Littelfuse®

Expertise Applied | Answers Delivered

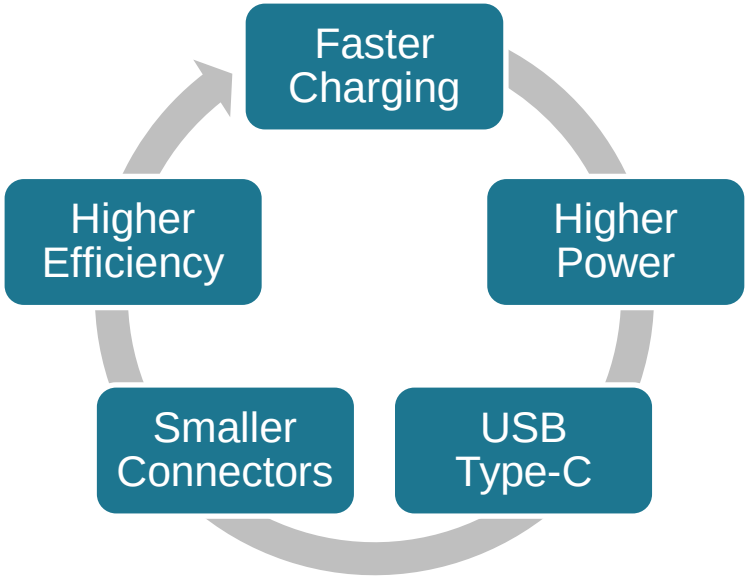
Power Supply Solutions

Power Supplies up to 100W

REV0918

Fast Charging Impacting Many Design Parameters

Market Changes



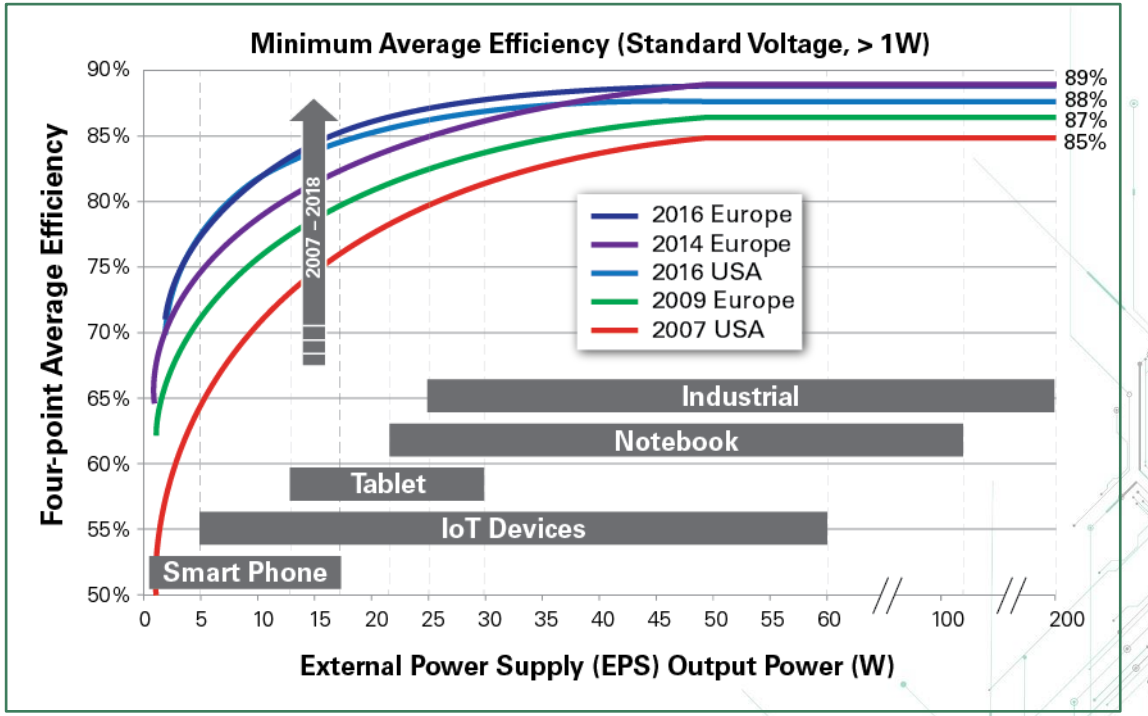
Impact On Designs

- New power electronics
- Circuit protection review
- Thermal management
- Contamination risks
- Mechanical damage risks

