

# FCX1053A

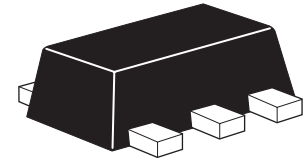
## SOT89 NPN medium power transistor

### Summary

$BV_{CEO} = 75V$

$R_{CE(sat)} = 78m\Omega$

$I_C = 3A$

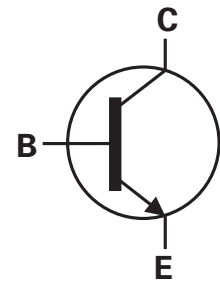


### Description

This medium power NPN transistor, offered in the SOT89 package provides high current and low saturation voltage making it ideal for use in various driving and power management applications.

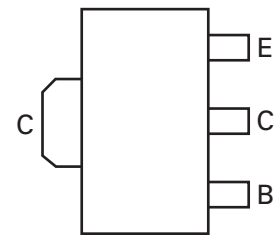
### Features

- Extremely low equivalent on-resistance;  $R_{CE(sat)} = 7.8m\Omega$  at 4.5A
- 3 Amps continuous current
- Up to 10 amps peak current
- Very low saturation voltages
- Excellent  $h_{FE}$  characteristics up to 10 amps



### Applications

- Emergency lighting circuits
- Motor driving (including DC fans)
- Solenoid, relay and actuator drivers
- DC-DC modules
- Backlight inverters
- Power switches
- MOSFET gate drivers



Pinout - top view

### Ordering information

Device	Reel size (inches)	Tape width (mm)	Quantity per reel
FCX1053ATA	7	12	1,000

### Device marking

053

## Absolute maximum ratings

Parameter	Symbol	Value	Unit
Collector-base voltage	$V_{CBO}$	150	V
Collector-emitter voltage	$V_{CEO}$	75	V
Emitter-base voltage	$V_{EBO}$	5	V
Continuous collector current <sup>(a)</sup>	$I_C$	3	A
Peak pulse current	$I_{CM}$	10	A
Power dissipation at $T_{amb} = 25^{\circ}C^{(a)}$	$P_D$	1.6	W
Linear derating factor		13	mW/°C
Power dissipation at $T_{amb} = 25^{\circ}C^{(b)}$	$P_D$	2.0	W
Linear derating factor		16	mW/°C
Operating and storage temperature range	$T_j; T_{stg}$	-55 to +150	°C

