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CCSMHx79x MEMS Micro-hotplate

MICRO-HOTPLATE (800µm Diameter)

Benefits and Features

- High stability + High temperature
- Built-in FET & temp-sensing diode option
- Thermal response <40ms
- Lifetime @ 450°C >10 years
- Power consumption <0.31mW/°C
(without sensing material)

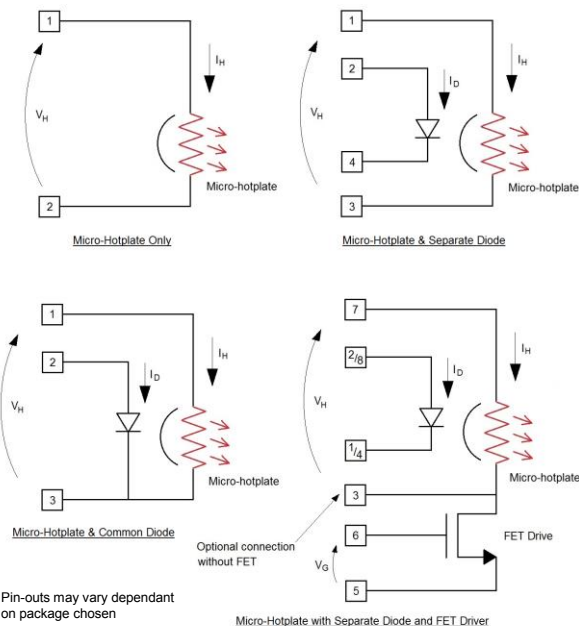
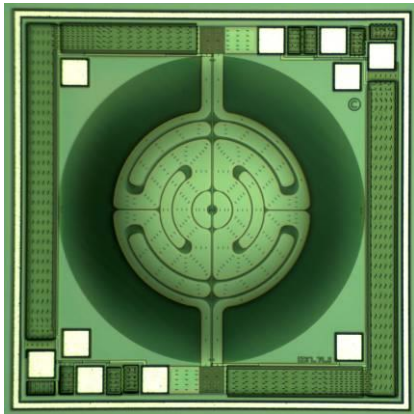
Sensing Applications

- Catalytic gases
- Medical
- Humidity
- Flow
- Multiple gases
- Micro-heating element

Packaging Options

- Bare Die
- SMD
- TO46
- TO39
- Array versions also available.

MEMS CMOS MICRO-HOTPLATE For Gas Sensing



Description

Basic high temperature micro-hotplate where the heater temperature can be controlled by appropriately adjusting the current or the supply voltage. The device is fabricated on a 1.76mm x 1.76mm silicon die as a single-chip solution and can incorporate a temperature-sensing diode and/or FET driver. Gold sensing electrodes are on top of the membrane.

Electrical/Optical specifications

Parameter	Nominal Value
Power Consumption(DC) at 500°C	155mW ± 15mW
Thermal Rise Time (t ₉₀)	40ms ± 10ms
Thermal Fall Time (t ₁₀)	55ms ± 10ms
Operating Temperature	500°C
Ambient Resistance (R ₀)	11Ω ± 2.5Ω
Heater Resistance ^{Note1} (R) @ 500°C	23Ω ± 5Ω
Heater Voltage (V _H) @ 500°C	1.9V ± 0.3V
Heater Current (I _H) @ 500°C	82mA ± 15mA
Diode Temp Coefficient (d) @ 65µA	1.17mV/K
Sensing Area	0.5mm ² min
Life Time (MTTF) @ 500°C ^{Note2}	~ 50000 Hours

Note1

$$R = (R_0 - R_T)[1 + \alpha(T - T_0) + \beta(T - T_0)^2] + R_T$$

$$R_T \text{ (Track Resistance)} = 2.7\Omega \pm 0.5\Omega @ 25^\circ\text{C}, T_0 = 25^\circ\text{C}$$

