

# HiPerFRED

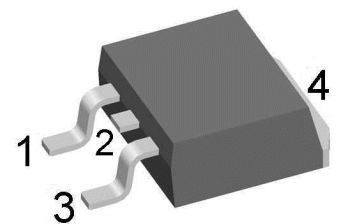
|           |   |       |
|-----------|---|-------|
| $V_{RRM}$ | = | 300 V |
| $I_{FAV}$ | = | 30 A  |
| $t_{rr}$  | = | 35 ns |

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

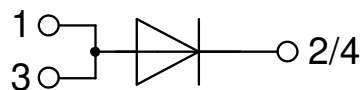
Part number

**DPG30IM300PC**

Marking on Product: *DPG30IM300PC*



Backside: cathode



### 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: TO-263 (D2Pak)

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

### Disclaimer Notice

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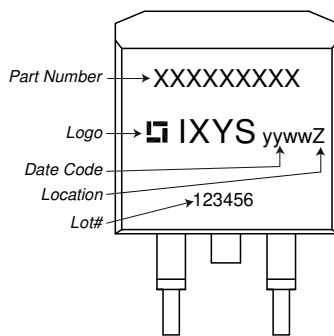
| Fast Diode |  |  |             | Ratings                      |      |      |               |
|------------|--|--|-------------|------------------------------|------|------|---------------|
| Symbol     | Definition                                   | Conditions   |             | min.                         | 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    | $\mu\text{A}$ |
|            |  | $V_R = 300\text{ V}$   |             | $T_{VJ} = 150^\circ\text{C}$ |      | 0.1  | mA            |
| $V_F$      | forward voltage drop                         | $I_F = 30\text{ A}$  |             | $T_{VJ} = 25^\circ\text{C}$  |      | 1.35 | V             |
|            |  | $I_F = 60\text{ A}$  |             |                              |      | 1.66 | V             |
|            |  | $I_F = 30\text{ A}$  |             | $T_{VJ} = 150^\circ\text{C}$ |      | 1.08 | V             |
|            |  | $I_F = 60\text{ A}$  |             |                              |      | 1.43 | V             |
| $I_{FAV}$  | average forward current                      | $T_C = 140^\circ\text{C}$  | rectangular | $T_{VJ} = 175^\circ\text{C}$ |      | 30   | A             |
| $V_{FO}$   | threshold voltage                            | } for power loss calculation only                                  |             | $T_{VJ} = 175^\circ\text{C}$ |      | 0.70 | V             |
| $r_F$      | slope resistance                             |  |             |                              |      | 11.1 | m $\Omega$    |
| $R_{thJC}$ | thermal resistance junction to case          |  |             |                              |      | 0.85 | K/W           |
| $R_{thCH}$ | thermal resistance case to heatsink          |  |             |                              | 0.25 |      | K/W           |
| $P_{tot}$  | total power dissipation                      |  |             | $T_C = 25^\circ\text{C}$     |      | 175  | W             |
| $I_{FSM}$  | max. forward surge current                   | $t = 10\text{ ms}; (50\text{ Hz}), \text{ sine}; V_R = 0\text{ V}$ |             | $T_{VJ} = 45^\circ\text{C}$  |      | 360  | A             |
| $C_J$      | junction capacitance                         | $V_R = 150\text{ V}$ $f = 1\text{ MHz}$                            |             | $T_{VJ} = 25^\circ\text{C}$  |      | 42   | pF            |
| $I_{RM}$   | max. reverse recovery current                | } $I_F = 30\text{ A}; V_R = 200\text{ V}$                          |             | $T_{VJ} = 25^\circ\text{C}$  |      | 3    | A             |
|            |  |  |             | $T_{VJ} = 125^\circ\text{C}$ |      | 7    | 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-263 (D2Pak) |                              |                            | Ratings |      |      |      |
|------------------------|------------------------------|----------------------------|---------|------|------|------|
| Symbol                 | Definition                   | Conditions                 | min.    | typ. | max. | Unit |
| $I_{RMS}$              | RMS current                  | per terminal <sup>1)</sup> |         |      | 35   | 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>          |                              |                            |         | 1.5  |      | g    |
| $F_C$                  | mounting force with clip     |                            | 20      |      | 60   | N    |

<sup>1)</sup>  $I_{RMS}$  is typically limited by the pin-to-chip resistance (1); or by the current capability of the chip (2). In case of (1) and a product with multiple pins for one chip-potential, the current capability can be increased by connecting the pins as one contact.

