

# CURRENT SENSOR

PRODUCT SERIES: STB-CAS/FA

STB-6CAS/FA

STB-15CAS/FA

STB-25CAS/FA

STB-50CAS/FA

STB-6CAS/R/FA

STB-15CAS/R/FA

PRODUCT PART NUMBER: STB-25CAS/R/FA

STB-50CAS/R/FA

STB-6CAS/K/FA

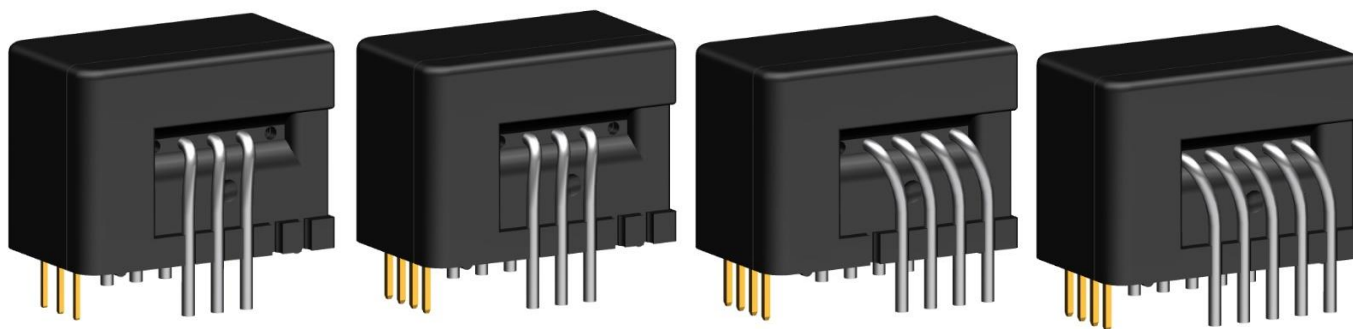
STB-15CAS/K/FA

STB-25CAS/K/FA

STB-50CAS/K/FA

STB-75CAS/K/FA

REVISION: Ver 1.0



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## CONTENT

|     |                                     |    |
|-----|-------------------------------------|----|
| 1.  | Description.....                    | 2  |
| 2.  | STB-6CAS/FA parameters.....         | 3  |
| 3.  | STB-15CAS/FA parameters .....       | 4  |
| 4.  | STB-25CAS/FA parameters .....       | 5  |
| 5.  | STB-50CAS/FA parameters .....       | 6  |
| 6.  | STB-6CAS/R/FA parameters.....       | 7  |
| 7.  | STB-15CAS/R/FA parameters .....     | 8  |
| 8.  | STB-25CAS/R/FA parameters .....     | 9  |
| 9.  | STB-50CAS/R/FA parameters .....     | 10 |
| 10. | STB-6CAS/K/FA parameters.....       | 11 |
| 11. | STB-15CAS/K/FA parameters.....      | 12 |
| 12. | STB-25CAS/K/FA parameters.....      | 13 |
| 13. | STB-50CAS/K/FA parameters.....      | 14 |
| 14. | STB-75CAS/K/FA parameters.....      | 15 |
| 15. | Step response time .....            | 16 |
| 16. | Dimensions: STB-CAS/FA .....        | 17 |
| 17. | Dimensions: STB-CAS/R/FA .....      | 18 |
| 18. | Dimensions: STB-6..50CAS/K/FA ..... | 19 |
| 19. | Dimensions: STB-75CAS/K/FA.....     | 20 |

## 1. Description

For the electronic measurement of current: DC, AC, pulsed..., with galvanic separation between the primary and the secondary circuit.

### Typical application

- Variable frequency converter
- Uninterruptible Power Supplies (UPS)
- Solar inverters.
- Direct-current dynamo
- Switched model power supplies (SMPS)

### General parameters

| Parameter           | Symbol | Unit | Value     |
|---------------------|--------|------|-----------|
| Working temperature | T_A    | °C   | -40 ~ 105 |
| Storage temperature | T_stg  | °C   | -40 ~ 105 |
| Mass                | m      | g    | 10.5      |
|                     |        |      | 10.2      |
|                     |        |      | 10        |

### Absolute maximum parameters

| Parameters               | Symbol    | Unit | Value |
|--------------------------|-----------|------|-------|
| Maximum supply voltage   | Vc max    | V    | 7     |
| Maximum ESD rating (HBM) | U_ESD max | kV   | 4     |

Remark: the unrecoverable damage may occur when the product works on the conditions over the absolute maximum ratings. Long-time working on the absolute maximum ratings may cause the degradation on performance and reliability.

### Isolation parameters

| Parameter                          | Symbol | Unit | Value                 | Remark                                      |
|------------------------------------|--------|------|-----------------------|---|
| RMS voltage for AC test 50Hz/1 min | Ud     | kV   | 4                     |   |
| Impulse withstand voltage 1.2/50µs | Ūw     | kV   | 6                     |   |
| Clearance distance (pri. -sec)     | dCl    | mm   | 7.5                   | Shortest distance through air               |
| Creepage distance (pri. -sec)      | dCp    | mm   | 7.5                   | Shortest path along device body             |
| Electrical clearance               | dCe    | mm   | 6.2                   | When mounted on PCB with recommended layout |
| Case material                      |        |      | V0 according to UL 94 |   |
| Comparative tracking index         | CTI    | V    | 600                   |   |

## 2. STB-6CAS/FA parameters

Condition:  $V_{cc} = 5.0\text{ V}$ ,  $NP = 1$ ,  $R_L = 10\text{ K}\Omega$ ,  $T_A = 25^\circ\text{C}$ , unless specified.

| Parameters  | Symbol              | Unit          | Min.  | Typ.                    | Max.     | Remark  |
|---|---------------------|---------------|-------|-------------------------|----------|---|
| Primary nominal RMS current                               | $I_{pn}$            | A             |       | 6                       |          |   |
| Primary current, measuring range                          | $I_{pm}$            | A             | -20   |                         | 20       |   |
| Number of primary turns                                   | NP                  | -             |       | 1,2,3                   |          |   |
| Supply voltage  | $V_c$               | V             | 4.75  | 5                       | 5.25     |   |
| Current consumption                                       | $I_c$               | mA            |       | 15 +<br>$IP*NP/NS*1000$ |          | NS =1731                                      |
| Output voltage @ $I_p=0A$                                 | $V_{out}$           | V             |       | 2.5                     |          |   |
| Output voltage  | $V_{out}$           | V             | 0.375 |                         | 4.625    |   |
| Electrical offset voltage                                 | $V_{OE}$            | mV            | -10.4 |                         | 10.4     | 100 % tested<br>$V_{out} - 2.5V @ 0\text{ A}$ |
| Temperature coefficient of $V_{out}$ @ $I_P = 0\text{ A}$ | TCV <sub>out</sub>  | ppm/K         |       | $\pm 10$                | $\pm 80$ | ppm/K of 2.5V<br>(-40 °C ... 105 °C)          |
| Theoretical sensitivity                                   | $G_{th}$            | mV/A          |       | 104.2                   |          | 0.625V @ $I_{pn}$                             |
| Sensitivity error   | $\xi_G$             | %             | -0.7  |                         | 0.7      | 100 % tested                                  |
| Temperature coefficient of G                              | TCG                 | ppm/K         |       |                         | $\pm 40$ | -40 °C ... 105 °C                             |
| Linearity error 0 ~ $I_{pn}$                              | $\xi_L$             | % of $I_{pn}$ |       | 0.3                     |          | Tested @25°C                                  |
| Reaction time @ 10 % of $I_{pn}$                          | $t_{ra}$            | $\mu\text{s}$ |       |                         | 0.3      |   |
| Response time @ 90 % of $I_{pn}$                          | $t_r$               | $\mu\text{s}$ |       |                         | 0.3      |   |
| -3 dB band width  | BW                  | kHz           |       | 400                     |          |   |
| Noise   | $V_{noise}$         | mVpp          |       | 5                       |          |   |
| DC ~ 10 kHz   |                     |               |       | 6                       |          |   |
| DC ~ 100 kHz  |                     |               |       |                         |          |   |
| Accuracy @ RT   | X                   | % of $I_{pn}$ |       |                         | 0.8      | @ 25°C  |
| Accuracy @ $T_A = 85^\circ\text{C}$<br>(105 °C)           | X <sub>TRange</sub> | % of $I_{pn}$ |       |                         | 1.4(1.6) | -40°C ~ 105°C                                 |