## Thermal resistance

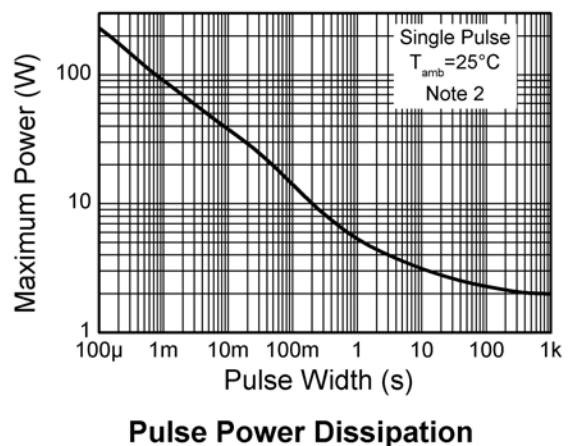
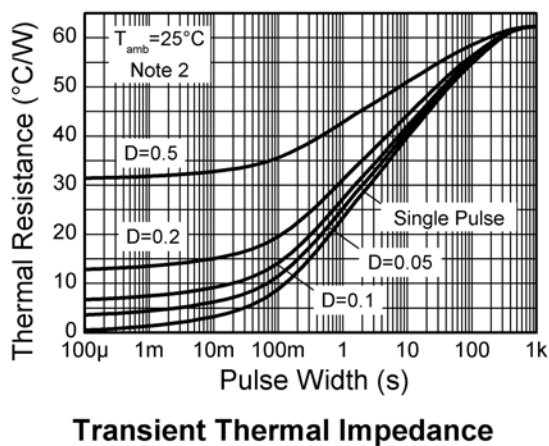
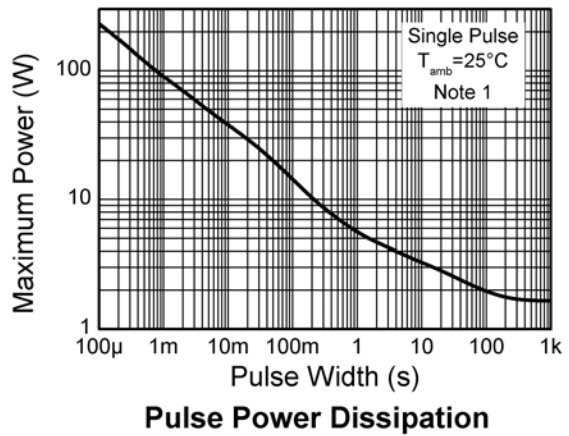
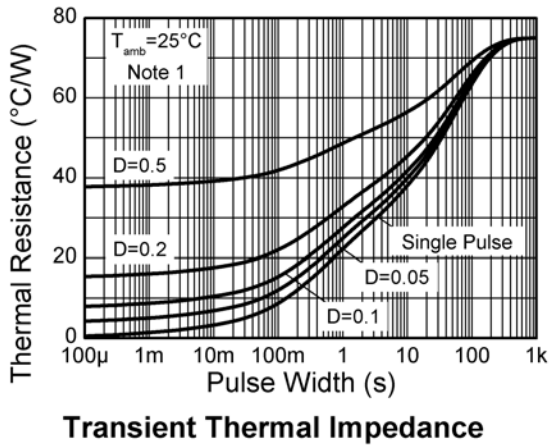
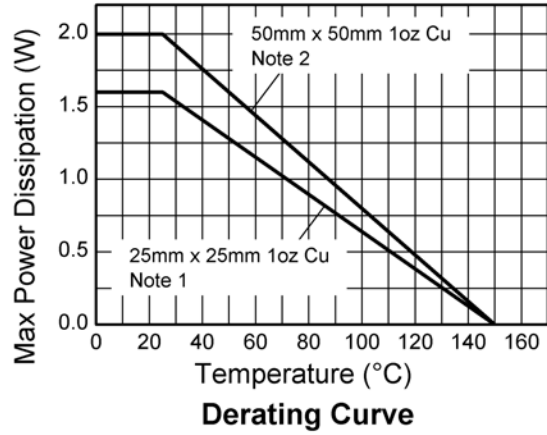
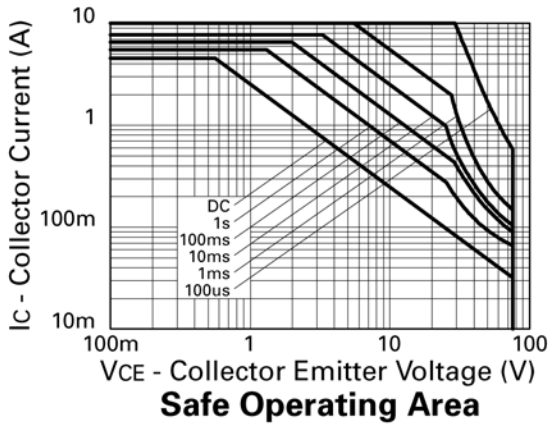
Parameter	Symbol	Value	Unit
Junction to ambient <sup>(a)</sup>	$R_{\theta JA}$	72	°C/W
Junction to ambient <sup>(b)</sup>	$R_{\theta JA}$	62	°C/W

### NOTES:

(a) For a device surface mounted on 25mm x 25mm x 1.6mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions.

(b) For a device surface mounted on 50mm x 50mm x 1.6mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions.

