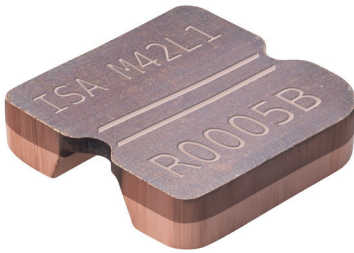




## PRECISION RESISTORS



## WAF // Size 1213



## Features

- Constant current up to 55 A (1 mOhm)
- 3 W power rating up to 140 °C
- Two terminal configuration
- Excellent long-term stability
- High application temperature range -65 to +175 °C
- RoHS 2011/65/EU compliant
- Max. solder temperature up to 350 °C / 30 sec
- AEC-Q200 qualified



## Applications

- Current sensor for power hybrid applications
- High current applications for the automotive market
- Frequency converters
- Power modules

## Technical data

Resistance values	<b>mOhm</b>	0.487 / 0.5 / 1
Material		MANGANIN® / ZERANIN®
Tolerance	<b>%</b>	1 / 5
Temperature coefficient (20-60 °C)	<b>ppm/K</b>	<70
Applicable temperature range	<b>°C</b>	-65 to +175
Power rating <b>P<sub>100 °C</sub></b>	<b>W</b>	up to 4
Power rating <b>P<sub>70 °C</sub></b>	<b>W</b>	up to 7
Internal heat resistance (R <sub>thi</sub> )	<b>K/W</b>	up to 12
Inductance	<b>nH</b>	<0.5
Stability (at rated power) deviation after 2000h, T <sub>K</sub> = Terminal temperature		<0.5% (T <sub>K</sub> =110 °C) <1.0% (T <sub>K</sub> =140 °C)

## Ordering code

WAF - M - R001 - 1.0

.....	Tolerance
.....	Resistance value [Ohm] / „R“ represents decimal point
.....	Material (MANGANIN®)
.....	Type



