

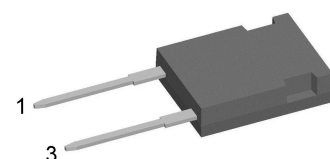
# HiPerDynFRED

|           |   |       |
|-----------|---|-------|
| $V_{RRM}$ | = | 600 V |
| $I_{FAV}$ | = | 30 A  |
| $t_{rr}$  | = | 35 ns |

High Performance Dynamic Fast Recovery Diode  
 Extreme Low Loss and Soft Recovery  
 Single Diode

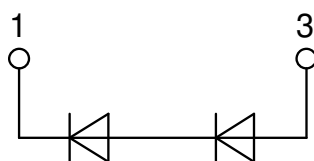
Part number

**DPH30IS600HI**



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: ISOPLUS247

- Isolation Voltage: 3600 V~
- Industry standard outline
- RoHS compliant
- Epoxy meets UL 94V-0
- Soldering pins for PCB mounting
- Backside: DCB ceramic
- Reduced weight
- Advanced power cycling

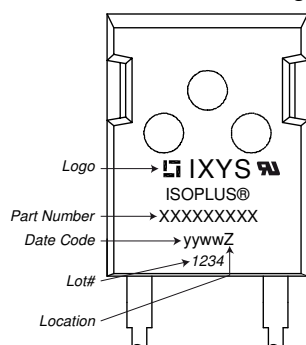
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| Fast Diode        |                                              |                                                                                    |                         | Ratings                  |      |      |      |  |
|-------------------|----------------------------------------------|------------------------------------------------------------------------------------|-------------------------|--------------------------|------|------|------|--|
| Symbol            | Definition                                   | Conditions                                                                         |                         | min.                     | typ. | max. | Unit |  |
| V <sub>RSM</sub>  | max. non-repetitive reverse blocking voltage | T <sub>VJ</sub> = 25°C                                                             |                         |                          |      | 600  | V    |  |
| V <sub>RRM</sub>  | max. repetitive reverse blocking voltage     | T <sub>VJ</sub> = 25°C                                                             |                         |                          |      | 600  | V    |  |
| I <sub>R</sub>    | reverse current, drain current               | V <sub>R</sub> = 600 V                                                             | T <sub>VJ</sub> = 25°C  |                          |      | 1    | μA   |  |
|                   |                                              | V <sub>R</sub> = 600 V                                                             | T <sub>VJ</sub> = 150°C |                          |      | 0.2  | mA   |  |
| V <sub>F</sub>    | forward voltage drop                         | I <sub>F</sub> = 30 A                                                              | T <sub>VJ</sub> = 25°C  |                          |      | 2.48 | V    |  |
|                   |                                              | I <sub>F</sub> = 60 A                                                              |                         |                          |      | 3.02 | V    |  |
|                   |                                              | I <sub>F</sub> = 30 A                                                              | T <sub>VJ</sub> = 150°C |                          |      | 1.89 | V    |  |
|                   |                                              | I <sub>F</sub> = 60 A                                                              |                         |                          |      | 2.45 | V    |  |
| I <sub>FAV</sub>  | average forward current                      | T <sub>C</sub> = 140°C<br>rectangular      d = 0.5                                 | T <sub>VJ</sub> = 175°C |                          |      | 30   | A    |  |
| V <sub>F0</sub>   | threshold voltage                            | } for power loss calculation only                                                  |                         | T <sub>VJ</sub> = 175°C  |      | 1.10 | V    |  |
| r <sub>F</sub>    | slope resistance                             |                                                                                    |                         |                          |      | 12.6 | mΩ   |  |
| R <sub>thJC</sub> | thermal resistance junction to case          |                                                                                    |                         |                          |      | 0.55 | K/W  |  |
| R <sub>thCH</sub> | thermal resistance case to heatsink          |                                                                                    |                         |                          | 0.3  |      | K/W  |  |
| P <sub>tot</sub>  | total power dissipation                      | T <sub>C</sub> = 25°C                                                              |                         |                          |      | 285  | W    |  |
| I <sub>FSM</sub>  | max. forward surge current                   | t = 10 ms; (50 Hz), sine; V <sub>R</sub> = 0 V                                     |                         | T <sub>VJ</sub> = 45°C   |      | 450  | A    |  |
| C <sub>J</sub>    | junction capacitance                         | V <sub>R</sub> = 400 V   f = 1 MHz                                                 |                         | T <sub>VJ</sub> = 25°C   |      | 30   | pF   |  |
| I <sub>RM</sub>   | max. reverse recovery current                | } I <sub>F</sub> = 30 A; V <sub>R</sub> = 400 V<br>-di <sub>F</sub> /dt = 200 A/μs |                         | T <sub>VJ</sub> = 25 °C  |      | 3    | A    |  |
|                   |                                              |                                                                                    |                         | T <sub>VJ</sub> = 125 °C |      | 8    | A    |  |
| t <sub>rr</sub>   | reverse recovery time                        |                                                                                    |                         | T <sub>VJ</sub> = 25 °C  |      | 35   | ns   |  |
|                   |                                              |                                                                                    |                         | T <sub>VJ</sub> = 125 °C |      | 65   | ns   |  |

