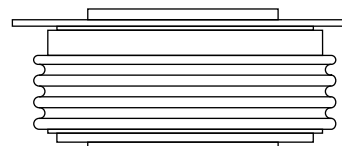


## Standard Recovery Diodes (Hockey PUK Version), 3800A

### FEATURES

- Wide current range
- High voltage ratings up to 5500V
- High surge current capabilities
- Diffused junction
- Hockey PUK version
- Case style B-44(R-PUK), Nell's E-type Capsule
- Lead (Pb)-free



B-44(R-PUK)  
(Nell's E-type Capsule)

### TYPICAL APPLICATIONS

- Converters
- Power supplies
- Machine tool controls
- High power drives
- Auxiliary system supplies for traction applications

### PRODUCT SUMMARY

|             |       |
|-------------|-------|
| $I_{F(AV)}$ | 3800A |
|-------------|-------|

### MAJOR RATINGS AND CHARACTERISTICS

| PARAMETER    | TEST CONDITIONS | VALUES       | UNIT              |
|--------------|-----------------|--------------|-------------------|
| $I_{F(AV)}$  |                 | 3800         | A                 |
|              | $T_{hs}$        | 55           | °C                |
| $I_{F(RMS)}$ |                 | 5970(6410)   | A                 |
|              | $T_{hs}$        | 55(25)       | °C                |
| $I_{FSM}$    | 50 HZ           | 35000        | A                 |
|              | 60 HZ           | 36650        |                   |
| $I^2t$       | 50 HZ           | 6125         | kA <sup>2</sup> s |
|              | 60 HZ           | 5575         |                   |
| $V_{RRM}$    |                 | 4000 to 5500 | V                 |
| $T_J$        | Typical         | -40 to 160   | °C                |

### ELECTRICAL SPECIFICATIONS

#### VOLTAGE RATINGS

| TYPE NUMBER | VOLTAGE CODE | $V_{RRM}$ , MAXIMUM REPETITIVE PEAK REVERSE VOLTAGE<br>V | $V_{RSM}$ , MAXIMUM NON-REPETITIVE PEAK REVERSE VOLTAGE<br>V | $I_{RRM}$ , MAXIMUM AT $T_J = T_J$ MAXIMUM<br>mA |
|-------------|--------------|----------------------------------------------------------|--------------------------------------------------------------|--------------------------------------------------|
| D3800E      | 40           | 4000                                                     | 4100                                                         | 100                                              |
|             | 45           | 4500                                                     | 4600                                                         |                                                  |
|             | 50           | 5000                                                     | 5100                                                         |                                                  |
|             | 55           | 5500                                                     | 5600                                                         |                                                  |