## WAF // Size 1213

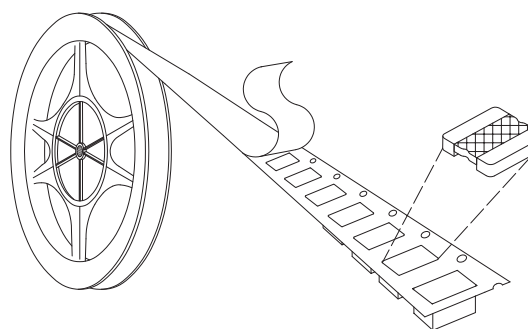
### Recommended solder profile

Reflow- and IR-soldering

Temperature	°C	260	255	217
Time	sec	peak	40	90

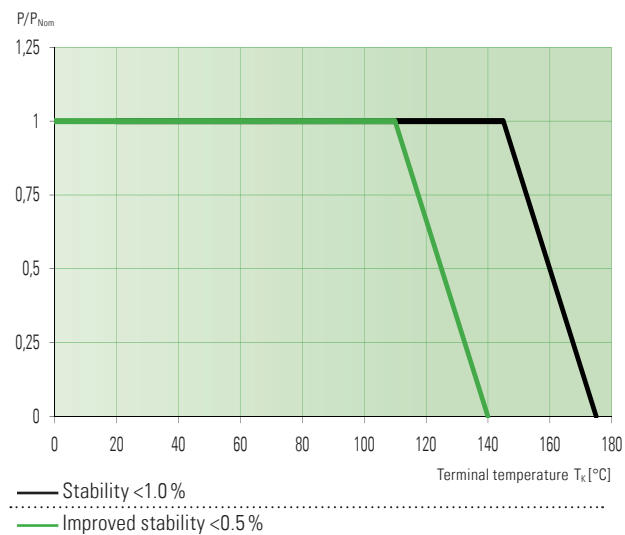
### Tape and reel information

Specification	DIN EN 60286-3		
Tape width	mm	12	
Parts per reel	pcs	5000	

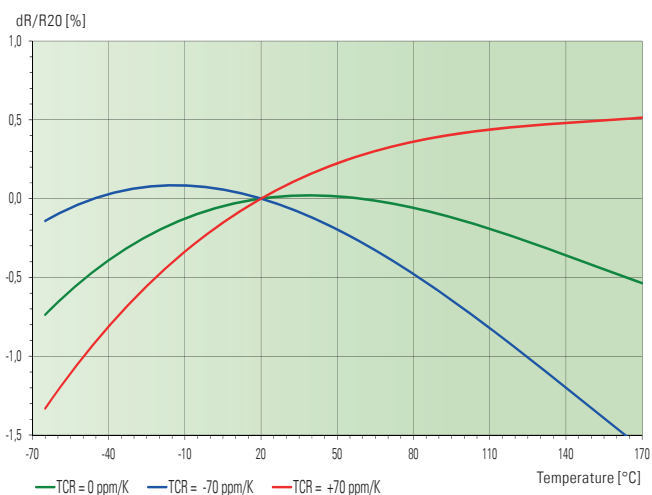


### Power derating curve: 110 °C / 145 °C

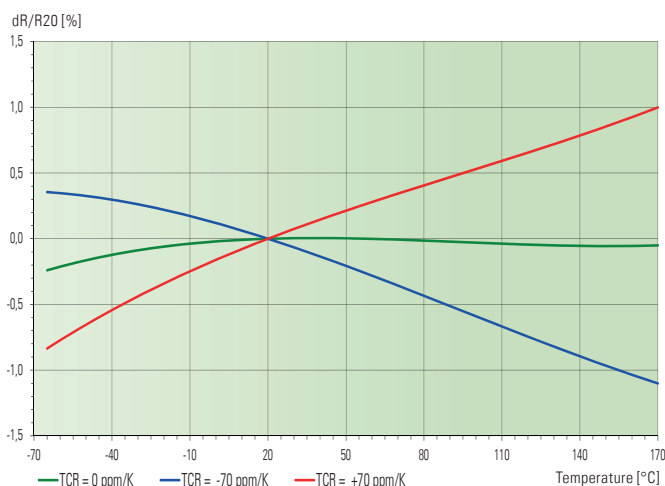
WAF-Z-R0005 / WAF-Z-R000487



### Temperature dependence of the electrical resistance of MANGANIN®



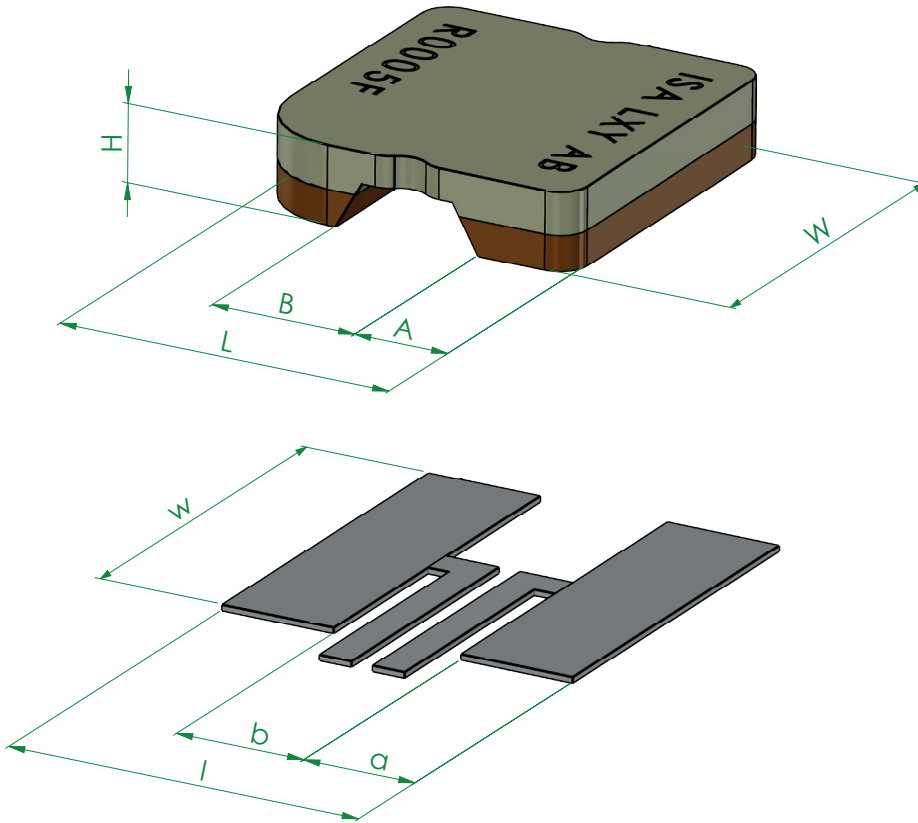
### Temperature dependence of the electrical resistance of ZERANIN®





