

## Standard Rectifier

$$V_{RRM} = 1600V$$

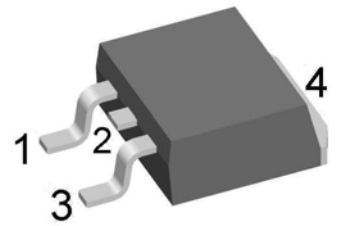
$$I_{FAV} = 30A$$

$$V_F = 1.25V$$

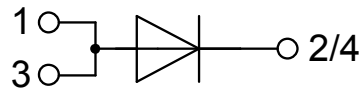
## Single Diode

Part number

DSI30-16AS



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

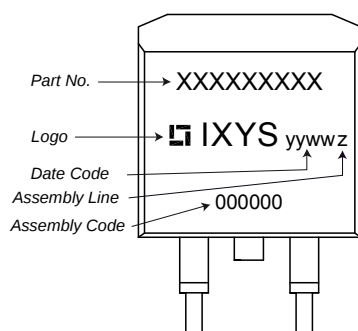
### Package: TO-263 (D2Pak)

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

| Rectifier  |                                              |                                                      |                                | Ratings                        |      |      |                  |
|------------|----------------------------------------------|------------------------------------------------------|--------------------------------|--------------------------------|------|------|------------------|
| Symbol     | Definition                                   | Conditions                                           |                                | min.                           | typ. | max. | Unit             |
| $V_{RSM}$  | max. non-repetitive reverse blocking voltage | $T_{VJ} = 25^{\circ}\text{C}$                        |                                |                                |      | 1700 | V                |
| $V_{RRM}$  | max. repetitive reverse blocking voltage     | $T_{VJ} = 25^{\circ}\text{C}$                        |                                |                                |      | 1600 | V                |
| $I_R$      | reverse current                              | $V_R = 1600\text{ V}$                                | $T_{VJ} = 25^{\circ}\text{C}$  |                                |      | 40   | $\mu\text{A}$    |
|            |                                              | $V_R = 1600\text{ V}$                                | $T_{VJ} = 150^{\circ}\text{C}$ |                                |      | 1.5  | mA               |
| $V_F$      | forward voltage drop                         | $I_F = 30\text{ A}$                                  | $T_{VJ} = 25^{\circ}\text{C}$  |                                |      | 1.29 | V                |
|            |                                              | $I_F = 60\text{ A}$                                  |                                |                                |      | 1.60 | V                |
|            |                                              | $I_F = 30\text{ A}$                                  | $T_{VJ} = 150^{\circ}\text{C}$ |                                |      | 1.25 | V                |
|            |                                              | $I_F = 60\text{ A}$                                  |                                |                                |      | 1.66 | V                |
| $I_{FAV}$  | average forward current                      | $T_C = 130^{\circ}\text{C}$<br>rectangular $d = 0.5$ | $T_{VJ} = 175^{\circ}\text{C}$ |                                |      | 30   | A                |
| $V_{FO}$   | threshold voltage                            | } for power loss calculation only                    |                                | $T_{VJ} = 175^{\circ}\text{C}$ |      | 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                   | $t = 10\text{ ms}; (50\text{ Hz}), \text{ sine}$     | $T_{VJ} = 45^{\circ}\text{C}$  |                                |      | 300  | A                |
|            |                                              | $t = 8,3\text{ ms}; (60\text{ Hz}), \text{ sine}$    | $V_R = 0\text{ V}$             |                                |      | 325  | A                |
|            |                                              | $t = 10\text{ ms}; (50\text{ Hz}), \text{ sine}$     | $T_{VJ} = 150^{\circ}\text{C}$ |                                |      | 255  | A                |
|            |                                              | $t = 8,3\text{ ms}; (60\text{ Hz}), \text{ sine}$    | $V_R = 0\text{ V}$             |                                |      | 275  | A                |
| $I^2t$     | value for fusing                             | $t = 10\text{ ms}; (50\text{ Hz}), \text{ sine}$     | $T_{VJ} = 45^{\circ}\text{C}$  |                                |      | 450  | A <sup>2</sup> s |
|            |                                              | $t = 8,3\text{ ms}; (60\text{ Hz}), \text{ sine}$    | $V_R = 0\text{ V}$             |                                |      | 440  | A <sup>2</sup> s |
|            |                                              | $t = 10\text{ ms}; (50\text{ Hz}), \text{ sine}$     | $T_{VJ} = 150^{\circ}\text{C}$ |                                |      | 325  | A <sup>2</sup> s |
|            |                                              | $t = 8,3\text{ ms}; (60\text{ Hz}), \text{ sine}$    | $V_R = 0\text{ V}$             |                                |      | 315  | A <sup>2</sup> s |
| $C_J$      | junction capacitance                         | $V_R = 400\text{ V}; f = 1\text{ MHz}$               |                                |                                | 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    |
| $T_{stg}$              | storage temperature          |                            | -55     |      | 150  | °C   |
| $T_{VJ}$               | virtual junction temperature |                            | -40     |      | 175  | °C   |
| Weight                 |                              |                            |         | 2    |      | g    |
| $F_C$                  | mounting force with clip     |                            | 20      |      | 60   | N    |