Redesign of power electronics and circuit protection stages required

Increasing Efficiency Requirements and Increasing Power Needs are Driving New Generation of Chargers

- Higher power chargers require higher efficiencies
- Each update to standard requires higher efficiency
- Resistances causes efficiency loss



Consumer Electronics Power Supply

AC Input:
- Fuse for Overcurrent Protection
- MOV for Surge Protection
- NTC for In-rush Current Limiters

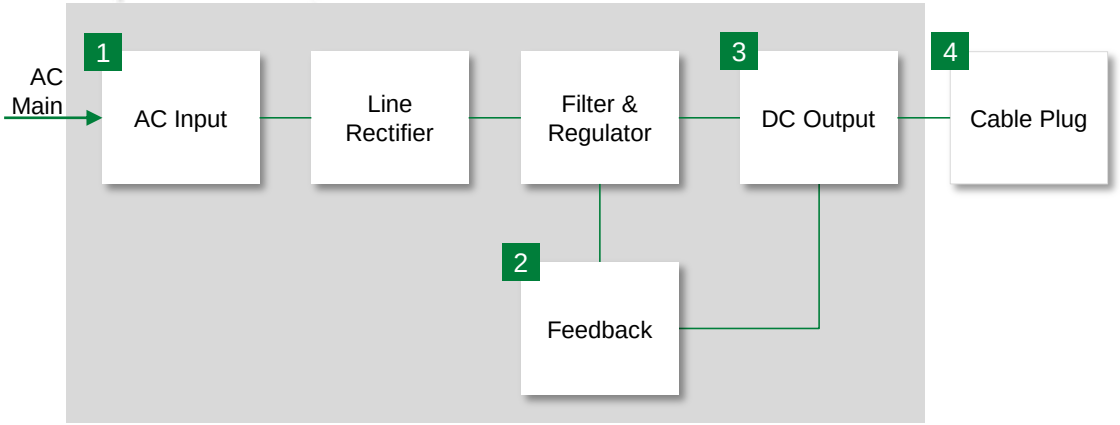
Feedback:
- Optically Isolated Error Amplifier

Cable Plug:
- setP™ Digital Temperature Indicator

DC Output:
- TVS Diode Array: ESD And Surge Protection
- Resettable PPTC: Over-temperature Protection

Protect Control Sense

Consumer Electronics Power Supply Block Diagram



	Technology	Product Series
1	Fuse [I]	369 or 219
	MOV [II]	UltraMOV
	NTC In-rush current limiter	ST
2	Linear Error Amplifier	LIA130
3	TVS Diode Array [III]	SP11xx
	Resettable PPTC	LoRho PPTC
4	Temperature Indicator [IV]	setP™

Table Notes:

I. Many different fuse options available based on current, voltage, mounting method, and surge withstand required

II. P6KE TVS Diodes provide alternative solution depending on surge clamping performance needed

III. SP11xx are uni-directional. For bi-directional protection, consider SMBJ TVS Diode

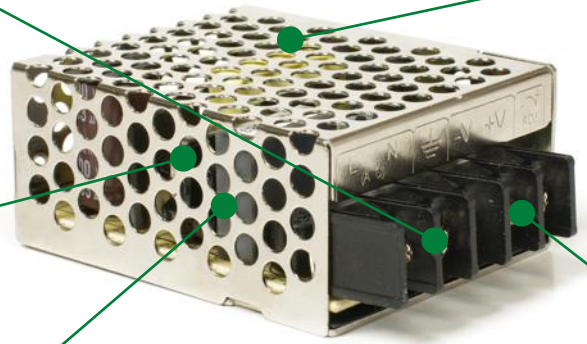
IV. setP digital temperature indicators for USB Type-C Plugs