| Package ISOPLUS247   |                                                              |                      |                                         | Ratings |      |      |      |
|----------------------|--------------------------------------------------------------|----------------------|-----------------------------------------|---------|------|------|------|
| Symbol               | Definition                                                   | Conditions           |                                         | min.    | typ. | max. | Unit |
| I <sub>RMS</sub>     | RMS current                                                  | per terminal         |                                         |         |      | 70   | A    |
| T <sub>VJ</sub>      | virtual junction temperature                                 |                      |                                         | -55     |      | 175  | °C   |
| T <sub>op</sub>      | operation temperature                                        |                      |                                         | -55     |      | 150  | °C   |
| T <sub>stg</sub>     | storage temperature                                          |                      |                                         | -55     |      | 150  | °C   |
| Weight               |                                                              |                      |                                         |         | 6    |      | g    |
| F <sub>C</sub>       | mounting force with clip                                     |                      |                                         | 20      |      | 120  | N    |
| d <sub>Spp/App</sub> | creepage distance on surface   striking distance through air | terminal to terminal |                                         | 5.4     |      |      | mm   |
| d <sub>Spb/Apb</sub> |                                                              | terminal to backside |                                         | 4.1     |      |      | mm   |
| V <sub>ISOL</sub>    | isolation voltage                                            | t = 1 second         | 50/60 Hz, RMS; I <sub>ISOL</sub> ≤ 1 mA | 3600    |      |      | V    |
|                      |                                                              | t = 1 minute         |                                         | 3000    |      |      | V    |

### Product Marking



### Part description

D = Diode  
 P = HiPerFRED  
 H = HiPerDyn  
 30 = Current Rating [A]  
 IS = Single Diode  
 600 = Reverse Voltage [V]  
 HI = ISOPLUS247 (2)

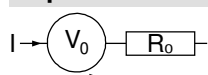
| Ordering | Ordering Number | Marking on Product | Delivery Mode | Quantity | Code No. |
|----------|-----------------|--------------------|---------------|----------|----------|
| Standard | DPH30IS600HI    | DPH30IS600HI       | Tube          | 30       | 506235   |

| Similar Part | Package              | Voltage class |
|--------------|----------------------|---------------|
| DHG60I600HA  | TO-247AD (2)         | 600           |
| DSEP60-06A   | TO-247AD (2)         | 600           |
| DSEP60-06AT  | TO-268AA (D3Pak) (2) | 600           |

