

Schottky Diode Gen <sup>2</sup>

preliminary

$$V_{RRM} = 45V$$

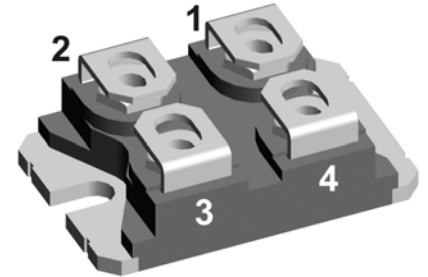
$$I_{FAV} = 300A$$

$$V_F = 0.76V$$

High Performance Schottky Diode  
Low Loss and Soft Recovery  
Single Diode

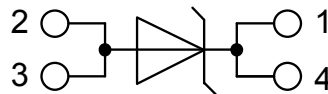
Part number

DSA300I45NA



Backside: Isolated

E72873

**Features / Advantages:**

- Very low  $V_f$
- Extremely low switching losses
- Low  $I_{rm}$  values
- Improved thermal behaviour
- High reliability circuit operation
- Low voltage peaks for reduced protection circuits
- Low noise switching

**Applications:**

- Rectifiers in switch mode power supplies (SMPS)
- Free wheeling diode in low voltage converters

**Package:** SOT-227B (minibloc)

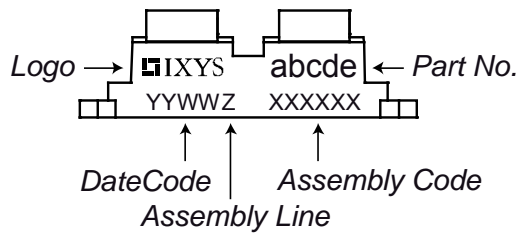
- Isolation Voltage: 3000V~
- Industry standard outline
- RoHS compliant
- Epoxy meets UL 94V-0
- Base plate: Copper internally DCB isolated
- Advanced power cycling

| Schottky   |  |  |                              | Ratings |      |      |   |
|------------|--|--|------------------------------|---------|------|------|---|
| Symbol     | Definition                                   | Conditions   | min.                         | typ.    | max. | Unit |   |
| $V_{RSM}$  | max. non-repetitive reverse blocking voltage |  |                              |         | 45   | V    |   |
| $V_{RRM}$  | max. repetitive reverse blocking voltage     |  |                              |         | 45   | V    |   |
| $I_R$      | reverse current, drain current               | $V_R = 45\text{ V}$  |                              |         | 3    | mA   |   |
|            |  | $V_R = 45\text{ V}$  |                              |         | 30   | mA   |   |
| $V_F$      | forward voltage drop                         | $I_F = 300\text{ A}$   |                              |         | 0.84 | V    |   |
|            |  | $I_F = 600\text{ A}$   |                              |         | 1.14 | V    |   |
|            |  | $I_F = 300\text{ A}$   | $T_{VJ} = 125^\circ\text{C}$ |         |      | 0.76 | V |
|            |  | $I_F = 600\text{ A}$   |                              |         |      | 1.10 | V |
| $I_{FAV}$  | average forward current                      | $T_C = 100^\circ\text{C}$<br>rectangular $d = 0.5$                 |                              |         | 300  | A    |   |
| $V_{FO}$   | threshold voltage                            | } for power loss calculation only                                  |                              |         | 0.41 | V    |   |
| $r_F$      | slope resistance                             |  |                              |         | 1.12 | mΩ   |   |
| $R_{thJC}$ | thermal resistance junction to case          |  |                              |         | 0.15 | K/W  |   |
| $R_{thCH}$ | thermal resistance case to heatsink          |  |                              | 0.10    |      | K/W  |   |
| $P_{tot}$  | total power dissipation                      |  |                              |         | 830  | W    |   |
| $I_{FSM}$  | max. forward surge current                   | $t = 10\text{ ms}; (50\text{ Hz}), \text{ sine}; V_R = 0\text{ V}$ |                              |         | 4.80 | kA   |   |
| $C_J$      | junction capacitance                         | $V_R = 5\text{ V}$ $f = 1\text{ MHz}$                              |                              |         | 16.5 | nF   |   |