### 3. STB-15CAS/FA parameters

Condition:  $V_{cc} = 5.0\text{ V}$ ,  $NP = 1$ ,  $R_L = 10\text{ K}\Omega$ ,  $T_A = 25^\circ\text{C}$ , unless specified.

| Parameters  | Symbol              | Unit          | Min.  | Typ.                    | Max.     | Remark  |
|---|---------------------|---------------|-------|-------------------------|----------|---|
| Primary nominal RMS current                             | $I_{pn}$            | A             |       | 15                      |          |   |
| Primary current, measuring range                        | $I_{pm}$            | A             | -51   |                         | 51       |   |
| Number of primary turns                                 | NP                  | -             |       | 1,2,3                   |          |   |
| Supply voltage  | $V_c$               | V             | 4.75  | 5                       | 5.25     |   |
| Current consumption                                     | $I_c$               | mA            |       | 15 +<br>$IP*NP/NS*1000$ |          | NS =1731                                      |
| Output voltage@ $I_p=0A$                                | $V_{out}$           | V             |       | 2.5                     |          |   |
| Output voltage  | $V_{out}$           | V             | 0.375 |                         | 4.625    |   |
| Electrical offset voltage                               | $V_{OE}$            | mV            | -7.1  |                         | 7.1      | 100 % tested<br>$V_{out} - 2.5V @ 0\text{ A}$ |
| Temperature coefficient of $V_{out} @ I_P = 0\text{ A}$ | TCV <sub>out</sub>  | ppm/K         |       | $\pm 7.5$               | $\pm 70$ | ppm/K of 2.5V<br>(-40 °C ... 105 °C)          |
| Theoretical sensitivity                                 | $G_{th}$            | mV/A          |       | 41.67                   |          | 0.625V @ $I_{pn}$                             |
| Sensitivity error                                       | $\xi_G$             | %             | -0.7  |                         | 0.7      | 100 % tested                                  |
| Temperature coefficient of G                            | TCG                 | ppm/K         |       |                         | $\pm 40$ | -40 °C ... 105 °C                             |
| Linearity error 0 ~ $I_{pn}$                            | $\xi_L$             | % of $I_{pn}$ |       | 0.3                     |          | Tested @25°C                                  |
| Reaction time @ 10 % of $I_{pn}$                        | $t_{ra}$            | $\mu\text{s}$ |       |                         | 0.3      |   |
| Response time @ 90 % of $I_{pn}$                        | $t_r$               | $\mu\text{s}$ |       |                         | 0.3      |   |
| -3 dB band width  | BW                  | kHz           |       | 400                     |          |   |
| Noise   | $V_{noise}$         | mVpp          |       |                         |          |   |
| DC ~ 10 kHz   |                     |               |       | 5                       |          |   |
| DC ~ 100 kHz  |                     |               |       | 6                       |          |   |
| Accuracy @ RT   | X                   | % of $I_{pn}$ |       |                         | 0.8      | @ 25°C  |
| Accuracy @ $T_A = 85^\circ\text{C}$<br>(105 °C)         | X <sub>TRange</sub> | % of $I_{pn}$ |       |                         | 1.2(1.3) | -40°C ~ 105°C                                 |

#### 4. STB-25CAS/FA parameters

Condition:  $V_{CC} = 5.0\text{ V}$ ,  $N_P = 1$ ,  $R_L = 10\text{ k}\Omega$ ,  $T_A = 25^\circ\text{C}$ , unless specified.

| Parameters  | Symbol       | Unit          | Min.  | Typ.                 | Max.       | Remark   |
|---|--------------|---------------|-------|----------------------|------------|--|
| Primary nominal RMS current                             | $I_{pn}$     | A             |       | 25                   |            |  |
| Primary current, measuring range                        | $I_{pm}$     | A             | -85   |                      | 85         |  |
| Number of primary turns                                 | $N_P$        | -             |       | 1,2,3                |            |  |
| Supply voltage  | $V_c$        | V             | 4.75  | 5                    | 5.25       |  |
| Current consumption                                     | $I_c$        | mA            |       | $15 + IP*NP/NS*1000$ |            | NS =1731   |
| Output voltage@ $I_p=0A$                                | $V_{out}$    | V             |       | 2.5                  |            |  |
| Output voltage  | $V_{out}$    | V             | 0.375 |                      | 4.625      |  |
| Electrical offset voltage                               | $V_{OE}$     | mV            | -6.25 |                      | 6.25       | 100 % tested<br>$V_{out} - 2.5V @ 0\text{ A}$                    |
| Temperature coefficient of $V_{out} @ I_P = 0\text{ A}$ | $TCV_{out}$  | ppm/K         |       | $\pm 6.5$            | $\pm 60$   | ppm/K of 2.5V<br>( $-40^\circ\text{C} \dots 105^\circ\text{C}$ ) |
| Theoretical sensitivity                                 | $G_{th}$     | mV/A          |       | 25                   |            | 0.625V @ $I_{pn}$  |
| Sensitivity error                                       | $\xi_G$      | %             | -0.7  |                      | 0.7        | 100 % tested   |
| Temperature coefficient of G                            | $TCG$        | ppm/K         |       |                      | $\pm 40$   | $-40^\circ\text{C} \dots 105^\circ\text{C}$                      |
| Linearity error 0 ~ $I_{pn}$                            | $\xi_L$      | % of $I_{pn}$ |       | 0.3                  |            | Tested @25°C   |
| Reaction time @ 10 % of $I_{pn}$                        | $t_{ra}$     | $\mu\text{s}$ |       |                      | 0.3        |  |
| Response time @ 90 % of $I_{pn}$                        | $t_r$        | $\mu\text{s}$ |       |                      | 0.3        |  |
| -3 dB band width  | $BW$         | kHz           |       | 400                  |            |  |
| Noise<br>DC ~ 10 kHz<br>DC ~ 100 kHz                    | $V_{noise}$  | mVpp          |       | 5<br>6               |            |  |
| Accuracy @ RT   | X            | % of $I_{pn}$ |       |                      | 0.8        | @ 25°C   |
| Accuracy @ $T_A = 85^\circ\text{C}$<br>(105 °C)         | $X_{TRange}$ | % of $I_{pn}$ |       |                      | 1.15(1.25) | $-40^\circ\text{C} \sim 105^\circ\text{C}$                       |

## 5. STB-50CAS/FA parameters

Condition:  $V_{cc} = 5.0\text{ V}$ ,  $N_p = 1$ ,  $R_L = 10\text{ k}\Omega$ ,  $T_A = 25^\circ\text{C}$ , unless specified.

