

ZXTN25060BFH

60V, SOT23, NPN medium power transistor

Summary

$BV_{CEX} > 150V$

$BV_{CEO} > 60V$

$BV_{ECO} > 6V$

$I_{C(cont)} = 3.5A$

$V_{CE(sat)} < 65\text{ mV @ } 1A$

$R_{CE(sat)} = 43\text{ m}\Omega$

$P_D = 1.25W$

Complementary part number ZXTP25060BFH

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.

Features

- High power dissipation SOT23 package
- High peak current
- Low saturation voltage
- 150V forward blocking voltage

Applications

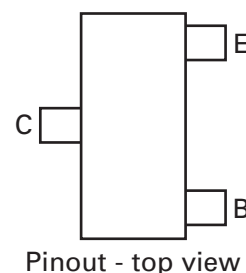
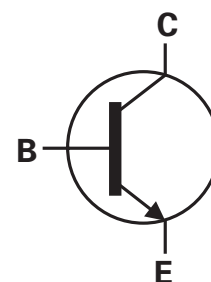
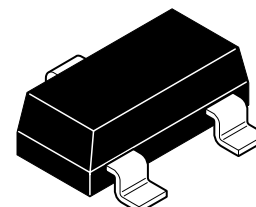
- Lamp, relay and solenoid drivers
- General switching in automotive and industrial applications
- Motor drive and control

Ordering information

Device	Reel size (inches)	Tape width (mm)	Quantity per reel
ZXTN25060BFHTA	7	8	3,000

Device marking

019



ZXTN25060BFH

Absolute maximum ratings

Parameter	Symbol	Limit	Unit
Collector-base voltage	V_{CBO}	150	V
Collector-emitter voltage (forward blocking)	V_{CEX}	150	V
Collector-emitter voltage	V_{CEO}	60	V
Emitter-collector voltage (reverse blocking)	V_{ECO}	6	V
Emitter-base voltage	V_{EBO}	7	V
Continuous collector current ^(b)	I_C	3.5	A
Peak pulse current	I_{CM}	10	A
Power dissipation at $T_A = 25^\circ\text{C}$ ^(a) Linear derating factor	P_D	0.73 5.84	W mW/°C
Power dissipation at $T_A = 25^\circ\text{C}$ ^(b) Linear derating factor	P_D	1.05 8.4	W mW/°C
Power dissipation at $T_A = 25^\circ\text{C}$ ^(c) Linear derating factor	P_D	1.25 9.6	W mW/°C
Power dissipation at $T_A = 25^\circ\text{C}$ ^(d) Linear derating factor	P_D	1.81 14.5	W 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)	$R_{\theta JA}$	171	°C/W
Junction to ambient ^(b)	$R_{\theta JA}$	119	°C/W
Junction to ambient ^(c)	$R_{\theta JA}$	100	°C/W
Junction to ambient ^(d)	$R_{\theta JA}$	69	°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.