## Thermal characteristics



# FCX1053A

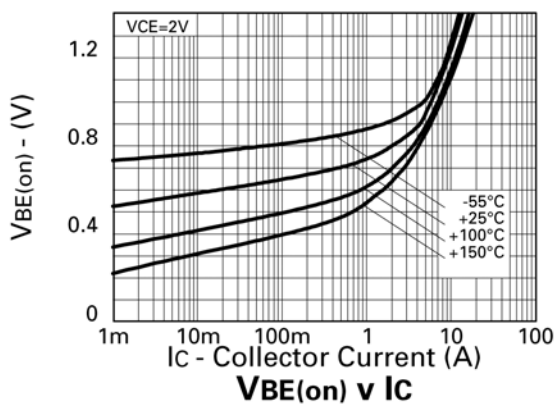
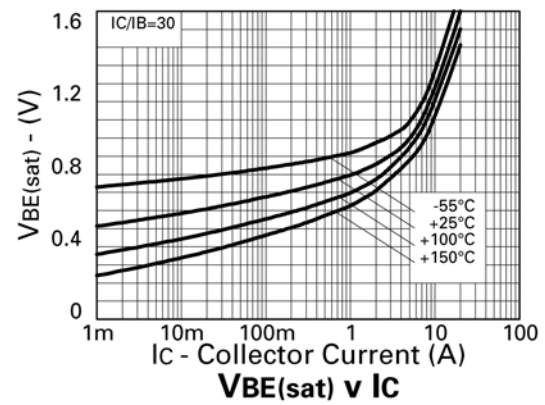
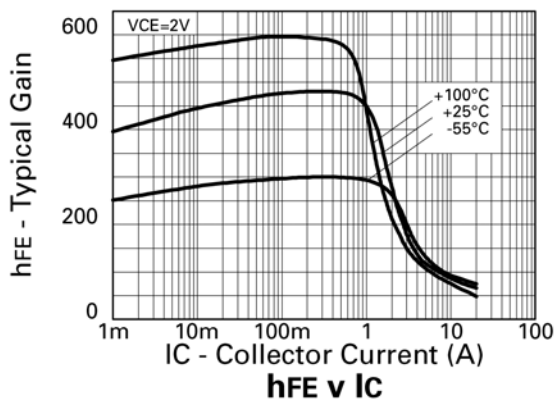
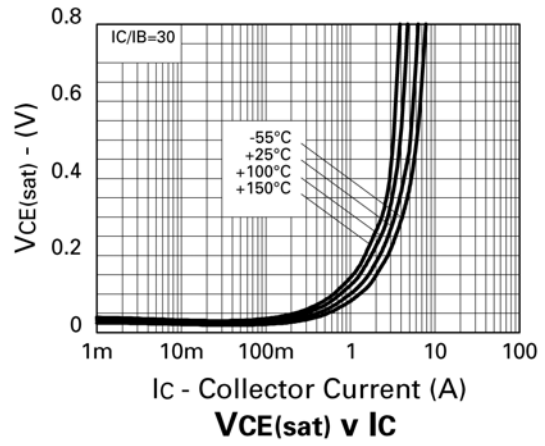
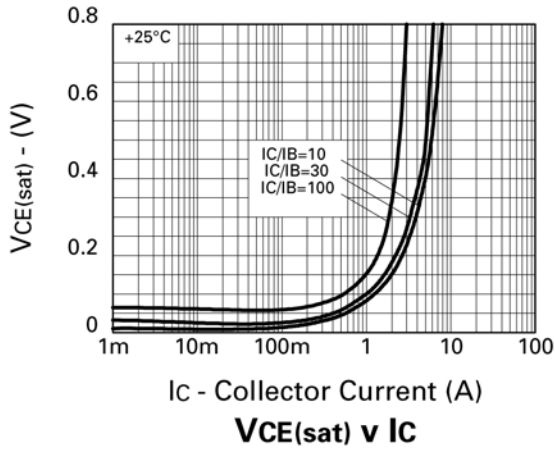
## Electrical characteristics (at $T_{amb} = 25^{\circ}\text{C}$ unless otherwise stated)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Collector-base breakdown voltage	$V_{(BR)CBO}$	150	250		V	$I_C = 100\mu\text{A}$
Collector-emitter breakdown voltage	$V_{CES}$	150	250		V	$I_C = 100\mu\text{A}$
Collector-emitter breakdown voltage	$V_{CEO}$	75	100		V	$I_C = 10\text{mA}$
Collector-emitter breakdown voltage	$V_{CEV}$	150	250		V	$I_C = 100\mu\text{A}, V_{EB} = 1\text{V}$
Emitter-base breakdown voltage	$V_{(BR)EBO}$	5	8.8		V	$I_E = 100\mu\text{A}$
Collector cut-off current	$I_{CBO}$		0.9	10	nA	$V_{CB} = 120\text{V}$
Emitter cut-off current	$I_{EBO}$		0.3	10	nA	$V_{EB} = 4\text{V}$
Collector-emitter cut-off current	$I_{CES}$		1.5	10	nA	$V_{CES} = 120\text{V}$
Collector-emitter saturation voltage	$V_{CE(sat)}$		21	30	mV	$I_C = 0.2\text{A}, I_B = 20\text{mA}^{(*)}$
			55	75	mV	$I_C = 0.5\text{A}, I_B = 20\text{mA}^{(*)}$
			150	200	mV	$I_C = 1\text{A}, I_B = 10\text{mA}^{(*)}$
			160	210	mV	$I_C = 2\text{A}, I_B = 100\text{mA}^{(*)}$
			350	440	mV	$I_C = 4.5\text{A}, I_B = 200\text{mA}^{(*)}$
Base-emitter saturation voltage	$V_{BE(sat)}$		900	1000	mV	$I_C = 3\text{A}, I_B = 100\text{mA}^{(*)}$
Base-emitter turn-on voltage	$V_{BE(on)}$		825	950	mV	$I_C = 3\text{A}, V_{CE} = 2\text{V}^{(*)}$
Static forward current transfer ratio	$h_{FE}$	270	440			$I_C = 10\text{mA}, V_{CE} = 2\text{V}^{(*)}$
		300	450	1200		$I_C = 0.5\text{A}, V_{CE} = 2\text{V}^{(*)}$
		300	450			$I_C = 1\text{A}, V_{CE} = 2\text{V}^{(*)}$
		40	60			$I_C = 4.5\text{A}, V_{CE} = 2\text{V}^{(*)}$
			20			$I_C = 10\text{A}, V_{CE} = 2\text{V}^{(*)}$
Switching times	$t_{on}$		162		ns	$I_C = 2\text{A}, I_{B1} = I_{B2} = \pm 20\text{mA}, V_{CC} = 50\text{V}$
	$t_{off}$		900		ns	$I_C = 2\text{A}, I_{B1} = I_{B2} = \pm 20\text{mA}, V_{CC} = 50\text{V}$
Transition frequency	$f_T$		140		MHz	$I_C = 50\text{mA}, V_{CE} = 10\text{V}, f = 100\text{MHz}$
Output capacitance	$C_{OBO}$		21	30	pF	$V_{CB} = 10\text{V}, f = 1\text{MHz}$

