## SPRINGFIELD, NEW JERSEY 07081

 <br> \section*{U.S.A. <br> \section*{U.S.A. <br> BSW68A NPN switching transistor <br> features}- High current (max. 1 A )
- High voltage (max. 150 V ).

APPLICATIONS

- General purpose switching and amplification
- Industrial applications.

DESCRIPTION


Fig. 1 Simplified outline (TO-39) and symbol.

PINNING

| PIN | DESCRIPTION |
| :---: | :--- |
| 1 | emitter |
| 2 | base |
| 3 | collector, connected to case |

NPN transistor in a TO-39 metal package.

| SYMBOL | PARAMETER | CONDITIONS | MIN. | MAX. | UNIT |
| :---: | :---: | :---: | :---: | :---: | :---: |
| $\mathrm{V}_{\text {cbo }}$ | collector-base voltage BSW68A | open emitter | - | 150 | V |
| $\mathrm{V}_{\text {CEO }}$ | collector-emitter voltage BSW68A | open base | - | 150 | $V$ |
| $\mathrm{V}_{\text {EBO }}$ | emitter-base voltage | Open coilector | - | 6 | V |
| $\mathrm{I}_{6}$ | collector current (DC) |  | - | 1 | A |
| ICM | peak collector current | $\mathrm{t}_{\mathrm{p}} \leq 20 \mathrm{~ms}$ | - | 2 | A |
| $\mathrm{I}_{\mathrm{BM}}$ | peak base current |  | - | 200 | mA |
| $P_{\text {tot }}$ | total power dissipation | $\mathrm{T}_{\text {amb }} \leq 25^{\circ} \mathrm{C}$ | - | 800 | mW |
|  |  | $\mathrm{T}_{\text {case }} \leq 25{ }^{\circ} \mathrm{C}$ | - | 5 | W |
| $\overline{\mathrm{T}_{\text {stg }}}$ | storage temperature |  | -65 | +150 | ${ }^{\circ} \mathrm{C}$ |
| $\mathrm{T}_{1}$ | junction temperature |  | - | 200 | ${ }^{\circ} \mathrm{C}$ |
| Tamb | operating ambient temperature |  | -65 | +150 | ${ }^{\circ} \mathrm{C}$ |

THERMAL CHARACTERISTICS

| SYMBOL | PARAMETER | CONDITIONS | VALUE | UNIT |
| :--- | :--- | :---: | :---: | :---: |
| $\mathrm{R}_{\text {th } j-\mathrm{a}}$ | thermal resistance from junction to ambient | free air | 220 | KW |
| $\mathrm{R}_{\text {th } j-\mathrm{c}}$ | thermal resistance from junction to case |  | 35 | KW |

CHARACTERISTICS
$\mathrm{T}_{j}=25^{\circ} \mathrm{C}$ unless otherwise specified.

