

# Schottky Diode

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

$$I_{FAV} = 2 \times 30 \text{ A}$$

$$V_F = 0.58 \text{ V}$$

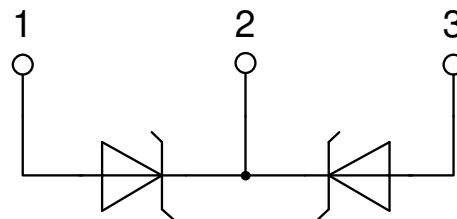
High Performance Schottky Diode  
 Low Loss and Soft Recovery  
 Common Cathode

Part number

**DSSK60-0045A**



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

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| 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               | $V_R = 45\text{ V}$  | $T_{VJ} = 25^\circ\text{C}$  |                          |      | 1    | mA   |
|            |  | $V_R = 45\text{ V}$  | $T_{VJ} = 125^\circ\text{C}$ |                          |      | 10   | mA   |
| $V_F$      | forward voltage drop                         | $I_F = 30\text{ A}$  | $T_{VJ} = 25^\circ\text{C}$  |                          |      | 0.70 | V    |
|            |  | $I_F = 60\text{ A}$  |                              |                          |      | 0.83 | V    |
|            |  | $I_F = 30\text{ A}$  | $T_{VJ} = 125^\circ\text{C}$ |                          |      | 0.58 | V    |
|            |  | $I_F = 60\text{ A}$  |                              |                          |      | 0.73 | V    |
| $I_{FAV}$  | average forward current                      | $T_C = 150^\circ\text{C}$<br>rectangular $d = 0.5$                 | $T_{VJ} = 175^\circ\text{C}$ |                          |      | 30   | A    |
| $V_{FO}$   | threshold voltage                            | } for power loss calculation only                                  |                              |                          |      | 0.37 | V    |
| $r_F$      | slope resistance                             |  |                              |                          |      | 4.9  | mΩ   |
| $R_{thJC}$ | thermal resistance junction to case          |  |                              |                          |      | 1.1  | K/W  |
| $R_{thCH}$ | thermal resistance case to heatsink          |  |                              |                          | 0.25 |      | K/W  |
| $P_{tot}$  | total power dissipation                      |  |                              | $T_C = 25^\circ\text{C}$ |      | 135  | W    |
| $I_{FSM}$  | max. forward surge current                   | $t = 10\text{ ms}; (50\text{ Hz}), \text{ sine}; V_R = 0\text{ V}$ | $T_{VJ} = 45^\circ\text{C}$  |                          |      | 500  | A    |
| $C_J$      | junction capacitance                         | $V_R = 5\text{ V}$ $f = 1\text{ MHz}$                              | $T_{VJ} = 25^\circ\text{C}$  |                          | 1.94 |      | nF   |
| $E_{AS}$   | non-repetitive avalanche energy              | $I_{AS} = 18\text{ A}$ $L = 180\text{ }\mu\text{H}$                | $T_{VJ} = 25^\circ\text{C}$  |                          |      | 46   | mJ   |
| $I_{AR}$   | repetitive avalanche current                 | $V_A = 1.5 \cdot V_R$ typ. $f = 10\text{ kHz}$                     |                              |                          |      | 1.8  | A    |



| Package TO-247 |                              |                            | Ratings |      |      |      |
|----------------|------------------------------|----------------------------|---------|------|------|------|
| Symbol         | Definition                   | Conditions                 | min.    | typ. | max. | Unit |
| $I_{RMS}$      | RMS current                  | per terminal <sup>1)</sup> |         |      | 70   | A    |
| $T_{VJ}$       | virtual junction temperature |                            | -55     |      | 175  | °C   |
| $T_{op}$       | operation temperature        |                            | -55     |      | 150  | °C   |
| $T_{stg}$      | storage temperature          |                            | -55     |      | 150  | °C   |
| <b>Weight</b>  |                              |                            |         | 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 | DSSK60-0045A    | DSSK60-0045A       | Tube          | 30       | 502510   |

**Equivalent Circuits for Simulation**

*\* on die level*

$T_{VJ} = 175^{\circ}C$



**Schottky**

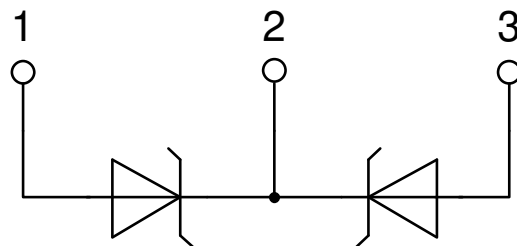
|              |                    |      |    |
|--------------|--------------------|------|----|
| $V_{0\ max}$ | threshold voltage  | 0.37 | V  |
| $R_{0\ max}$ | slope resistance * | 2.4  | mΩ |



**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     |       | 5.38       |       |
| 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**

