

# Schottky Diode

$$V_{RRM} = 45\text{ V}$$

$$I_{FAV} = 2 \times 40\text{ A}$$

$$V_F = 0.46\text{ V}$$

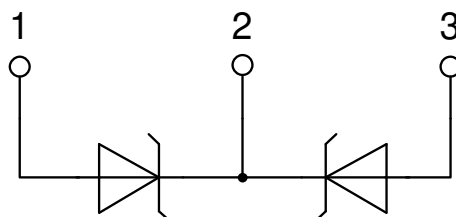
High Performance Schottky Diode  
 Low Loss and Soft Recovery  
 Common Cathode

Part number

**DSSK80-0045B**



Backside: cathode



## 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: TO-247

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

## Disclaimer Notice

Information furnished is believed to be accurate and reliable. However, users should independently evaluate the suitability of and test each product selected for their own applications. Littelfuse products are not designed for, and may not be used in, all applications. Read complete Disclaimer Notice at [www.littelfuse.com/disclaimer-electronics](http://www.littelfuse.com/disclaimer-electronics).

| Schottky   |                                              |                                                                    |                                | Ratings                        |      |      |      |
|------------|----------------------------------------------|--------------------------------------------------------------------|--------------------------------|--------------------------------|------|------|------|
| Symbol     | Definition                                   | Conditions                                                         |                                | min.                           | typ. | max. | Unit |
| $V_{RSM}$  | max. non-repetitive reverse blocking voltage | $T_{VJ} = 25^{\circ}\text{C}$                                      |                                |                                |      | 45   | V    |
| $V_{RRM}$  | max. repetitive reverse blocking voltage     | $T_{VJ} = 25^{\circ}\text{C}$                                      |                                |                                |      | 45   | V    |
| $I_R$      | reverse current, drain current               | $V_R = 45\text{ V}$                                                | $T_{VJ} = 25^{\circ}\text{C}$  |                                |      | 20   | mA   |
|            |                                              | $V_R = 45\text{ V}$                                                | $T_{VJ} = 100^{\circ}\text{C}$ |                                |      | 250  | mA   |
| $V_F$      | forward voltage drop                         | $I_F = 40\text{ A}$                                                | $T_{VJ} = 25^{\circ}\text{C}$  |                                |      | 0.51 | V    |
|            |                                              | $I_F = 80\text{ A}$                                                |                                |                                |      | 0.69 | V    |
|            |                                              | $I_F = 40\text{ A}$                                                | $T_{VJ} = 125^{\circ}\text{C}$ |                                |      | 0.46 | V    |
|            |                                              | $I_F = 80\text{ A}$                                                |                                |                                |      | 0.68 | V    |
| $I_{FAV}$  | average forward current                      | $T_C = 125^{\circ}\text{C}$<br>rectangular $d = 0.5$               | $T_{VJ} = 150^{\circ}\text{C}$ |                                |      | 40   | A    |
| $V_{F0}$   | threshold voltage                            | } for power loss calculation only                                  |                                | $T_{VJ} = 150^{\circ}\text{C}$ |      | 0.23 | V    |
| $r_F$      | slope resistance                             |                                                                    |                                |                                |      | 5.3  | mΩ   |
| $R_{thJC}$ | thermal resistance junction to case          |                                                                    |                                |                                |      | 0.8  | K/W  |
| $R_{thCH}$ | thermal resistance case to heatsink          |                                                                    |                                |                                | 0.25 |      | K/W  |
| $P_{tot}$  | total power dissipation                      | $T_C = 25^{\circ}\text{C}$                                         |                                |                                |      | 155  | W    |
| $I_{FSM}$  | max. forward surge current                   | $t = 10\text{ ms}; (50\text{ Hz}), \text{ sine}; V_R = 0\text{ V}$ | $T_{VJ} = 45^{\circ}\text{C}$  |                                |      | 750  | A    |
| $C_J$      | junction capacitance                         | $V_R = 5\text{ V}$ $f = 1\text{ MHz}$                              | $T_{VJ} = 25^{\circ}\text{C}$  |                                | 2.93 |      | nF   |
| $E_{AS}$   | non-repetitive avalanche energy              | $I_{AS} = 31\text{ A}$ $L = 180\text{ }\mu\text{H}$                | $T_{VJ} = 25^{\circ}\text{C}$  |                                |      | 137  | mJ   |
| $I_{AR}$   | repetitive avalanche current                 | $V_A = 1.5 \cdot V_R$ typ. $f = 10\text{ kHz}$                     |                                |                                |      | 3.1  | A    |