| Parameters  | Symbol       | Unit          | Min.  | Typ.                                  | Max.     | Remark   |
|---|--------------|---------------|-------|---------------------------------------|----------|--|
| Primary nominal RMS current                             | $I_{pn}$     | A             |       | 50                                    |          |  |
| Primary current, measuring range                        | $I_{pm}$     | A             | -150  |                                       | 150      |  |
| Number of primary turns                                 | NP           |               |       | 1,2,3                                 |          |  |
| Supply voltage  | $V_c$        | V             | 4.75  | 5                                     | 5.25     |  |
| Current consumption                                     | $I_c$        | mA            |       | 15 +<br>$IP \cdot NP / NS \cdot 1000$ |          | NS =966  |
| Output voltage@ $I_p=0A$                                | $V_{out}$    | V             |       | 2.5                                   |          |  |
| Output voltage  | $V_{out}$    | V             | 0.375 |                                       | 4.625    |  |
| Electrical offset voltage                               | $V_{OE}$     | mV            | -5.8  |                                       | 5.8      | 100 % tested<br>$V_{out} - 2.5V @ 0\text{ A}$                    |
| Temperature coefficient of $V_{out} @ I_P = 0\text{ A}$ | $TCV_{out}$  | ppm/K         |       | $\pm 6$                               | $\pm 60$ | ppm/K of 2.5V<br>( $-40^\circ\text{C} \dots 105^\circ\text{C}$ ) |
| Theoretical sensitivity                                 | $G_{th}$     | mV/A          |       | 12.5                                  |          | 0.625V @ $I_{pn}$  |
| Sensitivity error                                       | $\xi_G$      | %             | -0.7  |                                       | 0.7      | 100 % tested   |
| Temperature coefficient of G                            | TCG          | ppm/K         |       |                                       | $\pm 40$ | $-40^\circ\text{C} \dots 105^\circ\text{C}$                      |
| Linearity error 0 ~ $I_{pn}$                            | $\xi_L$      | % of $I_{pn}$ |       | 0.3                                   |          | Tested @25°C   |
| Reaction time @ 10 % of $I_{pn}$                        | $t_{ra}$     | $\mu\text{s}$ |       |                                       | 0.3      |  |
| Response time @ 90 % of $I_{pn}$                        | $t_r$        | $\mu\text{s}$ |       |                                       | 0.3      |  |
| -3 dB band width  | BW           | kHz           |       | 400                                   |          |  |
| Noise<br>DC ~ 10 kHz                                    | $V_{noise}$  | mVpp          |       | 5                                     |          |  |
| DC ~ 100 kHz  |              |               |       | 6                                     |          |  |
| Accuracy @ RT   | X            | % of $I_{pn}$ |       |                                       | 0.8      | @ 25°C   |
| Accuracy @ $T_A = 85^\circ\text{C}$<br>(105 °C)         | $X_{TRange}$ | % of $I_{pn}$ |       |                                       | 1.1(1.3) | $-40^\circ\text{C} \sim 105^\circ\text{C}$                       |

## 6. STB-6CAS/R/FA parameters

Condition:  $V_{cc} = 5.0\text{ V}$ ,  $N_p = 1$ ,  $R_L = 10\text{ k}\Omega$ ,  $T_A = 25^\circ\text{C}$ , unless specified.

| Parameters  | Symbol              | Unit          | Min.  | Typ.                                  | Max.     | Remark   |
|---|---------------------|---------------|-------|---------------------------------------|----------|--|
| Primary nominal RMS current                             | $I_{pn}$            | A             |       | 6                                     |          |  |
| Primary current, measuring range                        | $I_{pm}$            | A             | -20   |                                       | 20       |  |
| Number of primary turns                                 | NP                  | -             |       | 1,2,3                                 |          |  |
| Supply voltage  | $V_c$               | V             | 4.75  | 5                                     | 5.25     |  |
| Current consumption                                     | $I_c$               | mA            |       | 15 +<br>$IP \cdot NP / NS \cdot 1000$ |          | NS = 1731  |
| Reference voltage @ $I_p = 0\text{ A}$                  | $V_{ref}$           | V             | 2.495 | 2.5                                   | 2.505    |  |
| External reference voltage                              | $V_{ref}$           | V             | 0     |                                       | 4        |  |
| Output voltage @ $I_{pn}$                               | $V_{out}$           | V             |       | $V_{ref} \pm 0.625$                   |          |  |
| Output voltage @ $I_{pm}$                               | $V_{OM}$            | V             |       | $V_{ref} \pm 2.084$                   |          |  |
| Temperature coefficient of $V_{ref}$                    | TCV <sub>ref</sub>  | ppm/K         |       | $\pm 5$                               | $\pm 50$ | Internal reference                               |
| Electrical offset voltage                               | $V_{OE}$            | mV            | -5.3  |                                       | 5.3      | 100 % tested<br>$V_{out} - V_{ref} @ 0\text{ A}$ |
| Temperature coefficient of $V_{out} @ I_P = 0\text{ A}$ | TCV <sub>out</sub>  | ppm/K         |       | $\pm 6$                               | $\pm 14$ | ppm/K of 2.5V<br>(-40 °C ... 105 °C)             |
| Theoretical sensitivity                                 | $G_{th}$            | mV/A          |       | 104.2                                 |          | 0.625V @ $I_{pn}$                                |
| Sensitivity error                                       | $\xi_G$             | %             | -0.7  |                                       | 0.7      | 100 % tested                                     |
| Temperature coefficient of G                            | TCG                 | ppm/K         |       |                                       | $\pm 40$ | -40 °C ... 105 °C                                |
| Linearity error 0 ~ $I_{pn}$                            | $\xi_L$             | % of $I_{pn}$ |       | 0.3                                   |          | Tested @ 25 °C                                   |
| Reaction time @ 10 % of $I_{pn}$                        | $t_{ra}$            | $\mu\text{s}$ |       |                                       | 0.3      |  |
| Response time @ 90 % of $I_{pn}$                        | $t_r$               | $\mu\text{s}$ |       |                                       | 0.3      |  |
| -3 dB band width  | BW                  | kHz           |       | 400                                   |          |  |
| Noise   | $V_{noise}$         | mVpp          |       | 5                                     |          |  |
| DC ~ 10 kHz   |                     |               | 6     |                                       |          |  |
| DC ~ 100 kHz  |                     |               |       |                                       |          |  |
| Accuracy @ RT   | X                   | % of $I_{pn}$ |       |                                       | 0.8      | @ 25 °C  |
| Accuracy @ $T_A = 85\text{ }^\circ\text{C}$<br>(105 °C) | X <sub>TRange</sub> | % of $I_{pn}$ |       |                                       | 1.4(1.6) | -40 °C ~ 105 °C                                  |

## 7. STB-15CAS/R/FA parameters

Condition:  $V_{cc} = 5.0\text{ V}$ ,  $NP = 1$ ,  $R_L = 10\text{ k}\Omega$ ,  $T_A = 25^\circ\text{C}$ , unless specified.

| Parameters   | Symbol              | Unit          | Min.  | Typ.                    | Max.     | Remark  |
|--|---------------------|---------------|-------|-------------------------|----------|---|
| Primary nominal RMS current                            | $I_{pn}$            | A             |       | 15                      |          |   |
| Primary current, measuring range                       | $I_{pm}$            | A             | -51   |                         | 51       |   |
| Number of primary turns                                | NP                  | -             |       | 1,2,3                   |          |   |
| Supply voltage   | $V_c$               | V             | 4.75  | 5                       | 5.25     |   |
| Current consumption                                    | $I_c$               | mA            |       | 15 +<br>$IP*NP/NS*1000$ |          | NS =1731  |
| Reference voltage@ $I_p=0A$                            | $V_{ref}$           | V             | 2.495 | 2.5                     | 2.505    |   |
| External reference voltage                             | $V_{ref}$           | V             | 0     |                         | 4        |   |
| Output voltage @ $I_{pn}$                              | $V_{out}$           | V             |       | $V_{ref} \pm 0.625$     |          |   |
| Output voltage @ $I_{pm}$                              | $V_{OM}$            | V             |       | $V_{ref} \pm 2.125$     |          |   |
| Temperature coefficient of $V_{ref}$                   | TCV <sub>ref</sub>  | ppm/K         |       | $\pm 5$                 | $\pm 50$ | Internal reference                              |
| Electrical offset voltage                              | $V_{OE}$            | mV            | -2.21 |                         | 2.21     | 100 % tested<br>$V_{out} - V_{ref}@ 0\text{ A}$ |
| Temperature coefficient of $V_{out}@ I_P = 0\text{ A}$ | TCV <sub>out</sub>  | ppm/K         |       | $\pm 2.3$               | $\pm 6$  | ppm/K of 2.5V<br>(-40 °C ... 105 °C)            |
| Theoretical sensitivity                                | $G_{th}$            | mV/A          |       | 41.67                   |          | 0.625V @ $I_{pn}$                               |
| Sensitivity error                                      | $\xi_G$             | %             | -0.7  |                         | 0.7      | 100 % tested                                    |
| Temperature coefficient of G                           | TCG                 | ppm/K         |       |                         | $\pm 40$ | -40 °C ... 105 °C                               |
| Linearity error 0 ~ $I_{pn}$                           | $\xi_L$             | % of $I_{pn}$ |       | 0.3                     |          | Tested @25°C                                    |
| Reaction time @ 10 % of $I_{pn}$                       | $t_{ra}$            | $\mu\text{s}$ |       |                         | 0.3      |   |
| Response time @ 90 % of $I_{pn}$                       | $t_r$               | $\mu\text{s}$ |       |                         | 0.3      |   |
| -3 dB band width                                       | BW                  | kHz           |       | 400                     |          |   |
| Noise  | $V_{noise}$         | mVpp          |       |                         | 5        |   |
| DC ~ 10 kHz  |                     |               |       |                         | 6        |   |
| DC ~ 100 kHz   |                     |               |       |                         |          |   |
| Accuracy @ RT  | X                   | % of $I_{pn}$ |       |                         | 0.8      | @ 25°C  |
| Accuracy @ $T_A = 85^\circ\text{C}$<br>(105 °C)        | X <sub>TRange</sub> | % of $I_{pn}$ |       |                         | 1.2(1.3) | -40°C ~ 105°C                                   |

