



Expertise Applied | Answers Delivered

Wireless Charger Solutions



Mobile and wearables

Users must independently evaluate the suitability of and test each product selected for their own specific applications. It is the User's sole responsibility to determine fitness for a particular system or use based on their own performance criteria, conditions, specific application, compatibility with other parts, and environmental conditions. Users must independently provide appropriate design and operating safeguards to minimize any risks associated with their applications and products. Littelfuse products are not designed for, and may not be used in, all applications. Read complete Disclaimer Notice at littelfuse.com/disclaimer-electronics.

Consumer, medical, and industrial applications are creating a wave of wireless charging opportunities

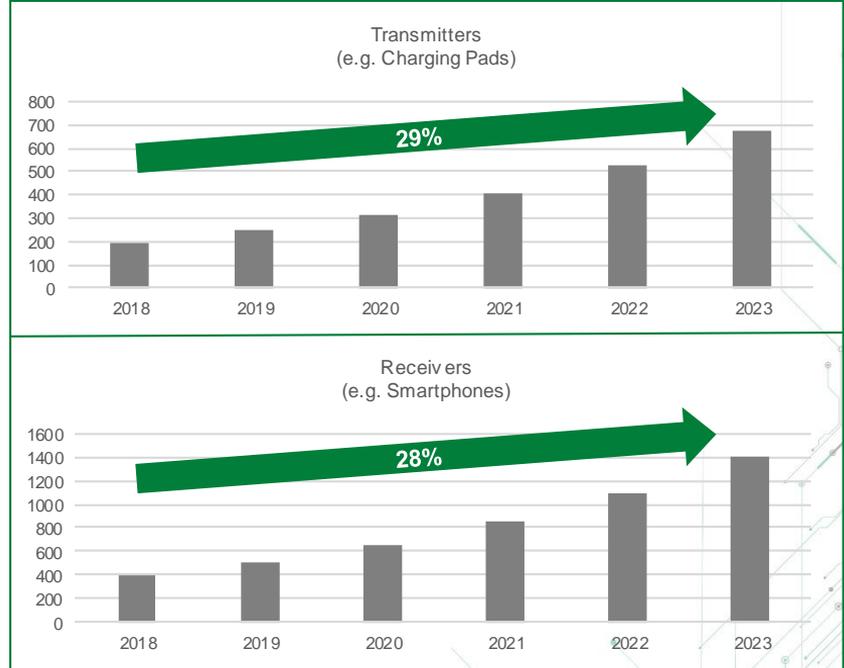


Wireless charging: powering a more convenient world

Market trends and drivers

- User convenience is driving consumer applications
 - Fewer cables allow for cleaner, less cluttered surfaces
 - Charging ports can become collection points for dust, dirt, and debris, which can cause overheating faults
- Consumer devices, such as phones and watches, are driving market growth
 - Medical and industrial applications are adopting wireless charging
 - Automotive in-cabin charging for consumer devices is increasingly being added to vehicular models
- Consumer product market leaders have standardized inductive charging to the Qi standard, allowing for further market adoption
- Inductive wireless charging is popular for low-power needs (<70 W), as in consumer devices
 - Magnetic resonant wireless charging will help drive additional use-cases like charging a vehicle

% CAGR Inductive wireless charging unit shipments



Source: [IHS Markit](#)

Components recommendations for wireless chargers

Power adapter



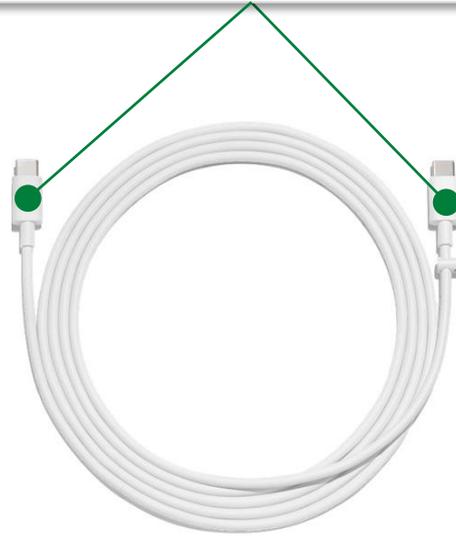
- Fuse
- TVS Diode
- N-channel MOSFET
- Barrier rectifier diode
- setP™*



