

# Semiconductor Fuses

Your guide to high speed fuse protection



## Semiconductor fuses that meet every major standard.

**“...the fast action  
of semiconductor  
fuses significantly  
limits the short  
circuit current.”**

Standards may change from country to country, but the need for safe, reliable circuit protection for semiconductor applications is the same the world over. That's why Ferraz Shawmut offers the widest range of semiconductor fuse solutions on the market today; fuses that meet every major North American and International Standard.

Semiconductor fuses are used to protect against over-current conditions in semiconductor devices. There is hardly an electric powered product that exists today which doesn't rely on semiconductor technology to some degree. That means extending circuit protection to thyristors, triacs, diodes, and a host of other solid-state components - as well as a wide range of voltage requirements, unique mounting configurations, and special protection characteristics.

### **Semiconductor Protection Fuse Solutions**

Ferraz Shawmut affords OEM designers and equipment-maintenance personnel a comprehensive line of Form 101 semiconductor protection fuses in ratings from 130 to 1500VAC. Plus, Square Body North American and European-Dimension semiconductor fuses in 690/700 and 1250/1300V ratings (four sizes of each). Plus, compatible fuse blocks and accessories such as blown-fuse indicators, trigger switch actuators, and add-on switches.

### **How to Obtain More Information**

This brochure provides a broad overview of semiconductor protection fuse solutions. For more detailed product information explore our online catalog at [us.ferrazshawmut.com](http://us.ferrazshawmut.com) or consult your local sales representative. For technical services and applications support call 978-465-4853 or email [technical.services@ferrazshawmut.com](mailto:technical.services@ferrazshawmut.com).

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## North American - Round Body

The North American Round Body Semiconductor Protection fuses were designed for the specific protection of diodes and other semiconductor devices. The product line's compact design is perfect for applications that have space limitations.

### Applications

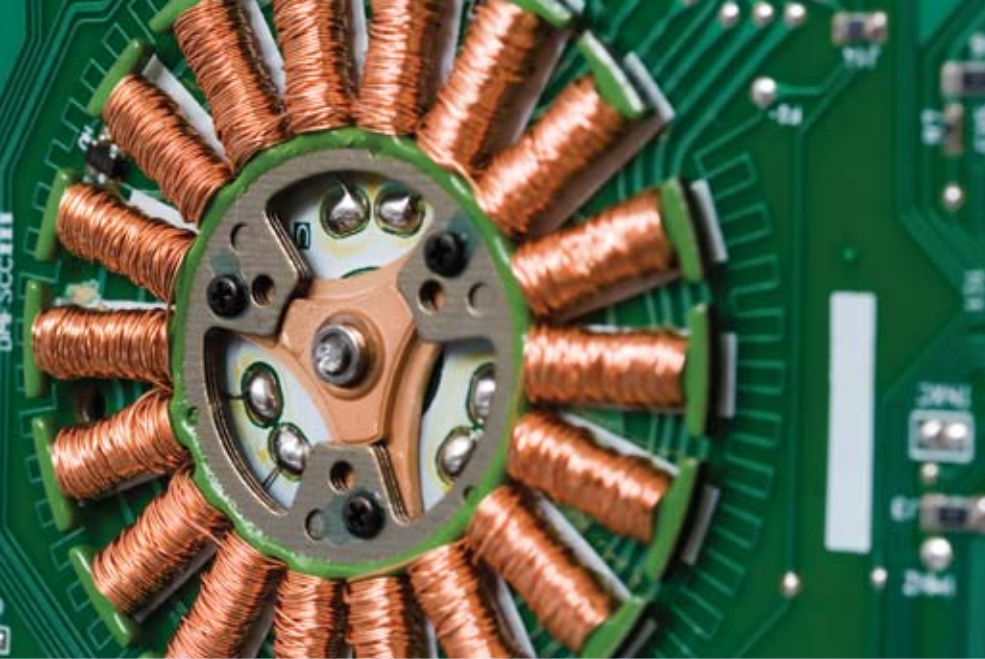
- Heavy duty devices such as electrochemical rectifiers
- Heavy duty rectifiers (at rated voltage or less) and similar heavy duty power supplies
- Protection of motor drives
- UPS, inverters, etc.
- Protection of small inverters and drives, and equipment requiring the highest degree of protection
- Protection of heavy traction and electrochemical rectifiers as well as other heavy-duty equipment



