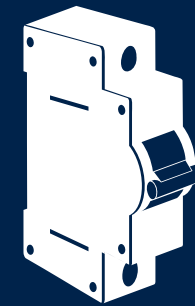


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# Sensitive SCR Thyristors





# Sensitive SCR Thyristors Portfolio

Available in through-hole and surface mount packages, ST Sensitive Thyristors can be controlled by very small power supplies thanks to low gate current.

## Main applications



Ignitor



Breaker



Dimmer

## Packages offered



SOT-23



SMBflat-3L



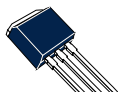
SOT-223



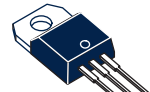
DPAK



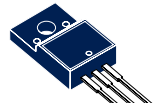
TO-92



IPAK



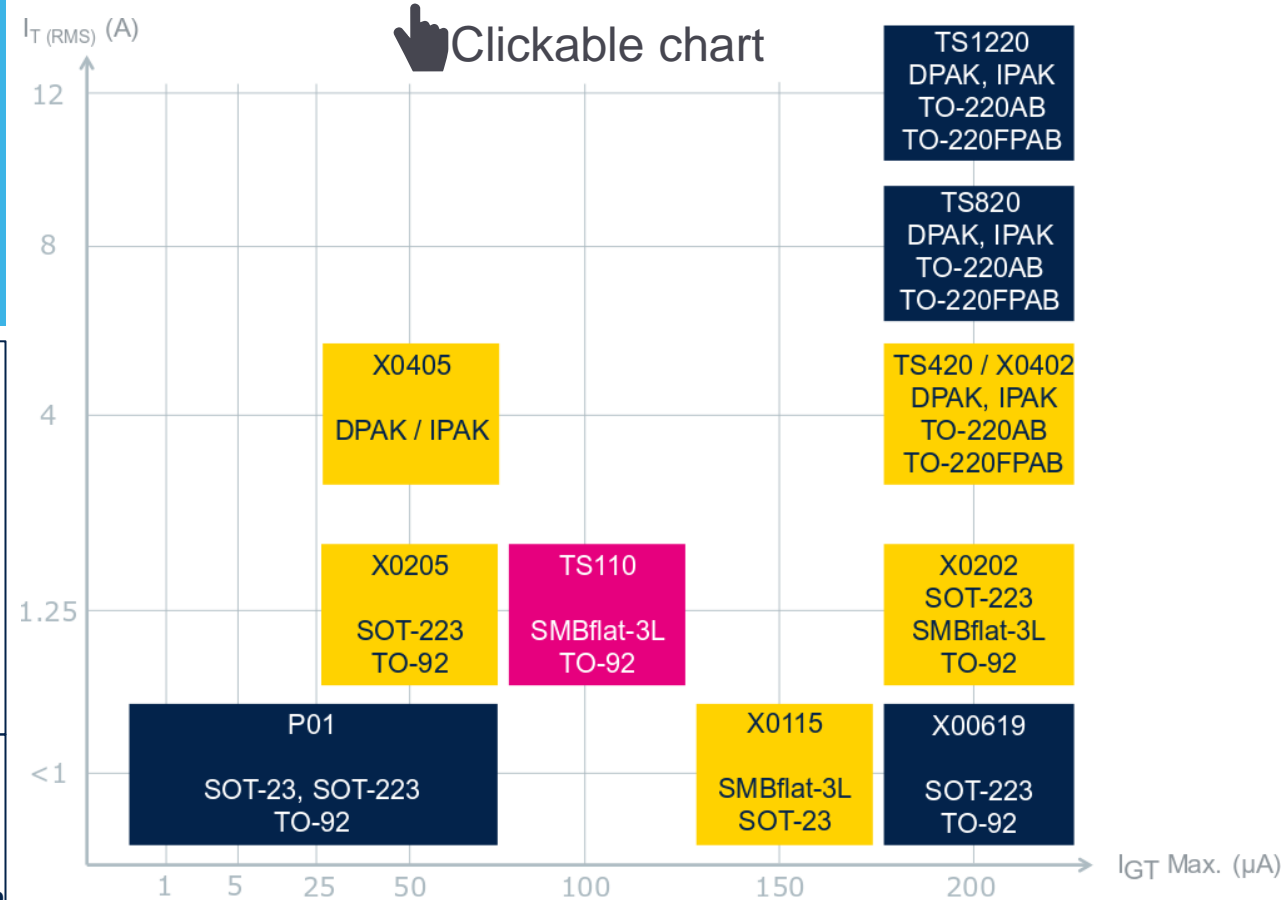
TO-220AB



TO-220FP



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Voltage ratings:

