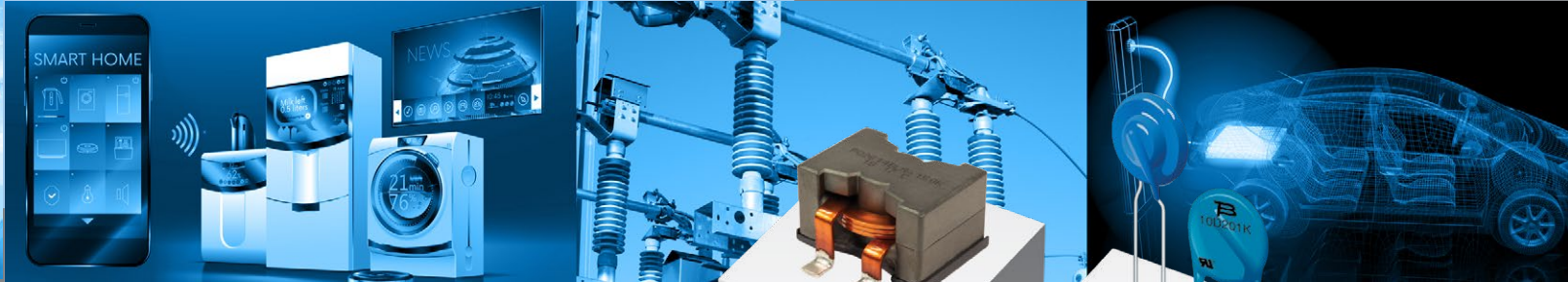


Power Supply

Component Guide



BOURNS®

Overview

STANDARDS & REGULATIONS

Regulations Regarding Power Consumption and Efficiency		
Program	Region	Description
ENERGY STAR	US, Worldwide	Program driven by US Environmental Protection Agency (EPA) to reduce standby power and power at light load; the program covers a wide range of industrial and consumer devices (e.g., white goods, computers, equipment).
80 PLUS®	US, Worldwide	Voluntary certification program for computer power supplies to increase energy efficiency; to obtain certification, power supplies must have more than 80 % energy efficiency at 20 %, 50 % and 100 % of rated load and a power factor of 0.9 or greater at 100 % load.

There are many more regulations specific to regions and/or countries.

EMC - Compatibility	
Emissions	Reference (Standards)
Radiated E-field Emissions (30 MHz to 40 GHz)	FCC Part 15 FCC Part 18 EN 55011 / CISPR 11 EN 55022 / CISPR 22 EN 61000-6-3 EN 61000-6-4 CNS 13438 KN22 AS/NZS CISPR 22 VCCI TCVN 7189
Radiated H-field Emissions (9 kHz to 30 MHz)	FCC Part 15 EN 55011 / CISPR 11
Conducted Emissions (150 kHz to 30 MHz) Note: This includes both AC and telecom, as denoted by the asterisk	FCC Part 15 FCC Part 18 EN 55011 / CISPR 11 EN 55022 / CISPR 22* EN 6100-6-3 EN6100-6-4 CNS 13438* KN22* AS/NZS CISPR 22 VCCI* TCVN 7189*
AC Power Line Harmonics	EN 61000-3-2 / IEC 61000-3-2
AC Power Line Flicker	EN 61000-3-3 / IEC 61000-3-3

Immunity	Reference (Standards)
Electrostatic Discharge	EN 61000-4-2 / IEC 61000-4-2
Radiated RF Immunity	EN 61000-4-3 / IEC 61000-4-3
Electrical Fast Transient	EN 61000-4-4 / IEC 61000-4-4
Surge Immunity	EN 61000-4-5 / IEC 61000-4-5
Conducted RF Immunity	EN 61000-4-6 / IEC 61000-4-6
Power Frequency H-field	EN 61000-4-8 / IEC 61000-4-8
Power Quality Failure	EN 61000-4-11 / IEC 61000-4-11

