

# CURRENT SENSE TRANSFORMER ACST-XXXX

## FEATURES:

- Conform to Class B insulation System
- Dielectric Strength 3000vrms
- Split Bobbin Design
- Small Physical Package For Tight Configurations
- UL approved Class B Insulation System
- Cost Effective

## OPTIONS:

- Bulk packaging is standard
- Custom design available

## COMMON APPLICATIONS:

- Protection current transformer
- Testing protection system
- Electronical monitoring system

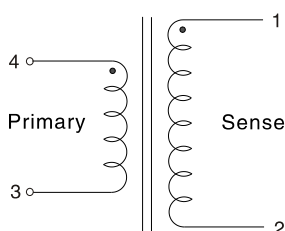
## ELECTRICAL CHARACTERISTICS

| Part No   | Turns Ratio | Current Range | Typical Output (mv/A) | Primary Resistance ( $\mu$ Ohms)max | Sense Resistance (Ohms) $\pm 10\%$ | Sense Inductance (H) $\pm 30\%$ | Primary Sense Frequency (Hz) |
|-----------|-------------|---------------|-----------------------|-------------------------------------|------------------------------------|---------------------------------|------------------------------|
| ACST-1901 | 1/50        | 1-30A         | 32                    | 800                                 | 0.198                              | 0.008                           | 50-200                       |
| ACST-1902 | 1/100       | 1-30A         | 64                    | 800                                 | 0.785                              | 0.025                           | 50-200                       |
| ACST-1903 | 1/150       | 1-30A         | 90                    | 800                                 | 1.7                                | 0.06                            | 50-200                       |
| ACST-1904 | 1/200       | 1-30A         | 120                   | 800                                 | 3.2                                | 0.12                            | 50-200                       |
| ACST-1905 | 1/300       | 1-30A         | 140                   | 800                                 | 7.4                                | 0.27                            | 50-200                       |
| ACST-1906 | 1/500       | 1-30A         | 110                   | 800                                 | 20                                 | 0.73                            | 50-200                       |
| ACST-1907 | 1/1000      | 1-30A         | 60                    | 800                                 | 79                                 | 2.4                             | 50-200                       |
| ACST-1908 | 1/1500      | 1-30A         | 45                    | 800                                 | 220                                | 5.2                             | 50-200                       |

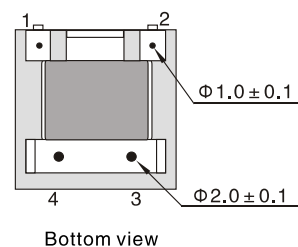
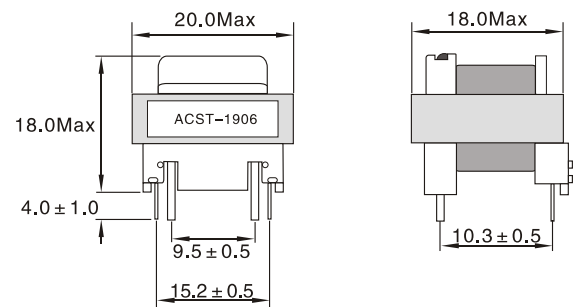
## TECHNICAL INFORMATION

- Terminal Leads (1A,2A)Strip Enamel Coating
- Typical Output Test Condition: Input 10A/50Hz,60Ohm Load
- Sense inductance Test Condition:100Hz/1V
- Creepage Distance Between Primary And Sense is More Than 5mm,But The Creepage Distance Can Be Changed To 8mm For Special Requirement
- Operating temperature: Primary Current 0.4 to 30A  $-40^{\circ}\text{C}$  to  $70^{\circ}\text{C}$ , Primary Current Range 0.4 to 20A  $-40^{\circ}\text{C}$  to  $85^{\circ}\text{C}$
- Storage temperature: $-40^{\circ}\text{C}$  to  $85^{\circ}\text{C}$

