NORTHERN CARBON

M10 & M10 GOLD Specification



M10 (Monocrystalline10) is a plate of type IIa single-crystal diamond cut to micron precision and finished to nanometer precision.

Polished major surfaces are finished to an average roughness below two nanometers (Ra < 2nm). Typical roughness is below one nanometer (Ra < 1nm).

The thermal conductivity of M10 is 2200 Watts per meter–Kelvin in every direction. Ultraviolet and visible transparency are exceptional.

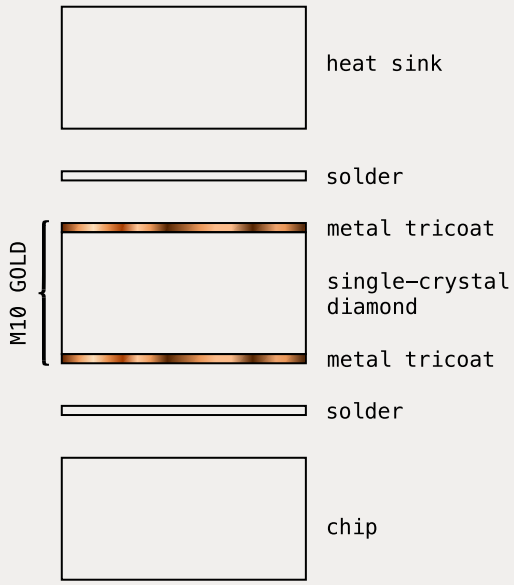
M10 GOLD is M10 covered with metal. A titanium–platinum–gold tri-coat embedded in the major surfaces enables soldering of M10 GOLD to a semiconductor package, heat sink, laser diode, or other metallic substrate, as shown in the graphic below.

M10 & M10 GOLD are suited for demanding optical, electrical, and thermal applications.

Composition	
crystallinity	one continuous crystal of IIa diamond
orientation	(100) to within 3°
mfg.	microwave plasma CVD
% nitrogen	< 200 parts per billion
% boron	< 20 parts per billion
thermal conductivity (κ)	2200 W/(m–K) @ 20°C in x, y, and z

Shape	
length	a/o (2–12mm ± 30µm)
width	a/o (2–12mm ± 30µm)
diameter	a/o (2–12mm ± 30µm)
thickness	a/o (250–1500mm ± 25µm)
parallelism	< 0.5°
kerf	< 2°

Finish	
options	lapped lapped + metallized polished polished + metallized
lapped	
Ra, Sa	< 400nm
flatness	< 2µm (5x5mm) < 4µm (7.5x7.5mm) < 8µm (10x10mm)
polished	
Ra, Sa	< 2nm < 1nm (typical)
flatness	< 2µm < 2.5µm < 4.5µm
metallized	
mfg.	sputter coating
composition	titanium—platinum—gold
gold thickness	< 5µm
options	closed (metallized sides) open (uncoated sides)

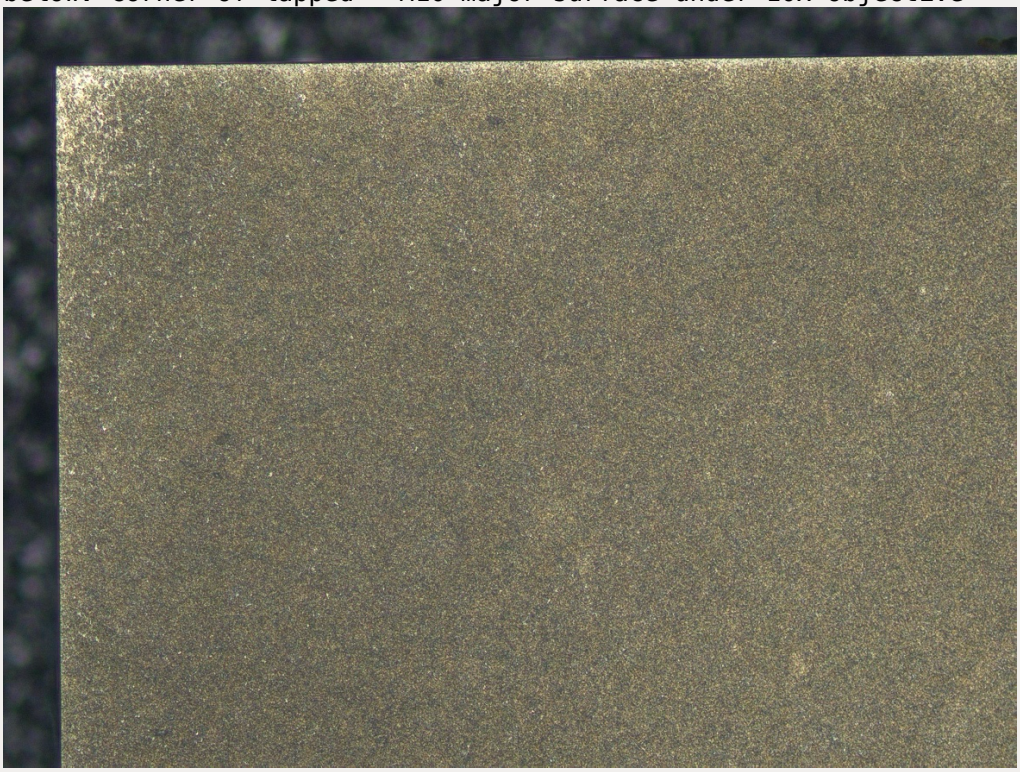


a/o means “as ordered”
see *NC Standards* for measurement methodology
graphics not to scale

Appendix to M10 & M10 GOLD Specification



above: corner of polished M10 major surface under 10x objective
below: corner of lapped M10 major surface under 10x objective



Appendix to M10 & M10 GOLD Specification (continued)



above: M10 GOLD