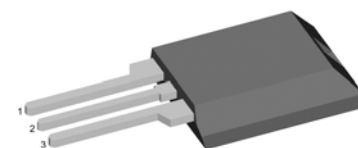
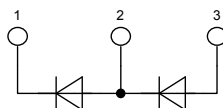


# HiPerFRED

High Performance Fast Recovery Diode  
Low Loss and Soft Recovery  
Phase leg

Part number

DSEE29-12CC



Backside: isolated

**E72873**

## Features / Advantages:

- Planar passivated chips
- Very low leakage current
- Very short recovery time
- Improved thermal behaviour
- Very low  $I_{rm}$ -values
- Very soft recovery behaviour
- Avalanche voltage rated for reliable operation
- Soft reverse recovery for low EMI/RFI
- Low  $I_{rm}$  reduces:
  - Power dissipation within the diode
  - Turn-on loss in the commutating switch

## Applications:

- Antiparallel diode for high frequency switching devices
- Antisaturation diode
- Snubber diode
- Free wheeling diode
- Rectifiers in switch mode power supplies (SMPS)
- Uninterruptible power supplies (UPS)

## Package:

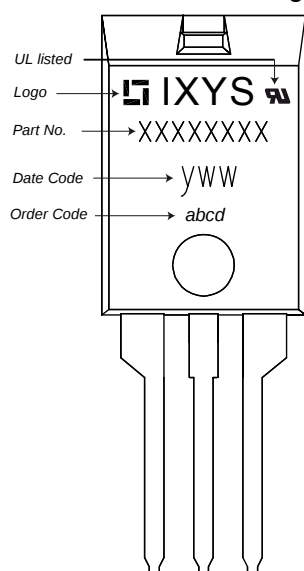
- Housing: ISOPLUS220
- Industry standard outline
- DCB isolated backside
- Isolation Voltage 3000 V
- Epoxy meets UL 94V-0
- RoHS compliant

## Ratings

| Symbol     | Definition                          | Conditions                                                                | min. | typ. | max. | Unit               |
|------------|-------------------------------------|---------------------------------------------------------------------------|------|------|------|--------------------|
| $V_{RRM}$  | max. repetitive reverse voltage     | $T_{VJ} = 25^{\circ}\text{C}$                                             |      |      | 600  | V                  |
| $I_R$      | reverse current                     | $V_R = 600\text{ V}$<br>$T_{VJ} = 25^{\circ}\text{C}$                     |      |      | 500  | $\mu\text{A}$      |
|            |                                     | $V_R = 600\text{ V}$<br>$T_{VJ} = 150^{\circ}\text{C}$                    |      |      | 1    | mA                 |
| $V_F$      | forward voltage                     | $I_F = 30\text{ A}$<br>$T_{VJ} = 25^{\circ}\text{C}$                      |      |      | 1.62 | V                  |
|            |                                     | $I_F = 60\text{ A}$                                                       |      |      | 1.95 | V                  |
|            |                                     | $I_F = 30\text{ A}$<br>$T_{VJ} = 150^{\circ}\text{C}$                     |      |      | 1.27 | V                  |
|            |                                     | $I_F = 60\text{ A}$                                                       |      |      | 1.58 | V                  |
| $I_{FAV}$  | average forward current             | rectangular $d = 0.5$<br>$T_C = 130^{\circ}\text{C}$                      |      |      | 30   | A                  |
| $V_{F0}$   | threshold voltage                   | $T_{VJ} = 175^{\circ}\text{C}$<br>for power loss calculation only         |      |      | 1.00 | V                  |
| $r_F$      | slope resistance                    |                                                                           |      |      | 10   | m $\Omega$         |
| $R_{thJC}$ | thermal resistance junction to case |                                                                           |      |      | 0.90 | K/W                |
| $T_{VJ}$   | virtual junction temperature        |                                                                           | -55  |      | 175  | $^{\circ}\text{C}$ |
| $P_{tot}$  | total power dissipation             | $T_C = 25^{\circ}\text{C}$                                                |      |      | 165  | W                  |
| $I_{FSM}$  | max. forward surge current          | $t = 10\text{ ms}$ (50 Hz), sine<br>$T_{VJ} = 45^{\circ}\text{C}$         |      |      | 200  | A                  |
| $I_{RM}$   | max. reverse recovery current       | $T_{VJ} = 25^{\circ}\text{C}$                                             |      | 17   |      | A                  |
|            |                                     | $I_F = 30\text{ A}; V_R = 300\text{ V}$<br>$T_{VJ} = 100^{\circ}\text{C}$ |      | 29   |      | A                  |
| $t_{rr}$   | reverse recovery time               | $-di_F/dt = 600\text{ A}/\mu\text{s}$<br>$T_{VJ} = 25^{\circ}\text{C}$    |      | 35   |      | ns                 |
|            |                                     | $T_{VJ} = 100^{\circ}\text{C}$                                            |      | 90   |      | ns                 |
| $C_J$      | junction capacitance                | $V_R = 400\text{ V}; f = 1\text{ MHz}$<br>$T_{VJ} = 25^{\circ}\text{C}$   |      | 26   |      | pF                 |

