

# SOT89 NPN SILICON POWER (SWITCHING) TRANSISTOR

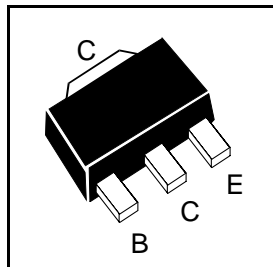
ISSUE 1 - NOVEMBER 1998

**FCX688B**

## FEATURES

- \* **2W POWER DISSIPATION**
- \* 10A Peak Pulse Current
- \* Excellent  $H_{FE}$  Characteristics up to 10 Amps
- \* Extremely Low Saturation Voltage

Complimentary Type - FCX789A  
Partmarking Detail - 688



## ABSOLUTE MAXIMUM RATINGS.

| PARAMETER                                  | SYMBOL         | VALUE       | UNIT        |
|--|----------------|-------------|-------------|
| Collector-Base Voltage                     | $V_{CBO}$      | 12          | V           |
| Collector-Emitter Voltage                  | $V_{CEO}$      | 12          | V           |
| Emitter-Base Voltage                       | $V_{EBO}$      | 5           | V           |
| Peak Pulse Current **                      | $I_{CM}$       | 10          | A           |
| Continuous Collector Current               | $I_C$          | 3           | A           |
| Power Dissipation at $T_{amb}=25^{\circ}C$ | $P_{tot}$      | 1 †<br>2 ‡  | W<br>W      |
| Operating and Storage Temperature Range    | $T_j; T_{stg}$ | -55 to +150 | $^{\circ}C$ |

† recommended  $P_{tot}$  calculated using FR4 measuring 15x15x0.6mm

‡ Maximum power dissipation is calculated assuming that the device is mounted on FR4 substrate measuring 40x40x0.6mm and using comparable measurement methods adopted by other suppliers.

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

Spice parameter data is available upon request for these devices

Refer to the handling instructions for soldering surface mount components.

# FCX688B

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

| PARAMETER                             | SYMBOL                | Min               | Typ       | Max                           | UNIT                       | CONDITIONS.  |
|---------------------------------------|-----------------------|-------------------|-----------|-------------------------------|----------------------------|--|
| Collector-Base Breakdown Voltage      | $V_{(BR)CBO}$         | 12                |           |                               | V                          | $I_C=100\mu\text{A}$   |
| Collector-Emitter Breakdown Voltage   | $V_{(BR)CEO}$         | 12                |           |                               | V                          | $I_C=10\text{mA}^*$  |
| Emitter-Base Breakdown Voltage        | $V_{(BR)EBO}$         | 5                 |           |                               | V                          | $I_E=100\mu\text{A}$   |
| Collector Cut-Off Current             | $I_{CBO}$             |                   |           | 0.1                           | $\mu\text{A}$              | $V_{CB}=9\text{V}$   |
| Emitter Cut-Off Current               | $I_{EBO}$             |                   |           | 0.1                           | $\mu\text{A}$              | $V_{EB}=4\text{V}$   |
| Collector-Emitter Saturation Voltage  | $V_{CE(sat)}$         |                   |           | 40<br>60<br>180<br>350<br>400 | mV<br>mV<br>mV<br>mV<br>mV | $I_C=0.1\text{A}, I_B=1\text{mA}^*$<br>$I_C=0.1\text{A}, I_B=0.5\text{mA}^*$<br>$I_C=1\text{A}, I_B=10\text{mA}^*$<br>$I_C=3\text{A}, I_B=10\text{mA}^*$<br>$I_C=4\text{A}, I_B=50\text{mA}^*$ |
| Base-Emitter Saturation Voltage       | $V_{BE(sat)}$         |                   |           | 1.1                           | V                          | $I_C=3\text{A}, I_B=20\text{mA}^*$   |
| Base-Emitter Turn-On Voltage          | $V_{BE(on)}$          |                   |           | 1.0                           | V                          | $I_C=3\text{A}, V_{CE}=2\text{V}^*$  |
| Static Forward Current Transfer Ratio | $h_{FE}$              | 500<br>400<br>100 |           |                               |                            | $I_C=100\text{mA}, V_{CE}=2\text{V}^*$<br>$I_C=3\text{A}, V_{CE}=2\text{V}^*$<br>$I_C=10\text{A}, V_{CE}=2\text{V}^*$  |
| Transition Frequency                  | $f_T$                 | 150               |           |                               | MHz                        | $I_C=50\text{mA}, V_{CE}=5\text{V}$<br>$f=50\text{MHz}$  |
| Input Capacitance                     | $C_{ibo}$             |                   | 200       |                               | pF                         | $V_{EB}=0.5\text{V}, f=1\text{MHz}$  |
| Output Capacitance                    | $C_{obo}$             |                   | 40        |                               | pF                         | $V_{CB}=10\text{V}, f=1\text{MHz}$   |
| Switching Times                       | $t_{on}$<br>$t_{off}$ |                   | 40<br>500 |                               | ns<br>ns                   | $I_C=500\text{mA}, I_{B1}=I_{B2}=50\text{mA}$<br>$V_{CC}=10\text{V}$   |

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

# FCX688B

## TYPICAL CHARACTERISTICS

