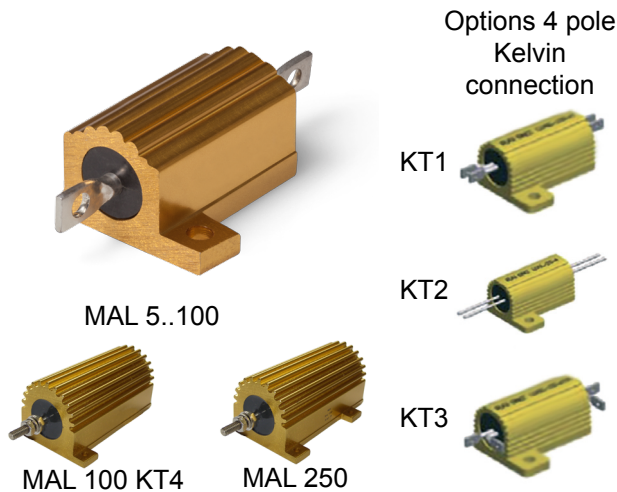


Data Sheet for Precision Resistors

Power Resistor (wirewound)

Series MAL



- Power rating up to 250 Watt (with heat-sink not included in delivery)
- Resistance range from 0,01Ω..86kΩ (>86kΩ..250kΩ on request)
- Resistance tolerances from ±0,01%
- Standard TCR ±20ppm/°C
- Aluminium housing
- Low inductive windings (option)
- Numerous connection variants with 4-pole (Kelvin) connection (option)
- MAL 250 / 250A with threaded flange / MAL 100 version KT4 with threaded flange
- MAL 250A commercial version

Electrical Specification	MAL					
	5	10	25	50	100	250/250A
Resistance range	0,01Ω..22kΩ	0,01Ω..10kΩ	0,01Ω..36kΩ	0,01Ω..86kΩ	0,01Ω..70kΩ	0,01Ω..50kΩ
Resistance tolerance	±0,01%..±10%					
Power rating without heat-sink @25°C (0W @ +275°C)	4,5W	7,5W	12W	20W	40W	100W
Power rating with heat-sink @25°C (0W @ +275°C)	7,5W	10W	25W	50W	100W	250W
Max. working voltage	160V	265V	550V	1250V	1900V	2200V
TCR-rate	±20ppm/°C @ R > 10Ω, ±50ppm/°C @ R ≥ 1Ω..10Ω (±90ppm/°C @ R < 1Ω on request)					
Working temperature range (max.)	-55..+275°C					

Mechanical Specification	
Resistance technology / material	Wirewound / wire alloy
Housing material	Aluminium
Connections	Axial copper tinned
Connection variants	2 pol. solder tail (for MAL5..100), threaded flange (for MAL250 / 250A, for MAL100 optional), optional 4 pole Kelvin connection variants for MAL 5..100

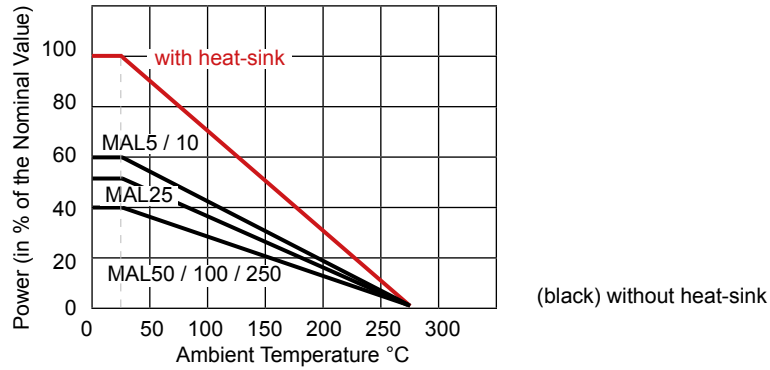
Parameters	Test Conditions (MIL-STD 202)	Specifications
Dielectric	See norm	±0,2% +0,05Ω
Load Life	See norm	±1% +0,05Ω
Storage	See norm	±0,2% +0,05Ω
Moisture Resistance	See norm	±0,2% +0,05Ω
Thermal Shock	See norm	±0,2% +0,05Ω
5 x Overload (5s)	See norm	±0,2% +0,05Ω
Shock	See norm	±0,1% + 0,05Ω
Vibration	See norm	±0,1% + 0,05Ω
Dielectric Strength	MAL5..10: 1500 VAC; MAL25: 2500 VAC; MAL50: 3500VAC; MAL100..250: 5500VAC	

Data Sheet for Precision Resistors

Power Resistor (wirewound)

Series MAL

Power Derating Curve



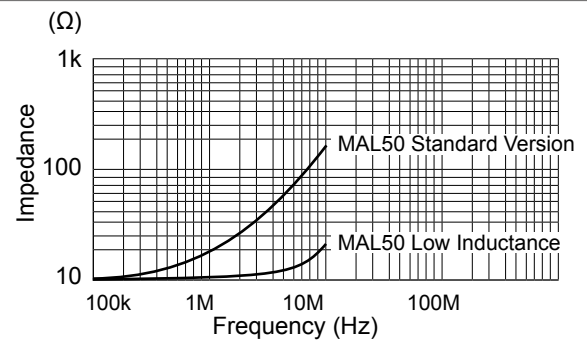
Examples for Heat-Sink Dimensions

	Surface (cm ²)	Thickness (mm)
MAL5	832	1
MAL10	832	1
MAL25	1077	1
MAL50	1877	1,5
MAL100	1896	3,2
MAL250	1896	3,2

Mounting Notes:

For the mounting of the resistor a special thermal grease has to be used.

