Standex Electronics

PARTNER | SOLVE | DELIVER®

Planar Transformers

PRODUCT LINE BROCHURE

Standex | Smart.

Partner, Solve, Deliver® "Solving your complex problems is why we exist."

CONTENTS

ABOUT STANDEX

Customer Focused Engineering Solutions. "Innovating for more than 50 years."

The Standex Electronics business, a division of Standex International Corporation (NYSE:SXI), has been providing solutions through high-performing products since the 1950's. Through growth, acquisition, strategically partnering with customers, and applying the latest engineering designs to the needs of our ever-changing world, Standex Electronics technology has been providing quality results to the end-user. The approach is achieved by partnering with customers to design and deliver individual solutions and products that truly address customers' needs.

Standex Electronics is headquartered in Cincinnati, Ohio, USA, Standex Electronics has nine manufacturing facilities in six countries, located in the United States, Germany, China, Mexico, the United Kingdom, and Japan.

That's **Standex** | Smart.

WHO WE ARE / WHERE WE PLAY

Powerfully transforming. "When failure is not an option, designers of critical electronic components rely on Standex and their decades of experience."

Standex Electronics is a worldwide market leader in the design, development and manufacture of custom magnetics and power conversion components and assemblies. Our work, growth, and dedication to providing reliable high-quality products through our engineering and manufacturing expertise go beyond products we ship.

We offer engineered product solutions for a broad spectrum of product applications in all major markets, including but not limited to:

- Aerospace & Military
- Alternative Energy
- Automotive (EV) & Transportation
- Electric Power & Utilities
- Medical
- Smart Grid & Metering
- Industrial & Power Distribution
- Test & Measurement
- Security & Safety
- Household & Appliances

Our values and what we believe align to the partner, solve, and deliver® approach. We produce parts but we are more than that. Connecting with your team as a strategic partner, listening to your challenges, and arriving at ways to solve your complex problems through our solutions are why we exist. We have custom capabilities that address your needs. Our team leverages our dynamic and diverse engineering expertise and other resources such as our global facilities for logistics and production.

50 YEARS of INNOVATION

Standex Electronics has been innovating for over 50 years by developing new products, partnering with customers, and expanding our global capabilities. We have also grown our global reach and local touch through synergistic acquisitions.

1960

1960 National Transistor
1969 Paul Smith Company

1970

1971 Comtelco
1973 Underwood Electric
1974 Van Products

1990

1998 ATR Coil /
Classic Coil Winding

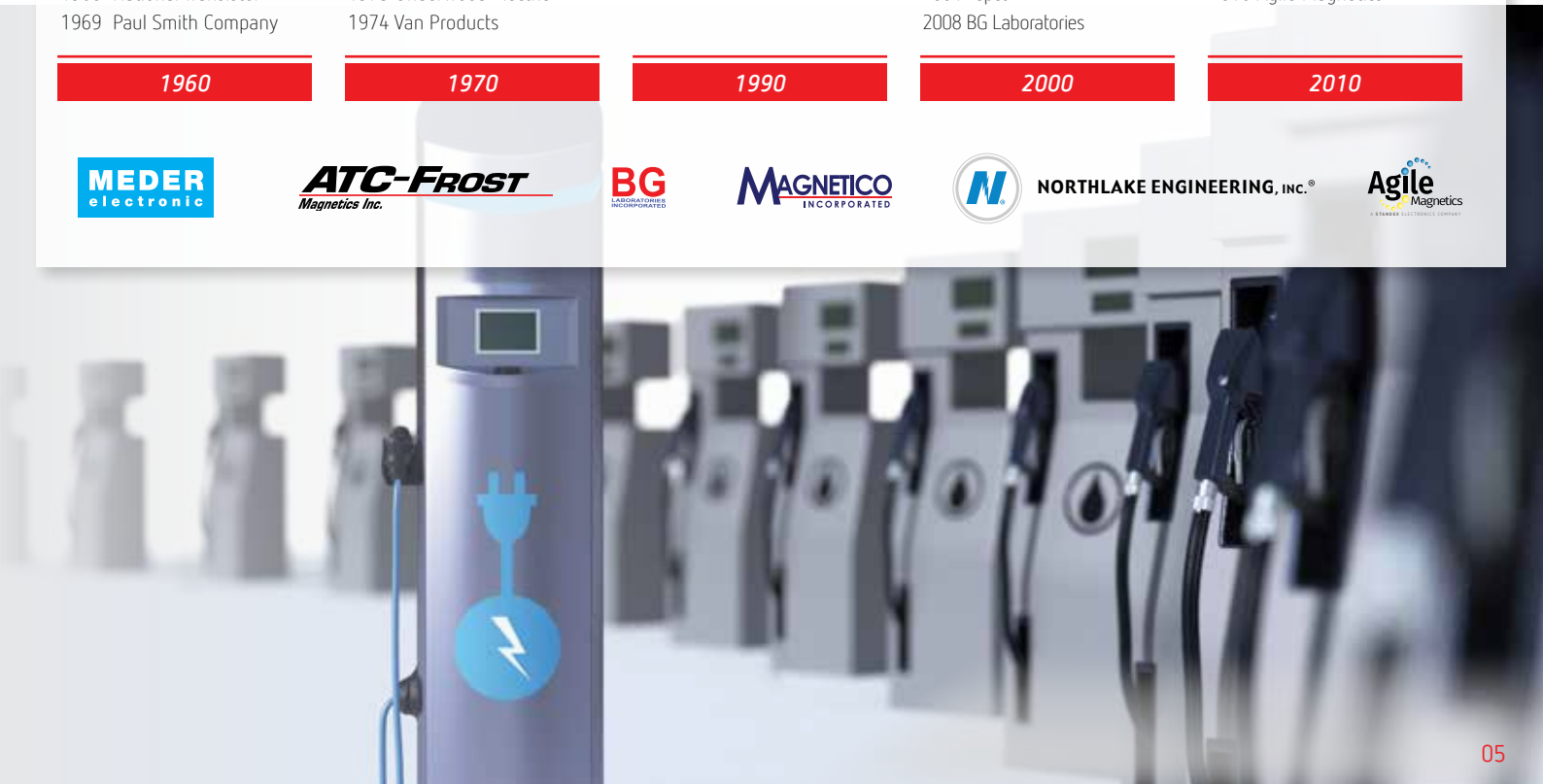
2000

2001 ATC-Frost Magnetics
2002 Cin-Tran
2003 Magnetico /Trans America
2004 Lepco
2008 BG Laboratories

2010

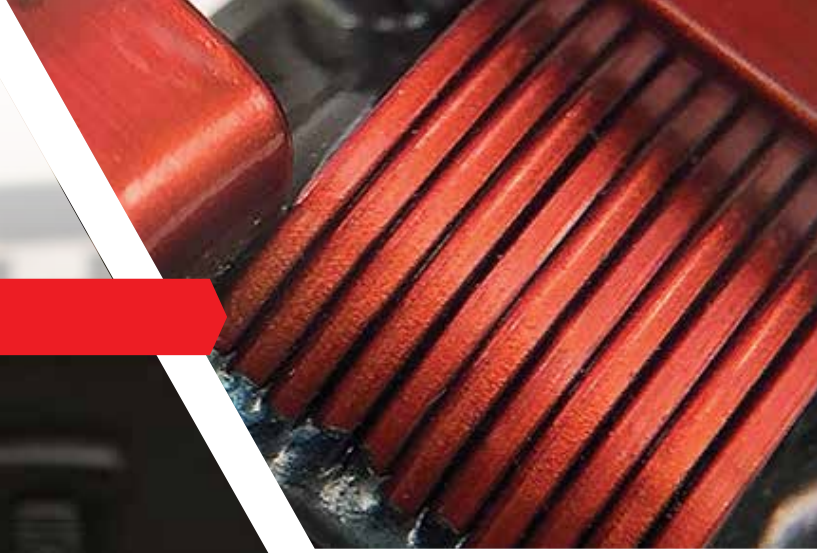
2012 Meder Electronic
2014 Planar Quality Corp.
2015 Northlake Engineering, Inc.®
2017 OKI Sensor Device Corp.
2018 Agile Magnetics

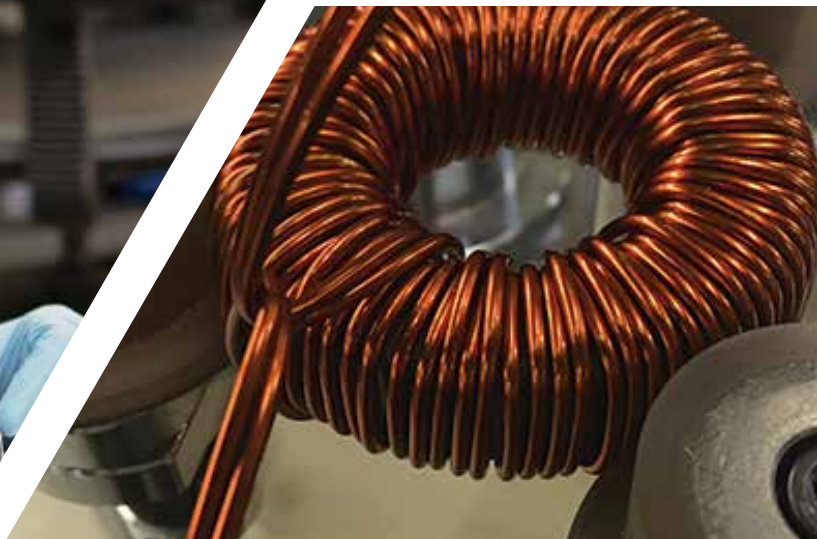
MEDER electronic
ATC-Frost Magnetics Inc.
BG Laboratories Incorporated
Magnetico Incorporated
NORTHLAKE ENGINEERING, INC.®
Agile Magnetics



Standex | Strong.

OUR CAPABILITIES



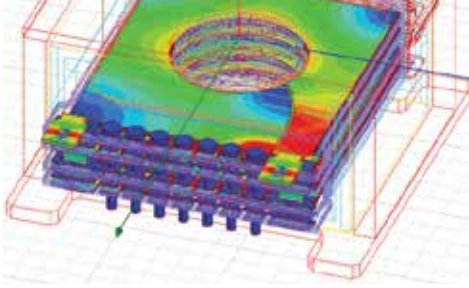


ITAR INTERNATIONAL TRAFFIC IN ARMS REGULATIONS

IATF 16949

ISO9001 CERTIFIED

REGISTERED AS9100



MANUFACTURING

52 to 5awg Magnetic Wire Winding
Foil, Flat, & Square Wire Winding
Automatic CNC Winding
Bobbin, Layer, & Self-Supporting Winding
Toroidal Hook & Shuttle Winding
Thermoplastic & Thermoset Overmolding
Impregnation, Casting, & Potting
Void-Free Vacuum Potting
NASA Certified Soldering
Wire Prep & Harness Assembly
Injection Molding
Metal & Plastic Fabrication
Lean Manufacturing Principles
Complete, In-House Machine Shop
Poka-Yoke "Mistake Proofing"

ENGINEERING

3-D CAD Modeling
3-D Printing
Mechanical Design & Packaging
Rapid Prototyping
Magnetic Simulation Software
Mechanical, Thermal & FEA Analysis
Plastic Mold Flow Simulation
APQP Project Management

QUALITY & COMPLIANCE

AS9100 & IATF16949 Certifications
ITAR Compliance
Regulatory Agency Approvals
PPAP & First Article Inspection
SPC Data Collection

TESTING & LAB CAPABILITIES

Automated Transformer Testing
Medical Safety Testing
High Voltage/Partial Discharge Testing
Full Load & Temperature Rise Testing
2-D/3-D Microfocus X-ray Inspection
Digital Microscopic Inspection
MIL-STD-202 In-House Qualification Testing
Mechanical, Shock & Vibration
Burn-In & Life Testing
Thermal Shock & Temperature Cycling
Humidity, Salt Fog, & Solderability
Moisture Resistance & Seal Testing

That's **Standex** | Strong.

Our Approach

PARTNER // TEAMWORK

Dig deep into the customer's project and develop relationship through our thought leadership, expertise, team, and global footprint.

