

## FCX605

### 120V NPN SILICON HIGH VOLTAGE DARLINGTON TRANSISTOR

#### SUMMARY

$V_{CE0}=120V$ ;  $V_{CE(sat)}=1V$ ;  $I_C=1A$

#### DESCRIPTION

This new NPN Darlington transistor provides users with very efficient performance combining low  $V_{CE(sat)}$  and very high  $H_{fe}$  to give extremely low on state losses at 120V operation. This makes it ideal 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
- $H_{fe} \text{ min } 2K @ 1A$
- $I_C=1A$  Continuous
- SOT89 package with Plot 1W
- Specification is also available in Eline and SOT223 package outlines

#### APPLICATIONS

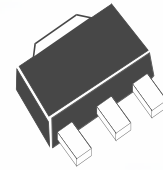
- Various driving functions
  - Lamps
  - Motors
  - Relays and solenoids
- High output current switches

#### ORDERING INFORMATION

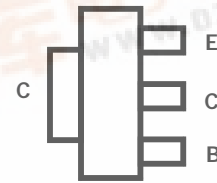
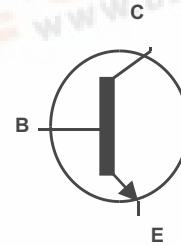
DEVICE	REEL SIZE (inches)	TAPE WIDTH (mm)	QUANTITY PER REEL
FCX605TA	7	12mm embossed	1000 units

#### 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.

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

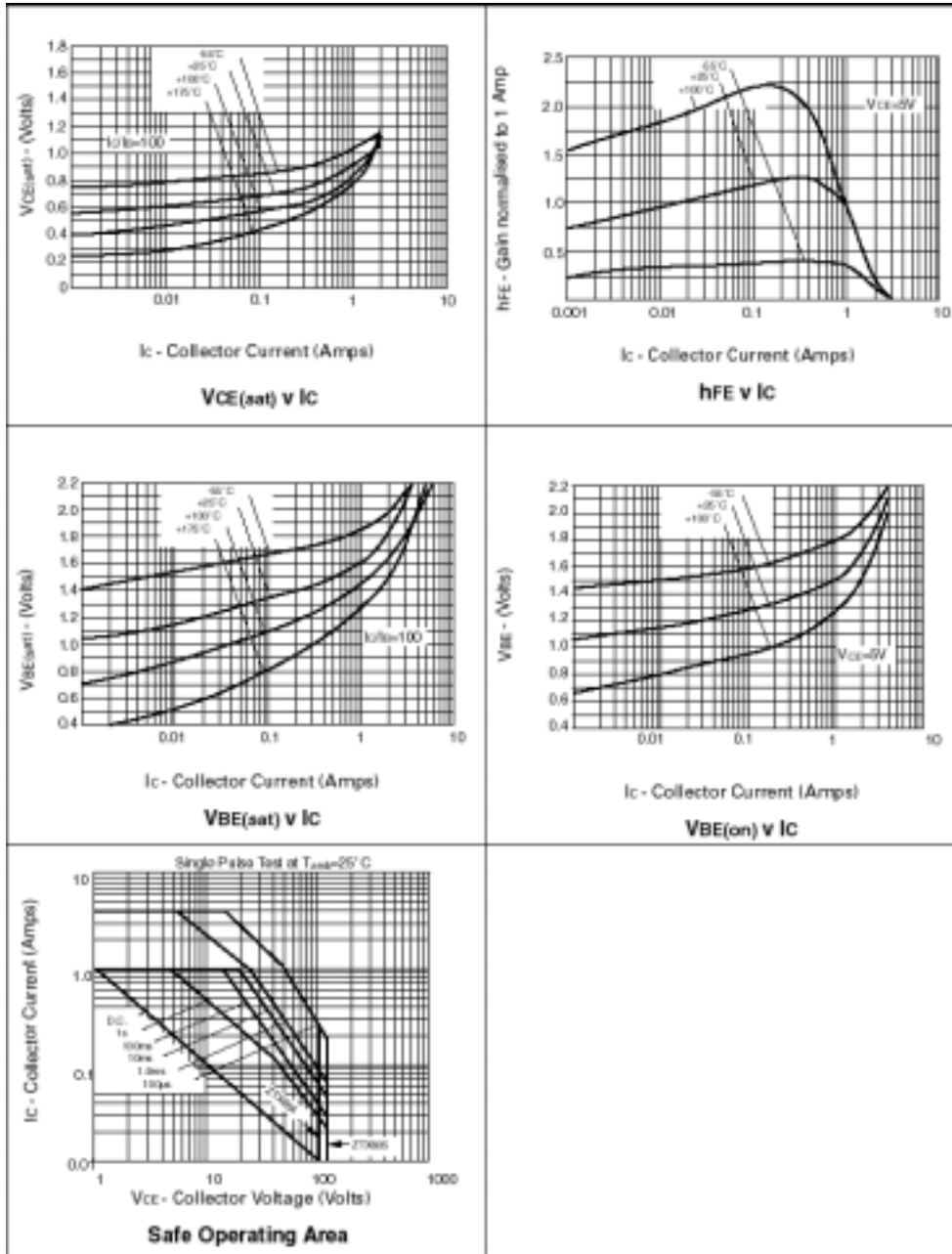
PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	CONDITIONS.
Collector-Base Breakdown Voltage	$V_{(BR)CBO}$	140			V	$I_C=100\mu\text{A}$
Collector-Emitter Breakdown Voltage	$V_{(BR)CEO}$	120			V	$I_C=10\text{mA}^*$
Emitter-Base Breakdown Voltage	$V_{(BR)EBO}$	10			V	$I_E=100\mu\text{A}$
Collector Cut-Off Current	$I_{CBO}$			100 10	nA $\mu\text{A}$	$V_{CB}=10\text{V}$ $V_{CB}=120\text{V}$ $T_{amb}=100^{\circ}\text{C}$
Emitter Cut-Off Current	$I_{EBO}$			0.1	$\mu\text{A}$	$V_{EB}=8\text{V}$
Collector Emitter Cut-Off Current	$I_{CES}$			10	$\mu\text{A}$	$V_{CES}=120\text{V}$
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		$\mu\text{s}$	$I_C=500\text{mA}, V_{CE}=10\text{V}$ $I_{B1}=I_{B2}=0.5\text{mA}$
Turn-Off Time	$t_{(off)}$		1.6		$\mu\text{s}$	$I_C=500\text{mA}, V_{CE}=10\text{V}$ $I_{B1}=I_{B2}=0.5\text{mA}$