## POLARITY INDICATION

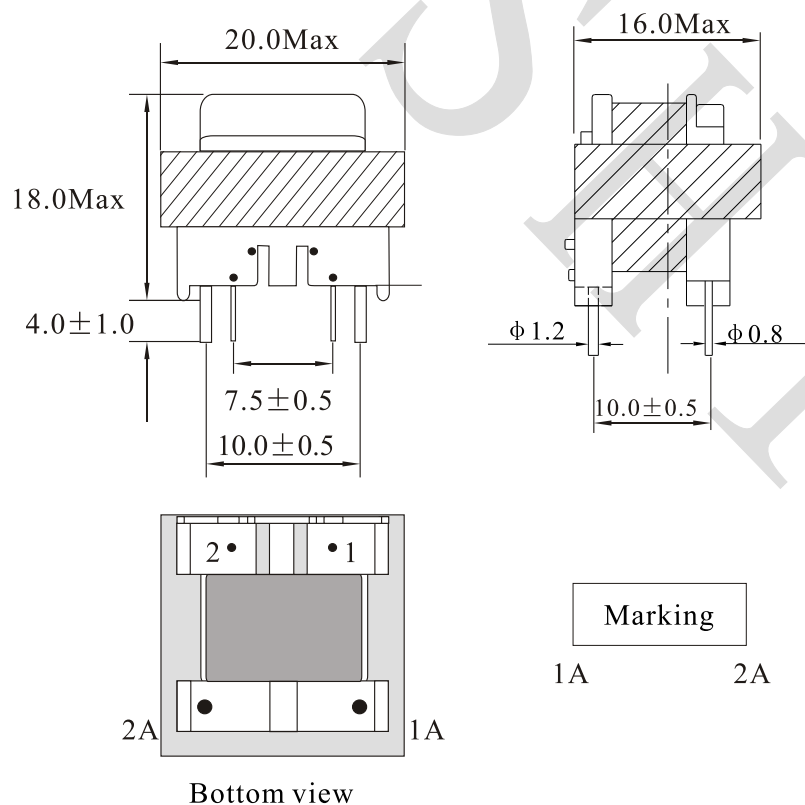


## MECHANICAL DIMENSIONS

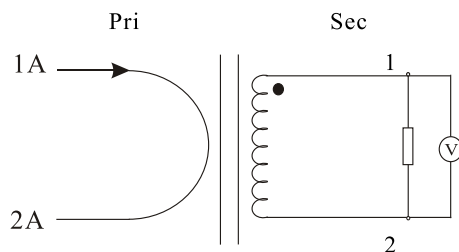


Note: All dimensions in mm  
Unless otherwise specified all tolerances are  $\pm 0.3\text{mm}$ .

### 1. PHYSICAL CHARACTERISTICS (mm)



### 2. ELECTRONICAL SCHEMATIC



#### NOTES:

Temp 20°C 48%RH  
RoHS Compliant

### 3. ELECTRONICAL SPECIFICATIONS

| Model Number | Current ratio | Accyarcy | Linearity | Output @ 50/60Hz |
|--------------|---------------|----------|-----------|------------------|
| ACST014-681  | 680:1         | ±2%      | <1%       | 2.2Vrms          |
| ACST014-102  | 1000:1        | ±2%      | <1%       | 3.2Vrms          |
| ACST014-152  | 1500:1        | ±2%      | <1%       | 4.7Vrms          |
| ACST014-252  | 2500:1        | ±2%      | <1%       | 7.9Vrms          |
| ACST014A-681 | 680:1         | ±5%      | <5%       | 2.2Vrms          |
| ACST014A-102 | 1000:1        | ±5%      | <5%       | 3.2Vrms          |
| ACST014A-152 | 1500:1        | ±5%      | <5%       | 4.7Vrms          |
| ACST014A-252 | 2500:1        | ±5%      | <5%       | 7.9Vrms          |

Hi-Pot: 2.5kVrms,50/60Hz,10S Winding to Winding

Hi-Pot: 1.25kVrms,50/60Hz,10S Winding to Core

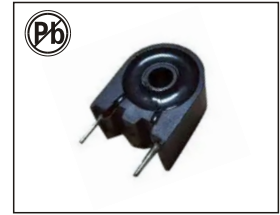
Operating Temperature: -30~95°C

Storage Temperature: -50~125°C

|               |                |            |            |
|---------------|----------------|------------|------------|
| NAME:         | Current Sensor |            |            |
| CUSTOMER P/N: |                | DATE:      | 2013-01-08 |
| SHINHOM P/N:  | ACST014 Series | REV: A0    | PAGE       |
| DRAWN BY      | CHECKED BY     | APPROVE BY |            |

# CURRENT SENSE TRANSFORMERS

## ACST02 SERIES



### FEATURES:

- Fully encapsulated for optimal PC board mounting
- Frequency range from 20KHz to 200KHz
- Primary current rating to 30 Amps
- Primary to secondary isolated to 2500 or 4000VAC
- Meets VDE norms
- Optimum performance over designated current and frequency range
- Competitive pricing due to high volume production
- Manufactured in an ISO 9001:2015 and ISO 14001:2015 certified Talema facility
- Fully RoHS & REACH Compliant

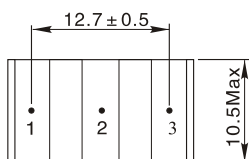
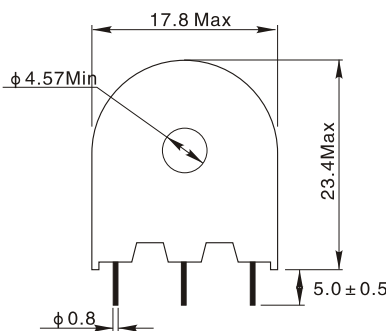
### APPLICATIONS:

- Isolated current feed-back signal in Switch Mode Power Supplies
- Motor current load/overload
- Lighting
- Switch Controls Ultra-sound current
- High resolution sonar current
- Isolated bi-directional current sensor with full wave bridge rectifier