### Equivalent Circuits for Simulation

\* on die level

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



**Fast Diode**

$V_{0 \max}$  threshold voltage

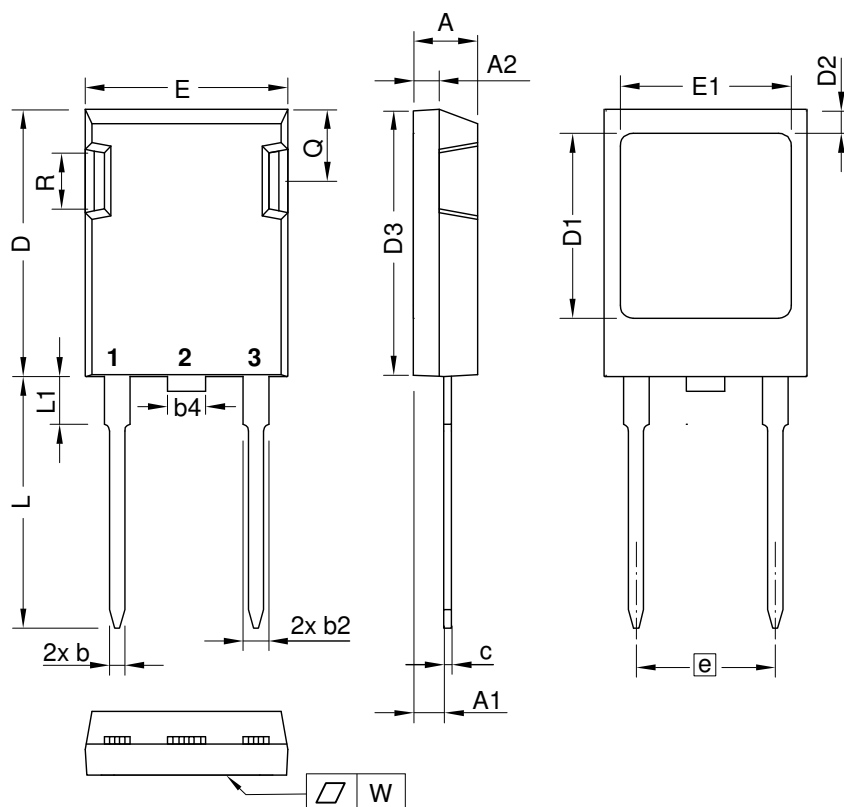
1.1

V

$R_{0 \max}$  slope resistance \*

10

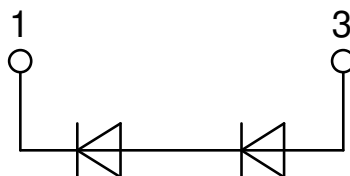
mΩ

**Outlines ISOPLUS247**


| Dim. | Millimeter |       | Inches    |       |
|------|------------|-------|-----------|-------|
|      | min        | max   | min       | max   |
| A    | 4.83       | 5.21  | 0.190     | 0.205 |
| A1   | 2.29       | 2.54  | 0.090     | 0.100 |
| A2   | 1.91       | 2.16  | 0.075     | 0.085 |
| b    | 1.14       | 1.40  | 0.045     | 0.055 |
| b2   | 1.91       | 2.20  | 0.075     | 0.087 |
| b4   | 2.92       | 3.24  | 0.115     | 0.128 |
| c    | 0.61       | 0.83  | 0.024     | 0.033 |
| D    | 20.80      | 21.34 | 0.819     | 0.840 |
| D1   | 15.75      | 16.26 | 0.620     | 0.640 |
| D2   | 1.65       | 2.15  | 0.065     | 0.085 |
| D3   | 20.30      | 20.70 | 0.799     | 0.815 |
| E    | 15.75      | 16.13 | 0.620     | 0.635 |
| E1   | 13.21      | 13.72 | 0.520     | 0.540 |
| e    | 10.90 BSC  |       | 0.429 BSC |       |
| L    | 19.81      | 20.60 | 0.780     | 0.811 |
| L1   | 3.81       | 4.38  | 0.150     | 0.172 |
| Q    | 5.59       | 6.20  | 0.220     | 0.244 |
| R    | 4.25       | 5.50  | 0.167     | 0.217 |
| W    | -          | 0.10  | -         | 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-247 AD gemäß JEDEC außer Schraubloch und  $L_{max}$ .  
 This drawing will meet all dimensions requirement of JEDEC outline TO-247 AD except screw hole and except  $L_{max}$ .



