



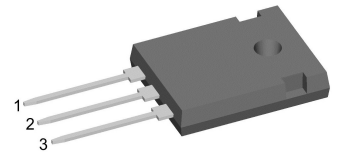
# HiPerFRED<sup>2</sup>

$V_{RRM} = 300\text{ V}$   
 $I_{FAV} = 2 \times 15\text{ A}$   
 $t_{rr} = 35\text{ ns}$

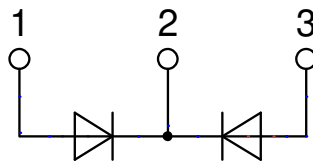
High Performance Fast Recovery Diode  
 Low Loss and Soft Recovery  
 Common Cathode

Part number

**DPG30C300HB**



Backside: cathode



**Features / Advantages:**

- Planar passivated chips
- Very low leakage current
- Very short recovery time
- Improved thermal behaviour
- Very low I<sub>rm</sub>-values
- Very soft recovery behaviour
- Avalanche voltage rated for reliable operation
- Soft reverse recovery for low EMI/RFI
- Low I<sub>rm</sub> 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: TO-247**

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

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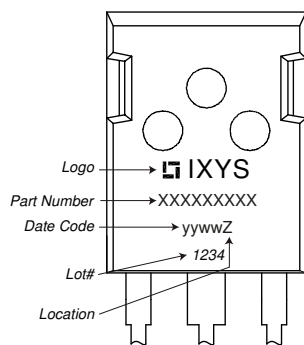


| Fast Diode |  |  |             | Ratings                      |      |      |               |
|------------|--|--|-------------|------------------------------|------|------|---------------|
| Symbol     | Definition                                   | Conditions   |             | min.                         | typ. | max. | Unit          |
| $V_{RSM}$  | max. non-repetitive reverse blocking voltage |  |             |                              |      | 300  | V             |
| $V_{RRM}$  | max. repetitive reverse blocking voltage     |  |             |                              |      | 300  | V             |
| $I_R$      | reverse current, drain current               | $V_R = 300\text{ V}$   |             | $T_{VJ} = 25^\circ\text{C}$  |      | 1    | $\mu\text{A}$ |
|            |  | $V_R = 300\text{ V}$   |             | $T_{VJ} = 150^\circ\text{C}$ |      | 0.08 | mA            |
| $V_F$      | forward voltage drop                         | $I_F = 15\text{ A}$  |             | $T_{VJ} = 25^\circ\text{C}$  |      | 1.25 | V             |
|            |  | $I_F = 30\text{ A}$  |             |                              |      | 1.50 | V             |
|            |  | $I_F = 15\text{ A}$  |             | $T_{VJ} = 150^\circ\text{C}$ |      | 1.00 | V             |
|            |  | $I_F = 30\text{ A}$  |             |                              |      | 1.27 | V             |
| $I_{FAV}$  | average forward current                      | $T_C = 145^\circ\text{C}$  | rectangular | $T_{VJ} = 175^\circ\text{C}$ |      | 15   | A             |
| $V_{FO}$   | threshold voltage                            | } for power loss calculation only                                  |             | $T_{VJ} = 175^\circ\text{C}$ |      | 0.69 | V             |
| $r_F$      | slope resistance                             |  |             |                              |      | 17.3 | m $\Omega$    |
| $R_{thJC}$ | thermal resistance junction to case          |  |             |                              |      | 1.7  | K/W           |
| $R_{thCH}$ | thermal resistance case to heatsink          |  |             |                              | 0.3  |      | K/W           |
| $P_{tot}$  | total power dissipation                      |  |             | $T_C = 25^\circ\text{C}$     |      | 90   | W             |
| $I_{FSM}$  | max. forward surge current                   | $t = 10\text{ ms}; (50\text{ Hz}), \text{ sine}; V_R = 0\text{ V}$ |             | $T_{VJ} = 45^\circ\text{C}$  |      | 240  | A             |
| $C_J$      | junction capacitance                         | $V_R = 150\text{ V}$ $f = 1\text{ MHz}$                            |             | $T_{VJ} = 25^\circ\text{C}$  |      | 20   | pF            |
| $I_{RM}$   | max. reverse recovery current                | } $I_F = 15\text{ A}; V_R = 200\text{ V}$                          |             | $T_{VJ} = 25^\circ\text{C}$  |      | 3    | A             |
|            |  |  |             | $T_{VJ} = 125^\circ\text{C}$ |      | 6.5  | A             |
| $t_{rr}$   | reverse recovery time                        | } $-di_F/dt = 200\text{ A}/\mu\text{s}$                            |             | $T_{VJ} = 25^\circ\text{C}$  |      | 35   | ns            |
|            |  |  |             | $T_{VJ} = 125^\circ\text{C}$ |      | 55   | ns            |



