102	0.1181	R	0.05	0.15	0.0019	0.0059
e	0.95 ref		0.0374 ref		O	0°	12°	0°	12°
e1	1.80	2.00	0.0709	0.0787	-	-	-	-	-

Note: Controlling dimensions are in millimeters. Approximate dimensions are provided in inches

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