| Package SOT-227B (minibloc) |  | Ratings                    |      |      |      |      |
|-----------------------------|--|----------------------------|------|------|------|------|
| Symbol                      | Definition   | Conditions                 | min. | typ. | max. | Unit |
| $I_{RMS}$                   | RMS current  | per terminal <sup>1)</sup> |      |      | 150  | A    |
| $T_{stg}$                   | storage temperature  |                            | -40  |      | 150  | °C   |
| $T_{vj}$                    | virtual junction temperature                                 |                            | -40  |      | 150  | °C   |
| <b>Weight</b>               |  |                            |      | 30   |      | g    |
| $M_D$                       | mounting torque  |                            | 1.1  |      | 1.5  | Nm   |
| $M_T$                       | terminal torque  |                            | 1.1  |      | 1.5  | Nm   |
| $d_{Spp/App}$               | creepage distance on surface   striking distance through air | terminal to terminal       | 10.5 | 3.2  |      | mm   |
| $d_{Spt/Abp}$               |  | terminal to backside       | 8.6  | 6.8  |      | mm   |
| $V_{ISOL}$                  | isolation voltage  | t = 1 second               | 3000 |      |      | V    |
|                             |  | t = 1 minute               | 2500 |      |      | V    |

<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



### Part number

- D = Diode
- S = Schottky Diode
- A = low VF
- 300 = Current Rating [A]
- I = Single Diode
- 45 = Reverse Voltage [V]
- NA = SOT-227B (minibloc)

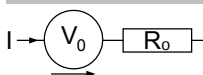
| Ordering | Part Number | Marking on Product | Delivery Mode | Quantity | Code No. |
|----------|-------------|--------------------|---------------|----------|----------|
| Standard | DSA300I45NA | DSA300I45NA        | Tube          | 10       | 511251   |

| Similar Part | Package             | Voltage class |
|--------------|---------------------|---------------|
| DSA300I100NA | SOT-227B (minibloc) | 100           |
| DSA300I200NA | SOT-227B (minibloc) | 200           |

