

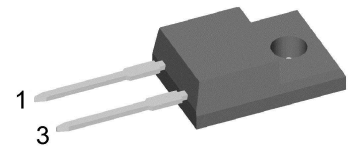
# HiPerFRED<sup>2</sup>

|           |   |       |
|-----------|---|-------|
| $V_{RRM}$ | = | 200 V |
| $I_{FAV}$ | = | 10 A  |
| $t_{rr}$  | = | 35 ns |


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

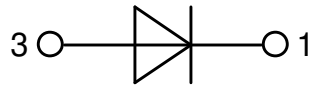
Part number

**DPG10I200PM**



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: TO-220FP

- Isolation Voltage: 2500 V~
- Industry standard outline
- RoHS compliant
- Epoxy meets UL 94V-0
- Soldering pins for PCB mounting
- Base plate: Plastic overmolded tab
- Reduced weight

### Disclaimer Notice

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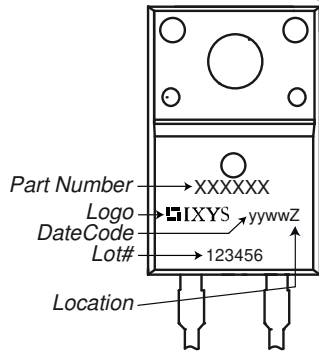


| Fast Diode |  |  |             | Ratings                      |      |      |               |
|------------|--|--|-------------|------------------------------|------|------|---------------|
| Symbol     | Definition                                   | Conditions   |             | min.                         | typ. | max. | Unit          |
| $V_{RSM}$  | max. non-repetitive reverse blocking voltage |  |             |                              |      | 200  | V             |
| $V_{RRM}$  | max. repetitive reverse blocking voltage     |  |             |                              |      | 200  | V             |
| $I_R$      | reverse current, drain current               | $V_R = 200\text{ V}$   |             | $T_{VJ} = 25^\circ\text{C}$  |      | 1    | $\mu\text{A}$ |
|            |  | $V_R = 200\text{ V}$   |             | $T_{VJ} = 150^\circ\text{C}$ |      | 0.06 | mA            |
| $V_F$      | forward voltage drop                         | $I_F = 10\text{ A}$  |             | $T_{VJ} = 25^\circ\text{C}$  |      | 1.27 | V             |
|            |  | $I_F = 20\text{ A}$  |             |                              |      | 1.45 | V             |
|            |  | $I_F = 10\text{ A}$  |             | $T_{VJ} = 150^\circ\text{C}$ |      | 0.98 | V             |
|            |  | $I_F = 20\text{ A}$  |             |                              |      | 1.17 | V             |
| $I_{FAV}$  | average forward current                      | $T_C = 125^\circ\text{C}$  | rectangular | $T_{VJ} = 175^\circ\text{C}$ |      | 10   | A             |
| $V_{FO}$   | threshold voltage                            | } for power loss calculation only                                  |             | $T_{VJ} = 175^\circ\text{C}$ |      | 0.74 | V             |
| $r_F$      | slope resistance                             |  |             |                              |      | 17.7 | m $\Omega$    |
| $R_{thJC}$ | thermal resistance junction to case          |  |             |                              |      | 4.4  | K/W           |
| $R_{thCH}$ | thermal resistance case to heatsink          |  |             |                              | 0.5  |      | K/W           |
| $P_{tot}$  | total power dissipation                      |  |             | $T_C = 25^\circ\text{C}$     |      | 35   | W             |
| $I_{FSM}$  | max. forward surge current                   | $t = 10\text{ ms}; (50\text{ Hz}), \text{ sine}; V_R = 0\text{ V}$ |             | $T_{VJ} = 45^\circ\text{C}$  |      | 140  | A             |
| $C_J$      | junction capacitance                         | $V_R = 150\text{ V}$ $f = 1\text{ MHz}$                            |             | $T_{VJ} = 25^\circ\text{C}$  |      | 15   | pF            |
| $I_{RM}$   | max. reverse recovery current                | } $I_F = 10\text{ A}; V_R = 130\text{ V}$                          |             | $T_{VJ} = 25^\circ\text{C}$  |      | 3    | A             |
|            |  |  |             | $T_{VJ} = 125^\circ\text{C}$ |      | 5.5  | A             |
| $t_{rr}$   | reverse recovery time                        | } $-di_F/dt = 200\text{ A}/\mu\text{s}$                            |             | $T_{VJ} = 25^\circ\text{C}$  |      | 35   | ns            |
|            |  |  |             | $T_{VJ} = 125^\circ\text{C}$ |      | 45   | ns            |