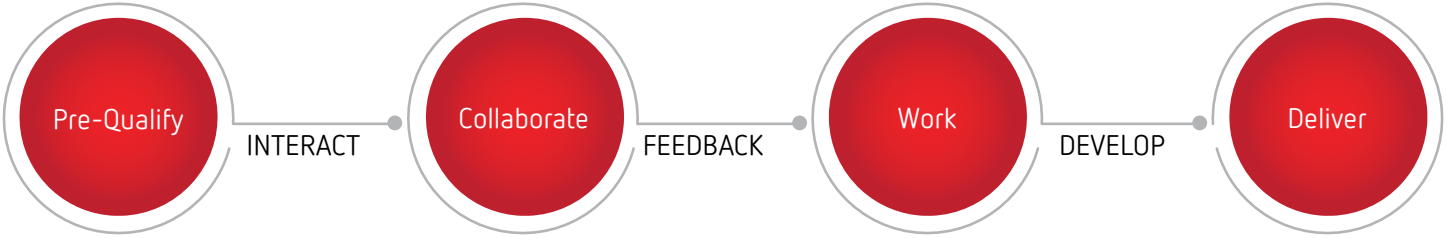
SOLVE // UNDERSTAND

Capabilities, lab, size, shape, power management, ranges, frequency, and more around how our capabilities can provide efficient, productive, designs & products.

DELIVER // QUALITY

Help customers win through our diverse products, dynamic capabilities, reliable high-quality magnetics solutions, and customer driven innovation and service.

Our Process



- Understand Application
- Define Design Targets
- Define Topology
- Why Planar?
- Efficiency & Power Requirements
- Operating Frequency
- Thermal & Cooling Conditions
- Isolation Considerations
- Cost Targets Vs. Efficiency

- Open Engineering Team Dialogue
- Footprint Negotiations
- Optimize Efficiency
- Electrical & Thermal Modeling
- Preliminary Design Approval
- Identify Custom Components
- Specify Terminations
- Thermal Management Design
- Generate Print & Quotation

- Final Design Approval
- Generate BOM
- Order Material
- Queue Samples
- Sample Build
- EL Test & Report
- Application Testing
- Feedback
- Iterations If Necessary

- Production Order
- APQP
- FAI
- DFMEA & PFMEA
- Line Audit
- PPAP
- Delivery
- Sustaining Engineering

Complex problems deserve custom solutions - As your "application engineer experts", we deliver custom design, development, and manufacture of reliable high-quality planar magnetics that are used across all major markets.

Standex Electronics

PARTNER | SOLVE | DELIVER®

Fill out a design request today!

Planar Inductor Request Form

We meet each unique need, encompassing our global capabilities to partner, solve, and deliver® *custom engineered solutions*. Complete the form below and our engineers and product specialists will review your request and respond with information targeting your application.

* **Inductor Application** — * required fields

Design Priorities - Cost? Height? Efficiency?

Why are you choosing Planar Magnetics over other magnetics?

* **RFQ Quantities** — Q1 Q2 Q3 Q4 Q5

Target Price — Currency

Sample Quantity — Est. Annual Usage

ELECTRICAL SPECIFICATIONS

* **Operating Frequency** — kHz

* **Winding 1** — µH — Adc — Arms

Winding 2 — µH — Adc — Arms

Winding 3 — µH — Adc — Arms

Winding 4 — µH — Adc — Arms

Winding 5 — µH — Adc — Arms

Considerations for min Inductance at Max Amps

Inductance — Isat — Adc — Arms

* **Max AC Peak to Peak Ripple Current** — A

* **Isolation Requirements** — Vdc — Vrms

Clearance Requirements (if needed) — mm

Creepage Requirements (if needed) — mm

MECHANICAL SPECIFICATIONS

Max Dimensions in mm — L — W — H

Termination Style

Explain Other

COOLING SPECIFICATIONS

* **Max Ambient Temperature** — °C

Max. Allowed Transformer Temperature (if applicable)? — °C

Cooling Considerations

1)* Airflow? Yes — If Yes, then supply — Airflow Value — CFM

If LFM/or mid then also supply

Fan Diameter — IN

2)* Coldplate? — Max. Coldplate Temp.

Yes — If Yes, then supply — °C

3) Other Considerations

CUSTOMER INFORMATION

* **Name**

* **Company**

* **Email**

Telephone

Street Address

City

* **State / Province / Region**

* **Zip / Postal Code**

* **Country**

Comments

standexelectronics.com/planar-inductor-request-form/ V02

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Planar Transformer Request Form

We meet each unique need, encompassing our global capabilities to partner, solve, and deliver® *custom engineered solutions*. Complete the form below and our engineers and product specialists will review your request and respond with information targeting your application.

* **Application** — * required fields

Design Priorities - Cost? Height? Efficiency?

Why are you choosing Planar Magnetics over other magnetics?

* **RFQ Quantities** — Q1 Q2 Q3 Q4 Q5

Target Price — USD — Currency

Sample Quantity — Est. Annual Usage

ELECTRICAL SPECIFICATIONS

* **Topology** — Forward

Other / Additional Info

* *Flyback Continuous - supply peak current,* ** *Flyback Discontinuous - supply waveforms or all load conditions,* *** *LLC Resonant - supply min, max, nom frequency, load conditions across operating range, waveforms if possible, required typical inductance, center tap?*

* **Operating Frequency** — kHz

* **Total Output Power** — W

* **Input Voltage** — Min — Max — Vdc

* **Input Voltage** — Min — Max — Vdc

Duty Cycle — Min — %

* **Duty Cycle** — Max — %

Primary Center Tap? — Secondary Center Tap?

* **Output 1** — Vdc(V) — Idc(A)

Output 2 — Vdc(V) — Idc(A)

Output 3 — Vdc(V) — Idc(A)

Output 4 — Vdc(V) — Idc(A)

* **Isolation** — Vdc — Vdc — Vdc

*Primary to Secondary — *Primary to Core — *Secondary to Core

COOLING SPECIFICATIONS

* **Max Ambient Temperature** — °C

Max. Allowed Transformer Temperature (if applicable)? — °C

Cooling Considerations

1)* Airflow? Yes — If Yes, then supply — Airflow Value — CFM

If LFM/or mid then also supply

Fan Diameter — IN

2)* Coldplate? — Max. Coldplate Temp.

Yes — If Yes, then supply — °C

3) Other Considerations

MECHANICAL SPECIFICATIONS

Max Dimensions in mm — L — W — H

Termination Style — SMD

Explain Other

Turn Ratio Np/Nsec 1 — Turn Ratio Np/Nsec 3

Turn Ratio Np/Nsec 2 — Turn Ratio Np/Nsec 4

* *Normally, Standex can determine the optimal turns ratio for each design. If there are specific requirements for Turns, then enter here.*

CUSTOMER INFORMATION

* **Name**

* **Company**

* **Email**

Telephone

Street Address

City

* **State / Province / Region**

* **Zip / Postal Code**

* **Country**

Comments

standexelectronics.com/planar-transformer-request-form/ V02

Standex | Smart.

"Planar magnetics offer improved power density and performance compared to equivalent wire wound designs."

PLANAR MAGNETICS

ADVANTAGES OF WORKING WITH STANDEX ELECTRONICS

Global Design and Manufacturing

- Experienced with creating custom solutions for partners across the globe
- Capable of leveraging global supply chains on behalf of our partners
- Global manufacturing locations provides options regarding cost vs timing

Ready and Willing to Grow with Our Partners

- Part of a $1B publicly traded corporation with access to capital markets
- Able to make investments to grow our capacity along with our partners
- Forward focused supplier that you can depend on in the long run

Deep Technical Expertise

- Over 100 years of custom magnetics design experience
- Capable of proving design calculations, simulations and prototype samples
- Portfolio of technical solutions developed through years of custom designs
  - US Patent 7,129,809 for surface mount header
  - US Patent 7,460,002 for custom terminal design
  - Optimized footprints & thermal management
  - Custom encapsulation/potting methods to meet isolation requirements

Broad Product Portfolio and Capabilities

- Experienced manufacturer of both planar and traditional magnetic designs
- Wide power range of 25W to 250kW and frequency range of 20kHz-1MHz+
- One-stop shop able to fully test components to meet rigorous certifications

ADVANTAGES OF STANDEX ELECTRONICS' DESIGN APPROACH

Minimized Footprint

- Planar better utilizes core space, enabling more compact magnetic designs
- Standex uses ER Cores, which allows most compact designs in the industry
- Flexible termination designs allow fit into existing space with minimal redesign

Optimized Performance

- High power density enables 99%+ efficiency with significantly lower material
- Optimized core cross section and low turn count minimizes losses
- Compact design better allows heat transfer out of components

High Reliability

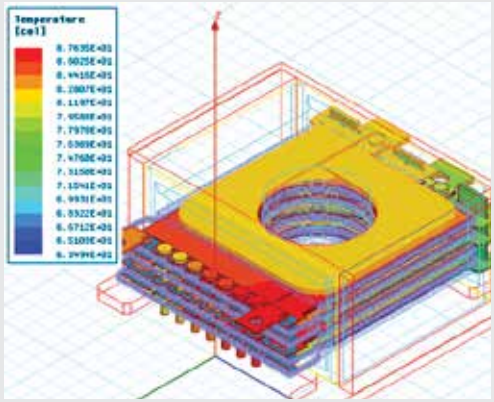
- Elimination of hand winding reduces part to part variation
- Use of PC boards and encapsulation methods allow high isolation
- ER core geometry reduces EMI that may interfere with sensitive equipment of custom designs

Partner in Innovation

- Experience in fully custom designs for customers large and small
- Plastic molding expertise, enabling unique isolation and value-add solutions
- Capable of providing full thermal management designs, as needed

That's **Standex** | Smart.

"Planar technology is making headway in some of the most demanding applications and emerging markets."



We offer **engineered planar magnetics solutions** for a **broad spectrum of product applications** in all major markets. Battery charging, electric vehicles, solar inverters, aviation, healthcare, and industrial markets are just some of the areas where planar technology is gaining ground.

APPLICATIONS

Automotive, Electric & Hybrid Vehicles
Renewable Energy - Wind & PV Systems
Aerospace & Military (high reliability & repeatability)
Welding, Lasers & Test Equipment
DC-DC Converters
AC-DC Resonant Designs
Appliance
Battery Charging (12V, 24V, 48V, 1-10 KW)
Switch Mode Power Supplies
Distributed Isolated Power
Feedback Control
High Current POL Converters
High Power LED Lighting & Industrial Power
Isolated Inverters
Isolated (unregulated) Bus Conv. (Vout 9-12V)
Server – Data Centers (400VDC)
Telecom ("Sweet Spot" 36-72 Vin 40-250W)

FAST CHARGER

Power Range 15kW - 100kW

- Main Transformer
- Resonant Inductor

BATTERY MANAGEMENT SYSTEM

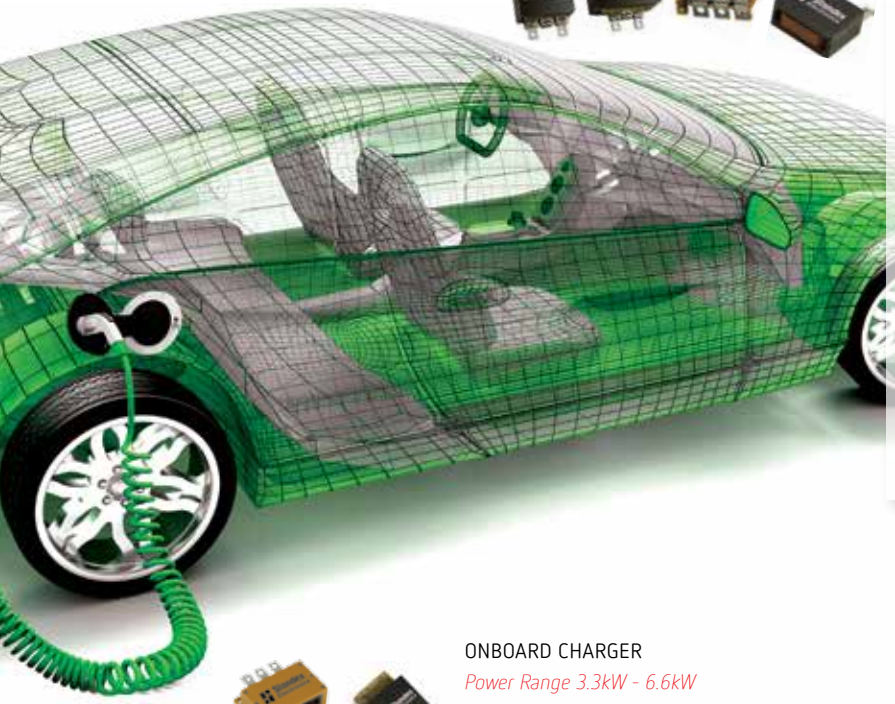
Power Range 25W

- Transformer

DC/DC CONVERTER

Power Range 1kW - 7kW

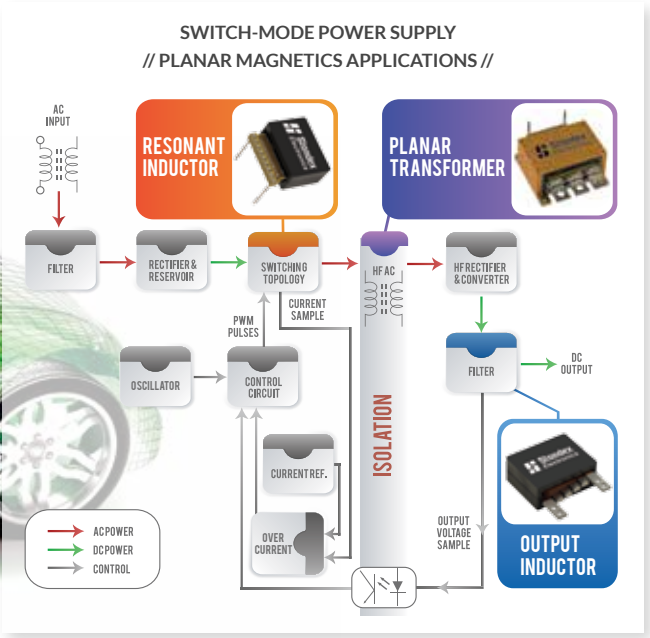
- Main Transformer
- Output Choke
- Resonant Inductor



ONBOARD CHARGER

Power Range 3.3kW - 6.6kW

- Main Transformer
- Resonant Inductor



"Planar transformers and inductors are the ideal solution for efficient SMPS applications."