### Equivalent Circuits for Simulation

\* on die level

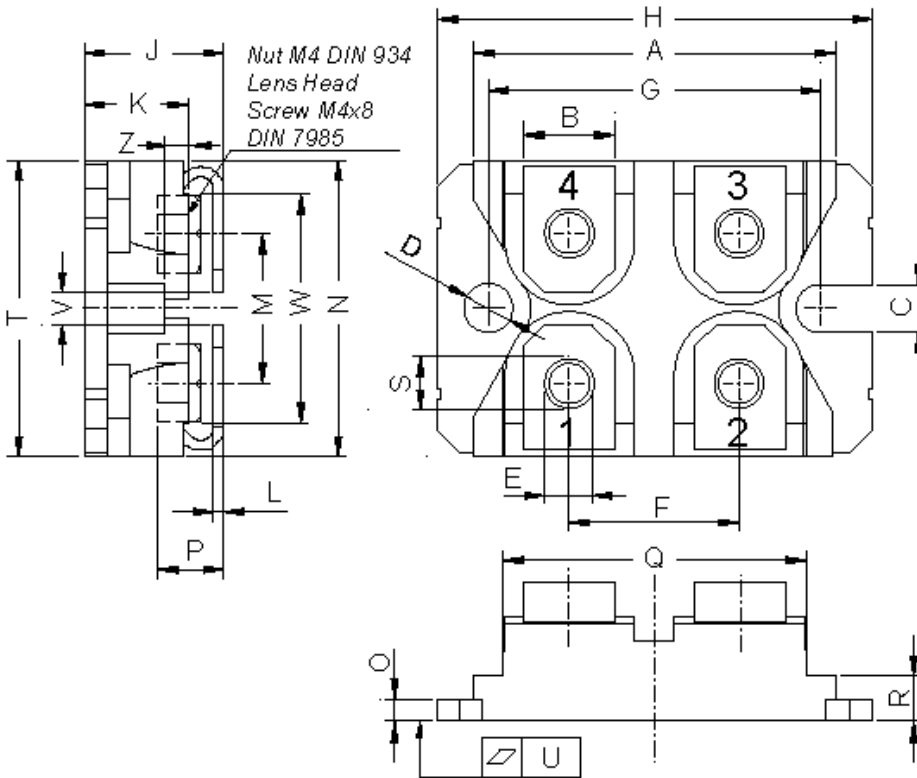
$T_{vj} = 150^{\circ}C$



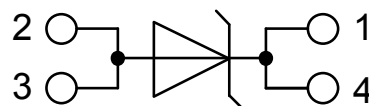
Schottky

|              |                    |      |    |
|--------------|--------------------|------|----|
| $V_{0\ max}$ | threshold voltage  | 0.41 | V  |
| $R_{0\ max}$ | slope resistance * | 0.28 | mΩ |

## Outlines SOT-227B (minibloc)



| Dim. | Millimeter |       | Inches |       |
|------|------------|-------|--------|-------|
|      | min        | max   | min    | max   |
| A    | 31.50      | 31.88 | 1.240  | 1.255 |
| B    | 7.80       | 8.20  | 0.307  | 0.323 |
| C    | 4.09       | 4.29  | 0.161  | 0.169 |
| D    | 4.09       | 4.29  | 0.161  | 0.169 |
| E    | 4.09       | 4.29  | 0.161  | 0.169 |
| F    | 14.91      | 15.11 | 0.587  | 0.595 |
| G    | 30.12      | 30.30 | 1.186  | 1.193 |
| H    | 37.80      | 38.23 | 1.488  | 1.505 |
| J    | 11.68      | 12.22 | 0.460  | 0.481 |
| K    | 8.92       | 9.60  | 0.351  | 0.378 |
| L    | 0.74       | 0.84  | 0.029  | 0.033 |
| M    | 12.50      | 13.10 | 0.492  | 0.516 |
| N    | 25.15      | 25.42 | 0.990  | 1.001 |
| O    | 1.95       | 2.13  | 0.077  | 0.084 |
| P    | 4.95       | 6.20  | 0.195  | 0.244 |
| Q    | 26.54      | 26.90 | 1.045  | 1.059 |
| R    | 3.94       | 4.42  | 0.155  | 0.167 |
| S    | 4.55       | 4.85  | 0.179  | 0.191 |
| T    | 24.59      | 25.25 | 0.968  | 0.994 |
| U    | -0.05      | 0.10  | -0.002 | 0.004 |
| V    | 3.20       | 5.50  | 0.126  | 0.217 |
| W    | 19.81      | 21.08 | 0.780  | 0.830 |
| Z    | 2.50       | 2.70  | 0.098  | 0.106 |



