



## A3L:130DT.XXH

### VOLTAGE RATINGS

| Part Number   | V <sub>RRM</sub> , V <sub>R</sub> (V) Max. rep. peak reverse voltage |                             | V <sub>RSM</sub> , V <sub>R</sub> (V) Max. non-rep. peak reverse voltage |
|---------------|--|-----------------------------|--|
|               | T <sub>J</sub> = 0 to 125°C  | T <sub>J</sub> = -40 to 0°C | T <sub>J</sub> = 25 to 125°C   |
| A3L:130TD.02H | 200  | 200                         | 300  |
| A3L:130TD.04H | 400  | 400                         | 500  |
| A3L:130TD.06H | 600  | 600                         | 700  |
| A3L:130TD.08H | 800  | 800                         | 900  |
| A3L:130TD.10H | 1000   | 1000                        | 1100   |
| A3L:130TD.12H | 1200   | 1200                        | 1300   |
| A3L:130TD.14H | 1400   | 1330                        | 1500   |
| A3L:130TD.16H | 1600   | 1520                        | 1700   |

### MAXIMUM ALLOWABLE RATINGS

| PARAMETER   | VALUE      | UNITS                            | NOTES   |
|---|------------|----------------------------------|---|
| T <sub>J</sub> Junction Temperature   | -40 to 125 | °C                               | -   |
| T <sub>stg</sub> Storage Temperature  | -40 to 150 | °C                               | -   |
| I <sub>F(AV)</sub> Max. Av. current<br>@ Max. T <sub>C</sub>                    | 130        | A                                | 180° half sine wave   |
|   | 85         | °C                               |   |
| I <sub>F(RMS)</sub> Nom. RMS current  | 289        | A                                | -   |
| I <sub>FSM</sub> Max. Peak non-rep. surge current                               | 4          | kA                               | 50 Hz half cycle sine wave Initial T <sub>J</sub> = 125°C, rated V <sub>RRM</sub> applied after surge.  |
|   | 4.37       |                                  | 60 Hz half cycle sine wave  |
|   | 4.57       |                                  | 50 Hz half cycle sine wave Initial T <sub>J</sub> = 125°C, no voltage applied after surge.  |
|   | 4.98       |                                  | 60 Hz half cycle sine wave  |
| I <sup>2</sup> t Max. I <sup>2</sup> t capability                               | 82.89      | kA <sup>2</sup> s                | t = 10ms Initial T <sub>J</sub> = 125°C, rated V <sub>RRM</sub> applied after surge.  |
|   | 90.35      |                                  | t = 8.3 ms  |
|   | 94.5       |                                  | t = 10ms Initial T <sub>J</sub> = 125°C, no voltage applied after surge.  |
|   | 103        |                                  | t = 8.3 ms  |
| I <sup>2</sup> t <sup>1/2</sup> Max. I <sup>2</sup> t <sup>1/2</sup> capability | 1130       | kA <sup>2</sup> s <sup>1/2</sup> | Initial T <sub>J</sub> = 125°C, no voltage applied after surge. I <sup>2</sup> t for time t <sub>x</sub> = I <sup>2</sup> t <sup>1/2</sup> * t <sub>x</sub> <sup>1/2</sup> . (0.1 < t <sub>x</sub> < 10ms). |
| di/dt Max. Non-repetitive rate-of-rise current                                  | 500        | A/μs                             | T <sub>J</sub> = 125°C, V <sub>D</sub> = V <sub>DRM</sub> , I <sub>TM</sub> = 1600A. Gate pulse: 20V, 20Ω, 10μs, 0.5μs rise time, Max. repetitive di/dt is approximately 40% of non-repetitive value.       |
| P <sub>GM</sub> Max. Peak gate power  | 10         | W                                | tp < 5 ms   |
| P <sub>G(AV)</sub> Max. Av. gate power  | 3          | W                                | -   |
| +I <sub>GM</sub> Max. Peak gate current   | 150        | mA                               | tp < 5 ms   |
| -V <sub>GM</sub> Max. Peak negative gate voltage                                | 2          | V                                | -   |
| F Mounting Force  | 3(5)       | N.m                              | Upper connectors(Heatsink)  |