## Product Marking

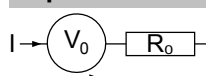


| Ordering | Part Number | Marking on Product | Delivery Mode | Quantity | Code No. |
|----------|-------------|--------------------|---------------|----------|----------|
| Standard | DSI30-16AS  | DSI30-16AS         | Tape & Reel   | 800      | 498378   |

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

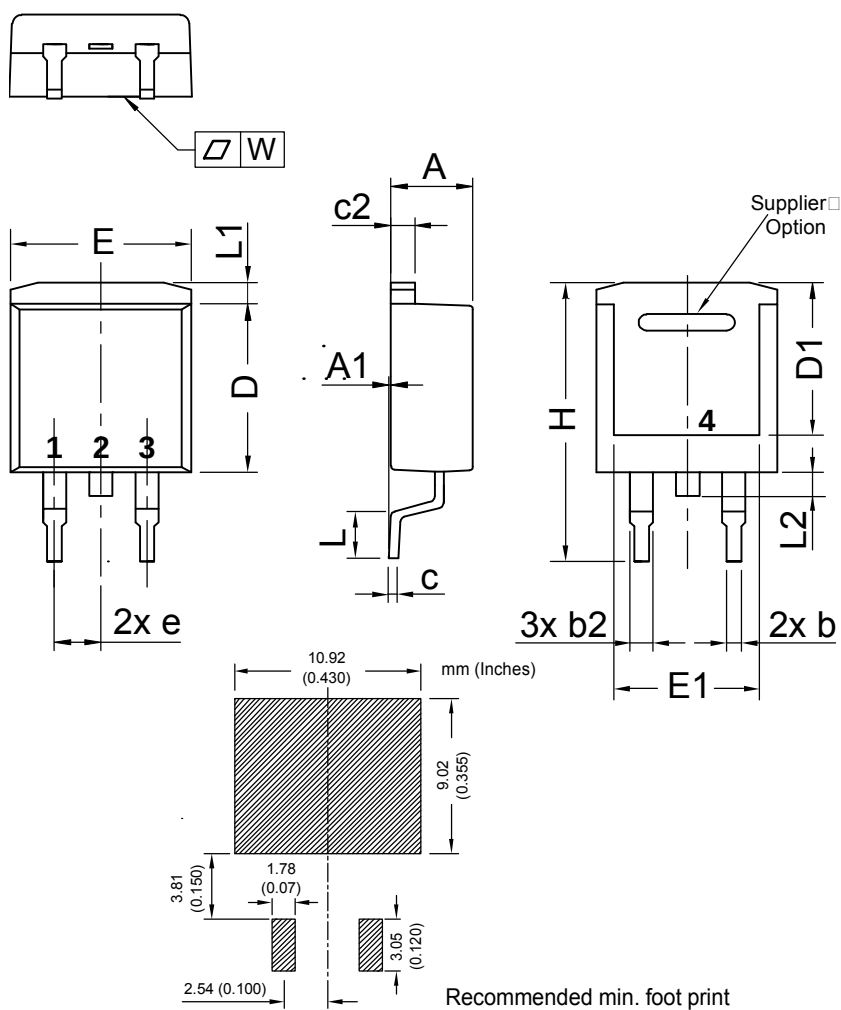
 $V_{0\max}$  threshold voltage 0.82

V

 $R_{0\max}$  slope resistance \* 11

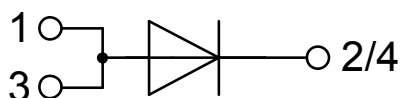
mΩ

## 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

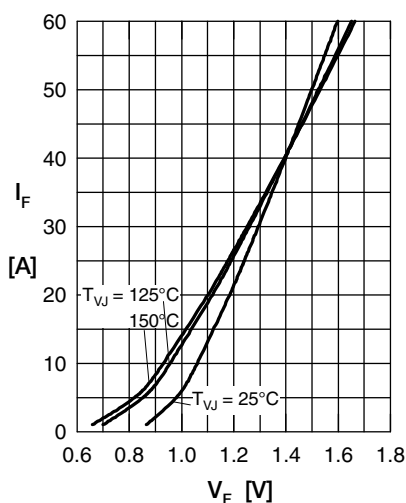