■ ≤ 600 V

■ ≤ 800 V

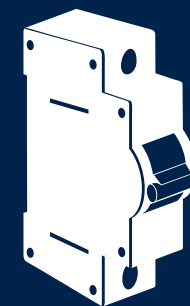
■ ≤ 1250 V

Thyristors and AC Switches



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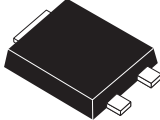
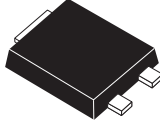

# Sensitive SCR for Circuit Breakers

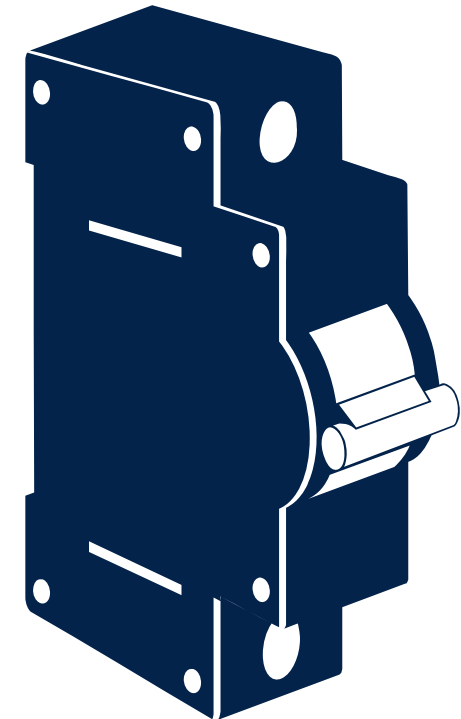




# SCR Thyristors for circuit breakers

ST Sensitive Thyristors enable smarter circuit breakers and help save on PCB assembly, footprint and MOV selection.

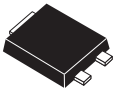
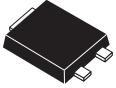
Params	Description	TS110-8UF SMBflat-3L	X0115MUF SMBflat-3L
Package			 
$d_{cr}$	Creepage distance	3.4 mm	3.4 mm
$I_{GT}$	Gate current	[1-100] $\mu$ A	[30-150] $\mu$ A
$I_{T(RMS)}$	On-state current	1.25 A	1 A
$I_{TSM}$	Surge current	20 A	10 A
$I_{DRM}$	Leakage current	100 $\mu$ A	150 $\mu$ A
$V_{DRM}$	Blocking voltage	800 V	600 V
$V_{DSM}$	Direct voltage surge	<b>1250 V</b>	750 V
$di/dt$	Turn-on reliability	100 A/ $\mu$ s	75 A/ $\mu$ s
$dV/dt$	Noise immunity	100 V/ $\mu$ s	80 V/ $\mu$ s





# SCR Thyristors for circuit breakers

TS110-8UF offers unique 1250V surge capability for 240V breakers  
X0115MUF and X0115ML are suitable for 120V breakers

	AFCI / AFDD	120 V GFCI	240 V GFCI	Pollution Degree 2	Minimal footprint
 TS110-8UF	✓	✓	✓	✓	✓
 X0115MUF	✓	✓	✗	✓	✓



