

## Standard Rectifier

$$V_{RRM} = 1200 \text{ V}$$

$$I_{FAV} = 30 \text{ A}$$

$$V_F = 1.25 \text{ V}$$

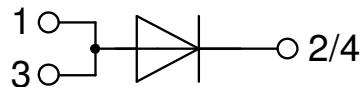
### Single Diode

#### Part number

**DSI30-12AS**



Backside: cathode



#### Features / Advantages:

- Planar passivated chips
- Very low leakage current
- Very low forward voltage drop
- Improved thermal behaviour

#### Applications:

- Diode for main rectification
- For single and three phase bridge configurations

#### Package: TO-263 (D2Pak)

- Industry standard outline
- RoHS compliant
- Epoxy meets UL 94V-0

#### Terms Conditions of usage:

The data contained in this product data sheet is exclusively intended for technically trained staff. The user will have to evaluate the suitability of the product for the intended application and the completeness of the product data with respect to his application. The specifications of our components may not be considered as an assurance of component characteristics. The information in the valid application- and assembly notes must be considered. Should you require product information in excess of the data given in this product data sheet or which concerns the specific application of your product, please contact the sales office, which is responsible for you.

Due to technical requirements our product may contain dangerous substances. For information on the types in question please contact the sales office, which is responsible for you.

Should you intend to use the product in aviation, in health or live endangering or life support applications, please notify. For any such application we urgently recommend

- to perform joint risk and quality assessments;

- the conclusion of quality agreements;

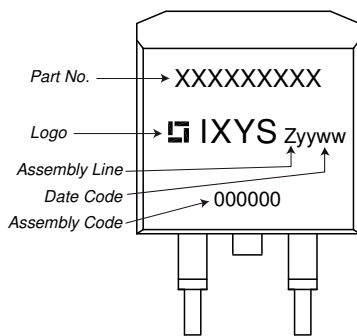
- to establish joint measures of an ongoing product survey, and that we may make delivery dependent on the realization of any such measures.

| Rectifier  |  |                                   |             | Ratings                      |      |      |                  |
|------------|--|-----------------------------------|-------------|------------------------------|------|------|------------------|
| Symbol     | Definition                                   | Conditions                        |             | min.                         | typ. | max. | Unit             |
| $V_{RSM}$  | max. non-repetitive reverse blocking voltage |                                   |             |                              |      | 1300 | V                |
| $V_{RRM}$  | max. repetitive reverse blocking voltage     |                                   |             |                              |      | 1200 | V                |
| $I_R$      | reverse current                              | $V_R = 1200$ V                    |             | $T_{VJ} = 25^\circ\text{C}$  |      | 40   | $\mu\text{A}$    |
|            |  | $V_R = 1200$ V                    |             | $T_{VJ} = 150^\circ\text{C}$ |      | 1.5  | mA               |
| $V_F$      | forward voltage drop                         | $I_F = 30$ A                      |             | $T_{VJ} = 25^\circ\text{C}$  |      | 1.29 | V                |
|            |  | $I_F = 60$ A                      |             |                              |      | 1.60 | V                |
|            |  | $I_F = 30$ A                      |             | $T_{VJ} = 150^\circ\text{C}$ |      | 1.25 | V                |
|            |  | $I_F = 60$ A                      |             |                              |      | 1.66 | V                |
| $I_{FAV}$  | average forward current                      | $T_C = 130^\circ\text{C}$         | rectangular | $T_{VJ} = 175^\circ\text{C}$ |      | 30   | A                |
| $V_{FO}$   | threshold voltage                            | } for power loss calculation only |             |                              |      | 0.82 | V                |
| $r_F$      | slope resistance                             |                                   |             |                              |      | 14.1 | m $\Omega$       |
| $R_{thJC}$ | thermal resistance junction to case          |                                   |             |                              |      | 0.9  | K/W              |
| $R_{thCH}$ | thermal resistance case to heatsink          |                                   |             | 0.25                         |      |      | K/W              |
| $P_{tot}$  | total power dissipation                      |                                   |             | $T_C = 25^\circ\text{C}$     |      | 160  | W                |
| $I_{FSM}$  | max. forward surge current                   | $t = 10$ ms; (50 Hz), sine        |             | $T_{VJ} = 45^\circ\text{C}$  |      | 300  | A                |
|            |  | $t = 8,3$ ms; (60 Hz), sine       |             | $V_R = 0$ V                  |      | 325  | A                |
|            |  | $t = 10$ ms; (50 Hz), sine        |             | $T_{VJ} = 150^\circ\text{C}$ |      | 255  | A                |
|            |  | $t = 8,3$ ms; (60 Hz), sine       |             | $V_R = 0$ V                  |      | 275  | A                |
| $I^2t$     | value for fusing                             | $t = 10$ ms; (50 Hz), sine        |             | $T_{VJ} = 45^\circ\text{C}$  |      | 450  | A <sup>2</sup> s |
|            |  | $t = 8,3$ ms; (60 Hz), sine       |             | $V_R = 0$ V                  |      | 440  | A <sup>2</sup> s |
|            |  | $t = 10$ ms; (50 Hz), sine        |             | $T_{VJ} = 150^\circ\text{C}$ |      | 325  | A <sup>2</sup> s |
|            |  | $t = 8,3$ ms; (60 Hz), sine       |             | $V_R = 0$ V                  |      | 315  | A <sup>2</sup> s |
| $C_J$      | junction capacitance                         | $V_R = 400$ V; $f = 1$ MHz        |             | $T_{VJ} = 25^\circ\text{C}$  |      | 10   | pF               |