Fig. 1 Forward current versus voltage drop per diode

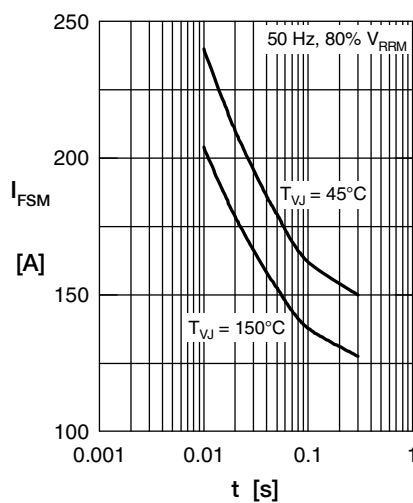


Fig. 2 Surge overload current

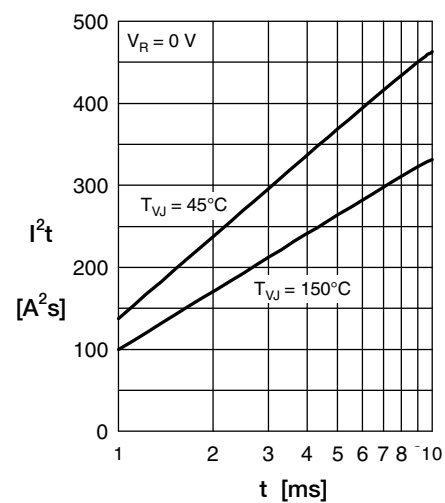


Fig. 3  $I^2t$  versus time per diode

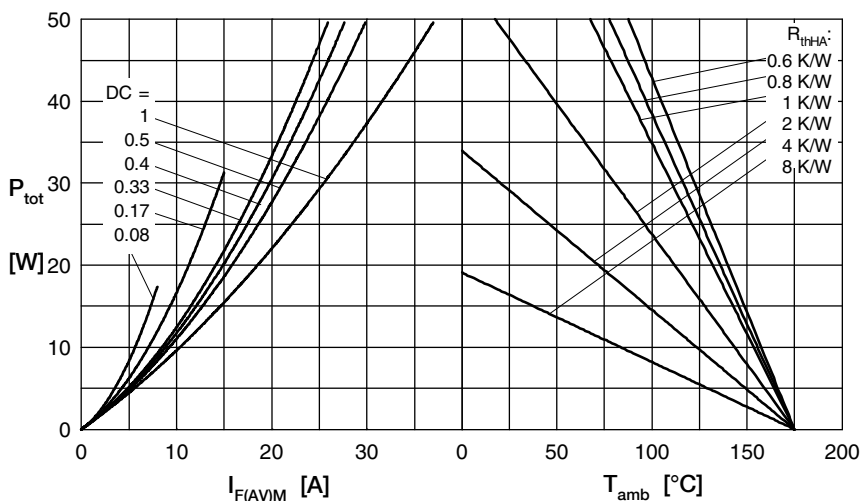


Fig. 4 Power dissipation vs. direct output current and ambient temperature

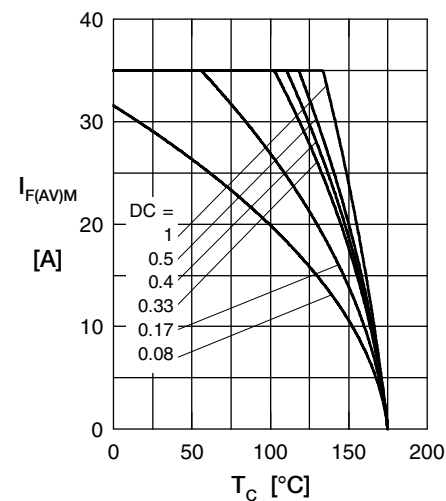


Fig. 5 Max. forward current vs. case temperature

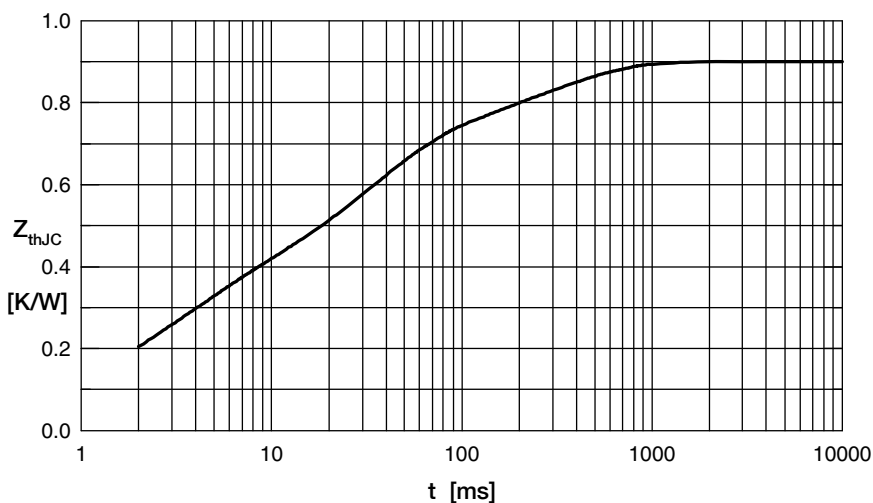


Fig. 6 Transient thermal impedance junction to case

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      |