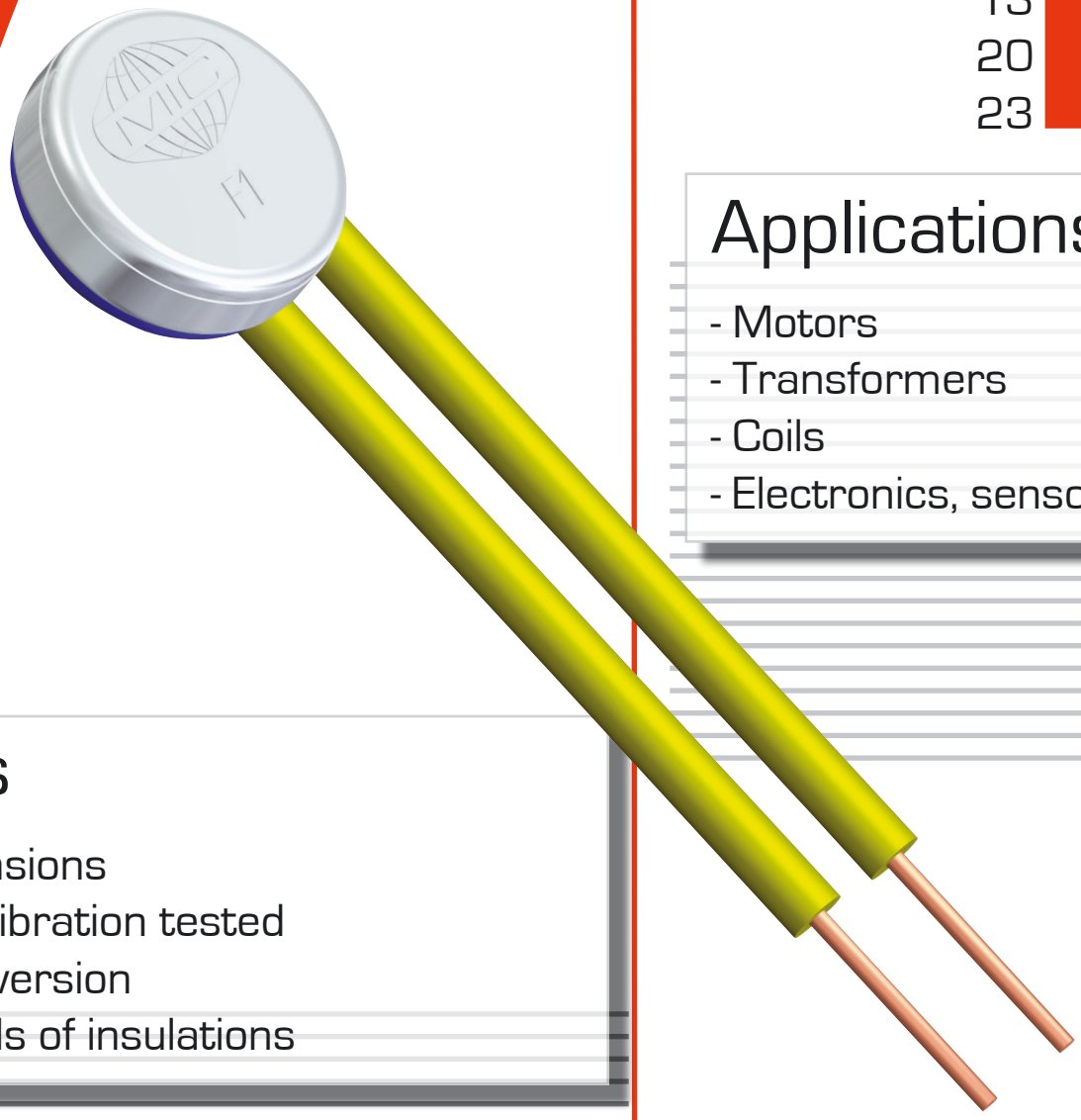
Thermal motor protector
Temperature limiter
Thermal cut-out