| Package TO-247 |                              |                           | Ratings |      |      |      |
|----------------|------------------------------|---------------------------|---------|------|------|------|
| Symbol         | Definition                   | Conditions                | min.    | typ. | max. | Unit |
| $I_{RMS}$      | RMS current                  | per terminal <sup>n</sup> |         |      | 70   | A    |
| $T_{VJ}$       | virtual junction temperature |                           | -55     |      | 150  | °C   |
| $T_{op}$       | operation temperature        |                           | -55     |      | 125  | °C   |
| $T_{stg}$      | storage temperature          |                           | -55     |      | 150  | °C   |
| Weight         |                              |                           |         | 6    |      | g    |
| $M_D$          | mounting torque              |                           | 0.8     |      | 1.2  | Nm   |
| $F_C$          | mounting force with clip     |                           | 20      |      | 120  | N    |

### Product Marking



| Ordering | Ordering Number | Marking on Product | Delivery Mode | Quantity | Code No. |
|----------|-----------------|--------------------|---------------|----------|----------|
| Standard | DSSK80-0045B    | DSSK80-0045B       | Tube          | 30       | 475580   |

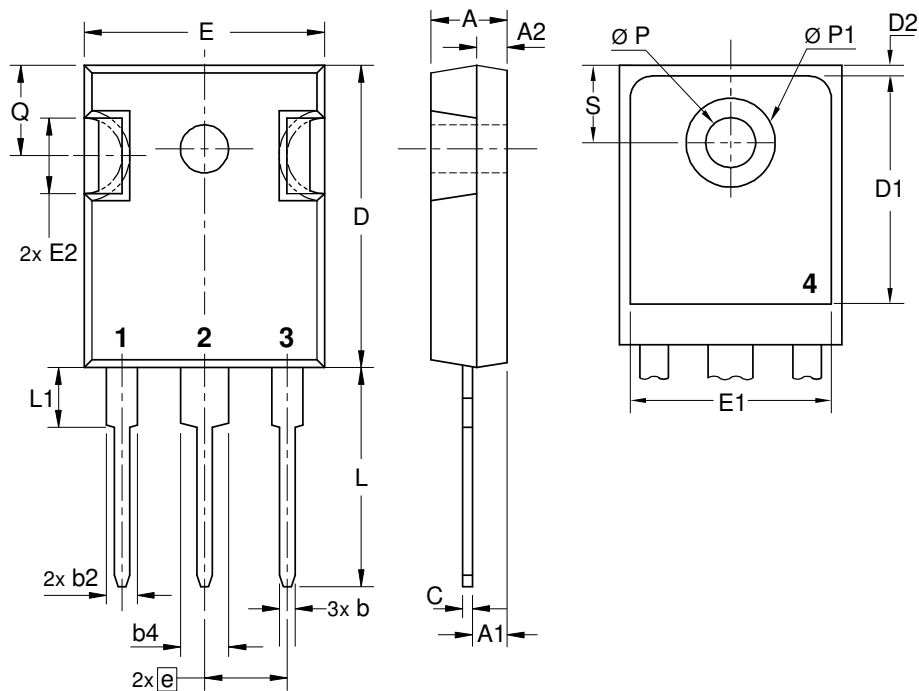
| Similar Part | Package      | Voltage class |
|--------------|--------------|---------------|
| DSB80C45HB   | TO-247AD (3) | 45            |

