BF862
N-channel junction FET

Product specification
Supersedes data of 1999 Jun 29

2000 Jan 05
FEATURES

- High transition frequency for excellent sensitivity in AM car radios
- High transfer admittance.

APPLICATIONS

- Pre-amplifiers in AM car radios.

DESCRIPTION

Silicon N-channel symmetrical junction field-effect transistor in a SOT23 package. Drain and source are interchangeable.

QUICK REFERENCE DATA

<table>
<thead>
<tr>
<th>SYMBOL</th>
<th>PARAMETER</th>
<th>CONDITIONS</th>
<th>MIN.</th>
<th>TYP.</th>
<th>MAX.</th>
<th>UNIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>$V_{DS}$</td>
<td>drain-source voltage</td>
<td>–</td>
<td>–</td>
<td>20</td>
<td>–</td>
<td>V</td>
</tr>
<tr>
<td>$V_{GSOFF}$</td>
<td>gate-source cut-off voltage</td>
<td>–0.3</td>
<td>–0.8</td>
<td>–1.2</td>
<td>–</td>
<td>V</td>
</tr>
<tr>
<td>$I_{DSS}$</td>
<td>drain-source current</td>
<td>10</td>
<td>–</td>
<td>25</td>
<td>–</td>
<td>mA</td>
</tr>
<tr>
<td>$P_{TOT}$</td>
<td>total power dissipation</td>
<td>$T_A \leq 90 ^\circ C$</td>
<td>–</td>
<td>–</td>
<td>300</td>
<td>mW</td>
</tr>
<tr>
<td>$</td>
<td>Y_{FS}</td>
<td>$</td>
<td>transfer admittance</td>
<td>35</td>
<td>45</td>
<td>–</td>
</tr>
<tr>
<td>$T_J$</td>
<td>junction temperature</td>
<td>–</td>
<td>–</td>
<td>150</td>
<td>–</td>
<td>°C</td>
</tr>
</tbody>
</table>

CAUTION

This product is supplied in anti-static packing to prevent damage caused by electrostatic discharge during transport and handling.

Fig.1 Simplified outline and symbol.
LIMITING VALUES
In accordance with the Absolute Maximum Rating System (IEC 134).

<table>
<thead>
<tr>
<th>SYMBOL</th>
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<th>CONDITIONS</th>
<th>MIN.</th>
<th>MAX.</th>
<th>UNIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>V_{DS}</td>
<td>drain-source voltage</td>
<td>–</td>
<td>20</td>
<td>V</td>
<td></td>
</tr>
<tr>
<td>V_{DG}</td>
<td>drain-gate voltage</td>
<td>–</td>
<td>20</td>
<td>V</td>
<td></td>
</tr>
<tr>
<td>V_{GS}</td>
<td>gate-source voltage</td>
<td>–</td>
<td>-20</td>
<td>V</td>
<td></td>
</tr>
<tr>
<td>I_{DS}</td>
<td>drain-source current</td>
<td>–</td>
<td>40</td>
<td>mA</td>
<td></td>
</tr>
<tr>
<td>I_{G}</td>
<td>forward gate current</td>
<td>–</td>
<td>10</td>
<td>mA</td>
<td></td>
</tr>
<tr>
<td>P_{tot}</td>
<td>total power dissipation</td>
<td>T_s ≤ 90 °C; note 1</td>
<td>–</td>
<td>300</td>
<td>mW</td>
</tr>
<tr>
<td>T_{stg}</td>
<td>storage temperature</td>
<td>-65</td>
<td>+150</td>
<td>°C</td>
<td></td>
</tr>
<tr>
<td>T_{j}</td>
<td>junction temperature</td>
<td>–</td>
<td>150</td>
<td>°C</td>
<td></td>
</tr>
</tbody>
</table>

Note
1. Main heat transfer is via the gate lead.