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

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

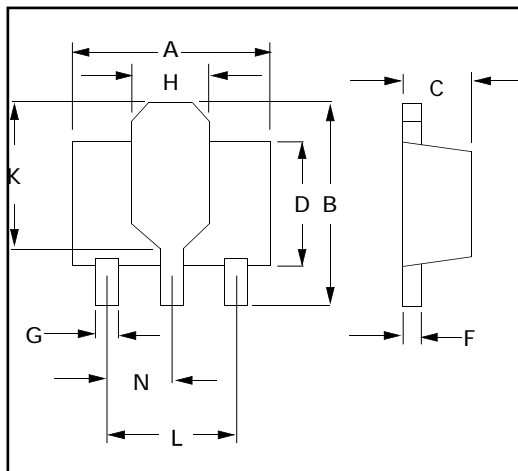
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## NPN TYPICAL CHARACTERISTICS



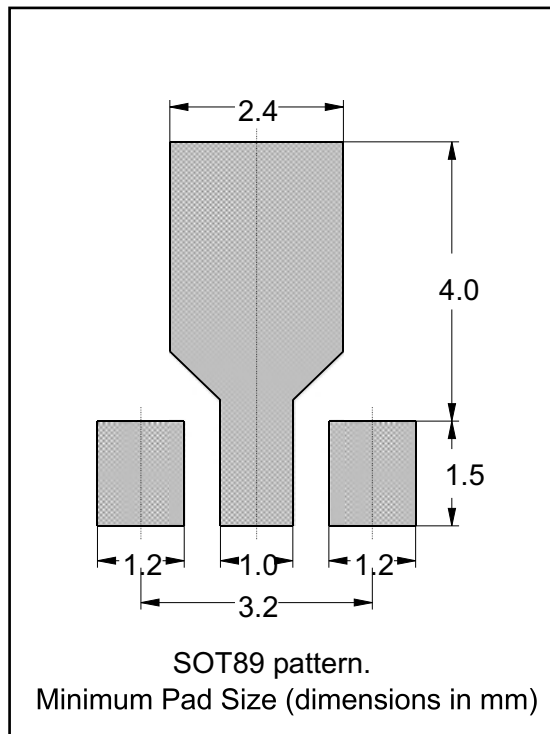
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## PACKAGE DIMENSIONS



DIM	Millimetres		Inches	
	Min	Max	Min	Max
A	4.40	4.60	0.173	0.181
B	3.75	4.25	.150	0.167
C	1.40	1.60	0.550	0.630
D	-	2.60	-	0.102
F	0.28	0.45	0.011	0.018
G	0.38	0.55	0.015	0.022
H	1.50	1.80	0.060	0.072
K	2.60	2.85	0.102	0.112
L	2.90	3.10	0.114	0.112
N	1.4	1.60	0.055	0.063

## PAD LAYOUT DETAILS



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