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PROTECTION & FILTERS Building Safety and Security

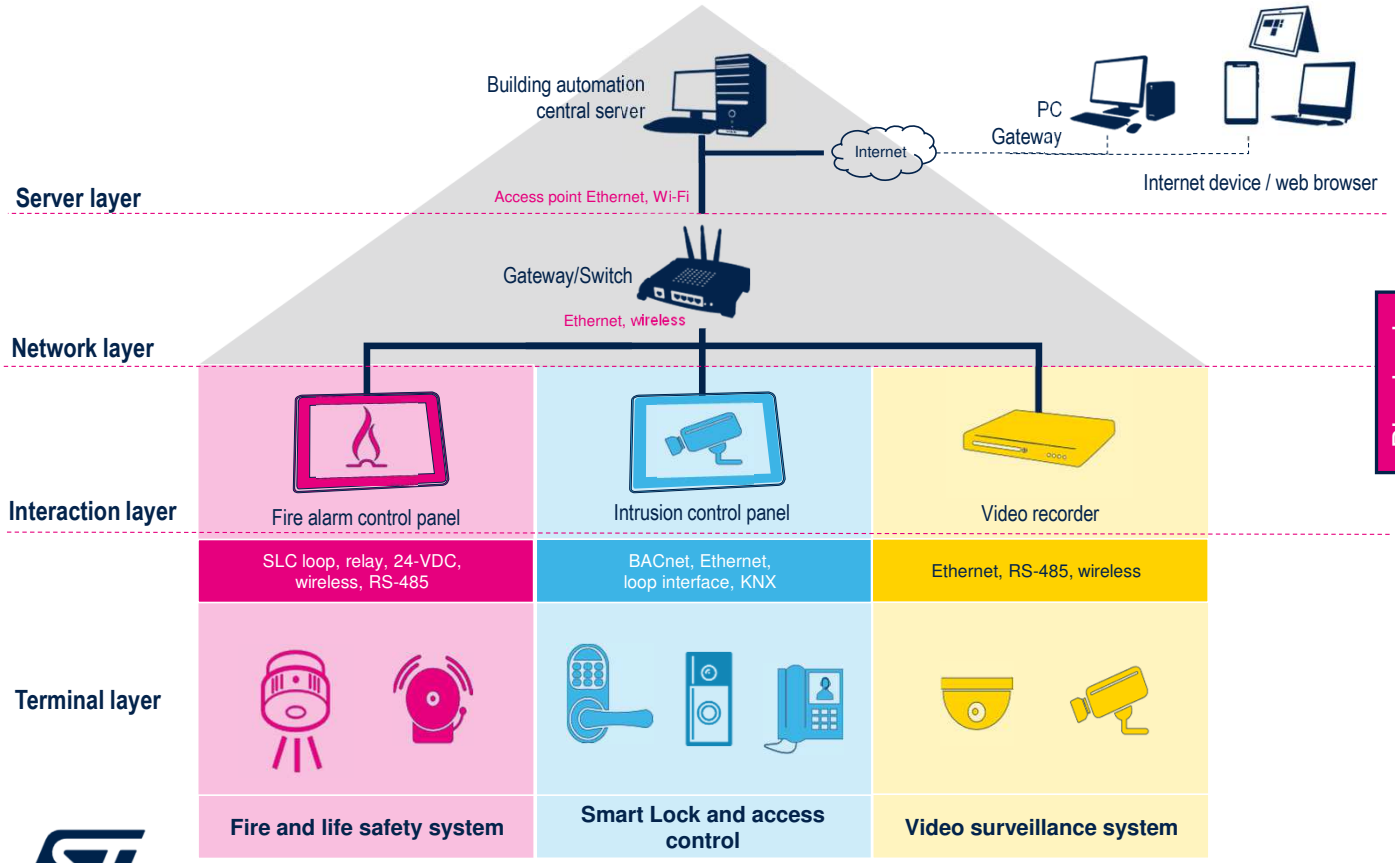
place for QR cod

Fire alarms and detectors

PROTECTION & FILTERS BUSINESS UNIT

ST PROTECT

Building safety and security overview



Key applications:

Blue book focus

- **Fire and life safety system**
  - Smoke & heat detector
  - Digital alarm communicator
  - Remote annunciator
  - Voice & audio amplifier
- **Smart lock and access**
  - Smart lock
  - Central alarm system
  - Video doorbell
  - Fingerprint / 3D face / iris recognition
- **Video surveillance system**
  - NVR/DVR
  - IP network camera
  - Analog video surveillance systems

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Protection & Filters solutions for fire safety systems

Power supply
SM15T series SMA6J series

Charging connector Battery (V_{BUS}, V_{BATT})
ESDAxP series SM6FY series SMA6J series

RF antennas (Wi-Fi / BLE)
ESDZX168B-1BF4

Display	
Data / clock	HSP053-4M5 ECMF4-40A100N10 (differential lines) EMIF08-LCD04M16 (parallel link)
I²C	ESDZV5-1BF4 USBLC6-2SC6

Buttons/ switches
ESDZL5-1F4 ESDZV5-1BF4 *EMIF01-1007AF4 (*)*

Ethernet
HSP053-4M5

RS-485 / RS-232
ESDA14V2BP6

USB-C (integrated solution)	
Vbus and CC lines	TCPP01-M12

USB Vbus and D+/D-	
Vbus	ESDA7P120-1U1M
Data D+ / D-	USBLC6-2SC6 HSP053-4M5 ECMF2-40A100N6

Detectors inputs (SLC com)
SMAJ24A SMAJ12A ESDA13P70-1U1M

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*under development ; (*) Contact our sales office

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Antennas
Wi-Fi, Bluetooth

Antennas are ESD protected according to IEC 61000-4-2 level 4
Very low harmonics generation ensures no disturbance in application

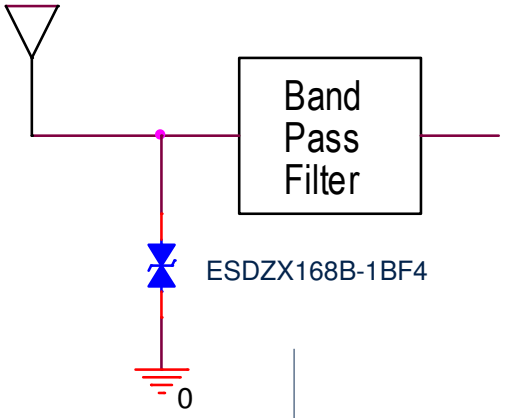
Wi-Fi antenna needs	Key product parameters	ST solutions
RF power = 23 dBm (V_{PEAK} = 4.5 V with 50 Ω load)	V_{RM} ≥16 V	**ESDZX168B-1BF4**
Alternative signal	Bidirectional device	
f = 2.4 GHz f = 5.0 GHz	Extra low capacitance = 0.12 pF Bandwidth >40 GHz	
Very low harmonic <41dBm @ 23 dBm	H3 = -61 dBm @ 23 dBm, f = 2.4 GHz H3 = -62 dBm @ 23 dBm, f = 5.0 GHz	

Needs for Bluetooth antenna	Product key parameters	ST solutions
RF power = 20 dBm (V_{PEAK} = 3.2 V with 50 Ω load)	V_{RM} = 16 V	**ESDZX168B-1BF4**
Alternative signal	Bidirectional device	
f = 2.4 GHz	Extra low capacitance: 0.12 pF - Bandwidth >40 GHz	
Very low harmonic <41dBm @ 20 dBm	H3 = -70 dBm @ 20 dBm, f = 2.4 GHz	

