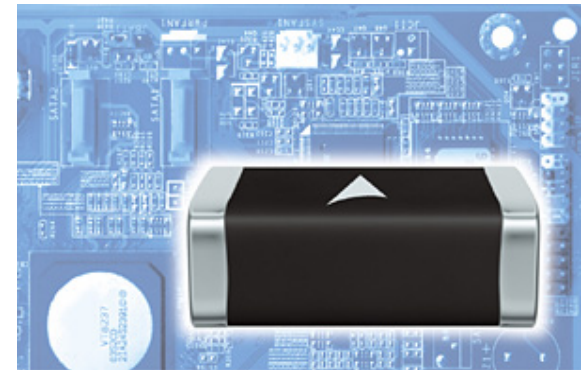


Smart Home Applications

CTVS chip varistors (MLV)

SMD NTC thermistors



EPCOS AG


A TDK Group Company

PPD ML

Munich, Germany

April 2017

SMART HOME: Products in Focus

Application	Product	Product details	Added value
 360° Smart Home	CTVS chip varistors (MLV)	Case size \geq EIA 0805 Function: Overvoltage protection (OVP); e.g. against surge, burst, inductive loads	<ul style="list-style-type: none"> • UL approval • Multiple pulse repeatability without derating • High surge capability up to 6 kA • Stable protection level • Excellent long-term stability
	SMD NTC thermistors	Case size \geq EIA 0402 Function: Temperature measurement and compensation	<ul style="list-style-type: none"> • Narrow tolerance types • Specified values at defined measurement points • High accuracy, e.g. @ 100°C • High sensitivity

Application focus



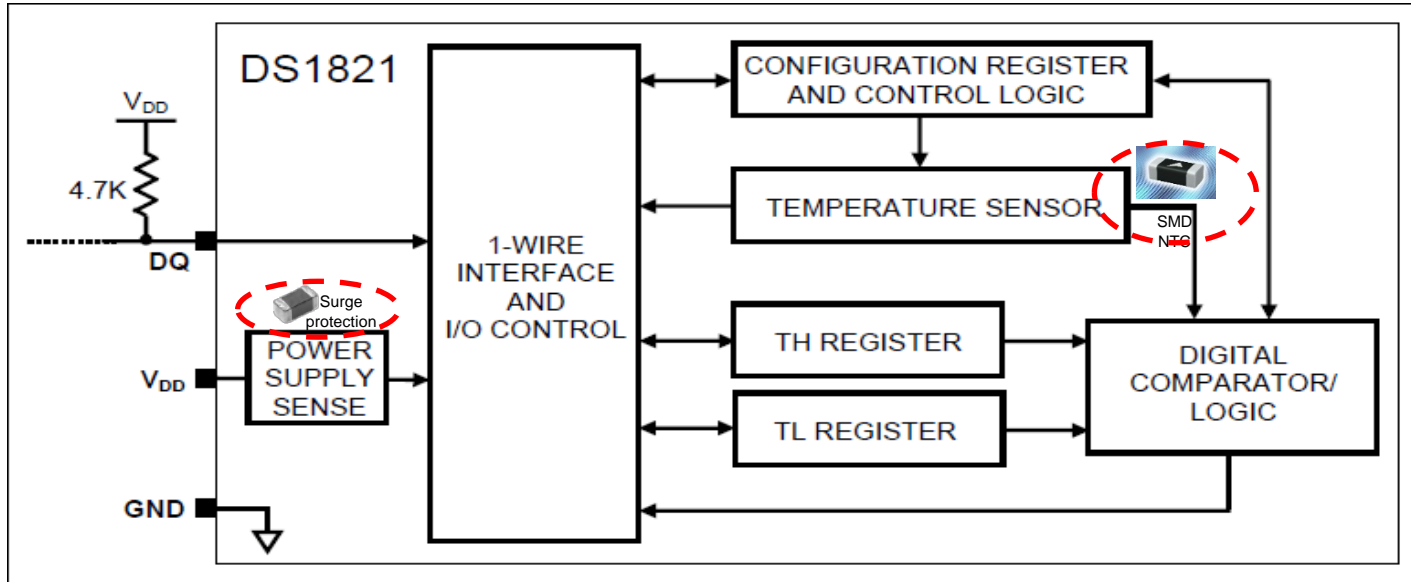
Thermostat



Fire security



Application Focus: Thermostat



Block diagram retrieved from:
<https://www.maximintegrated.com/en/images/qv/2794.gif>

