



Expertise Applied | Answers Delivered

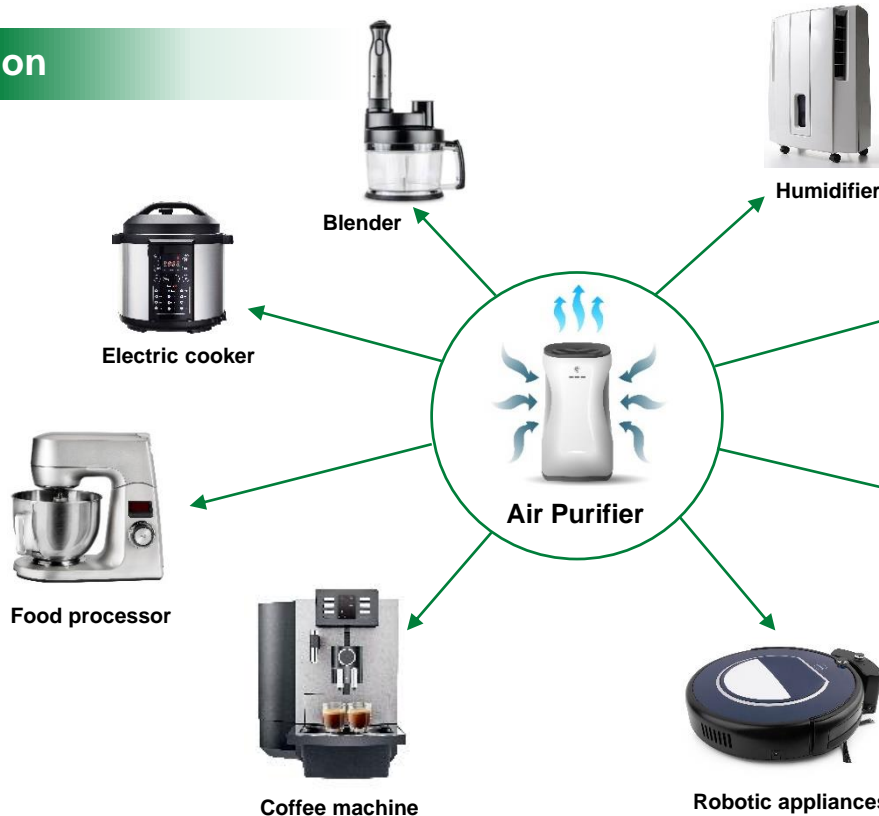
Air Purifier



Appliances

Smart appliances help to simplify daily life, enable healthier living, and improve efficiency

Food preparation



Quality living

Global air purifier shipments show strong growth

Market trends and drivers

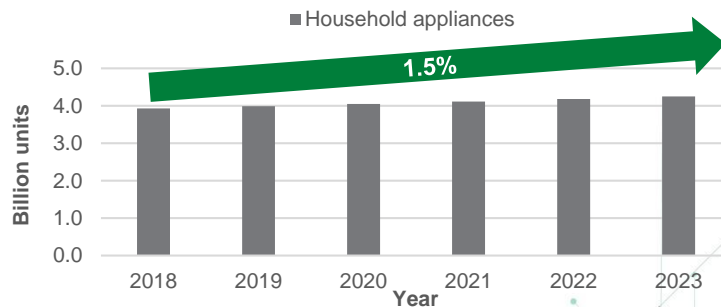
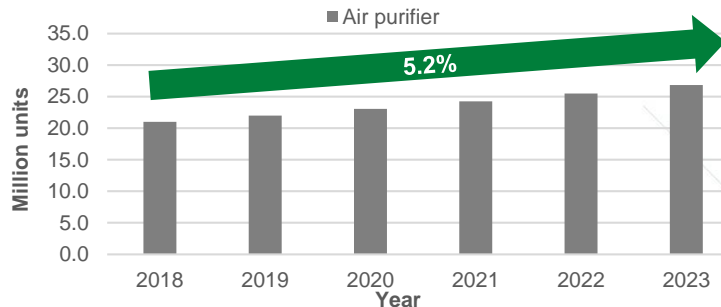
Global air purifier unit shipments are expected to increase from ~21 M units in 2018 to ~27 M units in 2023 at a CAGR of 5.2%*. In comparison, the total shipments of household appliances are expected to be ~4.25 B units by 2023 at a CAGR of 1.5% between 2018 and 2023. ^{1, 2}

The air purifier market is segmented into four types of filters: the HEPA purifier, the electrostatic precipitator, the stimulated carbon air purifier, and the ion and ozone generator air purifier. The HEPA purifier is likely to overshadow other types with a ~35% market share in 2018 and is expected to capture 38% by 2023.