Industrial Power Supply

AC Input:
- Fuse for Overcurrent Protection
- MOV for Surge Protection
- NTC for In-rush Current Limiters

Feedback:
- Optically Isolated Error Amplifier

Filter & Regulator:
- MOSFET for filtering
- Rectifier diodes

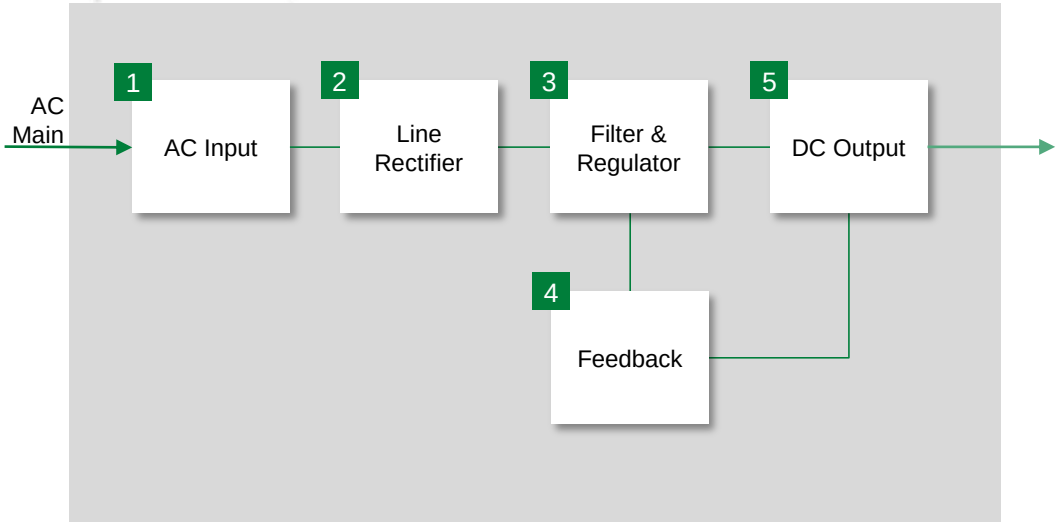


Line Rectifier:
- Hybrid voltage suppression

DC Output:
- TVS Diode Array: ESD And Surge Protection
- Resettable PPTC: Over-temperature Protection

Protect Control Sense

Industrial Power Supply Block Diagram



	Technology	Product Series
1	Fuse [I]	505
	MOV [II]	UltraMOV
	NTC In-rush current limiter	ST
2	SIDACtor + MOV [III]	P3500SCLRP and LA
3	MOSFET	X Class HiPerFET™
	Rectifier diodes	Schottky Gen^2 Diodes
4	Linear Error Amplifier	LIA130
5	TVS Diode Array [IV]	SP11xx
	Resettable PTC	LoRho PPTC

Table Notes:

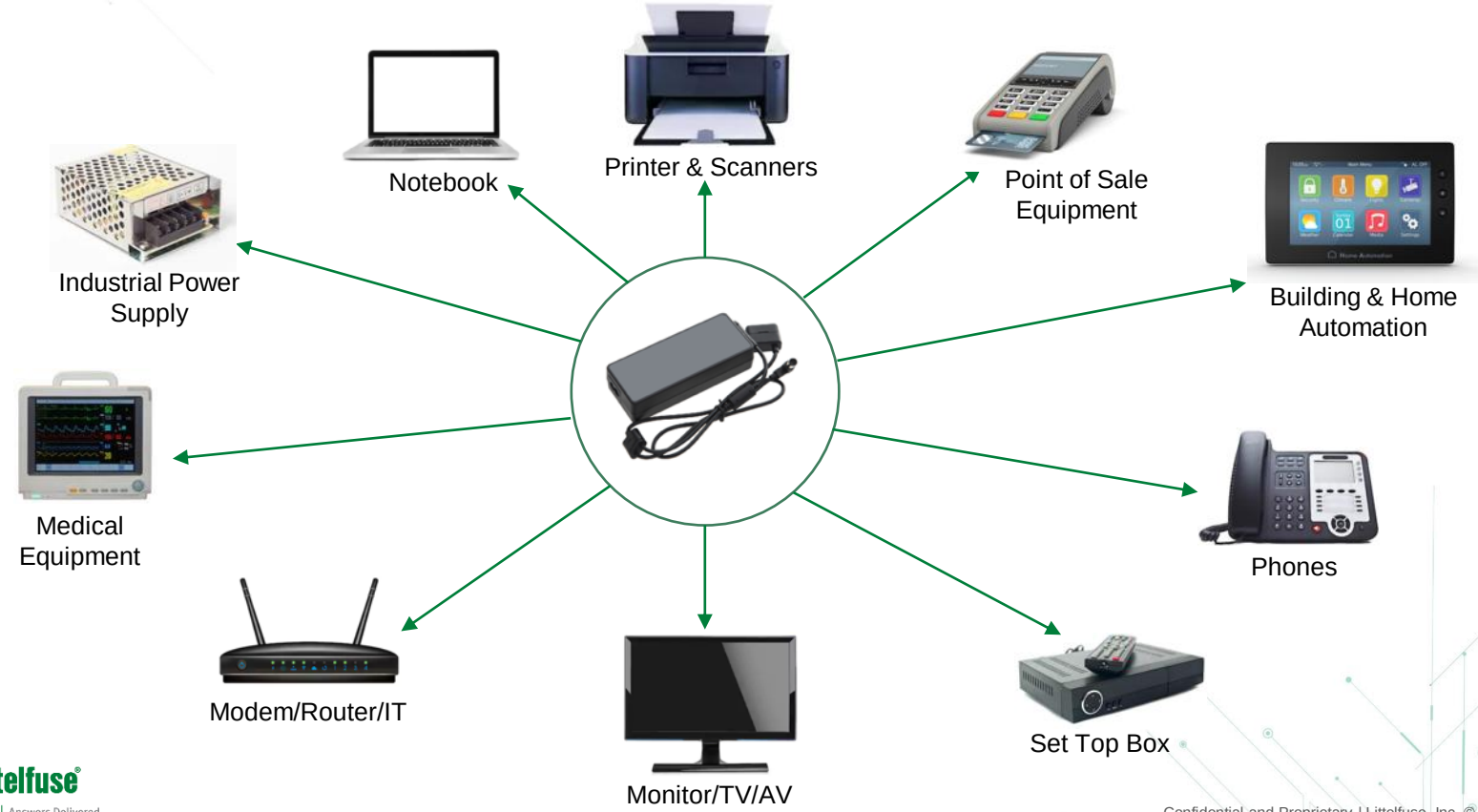
I. Many different fuse options available based on current, voltage, mounting method, and surge withstand required

II. P6KE TVS Diodes provide alternative solution depending on surge clamping performance needed

III. For protection in more harsh environments and when enhanced reliability is critical

IV. SP11xx are uni-directional. For bi-directional protection, consider SMBJ TVS Diode

Power Supplies – Bringing Life To Everyday Devices



Compliance and Standards for Power Supplies

- UL 1310 Standard for Class 2 Power Units
- IEC 60950-1 Information Technology Equipment Safety
- IEC 62368-1 Audio/video, information and communication technology equipment – Part 1: Safety requirements
- Mandatory efficiency requirements for supplies sold into various regions around the world
  - Europe: Code of Conduct version 5
  - USA: Department of Energy version VI
  - China: National Development and Reform Commissions, “NDRC”
  - Korea: Minimum Energy Performance Standards
  - Israel: SI-4664.2
  - India: Bureau of Energy Efficiency
- Electrostatic discharges to IEC 61000-4-2
- Fast Transient Burst Test to IEC 61000-4-4
- Fast Transient Surge Test to IEC 61000-4-5

Littelfuse Provides Critical, Energy-efficient, Functional Components For Power Supplies

- Reference solutions to help meet global safety requirements
- System-level design compliance support
- Components designed to help meet energy efficiency
- High-volume manufacturing with highest quality standards

Global delivery network with localized distribution & customer support

Expertise Applied | Answers Delivered

Littelfuse.com