Surge protection by CTVS chip varistors (examples):

CTVS chip varistor (MLV)	Type	$I_{\text{surge,max}}$ [A]	W_{max} (2 ms) [mJ]
B72520T0350K062	CT1206K35G	100	400
B72520T0400K062	CT1206K40G	100	500
B72520T0600K062	CT1206K60G	100	700
B72530T0300K062	CT1210K30G	300	2,000

Thermal measurement by SMD NTC thermistors (examples):

SMD NTC thermistor	EIA case size	R_{25} [Ω]	$\Delta R_R/R_R$ [%]	$B_{25/100}$ [K]	$\Delta B/B$ [%]
B57332V5103F360	0603	10 k	1	3450	1
B57334V2103D260	0603	10 k	0.5	3455	0.7

NEW:
PROTOTYPE

Application Focus: Fire Security

Why focus on fire security?

- Fire security is obligatory in many countries.
- New constructions and up-gradation of the already installed fire sensing and detection systems.
- Tremendous demand (mandatory for new buildings, several detectors in one room).

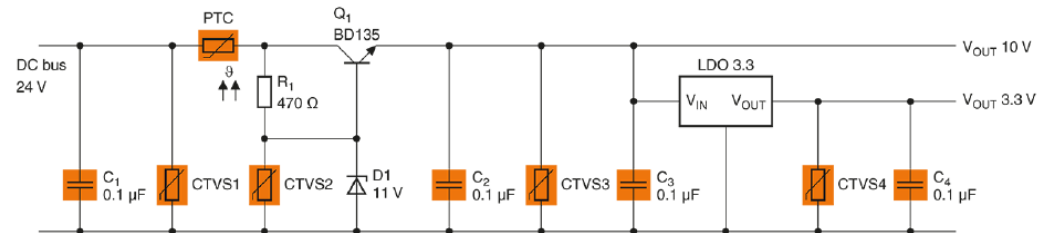
On which fire security applications do we focus?

- Interconnected **hard-wired** applications (no battery-powered)
- **Detection:** Motion, vibration, opening, breakage of glass, access control, burglar alarms, smoke, heat, water
- **Sender:** Manual pull stations, emergency call sender, assault sender
- **Communication modules:** ISDN, CSM, IP, info module, control panels



Which TDK products are inside the fire security devices?

- **CTVS chip varistors (MLV) to protect sensitive components, e.g. microprocessor, micro-controller against burst pulses**
- Capacitors, e.g. MLCC, aluminum, tantalum
- PTC thermistors

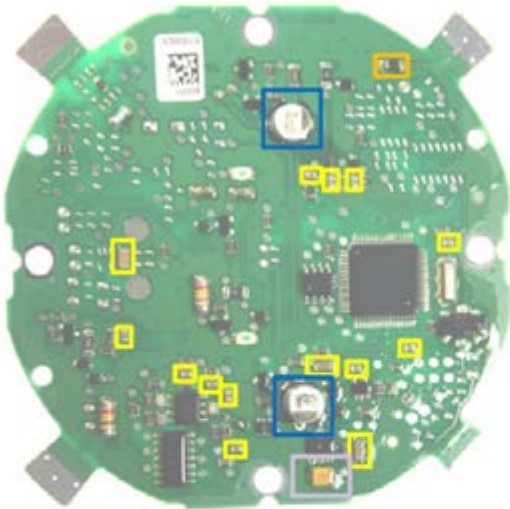


Which CTVS chip varistor can we recommend?

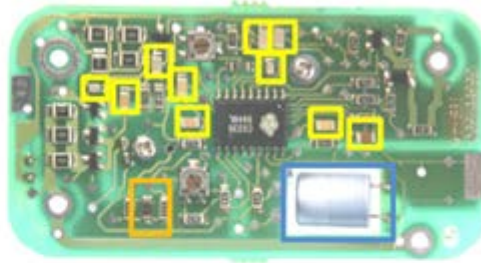
CTVS chip varistor (MLV)	Type	$V_{RMS,max}$ [V]	V_{DC} [V]	$V_V @ 1 \text{ mA}$ [V]	$V_{clamp,max}$ [V]	$I_{surge,max}$ [A]	$W_{max} (2 \text{ ms})$ [mJ]	$I_{leak} @ V_{RMS,max}$ [μA]
B72510T0350K062	CT0805K35G	35	45	47	77	80	300	1 max
B72520T0400K062	CT1206K40G	40	56	68	110	100	500	1 max
B72580T0600K062	CT1812K60G	60	85	100	165	400	5,800	1 max
B72540T0400K062	CT2220K40G	40	56	68	110	1,000	9,000	1 max