## Schottky

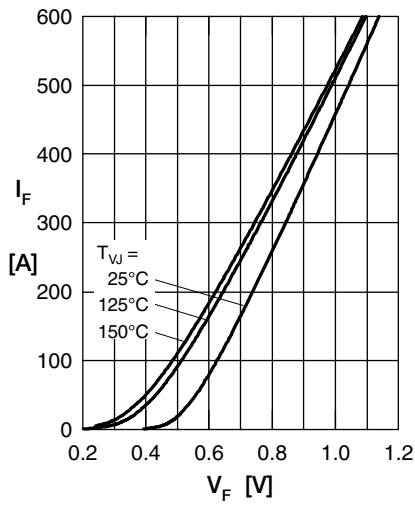


Fig. 1 Max. forward voltage drop characteristics

Fig. 2 Typ. reverse current  $I_R$  vs. reverse voltage  $V_R$

Fig. 3 Typ. junction capacitance  $C_T$  vs. reverse voltage  $V_R$

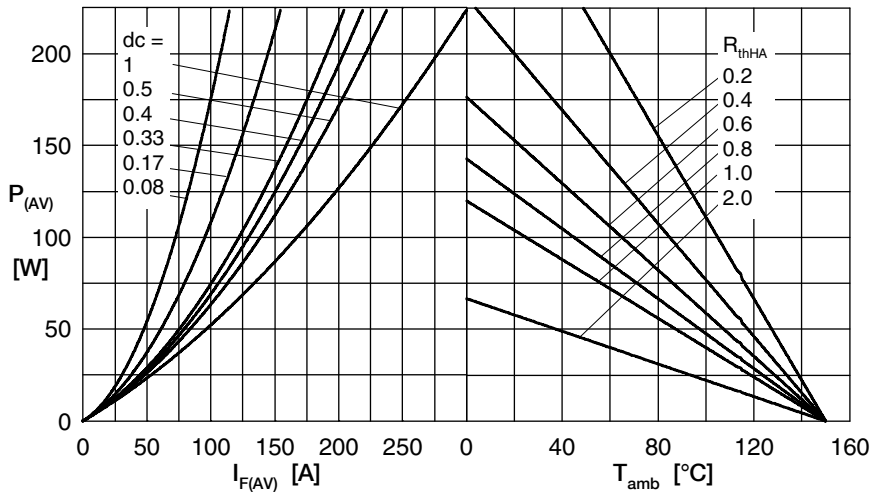


Fig. 4a Power dissipation versus direct output current  
Fig. 4b and ambient temperature

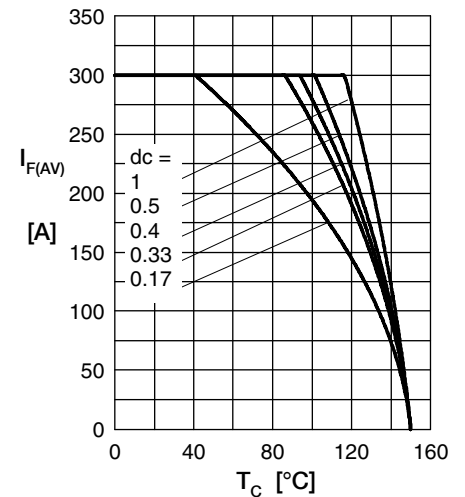


Fig. 5 Average forward current  $I_{F(AV)}$  vs. case temp.  $T_C$

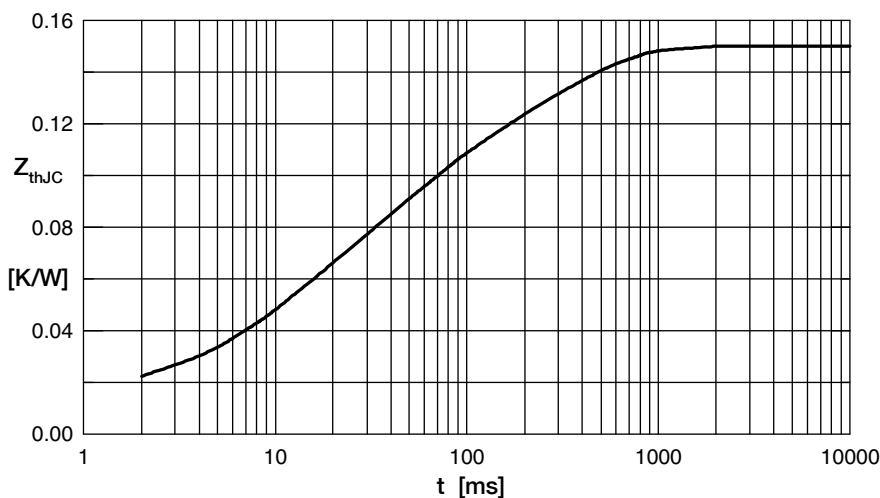


Fig. 6 Transient thermal impedance junction to case

| $R_{thi}$ [K/W] | $t_i$ [s] |
|-----------------|-----------|
| 0.017           | 0.01      |
| 0.013           | 0.00001   |
| 0.02            | 0.01      |
| 0.05            | 0.045     |
| 0.05            | 0.3       |

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