| Symbol        | Definition                                            | Conditions           | Ratings |      |      | Unit |
|---------------|-------------------------------------------------------|----------------------|---------|------|------|------|
|               |                                                       |                      | min.    | typ. | max. |      |
| $I_{RMS}$     | RMS current                                           | per terminal         |         |      | 35   | A    |
| $R_{thCH}$    | thermal resistance case to heatsink                   |                      |         | 0.50 |      | K/W  |
| $T_{stg}$     | storage temperature                                   |                      | -55     |      | 150  | °C   |
| <b>Weight</b> |                                                       |                      |         | 2    |      | g    |
| $F_c$         | mounting force with clip                              |                      | 20      |      | 60   | N    |
| $V_{ISOL}$    | isolation voltage                                     | t = 1 second         | 3600    |      |      | V    |
|               |                                                       | t = 1 minute         | 3000    |      |      | V    |
| $d_{Spp/App}$ | creepage   striking distance on surface   through air | terminal to terminal | 1.0     |      |      | mm   |
| $d_{Spb/Apb}$ | creepage   striking distance on surface   through air | terminal to backside | 3.0     |      |      | mm   |

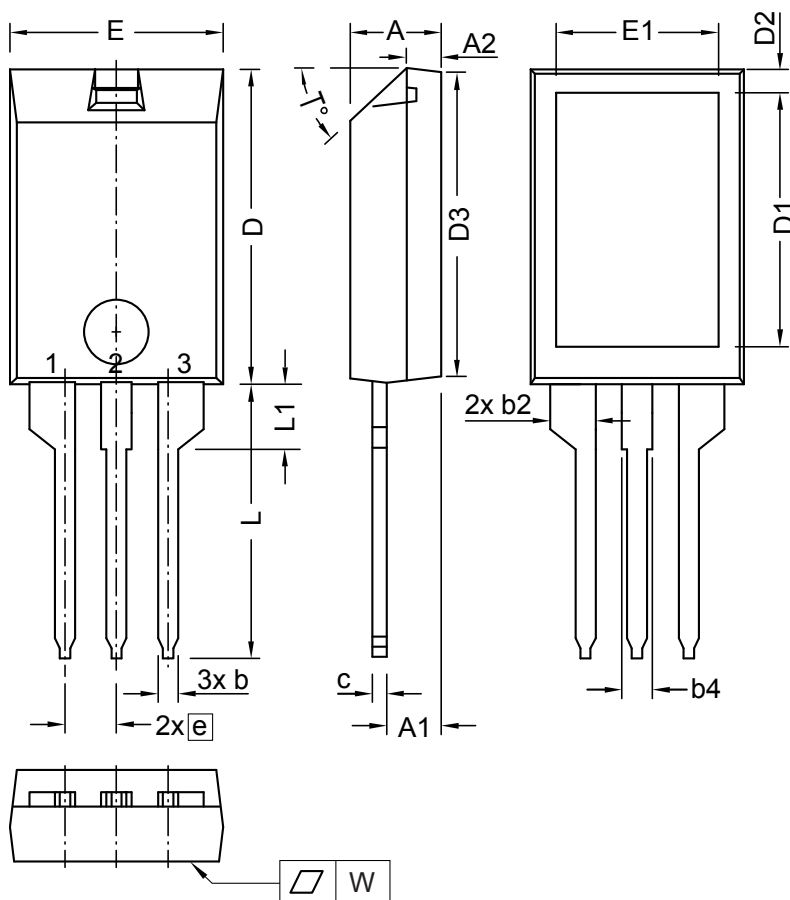
## Product Marking



| Ordering | Part Name   | Marking on Product | Delivering Mode | Base Qty | Code Key |
|----------|-------------|--------------------|-----------------|----------|----------|
| Standard | DSEE29-12CC | DSEE29-12CC        | Tube            | 50       | 500694   |

| Similar Part | Package      | Voltage Class |
|--------------|--------------|---------------|
| DSEE30-12A   | TO-247AD (3) | 600           |