Socket specifics

ST product parameter impact

ST recommended product



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Block diagram or schematic

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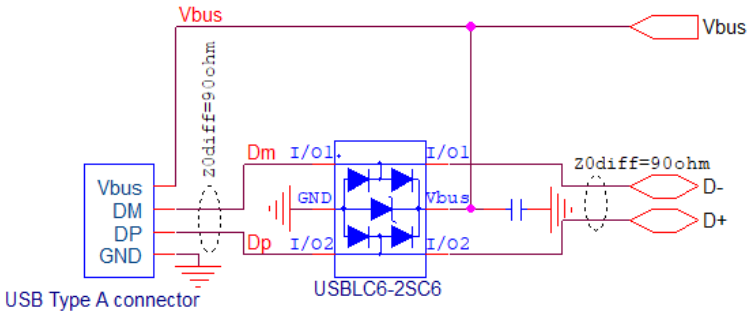
USB 2.0 type A

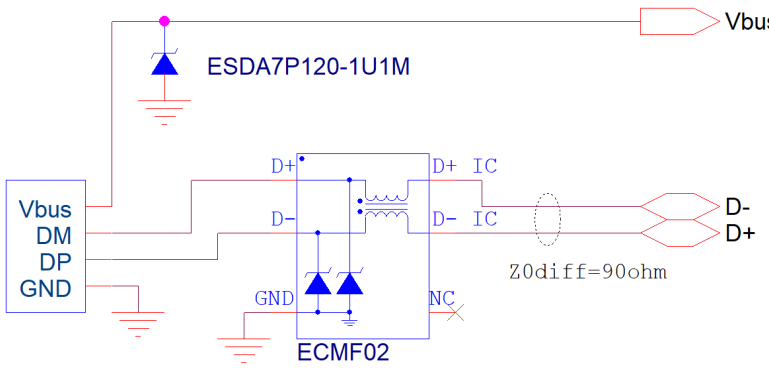
Complete solution portfolio for USB granting flexibility in design
All sockets are ESD protected according to IEC 61000-4-2 level 4

USB type A/B/µB

USB2.0 (D+/D-) needs	Product key parameters	ST solutions
Voltage ≤3.0 V	V_{RM} = 5.25 V	**USBLC6-2SC6** (dual lines) **HSP053-4M5** (pitch 500µm) **ECMF2-40A100N6**
Positive signal	Unidirectional	
Data rate: 480 Mbps Maximum equivalent frequency 240 MHz	Bandwidth : 3 GHz USBLC6-2SC6 Bandwidth : 18 GHz HSP053-4M5	
Avoid Wi-Fi antenna desense (2.4/5 GHz)	CMF rejection ≥-15dB (2.4 to 6.5 GHz)	
IEC 61000-4-2 level 4 8 kV contact/15 kV air	Contact discharge: ≥8 kV Air discharge: ≥15 kV	



USB2.0 (Vbus) needs	Product key parameters	ST solutions
Voltage ≤5.5 V	V_{RM} = 5.5 V	**ESDA7P120-1U1M**
Positive signal	Unidirectional	
Need to withstand 8/20 µs surge (IEC 61000-4-5)	I_{PP} up to 120 A	
IEC 61000-4-2 level 4 8 kV contact/15 kV air	Contact discharge: >30 kV Air discharge: >30 kV	