Charging cable



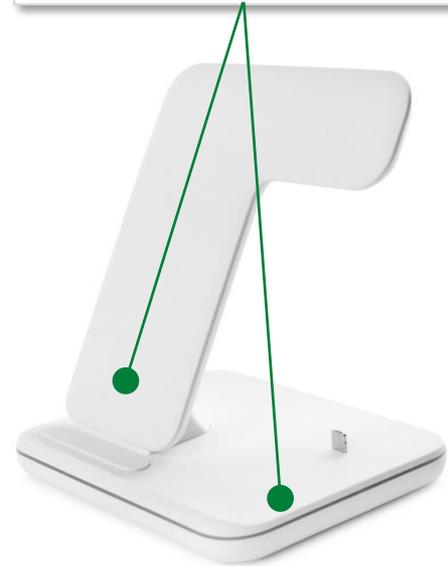
- setP™*



Charging pad



- Fuse
- TVS Diode, Diode Array
- setP™*



Acronyms:

TVS: *transient voltage suppressor*



Protect



Control



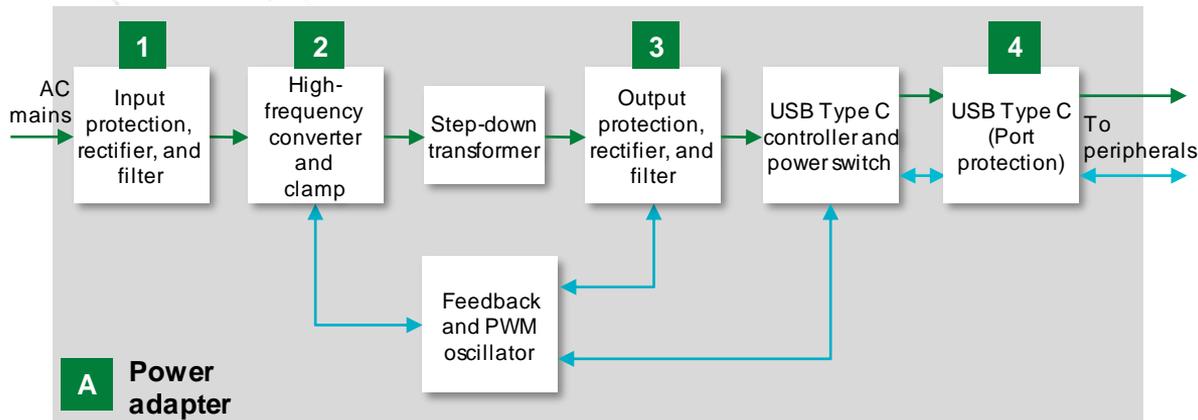
Sense

*For use with a USB Type C adapter

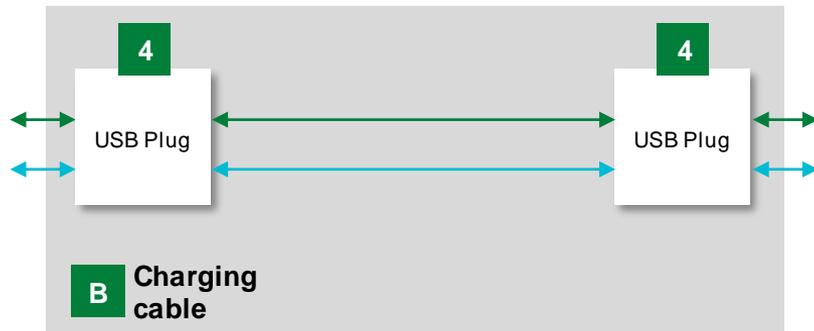
Component recommendations for power adapters and charging cables



Click on the product series in the table below for more info



Legend:
 → Power Line
 → Signal Line



	Technology	Product series
1	Fuse	443, 215, 373
2	N-channel MOSFET	X2-class
3	TVS diode	P6KE, P6SMB
	Schottky diode	MBR
4	setP™ ¹	SETP0805-100-CC

¹The setP™ solution is recommended for USB Type C port protection. Use Low Rho SMD Series for USB Type-A and USB Type-B