| Package TO-220FP |  | Ratings              |      |      |      |      |
|------------------|--|----------------------|------|------|------|------|
| Symbol           | Definition   | Conditions           | min. | typ. | max. | Unit |
| $I_{RMS}$        | RMS current  | per terminal         |      |      | 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>    |  |                      |      | 2    |      | g    |
| $M_D$            | mounting torque  |                      | 0.4  |      | 0.6  | Nm   |
| $F_C$            | mounting force with clip                                     |                      | 20   |      | 60   | N    |
| $d_{Spp/App}$    | creepage distance on surface   striking distance through air | terminal to terminal | 3.2  | 2.7  |      | mm   |
| $d_{Spb/Apb}$    |  | terminal to backside | 2.5  | 2.5  |      | mm   |
| $V_{ISOL}$       | isolation voltage  | t = 1 second         | 2500 |      |      | V    |
|                  |  | t = 1 minute         | 2100 |      |      | V    |

**Product Marking**



**Part description**

- D = Diode
- P = HiPerFRED
- G = extreme fast
- 10 = Current Rating [A]
- I = Single Diode
- 200 = Reverse Voltage [V]
- PM = TO-220ACFP (2)

| Ordering | Ordering Number | Marking on Product | Delivery Mode | Quantity | Code No. |
|----------|-----------------|--------------------|---------------|----------|----------|
| Standard | DPG10I200PM     | DPG10I200PM        | Tube          | 50       | 503771   |

| Similar Part | Package      | Voltage class |
|--------------|--------------|---------------|
| DPG10I200PA  | TO-220AC (2) | 200           |

**Equivalent Circuits for Simulation**

\* on die level

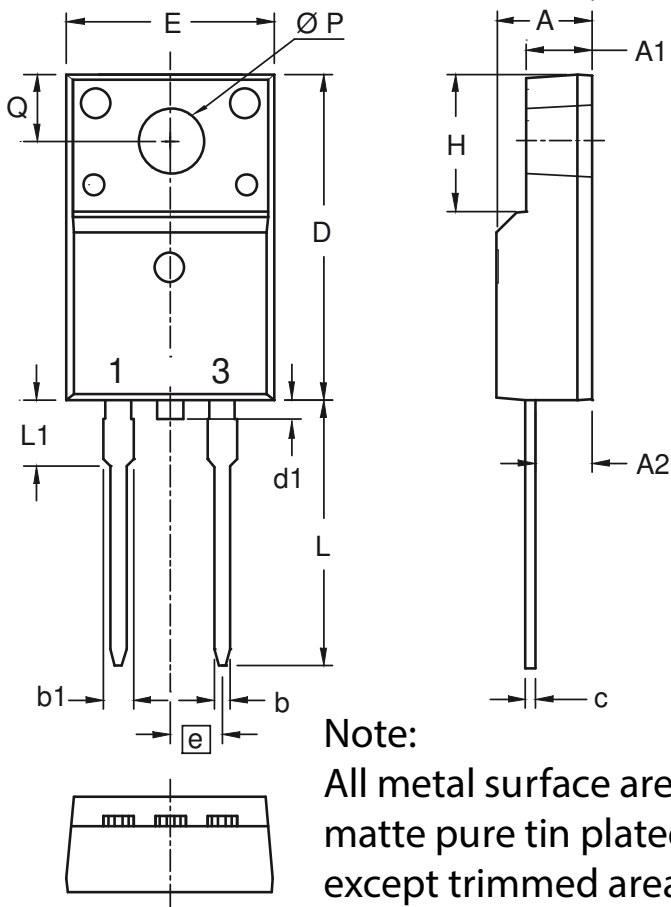
$T_{VJ} = 175^{\circ}C$



| Symbol       | Definition         | Fast Diode | Unit |
|--------------|--------------------|------------|------|
| $V_{0\ max}$ | threshold voltage  | 0.74       | V    |
| $R_{0\ max}$ | slope resistance * | 14.5       | mΩ   |