WAF // Size 1213

Mechanical dimensions and pcb-layout proposal (Reflow-soldering) [mm] // Z-YL-740b



type:	L	W	H	A	B
WAF-Z-R000487-1.0	3.1 ±0.2	3.3 ±0.2	0.7 +0.2/-0.1	0.85 ±0.2	1.4 ±0.2
WAF-Z-R0005-1.0	3.1 ±0.2	3.3 ±0.2	0.7 +0.2/-0.1	0.85 ±0.2	1.4 ±0.2
WAF-M-R001-1.0	3.1 ±0.2	3.3 ±0.2	0.7 +0.2/-0.1	0.85 ±0.2	1.4 ±0.2

solder pad type:	l	w	a	b
WAF	3.4	3.6	1.05	1.3

Type	Value [mΩ]	R <sub>thi</sub> [K/W]	TCR [ppm/K]	P <sub>70 °C</sub> [W]	P <sub>T<sub>K</sub> &gt; 100 °C</sub> T <sub>K</sub> = 170 °C - (R <sub>thi</sub> x P)	Notes
WAF-Z-R000487	0.487	7	<70	7	4	C-samples available
WAF-Z-R0005	0.5	7	<70	7	4	C-samples available
WAF-M-R001	1.0	12	<70	6	3	C-samples available

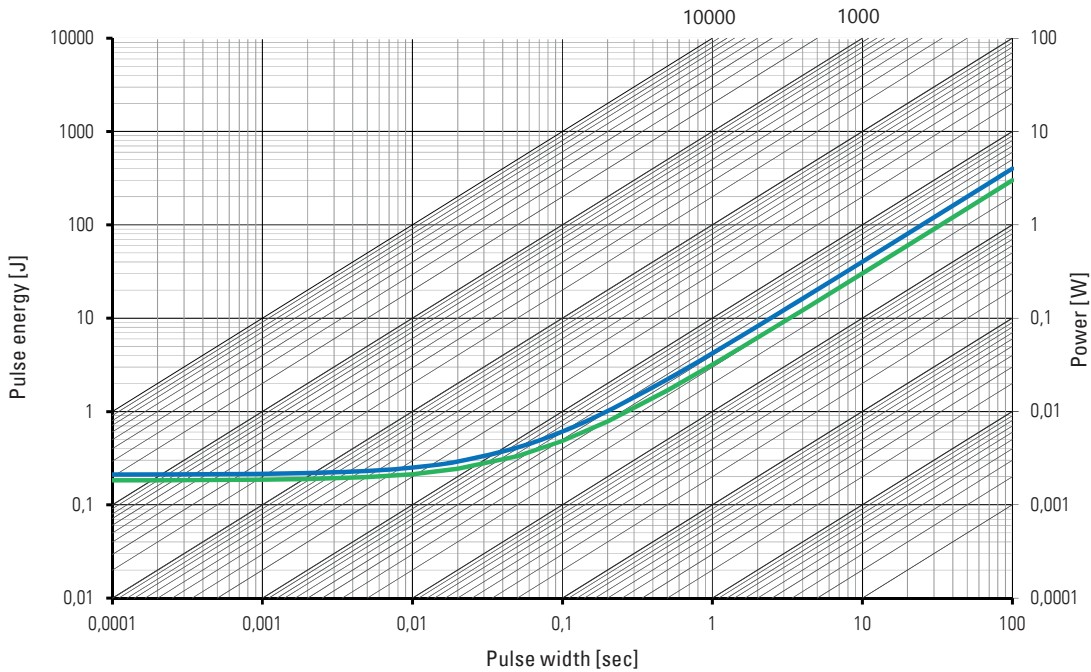
Material type M=MANGANIN®, Z=ZERANIN®



WAF // Size 1213

Maximum pulse energy respectively pulse power for permanent operation

WAF-Z-R0005; WAF-M-R001



Specification

Parameters	Test conditions	Specified values
Temperature Cycling	2000 cycles (-65 °C to +170 °C)	±1.0 %
Low Temperature Storage and Operation	-65 °C for 250 h	±0.1 %
Resistance to Soldering Heat	260 °C for 10 sec / 8h steam aging	n.a.
Moisture Resistance	MIL-STD-202 method 106	±0.2 %
Mechanical Shock	100 g, 6 ms half sine	±0.2 %
Vibration, High Frequency	10 g, 10-2000 Hz	±0.2 %
Operational Life	2000 h, T <sub>K</sub> max at rated power	±1.0 %, T <sub>K</sub> = 145 °C (in covered condition)
High Temperature Exposure	2000 h / 175 °C	±1.0 % (in covered condition)
Bias Humidity	+85 °C, 85 r.F., 1000 h	±0.5 %

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