| FORWARD CONDUCTION                                      |                     |                                                                                                         |                                |                                                                          |            |                    |
|---------------------------------------------------------|---------------------|---------------------------------------------------------------------------------------------------------|--------------------------------|--------------------------------------------------------------------------|------------|--------------------|
| PARAMETER                                               | SYMBOL              | TEST CONDITIONS                                                                                         |                                |                                                                          | VALUES     | UNIT               |
| Maximum average forward current at heatsink temperature | I <sub>F(AV)</sub>  | 180° conduction, half sine wave<br>Double side (single side) cooled                                     |                                |                                                                          | 3800(1925) | A                  |
|                                                         |                     |                                                                                                         |                                |                                                                          | 55(85)     | °C                 |
| Maximum RMS forward current                             | I <sub>F(RMS)</sub> | 55°C heatsink temperature double side cooled                                                            |                                |                                                                          | 5970       | A                  |
| Maximum peak, one cycle non-reptitive surge current     | I <sub>FSM</sub>    | t = 10ms                                                                                                | No voltage reapplied           | Sinusoidal half wave,<br>initial T <sub>J</sub> = T <sub>J</sub> maximum | 35000      | A                  |
|                                                         |                     | t = 8.3ms                                                                                               |                                |                                                                          | 36650      |                    |
|                                                         |                     | t = 10ms                                                                                                | 100%V <sub>RRM</sub> reapplied |                                                                          | 29400      |                    |
|                                                         |                     | t = 8.3ms                                                                                               |                                |                                                                          | 30790      |                    |
| Maximum I <sup>2</sup> t for fusing                     | I <sup>2</sup> t    | t = 10ms                                                                                                | No voltage reapplied           |                                                                          | 6125       | kA <sup>2</sup> s  |
|                                                         |                     | t = 8.3ms                                                                                               |                                |                                                                          | 5575       |                    |
|                                                         |                     | t = 10ms                                                                                                | 100%V <sub>RRM</sub> reapplied |                                                                          | 4320       |                    |
|                                                         |                     | t = 8.3ms                                                                                               |                                |                                                                          | 3935       |                    |
| Maximum I <sup>2</sup> √t for fusing                    | I <sup>2</sup> √t   | t = 0.1 to 10 ms, no voltage reapplied                                                                  |                                |                                                                          | 61250      | kA <sup>2</sup> √s |
| Maximum value of threshold voltage                      | V <sub>F(TO)</sub>  | I <sub>F</sub> = 5900A ~ 17900A, T <sub>J</sub> =T <sub>J</sub> maximum                                 |                                |                                                                          | 0.903      | V                  |
| Maximum value of forward slope resistance               | r <sub>t</sub>      |                                                                                                         |                                |                                                                          | 0.136      | mΩ                 |
| Maximum forward voltage drop                            | V <sub>FM</sub>     | I <sub>pk</sub> = 4000A, T <sub>J</sub> =T <sub>J</sub> maximum, t <sub>p</sub> = 10 ms sinusoidal wave |                                |                                                                          | 1.50       | V                  |

| THERMAL AND MECHANICAL SPECIFICATIONS            |              |                                    |  |                 |           |
|--------------------------------------------------|--------------|------------------------------------|--|-----------------|-----------|
| PARAMETER                                        | SYMBOL       | TEST CONDITIONS                    |  | VALUES          | UNIT      |
| Maximum junction operating temperature range     | $T_J$        |                                    |  | -40 to 160      | °C        |
| Maximum storage temperature range                | $T_{stg}$    |                                    |  | -55 to 160      |           |
| Maximum thermal resistance, junction to heatsink | $R_{thJ-hs}$ | DC operation single side cooled    |  | 0.022           | K/W       |
|                                                  |              | DC operation double side cooled    |  | 0.011           |           |
| Mounting force, ±10%                             |              |                                    |  | 40000<br>(4045) | N<br>(kg) |
| Approximate weight                               |              |                                    |  | 990             | g         |
| Case style                                       |              | B-44(R-PUK), Nell's E-type Capsule |  |                 |           |

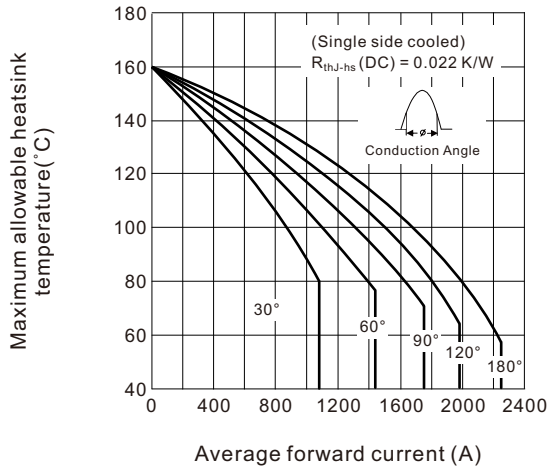
| △ R <sub>thJC</sub> CONDUCTION |                       |             |                        |             |                                         |       |
|--------------------------------|-----------------------|-------------|------------------------|-------------|-----------------------------------------|-------|
| CONDUCTION ANGEL               | SINUSOIDAL CONDUCTION |             | RECTANGULAR CONDUCTION |             | TEST CONDUCTIONS                        | UNITS |
|                                | SINGLE SIDE           | DOUBLE SIDE | SINGLE SIDE            | DOUBLE SIDE | T <sub>J</sub> = T <sub>J</sub> maximum | K/W   |
| 180°                           | 0.0009                | 0.0010      | 0.0006                 | 0.0006      |                                         |       |
| 120°                           | 0.0010                | 0.0011      | 0.0010                 | 0.0010      |                                         |       |
| 90°                            | 0.0013                | 0.0013      | 0.0014                 | 0.0014      |                                         |       |
| 60°                            | 0.0019                | 0.0019      | 0.0020                 | 0.0020      |                                         |       |
| 30°                            | 0.0033                | 0.0033      | 0.0034                 | 0.0034      |                                         |       |