## 8. STB-25CAS/R/FA parameters

Condition:  $V_{cc} = 5.0\text{ V}$ ,  $N_p = 1$ ,  $R_L = 10\text{ k}\Omega$ ,  $T_A = 25^\circ\text{C}$ , unless specified.

| Parameters  | Symbol              | Unit          | Min.  | Typ.                                  | Max.       | Remark   |
|---|---------------------|---------------|-------|---------------------------------------|------------|--|
| Primary nominal RMS current                             | $I_{pn}$            | A             |       | 25                                    |            |  |
| Primary current, measuring range                        | $I_{pm}$            | A             | -85   |                                       | 85         |  |
| Number of primary turns                                 | NP                  | -             |       | 1,2,3                                 |            |  |
| Supply voltage  | $V_c$               | V             | 4.75  | 5                                     | 5.25       |  |
| Current consumption                                     | $I_c$               | mA            |       | 15 +<br>$IP \cdot NP / NS \cdot 1000$ |            | NS =1731   |
| Reference voltage@ $I_p=0A$                             | $V_{ref}$           | V             | 2.495 | 2.5                                   | 2.505      |  |
| External reference voltage                              | $V_{ref}$           | V             | 0     |                                       | 4          |  |
| Output voltage @ $I_{pn}$                               | $V_{out}$           | V             |       | $V_{ref} \pm 0.625$                   |            |  |
| Output voltage @ $I_{pm}$                               | $V_{OM}$            | V             |       | $V_{ref} \pm 2.125$                   |            |  |
| Temperature coefficient of $V_{ref}$                    | TCV <sub>ref</sub>  | ppm/K         |       | $\pm 5$                               | $\pm 50$   | Internal reference                               |
| Electrical offset voltage                               | $V_{OE}$            | mV            | -1.35 |                                       | 1.35       | 100 % tested<br>$V_{out} - V_{ref} @ 0\text{ A}$ |
| Temperature coefficient of $V_{out} @ I_P = 0\text{ A}$ | TCV <sub>out</sub>  | ppm/K         |       | $\pm 1.4$                             | $\pm 4$    | ppm/K of 2.5V<br>(-40 °C ... 105 °C)             |
| Theoretical sensitivity                                 | $G_{th}$            | mV/A          |       | 25                                    |            | 0.625V @ $I_{pn}$                                |
| Sensitivity error                                       | $\xi_G$             | %             | -0.7  |                                       | 0.7        | 100 % tested                                     |
| Temperature coefficient of G                            | TCG                 | ppm/K         |       |                                       | $\pm 40$   | -40 °C ... 105 °C                                |
| Linearity error 0 ~ $I_{pn}$                            | $\xi_L$             | % of $I_{pn}$ |       | 0.3                                   |            | Tested @25°C                                     |
| Reaction time @ 10 % of $I_{pn}$                        | $t_{ra}$            | $\mu\text{s}$ |       |                                       | 0.3        |  |
| Response time @ 90 % of $I_{pn}$                        | $t_r$               | $\mu\text{s}$ |       |                                       | 0.3        |  |
| -3 dB band width  | BW                  | kHz           |       | 400                                   |            |  |
| Noise   | $V_{noise}$         | mVpp          |       | 5                                     |            |  |
| DC ~ 10 kHz   |                     |               | 6     |                                       |            |  |
| DC ~ 100 kHz  |                     |               |       |                                       |            |  |
| Accuracy @ RT   | X                   | % of $I_{pn}$ |       |                                       | 0.8        | @ 25°C   |
| Accuracy @ $T_A = 85^\circ\text{C}$<br>(105 °C)         | X <sub>TRange</sub> | % of $I_{pn}$ |       |                                       | 1.15(1.25) | -40 °C ~ 105 °C                                  |

## 9. STB-50CAS/R/FA parameters

Condition:  $V_{cc} = 5.0\text{ V}$ ,  $N_p = 1$ ,  $R_L = 10\text{ k}\Omega$ ,  $T_A = 25^\circ\text{C}$ , unless specified.

| Parameters  | Symbol             | Unit          | Min.   | Typ.                    | Max.     | Remark   |
|---|--------------------|---------------|--------|-------------------------|----------|--|
| Primary nominal RMS current                             | $I_{pn}$           | A             |        | 50                      |          |  |
| Primary current, measuring range                        | $I_{pm}$           | A             | -150   |                         | 150      |  |
| Number of primary turns                                 | NP                 | -             |        | 1,2,3                   |          |  |
| Supply voltage  | $V_c$              | V             | 4.75   | 5                       | 5.25     |  |
| Current consumption                                     | $I_c$              | mA            |        | 15 +<br>$IP*NP/NS*1000$ |          | NS =966  |
| Reference voltage@ $I_p=0A$                             | $V_{ref}$          | V             | 2.495  | 2.5                     | 2.505    |  |
| External reference voltage                              | $V_{ref}$          | V             | 0      |                         | 4        |  |
| Output voltage @ $I_{pn}$                               | $V_{out}$          | V             |        | $V_{ref} \pm 0.625$     |          |  |
| Output voltage @ $I_{pm}$                               | $V_{OM}$           | V             |        | $V_{ref} \pm 1.875$     |          |  |
| Temperature coefficient of $V_{ref}$                    | TCV <sub>ref</sub> | ppm/K         |        | $\pm 5$                 | $\pm 50$ | Internal reference                               |
| Electrical offset voltage                               | $V_{OE}$           | mV            | -0.725 |                         | 0.725    | 100 % tested<br>$V_{out} - V_{ref} @ 0\text{ A}$ |
| Temperature coefficient of $V_{out} @ I_P = 0\text{ A}$ | TCV <sub>out</sub> | ppm/K         |        | $\pm 0.7$               | $\pm 3$  | ppm/K of 2.5V<br>(-40 °C ... 105 °C)             |
| Theoretical sensitivity                                 | $G_{th}$           | mV/A          |        | 12.5                    |          | 0.625V @ $I_{pn}$                                |
| Sensitivity error                                       | $\xi_G$            | %             | -0.7   |                         | 0.7      | 100 % tested                                     |
| Temperature coefficient of G                            | TCG                | ppm/K         |        |                         | $\pm 40$ | -40 °C ... 105 °C                                |
| Linearity error 0 ~ $I_{pn}$                            | $\xi_L$            | % of $I_{pn}$ |        | 0.3                     |          | Tested @25°C                                     |
| Reaction time @ 10 % of $I_{pn}$                        | $t_{ra}$           | $\mu\text{s}$ |        |                         | 0.3      |  |
| Response time @ 90 % of $I_{pn}$                        | $t_r$              | $\mu\text{s}$ |        |                         | 0.3      |  |
| -3 dB band width  | BW                 | kHz           |        | 400                     |          |  |
| Noise   | $V_{noise}$        | mVpp          |        | 5                       |          |  |
| DC ~ 10 kHz   |                    |               |        | 6                       |          |  |
| DC ~ 100 kHz  |                    |               |        |                         |          |  |
| Accuracy @ RT   | X                  | % of $I_{pn}$ |        |                         | 0.8      | @ 25°C   |
| Accuracy @ $T_A = 85^\circ\text{C}$<br>(105 °C)         | $X_{TRange}$       | % of $I_{pn}$ |        |                         | 1.1(1.3) | -40°C ~ 105°C                                    |

