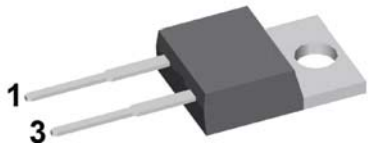
# HiPerFRED²

$V_{RRM}$ = 200 V
$I_{FAV}$ = 15 A
$t_{rr}$ = 35 ns

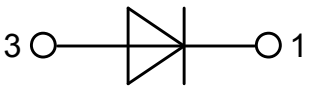
High Performance Fast Recovery Diode
Low Loss and Soft Recovery
Single Diode

**Part number**

DPG15I200PA




Backside: cathode




**Features / Advantages:**

- Planar passivated chips
- Very low leakage current
- Very short recovery time
- Improved thermal behaviour
- Very low Irm-values
- Very soft recovery behaviour
- Avalanche voltage rated for reliable operation
- Soft reverse recovery for low EMI/RFI
- Low Irm 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-220

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



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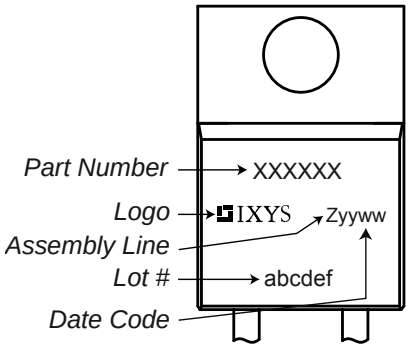
| Fast Diode | | | | Ratings | | | |
|---|---|---|---|---|---|---|---|
| Symbol | Definition | Conditions | | min. | typ. | max. | Unit |
| $V_{RSM}$ | *max. non-repetitive reverse blocking voltage* | | $T_{VJ}$ = 25°C | | | 200 | V |
| $V_{RRM}$ | *max. repetitive reverse blocking voltage* | | $T_{VJ}$ = 25°C | | | 200 | V |
| $I_R$ | *reverse current, drain current* | $V_R$ = 200 V | $T_{VJ}$ = 25°C | | | 1 | µA |
| | | $V_R$ = 200 V | $T_{VJ}$ = 150°C | | | 0.08 | mA |
| $V_F$ | *forward voltage drop* | $I_F$ = 15 A | $T_{VJ}$ = 25°C | | | 1.26 | V |
| | | $I_F$ = 30 A | | | | 1.51 | V |
| | | $I_F$ = 15 A | $T_{VJ}$ = 150°C | | | 1.01 | V |
| | | $I_F$ = 30 A | | | | 1.29 | V |
| $I_{FAV}$ | *average forward current* | $T_C$ = 145°C | $T_{VJ}$ = 175°C | | | 15 | A |
| | | rectangular d = 0.5 | | | | | |
| $V_{F0}$ | *threshold voltage* } *for power loss calculation only* | | $T_{VJ}$ = 175°C | | | 0.69 | V |
| $r_F$ | *slope resistance* } | | | | | 18 | mΩ |
| $R_{thJC}$ | *thermal resistance junction to case* | | | | | 1.7 | K/W |
| $R_{thCH}$ | *thermal resistance case to heatsink* | | | | 0.50 | | K/W |
| $P_{tot}$ | *total power dissipation* | | $T_C$ = 25°C | | | 90 | W |
| $I_{FSM}$ | *max. forward surge current* | t = 10 ms; (50 Hz), sine; $V_R$ = 0 V | $T_{VJ}$ = 45°C | | | 240 | A |
| $C_J$ | *junction capacitance* | $V_R$ = 150 V f = 1 MHz | $T_{VJ}$ = 25°C | | 20 | | pF |
| $I_{RM}$ | *max. reverse recovery current* | | $T_{VJ}$ = 25°C | | 3 | | A |
| | | $I_F$ = 15 A; $V_R$ = 130 V | $T_{VJ}$ = 125°C | | 6.5 | | A |
| $t_{rr}$ | *reverse recovery time* | $-di_F/dt$ = 200 A/µs | $T_{VJ}$ = 25°C | | 35 | | ns |
| | | | $T_{VJ}$ = 125°C | | 55 | | ns |



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| Package TO-220 | | | 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 |
| Weight | | | | 2 | | g |
| $M_D$ | *mounting torque* | | 0.4 | | 0.6 | Nm |
| $F_C$ | *mounting force with clip* | | 20 | | 60 | N |

