

SOT323 NPN SILICON PLANAR  
GENERAL PURPOSE TRANSISTOR

ISSUE 1 - DECEMBER 1998

ZUMT848B

Partmarking Detail: - T14



ABSOLUTE MAXIMUM RATINGS.

| PARAMETER                                  | SYMBOL         | VALUE       | UNIT        |
|--------------------------------------------|----------------|-------------|-------------|
| Collector-Base Voltage                     | $V_{CBO}$      | 30          | V           |
| Collector-Emitter Voltage                  | $V_{CES}$      | 30          | V           |
| Collector-Emitter Voltage                  | $V_{CEO}$      | 30          | V           |
| Emitter-Base Voltage                       | $V_{EBO}$      | 5           | V           |
| Continuous Collector Current               | $I_C$          | 100         | mA          |
| Peak Pulse Current                         | $I_{EM}$       | 200         | mA          |
| Base Current                               | $I_{BM}$       | 200         | mA          |
| Power Dissipation at $T_{amb}=25^{\circ}C$ | $P_{tot}$      | 330         | mW          |
| Operating and Storage Temperature Range    | $T_j, T_{stg}$ | -55 to +150 | $^{\circ}C$ |

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

| PARAMETER                            | SYMBOL        | MIN. | TYP.       | MAX.       | UNIT          | CONDITIONS.                                            |
|--------------------------------------|---------------|------|------------|------------|---------------|--------------------------------------------------------|
| Collector Cut-Off Current            | $I_{CBO}$     |      |            | 15<br>5    | nA<br>$\mu A$ | $V_{CB} = 30V$<br>$V_{CB} = 30V, T_{amb}=150^{\circ}C$ |
| Collector-Emitter Saturation Voltage | $V_{CE(sat)}$ |      | 90         | 250        | mV            | $I_C=10mA, I_B=0.5mA$                                  |
|                                      |               |      | 200        | 600        | mV            | $I_C=100mA, I_B=5mA$                                   |
|                                      |               |      | 300        | 600        | mV            | $I_C=10mA^*$                                           |
| Base-Emitter Saturation Voltage      | $V_{BE(sat)}$ |      | 700<br>900 |            | mV            | $I_C=10mA, I_B=0.5mA$<br>$I_C=100mA, I_B=5mA$          |
| Base-Emitter Voltage                 | $V_{BE}$      | 580  | 650        | 750<br>770 | mV            | $I_C=2mA, V_{CE}=5V$<br>$I_C=10mA, V_{CE}=5V$          |

\* Collector-Emitter Saturation Voltage at  $I_C = 10mA$  for the characteristics going through the operating point  $I_C = 11mA, V_{CE} = 1V$  at constant base current.

## **TYPICAL CHARACTERISTICS**

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ELECTRICAL CHARACTERISTICS (Continued)

| PARAMETER                    |         | SYMBOL    | MIN. | TYP. | MAX. | UNIT             | CONDITIONS.                                                                       |
|------------------------------|---------|-----------|------|------|------|------------------|-----------------------------------------------------------------------------------|
| Noise Figure                 |         | N         | –    | 2    | 10   | dB               | $V_{CB} = 5V, I_C=200\mu A, R_G=2k\Omega, f=1kHz, \Delta f=200Hz$                 |
|                              |         |           | –    | –    | –    | dB               | $V_{CB} = 5V, I_C=200\mu A, R_G=2k\Omega, f=30Hz \text{ to } 15kHz$ at 3dB points |
| Equivalent Noise Voltage     |         | $e_n$     | –    | –    | –    | nV               | $V_{CB} = 5V, I_C=200\mu A, R_G=2k\Omega, f=10Hz \text{ to } 50Hz$ at 3dB points  |
| Dynamic Characteristics      | Group B | $h_{ie}$  | 3.2  | 4.5  | 8.5  | k $\Omega$       | $V_{CE}=5V$<br>$I_C=2mA$<br>$f=1kHz$                                              |
|                              | Group B | $h_{re}$  |      | 2    |      | $\times 10^{-4}$ |                                                                                   |
|                              | Group B | $h_{fe}$  | 240  | 330  | 500  |                  |                                                                                   |
|                              | Group B | $h_{oe}$  | –    | 30   | 60   | $\mu s$          |                                                                                   |
| Static Forward Current Ratio | Group B | $h_{FE}$  |      | 150  |      |                  | $I_C=0.01mA, V_{CE}=5V$                                                           |
|                              |         |           | 200  | 290  | 450  |                  | $I_C=2mA, V_{CE}=5V$                                                              |
|                              |         |           | –    | 200  | –    |                  | $I_C=100mA, V_{CE}=5V$                                                            |
| Transition Frequency         |         | $f_T$     | –    | 300  | –    | MHz              | $I_C=10mA, V_{CE}=5V$<br>$f=100MHz$                                               |
| Collector-Base Capacitance   |         | $C_{obo}$ |      | 2.5  | 4.5  | pF               | $V_{CB}=10V, f=1MHz$                                                              |
| Emitter-Base Capacitance     |         | $C_{ibo}$ |      | 9    |      | pF               | $V_{EB}=0.5V, f=1MHz$                                                             |