## 10. STB-6CAS/K/FA parameters

Condition:  $V_{cc} = 5.0\text{ V}$ ,  $NP = 1$ ,  $R_L = 10\text{ k}\Omega$ ,  $T_A = 25^\circ\text{C}$ , unless specified.

| Parameters  | Symbol              | Unit          | Min.  | Typ.                    | Max.     | Remark  |
|---|---------------------|---------------|-------|-------------------------|----------|---|
| Primary nominal RMS current                           | $I_{pn}$            | A             |       | 6                       |          |   |
| Primary current, measuring range                      | $I_{pm}$            | A             | -20   |                         | 20       |   |
| Number of primary turns                               | NP                  | -             |       | 1,2,4                   |          |   |
| Supply voltage  | $V_c$               | V             | 4.75  | 5                       | 5.25     |   |
| Current consumption                                   | $I_c$               | mA            |       | 15 +<br>$IP*NP/NS*1000$ |          | NS =1731  |
| Reference voltage@ $I_p=0A$                           | $V_{ref}$           | V             | 2.495 | 2.5                     | 2.505    |   |
| External reference voltage                            | $V_{ref}$           | V             | 0     |                         | 4        |   |
| Output voltage @ $I_{pn}$                             | $V_{out}$           | V             |       | $V_{ref} \pm 0.625$     |          |   |
| Output voltage @ $I_{pm}$                             | $V_{OM}$            | V             |       | $V_{ref} \pm 2.084$     |          |   |
| Temperature coefficient of $V_{ref}$                  | TCV <sub>ref</sub>  | ppm/K         |       | $\pm 5$                 | $\pm 50$ | Internal reference                              |
| Electrical offset voltage                             | $V_{OE}$            | mV            | -5.3  |                         | 5.3      | 100 % tested<br>$V_{out} - V_{ref}@ 0\text{ A}$ |
| Temperature coefficient of $V_{out}@I_P = 0\text{ A}$ | TCV <sub>out</sub>  | ppm/K         |       | $\pm 6$                 | $\pm 14$ | ppm/K of 2.5V<br>(-40 °C ...105 °C)             |
| Theoretical sensitivity                               | $G_{th}$            | mV/A          |       | 104.2                   |          | 0.625V @ $I_{pn}$                               |
| Sensitivity error                                     | $\xi_G$             | %             | -0.7  |                         | 0.7      | 100 % tested                                    |
| Temperature coefficient of G                          | TCG                 | ppm/K         |       |                         | $\pm 40$ | -40 °C ... 105 °C                               |
| Linearity error 0 ~ $I_{pn}$                          | $\xi_L$             | % of $I_{pn}$ |       | 0.3                     |          | Tested @25°C                                    |
| Reaction time @ 10 % of $I_{pn}$                      | $t_{ra}$            | $\mu\text{s}$ |       |                         | 0.3      |   |
| Response time @ 90 % of $I_{pn}$                      | $t_r$               | $\mu\text{s}$ |       |                         | 0.3      |   |
| -3 dB band width                                      | BW                  | kHz           |       | 400                     |          |   |
| Noise   | $V_{noise}$         | mVpp          |       |                         | 5        |   |
| DC ~ 10 kHz   |                     |               |       |                         | 6        |   |
| DC ~ 100 kHz  |                     |               |       |                         |          |   |
| Accuracy @ RT   | X                   | % of $I_{pn}$ |       |                         | 0.8      | @ 25°C  |
| Accuracy @ $T_A = 85^\circ\text{C}$<br>(105 °C)       | X <sub>TRange</sub> | % of $I_{pn}$ |       |                         | 1.4(1.6) | -40°C ~ 105°C                                   |

## 11. STB-15CAS/K/FA parameters

Condition:  $V_{cc} = 5.0\text{ V}$ ,  $NP = 1$ ,  $R_L = 10\text{ k}\Omega$ ,  $T_A = 25^\circ\text{C}$ , unless specified.

| Parameters  | Symbol              | Unit          | Min.  | Typ.                    | Max.     | Remark  |
|---|---------------------|---------------|-------|-------------------------|----------|---|
| Primary nominal RMS current                           | $I_{pn}$            | A             |       | 15                      |          |   |
| Primary current, measuring range                      | $I_{pm}$            | A             | -51   |                         | 51       |   |
| Number of primary turns                               | NP                  | -             |       | 1,2,4                   |          |   |
| Supply voltage  | $V_c$               | V             | 4.75  | 5                       | 5.25     |   |
| Current consumption                                   | $I_c$               | mA            |       | 15 +<br>$IP*NP/NS*1000$ |          | NS =1731  |
| Reference voltage@ $I_p=0A$                           | $V_{ref}$           | V             | 2.495 | 2.5                     | 2.505    |   |
| External reference voltage                            | $V_{ref}$           | V             | 0     |                         | 4        |   |
| Output voltage @ $I_{pn}$                             | $V_{out}$           | V             |       | $V_{ref} \pm 0.625$     |          |   |
| Output voltage @ $I_{pm}$                             | $V_{OM}$            | V             |       | $V_{ref} \pm 2.125$     |          |   |
| Temperature coefficient of $V_{ref}$                  | TCV <sub>ref</sub>  | ppm/K         |       | $\pm 5$                 | $\pm 50$ | Internal reference                              |
| Electrical offset voltage                             | $V_{OE}$            | mV            | -2.21 |                         | 2.21     | 100 % tested<br>$V_{out} - V_{ref}@ 0\text{ A}$ |
| Temperature coefficient of $V_{out}@I_P = 0\text{ A}$ | TCV <sub>out</sub>  | ppm/K         |       | $\pm 2.3$               | $\pm 6$  | ppm/K of 2.5V<br>(-40 °C ...105 °C)             |
| Theoretical sensitivity                               | $G_{th}$            | mV/A          |       | 41.67                   |          | 0.625V @ $I_{pn}$                               |
| Sensitivity error                                     | $\xi_G$             | %             | -0.7  |                         | 0.7      | 100 % tested                                    |
| Temperature coefficient of G                          | TCG                 | ppm/K         |       |                         | $\pm 40$ | -40 °C ... 105 °C                               |
| Linearity error 0 ~ $I_{pn}$                          | $\xi_L$             | % of $I_{pn}$ |       | 0.3                     |          | Tested @25°C                                    |
| Reaction time @ 10 % of $I_{pn}$                      | $t_{ra}$            | $\mu\text{s}$ |       |                         | 0.3      |   |
| Response time @ 90 % of $I_{pn}$                      | $t_r$               | $\mu\text{s}$ |       |                         | 0.3      |   |
| -3 dB band width                                      | BW                  | kHz           |       | 400                     |          |   |
| Noise   | $V_{noise}$         | mVpp          |       |                         |          |   |
| DC ~ 10 kHz   |                     |               |       | 5                       |          |   |
| DC ~ 100 kHz  |                     |               |       | 6                       |          |   |
| Accuracy @ RT   | X                   | % of $I_{pn}$ |       |                         | 0.8      | @ 25°C  |
| Accuracy @ $T_A = 85^\circ\text{C}$<br>(105 °C)       | X <sub>TRange</sub> | % of $I_{pn}$ |       |                         | 1.2(1.3) | -40°C ~ 105°C                                   |

## 12. STB-25CAS/K/FA parameters

Condition:  $V_{cc} = 5.0\text{ V}$ ,  $NP = 1$ ,  $R_L = 10\text{ k}\Omega$ ,  $T_A = 25^\circ\text{C}$ , unless specified.