### Note

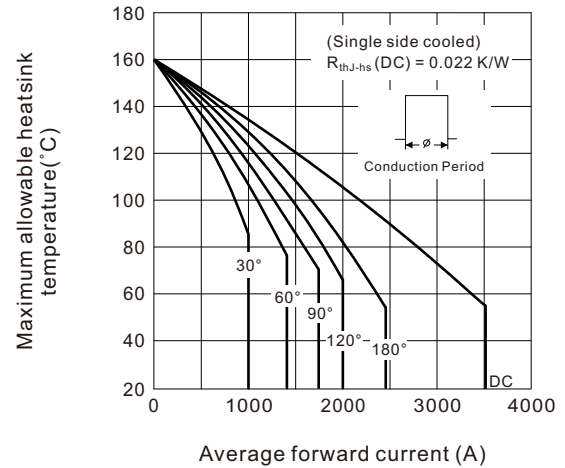
- The table above shows the increment of thermal resistance  $R_{thJ-hs}$  when devices operate at different conduction angles than DC

## Nell High Power Products

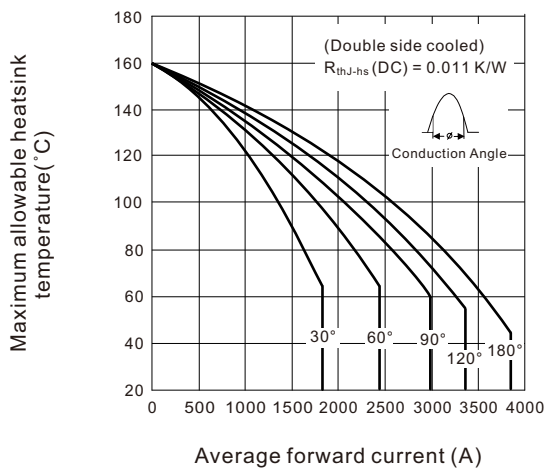
**Fig.1 Current ratings characteristics**



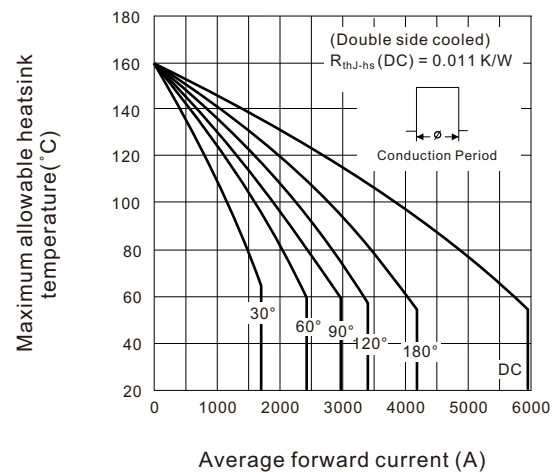
**Fig.2 Current ratings characteristics**