| Package TO-263 (D2Pak) |                              |                            | Ratings |      |      |      |
|------------------------|------------------------------|----------------------------|---------|------|------|------|
| Symbol                 | Definition                   | Conditions                 | min.    | typ. | max. | Unit |
| $I_{RMS}$              | RMS current                  | per terminal <sup>1)</sup> |         |      | 35   | A    |
| $T_{VJ}$               | virtual junction temperature |                            | -40     |      | 175  | °C   |
| $T_{op}$               | operation temperature        |                            | -40     |      | 150  | °C   |
| $T_{stg}$              | storage temperature          |                            | -40     |      | 150  | °C   |
| <b>Weight</b>          |                              |                            |         | 2    |      | g    |
| $F_C$                  | mounting force with clip     |                            | 20      |      | 60   | N    |

<sup>1)</sup>  $I_{RMS}$  is typically limited by the pin-to-chip resistance (1); or by the current capability of the chip (2). In case of (1) and a product with multiple pins for one chip-potential, the current capability can be increased by connecting the pins as one contact.

### Product Marking



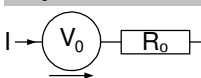
| Ordering    | Ordering Number | Marking on Product | Delivery Mode | Quantity | Code No. |
|-------------|-----------------|--------------------|---------------|----------|----------|
| Standard    | DSI30-12AS      | DSI30-12AS         | Tape & Reel   | 800      | 507511   |
| Alternative | DSI30-12AS-TUB  | DSI30-12AS         | Tube          | 50       | 470988   |

| Similar Part | Package              | Voltage class |
|--------------|----------------------|---------------|
| DSI30-12A    | TO-220AC (2)         | 1200          |
| DSI30-12AC   | ISOPLUS220AC (2)     | 1200          |
| DSI30-16AS   | TO-263AB (D2Pak) (2) | 1600          |
| DSI30-16A    | TO-220AC (2)         | 1600          |
| DSI30-08AS   | TO-263AB (D2Pak) (2) | 800           |
| DSI30-08A    | TO-220AC (2)         | 800           |
| DSI30-08AC   | ISOPLUS220AC (2)     | 800           |