| Parameters  | Symbol              | Unit          | Min.  | Typ.                    | Max.       | Remark   |
|---|---------------------|---------------|-------|-------------------------|------------|--|
| Primary nominal RMS current                             | $I_{pn}$            | A             |       | 25                      |            |  |
| Primary current, measuring range                        | $I_{pm}$            | A             | -85   |                         | 85         |  |
| Number of primary turns                                 | NP                  | -             |       | 1,2,4                   |            |  |
| Supply voltage  | $V_c$               | V             | 4.75  | 5                       | 5.25       |  |
| Current consumption                                     | $I_c$               | mA            |       | 15 +<br>$IP*NP/NS*1000$ |            | NS =1731   |
| Reference voltage@ $I_p=0A$                             | $V_{ref}$           | V             | 2.495 | 2.5                     | 2.505      |  |
| External reference voltage                              | $V_{ref}$           | V             | 0     |                         | 4          |  |
| Output voltage @ $I_{pn}$                               | $V_{out}$           | V             |       | $V_{ref} \pm 0.625$     |            |  |
| Output voltage @ $I_{pm}$                               | $V_{OM}$            | V             |       | $V_{ref} \pm 2.125$     |            |  |
| Temperature coefficient of $V_{ref}$                    | TCV <sub>ref</sub>  | ppm/K         |       | $\pm 5$                 | $\pm 50$   | Internal reference                               |
| Electrical offset voltage                               | $V_{OE}$            | mV            | -1.35 |                         | 1.35       | 100 % tested<br>$V_{out} - V_{ref} @ 0\text{ A}$ |
| Temperature coefficient of $V_{out} @ I_P = 0\text{ A}$ | TCV <sub>out</sub>  | ppm/K         |       | $\pm 1.4$               | $\pm 4$    | ppm/K of 2.5V<br>(-40 °C ... 105 °C)             |
| Theoretical sensitivity                                 | $G_{th}$            | mV/A          |       | 25                      |            | 0.625V @ $I_{pn}$                                |
| Sensitivity error                                       | $\xi_G$             | %             | -0.7  |                         | 0.7        | 100 % tested                                     |
| Temperature coefficient of G                            | TCG                 | ppm/K         |       |                         | $\pm 40$   | -40 °C ... 105 °C                                |
| Linearity error 0 ~ $I_{pn}$                            | $\xi_L$             | % of $I_{pn}$ |       | 0.3                     |            | Tested @25°C                                     |
| Reaction time @ 10 % of $I_{pn}$                        | $t_{ra}$            | $\mu\text{s}$ |       |                         | 0.3        |  |
| Response time @ 90 % of $I_{pn}$                        | $t_r$               | $\mu\text{s}$ |       |                         | 0.3        |  |
| -3 dB band width  | BW                  | kHz           |       | 400                     |            |  |
| Noise   | $V_{noise}$         | mVpp          |       | 5                       |            |  |
| DC ~ 10 kHz   |                     |               | 6     |                         |            |  |
| DC ~ 100 kHz  |                     |               |       |                         |            |  |
| Accuracy @ RT   | X                   | % of $I_{pn}$ |       |                         | 0.8        | @ 25°C   |
| Accuracy @ $T_A = 85^\circ\text{C}$<br>(105 °C)         | X <sub>TRange</sub> | % of $I_{pn}$ |       |                         | 1.15(1.25) | -40 °C ~ 105°C                                   |

### 13. STB-50CAS/K/FA parameters

Condition:  $V_{cc} = 5.0\text{ V}$ ,  $NP = 1$ ,  $R_L = 10\text{ k}\Omega$ ,  $T_A = 25^\circ\text{C}$ , unless specified.

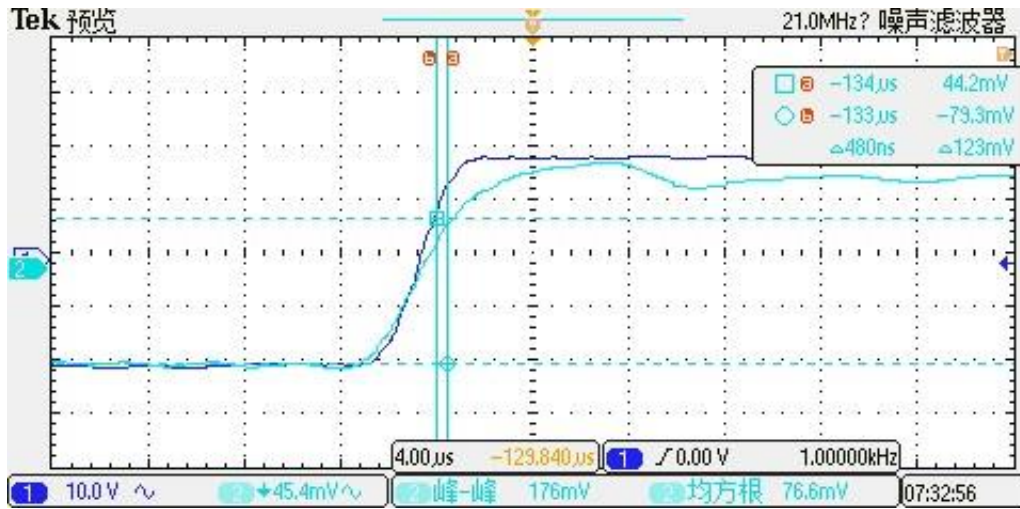
| Parameters  | Symbol              | Unit          | Min.   | Typ.                    | Max.     | Remark  |
|---|---------------------|---------------|--------|-------------------------|----------|---|
| Primary nominal RMS current                           | $I_{pn}$            | A             |        | 50                      |          |   |
| Primary current, measuring range                      | $I_{pm}$            | A             | -150   |                         | 150      |   |
| Number of primary turns                               | NP                  | -             |        | 1,2,4                   |          |   |
| Supply voltage  | $V_c$               | V             | 4.75   | 5                       | 5.25     |   |
| Current consumption                                   | $I_c$               | mA            |        | 15 +<br>$IP*NP/NS*1000$ |          | NS =966   |
| Reference voltage@ $I_p=0A$                           | $V_{ref}$           | V             | 2.495  | 2.5                     | 2.505    |   |
| External reference voltage                            | $V_{ref}$           | V             | 0      |                         | 4        |   |
| Output voltage @ $I_{pn}$                             | $V_{out}$           | V             |        | $V_{ref} \pm 0.625$     |          |   |
| Output voltage @ $I_{pm}$                             | $V_{OM}$            | V             |        | $V_{ref} \pm 1.875$     |          |   |
| Temperature coefficient of $V_{ref}$                  | TCV <sub>ref</sub>  | ppm/K         |        | $\pm 5$                 | $\pm 50$ | Internal reference                              |
| Electrical offset voltage                             | $V_{OE}$            | mV            | -0.725 |                         | 0.725    | 100 % tested<br>$V_{out} - V_{ref}@ 0\text{ A}$ |
| Temperature coefficient of $V_{out}@I_P = 0\text{ A}$ | TCV <sub>out</sub>  | ppm/K         |        | $\pm 0.7$               | $\pm 3$  | ppm/K of 2.5V<br>(-40 °C ... 105 °C)            |
| Theoretical sensitivity                               | $G_{th}$            | mV/A          |        | 12.5                    |          | 0.625V @ $I_{pn}$                               |
| Sensitivity error                                     | $\xi_G$             | %             | -0.7   |                         | 0.7      | 100 % tested                                    |
| Temperature coefficient of G                          | TCG                 | ppm/K         |        |                         | $\pm 40$ | -40 °C ... 105 °C                               |
| Linearity error 0 ~ $I_{pn}$                          | $\xi_L$             | % of $I_{pn}$ |        | 0.3                     |          | Tested @25°C                                    |
| Reaction time @ 10 % of $I_{pn}$                      | $t_{ra}$            | $\mu\text{s}$ |        |                         | 0.3      |   |
| Response time @ 90 % of $I_{pn}$                      | $t_r$               | $\mu\text{s}$ |        |                         | 0.3      |   |
| -3 dB band width                                      | BW                  | kHz           |        | 400                     |          |   |
| Noise   | $V_{noise}$         | mVpp          |        | 5                       |          |   |
| DC ~ 10 kHz   |                     |               | 6      |                         |          |   |
| DC ~ 100 kHz  |                     |               |        |                         |          |   |
| Accuracy @ RT   | X                   | % of $I_{pn}$ |        |                         | 0.8      | @ 25°C  |
| Accuracy @ $T_A = 85^\circ\text{C}$<br>(105 °C)       | X <sub>TRange</sub> | % of $I_{pn}$ |        |                         | 1.1(1.3) | -40°C ~ 105°C                                   |

## 14. STB-75CAS/K/FA parameters

Condition:  $V_{CC} = 5.0\text{ V}$ ,  $N_P = 1$ ,  $R_L = 10\text{ k}\Omega$ ,  $T_A = 25^\circ\text{C}$ , unless specified.