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### CHARACTERISTICS

| PARAMETER  | MIN. | TYP.      | MAX.  | UNITS                     | TEST CONDITIONS  |
|--|------|-----------|-------|---------------------------|--|
| $V_{TM}$ peak on-state voltage                         | ---  | ---       | 1.63  | V                         | Initial $T_J = 25^\circ\text{C}$ , 50-60Hz half sine, $I_{peak} = 408\text{A}$ .   |
| $V_{T(To)}$ Threshold voltage                          | ---  | ---       | 0.8   | V                         | $T_J = 125^\circ\text{C}$<br>Av. power = $V_{T(To)} * I_{T(AV)} + r_T * [I_{T(RMS)}]^2$ , 180 Half Sine.   |
| $r_T$ Slope resistance                                 | ---  | ---       | 1.99  | m $\Omega$                | Use low values for $I_{TM} < \pi$ rated $I_{T(AV)}$  |
| $I_L$ Latching current                                 | ---  | ---       | 300   | mA                        | $T_C = 125^\circ\text{C}$ , 12V anode. Gate pulse: 10V, 20 $\Omega$ , 100 $\mu\text{s}$ .  |
| $I_H$ Holding current                                  | ---  | ---       | 500   | mA                        | $T_C = 25^\circ\text{C}$ , 12V anode. Initial $I_T = 15\text{A}$ .   |
| $t_d$ Delay time                                       | ---  | 0.7       | 1.5   | $\mu\text{s}$             | $T_C = 25^\circ\text{C}$ , $V_D = V_{DRM}$ , 50A resistive load. Gate pulse: 10V, 20 $\Omega$ , 10 $\mu\text{s}$ , 1 $\mu\text{s}$ rise time.  |
| $t_q$ Turn-off time                                    | ---  | 125       | 200   | $\mu\text{s}$             | $T_J = 125^\circ\text{C}$ , $I_{TM} = 500\text{A}$ , $di/dt = 25\text{A}/\mu\text{s}$ , $V_R = 50\text{V}$ . $dv/dt = 20\text{V}/\mu\text{s}$ lin. to rated $V_{DRM}$ . Gate: 0V, 100 $\Omega$ . |
| $dv/dt$ Critical rate-of-rise of off-state voltage     | 80   | 140       | ---   | V/ $\mu\text{s}$          | $T_J = 125^\circ\text{C}$ . Exp. to 100% or lin. Higher $dv/dt$ values To 80% $V_{DRM}$ , gate open. available.  |
|  | ---  | ---       | 1000  |                           | $T_J = 125^\circ\text{C}$ , Exp. To 67% $V_{DRM}$ , gate open.   |
| $I_{RM}$ , $I_{DM}$ Peak reverse and off-state current | ---  | 10        | 50    | mA                        | $T_J = 125^\circ\text{C}$ , Rated $V_{RRM}$ and $V_{DRM}$ , gate open.   |
| $I_{GT}$ DC gate current to trigger                    | ---  | ---       | 300   | mA                        | $T_C = -40^\circ\text{C}$  |
|  | 50   | 80        | 150   |                           | $T_C = 25^\circ\text{C}$ +12V anode-to-cathode. For recommended gate drive see "Gate Characteristics" figure.  |
| $V_{GT}$ DC gate voltage to trigger                    | 4    | ---       | ---   | V                         | $T_C = -40^\circ\text{C}$  |
|  | 2    | ---       | 2.5   |                           | $T_C = 25^\circ\text{C}$   |
| $V_{GD}$ DC gate voltage not to trigger                | ---  | ---       | 0.3   | V                         | $T_C = 25^\circ\text{C}$ , Max. Value which will not trigger with rated $V_{DRM}$ anode.   |
| $R_{thJC}$ Thermal resistance, junction-to-case        | ---  | ---       | 0.1   | $^\circ\text{C}/\text{W}$ | DC operation, single side cooled.  |
|  | ---  | ---       | 0.107 | $^\circ\text{C}/\text{W}$ | 180 sine wave, single side cooled.   |
|  | ---  | ---       | 0.113 | $^\circ\text{C}/\text{W}$ | 120 rectangular wave, single side cooled.  |
| $R_{thCS}$ Thermal resistance, case-to-sink            | ---  | ---       | 0.05  | $^\circ\text{C}/\text{W}$ | Mtg. Surface smooth, flat and greased. Single side cooled.   |
| wt Weight  | ---  | 200(7.27) | ---   | g(oz.)                    | ---  |