### NOTES:

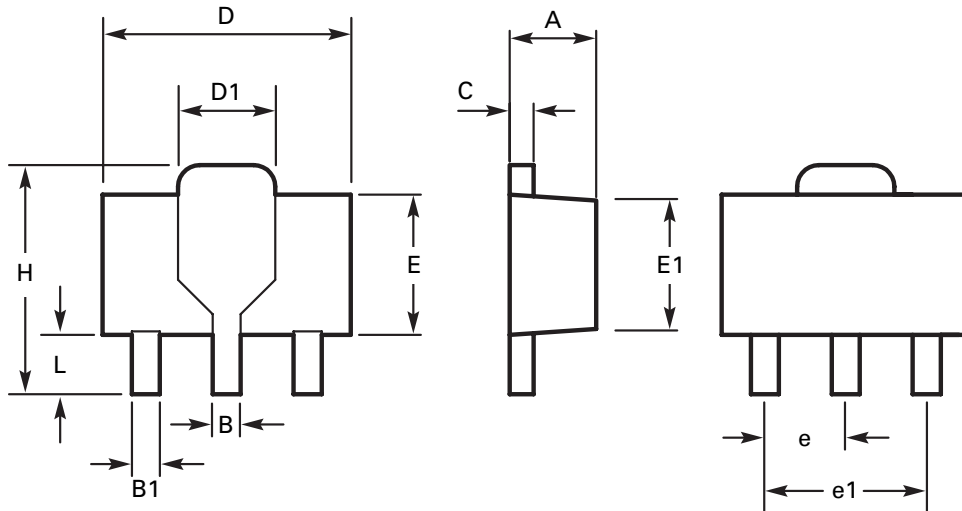
(\*) Measured under pulsed conditions. Pulse width = 300 $\mu\text{s}$ . Duty  $\leq 2\%$ .

## Typical characteristics



# FCX1053A

## Package outline - SOT89



DIM	Millimeters		Inches		DIM	Millimeters		Inches	
	Min	Max	Min	Max		Min	Max	Min	Max
A	1.40	1.60	0.550	0.630	E1	2.13	2.29	0.084	0.090
B	0.44	0.56	0.017	0.022	e	1.50 BSC		0.059 BSC	
B1	0.36	0.48	0.014	0.019	e1	3.00 BSC		0.118 BSC	
C	0.35	0.44	0.014	0.019	H	3.94	4.25	0.155	0.167
D	4.40	4.60	0.173	0.181	L	0.89	1.20	0.155	0.167
E	2.29	2.60	0.090	0.102		-	-	-	-

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

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