**Outlines TO-220FP**



**Note:**  
All metal surface are  
matte pure tin plated  
except trimmed area.

| Dim. | Millimeters |       | Inches    |       |
|------|-------------|-------|-----------|-------|
|      | min         | max   | min       | max   |
| A    | 4.50        | 4.90  | 0.177     | 0.193 |
| A1   | 2.34        | 2.74  | 0.092     | 0.108 |
| A2   | 2.56        | 2.96  | 0.101     | 0.117 |
| b    | 0.70        | 0.90  | 0.028     | 0.035 |
| b1   | 1.27        | 1.47  | 0.050     | 0.058 |
| c    | 0.45        | 0.60  | 0.018     | 0.024 |
| D    | 15.67       | 16.07 | 0.617     | 0.633 |
| d1   | 0           | 1.10  | 0         | 0.043 |
| E    | 9.96        | 10.36 | 0.392     | 0.408 |
| e    | 2.54 BSC    |       | 0.100 BSC |       |
| H    | 6.48        | 6.88  | 0.255     | 0.271 |
| L    | 12.68       | 13.28 | 0.499     | 0.523 |
| L1   | 3.03        | 3.43  | 0.119     | 0.135 |
| ØP   | 3.08        | 3.28  | 0.121     | 0.129 |
| Q    | 3.20        | 3.40  | 0.126     | 0.134 |