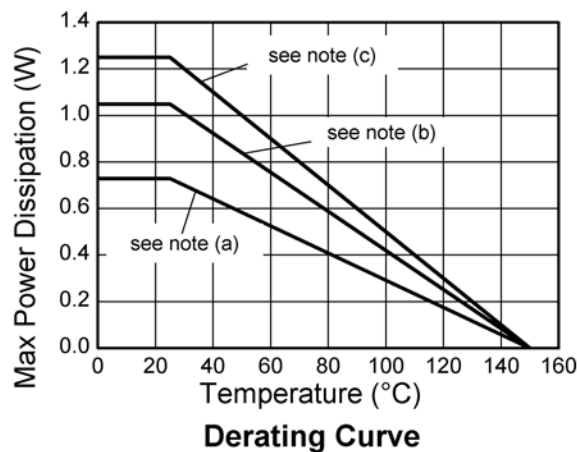
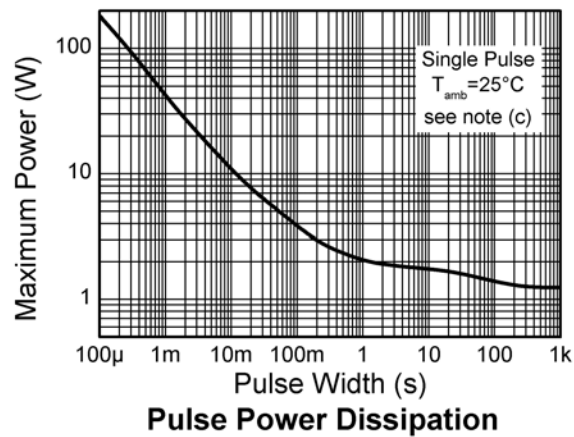
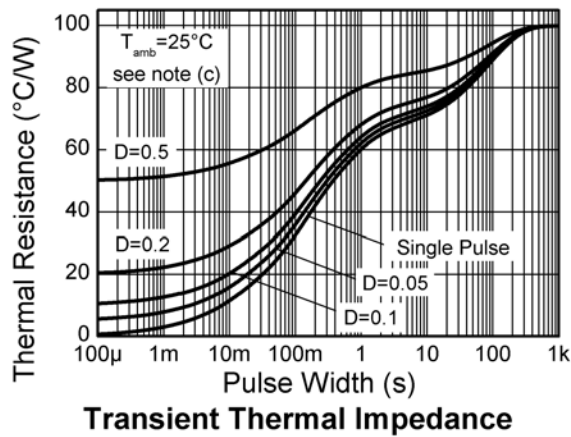
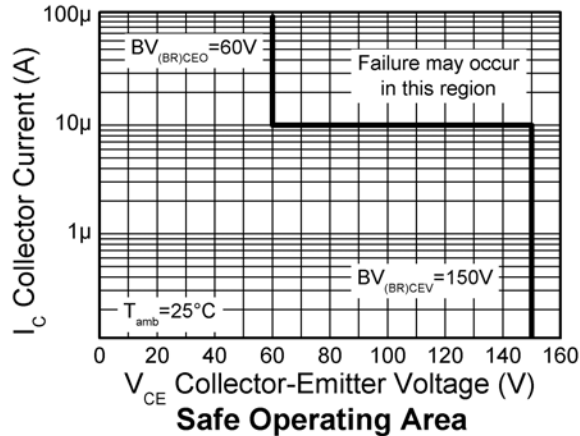
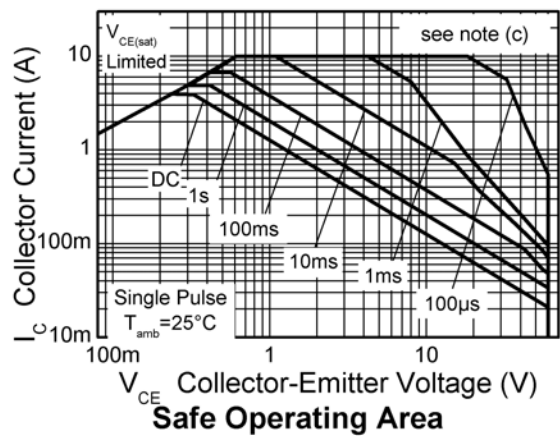
(b) Mounted on 25mm x 25mm x 1.6mm FR4 PCB with a high coverage of single sided 2 oz copper in still air conditions.

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

(d) As (c) above measured at $t < 5\text{secs}$.

