Specification document of MAX6605MXKV

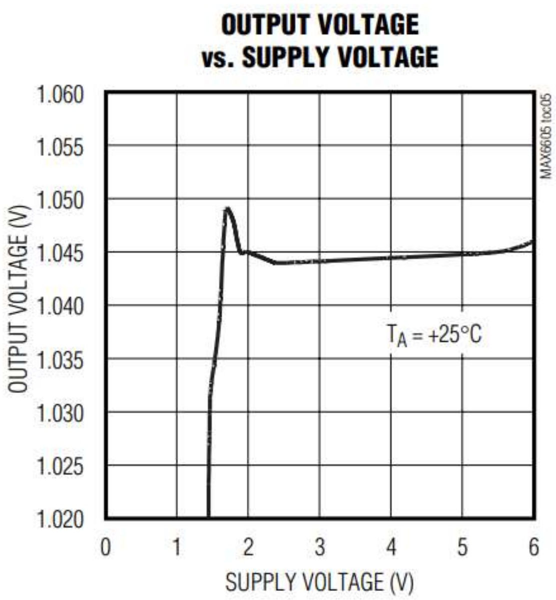
Component manufacturer	Maxim Integrated
Model number	MAX6605MXKV
Datasheets	MAX6605 DS (maximintegrated.com)
Specification Ver	01.00.00 Oct 04,2022 New release
	01.00.01 Oct 18,2022 Corrected license content
Documentation provided	Rui Long Lab Inc. https://rui-long-lab.com/

1. Component datasheet

Temperature accuracy	±0.75° C (25° C)
Temperature range	-40 to +85° C
Range of power supply voltage (Vdd)	2.7 to 5.5[V]
Output voltage (Vout)	Linear 11.9×Vdd/3.3 [mV/° C] Typ.
	Vdd = 3.3 [V]
	0 [° C] 0.744[V] Typ.
Calculation	Vout = 0.744V + (0.0119 V/° C × Ta)
	Ta = (Vout – 0.744V) / 0.0119 V/° C

More accurate temperature calculation

$Vout = 0.744V + (0.0119 V/°C \times Ta) + (1.604 \times 10^{-6} \times Ta^2)$



Applications

IoT etc

- Cellular Phones
- Battery Packs
- GPS Equipment
- Digital Cameras

Automotive

2. Component Software IF specification

The software interface specifications based on the MAX6605MXKV component specifications are as follows.

The voltage value-to-physical value conversion equation is a linear conversion equation as shown in the equation below.

ADC value to voltage value conversion formula

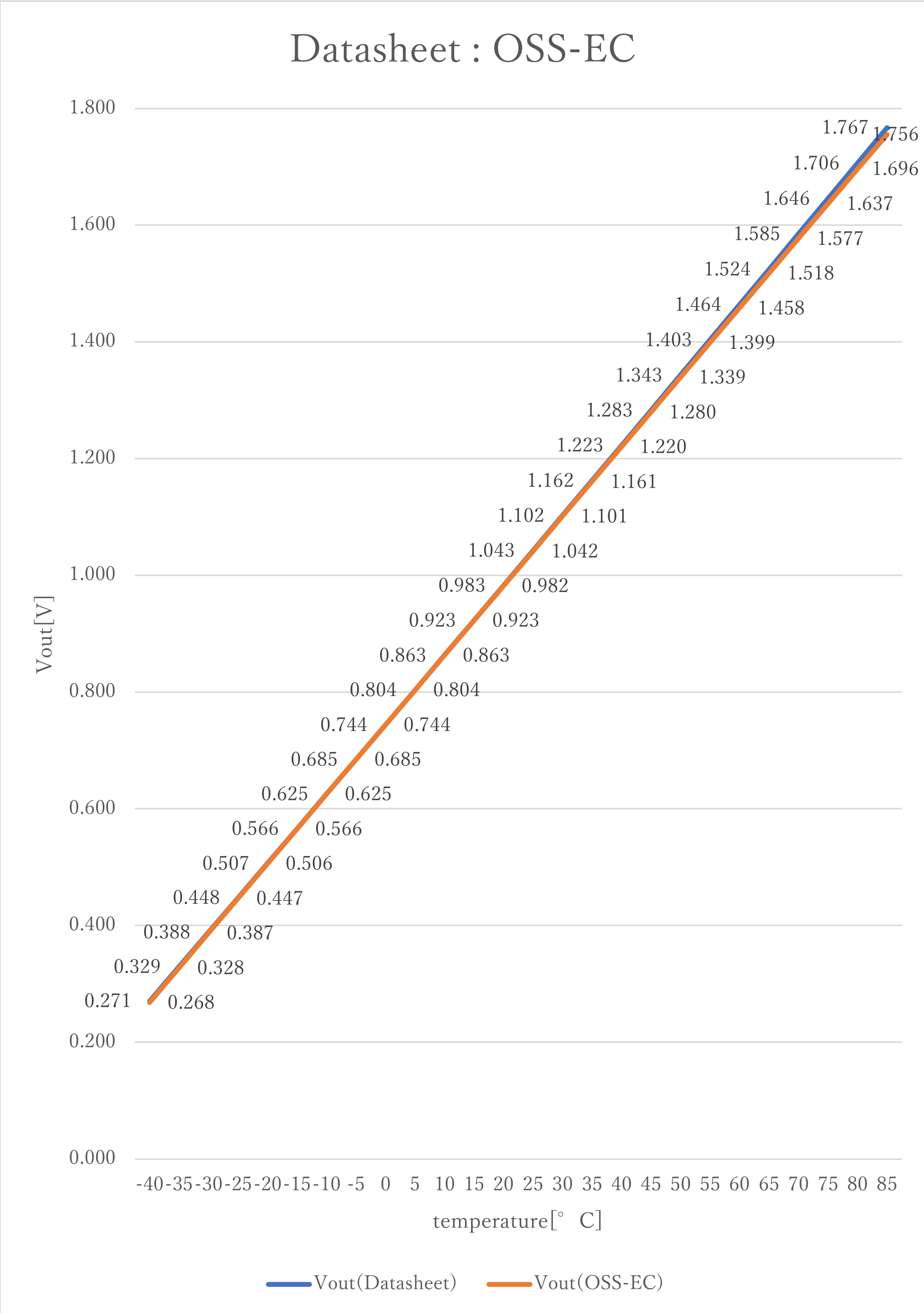
$$vi = (ai \times iADC\_vdd) / 2^{iADC\_bit} \quad [V]$$