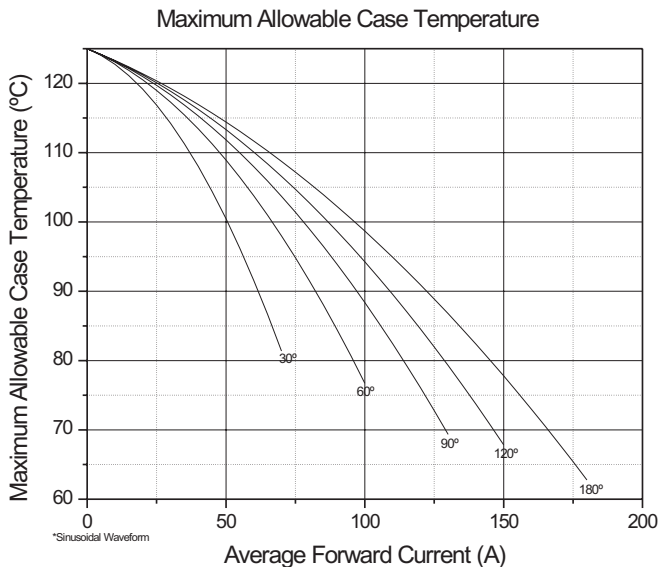


Fig. 1 - Current Ratings Characteristics

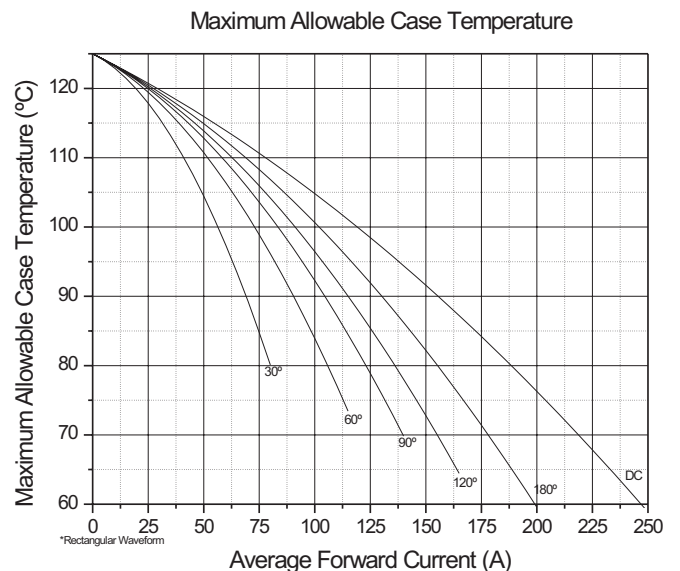


Fig. 2 - Current Ratings Characteristics



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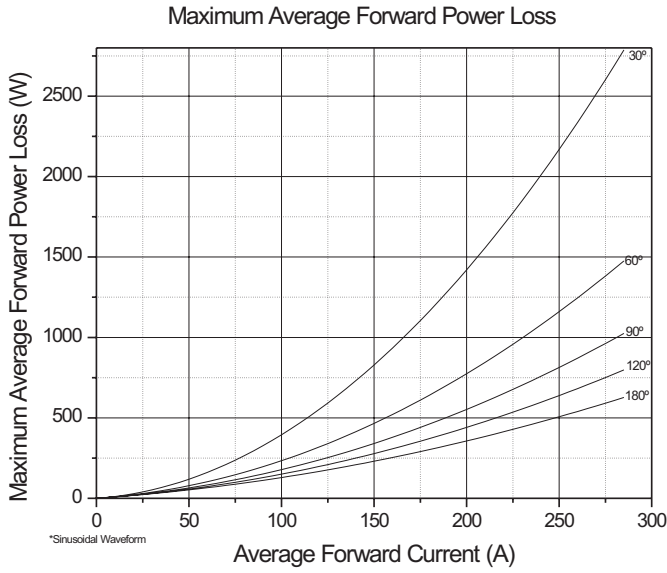