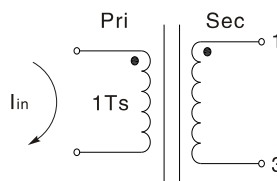
### ELECTRICAL CHARACTERISTICS@25°C

| Part Number  | Turns ratio | Sec inductance (mH)Min. | Sec DCR (Ω)Max | Isec Max <sup>①</sup> | Volt uS Max <sup>②</sup> | winding |
|--------------|-------------|-------------------------|----------------|-----------------------|--------------------------|---------|
| ACST02-500   | 1:50        | 5                       | 0.6            | 300mA                 | 175                      | A       |
| ACST02-101   | 1:100       | 22                      | 1.1            | 150mA                 | 350                      | A       |
| ACST02-201   | 1:200       | 89                      | 4.5            | 75mA                  | 700                      | A       |
| ACST02-301   | 1:300       | 200                     | 10.0           | 50mA                  | 900                      | A       |
| ACST02-501   | 1:500       | 560                     | 25.0           | 30mA                  | 1500                     | A       |
| ACST02-751   | 1:750       | 1260                    | 43.0           | 40mA                  | 3750                     | A       |
| ACST02-500CT | 1:50CT      | 5                       | 0.3/0.3        | 300mA                 | 175                      | B       |
| ACST02-101CT | 1:100CT     | 22                      | 0.55/0.55      | 150mA                 | 350                      | B       |
| ACST02-201CT | 1:200CT     | 89                      | 2.25/2.25      | 75mA                  | 700                      | B       |
| ACST02-301CT | 1:300CT     | 200                     | 10.0/5.0       | 50mA                  | 900                      | B       |
| ACST02-501CT | 1:500CT     | 560                     | 12.5/12.5      | 30mA                  | 1500                     | B       |
| ACST02-751CT | 1:750CT     | 1260                    | 21.5/21.5      | 40mA                  | 3750                     | B       |

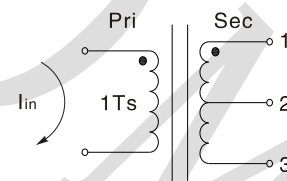
### PHYSICAL CHARACTERISTICS & WINDING



Schematic A



Schematic B

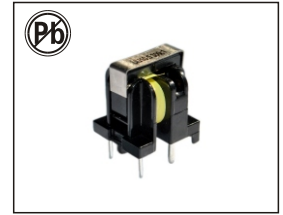


#### Notes

1. For Prim./Sec. Ratios of 1:50 through 1:500, the Isec value corresponds to a maximum primary current of 15 Amp-turns rms while the Isec value for the ratio of 1:750 corresponds to a max. primary current of 30 Amp-turns rms.
2.  $VuS = R_t \times I_s \times 1/2F$   
 $R_t$  (Ohms) : Recommended Terminating Resistance  
 $I_s$  (A) : Secondary Current  
 $F$  (Hz) : Frequency
3. Secondary inductance tested at 10KHz and 10mV for 1:50 through 1:500 Prim./Sec. Ratios and 1KHz/10mV for Prim./Sec. ratio of 1:750
4. Ambient temperature range: -40°C to +120°C.
5. Electrical specifications at 25°C.
6. Pin# 2 is on Center-Tapped (CT) versions only

# CURRENT TRANSFORMERS

## ACST11 SERIES



### FEATURES:

- Conform to Class B insulation System
- Dielectric Strength 3000vrms
- Split Bobbin Design
- Small Physical Package For Tight Configurations
- UL approved Class B Insulation System
- Cost Effective

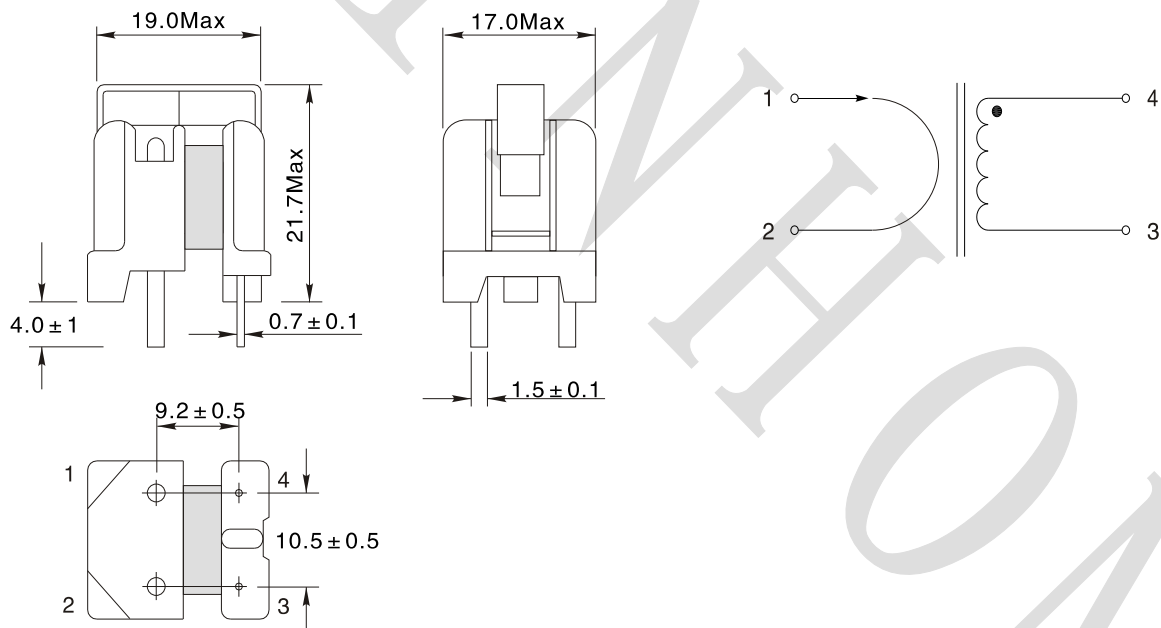
### APPLICATIONS:

- Protection current transformer
- Testing protection system
- Electronical monitoring system

## ELECTRICAL CHARACTERISTICS@25°C

| Part Number | Turns | Sec inductance Ls (mH)Ref | DCR Rs (Ω)Max | Pri current (A) | Sec wire diameter (mm) |
|-------------|-------|---------------------------|---------------|-----------------|------------------------|
| ACST11-101  | 100   | 40.0                      | 1.1           | 30              | 0.25                   |
| ACST11-151  | 150   | 90                        | 2.0           | 28              | 0.23                   |
| ACST11-201  | 200   | 160                       | 3.5           | 27              | 0.20                   |
| ACST11-301  | 300   | 360                       | 7.5           | 25              | 0.17                   |

## PHYSICAL CHARACTERISTICS & WINDING

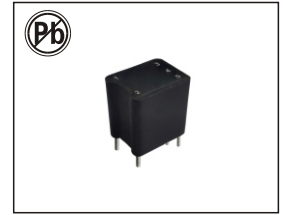


- Operating temperature : -0°C to 85°C
- Storage temperature Component: -25°C to +85°C
- Secondary inductance test at 10kHz, 0.1 Vrms
- Measuring frequency at 10KHz to 1MHz
- Electrical specifications at 25°C

Note:All specifications subject to change without notice.

# CURRENT SENSE TRANSFORMERS

## ACST19 SERIES



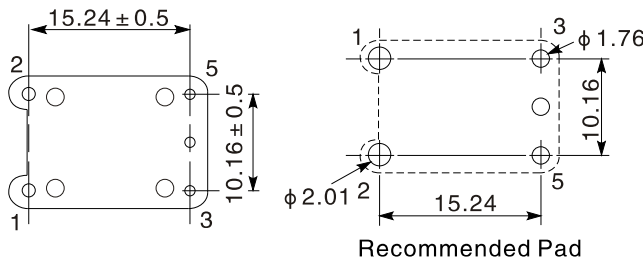
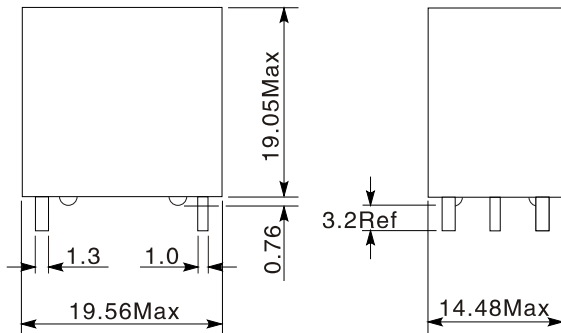
### FEATURES:

- Meets requirements of IEC 950 and VDE norms  
UL94V-0 recognized materials
- Operating frequency range from 20KHz to 200KHz
- Epoxy encapsulated construction

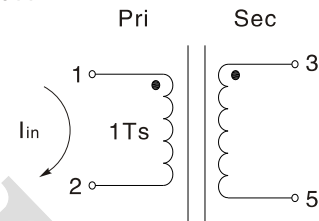
### ELECTRICAL CHARACTERISTICS@25°C

| Part Number  | Turns ratio | Sec inductance (3-5) (mH)Min. | Sec DCR (3-5) (Ω)Max | Isec Max ① | Volt uS Max ② | winding |
|--------------|-------------|-------------------------------|----------------------|------------|---------------|---------|
| ACST19-500   | 1:50        | 5                             | 0.65                 | 300mA      | 175           | A       |
| ACST19-101   | 1:100       | 20                            | 1.3                  | 150mA      | 350           | A       |
| ACST19-201   | 1:200       | 80                            | 4.5                  | 75mA       | 700           | A       |
| ACST19-500CT | 1:50CT      | 5                             | 0.65                 | 300mA      | 175           | B       |
| ACST19-101CT | 1:100CT     | 20                            | 1.3                  | 150mA      | 350           | B       |
| ACST19-201CT | 1:200CT     | 80                            | 4.5                  | 75mA       | 700           | B       |

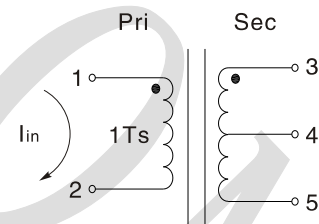
### PHYSICAL CHARACTERISTICS & WINDING



Schematic A



Schematic B



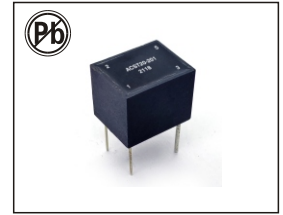
### Notes

1. Isec value corresponds to a maximum primary current of 15 Amp-turns rms
2.  $VuS = R_t \times I_s \times 1/2F$   
 $R_t$  (Ohms) : Recommended Terminating Resistance  
 $I_s$  (A) : Secondary Current  
 $F$  (Hz) : Frequency
3. Secondary inductance tested at 10KHz and 10mV
4. Ambient temperature range: -40°C to +120°C.
5. Electrical specifications at 25°C.
6. Pin# 4 is on Center-Tapped (CT) versions only

Note: All specifications subject to change without notice.