Power adapter: benefits and features of Littelfuse components

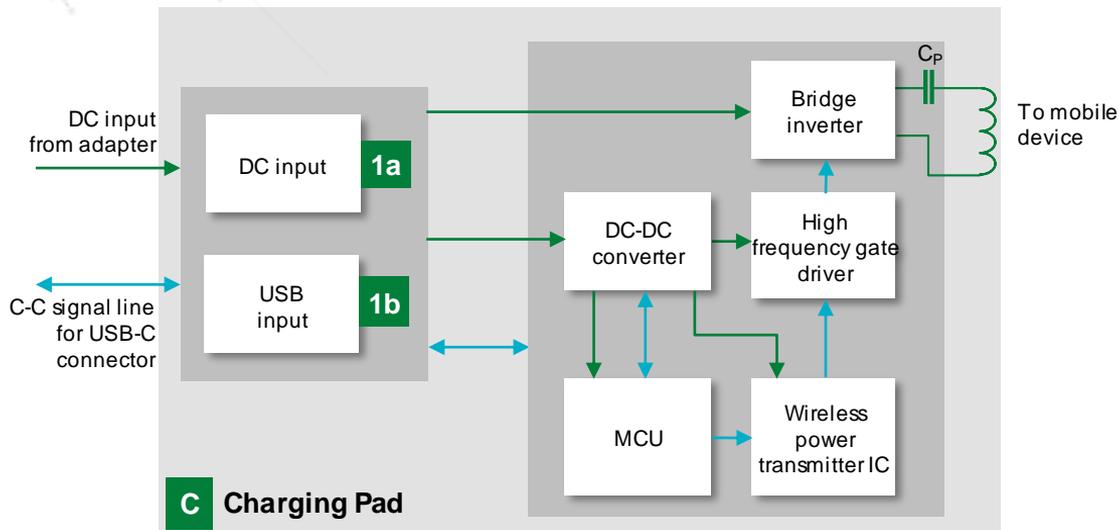
 Click on the product series in the table below for more info

	Technology	Function in application	Product series	Benefits	Features
1	Fuse	Protects the power stage from overcurrent events	443 , 215 , 373	Surface mount option, reduces customer qualification time by complying with regulatory safety standards, such as UL/IEC	Compliant with UL/IEC standards; low internal resistance; surface mount option; vibration resistant
2	N-channel MOSFET	High frequency switching for power conversion	X2-class	Higher efficiency and space saving	Low on-resistance and low gate charge
3	TVS diode	Protects the power unit from voltage transients that are induced by lightning and voltage transient events	P6KE , P6SMB	Improves system reliability by protecting components from transients on power lines	600 W peak pulse capability; fast response time (<1 ps); compatible with the high reflow temperature profile (260° C, 40 s)
	Schottky diode	Provides rectification and blocking in power supply units	MBR	Improves power supply efficiency	Low forward voltage drop; high-frequency operation; high junction temperature capability
4	setP™*	Helps protect USB-C connectors from overheating	SETP0805-100-CC	Helps improve reliability and user experience by reducing the risk of thermal damage; simple integration into existing USB-C systems	Fast response to thermal events; small form factor; zero IR loss contribution; protects systems with a 100 W or higher power rating

* - setP™ solution is recommended for USB Type C port protection.

Component recommendations for wireless charging pads

Click on the product series in the table below for more info



	Technology	Product series
1a	Fuse	435, 438GT, 0402SFF
	TVS Diode	SMCJ, SMF, SMBJ
1b	setP™	SETP0805-100-CC
	Diode Array	SP3522, SPHV24

Acronyms:

TVS: transient voltage suppressor

MCU: microcontroller unit

ESD: electrostatic discharge suppressor

Notes:

1a: DC jack or

1b: The USB-C port; setP™ solution is suitable for USB Type C port protection (generally, only one DC-input option is implemented in a unit).