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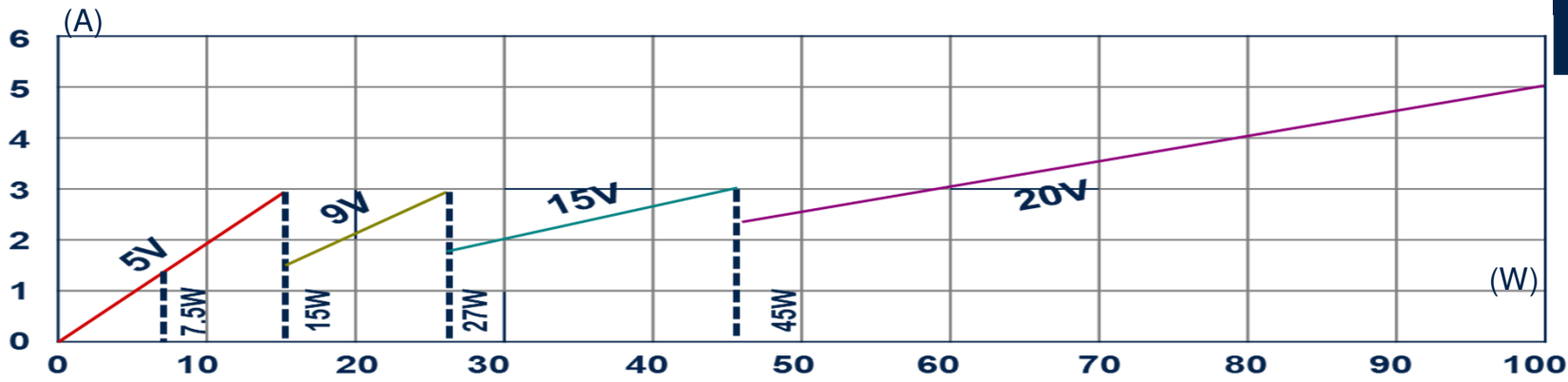
USB4 & USB 3.x / USB-C complete portfolio offer



Role Type	Application STM32 based	Pins	5V – 15 W	9V – 27 W	15 V – 45 W	20 V – 100 W
All	With or without STM32	D+/D-	**ASIP = ESD + CMF: ECMF2-40A100N6** // standalone ESD: USBLC6-2SC6			
		SSRx / SSTx	**ASIP = ESD + CMF: ECMF4-40A100N10** // standalone ESD: HSP053-4M5			
		CC1 / CC2	ESDZV5-1BF4	*ESD141-1BU2**	*ESDZ161-1BF4**	ESDALC20-1BF4
		SBU1 / SBU2	ESDA6V1L	ESDA14V2L	ESDA25L	ESDA25L
		Vbus	ESDA7P60-1U1M ESDA7P120-1U1M ESDA8P30-1T2 SMAJ6.0A-TR	ESDA13P70-1U1M SMAJ12A-TR	*ESDZ161-1BF4** SMAJ18A-TR	ESDA25P35-1U1M SMAJ24A-TR
Sink	YES	TCPP01-M12				
Source	YES	TCPP02-M18				
DRP	YES	TCPP03-M20				

TCPP series is compliant with USB Power Delivery Standard Power Range up to 100 W (5, 9, 15, 20V / 5 A)

**product under development*

Ethernet port

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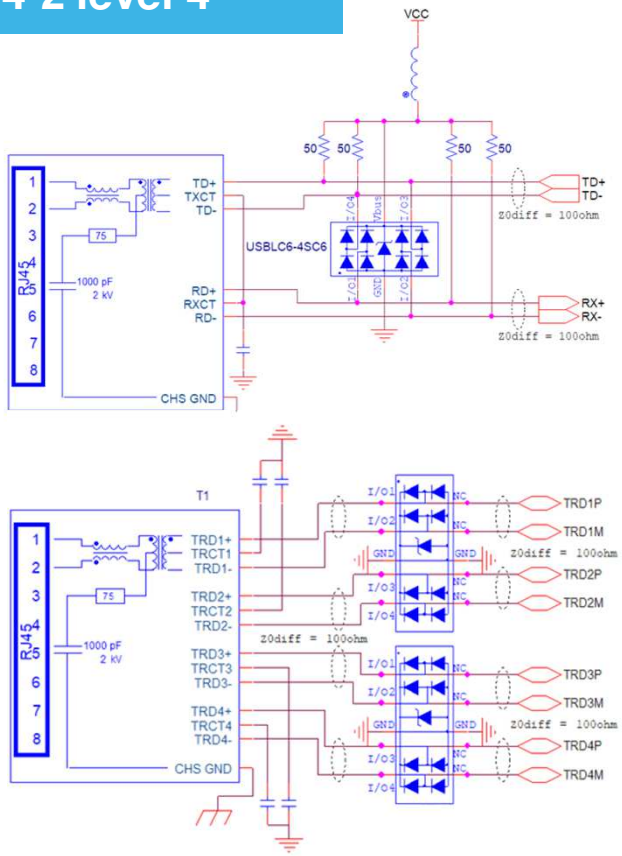
HSP series is compliant with all Ethernet lines
All sockets are ESD protected according to IEC 61000-4-2 level 4

