

High power cycling capability  
 Low on-state and switching losses  
 Optimized for line frequency rectifiers  
 Designed for traction and industrial applications

## Rectifier Diode Type D133-800-20

|                                 |           |      |      |           |      |               |      |      |      |
|---------------------------------|-----------|------|------|-----------|------|---------------|------|------|------|
| Average forward current         |           |      |      | $I_{FAV}$ |      | 800 A         |      |      |      |
| Repetitive peak reverse voltage |           |      |      | $V_{RRM}$ |      | 1000 ÷ 2000 V |      |      |      |
| $V_{RRM}, V$                    | 1000      | 1100 | 1200 | 1300      | 1400 | 1500          | 1600 | 1800 | 2000 |
| Voltage code                    | 10        | 11   | 12   | 13        | 14   | 15            | 16   | 18   | 20   |
| $T_j, °C$                       | -60 ÷ 190 |      |      |           |      |               |      |      |      |

### MAXIMUM ALLOWABLE RATINGS

| Symbols and parameters |                                      | Units             | Values               | Test conditions   |
|------------------------|--------------------------------------|-------------------|----------------------|---|
| <b>ON-STATE</b>        |                                      |                   |                      |   |
| $I_{FAV}$              | Average forward current              | A                 | 800<br>1310          | $T_c=145 °C$ ; Double side cooled;<br>$T_c=100 °C$ ; Double side cooled;<br>180° half-sine wave; 50 Hz        |
| $I_{FRMS}$             | RMS forward current                  | A                 | 1256                 | $T_c=145 °C$ ; Double side cooled;<br>180° half-sine wave; 50 Hz  |
| $I_{FSM}$              | Surge forward current                | kA                | 12.0<br>13.0         | $T_j=T_{jmax}$<br>$T_j=25 °C$<br>180° half-sine wave; 50 Hz<br>( $t_p=10 ms$ ); single pulse;<br>$V_R=0 V$ ;  |
|                        |                                      |                   | 13.0<br>15.0         | $T_j=T_{jmax}$<br>$T_j=25 °C$<br>180° half-sine wave; 60 Hz<br>( $t_p=8.3 ms$ ); single pulse;<br>$V_R=0 V$ ; |
| $I^2t$                 | Safety factor                        | $A^2s \cdot 10^3$ | 720<br>950           | $T_j=T_{jmax}$<br>$T_j=25 °C$<br>180° half-sine wave; 50 Hz<br>( $t_p=10 ms$ ); single pulse;<br>$V_R=0 V$ ;  |
|                        |                                      |                   | 700<br>930           | $T_j=T_{jmax}$<br>$T_j=25 °C$<br>180° half-sine wave; 60 Hz<br>( $t_p=8.3 ms$ ); single pulse;<br>$V_R=0 V$ ; |
| <b>BLOCKING</b>        |                                      |                   |                      |   |
| $V_{RRM}$              | Repetitive peak reverse voltages     | V                 | 1000 ÷ 2000          | $T_{jmin} < T_j < T_{jmax}$ ;<br>180° half-sine wave; 50 Hz;  |
| $V_{RSM}$              | Non-repetitive peak reverse voltages | V                 | 1100 ÷ 2100          | $T_{jmin} < T_j < T_{jmax}$ ;<br>180° half-sine wave; 50 Hz; single pulse;                                    |
| $V_R$                  | Reverse continuous voltages          | V                 | $0.75 \cdot V_{RRM}$ | $T_j = T_{jmax}$ ;  |
| <b>THERMAL</b>         |                                      |                   |                      |   |
| $T_{stg}$              | Storage temperature                  | °C                | -60 ÷ 50             |   |
| $T_j$                  | Operating junction temperature       | °C                | -60 ÷ 190            |   |
| <b>MECHANICAL</b>      |                                      |                   |                      |   |
| F                      | Mounting force                       | kN                | 9.0 ÷ 11.0           |   |
| a                      | Acceleration                         | $m/s^2$           | 50                   | Device unclamped  |
|                        |                                      |                   | 100                  | Device clamped  |

