

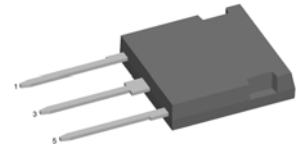
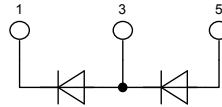
# HiPerFRED

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

$V_{RRM} = 1200\text{ V}$   
 $I_{FAV} = 60\text{ A}$   
 $t_{rr} = 40\text{ ns}$

Part number

**DSEE55-24N1F**



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:

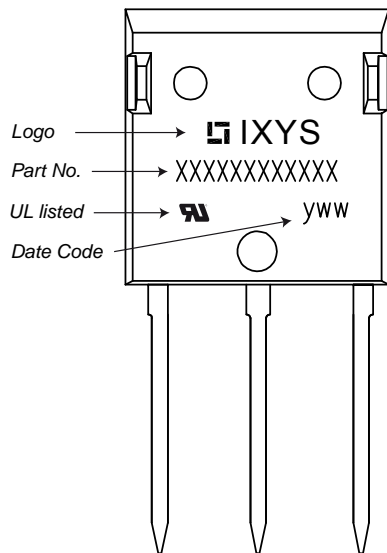
- Housing: i4-Pac
- DCB isolated backside
- Isolation Voltage 3000 V
- Epoxy meets UL 94V-0
- RoHS compliant

### Ratings

| Symbol     | Definition                          | Conditions                              | Ratings |      |      | Unit |
|------------|-------------------------------------|---|---------|------|------|------|
|            |                                     |   | min.    | typ. | max. |      |
| $V_{RRM}$  | max. repetitive reverse voltage     |   |         |      | 1200 | V    |
| $I_R$      | reverse current                     | $V_R = 1200\text{ V}$                   |         |      | 1    | mA   |
|            |                                     | $V_R = 1200\text{ V}$                   |         |      | 4    | mA   |
| $V_F$      | forward voltage                     | $I_F = 60\text{ A}$                     |         |      | 2.45 | V    |
|            |                                     | $I_F = 120\text{ A}$                    |         |      | 2.90 | V    |
|            |                                     | $I_F = 60\text{ A}$                     |         |      | 1.56 | V    |
|            |                                     | $I_F = 120\text{ A}$                    |         |      | 2.00 | V    |
| $I_{FAV}$  | average forward current             | rectangular $d = 0.5$                   |         |      | 60   | A    |
| $V_{F0}$   | threshold voltage                   | } for power loss calculation only       |         |      | 0.97 | V    |
| $r_F$      | slope resistance                    |   |         |      | 6.8  | mΩ   |
| $R_{thJC}$ | thermal resistance junction to case |   |         |      | 0.60 | K/W  |
| $T_{VJ}$   | virtual junction temperature        |   | -55     |      | 175  | °C   |
| $P_{tot}$  | total power dissipation             |   |         |      | 250  | W    |
| $I_{FSM}$  | max. forward surge current          | $t = 10\text{ ms}$ (50 Hz), sine        |         |      | 800  | A    |
| $I_{RM}$   | max. reverse recovery current       |   |         |      | 35   | A    |
|            |                                     | $I_F = 60\text{ A}; V_R = 600\text{ V}$ |         |      | 60   | A    |
| $t_{rr}$   | reverse recovery time               | $-di_F/dt = 600\text{ A}/\mu\text{s}$   |         |      | 75   | ns   |
|            |                                     |   |         |      | 220  | ns   |
| $C_J$      | junction capacitance                | $V_R = 600\text{ V}; f = 1\text{ MHz}$  |         |      | 48   | pF   |

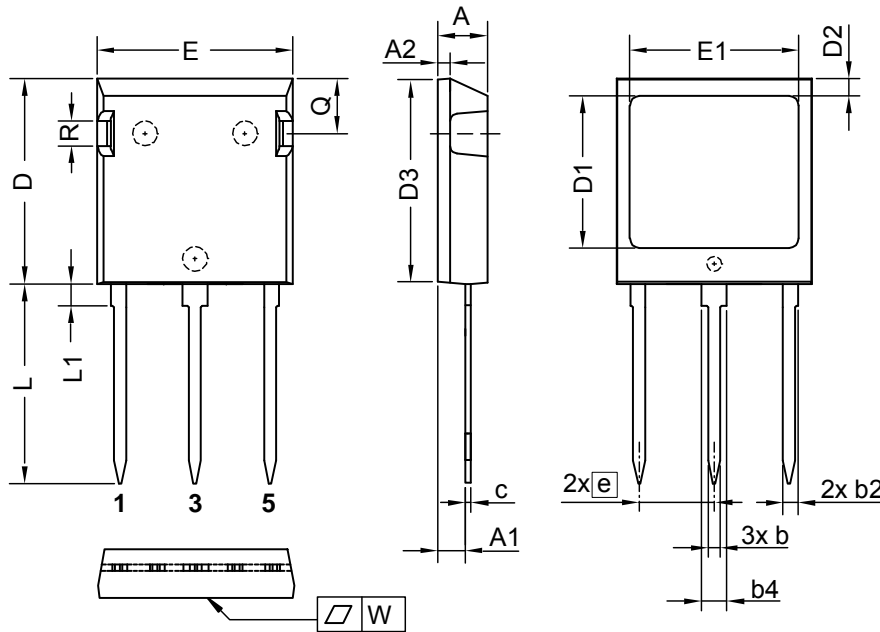
| Symbol        | Definition  | Conditions           | Ratings |      |      | Unit |
|---------------|---|----------------------|---------|------|------|------|
|               |   |                      | min.    | typ. | max. |      |
| $I_{RMS}$     | RMS current   | per terminal         |         |      | 70   | A    |
| $R_{thCH}$    | thermal resistance case to heatsink                   |                      |         | 0.20 |      | K/W  |
| $T_{stg}$     | storage temperature                                   |                      | -55     |      | 150  | °C   |
| <b>Weight</b> |   |                      |         | 9    |      | g    |
| $F_C$         | mounting force with clip                              |                      | 20      |      | 120  | 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 | 5.5     |      |      | mm   |
| $d_{Spb/Apb}$ | creepage   striking distance on surface   through air | terminal to backside | 5.1     |      |      | mm   |