### Product Lines & Specifications

North American Round Body	Voltage		Amps.	Interrupting Rating		UL Recog.	CSA Cert.	IEC	German Standard		British Standard
	AC	DC		AC	DC				VDE	DIN	
A15QS	150V	150V	1 - 6000A	100kA	100kA	√	-	-	-	-	-
A30QS	300V	300V	1 - 4500A	200kA	100kA	√	-	-	-	-	-
A50QS	500V	500V	35 - 1200A	200kA	100kA	√	√	-	-	-	-
A50P	500V	450V	10 - 1200A	100kA	79kA	√	-	-	-	-	-
A60Q	600V	600V	5 - 40A	200kA	100kA	√	-	-	-	-	-
A60X	600V		1 - 2000A	100kA		√	-	-	-	-	-
A070gRB	700V	550V	1 - 30A	160kA		√	-	269-4	-	-	-
A70QS (UL, blade)	700V	700V	35 - 800A	200kA	100kA	√	√	-	-	-	-
A70P	700V	650V	10 - 1200A	100kA	100kA	√	-	-	-	-	-
A70Q	700V	650V	35 - 600A	100kA	100kA	√	-	-	-	-	-
A100P	100V	750V*	15 - 1000A	100kA	100kA	√	-	-	-	-	-
A120X	1200V	1000V	1/2 - 30A	100kA	100kA	√	-	-	-	-	-
A150X	1500V	1000V	1 - 1000A	100kA	100kA	°	-	-	-	-	-

° Ferraz Shawmut certified.



## PSC Square Body

Ferraz Shawmut's PSC Square Body fuses provide maximum flexibility in equipment design and ultimate protection for today's power conversion equipment. These square body fuses are available in four different body sizes, each size having seven worldwide acceptable mounting styles. The PSC fuses have been engineered to provide state-of-the-art protection and have pure silver, die-cut elements embedded in solidified sand, which helps control arcing characteristics for low  $I^2t$  and high interrupting rating. All contact surfaces are silver plated and all hardware is non-magnetic.

## Applications

- Protection of rectifiers, inverters, DC drives
- UPS Systems, reduced voltage motor starters and other equipment in globally accepted applications



## Product Lines & Specifications

PSC Square Body	Sizes	Mounting Type	Volts		Amps.	Interrupting Rating		UL Recog.	CSA Cert.	IEC	German Standard		British Standard
			AC	DC		AC	DC				VDE	DIN	
PSC Square Body (European)	30, 31, 32, 33, 232, 233	D08A, D11A, TTF, EF, TDF, PLAF	450 - 690V	*	50 - 2500A	200kA	-	√	-	269-4	-	-	-
PSC Square Body (North American)	30, 31, 32, 33	KI, LI, TTI	500 - 700V	*	63 - 2500A	200kA	-	√	-	269-4	-	-	-
PSC Square Body (European)	70, 71, 72, 73, 272, 273	D11A, TTF, PLAF, PPAF	600 - 1250V	*	50 - 1800A	100kA	-	√	-	269-4	-	-	-
PSC Square Body (North American)	70, 71, 72, 73	LI, LLI, TTI	650 - 1300V	*	63 - 1800A	100kA	-	√	-	269-4	-	-	-

\* Consult the factory for DC rating.



### German and British Standard - Square

Ferraz Shawmut's DIN and BS88 Fuses offer an extremely high Interrupting rating affording power semiconductor applications the ultimate in circuit protection.

#### Product Lines & Specifications

German & British Standard	Volts		Amps.	Interrupting Rating		UL Recog.	CSA Cert.	IEC	German Standard		British Standard
	AC	DC		AC	DC				VDE	DIN	
6,9 gRB-URB (DIN/BS88 Fuses)	690V		12 - 100A	200kA	-	√	-	269-4, 33	636-23	43623/00C	BS 88-4
6,9 gRB-URB (DIN 000 Fuses)	500-690V		20 - 400A	120/200kA	-	√	-	269-1, -4	636-23	43653-00C, 43620-00C	-
BS88 (Protistor® Fuses)	500-690V		20 - 400A	120/200kA	-	√	-	269,4 EN 60269-4	636-23	-	BS 88-4
DIN Size 00	600 - 690V		16 - 450A	200kA	-	√	-	269-1, -4	636-23	43653/00C, 43620/00C	-



### British Standard - Protistor® Round

Ferraz Shawmut's Protistor® Fuse line offers an extremely high Interrupting rating affording power semiconductor applications the ultimate in circuit protection while meeting the British Standard in a round fuse format.

