

120V NPN SILICON HIGH VOLTAGE DARLINGTON TRANSISTOR

SUMMARY

$V_{CEO}=120V$; $V_{CE(sat)}= 1V$; $I_C= 1A$

DESCRIPTION

This new NPN Darlington transistor provides users with very efficeint performance combining low $V_{CE(sat)}$ and very high H_{fe} to give extremely low on state losses at 120V operation. This makes it deal for use in a variety of efficient driving functions including motors, lamps relays and solenoids and will also benefit circuits requiring high output current switching.

FEATURES

- Low Saturation Voltage
- **Hfe** min 2K @ 1A
- $I_C= 1A$ Continuous
- SOT89 package with Plot 1W
- Specification is also available in Eline and SOT223 package outlines

APPLICATIONS

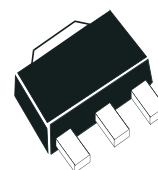
- Various driving functions
 - Lamps
 - Motors
 - Relays and solenoids
- High output current switches

ORDERING INFORMATION

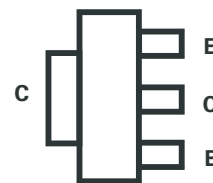
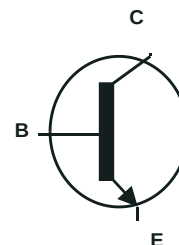
DEVICE	REEL SIZE (inches)	TAPE WIDTH (mm)	QUANTITY PER REEL
FCX605TA	7	12mm embossed	1000 units

DEVICE MARKING

605



SOT 89



Top View

FCX605

ABSOLUTE MAXIMUM RATINGS.

PARAMETER	SYMBOL	LIMIT NPN	UNIT
Collector-Base Voltage	V_{CBO}	140	V
Collector-Emitter Voltage	V_{CEO}	120	V
Emitter-Base Voltage	V_{EBO}	10	V
Peak Pulse Current	I_{CM}	4	A
Continuous Collector Current	I_C	1	A
Power Dissipation at $T_A=25^{\circ}\text{C}$ (a) Linear Derating Factor	P_D	1 8	W mW/ $^{\circ}\text{C}$
Power Dissipation at $T_A=25^{\circ}\text{C}$ (b) Linear Derating Factor	P_D	2.8 22	W mW/ $^{\circ}\text{C}$
Operating and Storage Temperature Range	$T_J:T_{stg}$	-55 to +150	$^{\circ}\text{C}$

THERMAL RESISTANCE

PARAMETER	SYMBOL	VALUE	UNIT
Junction to Ambient (a)	$R_{\theta JA}$	125	$^{\circ}\text{C/W}$
Junction to Ambient (b)	$R_{\theta JA}$	45	$^{\circ}\text{C/W}$

NOTES

(a) For a device surface mounted on 25mm x 25mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions

(b) For a device surface mounted on FR4 PCB measured at $t \leq 5$ secs.