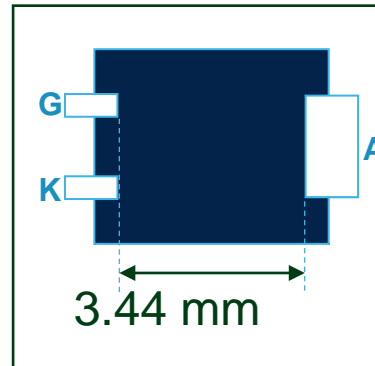
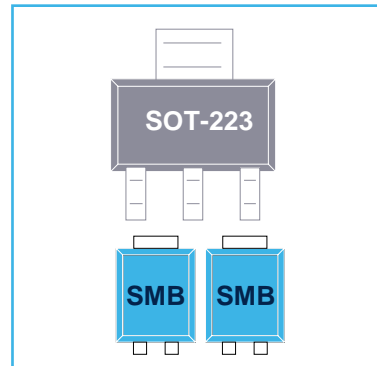
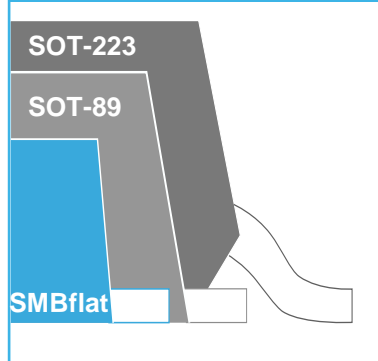
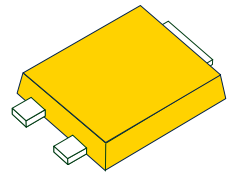
# Benefits of SMBflat-3L

Faster automatic assembly

Ultra-compact

No coating on PCB

PCB Material IIIa

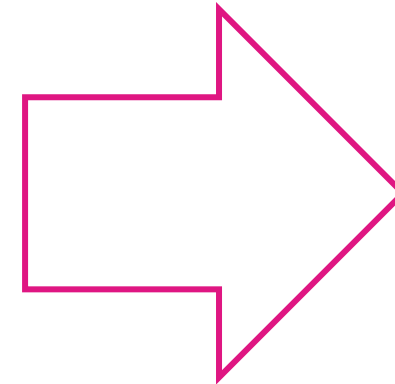


Surface Mount Package

1mm ultra-flat Thyristor package

Ultra-small footprint for loads  $\geq 0.8A$

Creepage OK for 250V applications (Pollution level 2)