#### Product Lines & Specifications

British Standard - Protistor® Round	Volts		Amps.	Interrupting Rating		UL Recog.	CSA Cert.	IEC	German Standard		British Standard
	AC	DC		AC	DC				VDE	DIN	
URE/URGS/URZ 10X28, 17X27	250V		5 - 180A	160kA	-	-	-	269-1, -4, 33	636-23	-	-
URGG/URGH 36X27, 2X36X27	250V		50 - 1050A	100kA	-	-	-	269-1, -4, 33	636-23	-	-
URE/URS/URT 10X51, 17X49, 2X17X49	690V		5 - 160A	200kA	-	-	-	269-1, -4, 33	636-23	-	-





## French Cylindrical

Ferraz Shawmut's French Cylindrical fuses provide an extremely high Interrupting rating affording power semiconductor applications the ultimate in circuit protection according to IEC 269.1 and 4. The semiconductor fuses offer protection against short circuit faults with low  $I^2t$  values, low power loss and high interrupt ratings. Fuses have high current rating and UL recognition.

### Applications

- Small inverters
- UPS systems
- Motor drives



### Product Lines & Specifications

French Cylindrical	Volts		Amps.	Interrupting Rating		UL Recog.	CSA Cert.	IEC	German Standard		British Standard
	AC	DC		AC	DC				VDE	DIN	
URB/URD/URL 10X38	500-600V	*	.10 - 30A	50/200kA	-	√	-	269-1, -4	636-23	-	-
URC/URD 14X51	690V	*	6 - 50A	100kA	-	√	-	269-1, -4	636-23	-	-
URD 22X58	690V	*	25 - 100A	100kA	-	√	-	269-1, -4	636-23	-	-
URGD 27X60	600-690V	*	63 - 250A	200kA	-	-	-	269-1, -4	636-23	-	-
URB/URQ 27X60	690-1000V	*	50 - 170A	200kA/100kA	-	√	-	269-1, -4	636-23	-	-
821cp gRB 27X60	800V	*	8 - 110A	90kA	-	-	-	269-1, -4, 33	-	-	-
A70QS (IEC, ferrule )	690V	700V	6 - 100A	200kA	100kA	√	√	269-4	-	-	-

\* Consult the factory for DC rating.



## Semiconductor Fuse Mapping Definitions

### Semiconductor Fuse Technology

Semiconductor fuses are used to protect against over-current conditions in semiconductor devices. Because of their fast action, semiconductor fuses help to significantly limit the short circuit current. The technology behind semiconductor fuses is typically defined by the fuse size, shape and type of termination:

- **CP:** Cylindrical fuses with a cap crimped to the body. The body is ceramic or GMG (Glass Melamine Glass). The electrical contacts are bladed or non bladed style.
- **PSC:** Square body ceramic fuses. The terminals are screwed to the body. Various types exist within the PSC technology: regular, low inductance, LR (Large Rectifier) and HV (High Voltage).
- **Flat pack:** Rectangular body ceramic fuses with a very low inductance and excellent high frequency performance.

### Regional Standards:

As semiconductor fuses are not covered by standards at this time, manufacturers have developed fuse types in response to regional practices and market needs. The mechanical connections represented by the standards shown in this bulletin follow these regional practices. Here are general descriptions of these regional practices.

- **US - North American:** Ferrule type, round body or square body fuses with closed slot blades or end contacts with UNC tapped holes.
- **FR - French:** Ferrule type and square body fuses with open slot blades or end contacts with metric tapped holes.
- **DIN - German:** Round body and square body fuses with brackets and wedge shaped contacts according to DIN43620 and DIN 43653 standards.
- **BS - British:** Round body and square body fuses with brackets according to BS 88-4 standards.
- **SP - Special Purpose:** Fuses with mounting arrangements determined by application needs.

### Class Types

By definition, semiconductor fuses are used to protect against over-current conditions in semiconductor devices. They are designed to be fast-acting and help to greatly limit the short circuit current. They are available in several different configurations and at least two class types:

- **gR-type:** full range protection. Overload and short circuit protection.
- **aR-Type:** partial range protection. Short circuit protection only. Faster acting than full range fuses.
- **Typical Markings:** Ultra Rapid, Silized, Silcu, Sitor, Recticur, Protistor®.



## **A relentless pursuit of protection for electrical components, systems - and the people who use them.**

Ferraz Shawmut is an international company manufacturing the widest range of circuit protection solutions in the electrical and power electronics industry. Drawing on a century of experience - and an ongoing commitment to critical research in electrical safety - we provide industrial, commercial, and OEM customers with innovative products and technical support teams to increase effectiveness, simplify applications, and enhance productivity. Learn more about our circuit protection solutions at [us.ferrazshawmut.com](http://us.ferrazshawmut.com).

### **Other Circuit Protection Products from Ferraz Shawmut:**

A wide range of fuse holders and accessories are also available:



For more on Semiconductor Fuses, visit [us.ferrazshawmut.com](http://us.ferrazshawmut.com).

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