| Package TO-247 |                              |                            | Ratings |      |      |      |
|----------------|------------------------------|----------------------------|---------|------|------|------|
| Symbol         | Definition                   | Conditions                 | min.    | typ. | max. | Unit |
| $I_{RMS}$      | RMS current                  | per terminal <sup>1)</sup> |         |      | 50   | 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**



**Part description**

- D = Diode
- P = HiPerFRED
- G = extreme fast
- 30 = Current Rating [A]
- C = Common Cathode
- 300 = Reverse Voltage [V]
- HB = TO-247AD (3)

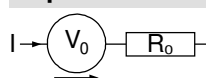
| Ordering | Ordering Number | Marking on Product | Delivery Mode | Quantity | Code No. |
|----------|-----------------|--------------------|---------------|----------|----------|
| Standard | DPG30C300HB     | DPG30C300HB        | Tube          | 30       | 502567   |

| Similar Part | Package              | Voltage class |
|--------------|----------------------|---------------|
| DPG30C300PB  | TO-220AB (3)         | 300           |
| DPG30C300PC  | TO-263AB (D2Pak) (2) | 300           |

**Equivalent Circuits for Simulation**

*\* on die level*

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

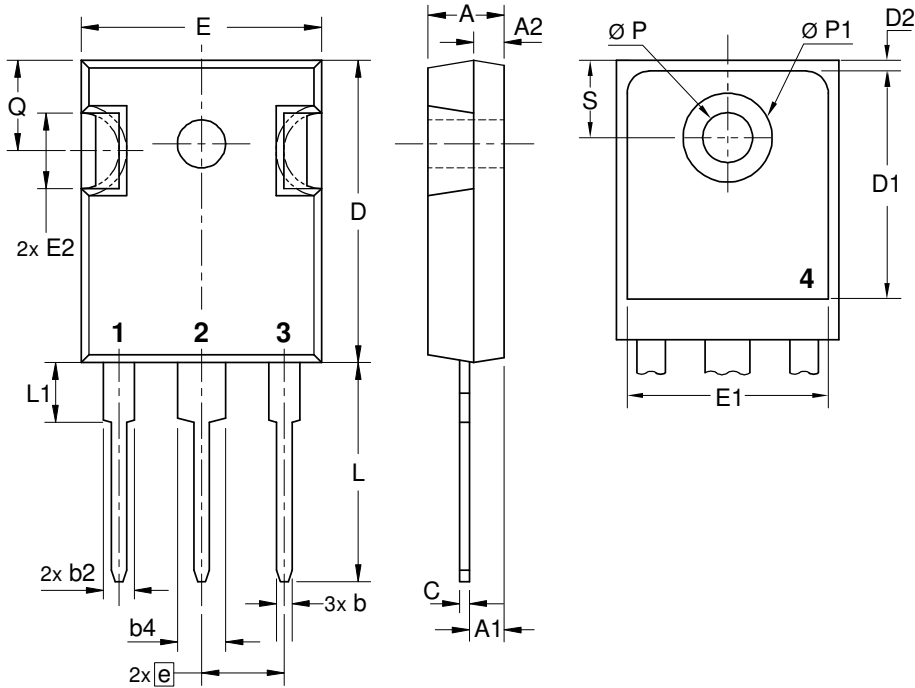


**Fast Diode**

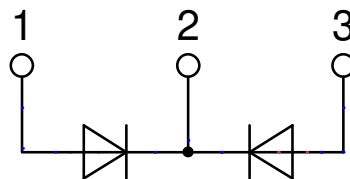
|              |                    |      |    |
|--------------|--------------------|------|----|
| $V_{0\ max}$ | threshold voltage  | 0.69 | V  |
| $R_{0\ max}$ | slope resistance * | 14.7 | mΩ |



