Mica Thermofoil Heaters

High watt density and temperature range

Overview

Mica Thermofoil™ heaters consist of an etched foil element sandwiched between layers of mica. Installed by clamping to heat sinks, mica heaters provide the ultimate temperature and wattage capability for fast warmup.

- Broad temperature range of -150º to 600°C provides faster processing and cycle times for greater production output
- High watt density capability to 110 W/in^2 (17 W/cm^2) provides faster processing times than conventional mica strip heaters
- Custom profiled heat density and mechanical clamping offers uniform heat sink temperature which can improve processing yields
- UL certification is available which can save time and money for end-use UL device recognition
- Can be factory formed to curves
- Heaters are suitable for vacuum use after initial burn-in (see next page)

Typical applications

- Semiconductor processing
- Packaging, strapping, and sealing equipment
- DNA thermocycling
- Food service appliances
- Plastics and rubber molding supplemental heat

Custom options

- Custom shapes and sizes to 22″ × 46″ (560 × 1168 mm)
- Custom resistance options up to 25 W/in^2 (3.9 W/cm^2)
- Factory forming techniques offer three dimensional packaging capabilities
- Integral temperature sensors
- Contact Customer Service for design assistance.

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Technical specifications

Specifications

Temperature range: -150 to 600°C (-238 to 1112°F).
Lead tab area: 538°C (1000°F) max.

Resistance tolerance: ±10% or ±0.5 Ω, whichever is greater.

Dielectric strength:
0.010" (0.3mm) insulation: 1000 VRMS.
0.020" (0.5mm) insulation: 2000 VRMS (recommended for over 250 V).

Mounting: Must be clamped to heat sink using bolt holes provided in heater and backing plate. See the mounting diagram below.

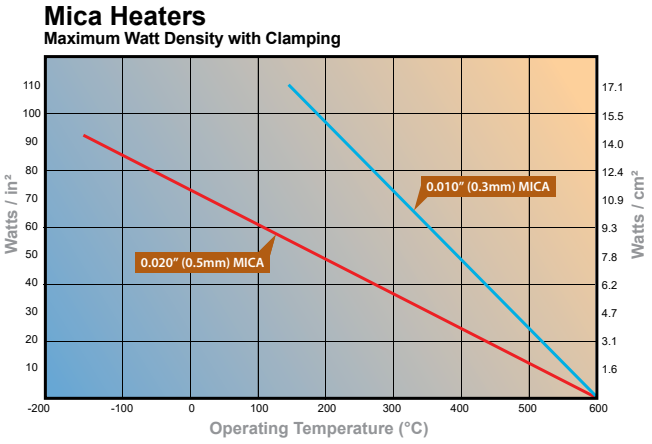
Burn-in: Organic binders will burn off, producing small amounts of smoke, when heaters are first powered. After this, layers can separate so heaters should not be reinstalled.

Leadwire: Mica/glass insulated, stranded nickel-clad copper, potted over termination with high temperature cement.

Maximum heater thickness:

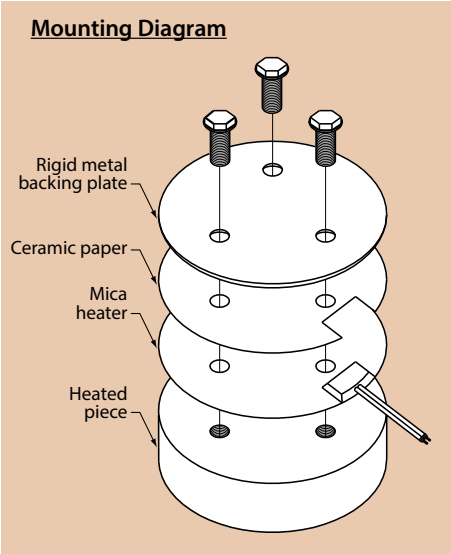
Mica insulation	Over heater element	Over lead termination
0.010" (0.3 mm)	0.030" (0.8 mm)	0.200" (5.1 mm)
0.020" (0.5 mm)	0.050" (1.3 mm)	0.220" (5.6 mm)

Current capacity (based on 100°C max. ambient temp.):
AWG 22 - 8.0 A
AWG 20 - 9.0 A
AWG 18 - 11.0 A



Backing plates

Backing plates are 0.0625" (1.6 mm) thick stainless steel with pre-drilled holes matching the bolt pattern of the specified model. These backing plates do not have cut out areas for the lead bulge and may require modification.