| SYMBOL | PARAMETER | CONDITIONS | MIN. | TYP. | MAX. | UNIT: |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| ${ }^{\text {c Cbo }}$ | collector cut-off current BSW68A | $\mathrm{I}_{\mathrm{E}}=0 ; \mathrm{V}_{\mathrm{CB}}=75 \mathrm{~V}$ | - | - | 100 | nA |
|  |  | $\mathrm{l}_{E}=0 ; \mathrm{V}_{C B}=75 \mathrm{~V} ; \mathrm{T}_{i}=150^{\circ} \mathrm{C}$ | - | - | 50 | $\mu \mathrm{A}$ |
|  |  | $\mathrm{I}_{\mathrm{E}}=0 ; \mathrm{V}_{C B}=150 \mathrm{~V}$ | - | - | 100 | $\mu \mathrm{A}$ |
| Iebo | emitter cut-off current | $\mathrm{t}_{\mathrm{C}}=0 ; \mathrm{V}_{\mathrm{EB}}=3 \mathrm{~V}$ | - | - | 100 | nA |
|  |  | $\mathrm{C}=0 ; \mathrm{V}_{\mathrm{EG}}=6 \mathrm{~V}$ | - | - | 100 | $\mu \mathrm{A}$ |
| $h_{\text {FE }}$ | DC current gain | $\begin{aligned} & \mathrm{V}_{\mathrm{CE}}=5 \mathrm{~V} \\ & \mathrm{I}_{\mathrm{C}}=10 \mathrm{~mA} \\ & \mathrm{I}_{\mathrm{C}}=100 \mathrm{~mA} \\ & \mathrm{I}_{\mathrm{C}}=500 \mathrm{~mA} \\ & \mathrm{I}_{\mathrm{C}}=1 \mathrm{~A} \\ & \end{aligned}$ | $\begin{array}{\|l\|} \hline 30 \\ 40 \\ 30 \\ 10 \\ \hline \end{array}$ |  |  |  |
| $V_{\text {CEsat }}$ | collector-emitter saturation voltage | $\mathrm{I}_{\mathrm{C}}=100 \mathrm{~mA} ; \mathrm{l}_{\mathrm{B}}=10 \mathrm{~mA}$ | - | - | 150 | mV |
|  |  | $\mathrm{I}_{\mathrm{C}}=500 \mathrm{~mA} ; \mathrm{I}_{\mathrm{B}}=50 \mathrm{~mA}$ | - | - | 400 | mV |
|  |  | $\mathrm{IC}_{\mathrm{c}}=1 \mathrm{~A}^{\prime} \mathrm{I}_{\mathrm{B}}=150 \mathrm{~mA}$ | - | - | 1 | V |
| $V_{\text {BEsat }}$ | base-emitter saturation voltage | $\mathrm{I}_{\mathrm{C}}=100 \mathrm{~mA} \mathrm{I}_{\mathrm{B}}=10 \mathrm{~mA}$ | - | - | 900 | mV |
|  |  | $\mathrm{I}_{\mathrm{C}}=500 \mathrm{~mA} \mathrm{I}_{\mathrm{B}}=50 \mathrm{~mA}$ | - | - | 1.1 | V |
|  |  | $\mathrm{I}_{\mathrm{C}}=1 \mathrm{~A} ; \mathrm{I}_{\mathrm{B}}=150 \mathrm{~mA}$ | - | - | 1.4 | V |
| $\mathrm{C}_{c}$ | collector capacitance | $\mathrm{I}_{\mathrm{E}}=i_{\text {e }}=0 ; \mathrm{V}_{\text {CE }}=10 \mathrm{~V} ; \mathrm{f}=1 \mathrm{MHz}$ | - | - | 20 | pF |
| $\mathrm{C}_{\text {e }}$ | emitter capacitance | $\mathrm{I}_{\mathrm{C}}=\mathrm{i}_{\mathrm{c}}=0 ; \mathrm{V}_{\text {EQ }}=0 ; \mathrm{f}=1 \mathrm{MHz}$ | - | - | 300 | pF |
| $\mathrm{f}_{\mathrm{T}}$ | transition frequency | $\mathrm{I}_{\mathrm{C}}=100 \mathrm{~mA} ; \mathrm{V}_{\text {CE }}=20 \mathrm{~V} ; \mathrm{f}=100 \mathrm{MHz}$ | - | 130 | - | MHz |
| Switching times (between $\mathbf{1 0 \%}$ and $\mathbf{9 0 \%}$ leveis) |  |  |  |  |  |  |
| $\mathrm{t}_{\text {on }}$ | turn-on time | $\left\{\begin{array}{l} I_{\text {Con }}=500 \mathrm{~mA} ; I_{\text {Bon }}=50 \mathrm{~mA} ; \\ I_{\text {Boff }}=-50 \mathrm{~mA} \end{array}\right.$ | - | 500 | $-$ | ns |
| tof | turn-off time |  | - | 900 | - | ns |

NJ Semi-Conductors reserves the right to change test conditions, parameter limits and package dimensions without notice. Information fumished by $N, I$ Semi-Conductors is believed to be both accurate and reliable at the time of going to press. However N. Semi-Conductors assumes no responsibility for any errors or omissions discovered in its use. NJ Semi-Conductors encourages customers to verity that datasheets are current before placing orders.