### Product Marking



| Ordering | Part Name    | Marking on Product | Delivering Mode | Base Qty | Code Key |
|----------|--------------|--------------------|-----------------|----------|----------|
| Standard | DSEE55-24N1F | DSEE55-24N1F       | Tube            | 24       | 488739   |

## Outlines i4-Pac



| Dim. | Millimeter |       | Inches    |       |
|------|------------|-------|-----------|-------|
|      | min        | max   | min       | max   |
| A    | 4.83       | 5.21  | 0.190     | 0.205 |
| A1   | 2.59       | 3.00  | 0.102     | 0.118 |
| A2   | 1.17       | 2.16  | 0.046     | 0.085 |
| b    | 1.14       | 1.40  | 0.045     | 0.055 |
| b2   | 1.47       | 1.73  | 0.058     | 0.068 |
| b4   | 2.54       | 2.79  | 0.100     | 0.110 |
| c    | 0.51       | 0.74  | 0.020     | 0.029 |
| D    | 20.80      | 21.34 | 0.819     | 0.840 |
| D1   | 14.99      | 15.75 | 0.590     | 0.620 |
| D2   | 1.65       | 2.03  | 0.065     | 0.080 |
| D3   | 20.30      | 20.70 | 0.799     | 0.815 |
| E    | 19.56      | 20.29 | 0.770     | 0.799 |
| E1   | 16.76      | 17.53 | 0.660     | 0.690 |
| e    | 7.62 BSC   |       | 0.300 BSC |       |
| L    | 19.81      | 21.34 | 0.780     | 0.840 |
| L1   | 2.11       | 2.59  | 0.083     | 0.102 |
| Q    | 5.33       | 6.20  | 0.210     | 0.244 |
| R    | 2.54       | 4.57  | 0.100     | 0.180 |
| W    | -          | 0.10  | -         | 0.004 |

Die konvexe Form des Substrates ist typ. < 0.05 mm über der Kunststoffoberfläche der Bauteilunterseite  
 The convex bow of substrate is typ. < 0.05 mm over plastic surface level of device bottom side