Ceramic paper

Each mica heater is supplied with two pre-trimmed sheets of 0.125" (3.2 mm) thick ceramic fabric paper for use as a resilient pad between the heater and backing plate. This paper does not have a cut out area for the lead bulge. If the backing plate being used does not have a cut out area for the leads attachment you must use two pieces of this paper and make this cut out in each. Contact Mod-tronic to order additional ceramic paper.

Mica sheets

Additional layers of 0.010" (0.3 mm) mica trimmed to the heater size are also available. Using an additional layer of mica will increase the dielectric strength, but it will also reduce the watt density limit by up to 50% across the temperature range. If used on the lead bulge side of the heater then the mica must be cut to allow for the ceramic and wires bulge on that side.

Stock Mica Thermofoil Heaters

The stock heaters listed below are available for immediate shipment to support your testing and evaluation.

Notes for Stock Heaters

- Insulation thickness is .010" (0.3 mm)
- Heated area is within the X and Y dimensions
- Resistance tolerance is +/- 10% or +/- 0.5Ω, whichever is greater
- Standard leadwire length is 12" (305 mm) minimum
- Mounting: Clamp to any flat surface either with a clamping mechanism outside the heater area or by using a backing plate and bolt through the pre-punched bolt holes. All heaters come with one piece of matching 0.125" (3 mm) thick ceramic paper for use as a resilient pad on the lead bulge side of the heater. Matching stainless steel backing plates and additional sheets of ceramic paper are also available.

Rectanglular heaters

Size (inches)		Size (mm)		Resistance (Ω at 0°C)	Effective Area		Lead AWG	Model Number
X	Y	X	Y		in²	cm²		
1.00	4.00	25.4	101.6	11.0	2.5	16.13	22	HM6950
1.00	4.00	25.4	101.6	21.2	2.5	16.13	22	HM6951
1.50	3.00	38.1	76.2	4.5	3.2	20.65	22	HM6952
1.50	3.00	38.1	76.2	8.7	3.2	20.65	22	HM6953
2.00	2.00	50.8	50.8	12.0	2.8	18.06	22	HM6954
2.00	2.00	50.8	50.8	23.2	2.8	18.06	22	HM6955
2.00	4.00	50.8	101.6	6.0	5.9	38.06	18	HM6956
2.00	4.00	50.8	101.6	11.6	5.9	38.06	18	HM6957
2.00	6.00	50.8	152.4	21.9	9.2	59.35	20	HM6958
2.00	6.00	50.8	152.4	42.3	9.2	59.35	20	HM6959
2.00	8.00	50.8	203.2	24.0	12.6	81.29	18	HM6960
2.00	8.00	50.8	203.2	46.3	12.6	81.29	18	HM6961
3.00	3.00	76.2	76.2	31.0	6.5	41.94	20	HM6962
3.00	3.00	76.2	76.2	59.8	6.5	41.94	20	HM6963
6.00	6.00	152.4	152.4	22.0	31.9	205.81	18	HM6964
6.00	6.00	152.4	152.4	42.5	31.9	205.81	18	HM6965
8.00	8.00	203.2	203.2	22.0	58.3	376.13	18	HM6966
8.00	8.00	203.2	203.2	42.5	58.3	376.13	18	HM6967

Round heaters

Diameter (inches)	Diameter (mm)	Resistance (Ω at 0°C)	Effective Area		Lead AWG	Model Number
			in²	cm²		
1.50	38.1	2.0	1.2	7.74	22	HM6968
1.50	38.1	3.9	1.2	7.74	22	HM6969
2.00	50.8	9.5	2.2	14.19	22	HM6970
2.00	50.8	18.3	2.2	14.19	22	HM6971
3.00	76.2	11.1	5.4	34.84	20	HM6972
3.00	76.2	21.4	5.4	34.84	20	HM6973
4.00	101.6	40.0	10.0	64.52	18	HM6974
4.00	101.6	77.2	10.0	64.52	18	HM6975
6.00	152.4	32.7	24.7	159.35	18	HM6976
6.00	152.4	63.1	24.7	159.35	18	HM6977