ZXTN25060BFH

Characteristics



ZXTN25060BFH

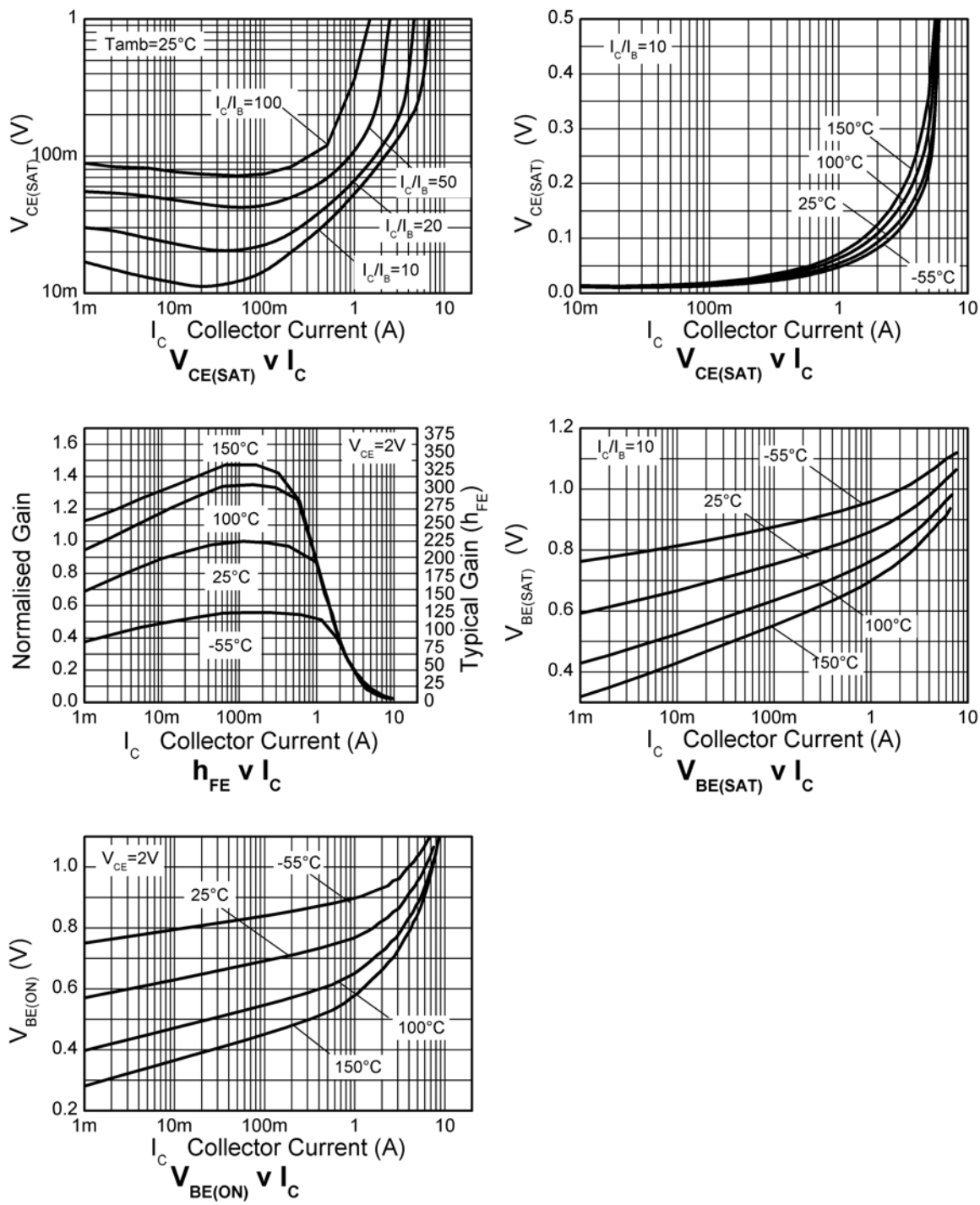
ELECTRICAL CHARACTERISTICS (at $T_{amb} = 25^{\circ}\text{C}$ unless otherwise stated)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Collector-base breakdown voltage	BV_{CBO}	150	190		V	$I_C = 100\mu\text{A}$
Collector-emitter breakdown voltage (forward blocking)	BV_{CEX}	150	190			$I_C = 100\mu\text{A}$, $R_{BE} \leq 1\text{k}\Omega$ or $-1\text{V} < V_{BE} < 0.25\text{V}$
Collector-emitter breakdown voltage (base open)	BV_{CEO}	60	80		V	$I_C = 10\text{mA}$ (*)
Emitter-collector breakdown voltage (reverse blocking)	BV_{ECX}	6	8		V	$I_E = 100\mu\text{A}$, $R_{BC} \leq 1\text{k}\Omega$ or $0.25\text{V} > V_{BC} > -0.25\text{V}$
Emitter-collector breakdown voltage (base open)	BV_{ECO}	6	7		V	$I_E = 100\mu\text{A}$,
Emitter-base breakdown voltage	BV_{EBO}	7	8		V	$I_E = 100\mu\text{A}$
Collector cut-off current	I_{CBO}		<1	50 20	nA μA	$V_{CB} = 120\text{V}$ $V_{CB} = 120\text{V}$, $T_{amb} = 100^{\circ}\text{C}$
Collector-emitter cut-off current	I_{CEX}		-	100	nA	$V_{CE} = 120\text{V}$; $R_{BE} \leq 1\text{k}\Omega$ or $-1\text{V} < V_{BE} < 0.25\text{V}$
Emitter cut-off current	I_{EBO}		<1	50	nA	$V_{EB} = 5.6\text{V}$
Collector-emitter saturation voltage	$V_{CE(sat)}$		33	40	mV	$I_C = 0.5\text{A}$, $I_B = 50\text{mA}$ (*)
			73	95	mV	$I_C = 0.5\text{A}$, $I_B = 10\text{mA}$ (*)
			50	65	mV	$I_C = 1\text{A}$, $I_B = 100\text{mA}$ (*)
			150	175	mV	$I_C = 3.5\text{A}$, $I_B = 350\text{mA}$ (*)
Base-emitter saturation voltage	$V_{BE(sat)}$		960	1050	mV	$I_C = 3.5\text{A}$, $I_B = 350\text{mA}$ (*)
Base-emitter turn-on voltage	$V_{BE(on)}$		865	950	mV	$I_C = 3.5\text{A}$, $V_{CE} = 2\text{V}$ (*)
Static forward current transfer ratio	h_{FE}	100	200	300		$I_C = 10\text{mA}$, $V_{CE} = 2\text{V}$ (*)
		90	180			$I_C = 1\text{A}$, $V_{CE} = 2\text{V}$ (*)
		25	40			$I_C = 3.5\text{A}$, $V_{CE} = 2\text{V}$ (*)
Transition frequency	f_T		185		MHz	$I_C = 100\text{mA}$, $V_{CE} = 5\text{V}$ $f = 100\text{MHz}$
Output capacitance	C_{OBO}		11.5	20	pF	$V_{CB} = 10\text{V}$, $f = 1\text{MHz}$ (*)
Turn-on time	$t_{(on)}$		34		ns	$V_{CC} = 10\text{V}$. $I_C = 500\text{mA}$,
Turn-off time	$t_{(off)}$		566		ns	$I_{B1} = I_{B2} = 50\text{mA}$.

