IXYS UK WESTCODE

**Date: - 1st June, 2017**

**Data Sheet Issue: - 2**

# Water Cooled Heatsink
## Type XW180GA34#

**Characteristics – Double side cooling, 2 coolers + 1 Semiconductor**

| | PARAMETER | TYP. | TEST CONDITIONS | UNITS |
|---|---|---|---|---|
| $R_{th\ (C/W)}$ | Cooler-input water thermal resistance | 3 | 6l/m flow rate, Power – 2.5kW | K/kW |
| $R_{th\ (C/W)}$ | Cooler-input water thermal resistance | 2.3 | 10l/m flow rate, Power – 2.5kW | K/kW |

**Characteristics – Double side cooling, 3 coolers + 2 Semiconductors**

| | PARAMETER | TYP. | TEST CONDITIONS | UNITS |
|---|---|---|---|---|
| $R_{th\ (C/W)}$ | Cooler-input water thermal resistance | 3.8 | 6l/m flow rate, Power – 2.5kW | K/kW |
| $R_{th\ (C/W)}$ | Cooler-input water thermal resistance | 2.7 | 10l/m flow rate, Power – 2.5kW | K/kW |

**Physical/Electrical properties**

| | PARAMETER | MIN. | TYP. | MAX. | TEST CONDITIONS | UNITS |
|---|---|---|---|---|---|---|
| ΔP | Pressure difference between input and output water per cooler | - | 63 | - | 6l/m | kPa |
| ΔP | Pressure difference between input and output water per cooler | - | 140 | - | 10l/m | kPa |
| M | Mass without busbar (XW180GC34A) | - | 1.49 | - | | kg |
| M | Mass with busbar (XW180GC34B) | - | 1.79 | - | | kg |
| | Dimensions | See outline drawing | | | | |

**Mechanical properties**

| | PARAMETER | MIN. | TYP. | MAX. | UNITS |
|---|---|---|---|---|---|
| ⏥ | Flatness of contact area | - | 20 | - | μm |
| Ra | Roughness of contact area | - | 0.8 | - | μm |
| | Clamping force | - | - | 13 | N/mm² |
| | Finish of contact area | Nickel-plating 10μm bright | | | |
| | Hydraulic fitting | 3/8” BSPP | | | |

* For other busbar/mechanical configurations please consult the factory.

**Notes**

The graphs on the following pages are typical values at 2500W.

1.0 - Temperature reference points

Heatsink – in the cooler within 2mm of device centre
Ambient – water temperature at the assembly input.

2.0 - Multiple cooler stacks

2.1 - 2 coolers/1 semiconductor

The temperature of the water entering the last cooler pair should be taken into account. The temperature rise of cooling water along the stack with respect to the ambient input water is (ΔT)W according to the formula shown below: -

$$(\Delta T)W = \frac{14.4 * P(n-1)}{F}$$

Where P is the power (in kW) dissipated in the semiconductor
n is the number of semiconductors
F is the water flow in Litres/min.

The rise in temperature of the last cooler pair with respect to the ambient input water is then: -

$$(\Delta T)C = (\Delta T)W + P * R_{thCW}$$

Where $R_{thCW}$ is obtained from the curve for double side cooling on page 3

2.2 - (n + 1) coolers/n semiconductors (n greater than 2)

In any series stack of coolers with n greater than two, the hottest cooler will usually be the penultimate one in the down stream direction.
The inlet water temperature rise to the last but one cooler (relative to stack inlet) may be calculated according to:

$$(\Delta T)W = \frac{14.4 * P(2n-3)}{2F}$$

The effective temperature rise of the penultimate cooler with respect to the stack input water is given by:

$$(\Delta T)C = (\Delta T)W + P * R_{thCW}$$

Where $R_{thCW}$ is obtained from the curve for 3 coolers on page 3

**Curves**

Figure 1 – Steady state thermal resistance vs Water flow

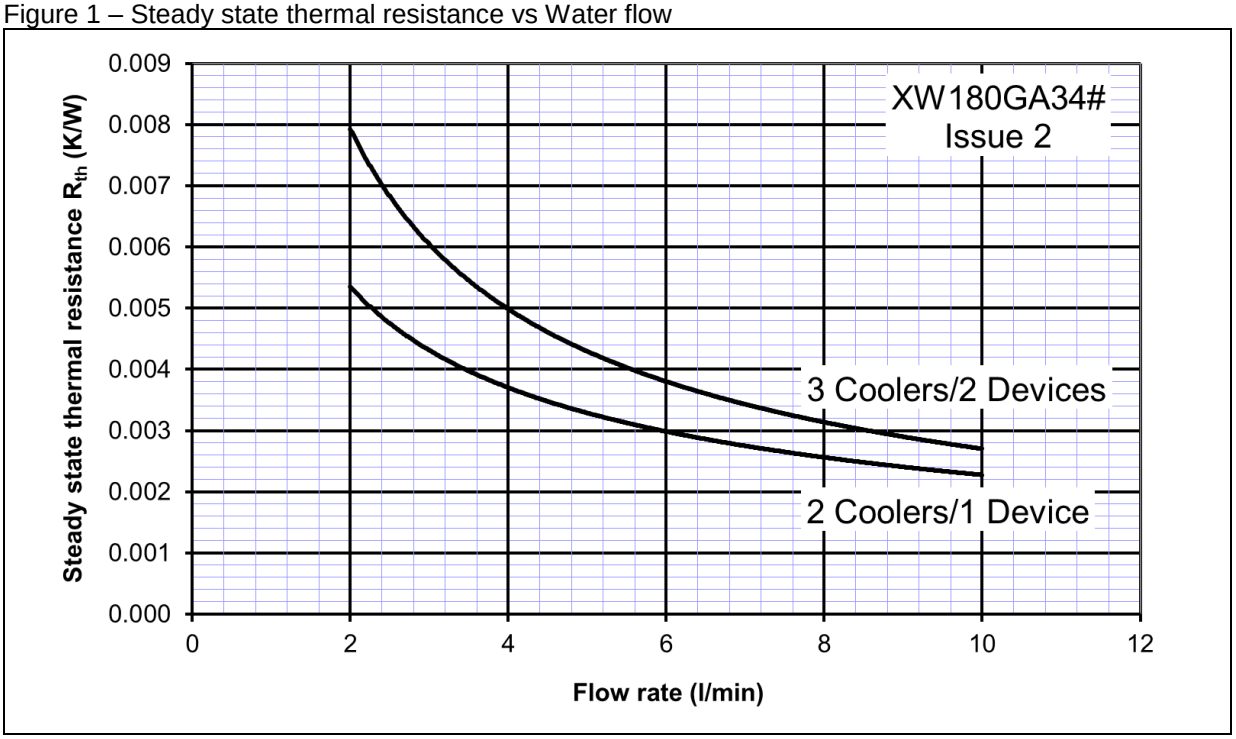



Figure 2 – Transient thermal impedance vs Time

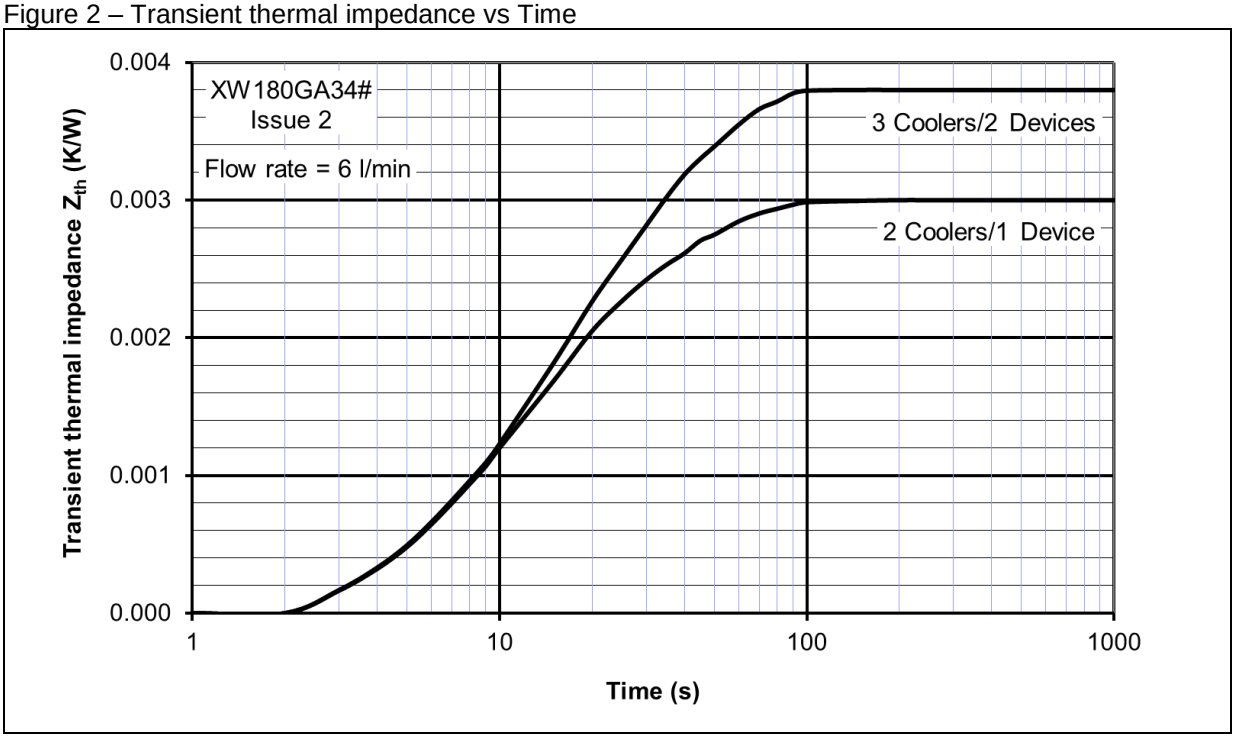
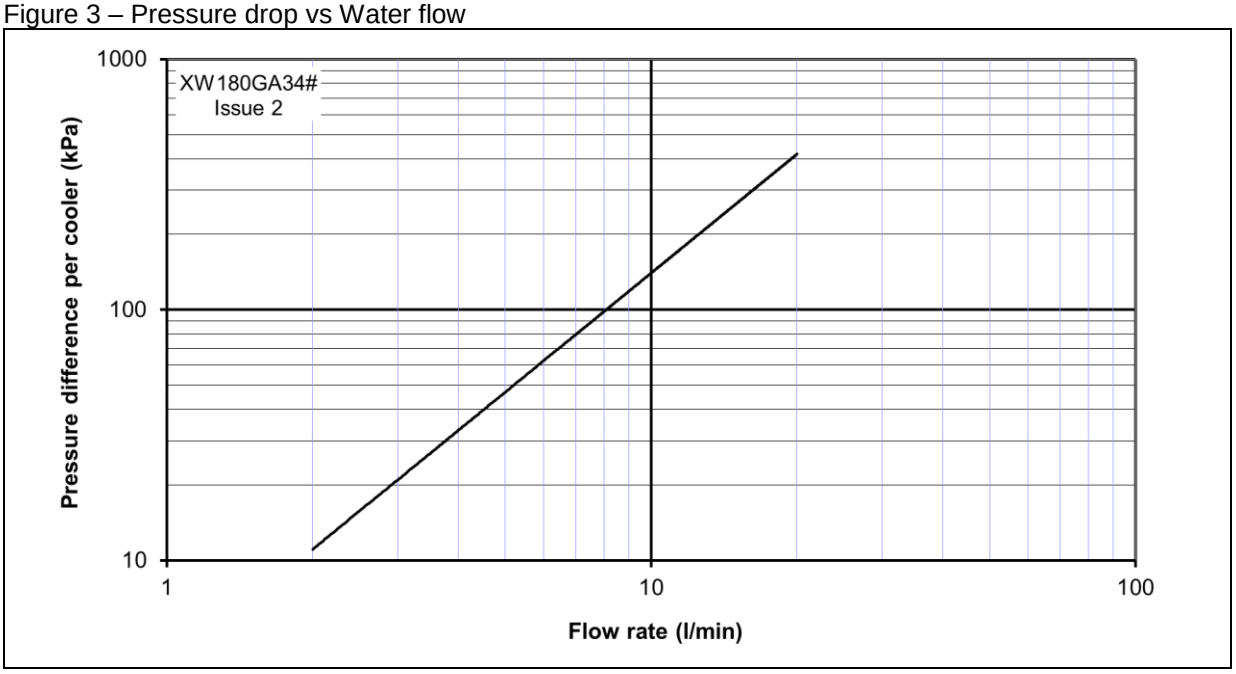
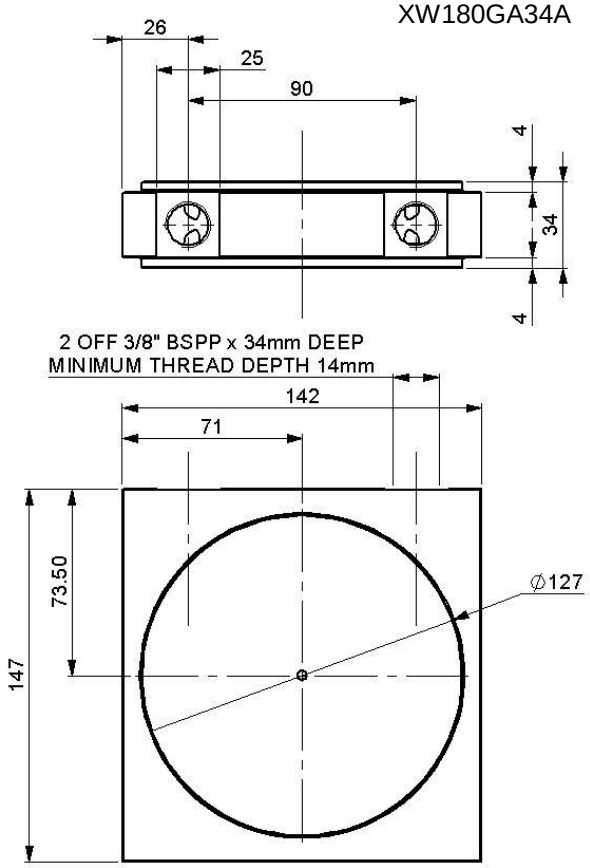