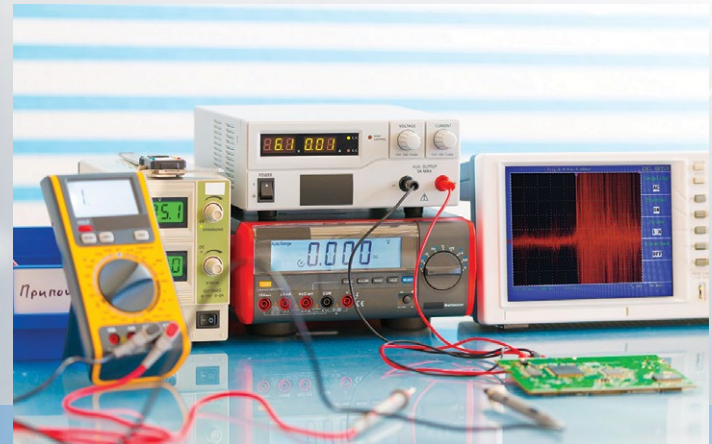
Other Regulations Regarding Safety and Surge Protection

IEC61643-1; EN61643-11 and EN61643-21
Telcordia Technologies
ANSI/IEEE C62.xx
Underwriters Laboratories UL1449 3rd

Standards and regulations affect and motivate the design of power supplies, specifically:

- EMC - Electromagnetic Compatibility
- PFC - Power Factor Correction
- Circuit Protection (Transients, Surges, Power Cross)

Whether external or internal, forward or flyback, each type of SMPS is subject to regulatory requirements. A power supply for a telecom installation must potentially comply with Telcordia or ITU requirements, depending on the target region and application. In the consumer or industrial sector, IEC, UL and CSA standards govern the equipment level. Bourns can help and advise which protection scheme may be best to comply with requirements.





SELECT & DESIGN COMPONENTS

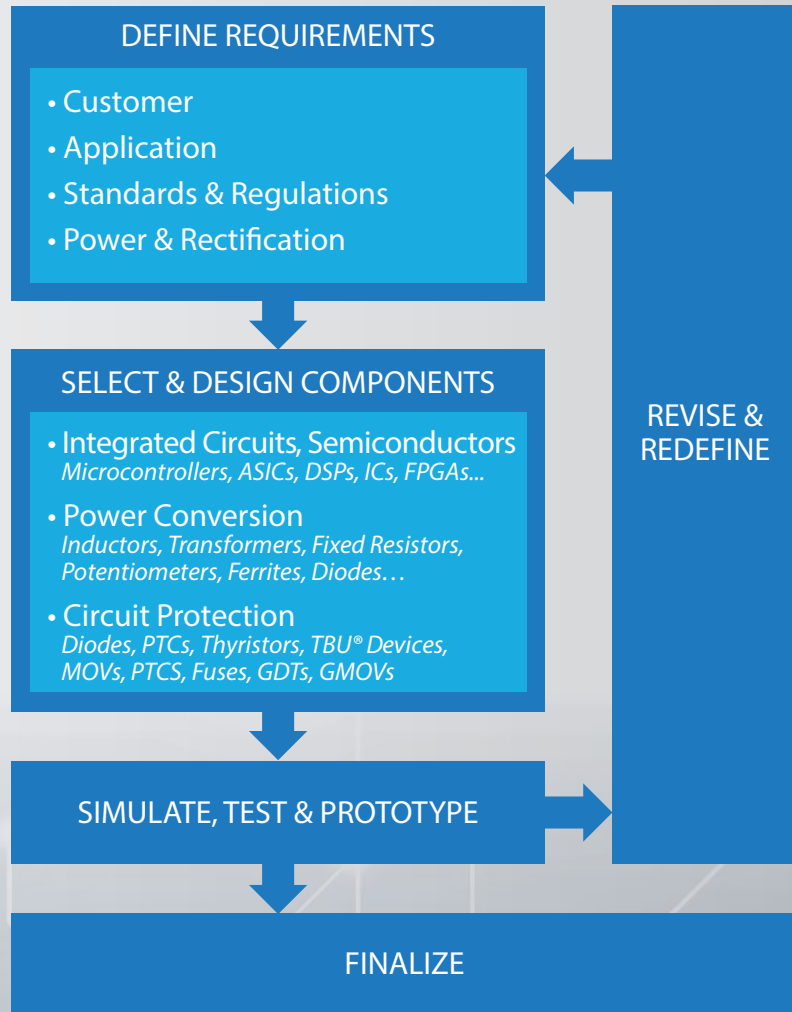
While designing power supplies, engineers decide if custom or off-the-shelf components are necessary.

Off-The-Shelf: When using off-the-shelf components designers rely on recommended and tested components; for example, AEC-Q compliant for automotive applications, or inductors and transformers recommended by reference designs. Simulation software tools enable designers to vary product performance in their application. Bourns® components are included in leading simulator tool libraries.