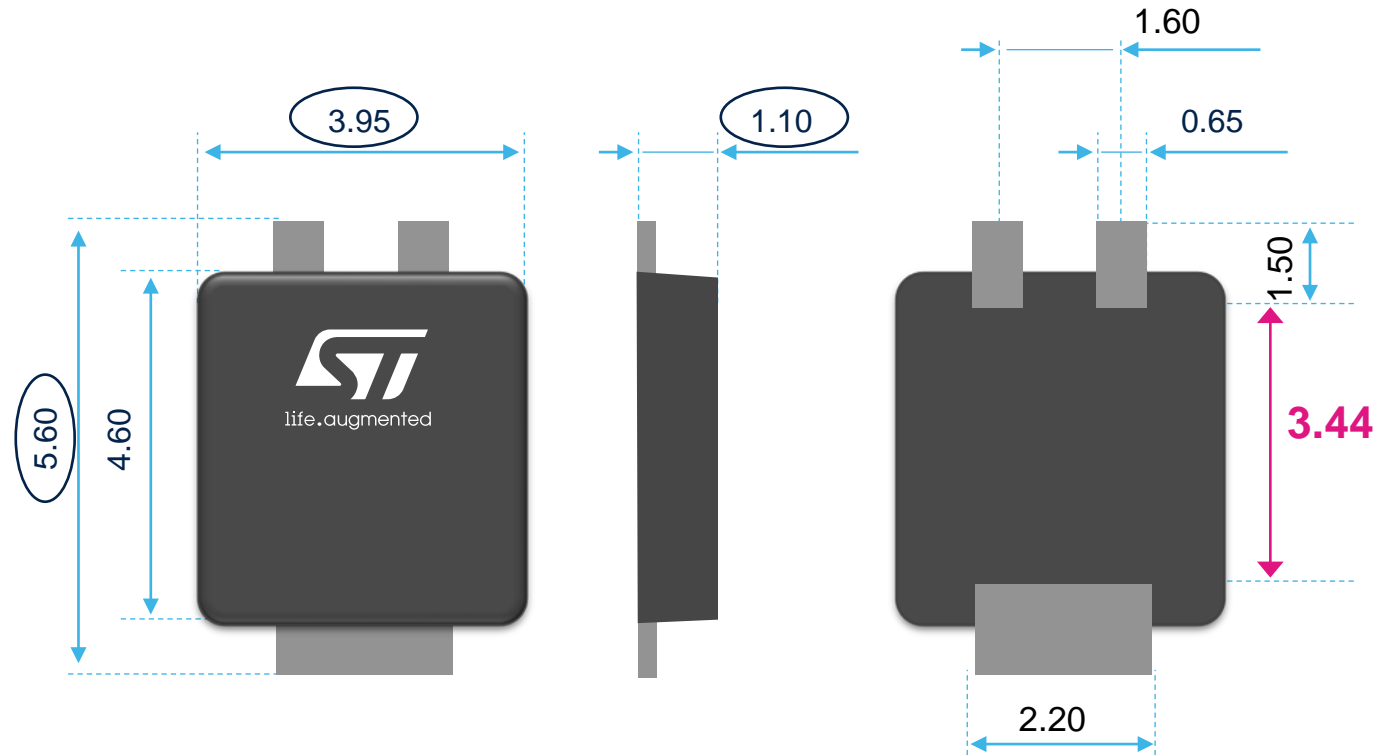
**COST SAVING**



# SMBflat-3L Dimensions

**Creepage > 3.4 mm (250V AC Switch; no certification required)**  
**MSL-1, Halogen free**

Length : 5.6 mm  
Width : 3.95 mm  
Height < 1.10 mm





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# Sensitive SCR for Ignitors

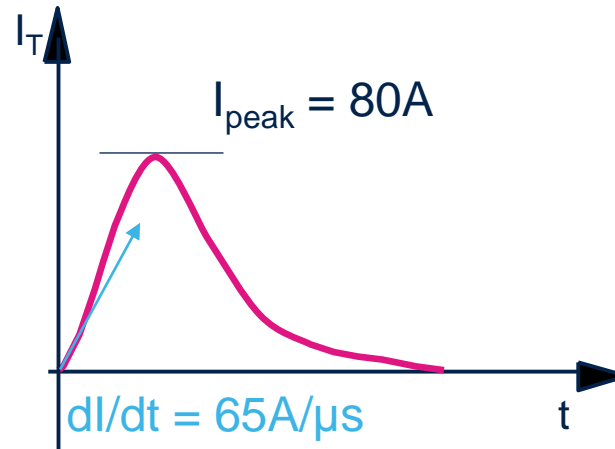
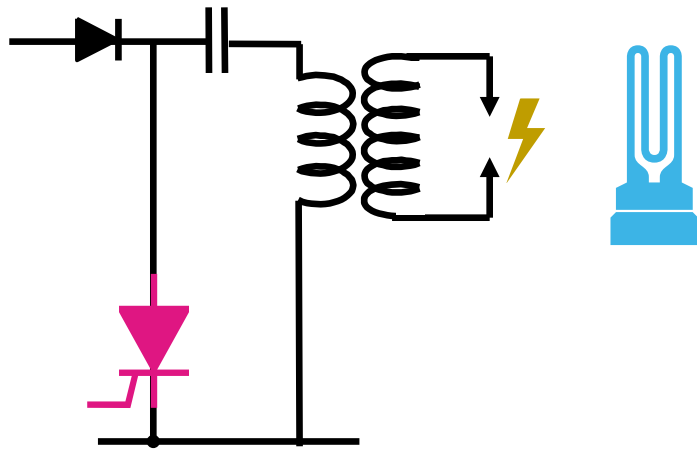






# Ignitor and capacitive discharge circuits

X0115MUF enables robust ignitors thanks to improved voltage and turn-on performance



$$I_{\text{TSM}} (10\mu\text{s}) \text{ max} = 100 \text{ A}$$

$$dI/dt \text{ max} = 75 \text{ A}/\mu\text{s}$$

$$V_{\text{DSM}} \text{ max} = 750 \text{ V}$$



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# Sensitive SCR for Light Dimmers