CUSTOMER CONFIGURATIONS

Complex problems deserve custom solutions - "Inductors available for design in all packages."

TYPICAL PACKAGE RATINGS – APPLICATION DEPENDENT

	Size "Semi-Standard Package"	Optimum Power Range (W)	Page #	Max Current Rating (A)	Optimum Frequency Range (kHZ)	Forward	Flyback	Full Bridge	Full Bridge (ZVS)	Half Bridge	Half Bridge (ZVS)	Push-Pull	Resonant LLC	Typ. Dimensions [4] L	W	H (mm)	Isolation Pri-Sec, Pri-Core (VDC)
LOW POWER	025 [1]	10 - 50 [2]	14	20 [3]	300 - 500	√	√							17	16	7	500 - 2k
	035 [1]	20 - 150 [2]	15	30 [3]	200 - 400	√	√			√				23	20	8	500 - 2k
	055 [1]	50 - 200 [2]	16	50	175 - 300	√	√			√				25	22	10	500 - 2k
	075 [1]	100 - 500 [2]	17	50 [3]	150 - 300		√	√	√	√		√		29 - 35	27	11	5k, 500 - 2k
	110 [1]	150 - 700 [2]	18	60 [3]	100 - 250			√	√	√		√		34 - 40	29	13	5k, 500 - 2k
	135 [1]	300 - 1.2k	19	100	100 - 250			√	√	√	√	√		39 - 45	32	13 - 16	5k, 500 - 2k
MID POWER	220 [1]	1k - 3k	22	250	60 - 200			√	√	√	√	√	√	46 - 51	41	18 - 21	5k, 500 - 2k
	350 [1]	2k - 6k	25	300	40 - 150			√	√	√	√	√	√	54 - 59	51	22 - 26	5k, 500 - 2k
	560 [1]	3k - 10k	28	400	40 - 125			√	√	√	√	√	√	66 -72	64	26 - 31	5k, 500 - 2k
HIGH	900 [1]	10k - 20k	34	500	40 - 125			√	√	√	√	√	√	119	111	44	5k
	2100 [1]	10k - 100k	37	600	20 - 125			√	√	√	√	√	√	195	109	45	5k
	4000 [1]	100k - 250k	38	1000	20 - 125			√	√	√	√	√	√	307	164	63	5k

(1) Size Is Preceded By "p" for Transformer Or "i" For Inductor
(2) Patented (U.S. PAT. 7,129,809) Header Design With Superior Thermal Management, Coplanarity, And Repeatable Height
(3) Current Rating Is 30% Higher For Through-Hole Applications
(4) Length (L) May Vary Depending On Terminals / Height (H) Depending On Input / Output Requirements

Standex offers **hundreds of multi-layer PCB's and lead frames that can be custom configured** for your custom power requirements.

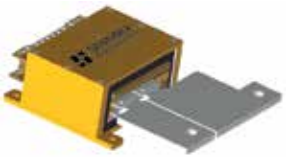
CUSTOMER CONFIGURATIONS

- Soft switching, single or multiple outputs
- Wide switching frequency range
- Input/output voltages
- Optimized turns ratio
- Thermal solutions heat sinks, etc.
- Multiple terminal/termination options
- Inductors available for design in all packages
- Value-added assemblies

Dual heatsink package with transformer and DC output inductor

Custom control transformer with multiple outputs

Custom heavy style busbar terminals for high current connection and thermal management



Custom Configurations / Standard Sizes

CUSTOM CONFIGURATIONS
Inductors, >30kW, Thermal Solutions, and Custom Terminations

HIGH POWER 10kW-250kW
SIZE 900, 2100, 4000

MID POWER 1kW-10kW
SIZE 220, 350, 560

LOW POWER 10W-1kW
SIZE 035, 055, 075, 110, 135

Surface mount solution with increased creepage and clearance

DC output inductor with narrow footprint and custom heatsink

Custom 6kW transformer with custom primary and secondary connections to accommodate customer packaging

Standex | Strong.

LOW POWER // 10W-1kW

"High Frequency Efficiency"

Size 025-135 is ideally suited for low power applications with an optimal power range of 10W-1kW. This size offers volumetric efficiency with low AC losses in a low profile, ultra compact package, as well as excellent repeatability and thermal management characteristics.

TYPICAL PACKAGE RATINGS - APPLICATION DEPENDENT

Optimum Power Range:	10W - 1kW
Current Rating Max.:	5-100A (+30% for THT)
Optimum Frequency Range:	300 - 500kHZ

Mounting Options:

Surface Mount (SMD), Through-Hole (THT)

Topologies:

Forward, Flyback, Full Bridge, Full Bridge (ZVS), Half Bridge, Half Bridge (ZVS), Push-Pull

Typical Dimensions:

L	W	H
17-45mm	16-32mm	6-20mm

Length (L) May Vary Depending On Terminals
Height (H) Depending On Input & Output Requirements

APPLICATIONS

- Renewable Energy - Photovoltaic Systems
- Aerospace & Military (high reliability & repeatability)
- Test Equipment
- Switch Mode Power Supplies
- Distributed Isolated Power
- Telecommunications
- Battery Management Systems
- Automotive, Electric & Hybrid Vehicles

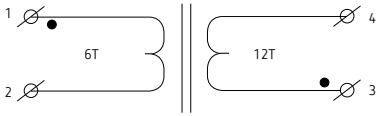
CUSTOMER CONFIGURATIONS

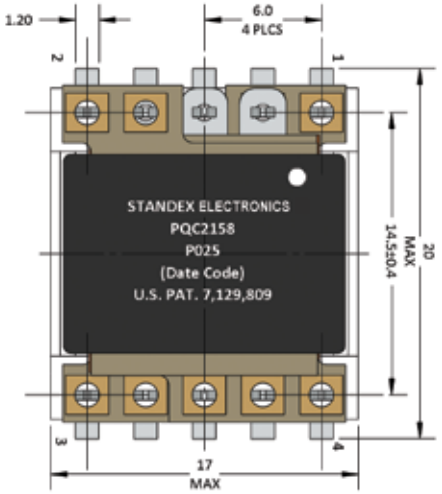
- Soft switching, single or multiple outputs
- Wide switching frequency range
- Input/output voltages
- Optimized turns ratio
- Thermal solutions heat sinks, etc.
- Multiple terminal/termination options
- Custom footprints for isolation requirements

That's **Standex** |Strong.

SIZE 025
10W-50W

DESIGN EXAMPLE





TRANSFORMER DESIGN | EXAMPLE - PQC2158 (U.S. PAT. 7,129,809)

ELECTRICAL SPECIFICATIONS

Topology	Forward w/Active Reset
Input Voltage	15-42VDC
Output Voltage/Current After Rectification	15VDC/2ADC
Turns Ratio - Np/Ns	6T/12T
Switching Frequency	300kHz
Duty Cycle At Low Input Voltage Max.	53.0%
Efficiency At Vin.=28Vdc/30W Output Calc.	98.2% (0.53W losses)
Operating Ambient Range (Full Load)	-20°C to +85°C

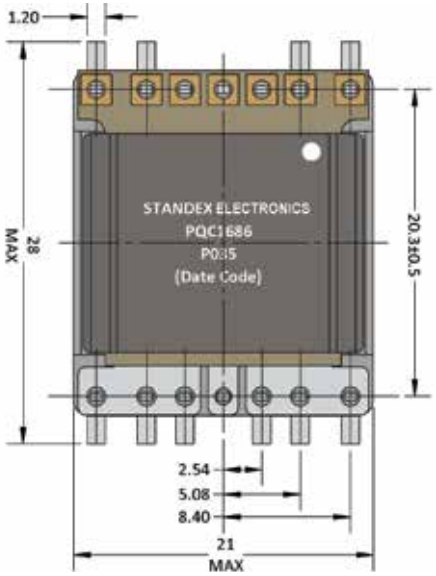
*When bonded to substrate and soldered using all available terminals.

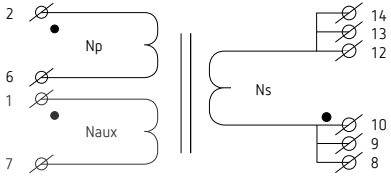
Temp. Rise, Max.	+15°C
Minimum Isolation Voltage	
Primary To Secondary And Core	200VDC
Secondary To Core	200VDC
Primary Inductance, Np, Min.	43µH
Primary Resistance, Rdc, Np, Max.	9mOhm
Secondary Resistance, Rdc, Ns, Max.	65mOhm
Leakage Inductance 1-2/3-4 Shorted, Typ.	0.2µH
Weight Range (Approximate)	12-50grams

NOTES:

1) PATENTED HEADER AND SURFACE MOUNT TERMINATIONS PROVIDE REPEATABLE CO-PLANARITY FOR MANUFACTURING

2) THROUGH-HOLE OR SURFACE MOUNT AVAILABLE





SIZE 035
20W-150W
DESIGN EXAMPLE

TRANSFORMER DESIGN | EXAMPLE - PQC1686

ELECTRICAL SPECIFICATIONS

Topology	Forward w/active rest
Input Voltage	36-72VDC
Output Power	50W
Rated Current From Ns1 Output	15A
Rated Current From Naux Output	0.5A
Switching Frequency	300kHz
Turns Ratio - Np/Ns/Naux	12T/2T/8T
Duty Cycle At Low Input Voltage Max.	61%
Operating Ambient Range (Full Load)	-40° C to +85° C
Minimum Inductance	248µH

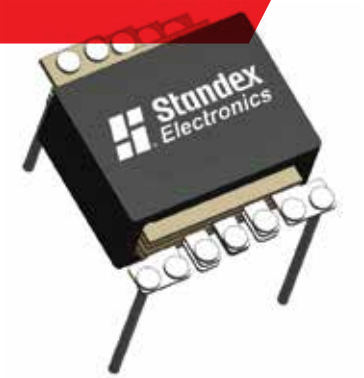
Minimum Efficiency At Nominal Input	97.50%
Temp. Rise Hot Spot Ambient	+45°C
Minimum Isolation Voltage	
Primary And Aux To Secondary	1500VDC
Primary And Aux To Core	1500VDC
Primary To Aux	200VDC
Secondary To Core	200VDC
Leakage Inductance Typ.	0.75µH
Weight Range (Approximate)	12-50grams

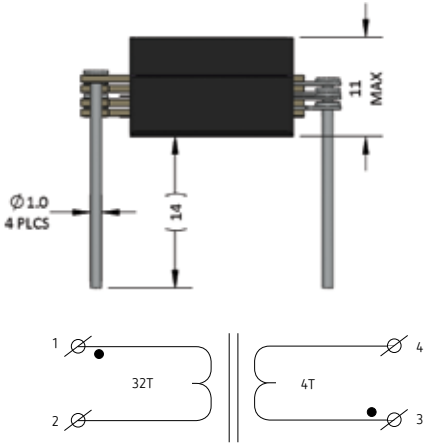
NOTES:

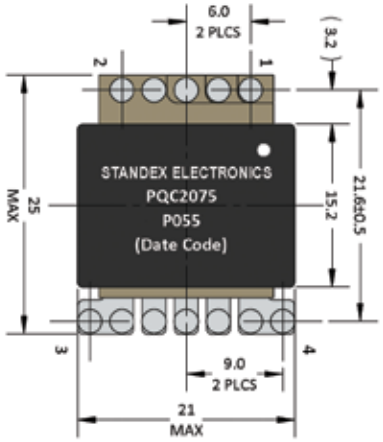
1) PATENTED HEADER AND SURFACE MOUNT TERMINATIONS PROVIDE REPEATABLE CO-PLANARITY FOR MANUFACTURING
2) THROUGH-HOLE OR SURFACE MOUNT AVAILABLE