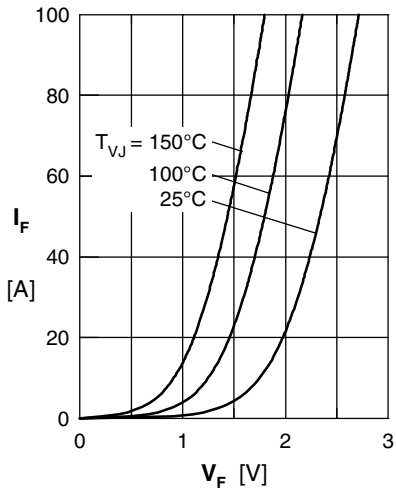


Fig. 1 Forward current  $I_F$  vs.  $V_F$

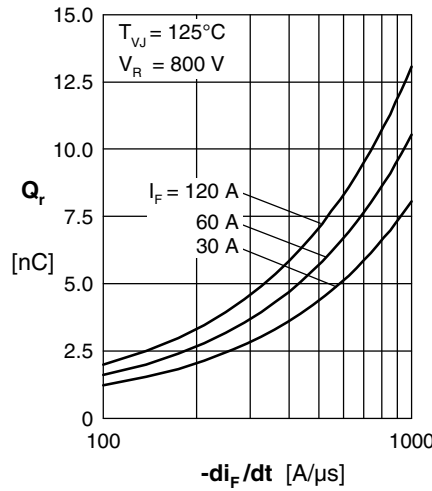


Fig. 2 Typ. reverse recovery charge  $Q_r$  versus  $-di_F/dt$

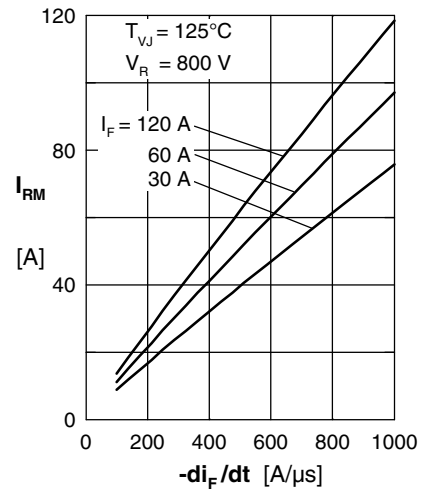


Fig. 3 Typ. peak reverse current  $I_{RM}$  versus  $-di_F/dt$

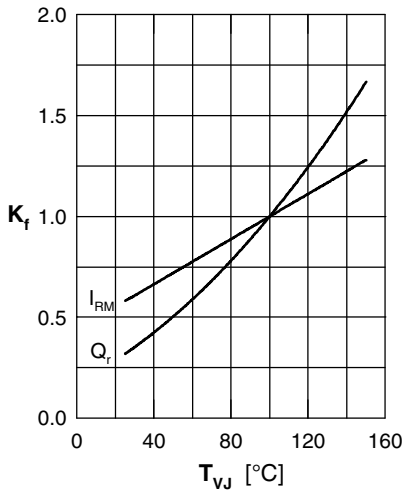


Fig. 4 Dynamic parameters  $Q_r$ ,  $I_{RM}$  versus  $T_{VJ}$

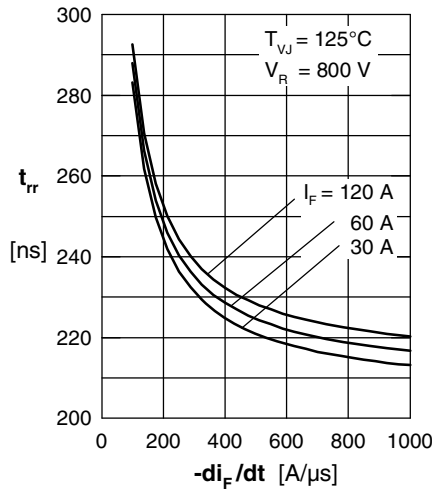


Fig. 5 Typ. recovery time  $t_{tr}$  versus  $-di_F/dt$

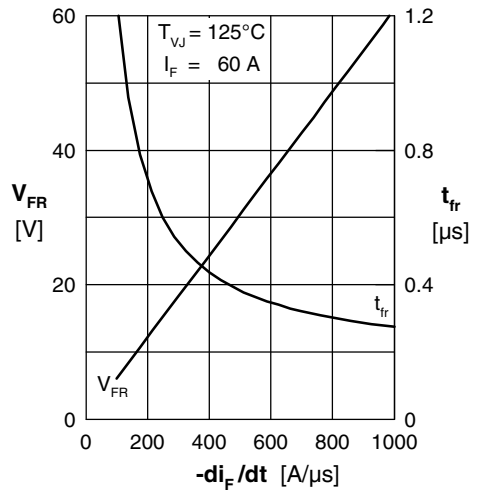


Fig. 6 Typ. peak forward voltage  $V_{FR}$  and typ. forward recovery time  $t_{fr}$  versus  $di_F/dt$

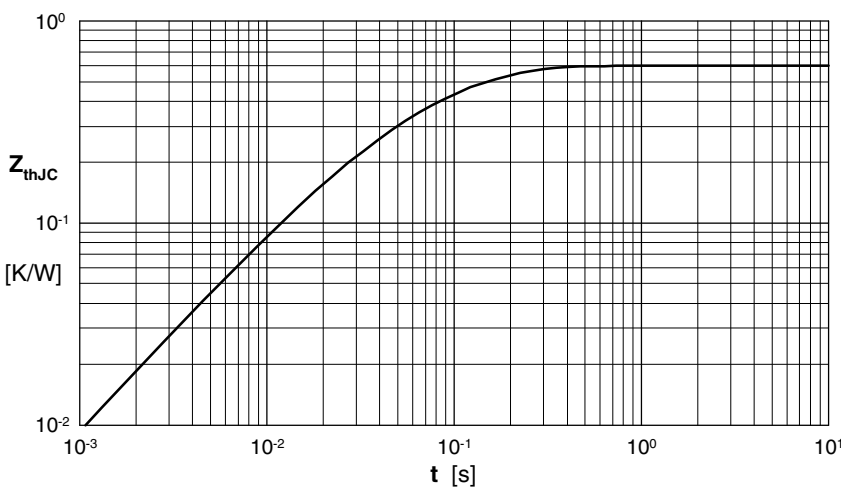


Fig. 7 Transient thermal resistance junction to case

Constants for  $Z_{thJC}$  calculation:

| i | $R_{thi}$ (K/W) | $t_i$ (s) |
|---|-----------------|-----------|
| 1 | 0.212           | 0.0055    |
| 2 | 0.248           | 0.0092    |
| 3 | 0.063           | 0.0007    |
| 4 | 0.077           | 0.0391    |