**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     |



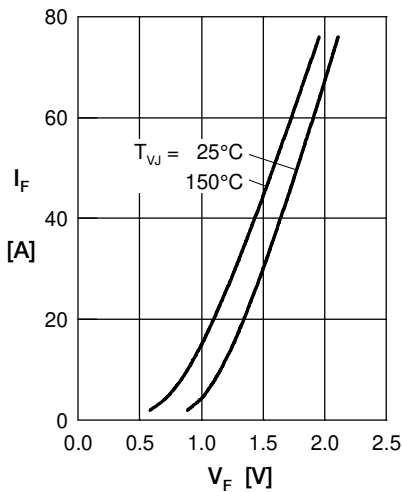
**Fast Diode**


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

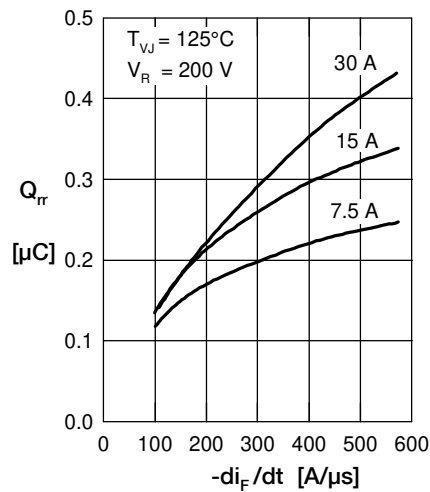


Fig. 2 Typ. reverse recov. charge  $Q_{rr}$  versus  $-di_F/dt$

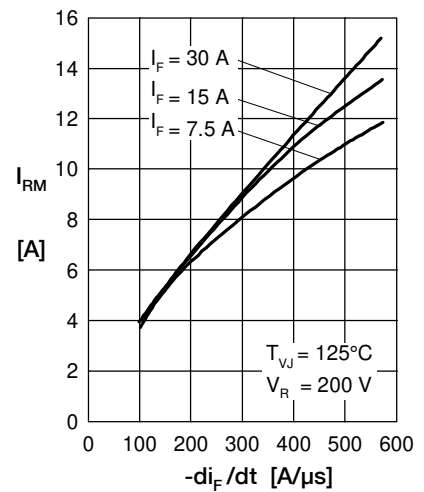


Fig. 3 Typ. peak reverse current  $I_{RM}$  versus  $-di_F/dt$

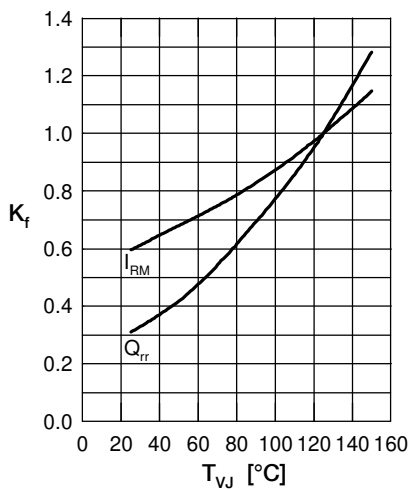


