

## FUSE

Products Name	Part No.	Dimension	Fusing Characteristics	Rated Current	Rated Voltage	Breaking Capacity
<b>Glass Tube Fuselink</b>	G1T(F)AL-***A	3.6*10mm	Fast acting/Slow Blow	100mA-16A	125V/250V	35A or 10 Iin which is Higher 100A/200A@250V AC
	G2T(F)AW(L)-***A	5*20mm		100mA-25A		
	G3T(F)AW(L)-***A	6.35*32mm				
<b>Ceramic High Voltage Tube Fuse</b>	C1T(F)*W(L)-***A	5*20mm	Fast acting/Slow Blow	63mA-15A	400V/500V/600V/1KV	15KA@250V
	C2T(F)*W(L)-***A	6.35*32mm		63mA-40A		10KA@250V
	C3T(F)*W-***A	10*38mm		100mA-50A		10KA@250V
<b>Polymer Case Minifuse</b>	SET-***A	8.4*7.2mm	Time-lag	50mA-10A	250V	35A or 10 Iin which is Higher
	RTA-***A	8.5*8mm				
<b>SMD Fuse</b>	F/T2410A(B/C)-***A	2.6*6.1mm	Fast acting/Slow Blow	50mA-10A	125/250/300V	50A@250V
	F/T4012B(C)-**A	3.12*10.1mm			250V/380V	50A@250V
	F/T4818B(C)	4.5*12.1mm			250V/600V	100A@250V

Products Name	Part No.	Dimension	Fusing	Rated Temp.	Rated Voltage	Lifetime
<b>Resettable Thermal Fuse</b>	MRTF22-***(S)	φ2.15*6.6mm	Thermal Cut-off	75/95/115°C	250V	6000times Min.
	MRTF40-***(S)	φ4.0*10.5mm				

## Varistor

Products Name	Part No.	Dimension	ACrms	Max. Peak current I(times(8/20μS)	Energy	Typical Capacitance
<b>MYG Series Varistor</b>	MYG05D***K	φ5mm	11-420V	100/400A	0.3-14J	40-2400pF
	MYG07D***K	φ7mm	11-510V	250/1200A	0.8-35J	48-3500pF
	MYG10D***K	φ10mm	11-1000V	500/2500A	1.5-100J	60-7500pF
	MYG14D***K	φ14mm		1000/4500A	3.5-240J	120-18000pF
	MYG20D***K	φ20mm		2000/6500A	10-400J	220-39000pF
<b>High Energy Varistor</b>	(W)CA***-25D***K	φ25mm	130-625V	20KA	150-540J	—
	(W)CA***-32D***K	φ32mm		30KA	265-880J	—
	(W)CA***-34S***K	L34mm		40KA	390-1320J	—
	(W)CB***-34S***KD2	L34mm	275-550V	80KA	1000J-2000J	—
	(W)CC***-34S***KD3	L34mm	275-420V	100KA	1600J-2700J	—
	(W)CD***-34S***KD4	L34mm		120KA	2100J-3600J	—
	(W)CA***-40D***K	L40mm		40KA	675-1320J	—
	(W)CA***-53D431K	L53mm	275-550V	70KA	675-1270J	—
<b>Thermally Protected Varistor</b>	TMOV20T***K(A)	φ20mm	50-460V	10KA	40-300J	—
	TMOV25T***K(A)	φ25mm		15KA	150-390J	—
	TMOV32T***K(A)	φ32mm		25KA	210-600J	—
<b>Multilayer Varistor</b>	MEV0603***T	0603mils	Vdc:5-24V	1A	0.01J	1-10pF
	MLV0603***T		Vdc:3.3-33V	30A	0.1J	—
	MLV0805***T	0805mils	Vdc:3.3-60V	40A	0.1J	—
	MLV1206***T	1206mils	Vdc:3.3-100V	100A	1.0J	—
	MLV1210***T	1210mils	Vdc:3.3-75V	250A	1.5J	—
	MLV1812***T	1812mils	Vdc:12-85V	800A	2.3J	—
	MLV2220***T	2220mils	Vdc:18-85V	800/1200A	7.5J	—
MHV2220***T	2220mils	130-320V	400-1200A	8.5/10J	200-550pF	