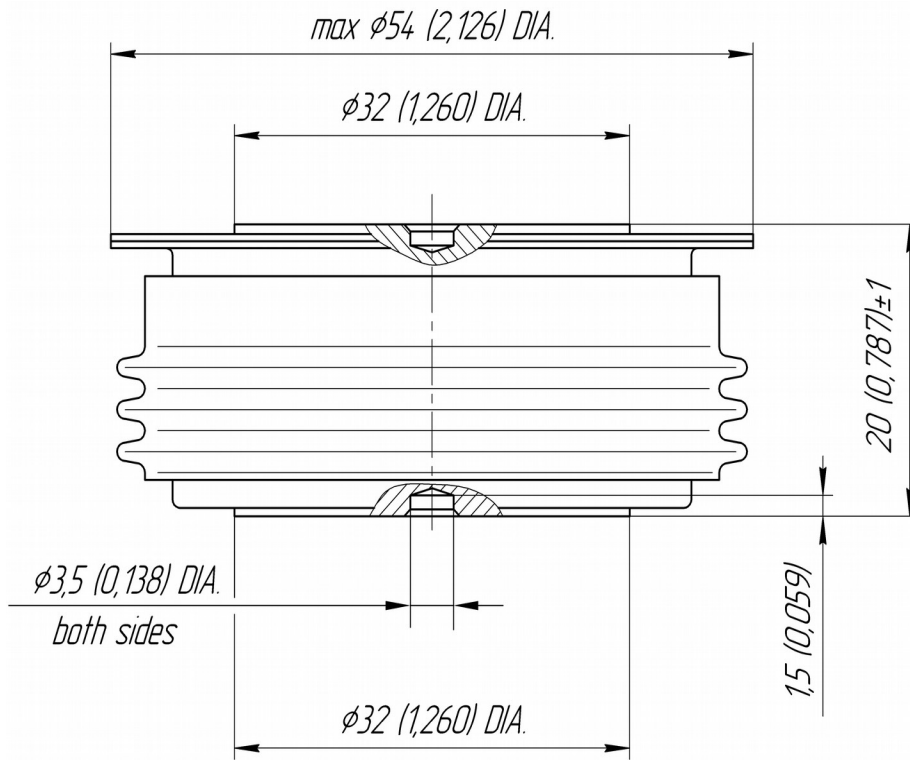
## CHARACTERISTICS

| Symbols and parameters |   | Units              | Values           | Conditions   |                     |
|------------------------|---|--------------------|------------------|--|---------------------|
| <b>ON-STATE</b>        |   |                    |                  |  |                     |
| $V_{FM}$               | Peak forward voltage, max                 | V                  | 1.60             | $T_j=25\text{ }^\circ\text{C}; I_{FM}=2512\text{ A}$ |                     |
| $V_{F(TO)}$            | Forward threshold voltage, max            | V                  | 1.00             | $T_j=T_{j\text{ max}}$ ;                             |                     |
| $r_T$                  | Forward slope resistance, max             | m $\Omega$         | 0.280            | $0.5\pi I_{FAV} < I_T < 1.5\pi I_{FAV}$              |                     |
| <b>BLOCKING</b>        |   |                    |                  |  |                     |
| $I_{RRM}$              | Repetitive peak reverse current, max      | mA                 | 50               | $T_j=T_{j\text{ max}}$ ;<br>$V_R=V_{RRM}$            |                     |
| <b>THERMAL</b>         |   |                    |                  |  |                     |
| $R_{thjc}$             | Thermal resistance, junction to case, max | $^\circ\text{C/W}$ | 0.036            | Direct current                                       |                     |
| $R_{thjc-A}$           |   |                    | 0.079            |  | Anode side cooled   |
| $R_{thjc-K}$           |   |                    | 0.065            |  | Cathode side cooled |
| $R_{thck}$             | Thermal resistance, case to heatsink, max | $^\circ\text{C/W}$ | 0.008            | Direct current                                       |                     |
| <b>MECHANICAL</b>      |   |                    |                  |  |                     |
| w                      | Weight, typ                               | g                  | 180              |  |                     |
| $D_s$                  | Surface creepage distance                 | mm<br>(inch)       | 23.69<br>(0.933) |  |                     |
| $D_a$                  | Air strike distance                       | mm<br>(inch)       | 19.10<br>(0.752) |  |                     |

### PART NUMBERING GUIDE

|   |     |     |    |   |
|---|-----|-----|----|---|
| D | 133 | 800 | 20 | N |
| 1 | 2   | 3   | 4  | 5 |

1. D — Rectifier Diode
2. Design version
3. Average forward current, A
4. Voltage code
5. Ambient conditions: N – normal; T – tropical



All dimensions in millimeters (inches)