THERMAL CHARACTERISTICS

<table>
<thead>
<tr>
<th>SYMBOL</th>
<th>PARAMETER</th>
<th>CONDITIONS</th>
<th>VALUE</th>
<th>UNIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>R_{thj-s}</td>
<td>thermal resistance from junction to soldering point</td>
<td>note 1</td>
<td>200</td>
<td>K/W</td>
</tr>
</tbody>
</table>

Note
1. Soldering point of the gate lead.

Fig.2 Power derating curve.
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STATIC CHARACTERISTICS

$T_j = 25 \, ^\circ\text{C}$; unless otherwise specified.

<table>
<thead>
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<th>UNIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>$V_{(BR)GSS}$</td>
<td>gate-source breakdown voltage</td>
<td>$I_{GS} = -1 , \mu\text{A}; V_{DS} = 0$</td>
<td>$-20$</td>
<td>$-$</td>
<td>$-$</td>
<td>V</td>
</tr>
<tr>
<td>$V_{GS}$</td>
<td>gate-source forward voltage</td>
<td>$V_{DS} = 0; I_{D} = 1 , \text{mA}$</td>
<td>$-$</td>
<td>$-$</td>
<td>$1$</td>
<td>V</td>
</tr>
<tr>
<td>$V_{GSoff}$</td>
<td>gate-source cut-off voltage</td>
<td>$V_{DS} = 8 , \text{V}; I_{D} = 1 , \mu\text{A}$</td>
<td>$-0.3$</td>
<td>$-0.8$</td>
<td>$-1.2$</td>
<td>V</td>
</tr>
<tr>
<td>$I_{GSS}$</td>
<td>reverse gate current</td>
<td>$V_{GS} = -15 , \text{V}; V_{DS} = 0$</td>
<td>$-$</td>
<td>$-$</td>
<td>$1$</td>
<td>nA</td>
</tr>
<tr>
<td>$I_{DSS}$</td>
<td>drain-source current</td>
<td>$V_{GS} = 0; V_{DS} = 8 , \text{V}$</td>
<td>$10$</td>
<td>$-$</td>
<td>$25$</td>
<td>mA</td>
</tr>
</tbody>
</table>

DYNAMIC CHARACTERISTICS

Common source; $T_{\text{amb}} = 25 \, ^\circ\text{C}$; $V_{GS} = 0$; $V_{DS} = 8 \, \text{V}$; unless otherwise specified.

<table>
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<tr>
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<th>TYP.</th>
<th>MAX.</th>
<th>UNIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>$</td>
<td>y_{fs}</td>
<td>$</td>
<td>common source forward transfer admittance</td>
<td>$T_j = 25 , ^\circ\text{C}$</td>
<td>$35$</td>
<td>$45$</td>
</tr>
<tr>
<td>$g_{os}$</td>
<td>common source output conductance</td>
<td>$T_j = 25 , ^\circ\text{C}$</td>
<td>$-$</td>
<td>$180$</td>
<td>$400$</td>
<td>$\mu\text{S}$</td>
</tr>
<tr>
<td>$C_{iss}$</td>
<td>input capacitance</td>
<td>$f = 1 , \text{MHz}$</td>
<td>$-$</td>
<td>$10$</td>
<td>$-$</td>
<td>pF</td>
</tr>
<tr>
<td>$C_{rss}$</td>
<td>reverse transfer capacitance</td>
<td>$f = 1 , \text{MHz}$</td>
<td>$-$</td>
<td>$1.9$</td>
<td>$-$</td>
<td>pF</td>
</tr>
<tr>
<td>$e_{in}$</td>
<td>equivalent noise input voltage</td>
<td>$f = 100 , \text{kHz}$</td>
<td>$-$</td>
<td>$0.8$</td>
<td>$-$</td>
<td>nV/$\sqrt{\text{Hz}}$</td>
</tr>
<tr>
<td>$f_T$</td>
<td>transition frequency</td>
<td>$-$</td>
<td>$715$</td>
<td>$-$</td>
<td>MHz</td>
<td></td>
</tr>
</tbody>
</table>
Fig. 3  Drain saturation current as a function of gate-source cut-off voltage; typical values.