## NTC Thermistor

Products Name	Part No.	Dimension	Rated Resistance	R Tolerance ±%	B Value	B Tolerance ±%
<b>Surface Mount NTC Thermistor</b>	SNT0402 Series	0402mils	4.7K-100KΩ	1%/2%/3%/5%	3435-4100	1%/2%/3%
	SNT0603 Series	0603mils	4.7K-680KΩ			
	SNT0805 Series	0805mils	1K-680KΩ			
<b>MF72 Power NTC</b>	MF72-**D**	5, 7, 9, 11, 13, 15, 20, 25mm	5-60Ω	±20%	—	—

## Surge Protection Device (SPD)

Products Name	Part No.	Dimension	Nominal Discharge Current	Maximum Discharge Current	Max. Continuous Operating	Voltage Protection Level
			Iin(8/20μs)	Imax(8/20μs)	Uc	Up
<b>Surge Protection Device</b>	ESP-20/L150-P(S)	37.4*34.3*58.2mm	10KA	20KA	150V	1000V
	ESP-20/L275-P(S)				275V	1.3KV
	ESP-20/L320-P(S)				320V	1.5KV
	ESP-20/L420-P(S)				420V	2KV
	ESP-20/L510-P(S)				510V	2.1KV



## LED Lighting(Light Emitting Diode) Protection Guide

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## Target Application:

Residential LED Lighting  
Street&Highway LED Lighting  
Packing Lot&Public Structure LED Illumination  
Commercial&Outdoor LED lighting

## Target Protection:

Lighting Protection under thunderstorm condition  
Over current & Over voltage Protection  
Over Temperature Protection  
ESD Protection  
Components Failure or fire protection




**Ceramic High Voltage Tube Fuselink**

**Features:**

- 6\*32mm Time-lag surge withstand ceramic fuse
- Available as without lead or axial lead types
- High Rated voltage:AC400V,AC500V,AC600V,AC1000V
- Very High Breaking capacity: Maximum 400A@250V
- Applied to High Energy,lighting endurance environment

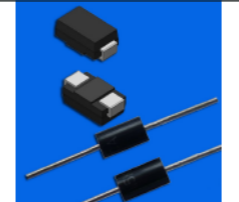


LED,  
a 'Green' Technology!  
Ecube-tech,  
a 'Green' supplier with RoHS Compliant!



**MF72 Power NTC Thermistor**

- A Power NTC designed on LED power supply as a temperature sensitive component, when temperature inside LED lamp is increasing, MF72 can decrease output current automatically in order to adjust the environment temperature LED life-span can be prolonged.



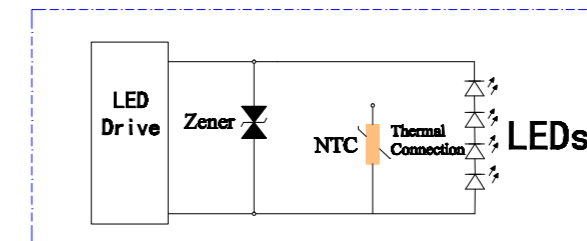
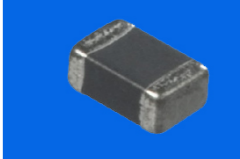
**Transient Voltage Suppressor (TVS)**

A Power TVS diode can be added before DC converter as transient secondary protection comparing with former stage MOV.

**Features:**

- Package : SMA, SMB,SMC,SMD,DO-41,DO-15
- Available as SMD in order to optimize board space
- Excellent clamping capability
- Fast response time and high reliability
- High Power & High temperature soldering

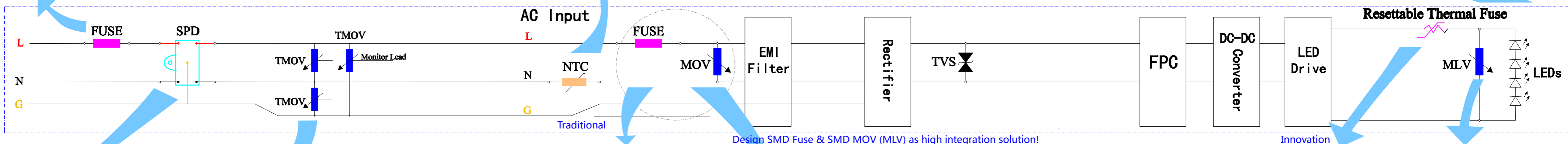
SMD NTC was designed close to LED bulbs as a temperature sensing component, temperature signal will be monitored and feedback to controller to adjust Lumen degree, then further protect against the over-temperature of LED bulbs.