### Equivalent Circuits for Simulation

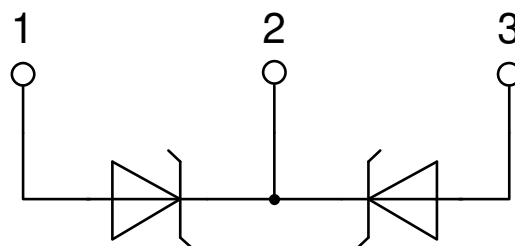
\* on die level

$T_{VJ} = 150^{\circ}\text{C}$

|                                                                                     |                    |                 |    |
|-------------------------------------------------------------------------------------|--------------------|-----------------|----|
|  |                    | <b>Schottky</b> |    |
| $V_{0\max}$                                                                         | threshold voltage  | 0.23            | V  |
| $R_{0\max}$                                                                         | slope resistance * | 2.8             | mΩ |

**Outlines TO-247**


| Sym. | Inches |       | Millimeter |       |
|------|--------|-------|------------|-------|
|      | min.   | max.  | min.       | max.  |
| A    | 0.185  | 0.209 | 4.70       | 5.30  |
| A1   | 0.087  | 0.102 | 2.21       | 2.59  |
| A2   | 0.059  | 0.098 | 1.50       | 2.49  |
| D    | 0.819  | 0.845 | 20.79      | 21.45 |
| E    | 0.610  | 0.640 | 15.48      | 16.24 |
| E2   | 0.170  | 0.216 | 4.31       | 5.48  |
| e    | 0.215  | BSC   | 5.46       | BSC   |
| L    | 0.780  | 0.800 | 19.80      | 20.30 |
| L1   | -      | 0.177 | -          | 4.49  |
| Ø P  | 0.140  | 0.144 | 3.55       | 3.65  |
| Q    | 0.212  | 0.244 | 5.38       | 6.19  |
| S    | 0.242  | BSC   | 6.14       | BSC   |
| b    | 0.039  | 0.055 | 0.99       | 1.40  |
| b2   | 0.065  | 0.094 | 1.65       | 2.39  |
| b4   | 0.102  | 0.135 | 2.59       | 3.43  |
| c    | 0.015  | 0.035 | 0.38       | 0.89  |
| D1   | 0.515  | -     | 13.07      | -     |
| D2   | 0.020  | 0.053 | 0.51       | 1.35  |
| E1   | 0.530  | -     | 13.45      | -     |
| Ø P1 | -      | 0.29  | -          | 7.39  |