**Product Marking**



**Part description**

- D = Diode
- P = HiPerFRED
- G = extreme fast
- 30 = Current Rating [A]
- IM = Single Diode
- 300 = Reverse Voltage [V]
- PC = TO-263AB (D2Pak) (2)

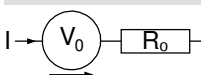
| Ordering    | Ordering Number  | Marking on Product | Delivery Mode | Quantity | Code No. |
|-------------|------------------|--------------------|---------------|----------|----------|
| Standard    | DPG30IM300PC-TRL | DPG30IM300PC       | Tape & Reel   | 800      | 510002   |
| Alternative | DPG30IM300PC-TUB | DPG30IM300PC       | Tube          | 50       | 525113   |

| Similar Part | Package              | Voltage class |
|--------------|----------------------|---------------|
| DSEP40-03AS  | TO-263AB (D2Pak) (2) | 300           |
| DPG60IM300PC | TO-263AB (D2Pak) (2) | 300           |

**Equivalent Circuits for Simulation**

\* on die level

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



|              |                    |     |    |
|--------------|--------------------|-----|----|
| $V_{0\ max}$ | threshold voltage  | 0.7 | V  |
| $R_{0\ max}$ | slope resistance * | 7.8 | mΩ |

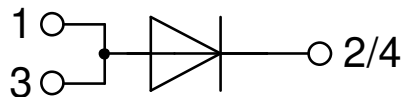


**Outlines TO-263 (D2Pak)**



| Dim. | Millimeter |       | Inches      |       |
|------|------------|-------|-------------|-------|
|      | min        | max   | min         | max   |
| A    | 4.06       | 4.83  | 0.160       | 0.190 |
| A1   | typ. 0.10  |       | typ. 0.004  |       |
| A2   | 2.41       |       | 0.095       |       |
| b    | 0.51       | 0.99  | 0.020       | 0.039 |
| b2   | 1.14       | 1.40  | 0.045       | 0.055 |
| c    | 0.40       | 0.74  | 0.016       | 0.029 |
| c2   | 1.14       | 1.40  | 0.045       | 0.055 |
| D    | 8.38       | 9.40  | 0.330       | 0.370 |
| D1   | 8.00       | 8.89  | 0.315       | 0.350 |
| D2   | 2.5        |       | 0.098       |       |
| E    | 9.65       | 10.41 | 0.380       | 0.410 |
| E1   | 6.22       | 8.50  | 0.245       | 0.335 |
| e    | 2.54 BSC   |       | 0.100 BSC   |       |
| e1   | 4.28       |       | 0.169       |       |
| H    | 14.61      | 15.88 | 0.575       | 0.625 |
| L    | 1.78       | 2.79  | 0.070       | 0.110 |
| L1   | 1.02       | 1.68  | 0.040       | 0.066 |
| W    | typ. 0.02  | 0.040 | typ. 0.0008 | 0.002 |