Needs for Ethernet 10/100M	Product key parameters	ST solutions
Voltage: ≤ 3.0 V	V_{RM} ≥ 3.0 V	**USBLC6-4SC6** **HSP053-4M5** (pitch 500µm)
Positive signal	Unidirectional	
Data rate: up to 100 Mbps Maximum equivalent frequency 100 MHz	Bandwidth > 800 MHz	
IEC 61000-4-2 level 4 8kV contact / 15 kV air	Contact discharge: ≥15 kV Air discharge: ≥15 kV	

Needs for Ethernet 1G / 10G	Product key parameters	ST solutions
1GEthernet voltage: 2.5V 10GEthernet voltage: 1.0V	V_{RM} ≥ 3.3V	**HSP053-4M5** (pitch 500µm)
Positive signal	Unidirectional (bidirectional also suitable)	
Data rate per pair = 2.5 Gbps, 800 Msymbols/s Maximum equivalent frequency 500 MHz	Bandwidth > 5.0 GHz	
IEC 61000-4-2 level 4 – 8kV contact / 15 kV air	Contact discharge: ≥ 20 kV Air discharge: 30 kV	

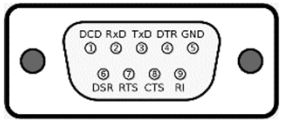


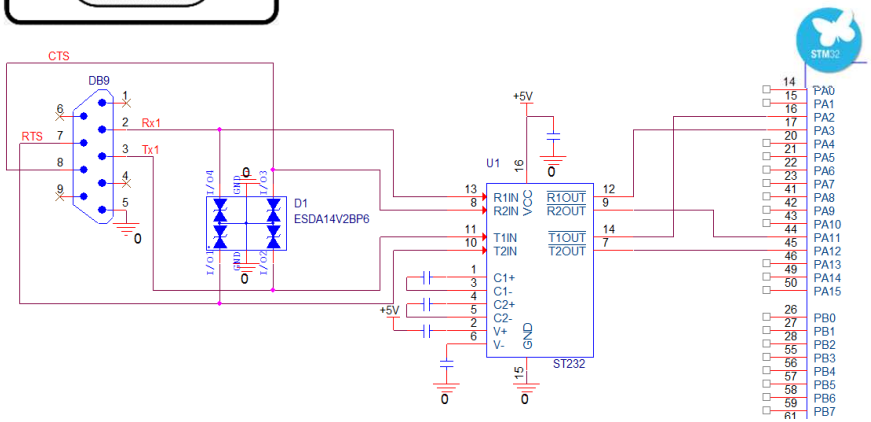
Complete BOM link

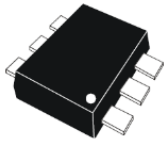
RS-232

Always place the ESD protection close to ESD source
In this case, close to RS-232 connector

Needs for RS-232	Product key parameters	ST solutions
Voltage: ≤ 12 V	V_{RM} ≥ 12 V	ESDA14V2BP6
Positive and negative signal	Bidirectional – 4 lines	
Maximum data rate: 256 kb/s Maximum equivalent frequency < 1 MHz	Low constraint on capacitance Typical line capacitance 25 pF Bandwidth >> 1 MHz	
IEC 61000-4-2 level 4 8 kV contact / 15 kV air	Contact discharge: ≥8 kV Air discharge: ≥15 kV	







