PS25454 EPIC QFN sensor, non-contact, low gain

Datasheet

Plessey Semiconductors Electric Potential Integrated Circuit (EPIC) product line targets a range of applications.

The PS25454 is an ultra high impedance non-contact solid state electric potential sensor. It can be used to detect field disturbance due to the movement of a near-by object. This functionality can be employed in a range of applications including security motion sensors and non-contact electric switches for lighting, door opening, toys etc.

The device uses active feedback techniques to both lower the effective input capacitance of the sensing element (Cin) and boost the input resistance (Rin). These techniques are used to realise a sensor with a frequency response suitable for remote sensing applications.

FEATURES

- Ultra high effective input resistance, typically 20GΩ.
- Effective input capacitance as low as 15pF.
- Upper 3dB point typically 20kHz.
- Operates with bipolar power supply from ±2.4V to ±5.5V.
- Sensors supplied in a custom package with exposed pins for surface mount assembly.

APPLICATIONS

- Proximity switching of lighting and similar electric circuits
- Remote control of TVs and other domestic appliances
- Presence detection for security / alarm systems
- Room occupancy detection for rescue services
- Simple gesture recognition to control children’s toys
- Controller-less computer gaming systems
Fig. 2 Internal circuit of EPIC Movement Sensor

**ELECTRICAL CHARACTERISTICS**

$T_{\text{amb}} = -25^\circ\text{C}$ to $+75^\circ\text{C}$, $V_{\text{dd}}/V_{\text{ss}} \pm 2.4\text{V}$ to $\pm 5.5\text{V}$. The electrical characteristics are guaranteed by either production test or by design and characterisation. They apply within the specified ambient temperature and supply voltage unless otherwise stated.

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Value</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Min.</td>
<td>Typ.</td>
</tr>
<tr>
<td>Supply voltage</td>
<td>±2.4</td>
<td>±5.5</td>
</tr>
<tr>
<td>Supply current</td>
<td>1.5</td>
<td>2.5</td>
</tr>
<tr>
<td>Effective input resistance</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>Effective input capacitance</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>Voltage Gain (Av)</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Lower -3dB point</td>
<td>0.20</td>
<td></td>
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<tr>
<td>Upper -3dB point</td>
<td>20.0</td>
<td></td>
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<tr>
<td>Noise</td>
<td>tbd</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
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<tr>
<td><strong>Conditions</strong></td>
<td>Bipolar supply, $\text{Gnd}=0\text{V}$</td>
<td></td>
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<tr>
<td></td>
<td>As measured at the sensor electrode</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Set by internal DC signal rejection network – coupling capacitor 250pF</td>
<td></td>
</tr>
</tbody>
</table>
Fig. 3 Typical Bode Plot for PS25454 Sensor with Coupling through 250pF Capacitor

PIN ASSIGNMENT

Fig. 4 Pin Assignment for the PS25454
MECHANICAL DIMENSIONS
A preliminary package diagram is shown below. This is certain to change and so should only be used for illustration purposes.

![Mechanical Drawing](image)

**Fig. 5 Mechanical Drawing (all dimensions are nominal and in mm)**

ELECTROSTATIC DISCHARGE (ESD) PROTECTION
The PS25454 is manufactured using a high performance analog CMOS process. As for all CMOS components, it is essential that conventional ESD protection protocols be applied for the handling of this device.
PATENTS

This component and many of the associated applications are covered by the following international patents:

602 32 911 6-08 (DE)       EP2174416
AU2007228660                GB1118970.1
CA2646411                   JP2009-500903
CN20070028584.9             JP4391823
EP1451595 (CH)              TW097126903
EP1451595 (ES)              TW1308066
EP1451595 (FR)              US12293872
EP1451595 (IE)              US12374359
EP1451595 (IT)              US12669615
EP1451595 (NL)              US13020890
EP2002273                   US13/163998
EP2047284                   US7885700
Soldering

Care should be taken during soldering as the device pads are delicate. A suitable low temperature re-flow paste should be used and the temperature profile shown below should be adhered to.

**FOR LEADFREE SOLDER**

Temp.[°C]  
230°C - 260°C max.  
220°C  
150°C - 190°C  
90 ±30s  
30 +20/-10s  

Time [s]
Customer Enquiries/Sales/Technical Support

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