# CURRENT SENSE TRANSFORMERS

## ACST20 SERIES



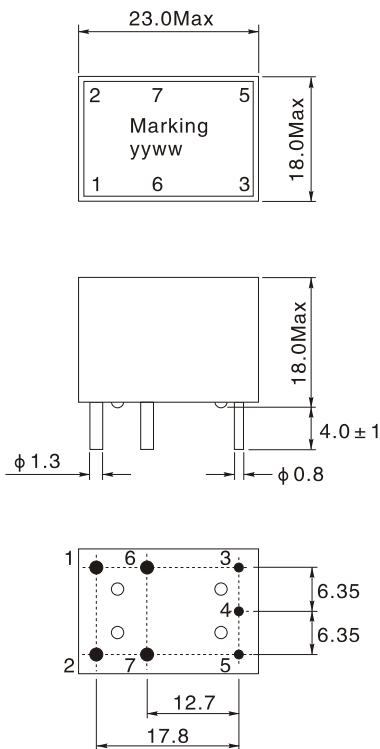
### FEATURES:

- Meets requirements of IEC 950 and VDE norms  
UL94V-0 recognized materials
- Operating frequency range from 20KHz to 200KHz
- Epoxy encapsulated construction

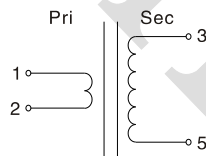
### ELECTRICAL CHARACTERISTICS@25°C

| Part Number   | Turns ratio | Sec inductance (mH)Min. | Sec DCR (Ω)Max | Isec ① Max | Volt uS ② Max | winding |
|---------------|-------------|-------------------------|----------------|------------|---------------|---------|
| ACST20-500    | 1:50        | 5                       | 0.65           | 300mA      | 175           | A       |
| ACST20-101    | 1:100       | 20                      | 1.3            | 150mA      | 350           | A       |
| ACST20-201    | 1:200       | 80                      | 4.5            | 75mA       | 700           | A       |
| ACST20-500CT  | 1:50CT      | 5                       | 0.65           | 300mA      | 175           | B       |
| ACST20-101CT  | 1:100CT     | 20                      | 1.3            | 150mA      | 350           | B       |
| ACST20-201CT  | 1:200CT     | 80                      | 4.5            | 75mA       | 700           | B       |
| ACST20A-500   | 1:1:50      | 5                       | 0.65           | 300mA      | 175           | C       |
| ACST20A-101   | 1:1:100     | 20                      | 1.3            | 150mA      | 350           | C       |
| ACST20A-201   | 1:1:200     | 80                      | 4.5            | 75mA       | 700           | C       |
| ACST20A-500CT | 1:1:50CT    | 5                       | 0.65           | 300mA      | 175           | D       |
| ACST20A-101CT | 1:1:100CT   | 20                      | 1.3            | 150mA      | 350           | D       |
| ACST20A-201CT | 1:1:200CT   | 80                      | 4.5            | 75mA       | 700           | D       |

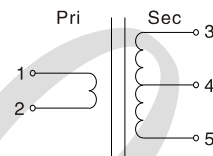
### PHYSICAL CHARACTERISTICS & WINDING



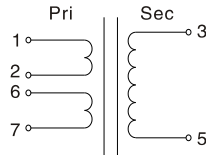
Schematic A



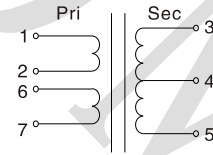
Schematic B



Schematic C



Schematic D

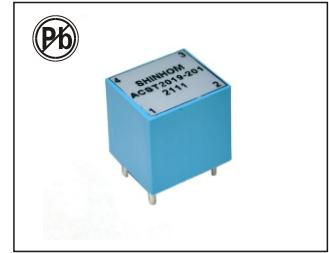


#### Notes

1. Isec value corresponds to a maximum primary current of 15 Amp-turns rms
2.  $VuS = R_t \times I_s \times f$   
 $R_t$  (Ohms) : Recommended Terminating Resistance  
 $I_s$  (A) : Secondary Current  
 $f$  (Hz) : Frequency
3. Secondary inductance tested at 10KHz and 10mV
4. Ambient temperature range: -40°C to +120°C.
5. Electrical specifications at 25°C.
6. Pin# 4 is on Center-Tapped (CT) versions only
7. Pin#6, #7 is on ACST20A versions only

# CURRENT SENSE TRANSFORMERS

## ACST2019 SERIES



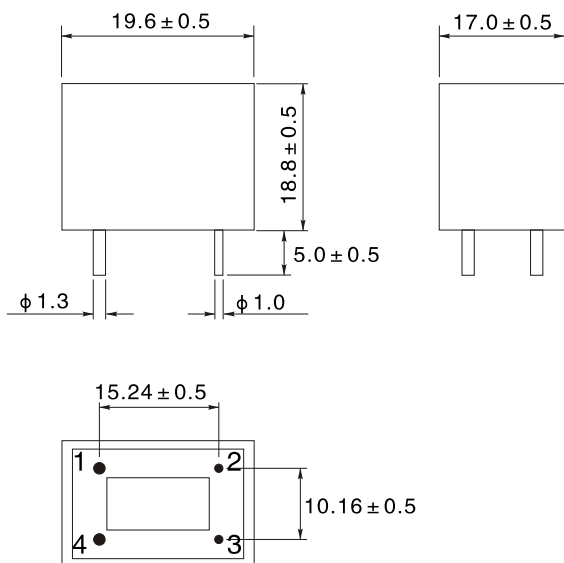
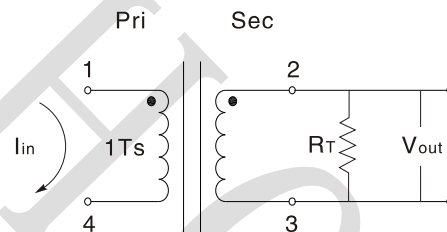
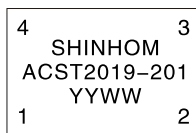
### FEATURES:

- 3750VDC insulation between winding to winding
- Frequency range: 10kHz to 1MHz
- Designed for use with switching power supplies
- This current sensing transformers are designed to meet UL/CSA/IEC 60950 Reinforced Insulation specification and provide 3 mm creepage/clearance between primary and secondary windings. Winding to winding
- Reinforced insulation per IEC 380
- Epoxy encapsulated construction
- Materials meet requirement of UL94V-0

### ELECTRICAL CHARACTERISTICS@25°C

| Part Number  | Turns ratio | Sec inductance<br>15.75KHz, 1V<br>(mH)Min. | Sec DCR<br>(Ω)Max | IPK<br>(A) | Terminating<br>resistance RT<br>(Ω) |
|--------------|-------------|--|-------------------|------------|-------------------------------------|
| ACST2019-500 | 1:50        | 5  | 0.7               | 35         | 50                                  |
| ACST2019-101 | 1:100       | 20   | 1.4               | 37         | 100                                 |
| ACST2019-201 | 1:200       | 80   | 4.5               | 38         | 200                                 |
| ACST2019-301 | 1:300       | 180  | 11.0              | 37         | 300                                 |

### PHYSICAL CHARACTERISTICS & WINDING

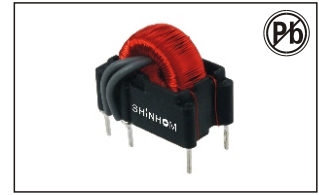


#### Notes

- Inductance is for the secondary, measured at 15.75 kHz, 1 Vrms.
- Volt-time product is for the secondary, based on 2000 Gauss.
- Terminating resistance (RT) value is based on 1 Volt output with 35 Amps flowing through the primary. Varying terminating resistance increases or decreases output Voltage/Ampere according to the following equation:  $RT = V_{out} \times N_{sec} / I_{in}$ .
- The maximum useable peak sense current (IPK) depends on temperature rise or core saturation, which should be evaluated for the operating conditions.
- Ambient temperature range: -40°C to +85°C.
- Electrical specifications at 25°C.

Note: All specifications subject to change without notice.

# CURRENT SENSING TRANSFORMER CT05 SERIES



## FEATURES:

- UL/C-UL recognized components
- 3000Vrms gate to drive winding test
- Useful operating frequency from 50kHz to 500kHz
- Most popular winding configurations

### Electrical Specifications @ 25 °C Operating Temperature -40 °C to 130 °C

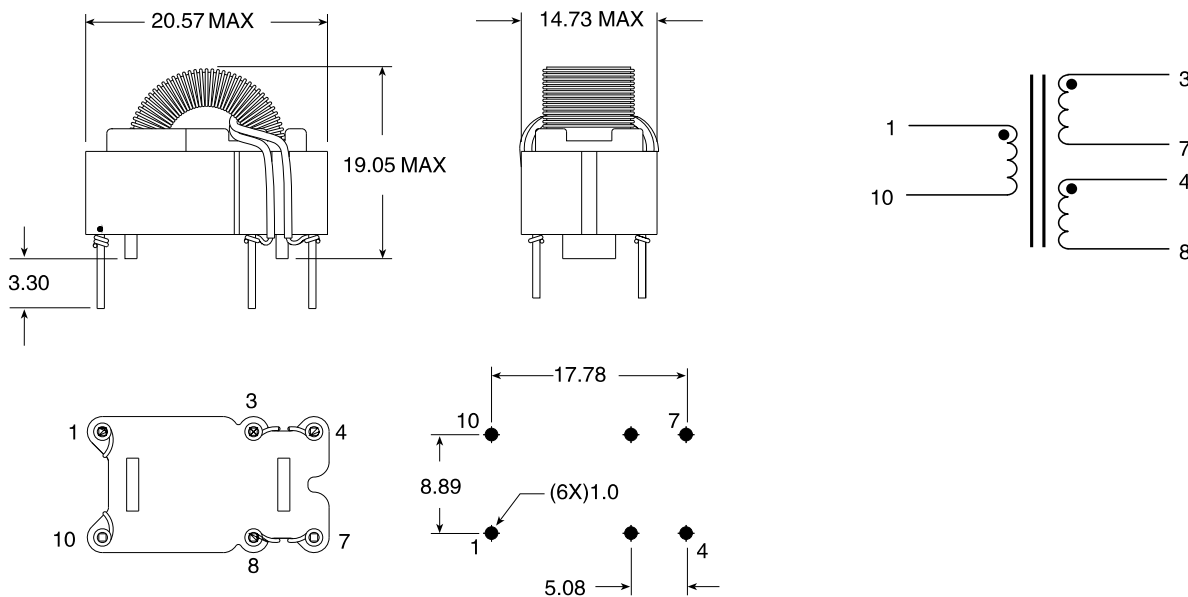
| Part Number | Turns Ratio | Primary Inductance (1-10) (mH MIN) | DCR Pri (1-10)(Ω Max) | DCR Sec1 (3-7)(mΩ ± 15%) | DCR Sec2 (4-8)(mΩ ± 15%) | Hi-Pot (Pri-Sec) (Vrms) |
|-------------|-------------|------------------------------------|-----------------------|--------------------------|--------------------------|-------------------------|
| CT0581      | 200:1:1     | 76                                 | 2.8                   | 1.7                      | 1.7                      | 3000                    |
| CT0582      | 100:1:1     | 19                                 | 1.4                   | 1.7                      | 1.7                      | 3000                    |
| CT0583      | 50:1:1      | 5                                  | 0.7                   | 1.7                      | 1.7                      | 3000                    |

