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Ultra-Fast Current Shunt UFCS

>1GHz Bandwidth, <200pH Insertion Inductance
Various sizes available: 5mΩ – 52mΩ

PRELIMINARY Datasheet

About the Ultra-Fast Current Shunt series UFCS

The solder-in UFCS Ultra-Fast Current Shunts with their small form factor and high current capabilities are dedicated for WBG switching loss and pulse current measurements. Analyse pulsed current signals with high frequency components in all its details with the UFCS market-leading >1GHz bandwidth and highest signal fidelity due to its ultra-low <200pH insertion inductance.

Specifications

Read the Instruction Manual before first use and keep it for future reference. A digital copy of the latest Instruction Manual revision can be downloaded at www.pmk.de.

Electronical Specifications

Allow the shunt to warm up for 20 minutes. This shunt comes with 1 year warranty. Each specification is determined at +23°C ambient temperature. Do not exceed the specifications.

Exceeding the specified ratings may cause irreversible failure and damage to the connected equipment.

The ratings may vary depending on usage conditions and usage environment. The provided data is intended as a reference only.

PMK's UFCS ultra-fast current shunts are for use in a controlled environment in accordance with IEC 61010-1 only. The shunts are not for hand-held use. This product is not rated for CAT II, III or IV. Do not exceed the specifications[1].

Order number	Shunt Resistance	Bandwidth (3dB)	Maximum 1us Pulse Current [2]	Maximum 100us Pulse Current [2]	Continuous Current [2]	Temperature Drift
UFCS-R005	5mΩ	>800MHz	TBD	TBD	TBD	TBD
UFCS-R011	11mΩ	>1GHz	337 A	104 A	7.3 A	TBD
UFCS-R024	24mΩ	>1GHz	227 A	70 A	4.9 A	TBD
UFCS-R052	52mΩ	>900MHz	155 A	48 A	3.4 A	TBD

The following specifications are valid for all models of the UFCS series:

Pollution Degree: 1

Gain Accuracy: 1%

Output connector: SMA (female) *
Input Coupling of the Measuring Instrument: 50Ω

Notes:
[1] Electrical Specifications[1] that are not marked with (*) as guaranteed are typical.
Performance parameters may vary if not using the recommended footprint.
[2] See Maximum Current per Pulse Length graph.

Environmental Specifications

Parameter		Specification
Temperature Range	Operating	-40 °C to +85 °C -40 °C to +30 °C under non-pulsed current conditions
	Non-Operating	-40 °C to +85 °C
Maximum Relative Humidity	Operating	80 % relative humidity for temperatures up to +31 °C, decreasing linearly to 40 % at +50 °C, non-condensing humidity
	Non-Operating	95 % relative humidity for temperatures up to +40 °C, non-condensing humidity
Altitude	Operating	up to 2000 m
	Non-Operating	up to 15000 m

Please contact sales@pmk.de, if another temperature range is of interest.

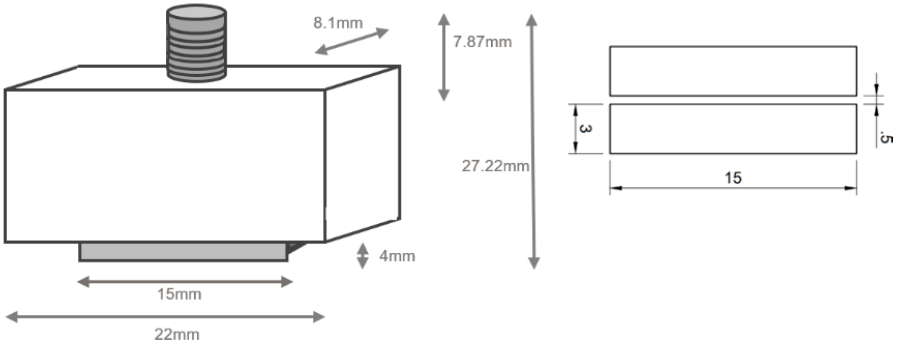
Mechanical Specifications

Parameter	Shunt Specifications	UFCS-Choke Specifications
Weight	TBD	TBD
Dimensions	See drawing	L = TBD, choke Ø TBD
Input	Soldering Pads [1]	SMA (male)
Output Connector	SMA (female)	BNC (male)
Input Coupling of the Measuring Instrument [2]	50Ω	

Notes:
[1] See section “Dimensional Drawing and Recommended Footprint”
[2] Or 1MΩ input impedance and a 50Ω feed-through termination, see ordering information

Dimensional Drawing and Recommended Footprint

The schematical drawing and all dimensions in the recommended footprint drawing are shown in [mm]. Contact sales@pmk.de or your local PMK representative for a design file.



Observe Solder-in direction: UFCS IN for input, REF for reference connection.