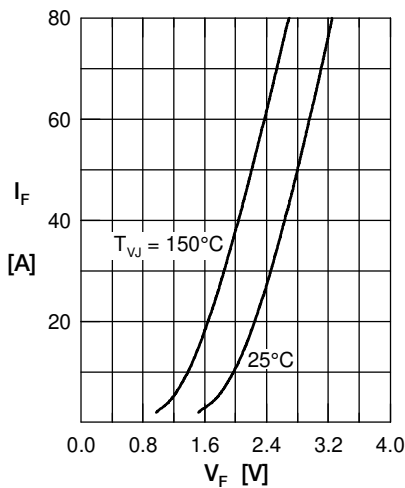
**Fast Diode**


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

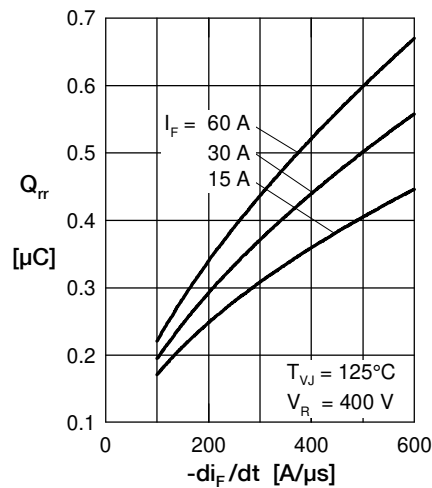


Fig. 2 Typ. reverse recov. charge  
 $Q_{rr}$  versus  $-di_F/dt$

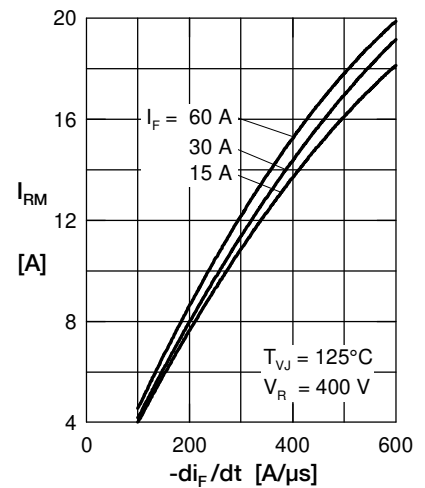


Fig. 3 Typ. reverse recov. current  
 $I_{RM}$  versus  $-di_F/dt$

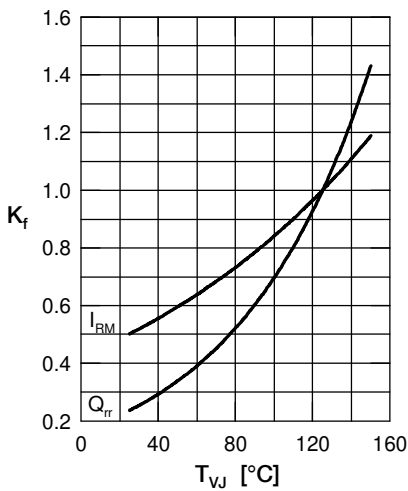


Fig. 4 Typ. dynamic parameters  
 $Q_{rr}$ ,  $I_{RM}$  versus  $T_{VJ}$