Fig. 4 Typ. dynamic parameters  $Q_{rr}$ ,  $I_{RM}$  versus  $T_{VJ}$

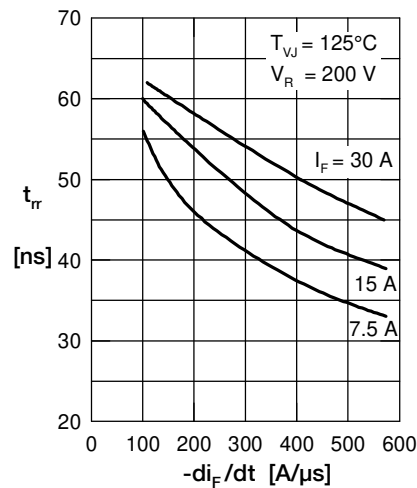


Fig. 5 Typ. recovery time  $t_{rr}$  versus  $-di_F/dt$

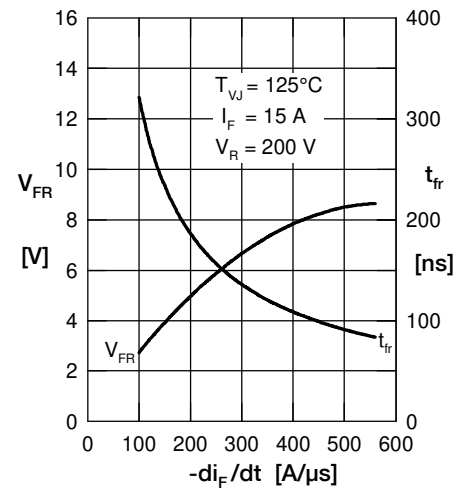


Fig. 6 Typ. peak forward voltage  $V_{FR}$  and  $t_{fr}$  versus  $di_F/dt$

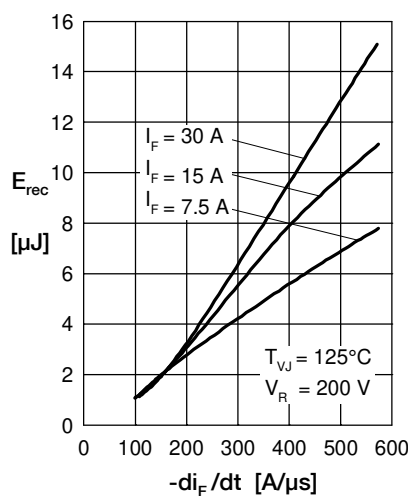


Fig. 7 Typ. recovery energy  $E_{rec}$  versus  $-di_F/dt$

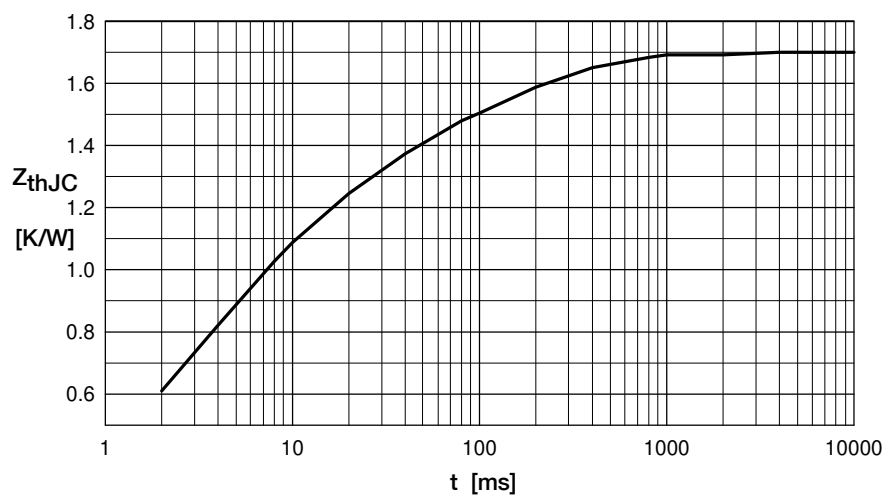


Fig. 8 Transient thermal resistance junction to case