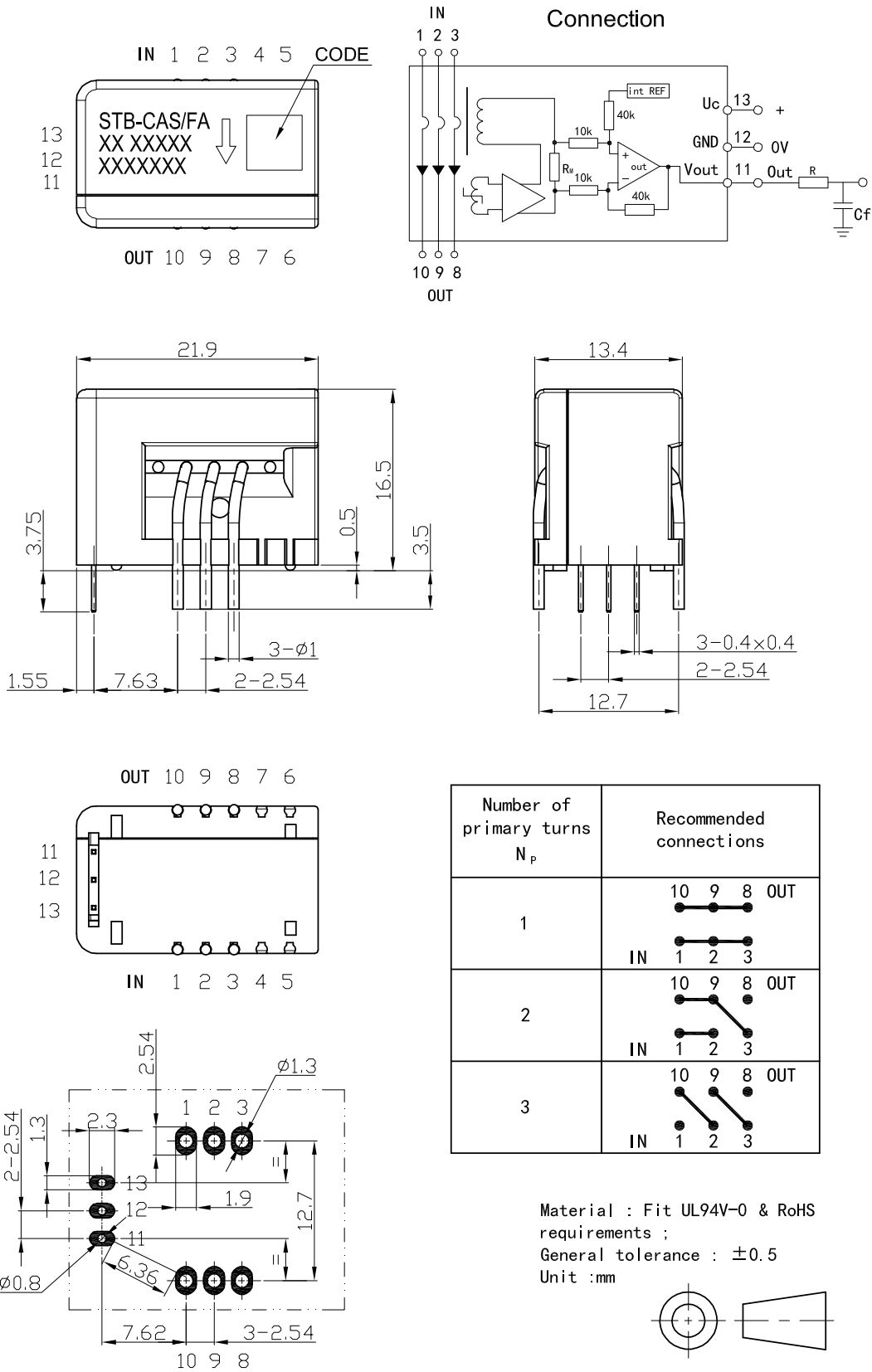
| Parameters   | Symbol       | Unit          | Min.  | Typ.  | Max.     | Remark  |
|--|--------------|---------------|-------|---|----------|---|
| Primary nominal RMS current                                    | $I_{pn}$     | A             |       | 75  |          |   |
| Primary current, measuring range                               | $I_{pm}$     | A             | -220  |   | 220      | With $V_c = 5\text{V}$ , $T_A = 25^\circ\text{C}$ , $R_L = 10\text{ k}\Omega$ .     |
| Primary current, measuring range                               | $I_{pm}$     | A             | -180  |   | 180      | With $V_c = 4.75\text{ V}$ , $T_A = 85^\circ\text{C}$ , $R_L = 10\text{ k}\Omega$ . |
| Number of primary turns  | $N_P$        | -             |       | 1,4,5                                       |          |   |
| Supply voltage   | $V_c$        | V             | 4.75  | 5   | 5.25     |   |
| Current consumption  | $I_c$        | mA            |       | $15 + \frac{I_P \cdot N_P}{N_S} \cdot 1000$ |          | $N_S = 966$   |
| Reference voltage@ $I_p=0\text{A}$                             | $V_{ref}$    | V             | 2.495 | 2.5   | 2.505    |   |
| External reference voltage                                     | $V_{ref}$    | V             | 0     |   | 4        |   |
| Output voltage @ $I_{pn}$                                      | $V_{out}$    | V             |       | $V_{ref} \pm 0.46875$                       |          |   |
| Output voltage @ $I_{pm}$                                      | $V_{OM}$     | V             |       | $V_{ref} \pm 1.375$                         |          | With $V_c = 5\text{V}$ , $T_A = 25^\circ\text{C}$ , $R_L = 10\text{ k}\Omega$ .     |
| Temperature coefficient of $V_{ref}$                           | $TCV_{ref}$  | ppm/K         |       | $\pm 5$                                     | $\pm 50$ | Internal reference  |
| Electrical offset voltage                                      | $V_{OE}$     | mV            | -0.5  |   | 0.5      | 100 % tested<br>$V_{out} - V_{ref} @ 0\text{ A}$                                    |
| Temperature coefficient of $V_{out} @ I_P = 0\text{ A}$        | $TCV_{out}$  | ppm/K         |       | $\pm 0.7$                                   | $\pm 3$  | ppm/K of 2.5V<br>( $-40^\circ\text{C} \dots 105^\circ\text{C}$ )                    |
| Theoretical sensitivity  | $G_{th}$     | mV/A          |       | 6.25  |          | <b>0.46875V @ <math>I_{pn}</math></b>   |
| Sensitivity error  | $\xi_G$      | %             | -0.7  |   | 0.7      | 100 % tested  |
| Temperature coefficient of G                                   | $TCG$        | ppm/K         |       |   | $\pm 40$ | $-40^\circ\text{C} \dots 105^\circ\text{C}$   |
| Linearity error 0 ~ $I_{pn}$                                   | $\xi_L$      | % of $I_{pn}$ |       | 0.3   |          | Tested @ $25^\circ\text{C}$   |
| Reaction time @ 10 % of $I_{pn}$                               | $t_{ra}$     | $\mu\text{s}$ |       |   | 0.3      |   |
| Response time @ 90 % of $I_{pn}$                               | $t_r$        | $\mu\text{s}$ |       |   | 0.3      |   |
| -3 dB band width   | $BW$         | kHz           |       | 400   |          |   |
| Noise  | $V_{noise}$  | mVpp          |       | 5   |          |   |
| DC ~ 10 kHz  |              |               |       | 6   |          |   |
| DC ~ 100 kHz   |              |               |       |   |          |   |
| Accuracy @ RT  | $X$          | % of $I_{pn}$ |       |   | 0.8      | @ $25^\circ\text{C}$  |
| Accuracy @ $T_A = 85^\circ\text{C}$<br>( $105^\circ\text{C}$ ) | $X_{TRange}$ | % of $I_{pn}$ |       |   | 1.1(1.3) | $-40^\circ\text{C} \sim 105^\circ\text{C}$  |