Wireless charging transmitter: components benefits and features

 Click on the product series in the table below for more info

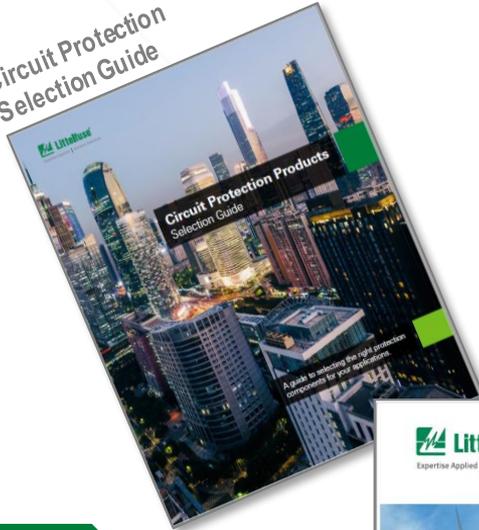
	Technology	Function in application	Product series	Benefits	Features
1a	Fuse	Protects the power stage from overcurrent events	435 , 438GT , 0402SFF	Reduces customer qualification time by complying with UL/IEC; compact design	Surface mountable; compatible with lead-free solder process, as per IEC standards
	TVS Diode	Protects sensitive electronic components from voltage transients	SMCJ , SMF , SMBJ	Improves system reliability by clamping the voltage at safe levels during transients	1500 W peak pulse capability; compatible with the lead-free solder reflow temperature profile
1b	setP™	Thermal indicator to protect USB-C plugs and receptacles from overheating	SETP0805-100-CC	Helps improve reliability and user experience by reducing the risk of thermal damage; simple integration into existing USB-C systems	Fast response to thermal events; small form factor; zero IR loss contribution; protects systems with a 100 W or higher power rating
	Diode Array	Protects the USB-C chipset from ESD events on data lines	SP3522	Compact design; reduces assembly time	Low capacitance; complies with IEC standards; small form factor
Helps protect equipment from user-induced ESD on the power line		SPHV24	Improves system reliability by clamping the voltage at safe levels during transients on power lines	Low clamping voltage; low leakage current; bidirectional	

Select standards for wireless chargers

Standard	Title	General Scope	Region
USB-IF	Universal Serial Bus specification	Supports advancement and adoption of Universal Serial Bus technology	Global
IEC 60950-1	Information technology equipment – Safety	Applicable to mains-powered or battery-powered information technology equipment, with a rated voltage not exceeding 600 V	Global
IEC 62368-1 (IEC 60950)	Audio/video, information and communication technology equipment – Part 1: Safety requirements	Safety of equipment within the field of audio, video, information and communication technology (rated voltage not exceeding 600 V)	Global
IEC 61000-4-2	Testing – Electrostatic Discharge (ESD)	This standard is made to check the capability of the equipment to survive repetitive electrical fast transients and bursts	Global
IEC 61000-4-4	Electrical fast transient/burst immunity test	Evaluating the immunity of equipment when subjected to electrical fast transient/bursts on supply, signal, control, and earth ports.	Global
IEC 61000-4-5	Surge immunity	Evaluate the immunity of equipment when subjected to surges	Global
Qi	Qi Wireless Power Transfer System	Open interface standard defining wireless power transfer using inductive charging	Global

Additional information can be found on [Littelfuse.com](https://www.littelfuse.com)