### Additional Specifications

| Part Number | Reference Data |            |           |                  | Calculation Data |          |
|-------------|----------------|------------|-----------|------------------|------------------|----------|
|             | RT             | Ipk (Amps) | Droop (%) | Max Flux Density | Kb               | Req (mΩ) |
| CT0581      | 200            | 34         | 1.00      | 2000             | 17.12            | .9       |
| CT0582      | 100            | 35         | 1.98      | 2000             | 68.49            | .8       |
| CT0583      | 15             | 36         | 1.19      | 2000             | 273.97           | .75      |

- NOTES:
1. These current sense transformers have two one turn primaries that can be used in parallel. The listed current ratings are for parallel connection.
  2. The reference values are for an application using the termination resistor (Rt) and operating with unipolar waveform at 100kHz, 40% duty cycle. The estimated temperature rise is 55 °C .
  3. The peak flux density should remain below 2100 Gauss to ensure that the core does not saturate. Use the following formula to calculate the peak flux density:  $B_{pk} = K_b * I_{pk} * R_t * \text{don} / (F_f * \text{Freq. in kHz})$  where: R<sub>t</sub> is the terminating resistor in the application and F<sub>f</sub> is 1 for unipolar waveform and 2 for bipolar waveform
  4. To calculate the droop: Droop Exponent (D) =  $R_t * \text{don} / (L_{pri} \text{ in mH} * \text{Freq. in kHz})$  %Droop =  $(1 - e^{-D}) * 100$
  5. The temperature rise of the component is calculated based on the total core loss and copper loss:
    - A. To calculate total copper loss (W):  $P_{cu} = I_{pk}^2 * R_{eq} * F_f * \text{don}$  where: F<sub>f</sub> is 1 for unipolar waveform and 2 for bipolar waveform
    - B. To calculate total core loss (W):  $P_{core} = 0.000073 * (\text{Freq. in kHz})^{1.67} * (B_{op} \text{ in kG})^{2.532}$  where: B<sub>op</sub> in kG =  $K_b * I_{pk} * R_t * \text{don} / (2000 * \text{Freq. in kHz})$
    - C. To calculate temperature rise: Temperature Rise (C) =  $60.18 * (\text{Core Loss(W)} + \text{Copper Loss (W)})^{.833}$

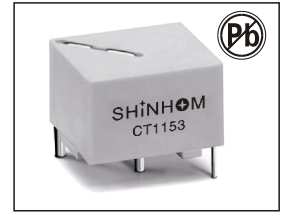
## TECHNICAL INFORMATION & PHYSICAL CHARACTERISTICS



SUGGESTED PCB HOLE PATTERN

# CURRENT SENSE TRANSFORMER

## CT11XX SERIES



### FEATURES:

- \* Current sense transformers provide output feedback to the pulse control circuitry allowing low-cost regulation of switch-mode power supplies
- \* 25A Rated primary current(40A Max)
- \* 500kHz maximum frequency

### APPLICATIONS:

- \* switch-mode power supplies
- \* lighting
- \* switch controls

### CONSTRUCTION:

- \* Fully encapsulated construction

**Electrical specification @25°C Operating temperature: -40°C to +125°C**

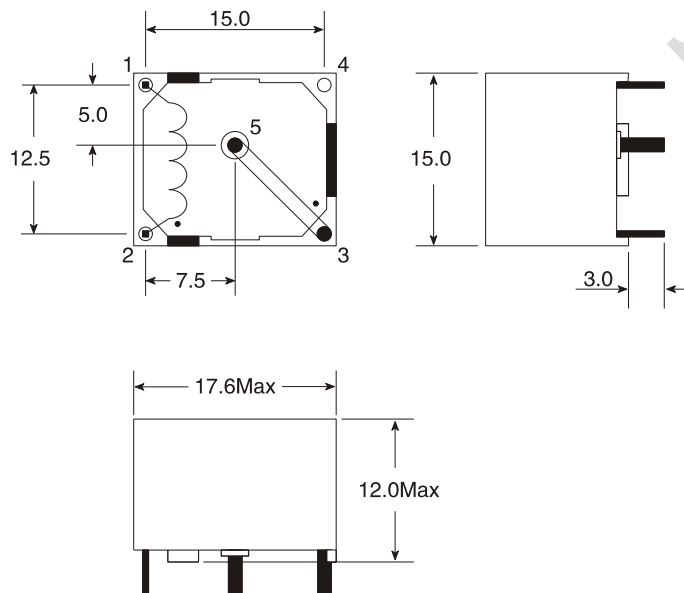
| Part No. | Prim/Sec Ratio | Sec L (mH MIN) | Sec DCR (MAX) | V x $\tau$ (MAX) |
|----------|----------------|----------------|---------------|------------------|
| CT1151   | 1:50           | 4.7            | 0.5           | 175uVs           |
| CT1152   | 1:100          | 18             | 2.0           | 350uVs           |
| CT1153   | 1:200          | 76             | 4.5           | 700uVs           |
| CT1154   | 1:500          | 470            | 16.0          | 1750uVs          |
| CT1155   | 1:1000         | 1900           | 50.0          | 3500uVs          |