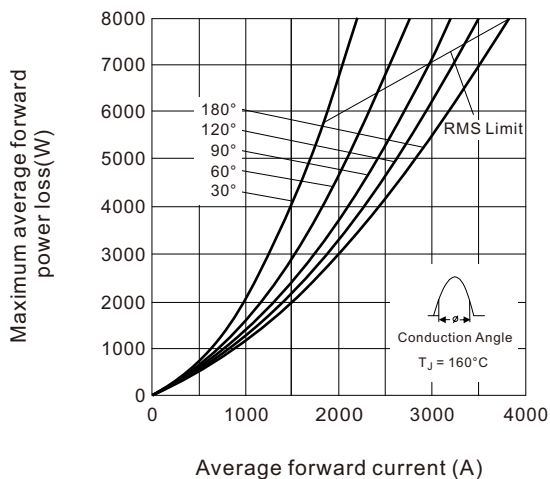
**Fig.3 Current ratings characteristics**



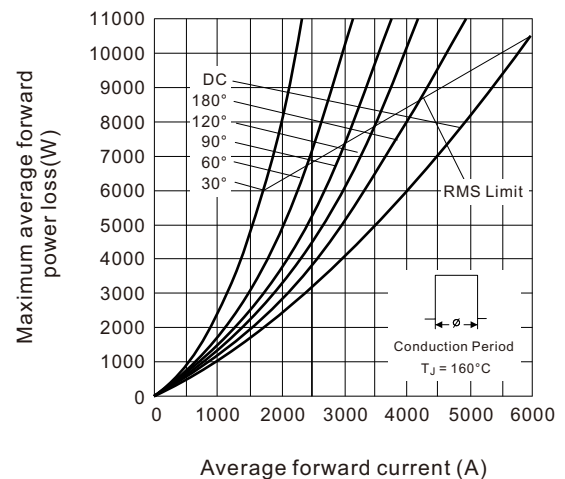
**Fig.4 Current ratings characteristics**



**Fig.5 Forward power loss characteristics**

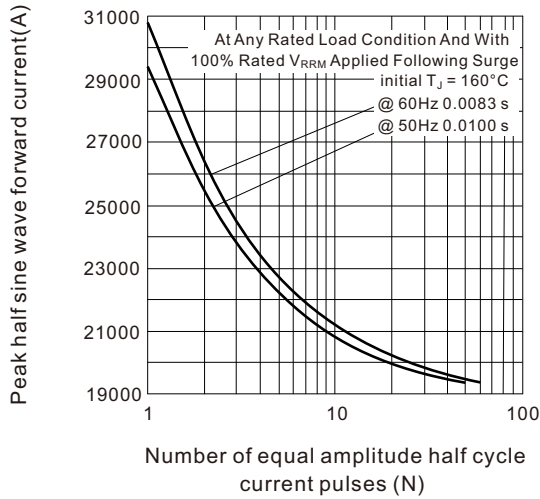


**Fig.6 Forward power loss characteristics**

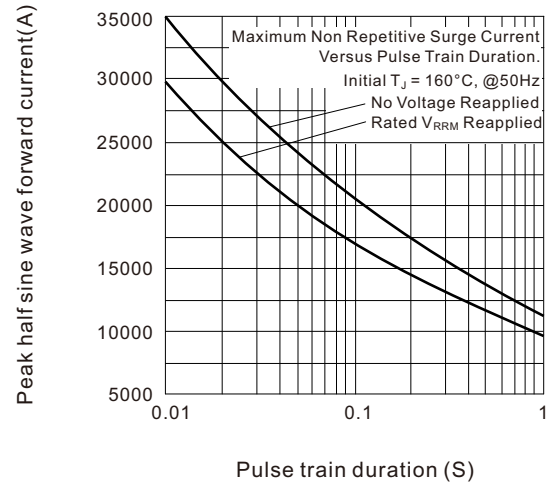


## Nell High Power Products

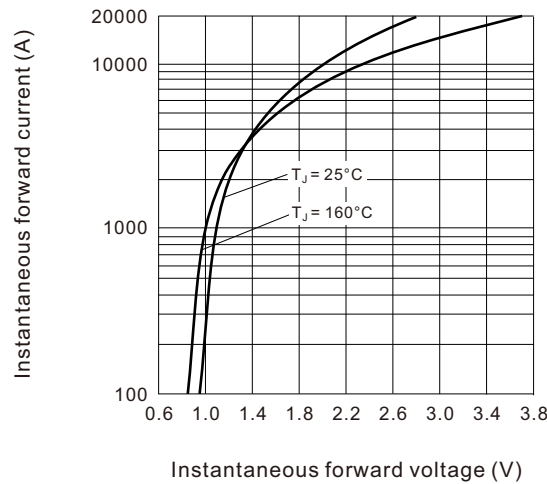
**Fig.7 Maximum non-repetitive surge current single and double side cooled**