Voltage value to physical value conversion formula

$$y = (vi - iMAX6605MXKV\_xoff) / iMAX6605MXKV\_gain + iMAX6605MXKV\_yoff \quad [℃]$$

$$iMAX6605MXKV\_min \leqq y \leqq iMAX6605MXKV\_max$$

```
ai              A/D conversion value
vi              Sensor output voltage value [V]
iADC_vdd        Sensor supply voltage value [V]
iADC_bit        A/D conversion bit length
y               Temperature value [℃]
#define iMAX6605MXKV_xoff       0.744F        // X offset [V]
#define iMAX6605MXKV_yoff       0.0F          // Y offset [℃]
#define iMAX6605MXKV_gain       0.0119F       // Gain [V/℃]
#define iMAX6605MXKV_max        85.0F         // Temperature Max [℃]
#define iMAX6605MXKV_min        -40.0F        // Temperature Min [℃]
```



Vout(Datasheet) = 0.744V + (0.0119 V/° C × Ta) + ($1.604 \times 10^{-6} \times Ta^2$)

3. File Structure and Definitions

MAX6605MXKV.h

```
#include "user_define.h"

// Components number
#define iMAX6605MXKV        111U                        // Maxim Integrated MAX6605MXKV

// MAX6605MXKV System Parts definitions
#define iMAX6605MXKV_xoff   0.744F                      // X offset [V]
#define iMAX6605MXKV_yoff   0.0F                        // Y offset [℃]
#define iMAX6605MXKV_gain   0.0119F                     // Gain [V/℃]
#define iMAX6605MXKV_max    85.0F                       // Temperature Max [℃]
#define iMAX6605MXKV_min    -40.0F                      // Temperature Min [℃]

extern const tbl_adc_t tbl_MAX6605MXKV;
```

MAX6605MXKV.cpp

```
#include        "MAX6605MXKV.h"
#if     iMAX6605MXKV_ma == iSMA                         // Simple moving average filter
static float32 MAX6605MXKV_sma_buf[iMAX6605MXKV_SMA_num];
static const sma_f32_t MAX6605MXKV_Phy_SMA =
{
        iInitial ,                                      // Initial state
        iMAX6605MXKV_SMA_num ,                         // Simple moving average number & buf size
        0U ,                                            // buffer position
        0.0F ,                                          // sum
        &MAX6605MXKV_sma_buf[0]                         // buffer
};
#elif   iMAX6605MXKV_ma == iEMA                         // Exponential moving average filter
static const ema_f32_t MAX6605MXKV_Phy_EMA =
{
        iInitial ,                                      // Initial state
        0.0F ,                                          // Xn-1
        iMAX6605MXKV_EMA_K                              // Exponential smoothing factor
};
#elif   iMAX6605MXKV_ma == iWMA                         // Weighted moving average filter
static float32 MAX6605MXKV_wma_buf[iMAX6605MXKV_WMA_num];
static const wma_f32_t MAX6605MXKV_Phy_WMA =
{
        iInitial ,                                      // Initial state
        iMAX6605MXKV_WMA_num ,                         // Weighted moving average number & buf size
        0U ,                                            // buffer poition
        iMAX6605MXKV_WMA_num * (iMAX6605MXKV_WMA_num + 1)/2 , // kn sum
        &MAX6605MXKV_wma_buf[0]                         // Xn buffer
};
#else                                                   // Non-moving average filter
#endif

#define iDummy_adr      0xffffffff                      // Dummy address
```

```
const tbl_adc_t tbl_MAX6605MXKV =
{
        iMAX6605MXKV            ,
        iMAX6605MXKV_pin        ,
        iMAX6605MXKV_xoff       ,
        iMAX6605MXKV_yoff       ,
        iMAX6605MXKV_gain       ,
        iMAX6605MXKV_max        ,
        iMAX6605MXKV_min        ,
        iMAX6605MXKV_ma         ,

#if     iMAX6605MXKV_ma == iSMA                         // Simple moving average filter
        &MAX6605MXKV_Phy_SMA    ,
        (ema_f32_t*)iDummy_adr  ,
        (wma_f32_t*)iDummy_adr
#elif   iMAX6605MXKV_ma == iEMA                         // Exponential moving average filter
        (sma_f32_t*)iDummy_adr  ,
        &MAX6605MXKV_Phy_EMA    ,
        (wma_f32_t*)iDummy_adr
#elif   iMAX6605MXKV_ma == iWMA                         // Weighted moving average filter
        (sma_f32_t*)iDummy_adr  ,
        (ema_f32_t*)iDummy_adr  ,
        &MAX6605MXKV_Phy_WMA
#else                                                   // Non-moving average filter
        (sma_f32_t*)iDummy_adr  ,
        (ema_f32_t*)iDummy_adr  ,
        (wma_f32_t*)iDummy_adr
#endif

};
```