## 15. Step response time

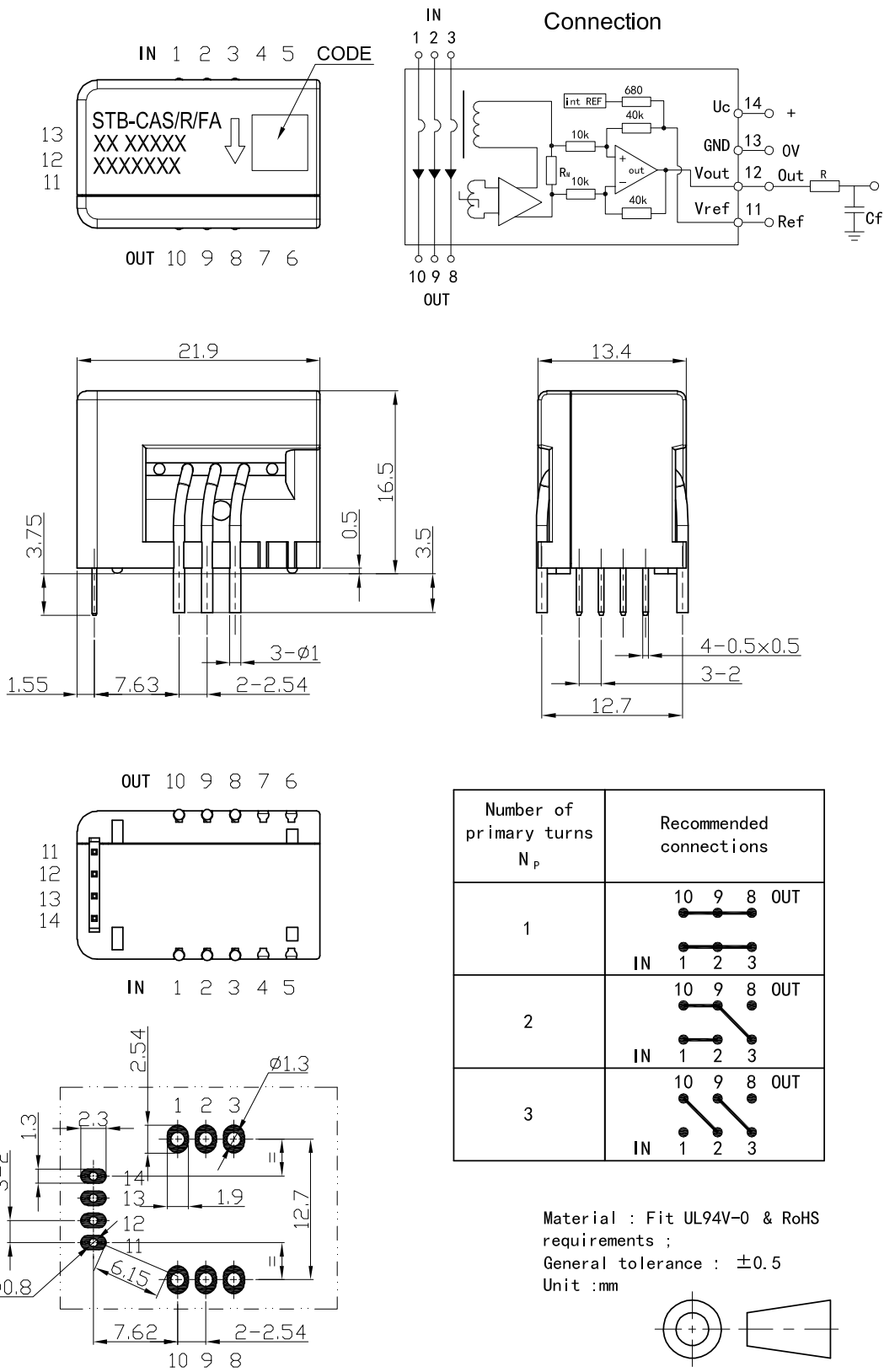


The step response time of STB-xxCAS/FA current sensors. The blue is primary current, while the green is output signal of current sensor. The step response time is less than 0.3 μs.

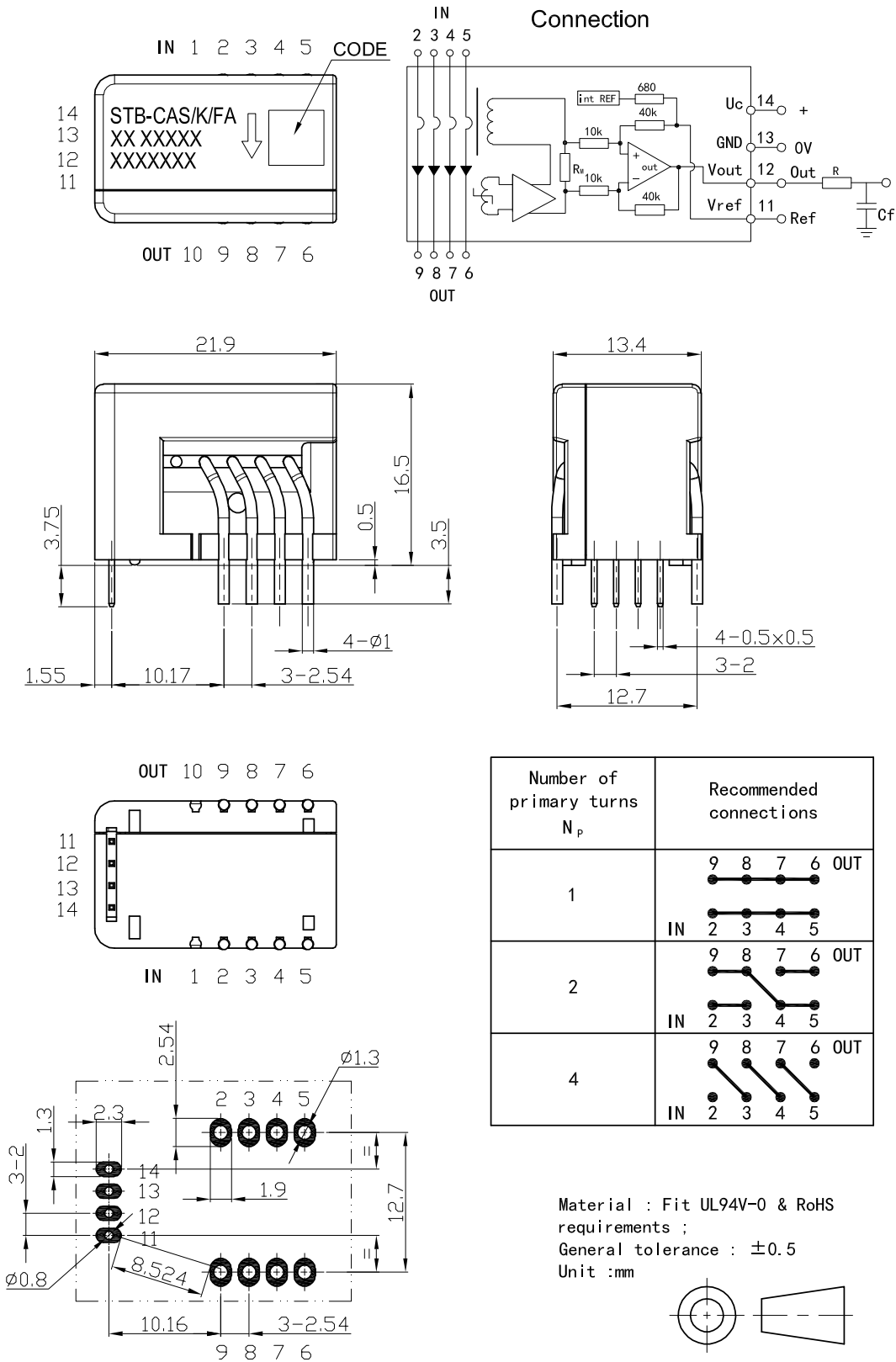
### 16. Dimensions: STB-CAS/FA



### 17. Dimensions: STB-CAS/R/FA



### 18. Dimensions: STB-6..50CAS/K/FA



### 19. Dimensions: STB-75CAS/K/FA