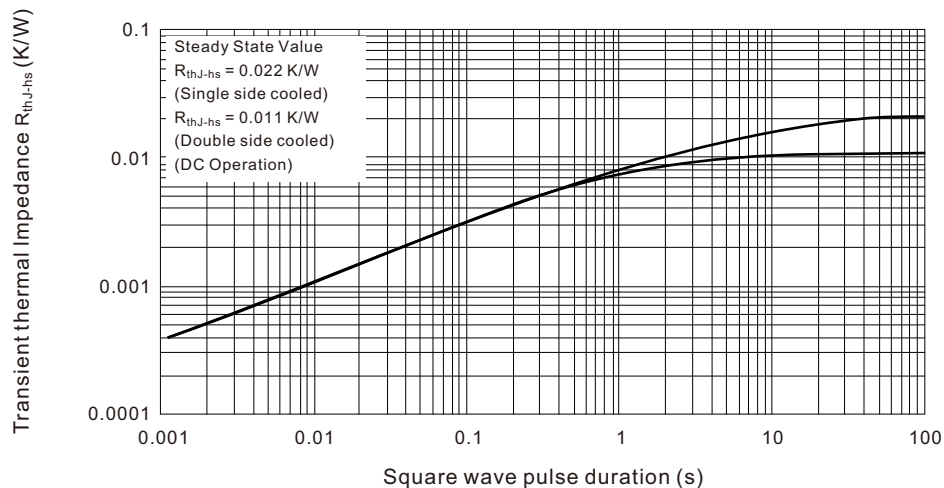
**Fig.8 Maximum non-repetitive surge current single and double side cooled**



**Fig.9 Forward voltage drop characteristics**



**Fig.10 Thermal Impedance  $R_{thJ-hs}$  characteristics**

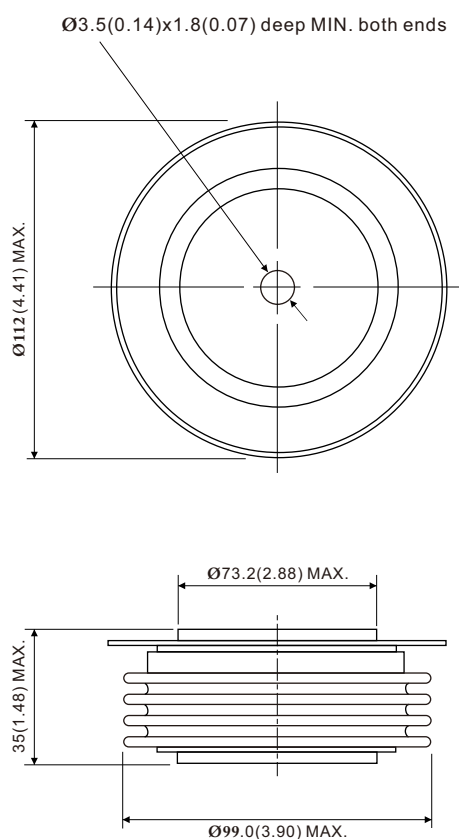


## ORDERING INFORMATION TABLE

| Device code | D | 3800 | E | 50 |
|-------------|---|------|---|----|
|             | ① | ②    | ③ | ④  |

- ① - "D" for standard recovery diode
- ②
- ③ - Case style : "E" for Nell's E-type Capsule, B-44(R-PUK)
- ④ - Voltage code, code x 100 =  $V_{RRM}$

### B-44(R-PUK), Nell's E-type Capsule



All dimensions in millimeters (inches)