Custom: In cases where designers need to optimize performance or have specific needs, for example, resizing of inductors and transformers may require customized parts to be designed. Bourns engineering teams support all phases of the custom design cycle (specification, design, testing, and sampling).

The majority of Bourns® components are designed for production on automated lines at our IATF16949 compliant factories to ensure high reliability and cost efficiency.

DESIGN CYCLE



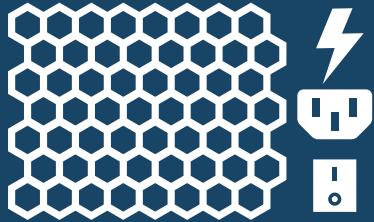
BOURNS DESIGN CYCLE CAPABILITIES

- Transformer Prototype service with quick turnaround
- Design support with high power Finite Element Analysis (FEA) software to optimize reliability and efficiency
- Application support, including board layout, simulation and tests
- Global safety standards compliance assistance, including compliance to IEC 61558-1 and EN600950
- Specifying and testing a robust and reliable circuit protection solution for the primary and secondary circuits
- Optimization of size, weight and efficiency of power supply through an comprehensive component portfolio offering

Visit Bourns Analysis, Modeling and Testing:
<https://www.bourns.com/services/analysis-modeling-and-testing>

Bourns® Power Supply Component Guide

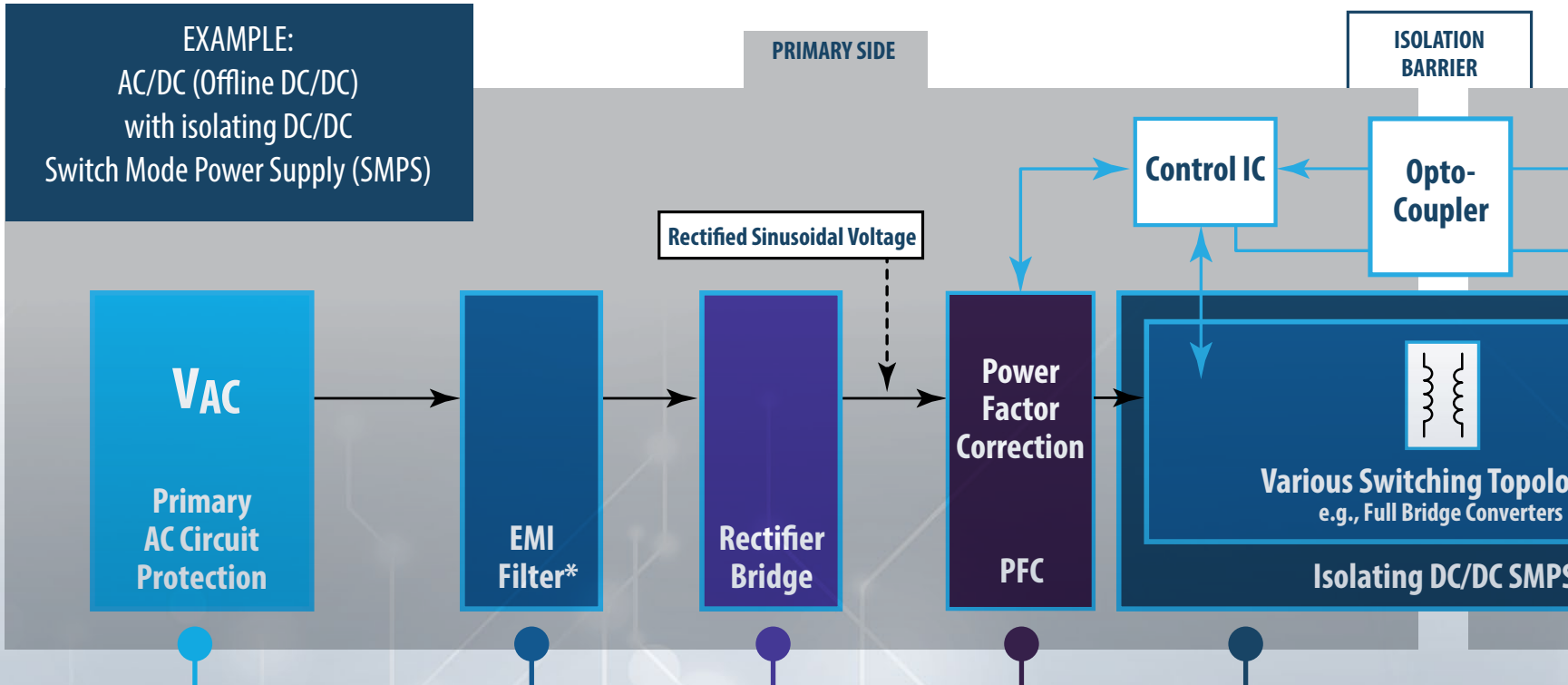
POWER SUPPLY



An offline AC/DC Power Supply includes stages such as Power Factor Correction, EMI (Electro Magnetic Interference) filters, an isolation barrier, transformer and non-isolating Switch Mode Power Supplies (SMPS) deploying various SMPS topologies. They convert AC voltages to different levels of DC voltage for specific applications.

Bourns offers components for both linear power supplies and switch mode power supplies. Bourns' extensive line of electronic components and custom application solutions meet customer device requirements for high reliability performance in smaller, more compact designs.

EXAMPLE:
AC/DC (Offline DC/DC)
with isolating DC/DC
Switch Mode Power Supply (SMPS)



CIRCUIT PROTECTION DEVICES	
Part	Description
	Power TVS Diodes
	AC - Transient Protector (ACTP)
	GMOV™ Components
	Metal Oxide Varistors (MOVs)
	Gas Discharge Tubes (GDTs)
	PTC Resettable Fuses: Multifuse®
	Fusible Resistors

INDUCTORS	
Part	Description
	Inductors
	Common Mode Chokes

*EMI filters can be used on power and signal lines

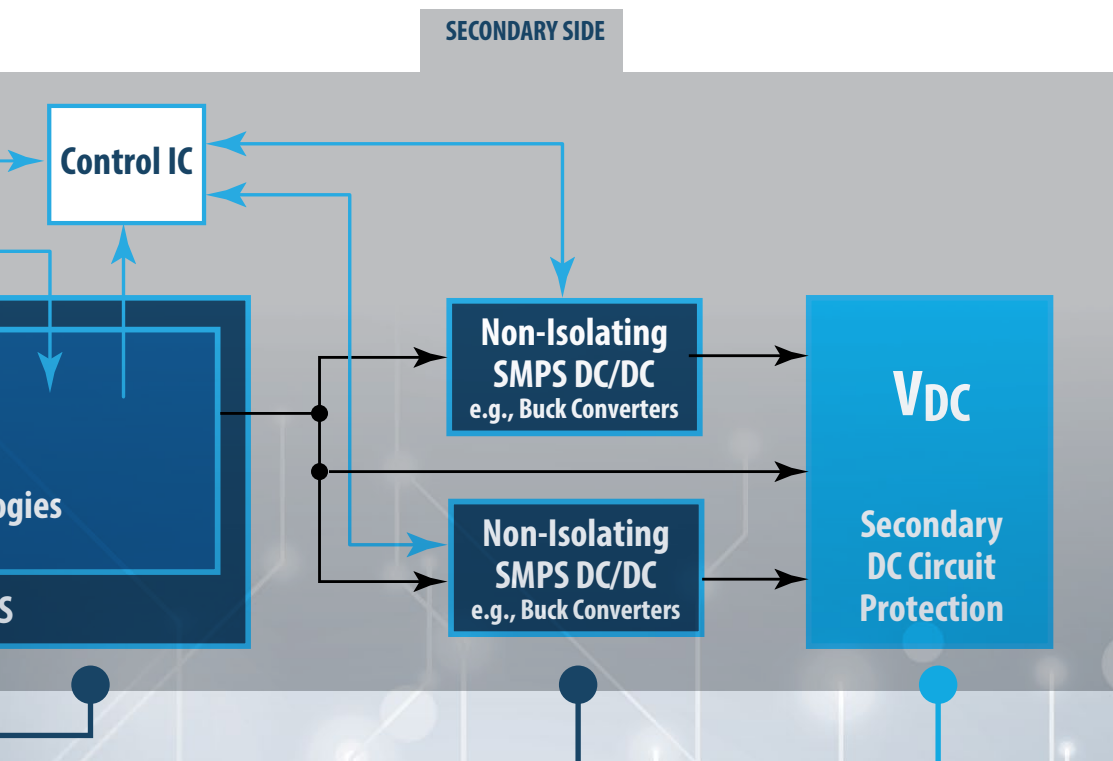
RECTIFIER DIODES	
Part	Description
	Bridge Rectifier Diodes
	Bridge Rectifier Diodes