Fig.3 -Forward Power Loss Characteristics

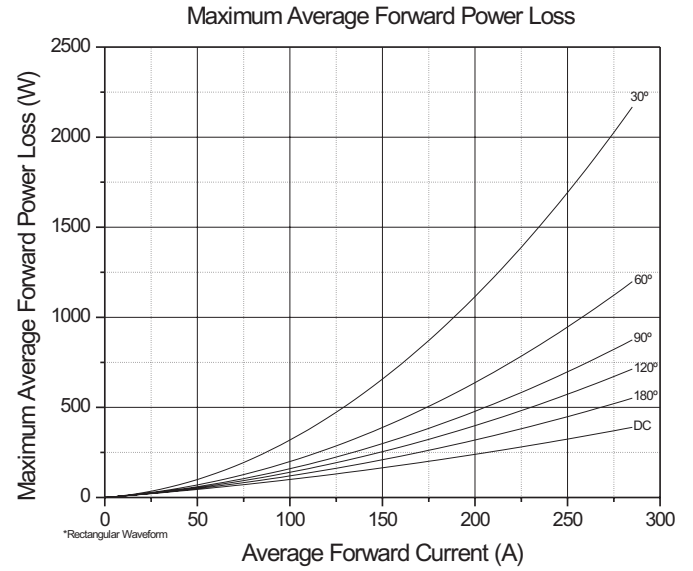


Fig. 4 - Forward Power Loss Characteristics

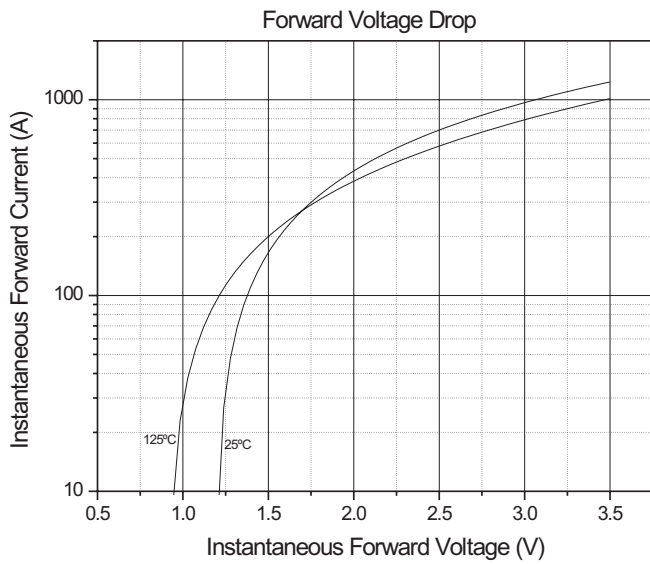


Fig. 5 - Forward Voltage Drop Characteristics

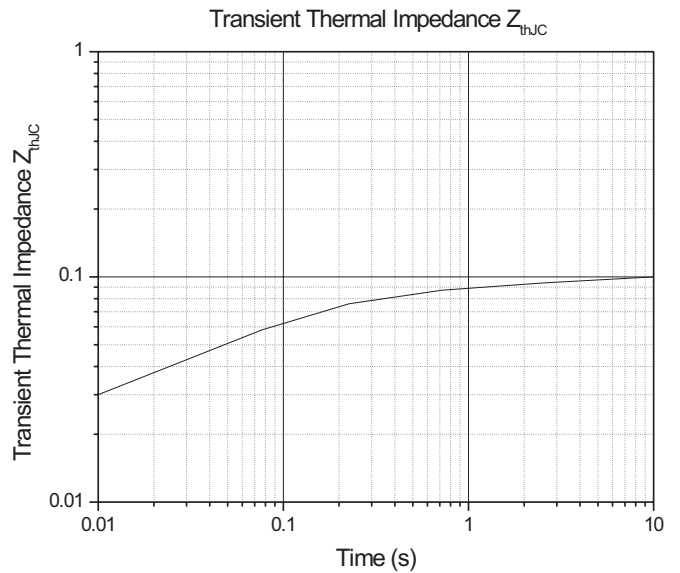