Maximum Pulse Current Derating

Note that the maximum input current rating of the probe decreases as the frequency of the applied signal increases.

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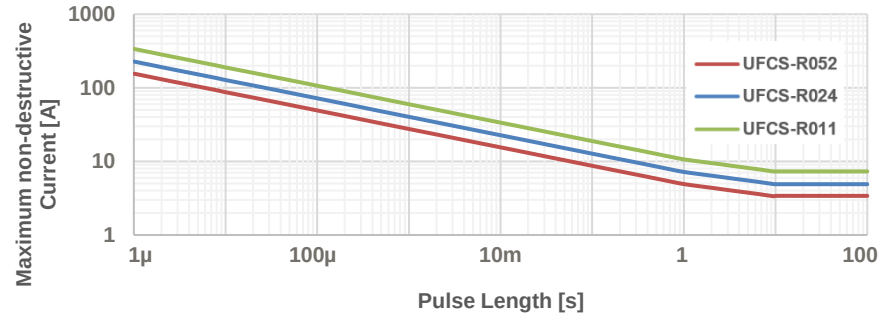
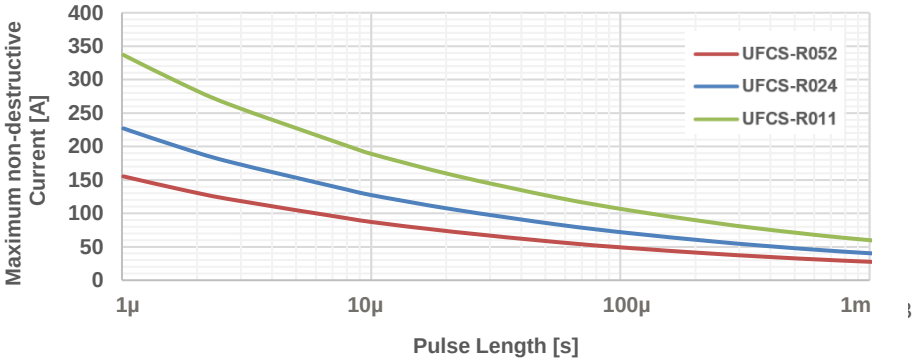
Always check that output voltage is compatible with ratings of oscilloscope or isolated probe.

$V_{OUT,SHUNT} = R_{SHUNT} \cdot I_{SHUNT}$

UFCS-R0XX Maximum Pulse Current Ratings (Preliminary Calculated Data)





Scope of Delivery

For stand-alone use and direct output into an oscilloscope, a choke is required. See chapter “Ordering Information” to review the selection.

UFCS series shunt

Instruction manual

Ordering Information

Step 1: Select the Shunt

Each resistance model is available as single pack or as more cost-effective pack of 25 pieces.

UFCS-R005	5mΩ, >800MHz bandwidth, <200pH insertion inductance, TBD A maximum pulse current, SMA (F) output, 1pc
UFCS-R005x25	5mΩ, >800MHz bandwidth, <200pH insertion inductance, TBD A maximum pulse current, SMA (F) output, 25pcs
UFCS-R011	11mΩ, >1GHz bandwidth, <200pH insertion inductance, 104A maximum pulse current @ 100µs, SMA (F) output, 1pc
UFCS-R011x25	11mΩ, >1GHz bandwidth, <200pH insertion inductance, 104A maximum pulse current @ 100µs, SMA (F) output, 25pcs
UFCS-R024	24mΩ, >1GHz bandwidth, <200pH insertion inductance, 70A maximum pulse current @ 100µs, SMA (F) output, 1pc
UFCS-R024x25	24mΩ, >1GHz bandwidth, <200pH insertion inductance, 70A maximum pulse current @ 100µs, SMA (F) output, 25pcs
UFCS-R052	52mΩ, >900MHz bandwidth, <200pH insertion inductance, 48A maximum pulse current @ 100µs, SMA (F) output, 1pc
UFCS-R052x25	52mΩ, >900MHz bandwidth, <200pH insertion inductance, 48A maximum pulse current @ 100µs, SMA (F) output, 25pcs

Step 2: Select Oscilloscope Connection Accessories

The use of the optional UFCS-Choke is recommended. UFCS-Choke is a 50Ω impedance matched, common mode choke with a high permeability nanocrystalline core. This is highly recommended when directly connecting the UFCS to an oscilloscope 50Ω input. The choke greatly increases CMRR (specs to follow) preventing issues with unexpected ground loops and common mode noise…..

UFCS-CHOKE **coming soon**	50Ω impedance matched, common mode choke increasing CMRR (*specs to follow*) preventing issues with unexpected ground loops and common mode noise, SMA (male) input, BNC (male) output, for use with UFCS shunts only
D010031	50Ω BNC feed-through for 1MΩ input oscilloscopes., >500MHz

Notes

Notes

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