NOTES:

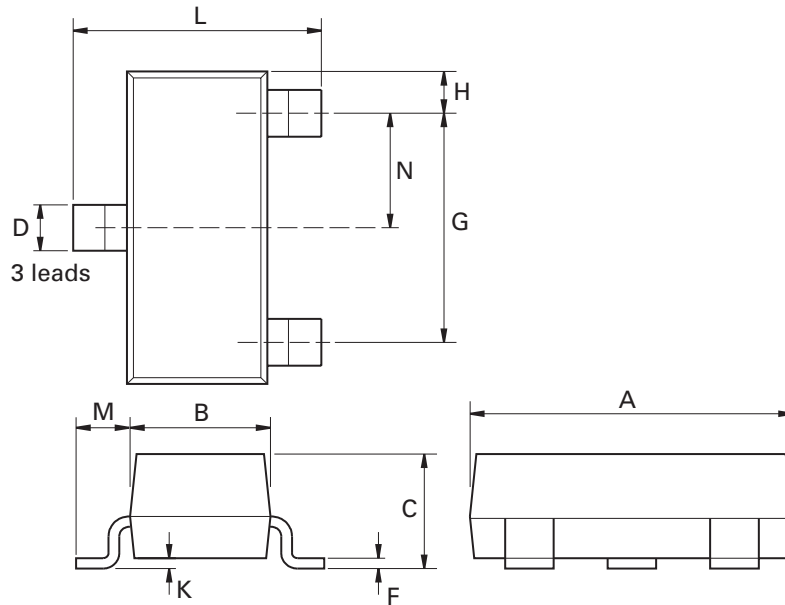
(*) Measured under pulsed conditions. Pulse width $\leq 300\mu\text{s}$; duty cycle $\leq 2\%$.

Typical characteristics



ZXTN25060BFH

Package outline - SOT23



Dim.	Millimeters		Inches		Dim.	Millimeters		Inches	
	Min.	Max.	Min.	Max.		Min.	Max.	Max.	Max.
A	2.67	3.05	0.105	0.120	H	0.33	0.51	0.013	0.020
B	1.20	1.40	0.047	0.055	K	0.01	0.10	0.0004	0.004
C	-	1.10	-	0.043	L	2.10	2.50	0.083	0.0985
D	0.37	0.53	0.015	0.021	M	0.45	0.64	0.018	0.025
F	0.085	0.15	0.0034	0.0059	N	0.95 NOM		0.0375 NOM	
G	1.90 NOM		0.075 NOM		-	-	-	-	-

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

Europe	Americas	Asia Pacific	Corporate Headquarters
Zetex GmbH Streitfeldstraße 19 D-81673 München Germany	Zetex Inc 700 Veterans Memorial Highway Hauppauge, NY 11788 USA	Zetex (Asia Ltd) 3701-04 Metroplaza Tower 1 Hing Fong Road, Kwai Fong Hong Kong	Zetex Semiconductors plc Zetex Technology Park, Chadderton Oldham, OL9 9LL United Kingdom
Telefon: (49) 89 45 49 49 0 Fax: (49) 89 45 49 49 49 europe.sales@zetex.com	Telephone: (1) 631 360 2222 Fax: (1) 631 360 8222 usa.sales@zetex.com	Telephone: (852) 26100 611 Fax: (852) 24250 494 asia.sales@zetex.com	Telephone: (44) 161 622 4444 Fax: (44) 161 622 4446 hq@zetex.com

For international sales offices visit www.zetex.com/offices

Zetex products are distributed worldwide. For details, see www.zetex.com/salesnetwork

This publication is issued to provide outline information only which (unless agreed by the company in writing) may not be used, applied or reproduced for any purpose or form part of any order or contact or be regarded as a representation relating to the products or services concerned. The company reserves the right to alter without notice the specification, design, price or conditions of supply of any product or service.