ISABELLENHÜTTE

PRECISION CURRENT SENSING WITH MINIMAL POWER LOSS

LOW-OHMIC SHUNTS FOR AI SERVER PSU, IBC, GPU, AND VRM

AI Servers Are Pushing Power Conversion to the Limit

Today's architectures include:

- Rack Power Supply Units (PSU)
- Intermediate Bus Converters (IBC)
- 48V distribution
- Graphics Processing Units (GPU)
- Voltage Regulator Modules (VRM)

Each stage requires:

- Efficiency optimization
- Current balancing
- Overcurrent protection
- Telemetry
- Power management



Every milliwatt of sensing loss matters

Modern AI racks are moving from 100 kW toward 400 kW and beyond, with discussions of future 1 MW racks.

Why Isabellenhütte

Ultra-Low Resistance = Minimal Insertion Loss

SENSING METHOD	TYPICAL LOSS CHALLENGE
Conventional Shunts	Higher dissipation
DCR Sensing	Accuracy drift over temperature and component variation
MOSFET RDS(on)	Strong temperature dependence
Isabellenhütte Ultra-Low-Ohmic Shunts	Combines low losses with precision current measurement

Ultra-low resistance values down into the µΩ range help minimize sensing losses while maintaining precise current measurement.

- Ultra-low resistance
- High current capability
- SMD package
- Precision alloy technology

Better Than DCR Alone

Why Some Designers Move to Direct Current Resistance (DCR)

- No dedicated shunt
- Lower apparent losses
- Lower bill of materials (BOM) costs

The Challenge

DCR measurement depends on:

- Inductance tolerance
- Temperature variation
- Magnetic component variability

Why Designers Still Choose Shunts

- Direct current measurement
- Predictable accuracy
- Better calibration
- Stable performance over lifetime
- Easier functional safety validation

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Why Alloy Technology Matters

Proprietary Resistance Alloys

Start with better alloys

Our legacy of metallurgical excellence is built on a 500-year history of creating unique alloys—and includes pioneering the future of precision measurement and power resistors alongside our customers.

The ability to precisely calibrate resistance and other electrical characteristics gives us exceptional flexibility to optimize product performance, package, and cost. It also enables us to match each customer with the solution that best fits their application, earning a reputation as a trusted engineering partner.

Alloy	Resistivity ρ
ISAOHM®	132 μΩcm
NOVENTIN®	90 μΩcm
MANGANIN®	43 μΩcm
ZERANIN®	29 μΩcm

Isabellenhütte's proprietary alloys

Benefits

- Low TCR
- Long-term stability
- Reduced thermoelectric effects
- High pulse capability
- Accurate Kelvin measurement

Designed for the AI Power Chain

- PSU output
- Intermediate Bus Converter
- 48V bus
- VRM phases
- GPU power rails

ISA-WELD®

	Series	Size	Parts per reel	Resistance value [mΩ] (0.01 · 0.1 · 1 · 10 · 100 · 1 000 · 5 000 · 100 000)	Rated power at 70°C [W]	Max. current [A]**
Analog Sensors	BSX*	8436 (metric)		0.025	45	1264
	BSN*	8436 (metric)		0.025	36	1100
	BSS	8420 (metric)		0.05 – 0.1	20-36	600
	BSL*	5216 (metric)		0.1	12	310
Bus-Bar	BAX	8436 (metric)		0.02 – 0.025	40-50	3162
	BAN	8436 (metric)		0.025	36	1200
	BAS	8420 (metric)		0.035 – 0.5	10-36	1014
	BAV	8420 (metric)		0.035 – 0.1	36	1014
	BAL	5216 (metric)		0.1	12	350
	KVM	3516 (metric)		0.05 – 0.1	7-10	250
SMD	BVE	5930	2,000	0.1 – 3	4-15	315
	BVS	3920	3,000	0.1 – 5	5-12	245
	BVT	2512	5,000	0.2 – 6.8	2-10	182
	BVR	4026	1,400	0.2 – 3	5-12	245
	BVB	2725	1,400	0.2 – 5	3-12	245
	BVN	1216	3,000	0.3 – 3	3-10	182
	BVZ	4026	1,400	0.5 – 3	5-13	157
	WAT*	2512	5,000	0.2 – 0.75	10	182
	WAF	1213	5,000	0.487 – 1	6-7	120
	WAK	1206	12,500	0.5 – 1	6	90