\[ V_{DS} = 8\,V; \, T_j = 25\,^\circ C. \]

Fig. 4  Common-source output conductance as a function of drain saturation current; typical values.

\[ V_{DS} = 8\,V; \, T_j = 25\,^\circ C. \]

Fig. 5  Forward transfer admittance as a function of drain saturation current; typical values.

\[ V_{DS} = 8\,V; \, T_j = 25\,^\circ C. \]

Fig. 6  Forward transfer admittance as a function of drain current; typical values.

\[ V_{DS} = 8\,V; \, T_j = 25\,^\circ C. \]
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Fig.7  Drain current as a function of gate-source voltage; typical values.  
$V_{DS} = 8\,V;\ T_j = 25\,^\circ C.$

Fig.8  Drain current as a function of drain-source voltage; typical values.  
$V_{DS} = 8\,V;\ T_j = 25\,^\circ C.$

Fig.9  Gate current as a function of drain-gate voltage; typical values.  
$V_{DS} = 8\,V;\ T_j = 25\,^\circ C.$

Fig.10  Input and reverse transfer capacitance as functions of gate-source voltage; typical values.  
$V_{DS} = 8\,V;\ f = 1\,\text{MHz};\ T_j = 25\,^\circ C.$
V_{DS} = 8 V; V_{GS} = 0; T_{amb} = 25 ^\circ C.

Fig. 11 Common-source input admittance as a function of frequency; typical values.

V_{DS} = 5 V; V_{G2} = 4 V. 
I_{D} = 15 mA; T_{amb} = 25 ^\circ C.

Fig. 12 Common-source reverse admittance as a function of frequency; typical values.

V_{DS} = 8 V; V_{GS} = 0; T_{amb} = 25 ^\circ C.

Fig. 13 Common-source forward transfer admittance as a function of frequency; typical values.

V_{DS} = 8 V; V_{GS} = 0; T_{amb} = 25 ^\circ C.

Fig. 14 Common-source output admittance as a function of frequency; typical values.
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PACKAGE OUTLINE
Plastic surface-mounted package; 3 leads  
SOT23

DIMENSIONS (mm are the original dimensions)

<table>
<thead>
<tr>
<th>UNIT</th>
<th>A</th>
<th>A₁ max.</th>
<th>bₚ</th>
<th>c</th>
<th>D</th>
<th>E</th>
<th>e</th>
<th>e₁</th>
<th>Hₑ</th>
<th>Lₚ</th>
<th>Q</th>
<th>v</th>
<th>w</th>
</tr>
</thead>
<tbody>
<tr>
<td>mm</td>
<td>1.1</td>
<td>0.1</td>
<td>0.48</td>
<td>0.15</td>
<td>3.0</td>
<td>1.4</td>
<td>1.9</td>
<td>0.95</td>
<td>2.5</td>
<td>0.45</td>
<td>0.55</td>
<td>0.2</td>
<td>0.1</td>
</tr>
</tbody>
</table>

OUTLINE VERSION  
SOT23

REFERENCES  
IEC  
JEDEC  
JEITA  

EUROPEAN PROJECTION  

ISSUE DATE  
04-11-04  
06-03-16
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DATA SHEET STATUS

<table>
<thead>
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<th>DOCUMENT STATUS(1)</th>
<th>PRODUCT STATUS(2)</th>
<th>DEFINITION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Objective data sheet</td>
<td>Development</td>
<td>This document contains data from the objective specification for product development.</td>
</tr>
<tr>
<td>Preliminary data sheet</td>
<td>Qualification</td>
<td>This document contains data from the preliminary specification.</td>
</tr>
<tr>
<td>Product data sheet</td>
<td>Production</td>
<td>This document contains the product specification.</td>
</tr>
</tbody>
</table>

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