### Equivalent Circuits for Simulation

\* on die level

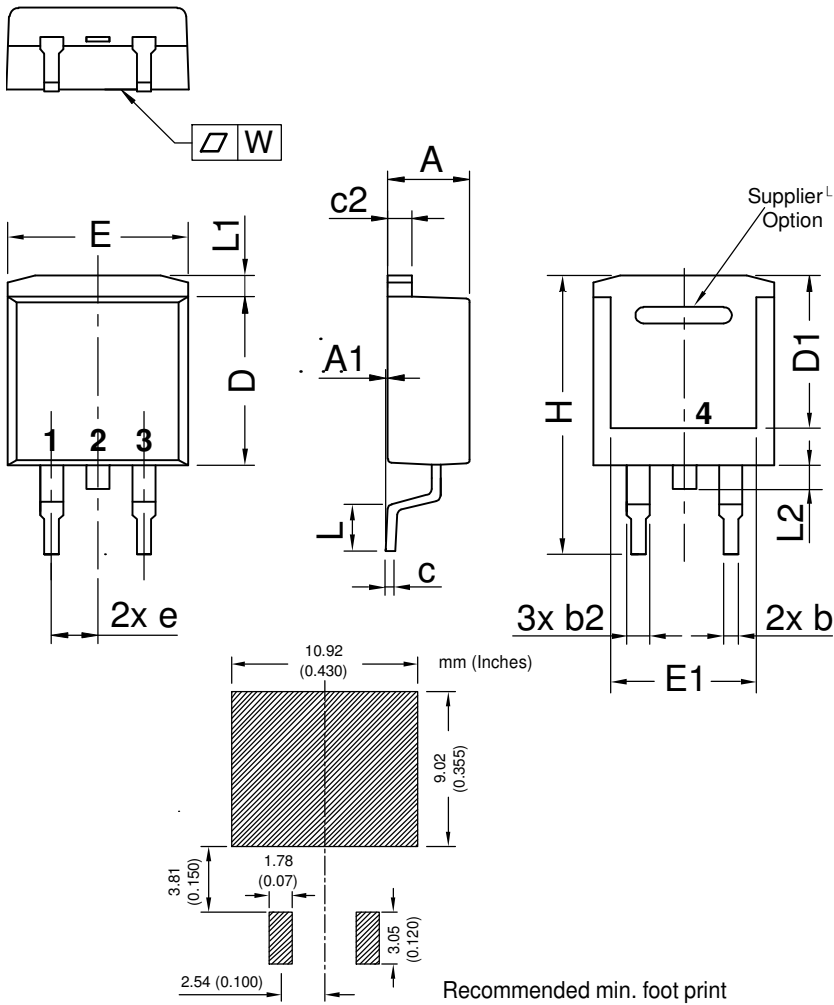
$T_{VJ} = 175\text{ °C}$



**Rectifier**

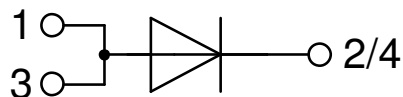
|              |                    |      |    |
|--------------|--------------------|------|----|
| $V_{0\ max}$ | threshold voltage  | 0.82 | V  |
| $R_{0\ max}$ | slope resistance * | 11   | mΩ |

## Outlines TO-263 (D2Pak)



| Dim. | Millimeter |       | Inches      |       |
|------|------------|-------|-------------|-------|
|      | min        | max   | min         | max   |
| A    | 4.06       | 4.83  | 0.160       | 0.190 |
| A1   | typ. 0.10  |       | typ. 0.004  |       |
| A2   | 2.41       |       | 0.095       |       |
| b    | 0.51       | 0.99  | 0.020       | 0.039 |
| b2   | 1.14       | 1.40  | 0.045       | 0.055 |
| c    | 0.40       | 0.74  | 0.016       | 0.029 |
| c2   | 1.14       | 1.40  | 0.045       | 0.055 |
| D    | 8.38       | 9.40  | 0.330       | 0.370 |
| D1   | 8.00       | 8.89  | 0.315       | 0.350 |
| D2   | 2.5        |       | 0.098       |       |
| E    | 9.65       | 10.41 | 0.380       | 0.410 |
| E1   | 6.22       | 8.50  | 0.245       | 0.335 |
| e    | 2,54 BSC   |       | 0,100 BSC   |       |
| e1   | 4.28       |       | 0.169       |       |
| H    | 14.61      | 15.88 | 0.575       | 0.625 |
| L    | 1.78       | 2.79  | 0.070       | 0.110 |
| L1   | 1.02       | 1.68  | 0.040       | 0.066 |
| W    | typ. 0.02  | 0.040 | typ. 0.0008 | 0.002 |