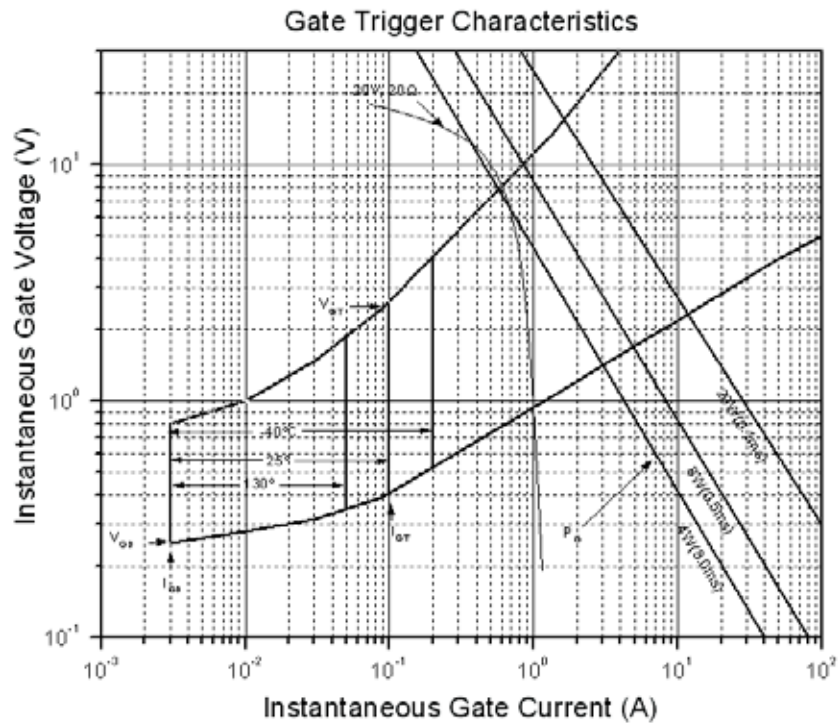


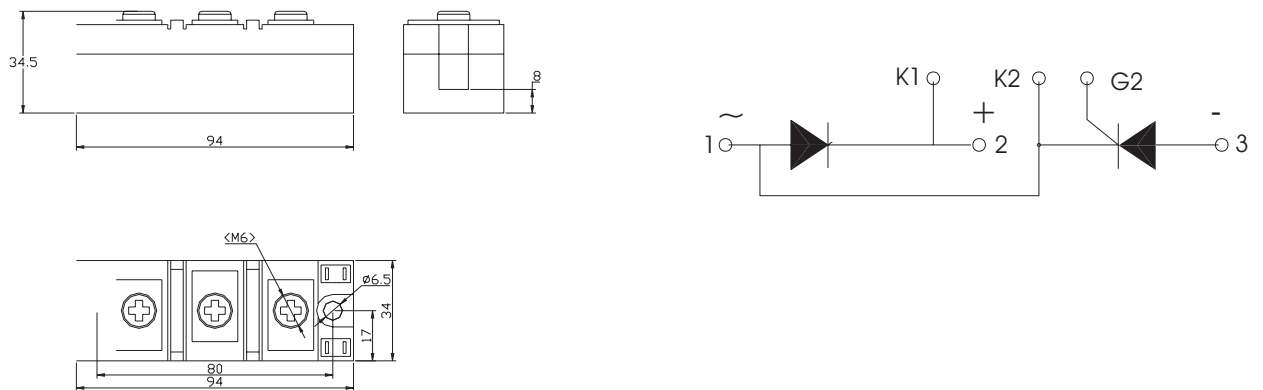
Fig. 6 - Transient Thermal Impedance



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**Fig. 7 - Gate Trigger Characteristics**



**Fig. 8 - Outline Characteristics**