APAC will account for 35% of the global air purifier market by 2023. China and India are expected to be the highest growth markets in APAC region due to their poor air quality, rising disposable income, and improved lifestyles.

The air purifier markets in North America and Europe are expected to witness moderate growth, while Latin America, the Middle East, and Africa will witness less growth.

Air purifier growth is strong at ~5% CAGR



*Units shipped are calculated based on forecast price/avg. price per unit of \$230

Source: 1. [Air purifier shipments](#) (Global air purifier market report; August 2018)
2. [Global household appliance unit shipments](#) (Statista, August 2018)

Component recommendations for an air purifier

Heater control:

- Fuse
- TRIAC
- Opto-isolator



Motor drive:

- NTC



Power supply:

- Fuse
- MOV
- TVS diode
- MOSFET
- Schottky barrier rectifier diode



Air quality detection sensors:

- Particulate matter (PM 20, PM 2.5)
- Humidity
- Gas (NO2, VOCs)

User interface and display:

- NTC
- PESD
- TVS diode array
- Chip fuse



Acronyms:

NTC: negative temperature co-efficient

MOV: metal oxide varistor

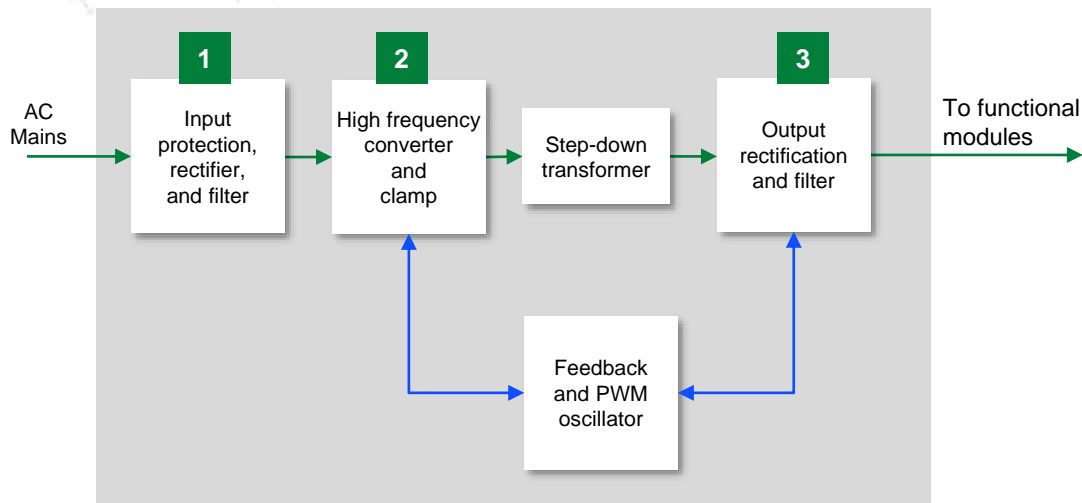
TVS: transient voltage suppressor

PESD: polymeric electrostatic discharge suppressor

MOSFET: metal-oxide field effect transistor

TRIAC: triode for alternating current

Component recommendations for power supply



Legend:

- Power
- Signal

	Technology	Product series
1	Fuse	875 , 877
	MOV	LA , C-III
2	TVS diode	P6KE , P6SMB
	N-channel MOSFET	X2-class
3	Schottky barrier rectifier diode	MBR , DST

Acronyms:

MOV: metal oxide varistor

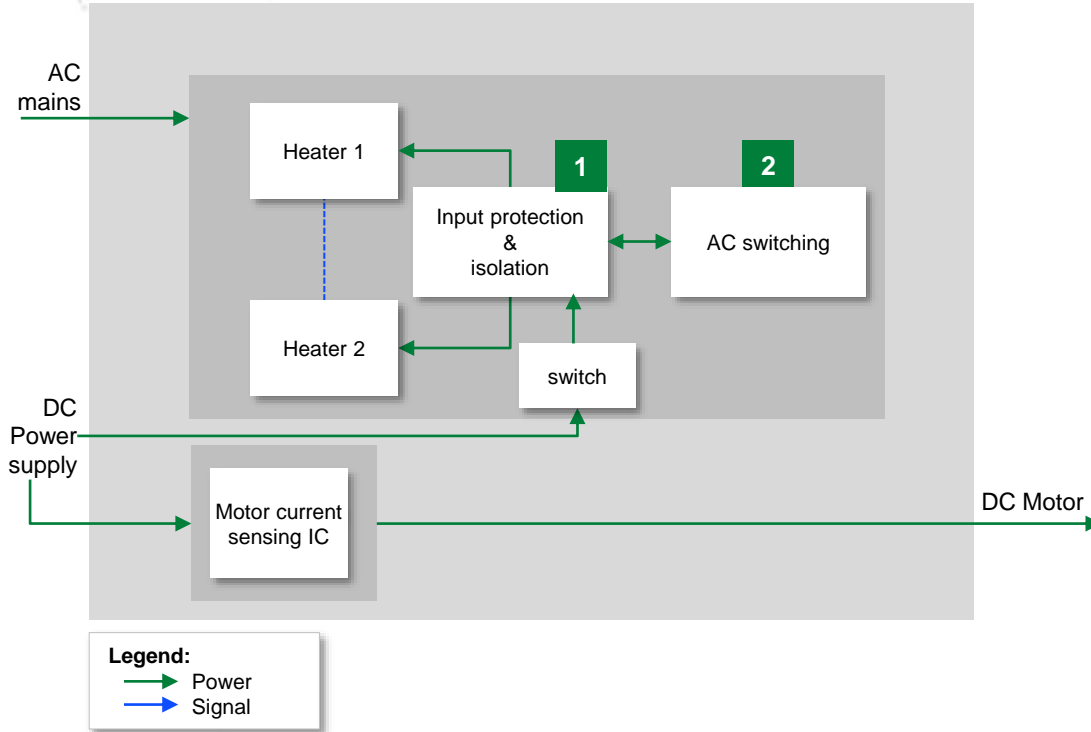
TVS: transient voltage suppressor



Power supply: Benefits and features of Littelfuse components

	Technology	Function in application	Product series	Benefits	Features
1	Fuse	Helps to protect equipment and users from hazards due to overcurrent equipment faults	875 , 877	Reduces customer qualification time by complying with regulatory safety standards such as UL/IEC	Compliant with UL/IEC standards, low internal resistance, shock safe, vibration resistant
	MOV	Helps protect power unit from voltage surges and lightning events on AC line	LA , C-III	Reduces customer qualification time by complying with regulatory safety standards such as UL/IEC	Can meet wide-set surge withstand specifications: 40 J – 530 J (2 mS)
2	TVS diode	Protect power unit from wide range of voltage transients	P6KE , P6SMB	Fast response time (<1 pS)	600 W peak pulse capability; compatible with high reflow temperature profile (260 °C/40 s)
	MOSFET	Main switching transistor in SMPS	X2-class	Fast response time, low power consumption, and lower heat signature improves operational efficiency	Low R _{ds} (on), low gate charge, dv/dt ruggedness
3	Schottky barrier rectifier diode	Rectification and blocking in power supply units	MBR , DST	Low heat generation (efficient) enables compact designs and improves power supply efficiency due to fast recovery time	Low forward voltage drop, high frequency operation, high junction temperature capability

Component recommendations for a heater control board



	Technology	Product series
1	Fuse	216
	Opto-isolator	CPC1972
2	TRIAC	Qxx10Hx , QJxx16xHx