### NOTES:

L: Inductance:(2-1)tested at 10KHz&10mV  
 $V \times \tau : V=Rt \times Is \quad \tau =1/2F$

$Rt(\Omega)$ : Recommended terminating resistance  
 $Is(A)$ : Sec. current  $F(Hz)$ : Frequency

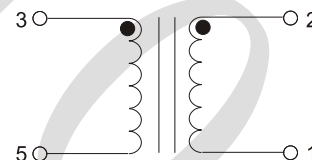
### Mechanical



Pin3&5:  $\phi$  1.2mm  
 Pin1&2:  $\phi$  0.5mm  
 Unless otherwise specified,all tolerance are  $\pm 0.5$

Note:All specifications subject to change without notice.

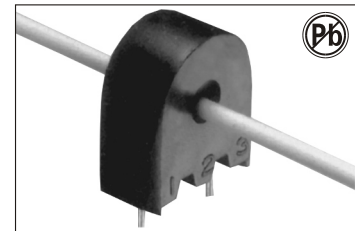
### Schematic



- Insulation resistance: 500V DC >100M $\Omega$
- Hi-Pot : 4000V 1mA 60S
- Temperature range: -25°C to +85°C
- Storage Temperature: -40°C to +105°C
- Resistance to soldering heat:260°C for 10 seconds
- Marking: Part number and date code

# HIGH FREQUENCY CURRENT SENSING TRANSFORMER

## ACST SETRIES



### FEATURES:

- Meets UL94-V0 Requirements
- Precise Current Sensing

### COMMON APPLICATIONS:

- SMPS Control Circuits
- Current Sensing
- Switching power regulators
- Pulse current test

## STANDARD SPECIFICATIONS @250C

| Part Number | SCHEMATIC | TURNS<br>(± 1% Max) | OCL<br>(mH Min) | DCR<br>(Ω Max) | ET<br>(V-μ SEC-Min) |
|-------------|-----------|---------------------|-----------------|----------------|---------------------|
| ACST-001    | 2A        | 50                  | 5.0             | 0.7            | 150                 |
| ACST-002    | 2A        | 100                 | 20.0            | 1.40           | 300                 |
| ACST-003    | 2A        | 200                 | 80.0            | 4.50           | 600                 |
| ACST-004    | 2A        | 300                 | 180.0           | 11.0           | 900                 |
| ACST-005    | 2B        | 50CT                | 5.0             | 0.7            | 150                 |
| ACST-006    | 2B        | 100CT               | 20.0            | 1.40           | 300                 |
| ACST-007    | 2B        | 200CT               | 80.0            | 4.50           | 600                 |
| ACST-008    | 2B        | 300CT               | 180.0           | 11.0           | 900                 |

## TECHNICAL INFORMATION & PHYSICAL CHARACTERISTICS

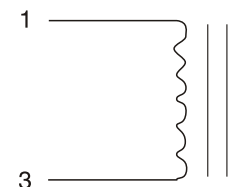
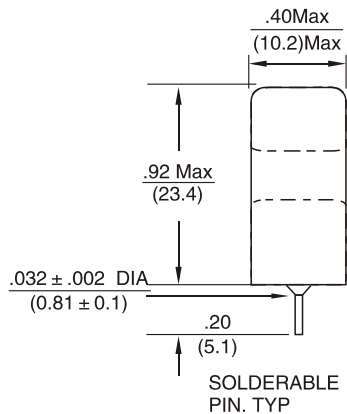
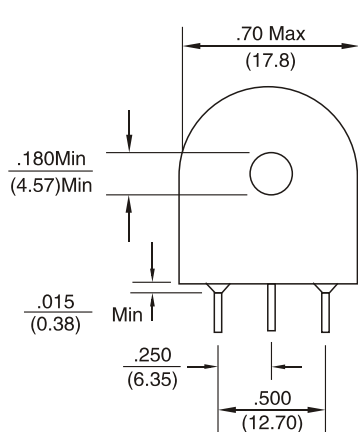


FIG. 2A

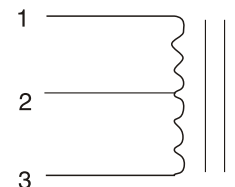


FIG. 2B

- Working Frequency range: 10KHz~1MHz
- Testing Frequency: 10 KHz 0.1VRMS
- Hipot: 2000VAC, Primary to Secondary
- Maximum Sensing Current: 20A p-p
- All secondary measurements are in pins 1-3
- Soldering methods: Wave, Reflow
- Operating Temperature: 0°C to 85°C
- Storage Temperature: -25°C to 85°C

Note: All specifications subject to change without notice