Frequency Characteristics

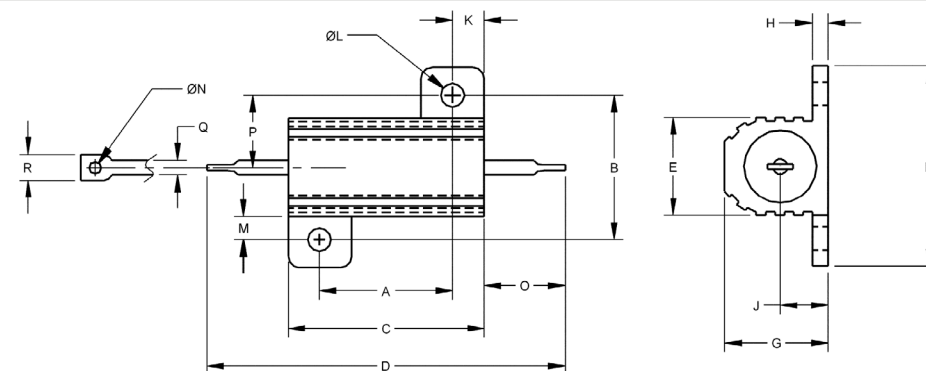


Data Sheet for Precision Resistors

Power Resistor (wirewound)

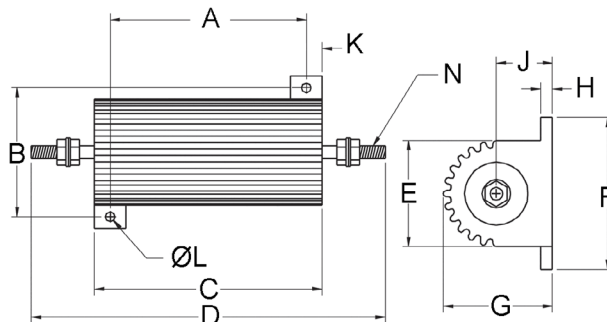
Series MAL

Technical Drawing MAL 5 / MAL 10 / MAL 25 / MAL 50 solder tail (standard)



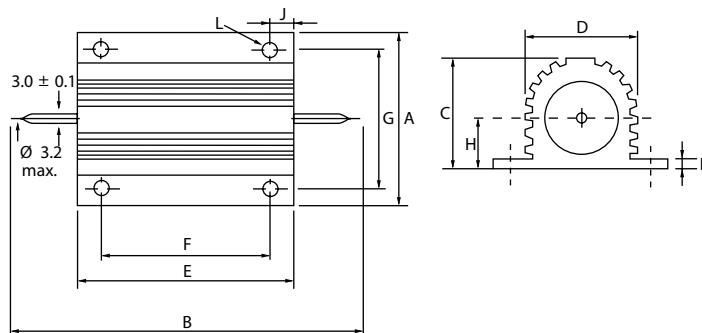
Typ	A	B	C	D	E	F	G	H	J	K	L	M	N	O	P	Q	R
(tolerance)	±0,13	±0,13	±0,8	±1,6	±0,4	±0,4	±0,4	±0,25	±0,25	±0,25	±0,13	±0,4	±0,15	±1,6	±0,8	±0,05	±0,8
MAL 5	11,3	12,4	15,2	28,5	8,5	16,4	8,1	1,7	3,6	2,0	2,4	2,0	1,3	6,8	6,2	1,3	2,2
MAL 10	14,3	15,9	19,1	33,5	10,9	20,3	10,2	1,9	4,8	2,4	2,4	2,6	2,0	7,9	7,9	2,49	4,0
MAL 25	18,3	19,8	27,0	47,5	13,5	27,4	14,2	2,2	6,6	4,4	3,2	3,2	2,0	11,1	9,9	2,49	4,7
MAL 50	39,7	21,4	50	70	15,6	29,0	15,6	2,2	7,6	5,0	3,2	3,2	2,0	11,1	10,7	2,49	4,7

Technical Drawing MAL 100 threaded flange (KT4)



Typ	A	B	C	D	E	F	G	H	J	K	L	N	Screw
(tolerance)	±0,13	±0,13	±0,8	±1,6	±0,4	±0,4	±0,4	±0,25	±0,25	±0,25	±0,13	-	-
MAL 100	69,9	57,15	88,9	139	45,7	71,5	44,5	4,78	20,3	9,52	4,78	12-24	(2) #8