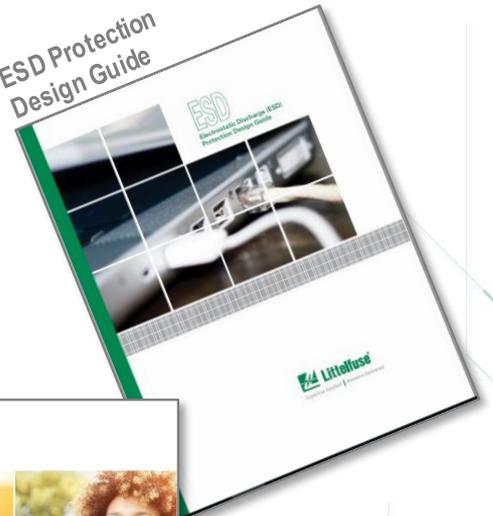
Circuit Protection
Selection Guide



ESD Suppression
Design Guide

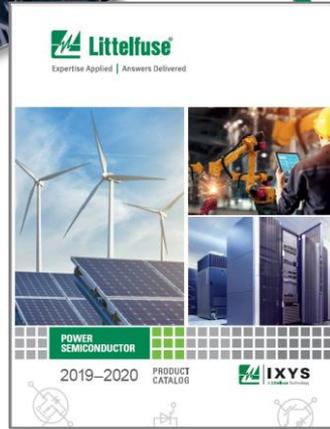


ESD Protection
Design Guide



Click on each
image to open the
catalog

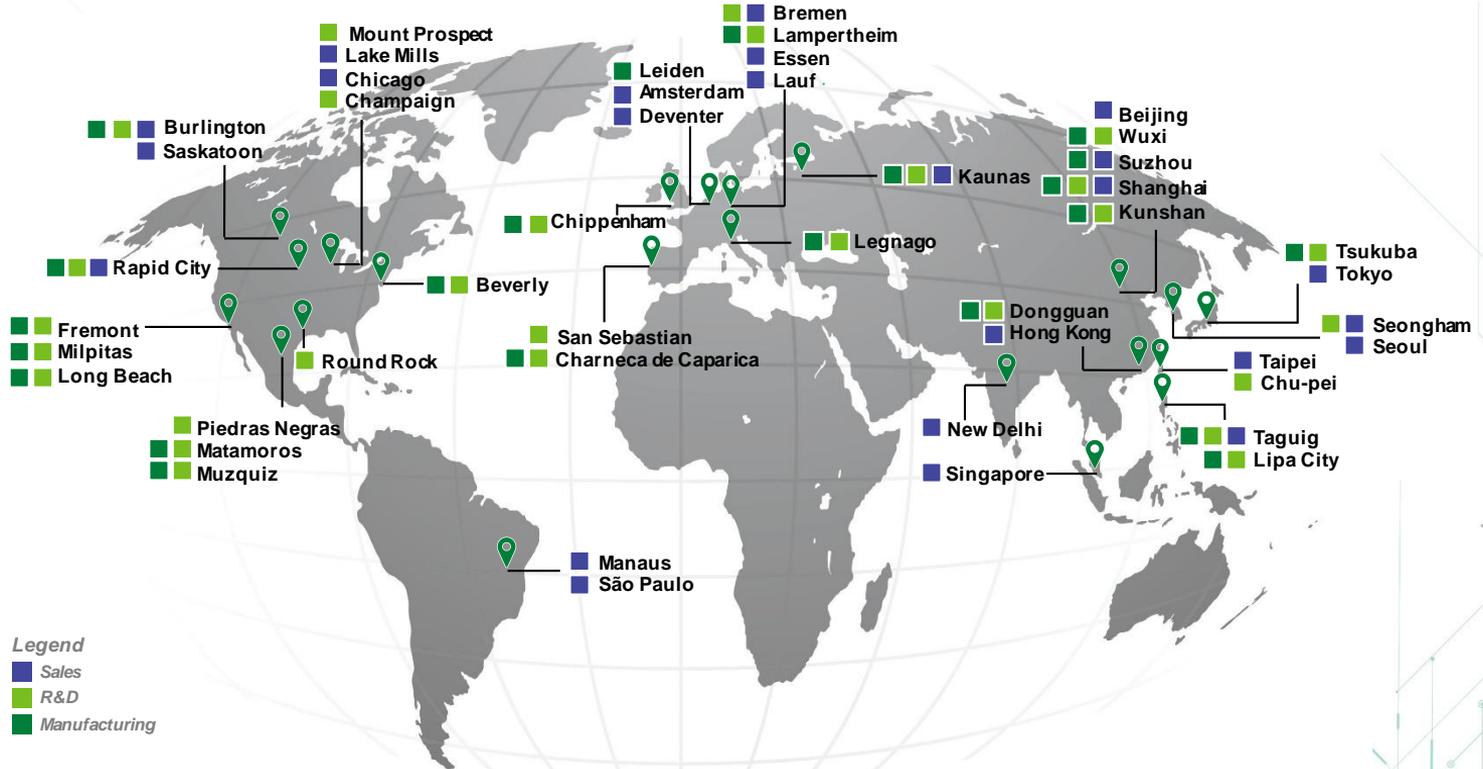
Power Semiconductor
Selection Guide



setP™ Design Guide



Local resources supporting our global customers



Partner for tomorrow's electronic systems

Broad product portfolio

A global leader with a broad product portfolio, covering every aspect of protection, sensing, and control

Application expertise

Our engineers partner directly with customers to help speed up product design and meet their unique needs

Global customer service

Our global customer service team is with you to anticipate your needs and ensure a seamless experience

Compliance & regulatory expertise

We help customers in the design process to account for requirements set by global regulatory authorities

Testing capabilities

To help customers get products to the market faster, we offer certification testing to global regulatory standards

Global manufacturing

High-volume manufacturing that is committed to the highest quality standards



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