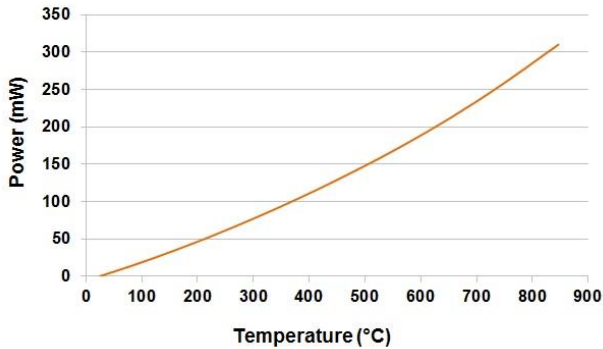
$$\alpha = 2.05 \times 10^{-3} \text{ K}^{-1}, \beta = 0.3 \times 10^{-6} \text{ K}^{-2}$$

Note2

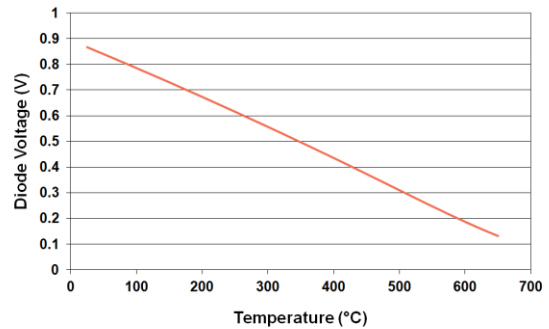
Without sensing material



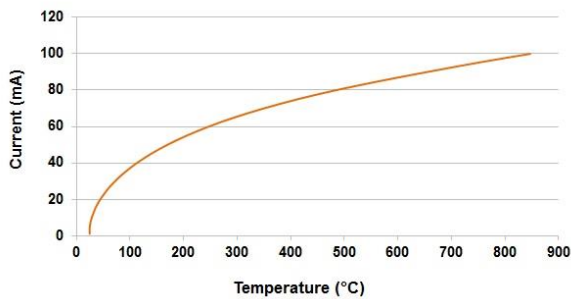
Power Consumption v Temperature



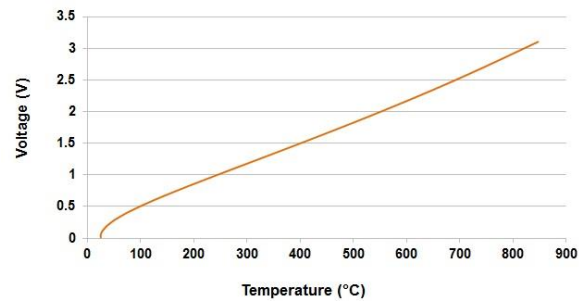
Diode characteristics



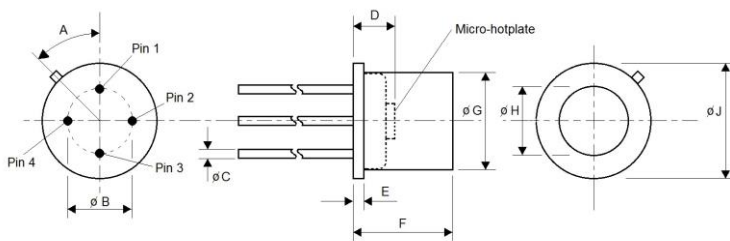
Current v Temperature



Voltage v Temperature

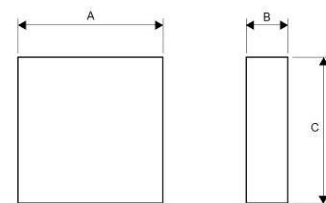


TO Package dimensions



	A	B	C	D	E	F	G	H	J
TO39	45°	5.08	0.45	1.92	0.38	4.35	8.31	5.30	9.20
TO46	45°	2.54	0.45	1.55	0.25	2.70	4.70	2.55	5.40

SMD Package dimensions



	A	B	C
LCC	3.80	1.45	3.80

Various pin-outs available

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