Technical Drawing MAL 100 solder tail (standard)



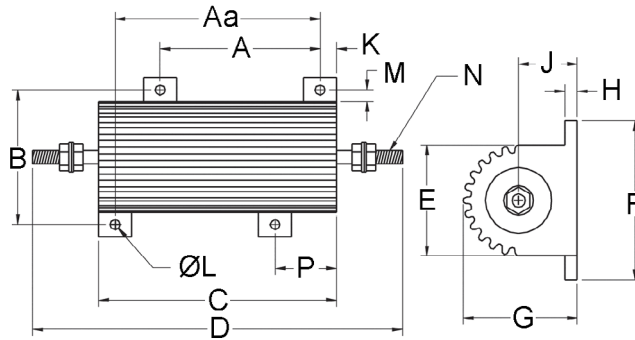
Typ	A	B	C	D	E	F	G	H	J	K	L
(tolerance)	max.	max.	max.	max.	max.	±0,3	±0,3	max.	max.	max.	±0,25
MAL 100	47,5	88,0	24,1	27,3	65,2	35	37,0	11,8	15,4	3,7	4,4

Data Sheet for Precision Resistors

Power Resistor (wirewound)

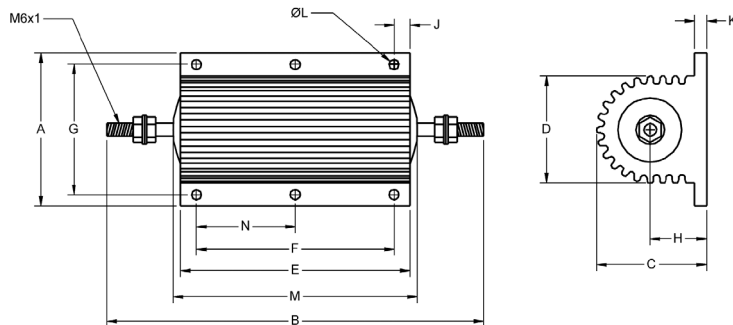
Series MAL

Technical Drawing MAL 250 threaded flange



Typ	A	Aa	B	C	D	E	F	G	H	J	K	L	M	N	P	Screw
(tolerance)	±0,13	±0,13	±0,13	±0,8	±1,6	±0,4	±0,4	±0,4	±0,25	±0,25	±0,25	±0,13	±0,4	±0,15	±0,8	-
MAL 250	98,4	76,2	63,5	114	178	54	76,2	55,6	6,4	25,4	7,9	4,8	5,1	1/4-20	30,7	(4) #8

Technical Drawing MAL 250A threaded flange (commercial)



Typ	A	B	C	D	E	F	G	H	J	K	L	M	N
(tolerance)	max.	max.	max.	max.	max.	±0,3	±0,3	max.	max.	max.	±0,3	max.	±0,3
MAL 250A	72,5	167	41,8	45,5	109,7	89	57,2	20,5	10,4	5,5	6,6	122,4	44,5

Data Sheet for Precision Resistors

Power Resistor (wirewound)

Series MAL

Order code

Description		Selection: standard=black/bold, possible options=grey/cursive					
Series:	MAL						
Type / size:							
5 (max. 22kΩ) - Standard solder tail		5					
10 (max. 10kΩ) - Standard solder tail		10					
25 (max. 36kΩ) - Standard solder tail		25					
50 (max. 86kΩ) - Standard solder tail		50					
100 (max. 70kΩ) - Standard solder tail		100					
250 (max. 50kΩ) - only threaded flange		250					
250A (max. 50kΩ) - only threaded flange		250A					
Resistance tolerance:							
±1%			W1%				
±2%			W2%				
±3%			W3%				
±5%			W5%				
±10%			W10%				
Option <±1..0,01%			W0,xx%				
Temperature coefficient:							
±20ppm/°C @ R >10Ω				TK20			
±50ppm/°C @ R ≥ 1Ω..10Ω				TK50			
Option ±90ppm/°C @ R < 1Ω				TK90			
Resistance value - please choose:							
From 0,01Ω to ≤ see type					xxkxxx		
Option further values max. 250 kΩ on request							
Option low induction:							
max. resistance / 2						N	
Connection:							
Standard - see above type							
MAL100 with threaded flange							
Option 4 pol. Kelvin solder tail (not for MAL 250)							
Option 4 pol. Kelvin strand (not for MAL 250)							
Option 4 pol. Kelvin, solder tail thereof 2 pol. angled (not for MAL 250)							
							-
							KT4
							KT1
							KT2
							KT3

Order Example	Series	Type	Resistance tolerance	Temperature coefficient	Resistance value	Inductance	Connection
Choice	MAL	25	±1%	20ppm/°C	10,1kΩ	Standard	4 pol. solder tail
Code	MAL	25	W1%	TK20	10k100	-	KT1