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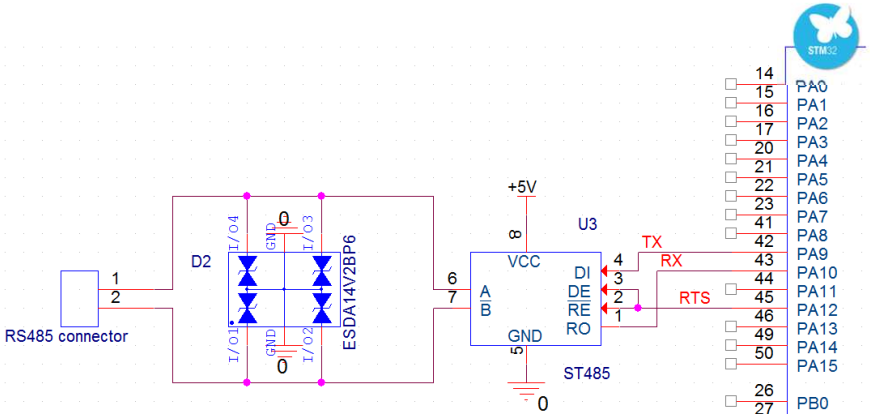
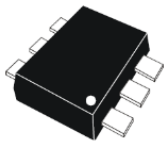
RS-485

Always place the ESD protection close to ESD source
Here, close to RS-485 connector

Needs for RS-485	Product key parameters	ST solutions
Voltage range: -7V to +12 V	V_{RM} ≥ 12 V	ESDA14V2BP6
Positive and negative signal	Bidirectional – 4 lines	
Maximum data rate: 20 Mb/s Maximum equivalent frequency < 10 MHz	Low constraint on capacitance Typical line capacitance 25 pF Bandwidth >> 10 MHz	
IEC 61000-4-2 level 4 8 kV contact / 15 kV air	Contact discharge: ≥8 kV Air discharge: ≥15 kV	





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Complete BOM link

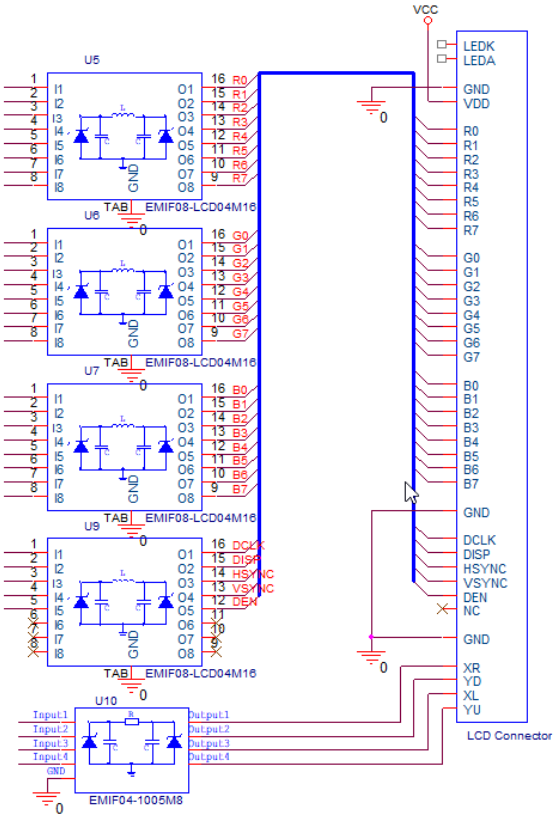
LCD Display

High efficiency EMI filtering
All sockets ESD protected according to IEC 61000-4-2 level 4

Needs for parallel interface	Product key parameters	ST solutions
Voltage ≤ 3.3V (high speed HS)	V_{RM} ≥ 3.3V	EMIF08-LCD04M16
Positive signal	Unidirectional (bidirectional also suitable)	
Clock frequency < 33 MHz	Bandwidth > 400MHz (-6dB)	
Avoid to disturb LTE, Wi-Fi, Bluetooth reception	Rejection of 700MHz, 2.4 GHz and 5 GHz	