FCX605

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

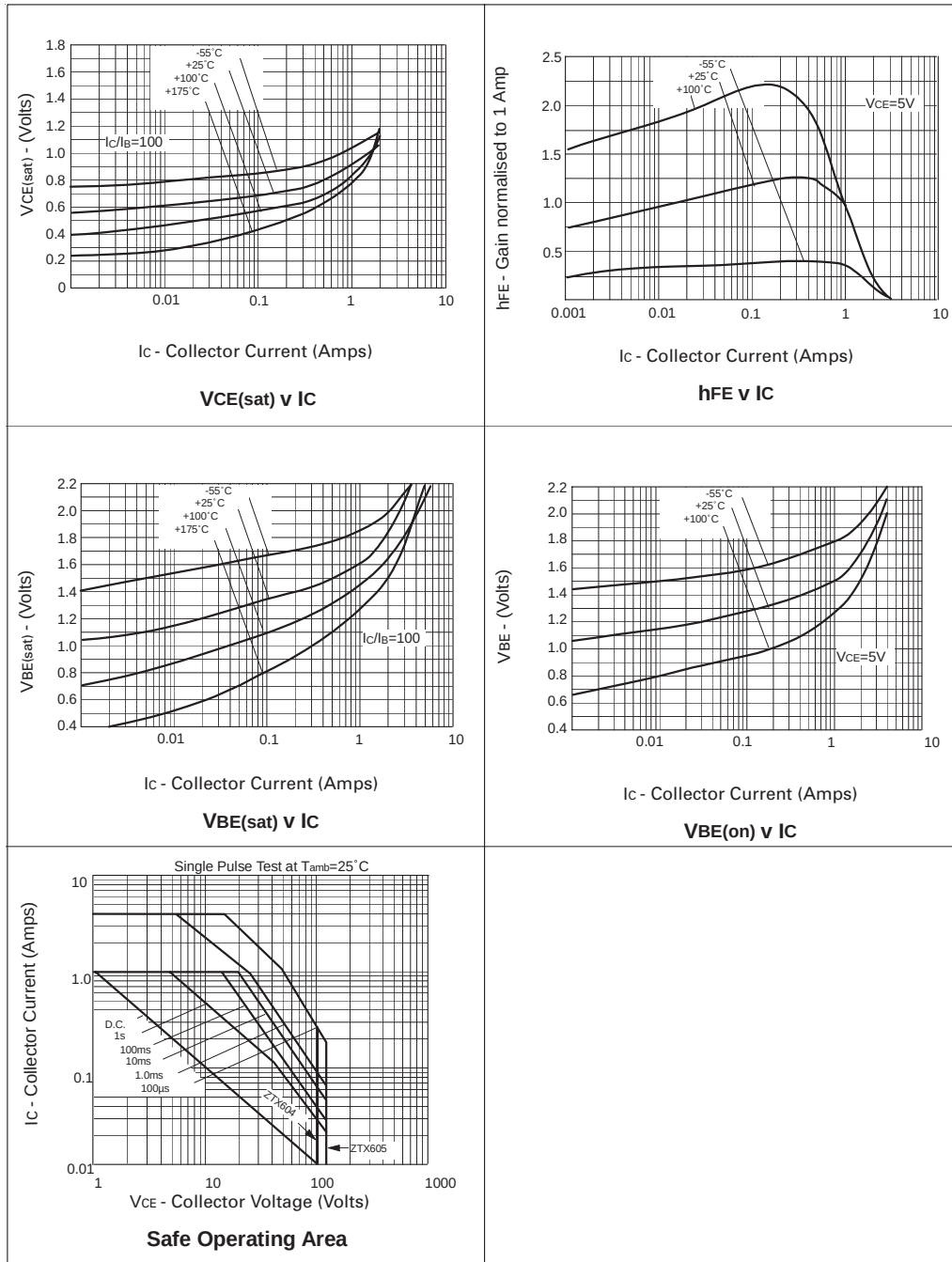
PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	CONDITIONS.
Collector-Base Breakdown Voltage	$V_{(BR)CBO}$	140			V	$I_C = 100\mu\text{A}$
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	120			V	$I_C = 10\text{mA}^*$
Emitter-Base Breakdown Voltage	$V_{(BR)EBO}$	10			V	$I_E = 100\mu\text{A}$
Collector Cut-Off Current	I_{CBO}			100 10	nA μA	$V_{CB} = 10\text{V}$ $V_{CB} = 120\text{V}$ $T_{amb} = 100^{\circ}\text{C}$
Emitter Cut-Off Current	I_{EBO}			0.1	μA	$V_{EB} = 8\text{V}$
Collector Emitter Cut-Off Current	I_{CES}			10	μA	$V_{CES} = 120\text{V}$
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$			1 1.5	V V	$I_C = 250\text{mA}$, $I_B = 0.25\text{mA}^*$ $I_C = 1\text{A}$, $I_B = 1\text{mA}^*$
Base-Emitter Saturation Voltage	$V_{BE(sat)}$			1.8	V	$I_C = 1\text{A}$, $I_B = 1\text{mA}^*$
Base-Emitter Turn-On Voltage	$V_{BE(on)}$			1.7	V	$I_C = 1\text{A}$, $V_{CE} = 5\text{V}^*$
Static Forward Current Transfer Ratio	h_{FE}	2K 5K 2K 0.5	100K			$I_C = 50\text{mA}$, $V_{CE} = 5\text{V}^*$ $I_C = 500\text{mA}$, $V_{CE} = 5\text{V}^*$ $I_C = 1\text{A}$, $V_{CE} = 5\text{V}^*$ $I_C = 2\text{A}$, $V_{CE} = 5\text{V}^*$
Transition Frequency	f_T	150			MHz	$I_C = 100\text{mA}$, $V_{CE} = 10\text{V}$ $f = 20\text{MHz}$
Input Capacitance	C_{ibo}		90		pF	$V_{CB} = 500\text{mV}$, $f = 1\text{MHz}$
Output Capacitance	C_{obo}		15		pF	$V_{CB} = 10\text{V}$, $f = 1\text{MHz}$
Turn-On Time	$t_{(on)}$		0.5		μs	$I_C = 500\text{mA}$, $V_{CE} = 10\text{V}$ $I_{B1} = I_{B2} = 0.5\text{mA}$
Turn-Off Time	$t_{(off)}$		1.6		μs	$I_C = 500\text{mA}$, $V_{CE} = 10\text{V}$ $I_{B1} = I_{B2} = 0.5\text{mA}$