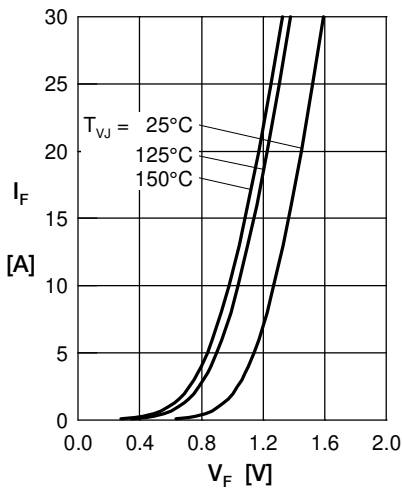
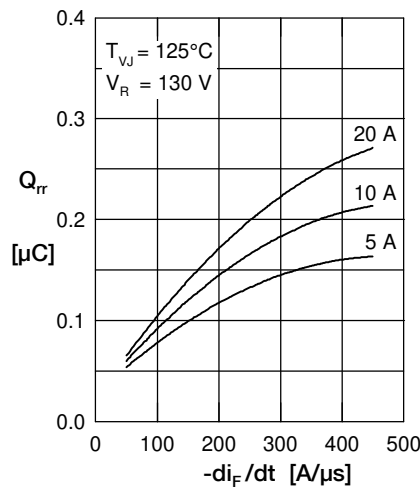
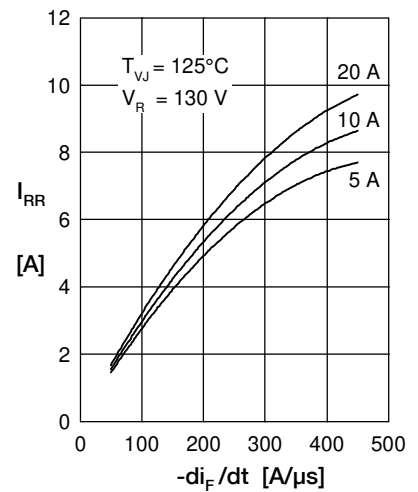
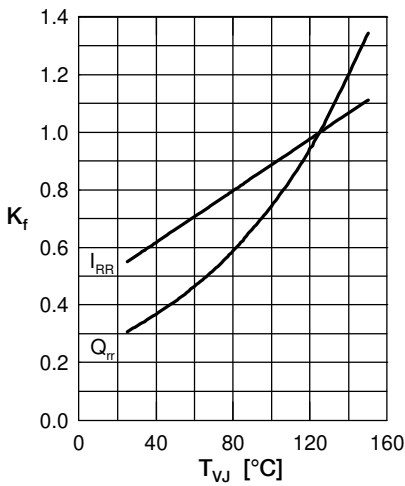
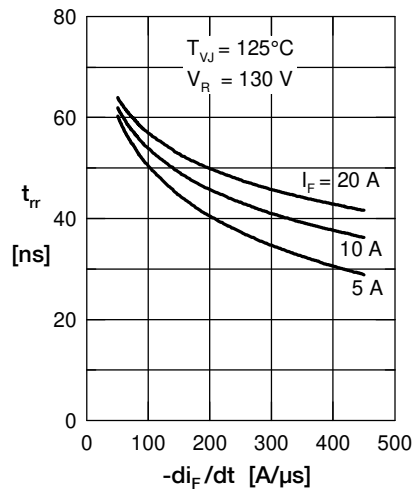
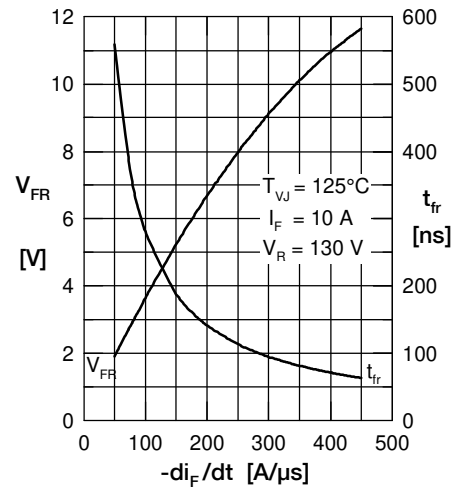
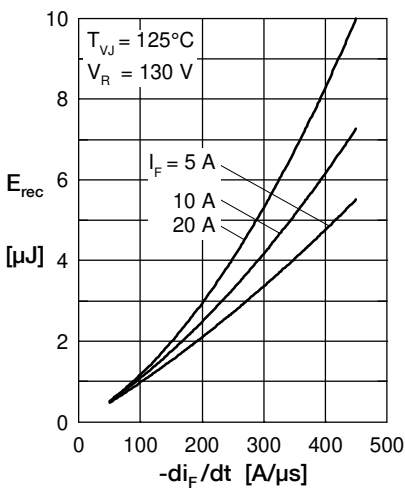
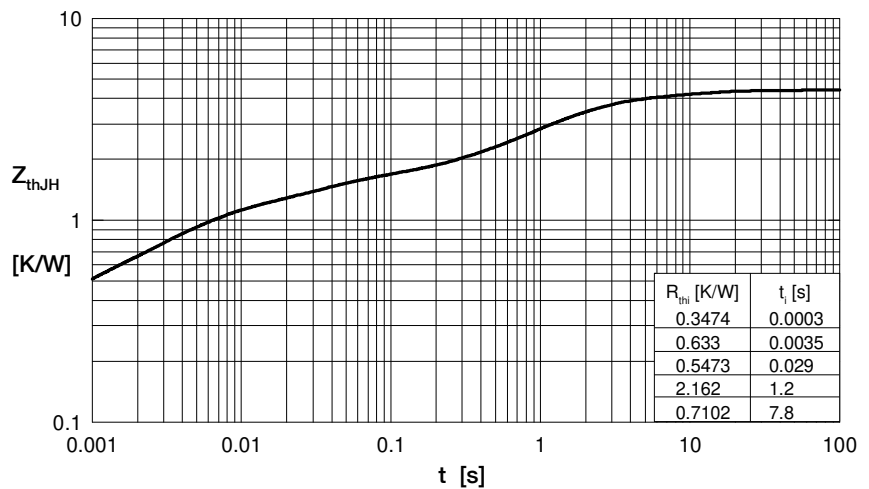
**Fast Diode**

 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  $I_{RR}$  versus  $-di_F/dt$ 

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

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

 Fig. 6 Typ. forward recov. 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