## Outlines ISOPLUS220



| Dim. | Millimeters |       | Inches    |       |
|------|-------------|-------|-----------|-------|
|      | min         | max   | min       | max   |
| A    | 4.00        | 5.00  | 0.157     | 0.197 |
| A1   | 2.50        | 3.00  | 0.098     | 0.118 |
| A2   | 1.60        | 1.80  | 0.063     | 0.071 |
| b    | 0.90        | 1.30  | 0.035     | 0.051 |
| b2   | 2.35        | 2.55  | 0.093     | 0.100 |
| b4   | 1.25        | 1.65  | 0.049     | 0.065 |
| c    | 0.70        | 1.00  | 0.028     | 0.039 |
| D    | 15.00       | 16.00 | 0.591     | 0.630 |
| D1   | 12.00       | 13.00 | 0.472     | 0.512 |
| D2   | 1.10        | 1.50  | 0.043     | 0.059 |
| D3   | 14.90       | 15.50 | 0.587     | 0.610 |
| E    | 10.00       | 11.00 | 0.394     | 0.433 |
| E1   | 7.50        | 8.50  | 0.295     | 0.335 |
| e    | 2.54 BSC    |       | 0.100 BSC |       |
| L    | 13.00       | 14.50 | 0.512     | 0.571 |
| L1   | 3.00        | 3.50  | 0.118     | 0.138 |
| T°   | 42.5        | 47.5  |           |       |
| W    | -           | 0.1   | -         | 0.004 |

Die konvexe Form des Substrates ist typ. < 0.04 mm über der Kunststoffoberfläche der Bauteilunterseite  
The convex bow of substrate is typ. < 0.04 mm over plastic surface level of device bottom side

Die Gehäuseabmessungen entsprechen dem Typ TO-273 gemäß JEDEC außer D und D1.  
This drawing will meet all dimensions requirement of JEDEC outline TO-273 except D and D1.