Benchmark Example: Smoke Detector

Detector made by Honeywell
 Brand “Esser”
 Design-in Germany



Detector made by Apollo
 PCB Series 60
 Design-in UK



Type	Dim	Size	Count	Type	Dim	Size	Count
 M LV	1206	SMD	1	 MLV	1206		1
 MLCC	0603	SMD	11	 MLCC	1206		8
 MLCC	1206	SMD	3	 MLCC	0805		2
 Tantalum	B	SMD	1	 ALU	Ø8mm		1
 Alu Cap	Ø5	SMD	2				

What is the job of the MLV:

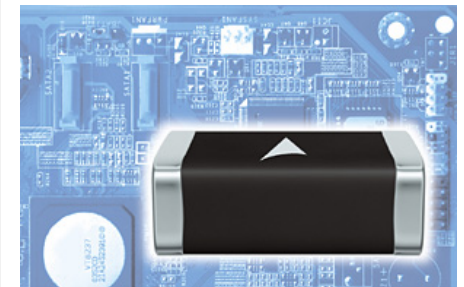
The CTVS chip varistor (MLV) is located on the PCB on the entrance after the connector block. The part protects sensitive components, e.g. microprocessor, microcontroller against **burst pulses**. Burst pulses can be generated by capacitance or inductive coupling because the system voltage is parallel to the bus lines.

Product Features – CTVS Chip Varistors (MLV)

- Efficient **overvoltage protection (OVP)**; e.g. against surge, burst, inductive loads in smart home applications
- **Small** package for further application miniaturization
- **Stable** protection level, excellent **long-term** stability
- **Multiple pulse repeatability without derating**
- High **reliability** in the application
- **UL1449** (incl. cUL) approved (UL file E481997)

**EFFICIENT AND
STABLE
OVERVOLTAGE
PROTECTION IN
SMALL PACKAGE**

	TDK CTVS chip varistors (MLV)	Competition including <u>TVS diodes</u>
Protection level	+	+
High surge capability	++ (up to 6kA)	+
Temperature derating behavior	++ (with multiple pulse repeatability)	-
Mechanical robustness	+	○
UL approval* NEW	++	-
Price level	+	○



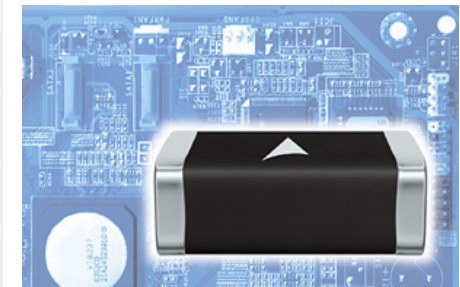
* Further information can be found on page 8

Product Features – SMD NTC Thermistors

- Efficient thermal measurement and compensation
- **Narrow tolerance types** available for precise measurement
- High **sensitivity** in the application
- High **accuracy** at specific temperature
- **UL1449** (incl. cUL) **approved** (UL file E69802)

**PRECISE AND
ACCURATE
MEASUREMENT/
COMPENSATION**

	TDK SMD NTC thermistors	Competition
Narrow tolerance types NEW	++ (e.g. 0.5%)	+
Specified values at defined measurement points	++	○
High accuracy	++	+
150°C types available	++	○
UL approval	+	+
Broad product range	+	○
Price level	+	○



Design-In Support

Application Note



Smart building and smart home applications such as intelligent thermostats, access controls and burglar alarms are becoming more widely established as a standard in building management. Of these applications, fire alarm systems are especially important, because people's lives and property depend on them. TDK offers a series of EPCOS components that are crucial to the reliability of fire alarm systems. Particular importance is attached to solutions for overvoltage protection.

March 2017

<https://en.tdk.eu/tdk-en/373562/tech-library/articles/applications---cases/applications---cases/essential-protection/2078206>



Article Essential protection

UL approval for CTVS

TDK is the biggest global supplier with UL approval for a complete CTVS chip varistor series.

Teaser:



UL for CTVS chip varistors

Sample kits

CTVS chip varistors	Order number
CTVS for general use	B72499S9999K199
CTVS for industrial use	B72499I9999K199
CTVS for surge protection	B72499H9999K199

NEW



SMD NTC	Order number
SMD NTC for general use	B57999V2999J199

NEW