INDUCTORS & RESISTORS	
Part	Description
	Power Inductors
	Snubber Resistors (Wirewound, Thick Film, Metal Strip)
	Current Sense Resistors (Thick Film, Metal Strip, Metal Element)

POWER TRANSFORMERS (High Frequency)		
Part	Core Type	Power (W)
	EP5, ER7.5	20
	EPC10, EFD10, EPC15	50
	EP7, EPC20, EE10, EE13	100
	EE16, EE19, EE20, EE25, EPC24	150
	EPC125, EPC30, PQ26/20	500
	EC35, EC29A, EC28B, FED28A, EC40B, RM14	700

INDUCTORS
Part

With continuing miniaturization and packaging innovation, Bourns® circuit protection, circuit conditioning and position control products deliver the standards-based solutions OEMs can rely on to fulfill ongoing technical demands.



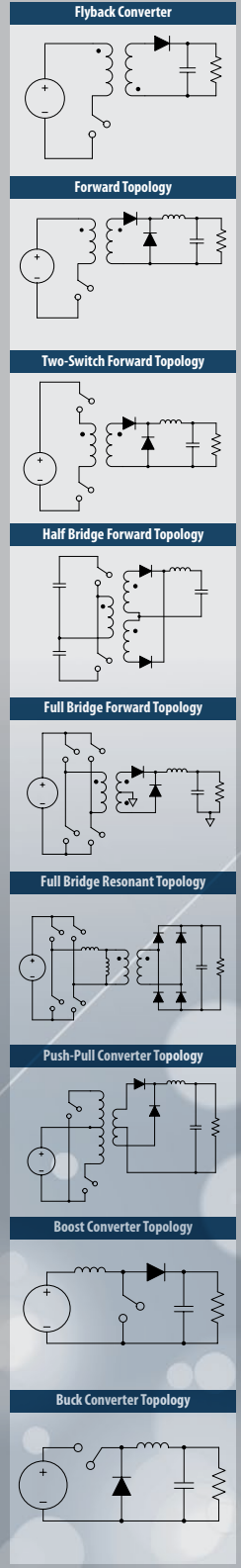
RESISTORS & RESISTORS	
Description	Part
Power Inductors	
Snubber Resistors (Wirewound, Thick Film, Metal Strip)	
Current Sense Resistors (Thick Film, Metal Strip, Metal Element)	
Variable Resistors: Trimpot® Trimming Potentiometers	

TRANSISTORS	
Part	Description
	Insulated Gate Bipolar Transistors (IGBTs)
	Insulated Gate Bipolar Transistors (IGBTs)

INDUCTORS & RESISTORS	
Part	Description
	Power Inductors
	Snubber Resistors (Wirewound, Thick Film, Metal Strip)
	Current Sense Resistors (Thick Film, Metal Strip, Metal Element)
	Variable Resistors: Trimpot® Trimming Potentiometers

CIRCUIT PROTECTION DEVICES	
Part	Description
	TVS Diodes
	PTC Resettable Fuses: Multifuse®
	Thyristor Surge Protectors: TISP®
	Chip Fuses: SinglFuse™
	TBU® High-Speed Protectors (HSPs)

SMPS TOPOLOGIES



Worldwide Sales Offices



Country	Phone	Email
Americas:	+1-951-781-5500	americus@bourns.com
Brazil:	+55 11 5505 0601	americus@bourns.com
China:	+86 21 64821250	asiacus@bourns.com
Europe, Middle East, Africa:	+36 88 885 877	eurocus@bourns.com
Japan:	+81 49 269 3204	asiacus@bourns.com
Korea:	+82 70 4036 7730	asiacus@bourns.com
Singapore:	+65 6348 7227	asiacus@bourns.com
Taiwan:	+886 2 25624117	asiacus@bourns.com
Other Asia-Pacific Countries:	+886 2 25624117	asiacus@bourns.com
Technical Assistance		
Region	Phone	Email
Asia-Pacific:	+886 2 25624117	techweb@bourns.com
Europe, Middle East, Africa:	+36 88 885 877	eurotech@bourns.com
Americas:	+1-951-781-5500	techweb@bourns.com

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Bourns® products are available through an extensive network of manufacturer's representatives, agents and distributors. To obtain technical applications assistance, a quotation, or to place an order, contact a Bourns representative in your area.

Specifications subject to change without notice. Actual performance in specific customer applications may differ due to the influence of other variables. Customers should verify actual device performance in their specific applications.

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