SIZE 055
50W-200W

DESIGN EXAMPLE







TRANSFORMER DESIGN | EXAMPLE - PQC2075

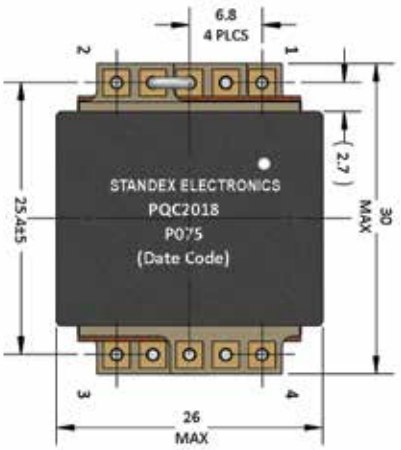
ELECTRICAL SPECIFICATIONS

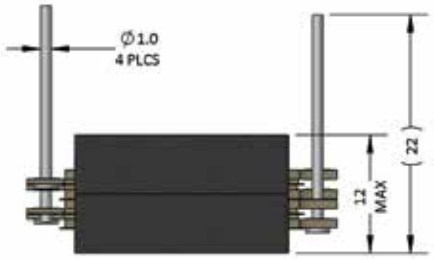
Topology	Continuous Flyback
Input Voltage (100 VDC Nominal)	93-105VDC
Output Power (Output Voltage/Current After Rectification)	36W (12V/3A)
*Surge Output Power	60W (12V/5A)
* 5 Sec., Once An Hour Or Less Frequency	
Turns Ratio - Np/Ns	8 : 1
Switching Frequency	150kHz
Duty Cycle, Max. At Low Input Voltage	53.0%
Efficiency At Vin=100VDC/36W Output Calc.	97.2% (1W losses)
Operating Ambient Range (Full Load)	-11°C to +70°C

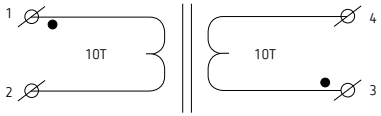
Temp. Rise, Natural Cooling 36W, Max.	+35°C
Minimum Isolation Voltage	
Primary To Secondary And Core	1000VDC
Secondary To Core	500VDC
Primary Inductance, Np, Typ.	200µH±5%
Primary Resistance, Rdc, Np, Max.	470mOhm
Secondary Resistance, Rdc, Ns, Max.	5mOhm
Leakage Inductance 1-2/3-4 Shorted, Typ. (Secondary Shorted With Low Impedance Jumper)	5µH
Weight Range (Approximate)	12-50grams

NOTES:

1) CUSTOM THROUGH HOLE FLYBACK DESIGN
2) PATENTED SURFACE MOUNT HEADER AVAILABLE
3) THROUGH-HOLE OR SURFACE MOUNT AVAILABLE







SIZE 075
100W-500W
DESIGN EXAMPLE

TRANSFORMER DESIGN | EXAMPLE - PQC2018

ELECTRICAL SPECIFICATIONS

Topology	Forward
Input Voltage	47-100VDC
Output Power (Output Voltage/Current After Rectification)	100W/(20VDC/5A)
Turns Ratio - Np/Ns	10T/10T
Switching Frequency	150kHz
Duty Cycle at Vin=47V, 1V Output Diode Drop	45.0%
Duty Cycle at Vin=100V, 1V Output Diode Drop	21.0%
Efficiency At Full Power Calculated	98.2% (1.8W losses)
Ambient Temp, Max.	+70°C

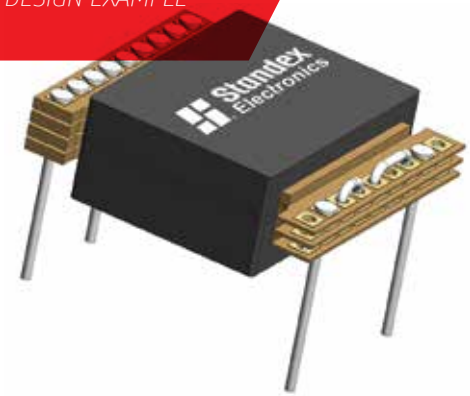
Temp. Rise, Hotspot External Heatsink, Max.	+40.5°C
Minimum Isolation Voltage	
Primary To Core	500VDC
Secondary To Primary And Core	1500VDC
Primary Inductance, Np, Min.	250µH
Primary Resistance, Np, Max.	25mOhm
Secondary Resistance, Ns, Max.	30mOhm
Leakage Inductance 1-2/3-4 Shorted, Typ.	0.4µH
Weight Range	20-70grams

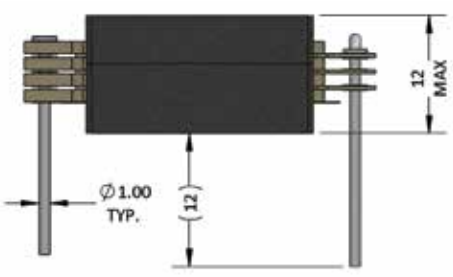
NOTES:

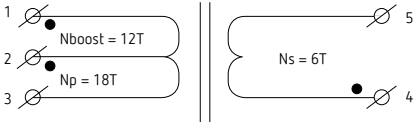
1) CUSTOM THROUGH HOLE FORWARD DESIGN
2) PATENTED SURFACE MOUNT HEADER AVAILABLE
3) THROUGH-HOLE OR SURFACE MOUNT AVAILABLE

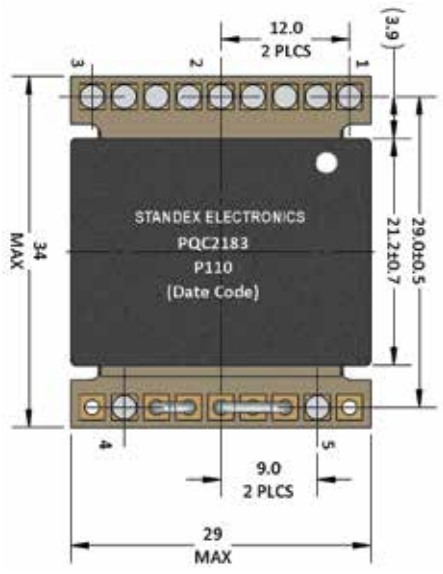
SIZE 110
150W-700W

DESIGN EXAMPLE









TRANSFORMER DESIGN | EXAMPLE - PQC2183

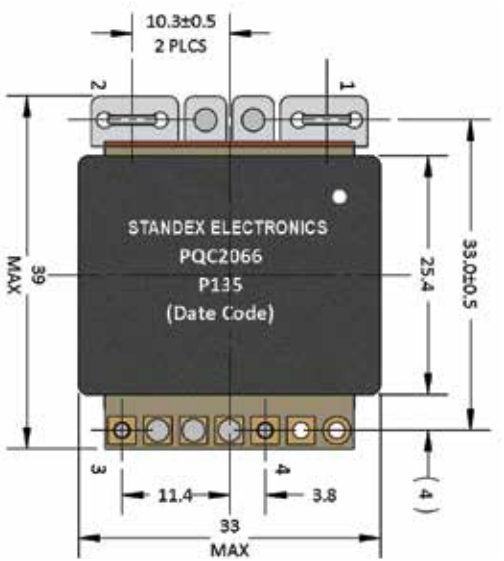
ELECTRICAL SPECIFICATIONS

Topology	Boost Forward
Input Voltage	120-150VDC
Output Power (Output Voltage/Current After Rectification)	200-300VDC/500-250mA
Output Power (Output Voltage/Current After Rectification) Ns1	0-30VDC/4A
Turns Ratio - Np/Nboost/Ns	18T/12T/6T
Switching Frequency	250kHz
Duty Cycle, Max. At Low Input Voltage	60.0%
Efficiency At Full Power Calculated	98.3% (2.5W losses)
Ambient Temp, Max.	-55°C to +85°C
Mounted On Heatsink With Max. Temp.	+65°C

Temp. Rise, Hotspot Ext. Heatsink, Max.	+25°C
Minimum Isolation Voltage	
Pri. To Secondary Ns1 And To Core	1000VDC
Secondary To Core	500VDC
Primary Inductance, Np, Min.	900µH
Primary Resistance, Rdc, Np, Max.	140mOhm
Secondary Resistance, Rdc, Ns, Max.	18mOhm
Boost Winding Resistance, Rdc, Nboost, Max.	80mOhm
Leakage Inductance 2-3/4-5 Shorted, Typ.	2µH
Weight Range (Approximate)	30-120grams

NOTES:

1) FOR OPTIMAL PERFORMANCE A THERMALLY CONDUCTIVE SUBSTRATE BETWEEN FERRITE & HEATSINK SHOULD BE UTILIZED
2) PATENTED SURFACE MOUNT HEADER AVAILABLE
3) HEATSINK & THERMAL SOLUTIONS AVAILABLE



SIZE 135
300W-1.2kW
DESIGN EXAMPLE

TRANSFORMER DESIGN | EXAMPLE - PQC2066

ELECTRICAL SPECIFICATIONS

Topology	Full Bridge ZVS
Input Voltage	42-56VDC
Output Power (Output Voltage/Current After Rectification)	120VDC/3.5A (420W)
Turns Ratio - Np/Nboost/Ns	3T/9T
Switching Frequency	200kHz
Duty Cycle, Max. At Low Input Voltage	97.0%
Efficiency At Full Power Calculated	98.95% (4.4W losses)
External Ambient Temp, Max.	+35°C

Temp. Rise, Hotspot Ambient, Max.	+58°C
Minimum Isolation Voltage	
Primary To Secondary	2121VDC
Secondary To Core	500VDC
Primary Inductance, Np, Min.	27µH
Primary Resistance, Np, Max.	1.8mOhm
Secondary Resistance, Ns, Max.	16mOhm
Leakage Inductance 1-2/3-4 Shorted, Typ.	50nH
Weight Range	50-150grams

NOTES:

1) FOR OPTIMAL PERFORMANCE A THERMALLY CONDUCTIVE SUBSTRATE BETWEEN FERRITE AND HEATSINK SHOULD BE UTILIZED
2) HEATSINK & THERMAL SOLUTIONS AVAILABLE

Standex | Smart.

MID POWER // 1kW-10kW

"Meets Critical Power Demands For EV Fast Charging"

Size 220, 350, and 560 are ideally suited for mid power applications with an optimal power range of 1kW-10kW. This size offers volumetric efficiency with low AC losses in a low profile, ultra compact package, as well as excellent repeatability and thermal management characteristics.

TYPICAL PACKAGE RATINGS - APPLICATION DEPENDENT

Optimum Power Range: 1kW - 10kW

Current Rating Max.: 45-72A (+30% for THT)

Optimum Frequency Range: 40 - 250kHZ

Mounting Options:

Through-Hole (THT)

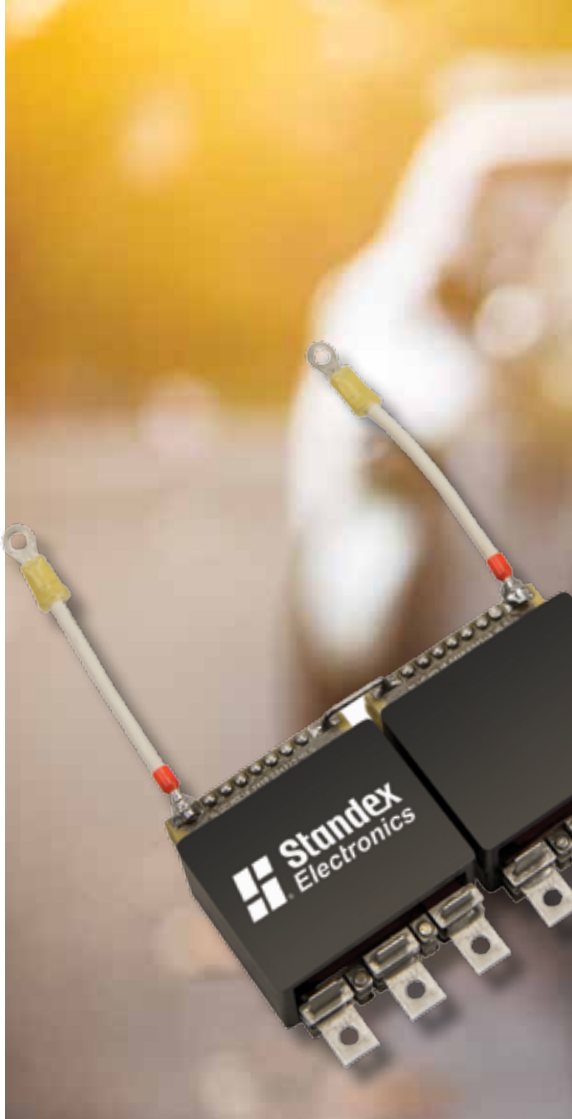
Topologies:

Full Bridge, Full Bridge (ZVS), Half Bridge, Half Bridge (ZVS), Push-Pull, Resonant

Typical Dimensions:

L	W	H
45-72mm	41-64mm	18-31mm

Length (L) May Vary Depending On Terminals
Height (H) Depending On Input & Output Requirements



APPLICATIONS

- Fast Charging
- Automotive, Electric & Hybrid Vehicles
- Renewable Energy
- Aerospace & Military (high reliability & repeatability)
- Welding, Lasers, & Test Equipment
- DC-DC Converters
- AC-DC resonant designs
- Battery Management Systems
- Switch Mode Power Supplies
- Distributed Isolated Power

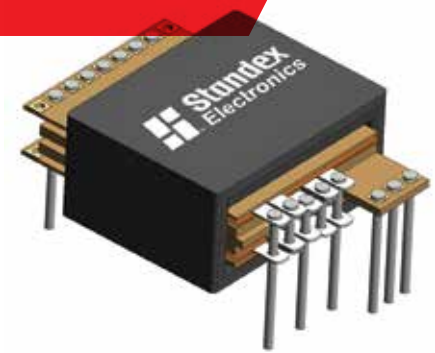
CUSTOMER CONFIGURATIONS

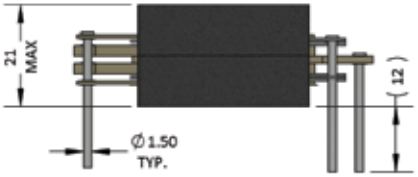
- Soft switching, single or multiple outputs
- Wide switching frequency range
- Input/output voltages
- Optimized turns ratio
- Thermal solutions heat sinks, etc.
- Multiple terminal/termination options
- Value-added assemblies

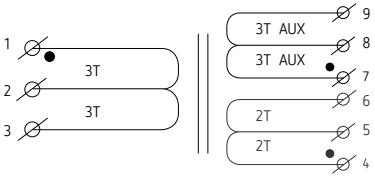
That's **Standex** | Smart.

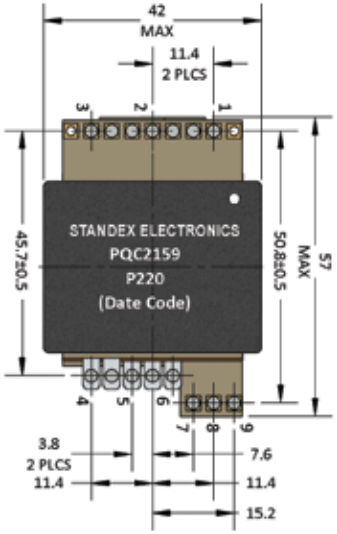
SIZE 220
1kW-3kW

DESIGN EXAMPLE









TRANSFORMER DESIGN | EXAMPLE - PQC2159

ELECTRICAL SPECIFICATIONS

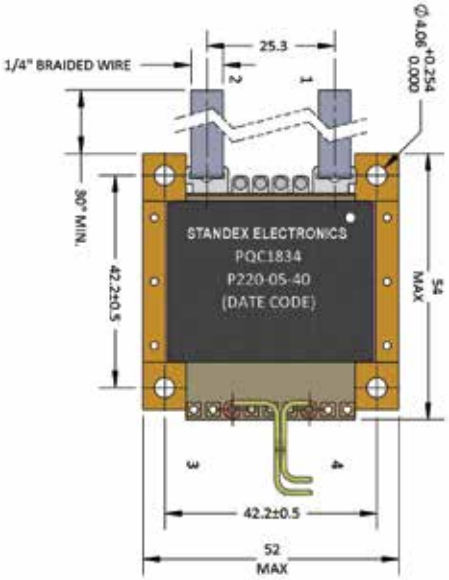
Topology	Push Pull
Input Voltage	23-125VDC
Output Power (Output Voltage/Current After Rectification)	
Ns1+Ns2 (320W Nom. Power)	13VDC/24.6A
Naux1+Naux2	16VDC/0.04A
Turns Ratio - Np1/Np2/Ns1/Ns2/Naux1/Naux2	3T/3T/2T/2T/3T/3T
Switching Frequency	70kHz
Duty Cycle, Max. Vin=23VDC	88.0%
Efficiency At Full Power (Calc.)	99% (3.2W losses)
Mounted On Heatsink With Max. Temp.	+90°C

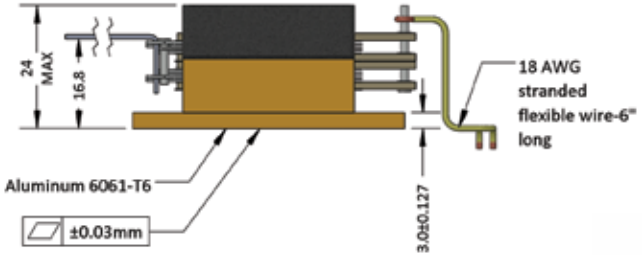
Temp. Rise Hot Spot External Heatsink, Max.	+30°C
Minimum Isolation Voltage	
Primary To Core, Secondary Ns1 And Naux1	1500VAC
Secondary Ns1 To Core	500VDC
Naux To Core	1500VAC
Primary Inductance, Np1 And Np2, Min.	45µH
Primary Resistance, Rdc, Np1 And Np2, Max.	2.5mOhm
Secondary Resistance, Rdc, Np1 And Np2, Max.	1.2mOhm
Leakage Inductance Np1+Np2/Ns1+Ns2 Shorted, Typ.	150nH
Weight Range	100-250grams

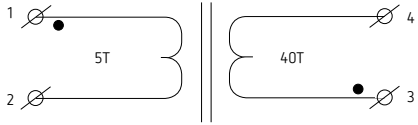
NOTES:

1) FOR OPTIMAL PERFORMANCE A THERMALLY CONDUCTIVE SUBSTRATE BETWEEN FERRITE AND HEATSINK SHOULD BE UTILIZED

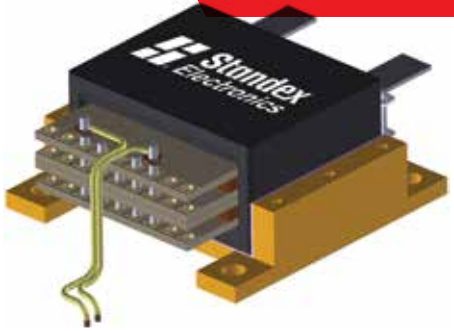
2) PATENTED TERMINALS AVAILABLE FOR SHIELDING ON HIGH CURRENT WINDING







SIZE 220
1kW-3kW
DESIGN EXAMPLE



TRANSFORMER DESIGN | EXAMPLE - PQC1834

ELECTRICAL SPECIFICATIONS

Topology	Full Bridge ZVS
Input Voltage	350-450VDC
Output Power (Output Voltage/Current After Rectification)	800W (320VDC/2.5ADC)
Turns Ratio - Np/Ns	5T/40T
Switching Frequency	100kHz
Duty Cycle, Max. 2.5A Operation	88%
Efficiency At Full Output 2.5A Operation (Calc.)	99.25% (6W losses)
External Heatsink Temperature Max.	+90°C
Temp. Rise Hot Spot External Heatsink, Max. Transformer Clamped To Heatsink	+20°C (2.5A operation)

Minimum Isolation Voltage	
Primary To Secondary And Core	1000VAC
Primary To Core	500VAC
Primary Inductance, Np, Min.	150µH
Primary Resistance, Np, Max.	2mOhm
Secondary Resistance, Max.	200mOhm
Leakage Inductance 3-4/1-2 Shorted, Typ.	8.0µH
Leakage Inductance 1-2/3-4 Shorted, Typ.	125nH
Weight Range	100-250grams

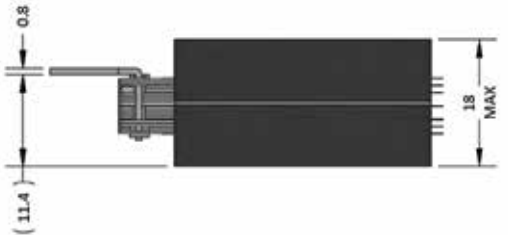
NOTES:

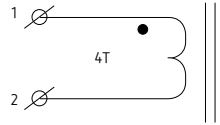
1) FOR OPTIMAL PERFORMANCE A THERMALLY CONDUCTIVE SUBSTRATE BETWEEN FERRITE AND HEATSINK SHOULD BE UTILIZED

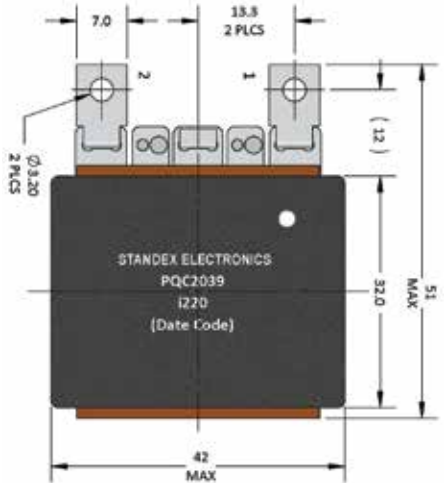
2) PATENTED TERMINALS AVAILABLE FOR SHIELDING ON HIGH CURRENT WINDING

SIZE 220
1kW-3kW

DESIGN EXAMPLE







INDUCTOR DESIGN | EXAMPLE - PQC2039

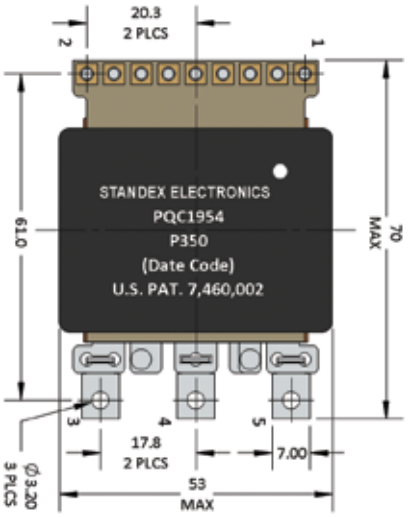
ELECTRICAL SPECIFICATIONS

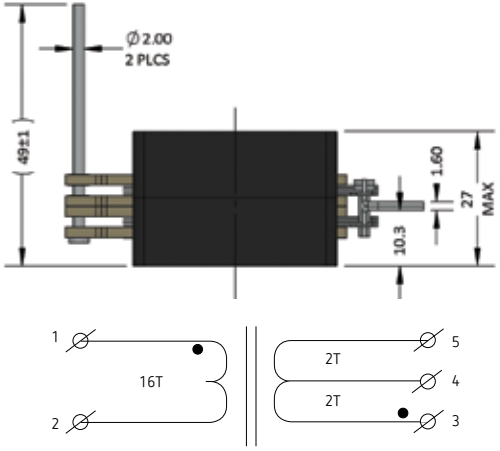
Inductance At Rated Current	2.4µH ±3%	Temp. Rise Hot Spot External Heatsink, Max.	+40°C
Rated Current	100A	Heatsink Temperature Max.	+65°C
Ripple Frequency	150kHz	Resistance Max.	1mOhm
Minimum Isolation Voltage (Winding To Core)	2000VDC	Total Losses	10W

NOTES:

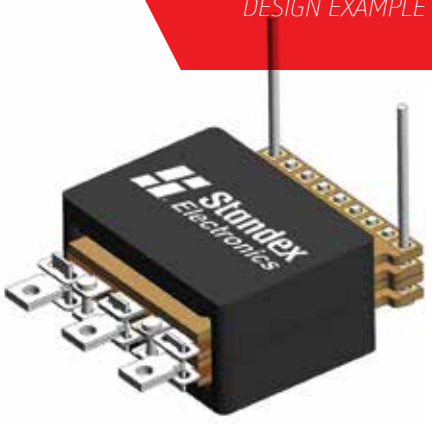
1) FOR OPTIMAL PERFORMANCE A THERMALLY CONDUCTIVE SUBSTRATE BETWEEN FERRITE AND HEATSINK SHOULD BE UTILIZED

2) PATENTED TERMINALS AVAILABLE FOR SPLITTING HIGH CURRENT WINDING





SIZE 350
2kW-6kW
DESIGN EXAMPLE



TRANSFORMER DESIGN | EXAMPLE - PQC1954 (U.S. PAT. 7,460,002)