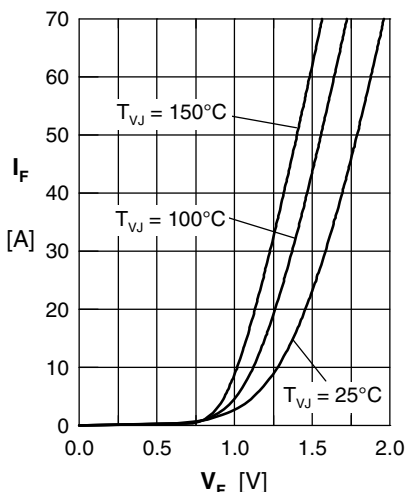


Fig. 1 Forward current  $I_F$  vs.  $V_F$

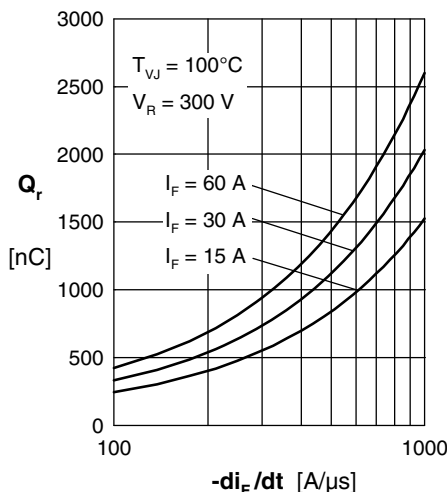


Fig. 2 Typ. reverse recovery charge  $Q_r$  versus  $-di_F/dt$

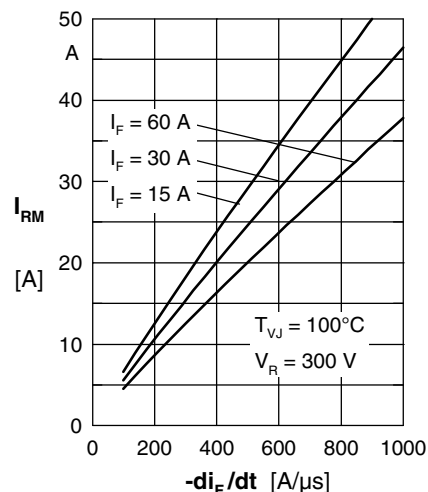


Fig. 3 Typ. peak reverse current  $I_{RM}$  versus  $-di_F/dt$

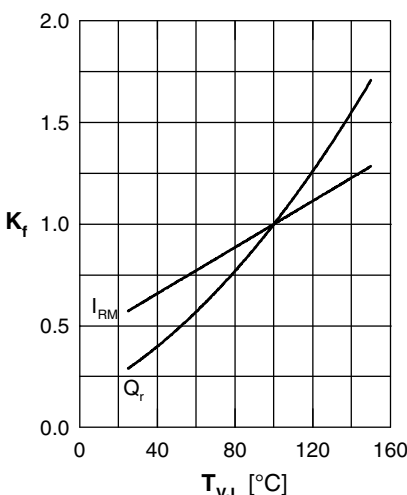


Fig. 4 Dynamic parameters  $Q_r$ ,  $I_{RM}$  versus  $T_{VJ}$

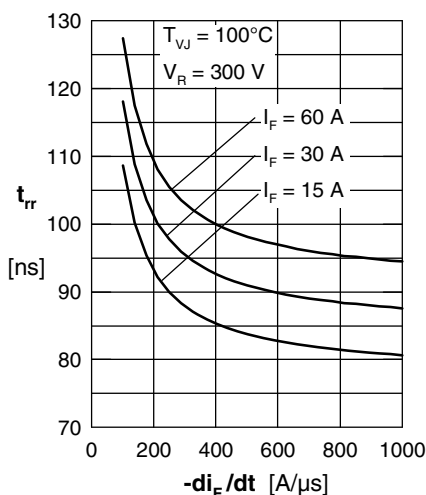


Fig. 5 Typ. recovery time  $t_{rr}$  versus  $-di_F/dt$

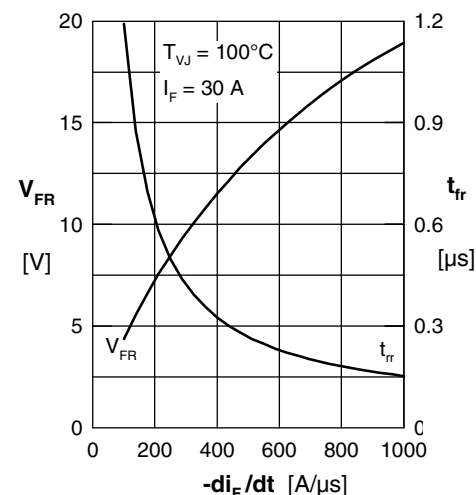


Fig. 6 Typ. peak forward voltage  $V_{FR}$  and typ. forward recovery time  $t_{fr}$  versus  $di_F/dt$

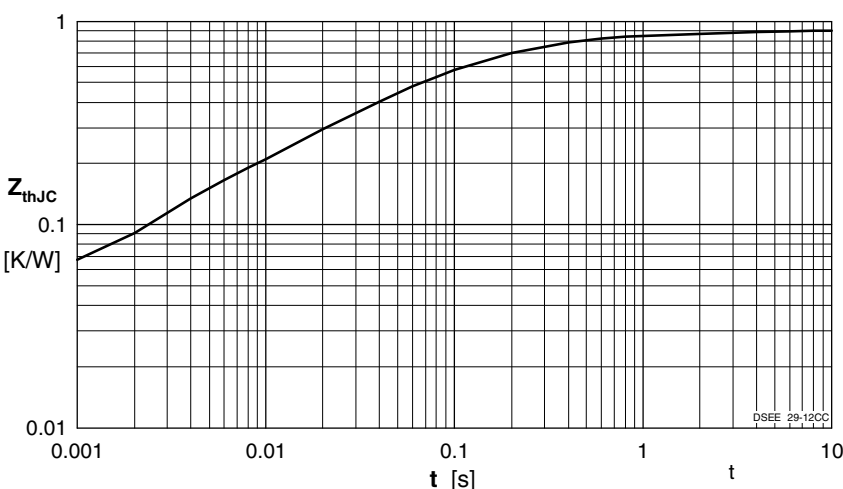


Fig. 7 Transient thermal resistance junction to case

Constants for  $Z_{thJC}$  calculation:

| i | $R_{thi}$ (K/W) | $t_i$ (s) |
|---|-----------------|-----------|
| 1 | 0.038           | 0.00024   |
| 2 | 0.07            | 0.0036    |
| 3 | 0.245           | 0.0235    |
| 4 | 0.198           | 0.1421    |
| 5 | 0.35            | 0.25      |

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