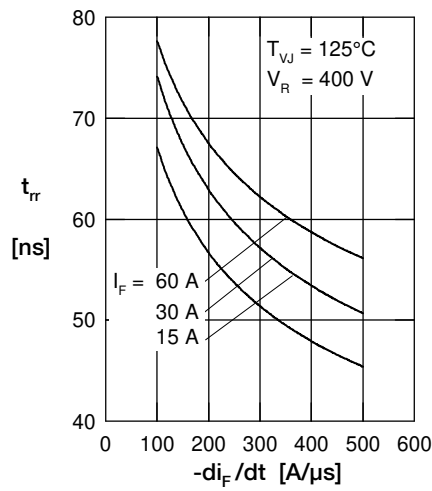


Fig. 5 Typ. reverse recov. time  
 $t_{rr}$  versus  $-di_F/dt$

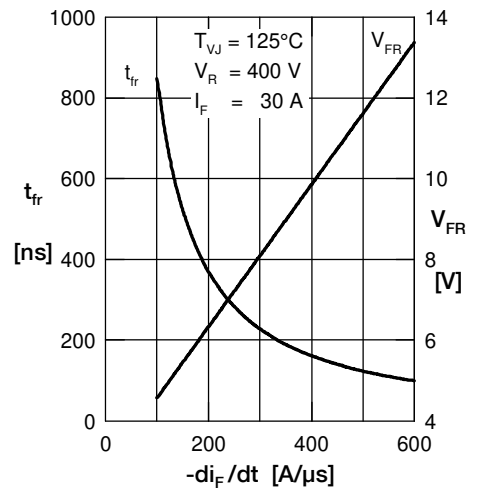


Fig. 6 Typ. forward recov. voltage  
 $V_{FR}$  & time  $t_{fr}$  versus  $di_F/dt$

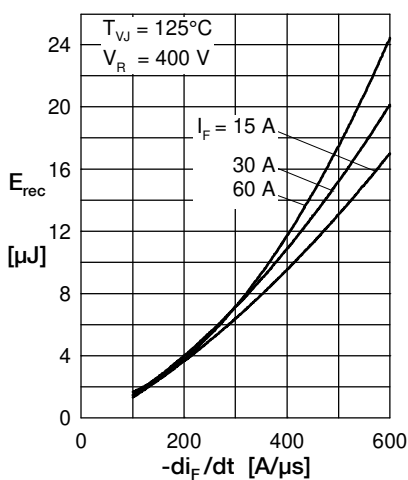


Fig. 7 Typ. recovery energy  
 $E_{rec}$  versus  $-di_F/dt$

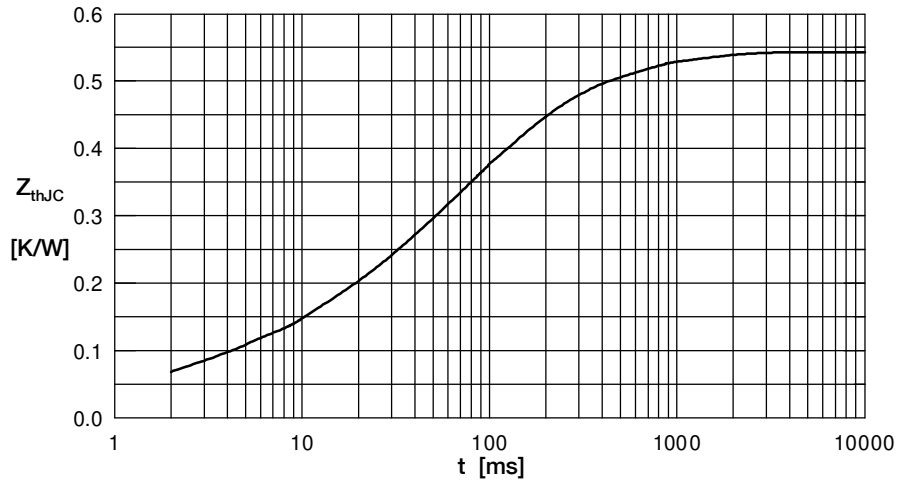


Fig. 8 Transient thermal impedance junction to case