VS6555

Ultra small reflowable VGA camera module

Features

■ VGA resolution sensor (640 x 480)
■ Electrical and logical interface fully SMIA compliant
■ Video data interface - CCP2.0
■ Command interface - CCI
■ 2.8 V/1.8 V operation
■ On-board 10-bit ADC
■ Small physical size (2.5mm height)
■ Integral EMC shielding
■ Ultra low power standby mode
■ On-chip PLL
■ Lead free reflowable module

Applications

■ Mobile phone
■ PDA
■ Videophone

Description

The VS6555 is an ultra small reflowable VGA camera module for use across a range of mobile phone handsets and accessories. It is primarily designed to be used as a secondary camera for video conferencing applications, but could equally be used as a primary camera. The camera silicon device is SMIA class 0 profile 0 compliant and is capable of generating raw bayer VGA images up to 30 fps. The VS6555 supports the CCI control and CCP2.0 data interfaces.

As different phone platforms have different baseband processors with varying capabilities, it may not be possible for all phones to support the associated image processing algorithms. Where the baseband cannot support this processing load, a separate hardware accelerator (STV0984 or STV0986) device can be incorporated in the phone system to run the algorithms in hardware. The STV0984 and STV0986 processors can support 2 cameras.

The module design is optimized to provide an ultra small footprint and height, and is designed to be reflowable at lead-free solder profiles. The product is lead free.

The lens design is optimized for video conferencing and maintains its performance even after the high temperatures of lead-free reflow.

VS6555 offers an ultra low power consumption hardware standby mode consuming less than 30 µW.
Table 1. Technical specifications

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pixel array</td>
<td>VGA (640 x 480)</td>
</tr>
<tr>
<td>Sensor technology</td>
<td>0.13 µm HCMOS9i</td>
</tr>
<tr>
<td>Pixel size</td>
<td>2.2 µm x 2.2 µm</td>
</tr>
<tr>
<td>Exposure control</td>
<td>+8 dB</td>
</tr>
<tr>
<td>Analogue gain</td>
<td>+24 dB (max)</td>
</tr>
<tr>
<td>Dynamic range</td>
<td>61 dB</td>
</tr>
<tr>
<td>Signal to noise</td>
<td>34 dB (@ 100 lux)</td>
</tr>
<tr>
<td>Minimum illumination</td>
<td>&lt; 7lux</td>
</tr>
<tr>
<td>Supply voltage</td>
<td>Analogue: 2.4V to 2.9V Digital: 1.8V ± 0.1V</td>
</tr>
<tr>
<td>Average power consumption @ 30fps</td>
<td>&lt;60 mW</td>
</tr>
<tr>
<td>Module size (XYZ) max</td>
<td>4.5 mm x 4.5 mm x 2.5 mm</td>
</tr>
<tr>
<td>Lens HFOV (typical)</td>
<td>66°</td>
</tr>
<tr>
<td>Lens DFOV (typical)</td>
<td>78°</td>
</tr>
<tr>
<td>F number</td>
<td>3.2</td>
</tr>
<tr>
<td>Lens SFR</td>
<td>On axis 45% (typ) Horizontal field (70%) 25% (typical)</td>
</tr>
<tr>
<td>Lens TV distortion</td>
<td>&lt; 1%</td>
</tr>
<tr>
<td>Relative illumination</td>
<td>&gt; 45% (typ)</td>
</tr>
<tr>
<td>System connectivity</td>
<td>Lead free reflowable BGA</td>
</tr>
<tr>
<td>Storage temperature</td>
<td>[-40; +85]°C</td>
</tr>
<tr>
<td>Functional operating temperature</td>
<td>[-30; +70]°C</td>
</tr>
<tr>
<td>Normal operating temperature</td>
<td>[-25; +55]°C</td>
</tr>
<tr>
<td>Optimal operating temperature</td>
<td>[+5; +30]°C</td>
</tr>
</tbody>
</table>
Figure 3. Module outline drawing (1/3)

Notes:
1. Mass of module 0.09 Grammes.
2. Class A surface inside this diameter.
3. Flatness of BGA.

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Title: 555 CAMERA MODULE
Date: 19 APR 06
Scale 1:1

ST

N/A

SEE TABLE

All dimensions in mm

Tolerances, unless otherwise stated:

Linear: 0 Place Decimals ±0.05
1 Place Decimals ±0.00 ±0.05
2 Place Decimals ±0.00 ±0.05
Angular: ±0.25 degrees

Surface Finish: 1.6 microns

Rev

Part No

COMPANY CONFIDENTIAL COMPANY CONFIDENTIAL COM
Figure 4. Module outline drawing (2/3)

'F' AT DATUM 'A'
MEASURED DIA 'D'
AT DATUM 'A'
'E' AT DATUM 'A'

TOP OF SCENE

CONE
SEE TABLE DIM 'A'

PYRAMID
SEE TABLE DIM 'C'

DIAM MEASURED AT DATUM 'A'

REV A

SEE TABLE DIM 'B'

PYRAMID FULL ANGLE HORIZONTAL FOV AT 'A'
VERTICAL FOV AT 'A'

84.4° 56.6° 1.28mm 1.02mm 0.77mm

1.6 microns

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Home, Personal & Communication Sector
Imaging Division

Sheet 7

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Ordering information

Table 2. Order codes

<table>
<thead>
<tr>
<th>Part number</th>
<th>Package</th>
<th>Packing</th>
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<tbody>
<tr>
<td>VS6555R0H9/TR</td>
<td>Lead-free reflowable module.</td>
<td>Tape and Reel</td>
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Revision history

Table 3. Document revision history

<table>
<thead>
<tr>
<th>Date</th>
<th>Revision</th>
<th>Changes</th>
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</thead>
<tbody>
<tr>
<td>18-Jan-2007</td>
<td>1</td>
<td>Initial release.</td>
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