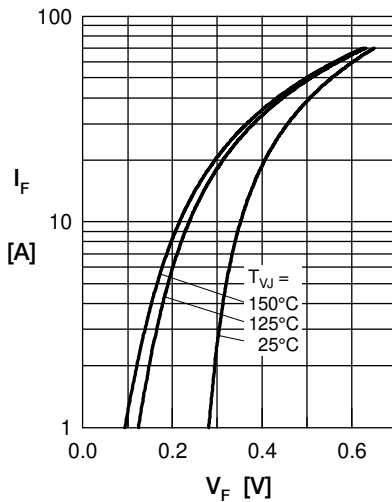
**Schottky**


Fig. 1 Max. forward voltage drop characteristics

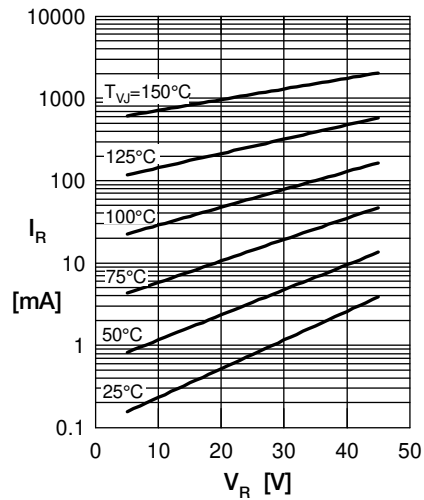


Fig. 2 Typ. reverse current  $I_R$  vs. reverse voltage  $V_R$

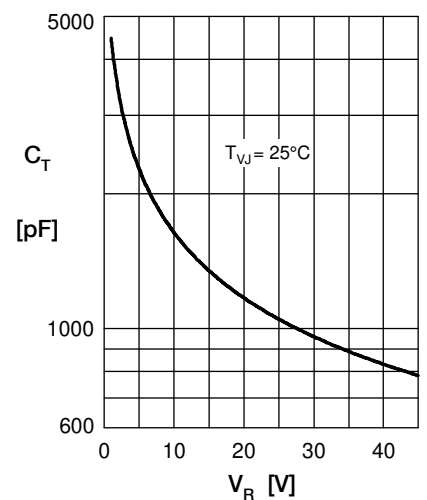


Fig. 3 Typ. junction capacitance  $C_T$  vs. reverse voltage  $V_R$

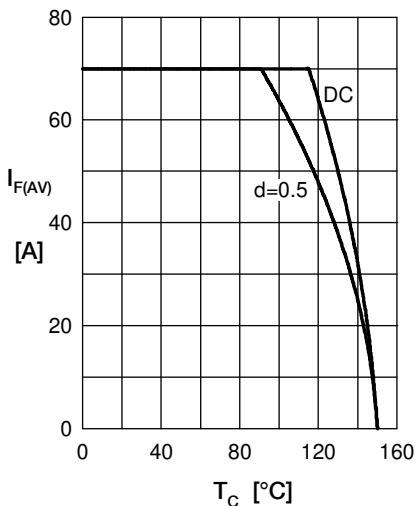


Fig. 4 Average forward current  $I_{F(AV)}$  vs. case temp.  $T_C$

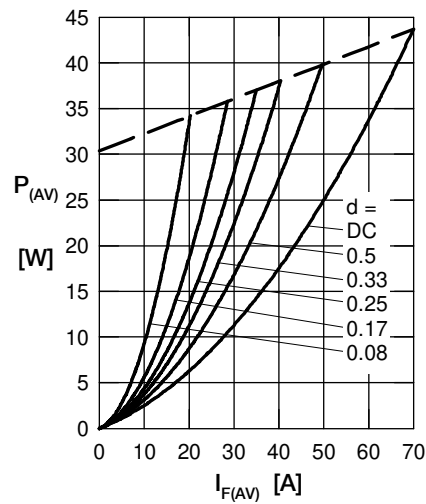


Fig. 5 Forward power loss characteristics

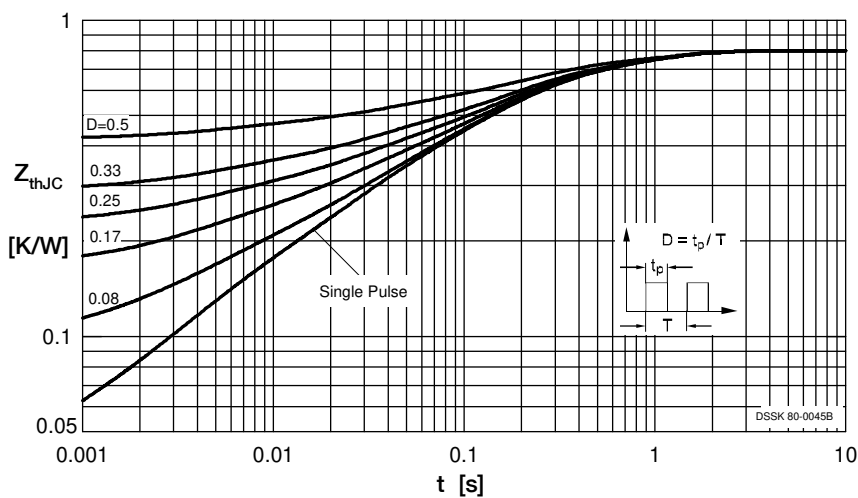


Fig. 6 Transient thermal impedance junction to case at various duty cycles

Note: All curves are per diode