Needs for MIPI (Data / Clock)	Product key parameters	ST solutions
Voltage ≤ 385 mV (high speed HS) Voltage ≤ 1.3V (low power LP)	V_{RM} ≥ 3.6V	HSP053-4M5
Positive signal	Unidirectional	
Data rate up to 1.5 Gbps	Bandwidth > 5 GHz	
Avoid to disturb Wifi antenna (2.4GHz / 5GHz)	CMF Rejection ≥ -15dB (2.4 GHz to 6.5 GHz)	ECMF4-40A100N10

Needs for I2C	Product key parameters	ST solutions
Line voltage range: 0 to 3.3V	V_{RM} ≥ 3.3V	USBLC6-2SC6 ESDZV5-1BF4 ESDZL5-1F4
Positive signal	Unidirectional (bidirectional also suitable)	
Small consumption on digital communication	Capacitance <10 pF to reduce consumption	
Data rate: 3.4 Mbps	Bandwidth : > 700 MHz	



Complete BOM link

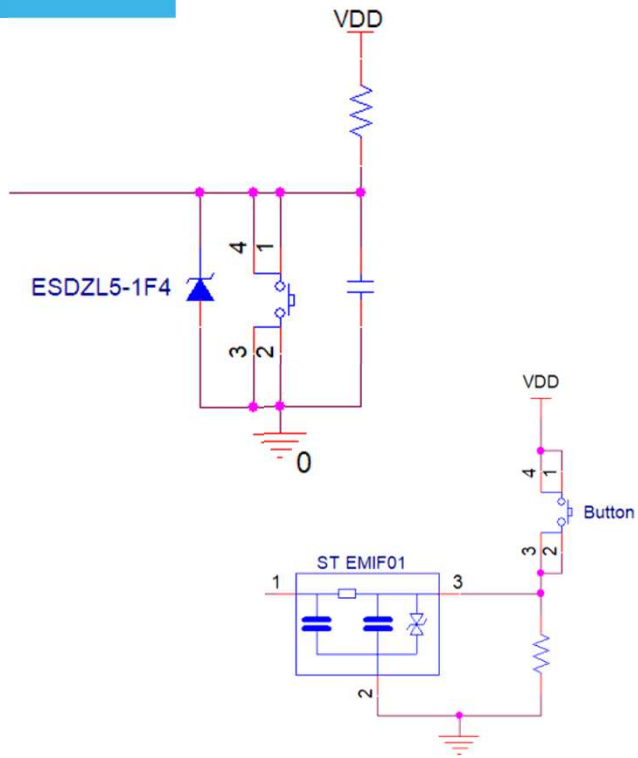
Buttons / Switches

All sockets are ESD protected according to IEC 61000-4-2 level 4
Very low clamping thanks to soft snapback type protection

Needs for switches	Product key parameters	ST solutions
MCU power supply, usually 3.3V or less	V_{RM} ≥ 5.5V	**ESDZV5-1BF4** (single line) **ESDZL5-1F4** (single line)
Digital positive signal	Unidirectional (bidirectional also suitable)	
Low frequency application	No constraints on capacitance Cline < 9.5pF	
IEC 61000-4-2 level 4 8 kV contact / 15 kV air	Contact discharge: ≥15 kV Air discharge: ≥30 kV	
Avoid EMI (antenna desense)	Reject frequency > 700 MHz	*EMIF01-1007AF4 (*)*
IEC 61000-4-2 level 4 8 kV contact / 15 kV air	Contact discharge : up to 8 kV Air discharge : up to 15 kV	