*All dimensions conform with and/or within JEDEC standard.*



## Rectifier

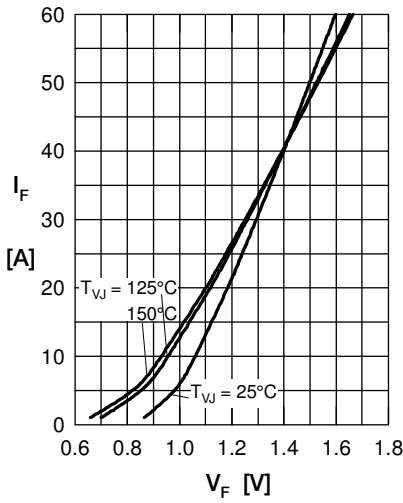


Fig. 1 Forward current versus voltage drop per diode

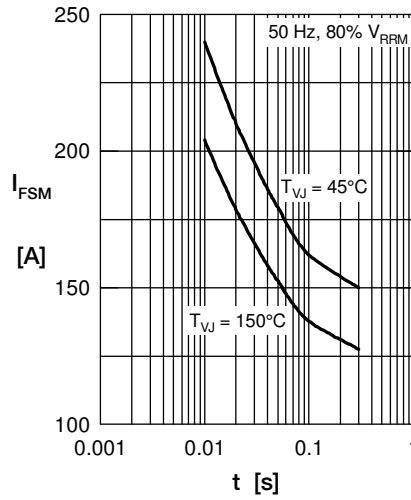


Fig. 2 Surge overload current

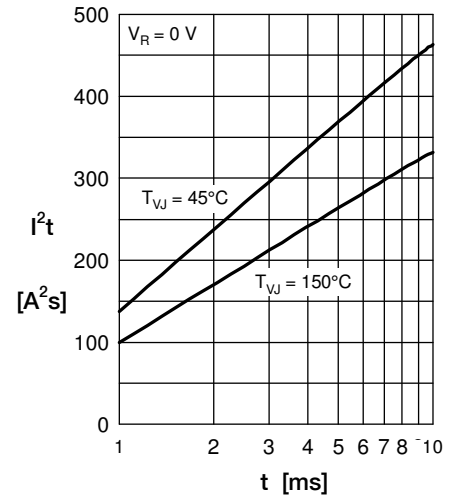


Fig. 3  $I^2t$  versus time per diode

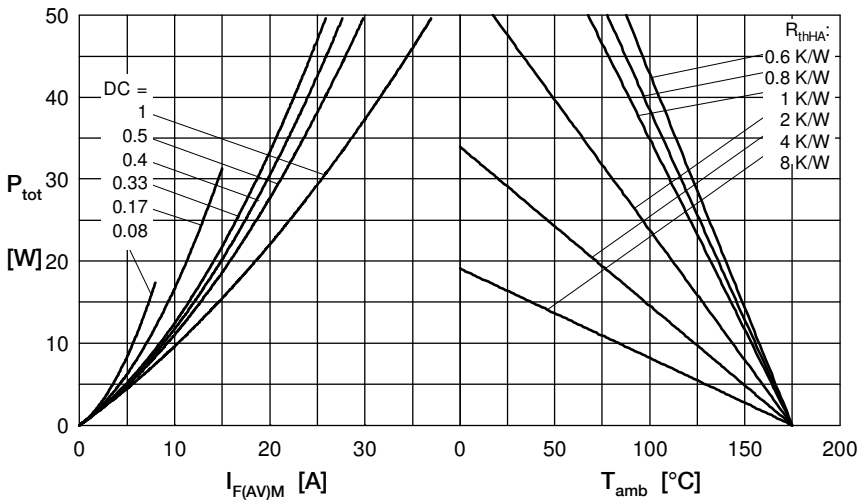


Fig. 4 Power dissipation vs. direct output current and ambient temperature

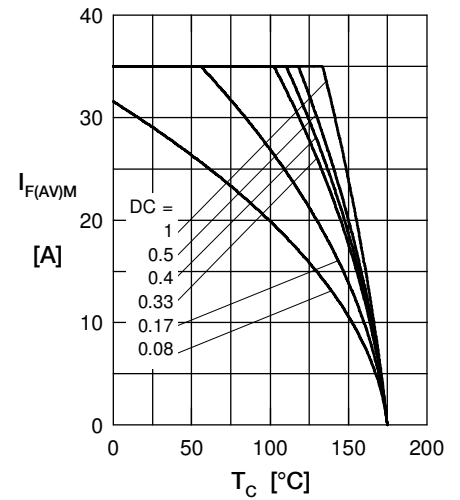


Fig. 5 Max. forward current vs. case temperature

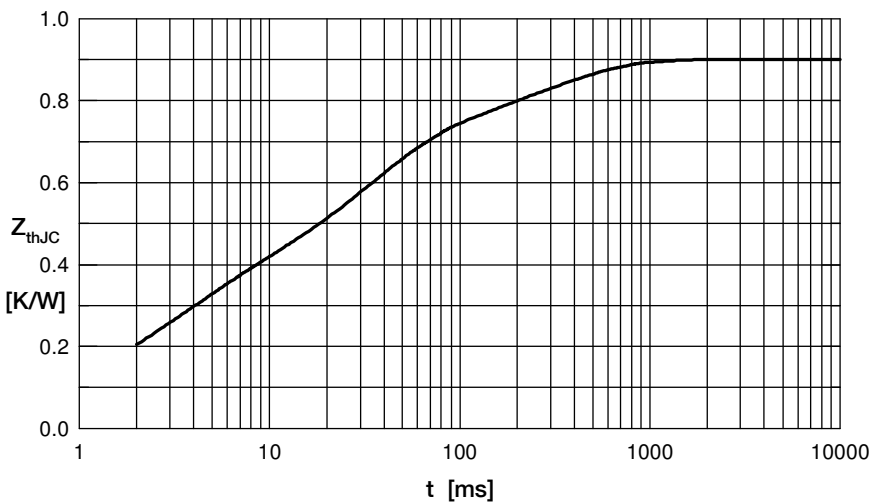


Fig. 6 Transient thermal impedance junction to case

Constants for  $Z_{thJC}$  calculation:

| i | $R_{thi}$ (K/W) | $t_i$ (s) |
|---|-----------------|-----------|
| 1 | 0.03            | 0.0004    |
| 2 | 0.08            | 0.002     |
| 3 | 0.2             | 0.003     |
| 4 | 0.39            | 0.03      |
| 5 | 0.2             | 0.29      |