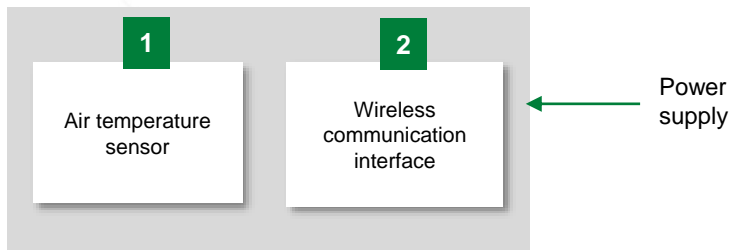


Motherboard: benefits and features of Littelfuse components

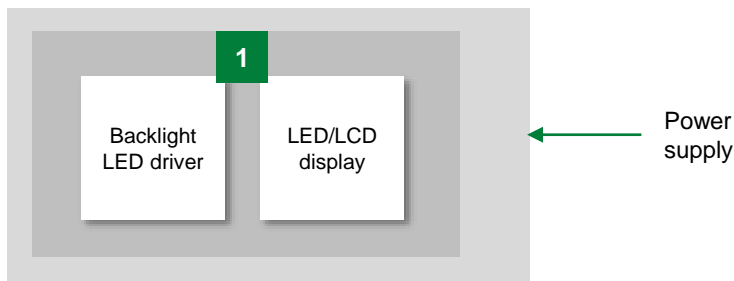
	Technology	Function in application	Product series	Benefits	Features
1	Fuse	Helps to protect equipment and users from hazards due to overcurrent equipment faults	216	Reduces customer qualification time by complying with regulatory safety standards such as UL/IEC	Compliant with UL/IEC standards, low internal resistance, shock safe, vibration resistant
	Opto-isolator	Provides optically isolated control signal to TRIAC	CPC1972	Promotes robust system operation	High noise immunity, low EMI and RFI generation
2	TRIAC	AC switching and motor speed control (pump & boiler)	Qxx10Hx , QJxx16xHx	Solid-state switching with no audible noise during operation; enables power efficient operation, compact design	High voltage withstand capability (1kA), high surge capability up to 200A, solid-state switching eliminates contact bounce

User interface, display block diagram

User interface:



Display:



Legend:

- Power
- Signal

	Technology	Product series
1	NTC	KC
2	PESD	PGB10603

	Technology	Product series
1	TVS diode array	SP3423 , SP1064 , SP1002

Acronyms:

TVS: transient voltage suppressor

PESD: polymer ESD suppressor

NTC: negative temperature co-efficient

Mechanical and displays components usage

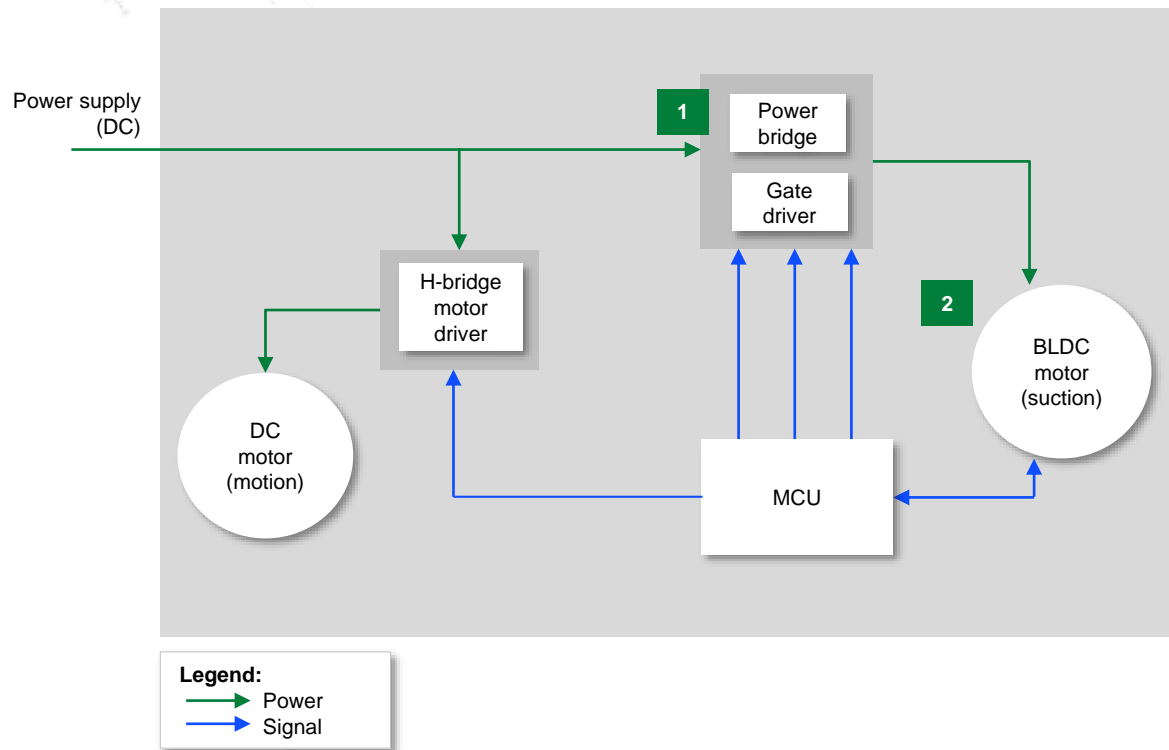
User interface:

	Technology	Function in application	Product series	Benefits	Features
1	NTC	Temperature sensing	KC	Provides accurate temperature (component/ambient) for enabling safe device operation	High reliability, small form factor, fast thermal response
2	PESD	Protects Wi-Fi chipset from user- induced ESD events	PGB10603	Retains RF signal integrity, enables compact design, improves system reliability by quickly clamping voltage to safe levels during ESD	Ultra-low capacitance, compact form factor, low leakage current, fast response time

Display:

	Technology	Function in application	Product series	Benefits	Features
1	TVS diode array	Helps protect equipment from user-induced ESD on signal line	SP3423 , SP1064 , SP1002	Smaller form factor and multi-line protection enables compact designs	Low leakage current, low capacitance per I/O

Motor drive block diagram



	Technology	Product series
1	NTC	MELF Style Thermistor
2	NTC	KW



Benefits of Littelfuse components for motor drive

	Technology	Function in application	Product series	Benefits	Features
1	NTC	Temperature sensing	MELF Style Thermistor	Provides accurate temperature (component/ambient) for enabling safe device operation	High reliability, small form factor, fast thermal response.
2	NTC	Temperature sensing	KW	Provides accurate temperature (component/ambient) for enabling safe device operation	High reliability, small form factor, fast thermal response

Standards for air purifier equipment

Standard	Title	General scope	Market
UL 867	Standard for Safety – Electrostatic Air Cleaners	This standard deals with electrostatic air cleaners rated at 600 volts or less, intended to remove dust and other particles from the air and intended for use in accordance with the National Electrical Code, ANSI/NFPA 70	United States
CSA C22. No. 187	Electrostatic Air Cleaners	This standard deals with electrostatic air cleaners rated at 600 volts or less, intended to remove dust and other particles from the air and intended for use in accordance with the CSA C22.1, Canadian Electrical Code, Part I	Canada
UL 507	Standard for Safety – Electric Fans	Fixed or portable air-filtering appliances utilizing mechanical filtration. Rated 600 volts or less and intended for use in accordance with the National Electrical Code, ANSI/NFPA 70	North America
CSA C22.2 No. 113	Fans and Ventilators	Fixed or portable air-filtering appliances utilizing mechanical filtration. Rated 600 volts or less	Canada
IEC 60335-2-65	Household and similar electrical appliances – Safety; Part 2-65: Particular requirements for air-cleaning appliances	This International Standard deals with the safety of electric air-cleaning appliances for household and similar purposes, their rated voltage being not more than 250 V for single phase appliances and 480 V for other appliances.	Global
GB/T 18801-2015	Air Cleaner	This standard specifies air cleaner's terms and definitions, model and naming method, requirements, test methods, inspection rules, marks, instructions for use, package, transportation and storage.	China