*Measured under pulsed conditions. Pulse width=300 μs . Duty cycle $\leq 2\%$

Nb. Spice parameter data is available upon request for this device.

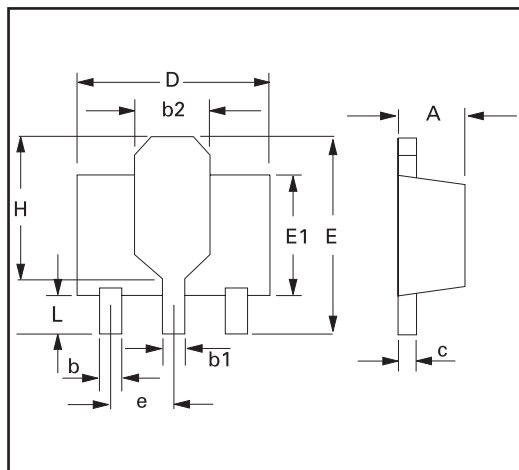
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NPN TYPICAL CHARACTERISTICS

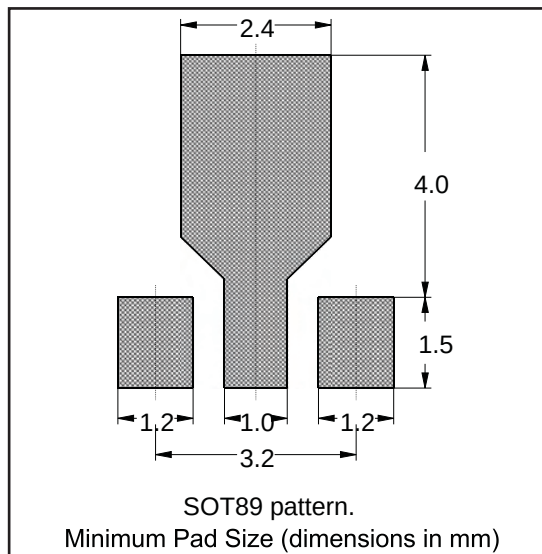


FCX605

PACKAGE DIMENSIONS



PAD LAYOUT DETAILS



PACKAGE DIMENSIONS

DIM	Millimeters		Inches		DIM	Millimeters		Inches	
	Min	Max	Min	Max		Min	Max	Min	Max
A	1.40	1.60	0.550	0.630	e	1.40	1.50	0.055	0.059
b	0.38	0.48	0.015	0.019	E	3.75	4.25	0.150	0.167
b1	-	0.53	-	0.021	E1	-	2.60	-	0.102
b2	1.50	1.80	0.060	0.071	G	2.90	3.00	0.114	0.118
c	0.28	0.44	0.011	0.017	H	2.60	2.85	0.102	0.112

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Europe	Americas	Asia Pacific	Corporate Headquarters
Zetex GmbH Streitfeldstraße 19 D-81673 München Germany	Zetex Inc 700 Veterans Memorial Hwy 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 europa.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

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Contact Us :

➤ Address :

401 Building No.5, JiuGe Business Center, Lane 2301, Yishan Rd
Minhang District, Shanghai , China

➤ Sales :

Direct +86 (21) 6401-6692
Email amall@ameya360.com
QQ 800077892
Skype ameyasales1 ameyasales2

➤ Customer Service :

Email service@ameya360.com

➤ Partnership :

Tel +86 (21) 64016692-8333
Email mkt@ameya360.com