F

13
20
23

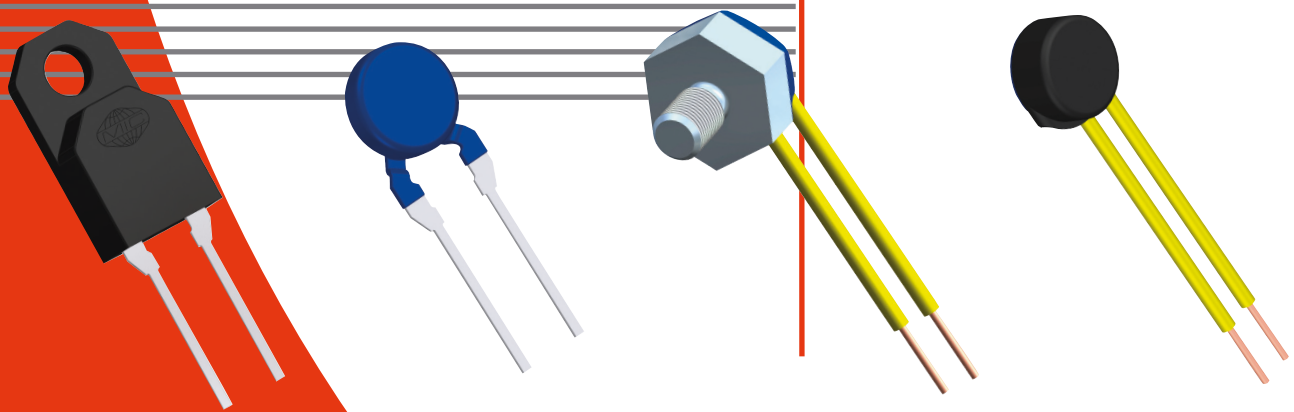


Applications

- Motors
- Transformers
- Coils
- Electronics, sensors

Benefits

- Small dimensions
- Shock and vibration tested
- Leadframe version
- Various kinds of insulations



MICROTHERM

MIC®
Microtherm International Cooperation

Technical data

ratings \ control type		F13A	F23A / E	F20B / G
version		normally closed		normally open
rated current at 250 V 50/60 Hz (power factor 0.95 / 0.6)		3.0 A / 2.5 A	3.0 A / 3.0 A	2.0 A / 1.6 A
switching cycles under rated current		10,000	10,000	7,000
max. current under failure condition at 250 V 50/60 Hz (power factor 0.95)		4.0 A	6.0 A	4.0 A
switching cycles under max. current		3,000		
temperature rating T_a (steps in 5 K)		70°C ... 190°C / ... 160°C CQC		70°C ... 185°C
tolerances		standard: ± 5 K		
feature of automatic action		2.C, 1.C		
contact resistance (incl. wire of 100 mm)		< 50 mΩ		
hysteresis		30 K ± 15 K [2]		
dielectric strength (standard insulation)		2 kV		
shock / vibration testing (similar to EN 50155)		400 m/s² sine half wave / 100 m/s² 5 Hz ... 2,000 Hz sine		
resistances to impregnation		tight against ordinary resins and lacquers		
degrees of protection provided by enclosures (EN 60529)		IP00		
suitable for use in protection category		I, II		
approvals	**VDE / ENEC**	EN 60730-1 / -2-9		
	UL	UL 2111 / UL 873 [1]		
	cUL	C22.2 No. 77 / C22.2 No. 24 [1]		
	CQC	GB14536.1-2008 / GB14536.10-2008 [3]		-

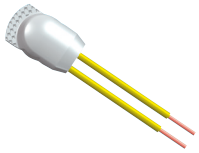
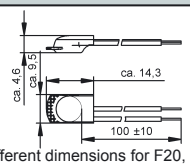
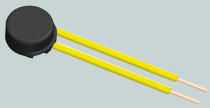
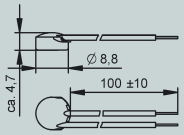
[1] on request [2] at the T_a (upper and lower) limits the hysteresis could deviate [3] different power rating

Standard wire (length 100 ± 10 mm, stripped 6 ± 1 mm)

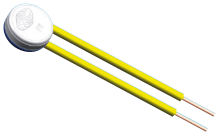
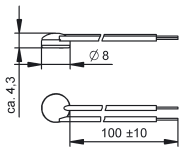
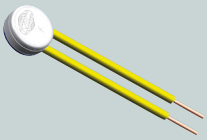
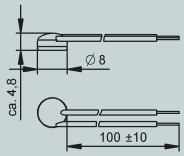
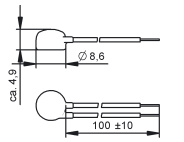
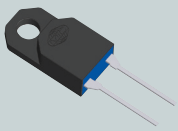
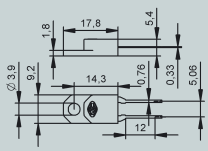
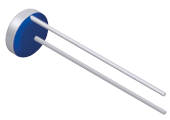
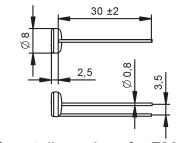
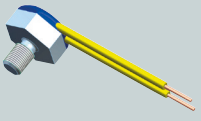
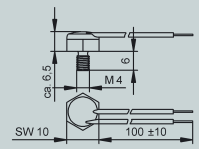
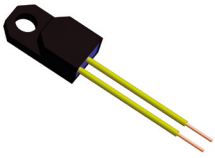
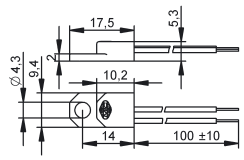
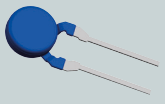
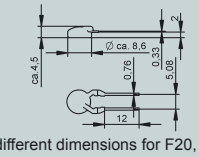
lead	code	temperature max.	operating voltage max.	approx. diameter insulation	approx. cross section diameter [1]	UL style
stranded white	L300	150 °C	300 V	1.50 mm	AWG24 / 0.25 mm²	3398
	L310			1.82 mm	AWG20 / 0.50 mm²	
	L360	200 °C	600 V	1.20 mm	AWG24 / 0.25 mm²	10086
	L370			1.60 mm	AWG20 / 0.50 mm²	
solid yellow	L400	150 °C	300 V	1.35 mm	AWG24 / 0.50 mm	3398
	L410			1.66 mm	AWG20 / 0.80 mm	
	L430	200 °C	300 V	1.16 mm	AWG24 / 0.50 mm	1332
	L440			1.54 mm	AWG20 / 0.80 mm	