Additional information can be found on littelfuse.com

Circuit Protection Selection Guide



Sensor Selection Guide



Power Semiconductor



ESD Protection



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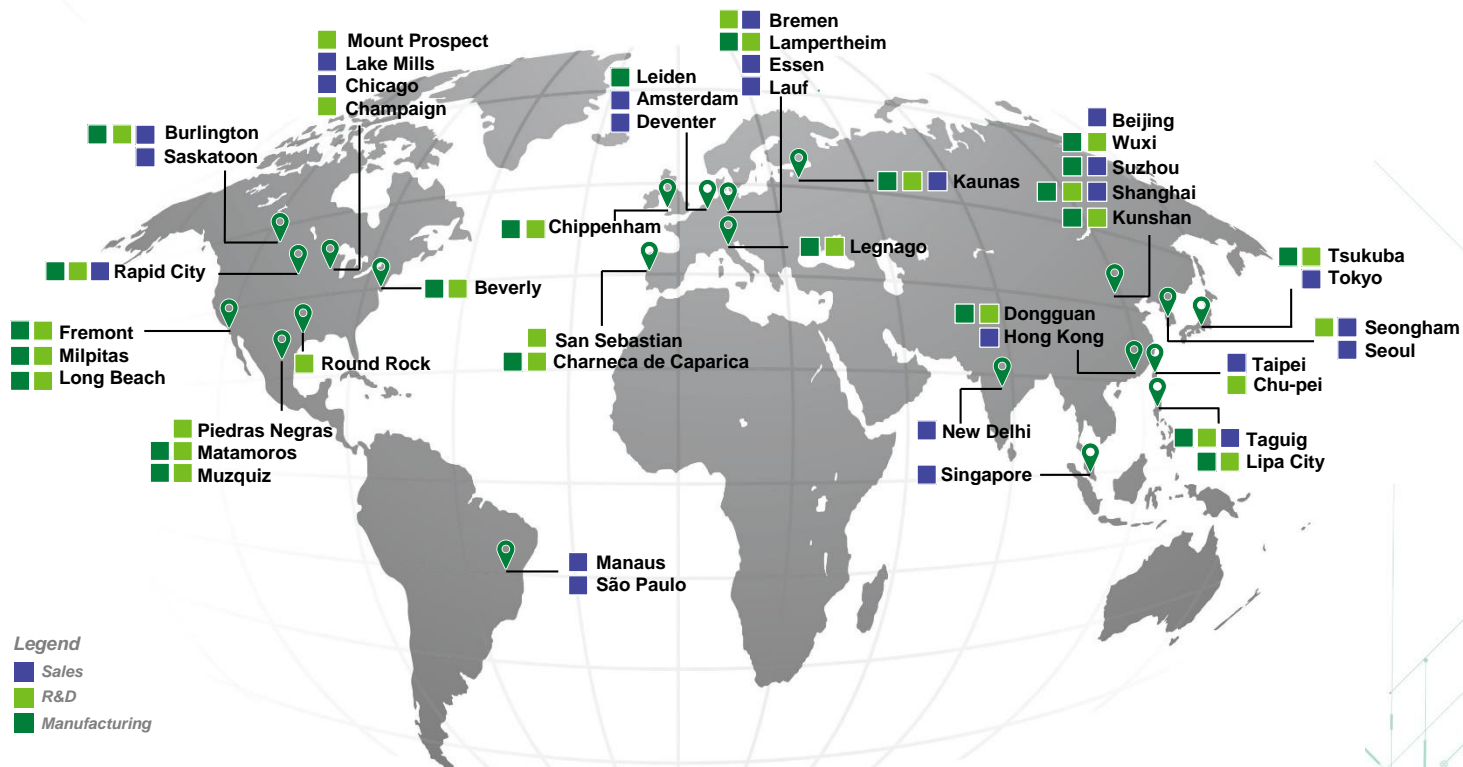
Integrated Circuits Catalog



Small appliances spotlight



Local resources supporting our global customers



Why choose Littelfuse?

- It is a global leader with a broad product portfolio, covering every aspect of protection, sensing, and control
- Its application expertise, combined with its product design guidelines, can help you determine the best components for your applications
- Its testing capabilities and assistance support the confirmation of your product selection
- It has standards compliance expertise, including product compliance with many standards and approval support
- It conducts high-volume manufacturing that is committed to the highest quality standards
- It is a global company with local support

We are committed to supporting your success!



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