Figure 3 – Pressure drop vs Water flow

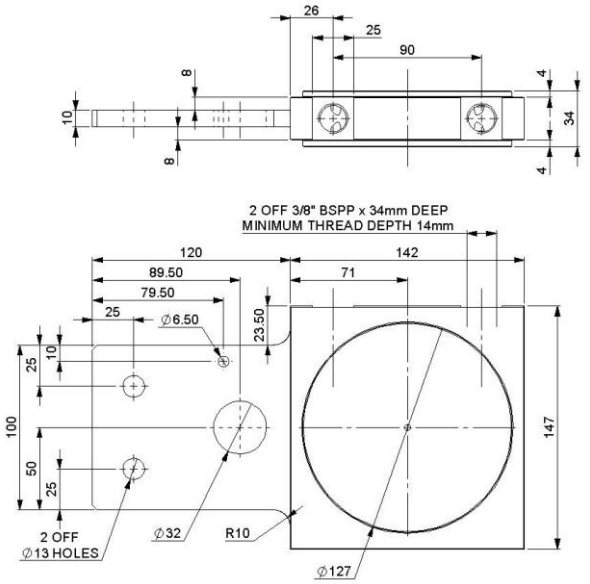


## Outline Drawing & Ordering Information

XW180GA34A




XW180GA34B




### ORDERING INFORMATION

(Please quote order code as below)

| XW | 180 | G | A | 34 | # |
|---|---|---|---|---|---|
| Water cooler | Maximum flange diameter (mm) | Nominal poleface diameter | Material<br>A = Aluminium | Cooler thickness (mm) | A = No busbar<br>B = Busbar |

Typical order code: XW180GA34A – Assemblies water cooler, 180mm maximum flange diameter, made from aluminium, 34mm thick with no busbar.

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