*All dimensions conform with and/or within JEDEC standard.*





**Fast Diode**

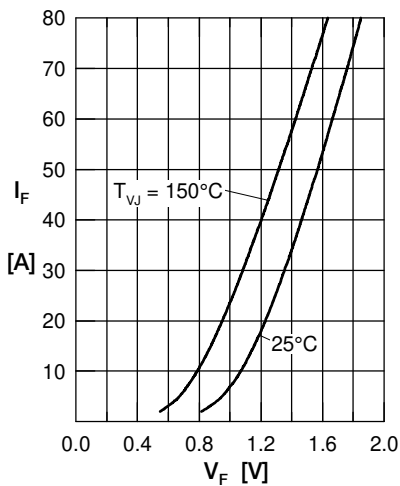


Fig. 1 Forward current  $I_F$  versus  $V_F$

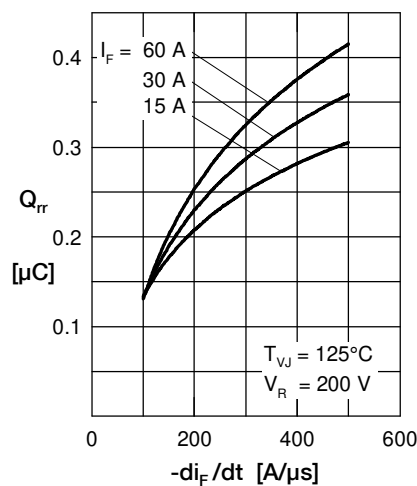


Fig. 2 Typ. reverse recov. charge  $Q_{rr}$  versus  $-di_F/dt$

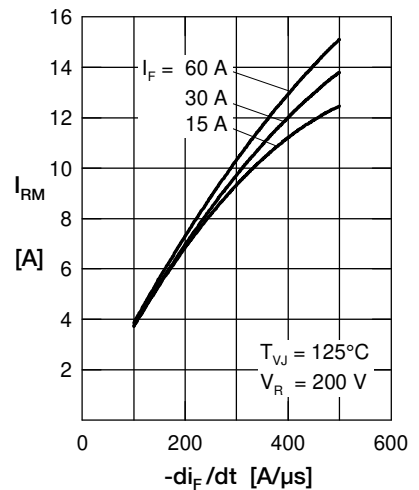


Fig. 3 Typ. reverse recov. current  $I_{RM}$  versus  $-di_F/dt$

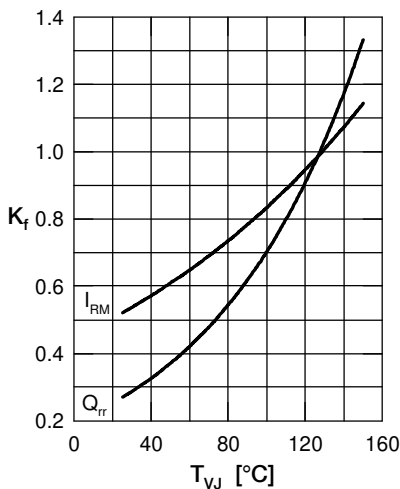


Fig. 4 Typ. dynamic parameters  $Q_{rr}$ ,  $I_{RM}$  versus  $T_{VJ}$

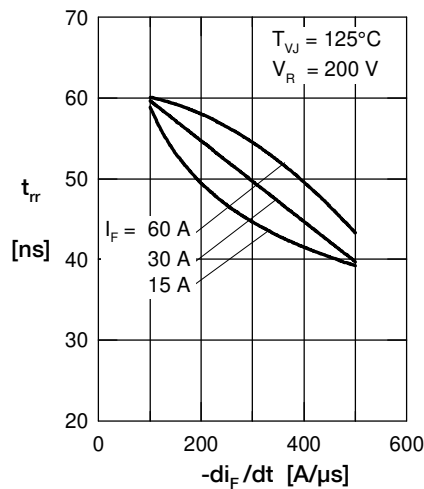


Fig. 5 Typ. reverse recov. time  $t_{rr}$  versus  $-di_F/dt$

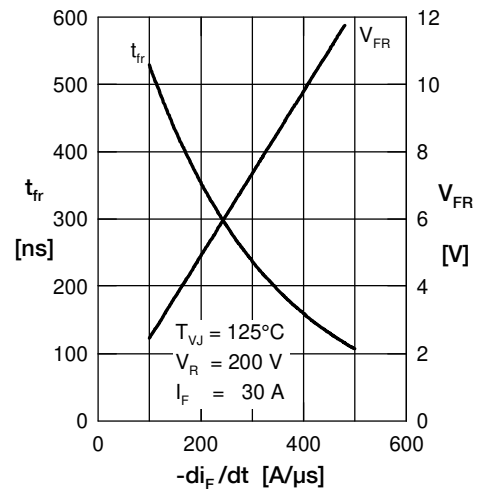


Fig. 6 Typ. forward recov. voltage  $V_{FR}$  &  $t_{fr}$  versus  $di_F/dt$

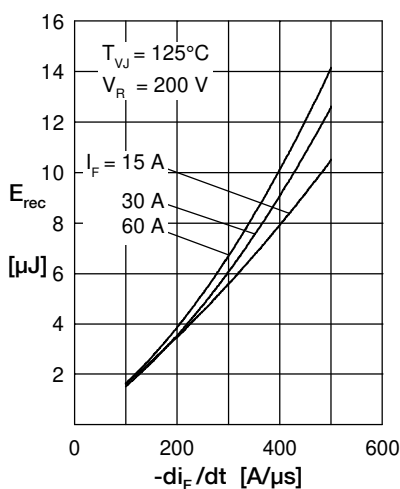


Fig. 7 Typ. recovery energy  $E_{rec}$  versus  $-di_F/dt$

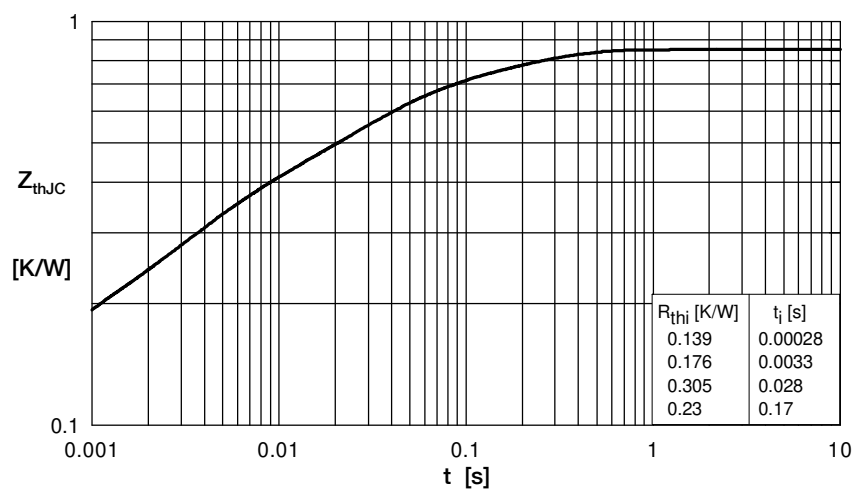


Fig. 8 Transient thermal impedance junction to case