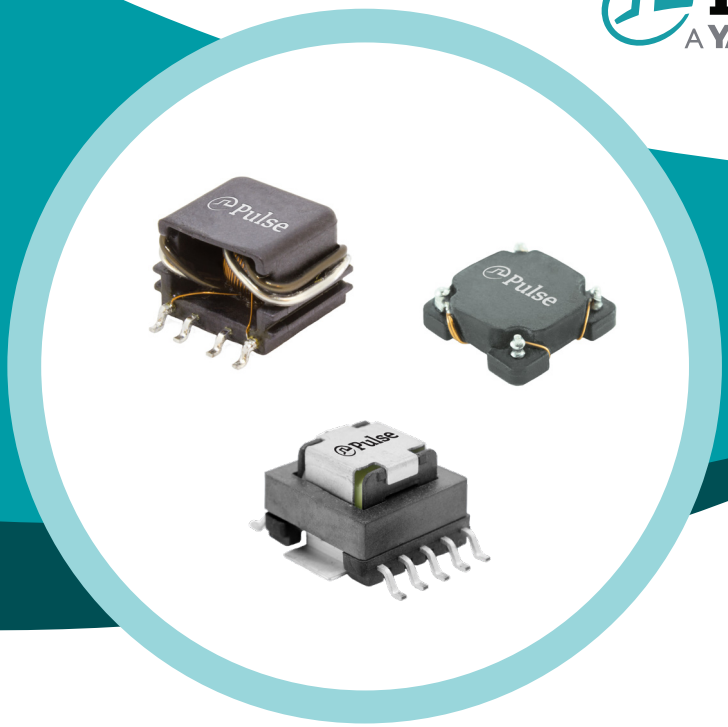
Pulse
A YAGEO Company
POWER PRODUCTS



AEC-Q200 · IATF 16949 · MSL · ROHS COMPLIANT

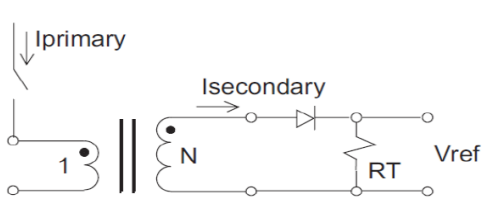
# SMT CURRENT SENSE TRANSFORMERS

## FOR SWITCH MODE POWER APPLICATIONS

With the increased focus on end-product efficiency the need to accurately monitor current in electronic circuits is paramount. By accurately knowing the current in the system it is possible to identify issues, optimize efficiency and re-direct current flow as required. Broadly speaking current sense applications can be broken up into DC current applications (battery monitoring), low frequency sinusoidal applications (50/60Hz electrical transmission, distribution and storage systems) and high frequency applications (switch mode power supply circuits operating >40kHz). Within these broad groups there are a variety of current sense technologies available (basic shunt resistors, Hall Effect, magnetic transformer and AMR) and each has trade-offs in terms of complexity, size, cost, efficiency, accuracy and isolation. Perhaps the most versatile solution, for non-DC applications, is the use of a transformer and Pulse Electronics is a leader in market lead in both low frequency (https://egston.com/) and high frequency switch mode power solutions (https://www.power.pulseelectronics.com/current-sensing). Transformer solutions are inherently electrically isolated and can be designed to easily comply with relevant safety standards, they offer very low loss, excellent accuracy over temperature and time and the cost and complexity are quite low.

When selecting a current sense transformer it is important to know:
* The maximum rms current that is going to be measured so that a thermally appropriate transformer can be identified.
* The isolation voltage required
* The insulation level (functional, basic, reinforced)
* Specific mechanical constraints.

In any practical application the only real 'limit' to the current sense operation is thermal. If too much current is applied to the primary it (and the secondary winding) may overheat so it is important to make the correct selection and test the transformer at maximum current and ambient temperature. Although users often worry about saturating the transformer it is almost impossible, in any realistic application, to do so as the saturation current is not related to large primary current (as this energy is not stored in the core) but rather the relatively low sensed voltage divided by the secondary turns and frequency. As long as the frequency is not too low (<kHz) then saturation is not an issue. However, this does highlight that switch mode power current sense magnetics cannot be used in 50/60/400Hz type applications.




TYPICAL APPLICATION CIRCUIT

# SMT CURRENT SENSE TRANSFORMERS

## FOR SWITCH MODE POWER APPLICATIONS

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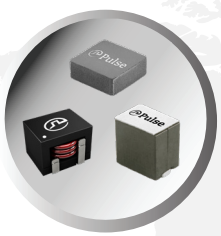
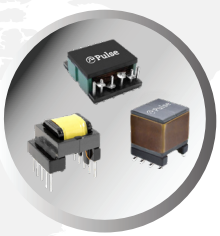
| | Dimensions | | | Series | Isolation Voltage (Hi-pot) | Insulation Type | UL Creepage Distance (Pri-Sec) | Volt-usec Rating (V-usec) | Primary DCR (MAX) | Available Turns Ratios | IATF |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | L | W | H | | | | | | | | |
|  | 8.4 | 7.2 | 5.5 | P820x | 500Vrms | Functional | - | 10Arms | 6.0 mOhms | 1:20 to 1:125 | - |
| | 8.4 | 7.2 | 5.5 | PA1005, PM2165 | 500Vrms | Functional | - | 20Arms | 0.75 mOhms | 1:20 to 1:125 | Yes* |
|  | 8.4 | 8.4 | 3.3 | PA0368 | 500Vrms | Functional | - | 4Arms | 4.0 mOhms | 1:50 to 1:125 | - |
|  | 12.8 | 9.7 | 7.2 | PH9494 | 2250Vdc | Functional | - | 30Arms | 0.35 mOhms | 1:50 to 1:200 | - |
|  | 13.6 | 12.8 | 14.4 | PH9505 | 3000Vrms | Reinforced | 6.5mm | 30Arms | 0.5 mOhms | 1:50 to 1:180 | - |
|  | 14.0 | 13.0 | 8.8 | PH9500 | 4400Vdc | Basic | 8.2mm | 10Arms | 3.0 mOhms | 1:65 to 1:100 | - |
|  | 14.6 | 12.6 | 7.1 | PE-682xx | 500Vrms | Functional | - | 15Arms | 1.15 mOhms | 1:1:50 to 1:1:200 | - |
|  | 19.9 | 14.5 | 10.0 | PB002x | 1000Vdc | Functional | - | 35Arms | 0.42 mOhms | 1:50 to 1:200 | - |

## Other Great Products from Pulse Electronics



### Power Inductors

- Power Bead, Molded, Composite, Drum Core and Toroid Constructions
- Over 100Apk



### Switch Mode Transformers

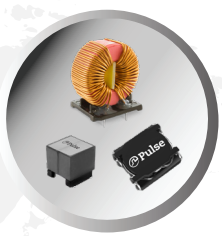
- Multiple Topologies
- Up to 2kW
- Functional, Basic and Reinforced Insulation

### Isolation Transformers

- Push-pull, Flyback and H-Bridge topologies
- Functional, Basic and Reinforced Insulation
- Up to 5kVrms Hi-pot*

### Current Sense Magnetics

- Functional, Basic and Reinforced Insulation
- Up to 40Arms



### Common Mode Chokes

- NiZn, MnZn and Nanocrystaline Materials
- Up to 45Arms

Surface Mount and Through-hole Terminations • Catalog and Custom Solutions Available