ELECTRICAL SPECIFICATIONS

Topology	Full Bridge ZVS
Input Voltage	350-750VDC
Output Power (Output Voltage/Current After Rectification)	2.5kW typ. 3kW surge
Output Power (Output Voltage/Current After Rectification)	28.4VDC/83A, 100A surge
Turns Ratio - Np/Ns	16/2+2T
Switching Frequency	100kHz
Duty Cycle At Low Input	80.0%
Efficiency At Full Power (Calculated)	99.1% (21W losses)
Baseplate/Heatsink Temperature Max.	+85°C
Mounted On Heatsink With Max. Temp.	+90°C

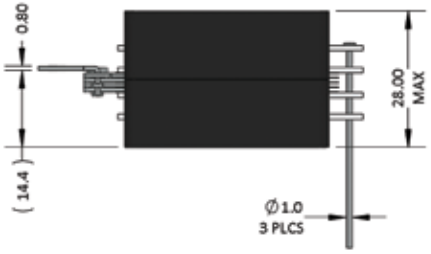
Temp. Rise Hot Spot Baseplate, Max.	+21°C
Minimum Isolation Voltage	
Primary To Secondary And Core	2500VAC for 1min
Secondary To Core	500VDC
Primary Inductance, Np, Min.	1792µH
Primary Resistance, Rdc, Np, Max.	22mOhm
Secondary Resistance, Rdc, Ns, Max.	1mOhm (0.5+0.5mOhm)
Leakage Inductance 1-2/3-4-5 Shorted, Typ.	1.5µH
Weight Range	150-400grams

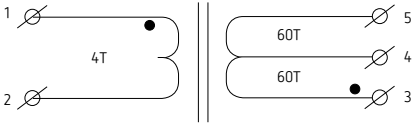
NOTES:

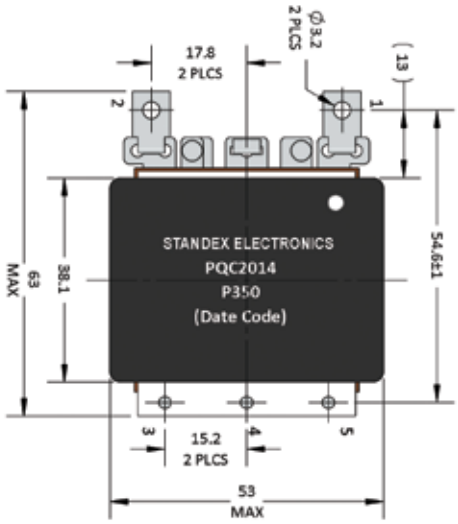
1) FOR OPTIMAL PERFORMANCE A THERMALLY CONDUCTIVE SUBSTRATE BETWEEN FERRITE AND HEATSINK SHOULD BE UTILIZED

2) PATENTED TERMINALS AVAILABLE FOR SPLITTING HIGH CURRENT WINDING

SIZE 350
2kW-6kW
DESIGN EXAMPLE







TRANSFORMER DESIGN | EXAMPLE - PQC2014

ELECTRICAL SPECIFICATIONS

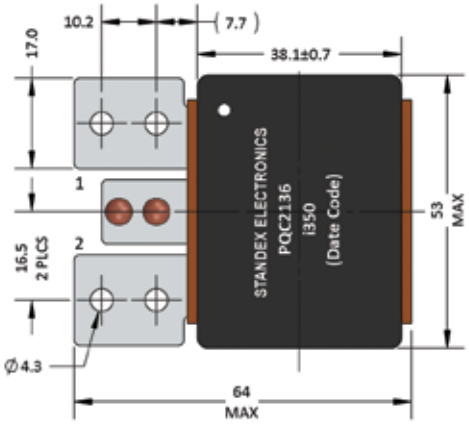
Topology	Full Bridge ZVS
Input Voltage	110-150VDC
Output Power (Output Voltage/Current After Rectification)	3100VDC/0.5A (1.55kW max)
Turns Ratio Np / Ns1 + Ns2	4T/60T + 60T
Switching Frequency	100kHz
Duty Cycle At 150 VDC	95%
Efficiency At Full Power (Calculated)	99.3% (11W losses)
Ambient Temperature Max.	+20°C
Airflow Temperature, Speed (Recommended)	50CFM

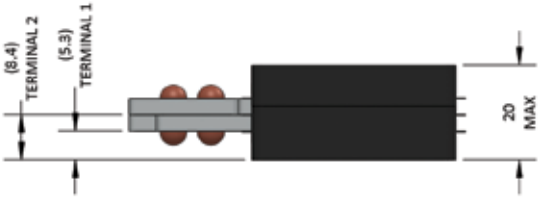
Temp. Rise Hot Spot Heatsink, Max.	+53°C
Minimum Isolation Voltage	
Primary To Core	500VAC
Secondary To Primary And Core	3000VDC
Primary Inductance, Np, Min.	100µH
Primary Resistance, Np, Max.	2mOhm
Secondary Resistance, Ns1 or Ns2, Max.	800mOhm
Leakage Inductance 1-2/3-4-5 Shorted, Typ.	0.2µH
Weight Range	150-400grams

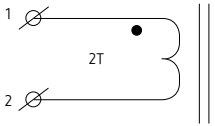
NOTES:

1) FOR OPTIMAL PERFORMANCE A THERMALLY CONDUCTIVE SUBSTRATE BETWEEN FERRITE AND HEATSINK SHOULD BE UTILIZED

2) PATENTED TERMINALS AVAILABLE FOR SPLITTING HIGH CURRENT WINDING







SIZE 350
2kW-6kW
DESIGN EXAMPLE

INDUCTOR DESIGN | EXAMPLE - PQC2136

ELECTRICAL SPECIFICATIONS

Inductance At Rated Current	0.5µH ±3%	Temp. Rise Hot Spot Baseplate (Heatsink Cooling), Max.	+40°C
Rated Current (Ave. ±12.5A Ripple)	250A	Heatsink Temperature Max.	+65°C
Ripple Frequency	200kHz	Resistance Max.	0.2mOhm
Minimum Isolation Voltage (Winding To Core)	500VDC	Total Losses	18.4W

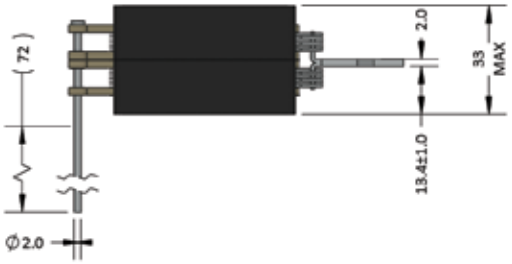
NOTES:

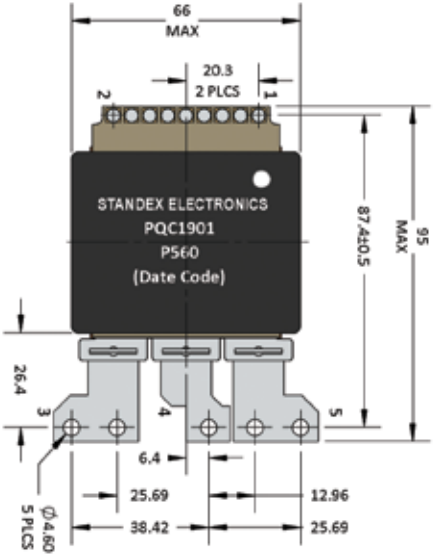
1) FOR OPTIMAL PERFORMANCE A THERMALLY CONDUCTIVE SUBSTRATE BETWEEN FERRITE AND HEATSINK SHOULD BE UTILIZED

2) PATENTED TERMINALS AVAILABLE FOR SPLITTING HIGH CURRENT WINDING

SIZE 560
3kW-10kW

DESIGN EXAMPLE





TRANSFORMER DESIGN | EXAMPLE - PQC1901 (U.S. PAT. 7,460,002)

ELECTRICAL SPECIFICATIONS

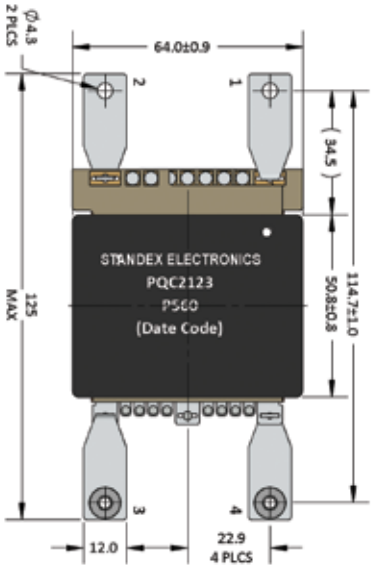
Topology	Half Bridge ZVS
Input Voltage	800VDC
Output Power (Output Voltage/Current After Rectification)	6144W Max. (24VDC/256A)
Turns Ratio - Np/Ns	20T/1T + 1T
Switching Frequency	50kHz
Duty Cycle, Max.	100%
Efficiency At Full Power (Calculated)	99.24% (47W Losses)
Ambient Temp. Max. (Transfer clamped to heatsink)	+85°C

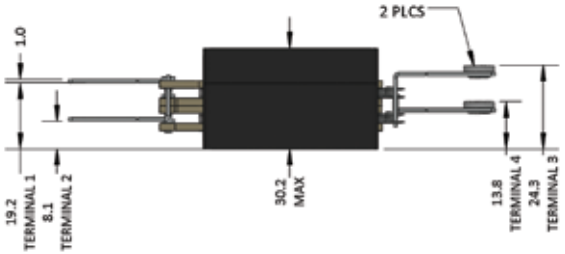
*Heatsink Provided By Customer

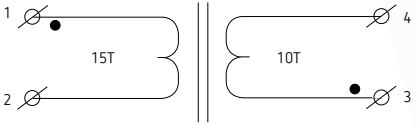
Temperature Rise Hot Spot Heatsink, Max.*	+37.6°C
Minimum Isolation Voltage	
Primary To Secondary And Core	3000VDC
Secondary To Core	500VDC
Primary Inductance, Np, Min.	4000µH
Primary Resistance, Np, Max.	30mOhm
Secondary Resistance, Ns, Max.	0.25mOhm
Leakage Inductance 1-2/3-4-5 Shorted, Typ.	3µH
Weight Range	650-700grams

NOTES:

1) FOR OPTIMAL PERFORMANCE A THERMALLY CONDUCTIVE SUBSTRATE BETWEEN FERRITE AND HEATSINK SHOULD BE UTILIZED
2) PATENTED TERMINALS AVAILABLE FOR SPLITTING HIGH CURRENT WINDING
3) CUSTOM TERMINALS CAN BE DESIGNED AND OPTIMIZED







SIZE 560
3kW-10kW
DESIGN EXAMPLE

TRANSFORMER DESIGN | EXAMPLE - PQC2123

ELECTRICAL SPECIFICATIONS

Topology	Full Bridge ZVT
Input Voltage	760-840VDC
Output Power (Output Voltage/Current After Rectification)	12kW max. (500VDC/24ADC)
Output Power (Output Voltage/Current After Rectification)	28.4VDC/83A, 100A Surge
Turns Ratio - Np/Ns	15T/10T
Switching Frequency	100kHz
Duty Cycle At Low Input Voltage Max.	99.0%
Efficiency At Full Power (Calculated)	99.3% (87.4W Losses)
External Heatsink Temperature Max.	+45°C

*Heatsink Provided By Customer

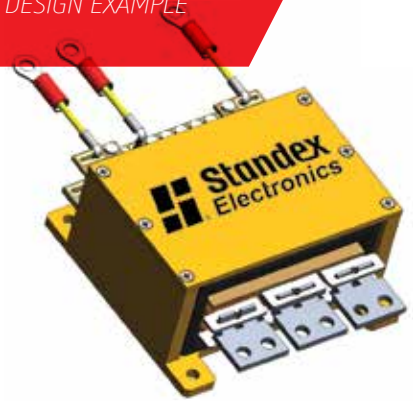
Temp. Rise Hot Spot External Heatsink*, Max.	+69.9°C
Minimum Isolation Voltage	
Primary To Secondary And Core	5700VAC for 1sec
Secondary To Core	2850VAC for 1sec
Primary Inductance, Np, Min.	600µH
Primary Resistance, Rdc, Np, Max.	20mOhm
Secondary Resistance, Rdc, Ns, Max.	18mOhm
Leakage Inductance 1-2/3-4 Shorted, Typ.	1.8µH
Weight Range	300-800grams

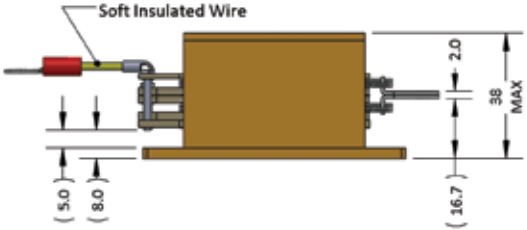
NOTES:

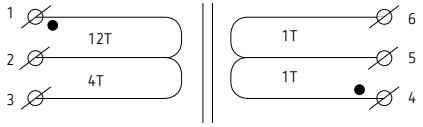
1) FOR OPTIMAL PERFORMANCE A THERMALLY CONDUCTIVE SUBSTRATE BETWEEN FERRITE AND HEATSINK SHOULD BE UTILIZED
2) PATENTED TERMINALS AVAILABLE FOR SPLITTING HIGH CURRENT WINDING
3) CUSTOM TERMINALS CAN BE DESIGNED AND OPTIMIZED

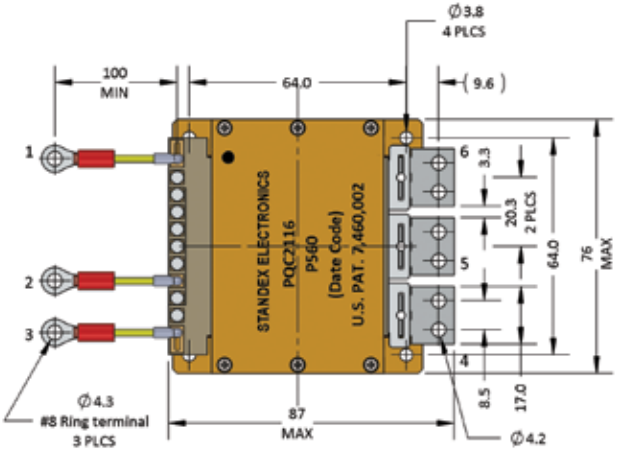
SIZE 560
3kW-10kW

DESIGN EXAMPLE









TRANSFORMER DESIGN | EXAMPLE - PQC2116

ELECTRICAL SPECIFICATIONS

Topology	Full Bridge ZVS
Input Voltage Np1 = 12 Turns (1-2)	350-630VDC
Input Voltage Np2 = 16 Turns (1-3)	500-820VDC
Output Power (Output Voltage/Current After Rectification)	28VDC/250A (7kW)
Turns Ratio - Np1/Np2/Ns1/Ns2	12T/16T/1T/1T
Switching Frequency	100kHz
Duty Cycle, At Vin=350VDC Max.	99%
Efficiency At Full Power (Calculated)	99.2% (55W losses)
External Heatsink Temperature Max.	+65°C
*Transformer Clamped To Heatsink	

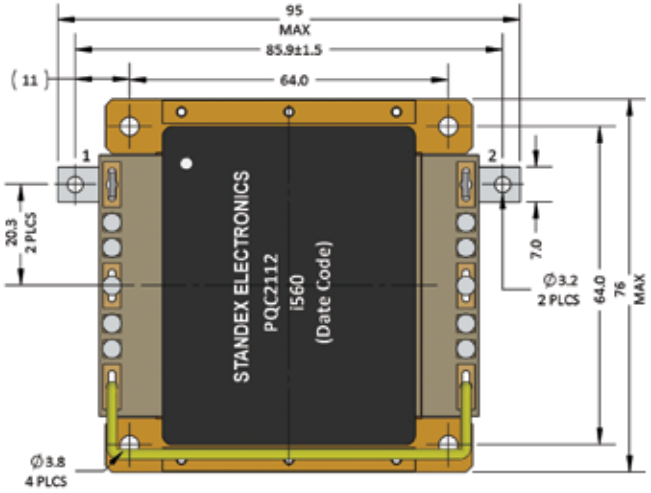
Temp. Rise Hot Spot External Heatsink*, Max.	+44°C
Minimum Isolation Voltage	
Primary To Secondary And Core	2700VAC
Secondary To Core	500VDC
Primary Inductance, Np1 (1-2)/Np2 (1-3), Min.	1440/2560µH
Primary Resistance, Rdc, Np,1 (1-2)/Np2 (1-3), Max.	14/18mOhm
Secondary Resistance, Rdc, Ns1 + Ns2, Max.	0.3mOhm
Leakage Inductance 1-2/Sec. Shorted, Typ.	900nH
Leakage Inductance 1-3/Sec. Shorted, Typ.	1800nH
Weight Range	300-800grams

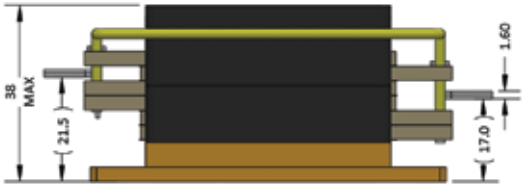
NOTES:

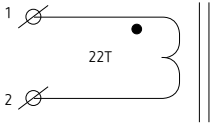
1) FOR OPTIMAL PERFORMANCE A THERMALLY CONDUCTIVE SUBSTRATE BETWEEN FERRITE AND HEATSINK SHOULD BE UTILIZED

2) PATENTED TERMINALS AVAILABLE FOR SPLITTING HIGH CURRENT WINDING

3) CUSTOM TERMINALS CAN BE DESIGNED AND OPTIMIZED







SIZE 560
3kW-10kW
DESIGN EXAMPLE

INDUCTOR DESIGN | EXAMPLE - PQC2112 (U.S. PAT. 7,460,002)

ELECTRICAL SPECIFICATIONS

Inductance At Rated Current	100µH ±10%	Temp. Rise Hot Spot Baseplate, Max.	+46°C
Rated Current (Ave. ±12.5A Ripple)	32ADC +3App	Heatsink Temperature Max.	+55°C
Ripple Frequency	100kHz	Resistance Max.	22mOhm
Minimum Isolation Voltage (Winding To Core)	2500VDC	Total Losses At Max. Current	28.7W

NOTES:

1) FOR OPTIMAL PERFORMANCE A THERMALLY CONDUCTIVE SUBSTRATE BETWEEN FERRITE AND HEATSINK SHOULD BE UTILIZED
2) PATENTED TERMINALS AVAILABLE FOR SPLITTING HIGH CURRENT WINDING
3) CUSTOM TERMINALS CAN BE DESIGNED AND OPTIMIZED

Standex | Strong.

HIGH POWER // 10kW-250kW

"Renewable Energy "

Size 900, 2100, and 4000 are ideally suited for high power applications with an optimal power range of 10kW-250kW. This size offers volumetric efficiency with low AC losses in a low profile, ultra compact package, as well as excellent repeatability and thermal management characteristics.

TYPICAL PACKAGE RATINGS - APPLICATION DEPENDENT

Optimum Power Range:	10kW - 250kW
Current Rating Max.:	500A (+30% for THT)
Optimum Frequency Range:	40 - 125kHZ

Mounting Options:

Through-Hole (THT)

Topologies:

Full Bridge, Full Bridge (ZVS), Half Bridge, Half Bridge (ZVS), Push-Pull, Resonant

Typical Dimensions:

L	W	H
120-145mm	94-111mm	38-45mm

Length (L) May Vary Depending On Terminals
Height (H) Depending On Input & Output Requirements

APPLICATIONS

- Fast Charging
- Electric & Hybrid Transportation
- Renewable Energy - Wind & Photovoltaic Systems
- Aerospace & Military (high/repeat reliability)
- Welding, Lasers, & Test Equipment
- DC-DC Converters
- AC-DC resonant designs
- Switch Mode Power Supplies
- Distributed Isolated Power
- Grid Energy Storage

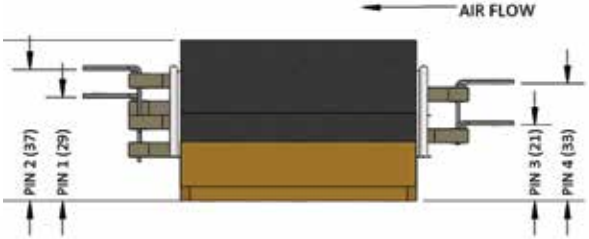
CUSTOMER CONFIGURATIONS

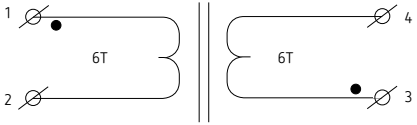
- Soft switching, single or multiple outputs
- Wide switching frequency range
- Input/output voltages
- Optimized turns ratio
- Thermal solutions heat sinks, etc.
- Multiple terminal/termination options
- Value-added assemblies

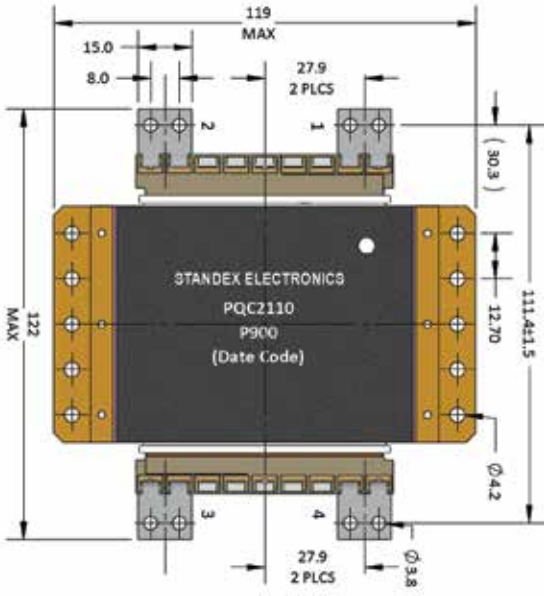
That's **Standex** | Strong.

SIZE 900
10kW-20kW

DESIGN EXAMPLE







TRANSFORMER DESIGN | EXAMPLE - PQC2110

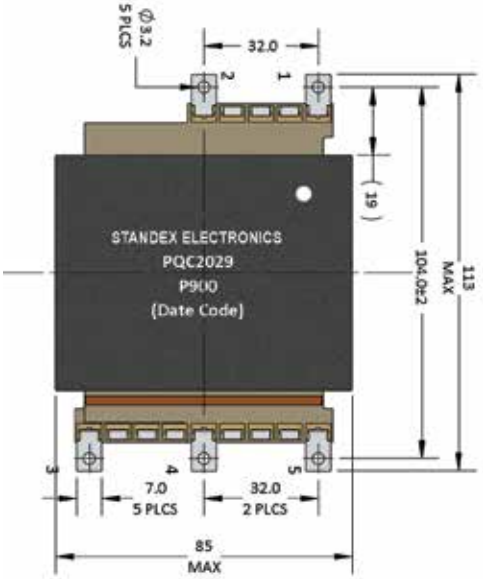
ELECTRICAL SPECIFICATIONS

Topology	LLC Resonant
Input Voltage	350-450VDC
Output Power (Output Voltage/Current After Rectification)	24kW ave. (400VDC/60ADC)
Turns Ratio - Np/Ns	6T to 6T
Switching Frequency	100kHz
Duty Cycle At 410VDC Input, Max.	98%
Max. Efficiency 24kW Output & Vin=410VDC	99.59% (99W losses calc.)
Ambient Temperature Max.	+65°C
External Heatsink Temperature Max.	+60°C
Temp. Rise Hot Spot Baseplate*, Max.	+59°C

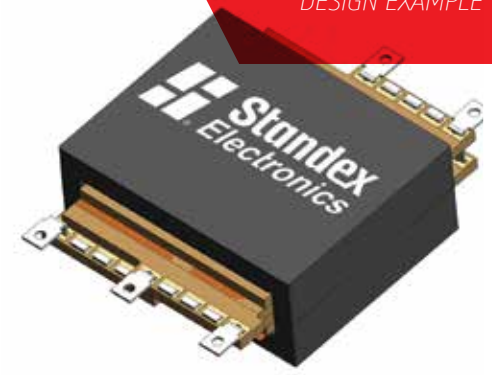
*Airflow Of Cooling Fan (Required)	50CFM
Minimum Isolation Voltage	
Primary To Secondary And Core	4000VAC
Secondary To Core	4000VAC
Primary Inductance, Np, Min.	540µH
Primary Resistance, Rdc, Np, Max.	1.5mOhm
Secondary Resistance, Rdc, Ns, Max.	3mOhm
Leakage Inductance 1-2/3-4 Shorted, Typ.	220µH
Weight Range	800-1600grams

NOTES:

1) CUSTOM TOOLED CORE UNIQUE TO STANDEX PRODUCT OFFERING
2) LARGE CROSS-SECTIONAL AREA REDUCES MAGNETIC FLUX DENSITY
3) MULTI LAYER PCB'S REDUCE AC LOSSES