**Surface Mount NTC Thermistor**

**Features:**

- Small size, ideal for high density SMT installation
- Superior ability and resistance to soldering heat
- Available body size: 0402,0603,0805
- Low floating Capacitance
- Wide operating temperature -40°C to +125°C



**Innovation**




For outdoor LED lighting, Surge Protection devices (SPD) might need to be designed on the AC input before LED driver in order to provide higher surge level e.g.:20KV/10KA surge.

**Surge Protection Device (SPD)**

**Features:**

- Tailored product for Outdoor Street LED Light Driver
- Available as 'in series' & 'in parallel' connection
- Maximum discharge current 20KA (8/20μs)
- Failure safe function, e.g.:MOV Failure
- Automatic Protection for high temperature
- LED Indication for SPD Online Status (Series Connection)
- Meets IEEE C62.41.2 Location Category C High Exposure
- Operating Temperature Range: -40°C~+70°C
- Relative Humidity: ≤95% (25°C)
- IP66 Water & Dust-proof Level

**Traditional**




In traditional outdoor LED lighting applications, the high surge withstand MOV was designed as common mode and difference mode dual protection. Approved Thermally protected varistor (TMOV) with thermal element integration protect against thermal runaway and avoid dangerous condition like smoke or fire.

**Thermally Protected Varistor (TMOV)**

**Features:**

- Three-Terminal thermally protected metal oxide varistor
- Three-Terminal type is available for failure indication
- Body size: 20mm,25mm,32mm
- High peak surge current rating up to 20kA at single 8/20μs impulse
- Operating temperature range: -40°C ~ +85°C

**Glass Case Tube Fuselink**



**Features:**

- Available as Axial Lead/without lead
- Dimension:3.6\*10, 5\*20,6\*30mm
- Fast-Acting & Slow-Blow Fusing
- Rated Current/Voltage:250mA-16A/250V
- Operating Temperature: -55°C ~ +125°C

**Polymer Case minifuse**



**Features:**

- Radial leaded Sub-Miniature Fuse
- Available as round and square shape.
- Save more space for PCB layout
- Fusing characteristics: Time-lag
- Rated Current/Voltage:50mA-10A/250V

**Metal Oxide Varistor (MOV)**



**Features:**

- High Energy Dissipation Capability
- Body size: 5,10,14,20,25,32mm
- Fast Response Time
- Stable Clamping Voltage
- High Voltage Endurance

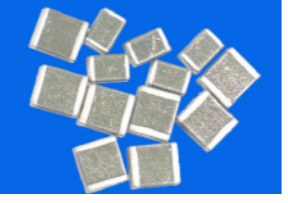
**Surface Mount Fuse**



**Features:**

- Available SMD size 2410,4012,4818
- Fast-Acting & Slow-Blow Fusing
- Small size and surface mount devices
- Breaking capacity upto 100A@250V
- Rated voltage: 125V/250V/300V

**High Energy Multilayer Varistors (MLV)**




**Features:**

- Zinc Oxide based ceramic devices
- Very Small Size SMD type
- High Varistor Voltage & High Energy among MLV products
- Low Clamping Voltage

**Illustration:**

**Innovation**



Resettable Thermal fuse can sense over-temperature and over-current near LED bulbs simultaneously, comparing to PTC or NTC, it is thermally defined fast acting fuse to avoid continuous on load & acting; can cut-off circuit totally to protect but resettable again.

**Resettable Thermal fuse**

**Features:**

- Thermally sensitive fuse but resettable after acting
- Small Size
- Available as Axial lead and SMD Type
- Over-current&Over-temperature Protection
- High Rated voltage and Rated current

**Small Size MLV e.g. 0603size as ESD Protection components for LED bulbs.**



**ESD Multilayer Varistors (MLV)**

**Features:**

- Very Small Size SMD type
- Fast response time, below 1ns
- Very low capacitance
- Low Clamping Voltage
- Can replace SMD Zener TVS for ESD Protection

**Experiment Illustration:**

Normal Condition Pose heat → When over-Temperature → When Temperature Decrease

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