[1] **AWG24 is recommended**

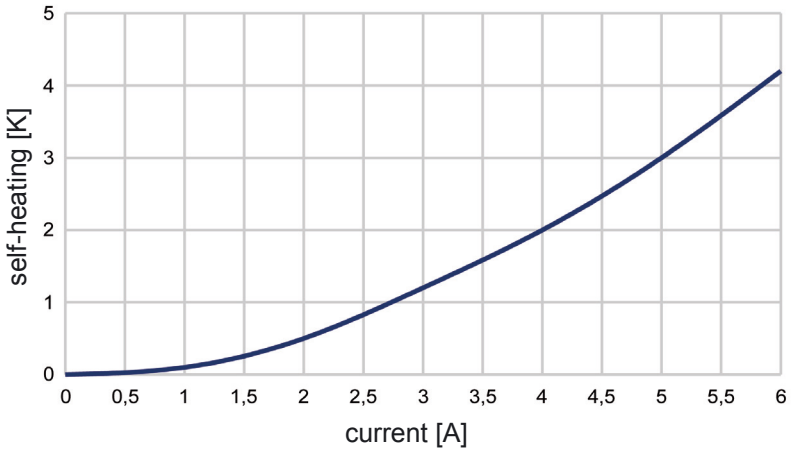
Standard insulation

control type	nc normally closed	no normally open	code	illustration	drawing dimensions (mm)	technical specification	approvals
F13 F20 F23	A A	B	U254		 different dimensions for F20, F23	shrink cap potted	VDE, UL, cUL
F13	A		U198		 different dimensions for F20, F23	cap of PPS potted	VDE, UL, cUL
F20 F23	A	B	U185				

Specific variations

control type	nc normally closed	no normally open	code	illustration	drawing dimensions (mm)	technical specification	approvals
F13	A					not insulated potted	VDE, UL cUL
F20 F23	A	B				not insulated potted	VDE, UL, cUL
F13 F20 F23	A A	B	U112		 different dimensions for F20, F23	coated T_a max. 160 °C	VDE, UL cUL
F20 F23	A	B	A150 U280			housing of PPS leadframe leads grid dimension 5.08 potted	VDE, UL, cUL
F13 F20 F23	A A	B	A800		 different dimensions for F20, F23	not insulated potted	VDE, UL cUL
F20 F23	E	G	G700			alluminium housing thread M4x6 potted T_a max. 150 °C	VDE, UL, cUL
F13	A		U282			housing of PPS potted	VDE, UL cUL
F13 F20 F23	A A	B	A150 U112		 different dimensions for F20, F23	leadframe leads grid dimension 5.08 coated T_a max. 160 °C	VDE, UL, cUL

Heating by current

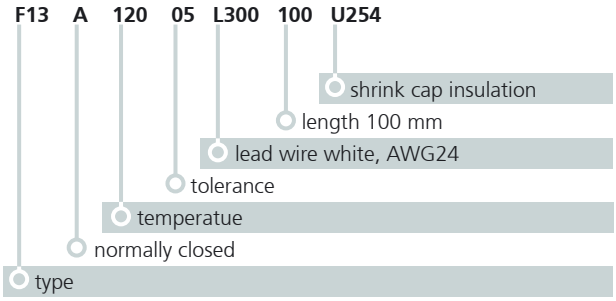


The characteristic curve in the diagram is measured with a thermal control without any insulation in an oil bath.

Attention:
The heating depends on the thermal conduction of the control to the equipment or part which should be protected.

Ordering and marking example

Ordering example



Marking

F13A	type (F13 nc)
12005	response temperature (120°C), tolerance (± 5K)
025D	date of manufacture (February 2015), country (D=Germany)

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Deviations from standard controls on request.