SIZE 900
10kW-20kW
DESIGN EXAMPLE



TRANSFORMER DESIGN | EXAMPLE - PQC2029

ELECTRICAL SPECIFICATIONS

Topology	LLC Resonant
Input Voltage	400VDC
Output Power (Output Voltage/Current After Rectification)	10kW max. (400VDC/25ADC)
Secondary Current Nom. Rms Half Sec. Current	19A RMS sinusoidal
Turns Ratio - Np/Ns1+Ns2	8T/8T + 8T
Switching Frequency	100kHz fixed
Duty Cycle Max.	100% (50% + 50%)
Efficiency At Full Power (Calculated)	99.5% (50W losses)
External Heatsink Temperature Max.	+80°C
Temp. Rise Hot Spot External Heatsink*, Max.	+25°C

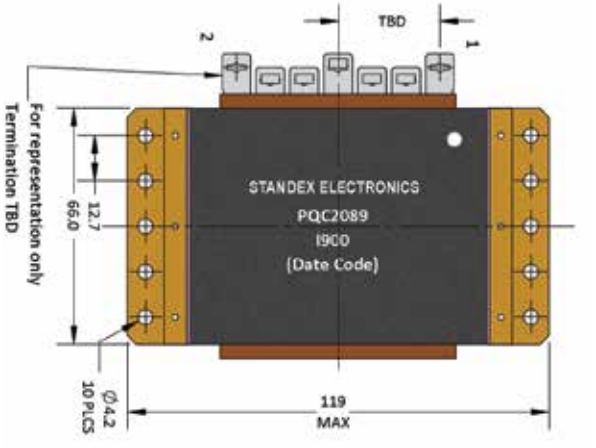
Minimum Isolation Voltage	
Primary To Secondary	2500VAC for 1min
Primary To Core	2500VAC for 1min
Secondary To Core	2500VAC for 1min
Primary Inductance, Np, Min.	1000µH
Primary Resistance, Np, Max.	5mOhm
Secondary Resistance, Ns, Max.	10mOhm
Leakage Inductance 1-2/3-4-5 Shorted, Typ.	0.7µH
Weight Range	800-1600grams

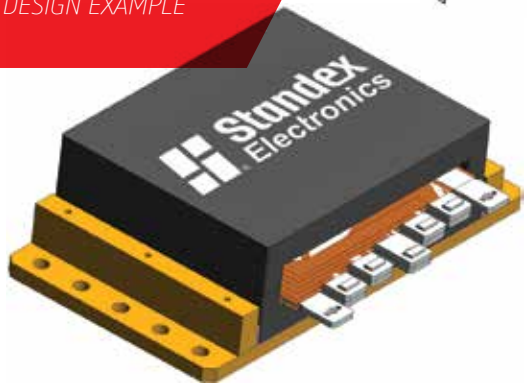
NOTES:

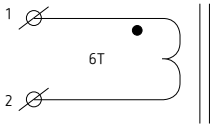
1) CUSTOM TOOLED CORE UNIQUE TO STANDEX PRODUCT OFFERING
2) LARGE CROSS-SECTIONAL AREA REDUCES MAGNETIC FLUX DENSITY
3) MULTI LAYER PCB'S REDUCE AC LOSSES

SIZE 900
10kW-20kW

DESIGN EXAMPLE







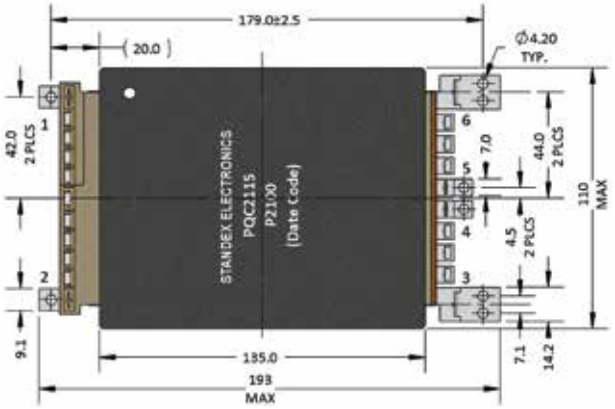
INDUCTOR DESIGN | EXAMPLE - PQC2089

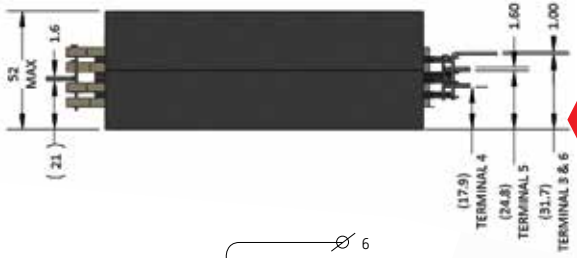
ELECTRICAL SPECIFICATIONS

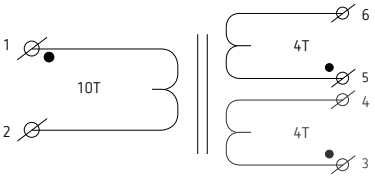
Inductance At Rated Current	12µH	Temp. Rise Hot Spot Baseplate, Typ.	+19°C
Rated Current	120ADC	Heatsink / Baseplate Temperature Max.	+70°C
Ripple Frequency	100kHz	Resistance Max.	2mOhm
Minimum Isolation Voltage (Winding To Core / Heatsink)	500VDC	Total Losses At Max. Current (Estimated Calc.)	25W

NOTES:

1) CUSTOM TOOLED CORE UNIQUE TO STANDEX PRODUCT OFFERING
2) LARGE CROSS-SECTIONAL AREA REDUCES MAGNETIC FLUX DENSITY







SIZE 2100
10kW-100kW
DESIGN EXAMPLE

TRANSFORMER DESIGN | EXAMPLE - PQC2115

ELECTRICAL SPECIFICATIONS

Topology	LLC ZVS Converter
Input Voltage	730-880VDC
Output Power (Output Voltage/Current After Rectification)	60kW max. (400VDC/75A)
Secondary Current Nom. Rms Half Sec. Current	19A RMS sinusoidal
Turns Ratio - Np/Ns1/Ns2	10T/4T/4T
Switching Frequency	80kHz (60-104kHz range)
Duty Cycle At Vin=800V Vout=400V, Max.	99% after rectification
Efficiency At Full Power (Calculated)	99.5% (150W losses)
External Heatsink Temperature Max.	+65°C
Ambient Temperature	+45°C

Temp. Rise Hot Spot Ambient Max. (Transformer Clamped To Heatsink)	+45°C
Minimum Isolation Voltage	
Primary To Secondary	1750VAC
Primary And Secondary To Core	2000VAC
Primary Inductance, Np, Min.	39µH ±5%
Primary Resistance, Rdc, Np, Max.	3mOhm
Secondary Resistance, Rdc, Ns1 or Ns2, Max.	2mOhm
Leakage Inductance 1-2/Secondary Shorted, Typ.	0.5µH
Thermal Impedance - Hotspot External Heatsink	0.3°C/W
Weight (Approximate)	2000grams

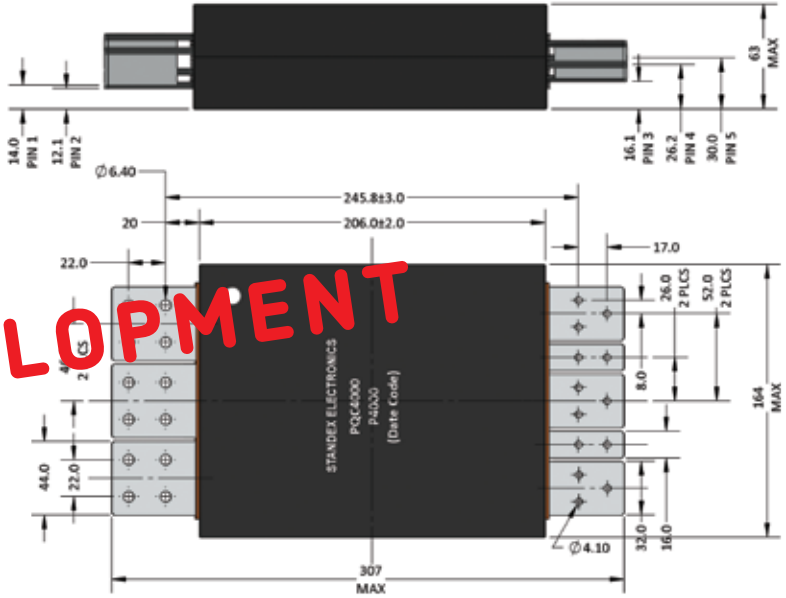
NOTES:

1) INDUSTRY BEST FORM FACTOR TO POWER RATIO
2) INHERENT ISOLATION DUE TO PCB WINDINGS
3) UNIQUE TERMINATION OPTIONS AVAILABLE FOR CUSTOMIZATION
4) MULTI LAYER PCB'S REDUCE AC LOSSES

SIZE 4000
100kW-250kW

DESIGN EXAMPLE

IN DEVELOPMENT



TRANSFORMER DESIGN | EXAMPLE

ELECTRICAL SPECIFICATIONS

Topology	Full Bridge ZVS
Input Voltage	450-800VDC
Output Power (Output Voltage/Current After Rectification)	250kW max. (400VDC/625A)
Turns Ratio - Np/Ns1/Ns2	2T/2T/2T
Switching Frequency	50kHz
Duty Cycle At Low Input Voltage Max.	89.1%
Efficiency At Full Power (Calculated)	99.6% (855W losses)
*External Heatsink Temperature Max.	+40°C
Ambient Temperature Max.	+40°C

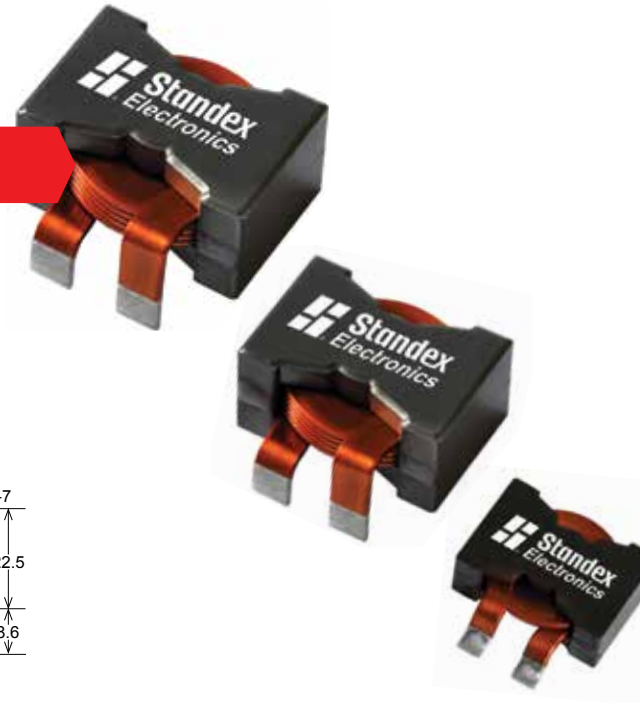
Temp. Rise Hot Spot Ambient External Heatsink*, Max.	+85.4°C
Minimum Isolation Voltage	
Primary To Secondary	2000VAC
Primary And Secondary To Core	2000VAC
Primary Inductance, Np, Min.	TBD
Primary Resistance, Np, Max.	0.17mOhm
Secondary Resistance, Ns1 + Ns2, Max.	0.4mOhm
Leakage Inductance 1-2/3-4-5 Shorted, Typ.	16nH
Weight (Approximate)	2000grams

NOTES:

1) INDUSTRY BEST FORM FACTOR TO POWER RATIO
2) INHERENT ISOLATION DUE TO PCB WINDINGS
3) UNIQUE TERMINATION OPTIONS AVAILABLE FOR CUSTOMIZATION

PQ SERIES INDUCTORS // 0.9-6.0µH, 80A Max

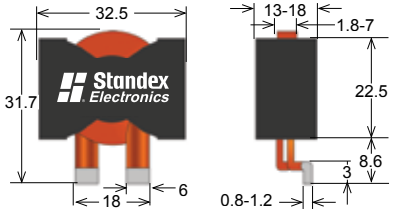
"Fixed Power Inductors"



Size PQ32 fixed power inductors w/ferrite core are used in switching power supplies, DC/DC converters, FPGA and low/high profile current, high current POL converters, feedback control, overload sensing, load drop and shut down detection.

PQ32 (SMD/THT)

Inductance at Rated Current:	0.9 - 6.0 µH
Rated Current Typ.:	45 -60 A
Height Max.:	11 - 18 mm
Mounting Options:	31.7 x 32.5 mm



PQ3218 - 6R0 - 50 - T - R

1 2 3 4 5 6

Available in Tape & Reel Packaging

CUSTOMER CONFIGURATIONS

1. Core style and size
2. Typical height in mm
3. Min. inductance in "µH", "R" = decimal point
4. Typical Amp rating
5. Terminal style - "G" = SMT, "T" = Through hole tabs
6. Optional packaging "R" = Tape & Reel

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