# Sensitive SCR for light dimmers

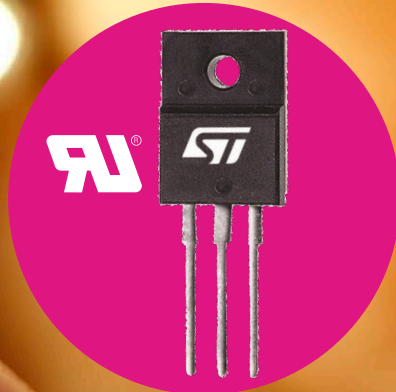
## Experience LED deep dimming with Sensitive SCR

Reference design with STM8: [STEVAL\\_ILD004V2](#)

Low holding current to increase dimming range

UL-1557 recognized component at 2 kV level

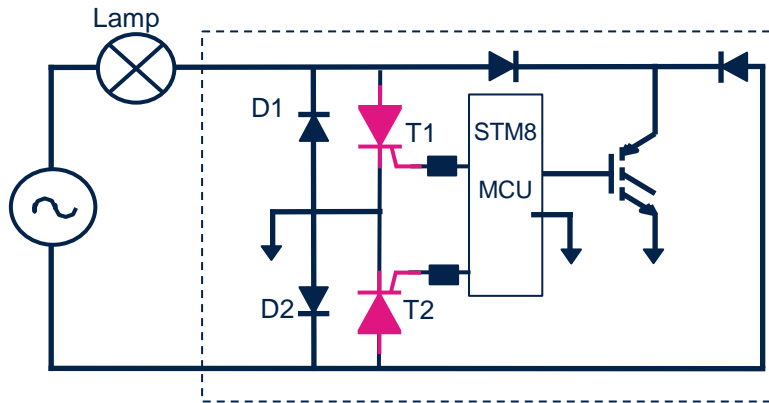
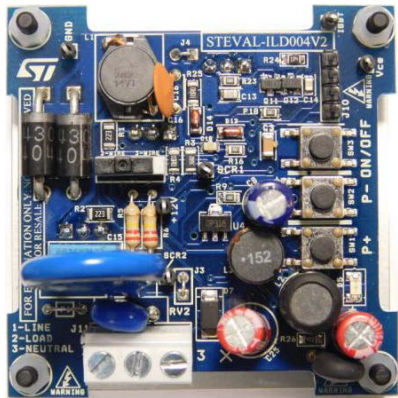
<u>TS820-6FP</u>	<u>TS1220-6FP</u>
600 V, 8 A	600 V, 12 A





# SCR-based light dimmer demo board

## STEVAL-ILD004V2 reference design for Thyristor-based dimmer



### Main characteristics

- 110V / 240V compatible
- 2-Wires and 3-Wires compatible
- Power: 300W
- Topology: SCR in Anti-series
- Deep dimming enabled (92% to 97% light dimming range on LED)

### 8-bit STM8S MCU control

### Benefits:

- Overcurrent protection at turn-on
- Soft-start & soft-stop
- Excellent compatibility with LED and CFL (97% with tested lamps; 100% with ILD004V2 in 3-wire option mode)
- No flickering, even with multiple lamps in parallel

Buy on [st.com](https://www.st.com):





# Leading-edge dimmer compatible lamps

Load	Type	2-wires		3-wires	
		# Lamp tested	Dimming success	# Lamp tested	Dimming success
R	Incandescent, Halogen, electronic transformer, CFL/LED high power with PFC	4/4	100%	4/4	100%
L	Transformer	5/5	100 %	5/5	100%
C	CFL and LED dimmable lamps, LED in parallel	28/31	90%	31/31	100%

Validation with STEVAL-ILD004V2 SCR dimmer in two configurations:

- 2-wire dimmer (Load and Line connection)
- 3-wire dimmer (Load, Neutral and Line connection)

ST Reference design resolves:

- ON-state: no flickering phenomenon or jittering
- OFF-state: no ghosting effect on lamp light-up

Lamps are Thyristor leading-edge compatible for deep dimming  
(90% of tested lamps in 2-wire configuration)

# Our technology starts with You

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