(*) Contact our sales office

0201 package



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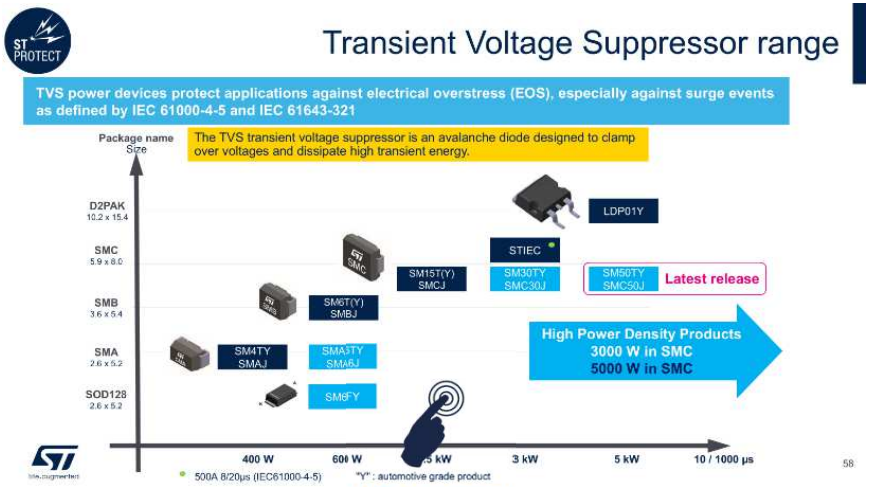
Complete BOM link

Power supply

Wide range of Ipp surge capabilities
Flexibility with various voltages and package sizes

Power supply needs	Product key parameters	ST solutions in SMD
DC input voltage	$V_{RM} \geq V_{DC}$ (V_{DC} + 10% margin)	**SMA6J series** (SMA) **SM15T** (SMC)
	Unidirectional	
AC input voltage	$V_{RM} \geq \sqrt{2} \times V_{AC}$ (V_{AC} + 10% margin)	
	Bidirectional	
Need to withstand 8/20 µs surge (IEC 61000-4-5)	I_{PP} up to 169A with V_{RM} 28 V	
IEC 61000-4-2 level 4 8 kV contact / 15 kV air	Contact discharge: >30 kV Air discharge: >30 kV	



Full TVS range link

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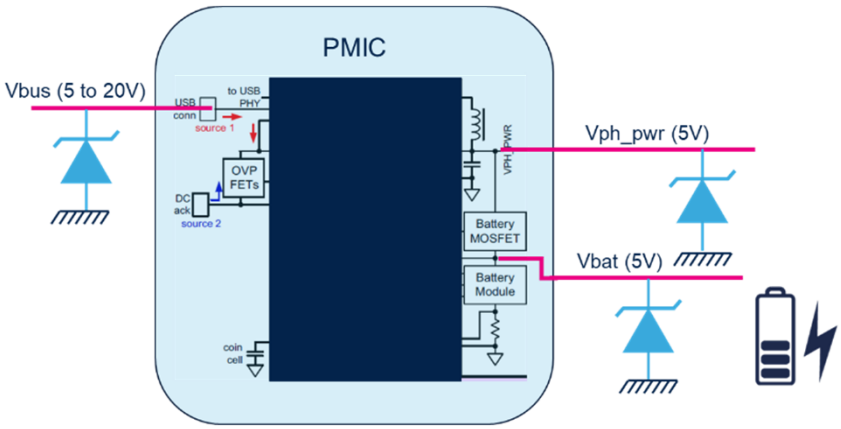
Charging connector & Battery

Wide range of Ipp surge capabilities
Flexibility with various voltages and package sizes

Power supply needs	Product key parameters	ST solutions in SMD
Voltage according to battery or specification	$V_{RM} \geq V_{bat}$ (generally V_{bat} = 5 V to 7 V)	**ESDAxP series** (QFN) **SM6F series** (SOD128)
	Unidirectional	
Need to withstand 8/20 µs surge (IEC 61000-4-5)	I_{PP} up to 120 A with V_{RM} 7 V	
IEC 61000-4-2 level 4 8 kV contact / 15 kV air	Contact discharge: >30 kV Air discharge: >30 kV	



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Glossary

- **ESD**: electrostatic discharge
- **EOS**: electrical overstress
- **TVS:** transient voltage suppressor diode
- **CMF:** common-mode filter
- **FACP**: fire alarm control panel
- **HMI**: human machine interface
- **PLC**: power line communication
- **SLC com:** signal line circuit communication is used to transmit power and data to devices connected in a closed loop. This is a 24V nominal DC current limited bus.

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