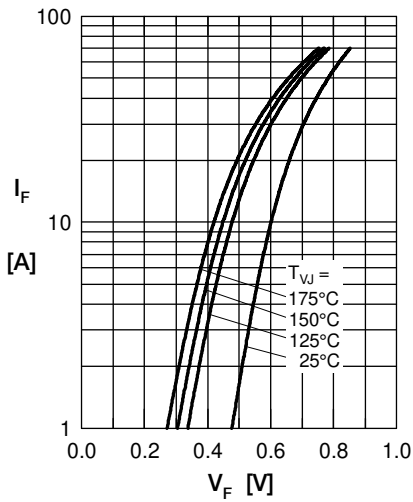


Fig. 1 Max. forward voltage drop characteristics

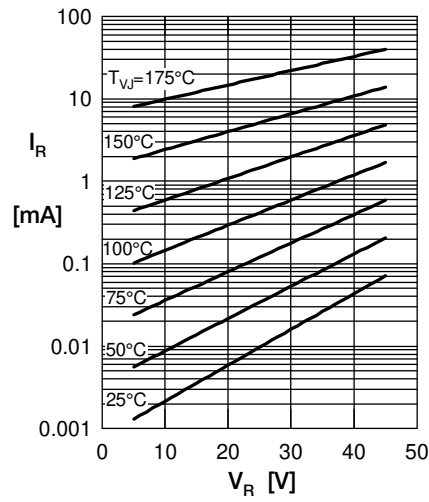


Fig. 2 Typ. reverse current  $I_R$  vs. reverse voltage  $V_R$

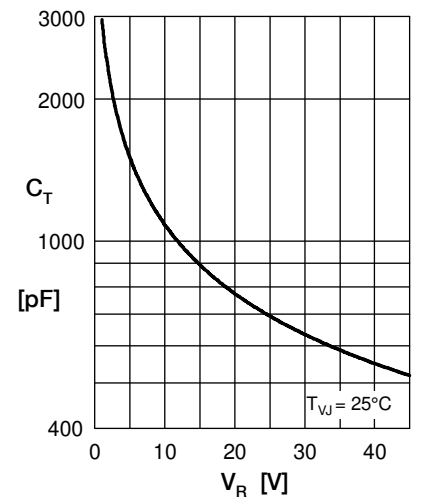


Fig. 3 Typ. junction capacitance  $C_T$  vs. reverse voltage  $V_R$

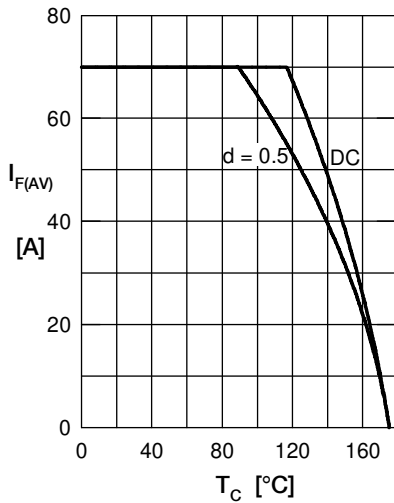


Fig. 4 Average forward current  $I_{F(AV)}$  vs. case temp.  $T_C$

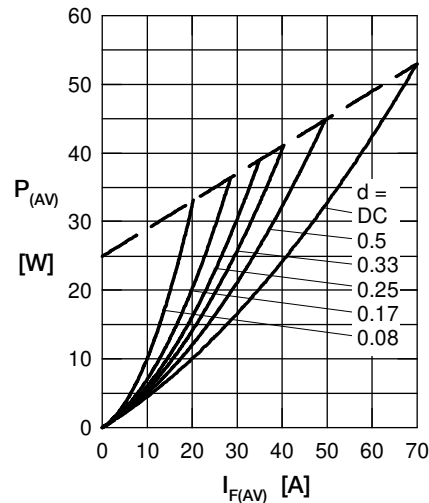


Fig. 5 Forward power loss characteristics

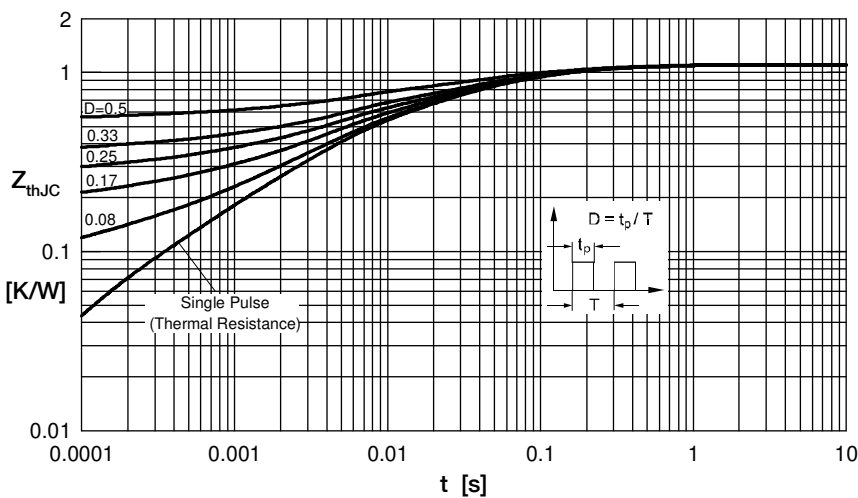


Fig. 6 Transient thermal impedance junction to case at various duty cycles

Note: All curves are per diode