**Product Marking**

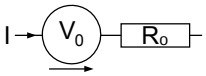



**Part number**

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

| Ordering | Part Number | Marking on Product | Delivery Mode | Quantity | Code No. |
|---|---|---|---|---|---|
| Standard | DPG15I200PA | DPG15I200PA | Tube | 50 | 506661 |

**Equivalent Circuits for Simulation** ** on die level* $T_{VJ}$ = 175 °C

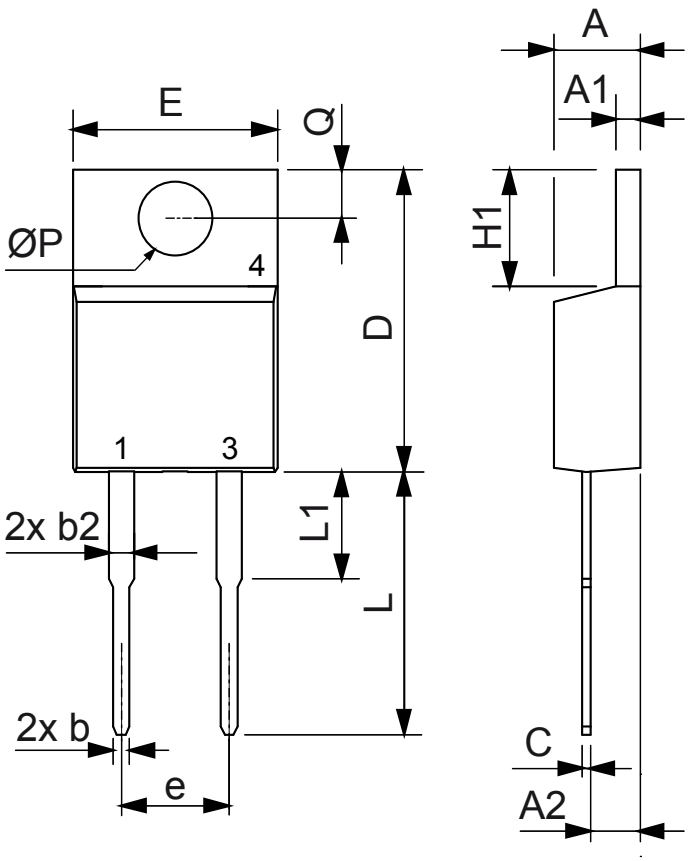



| | | Fast Diode | |
|---|---|---|---|
| $V_{0\,max}$ | *threshold voltage* | 0.69 | V |
| $R_{0\,max}$ | *slope resistance ** | 14.8 | mΩ |

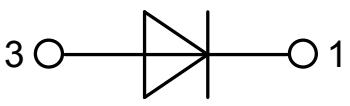


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## Outlines TO-220




| Dim. | Millimeter | | Inches | |
|---|---|---|---|---|
| | Min. | Max. | Min. | Max. |
| A | 4.32 | 4.82 | 0.170 | 0.190 |
| A1 | 1.14 | 1.39 | 0.045 | 0.055 |
| A2 | 2.29 | 2.79 | 0.090 | 0.110 |
| b | 0.64 | 1.01 | 0.025 | 0.040 |
| b2 | 1.15 | 1.65 | 0.045 | 0.065 |
| C | 0.35 | 0.56 | 0.014 | 0.022 |
| D | 14.73 | 16.00 | 0.580 | 0.630 |
| E | 9.91 | 10.66 | 0.390 | 0.420 |
| e | 5.08 | BSC | 0.200 | BSC |
| H1 | 5.85 | 6.85 | 0.230 | 0.270 |
| L | 12.70 | 13.97 | 0.500 | 0.550 |
| L1 | 2.79 | 5.84 | 0.110 | 0.230 |
| ØP | 3.54 | 4.08 | 0.139 | 0.161 |
| Q | 2.54 | 3.18 | 0.100 | 0.125 |






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## Fast Diode

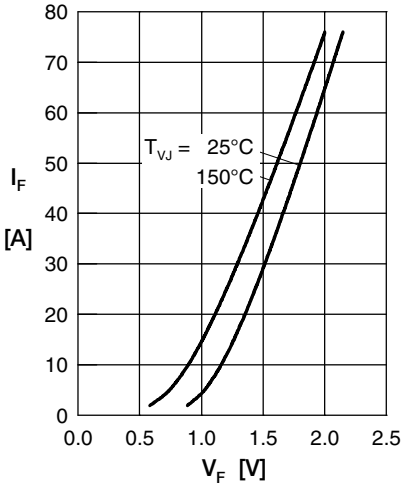



Fig. 1 Forward current $I_F$ versus $V_F$

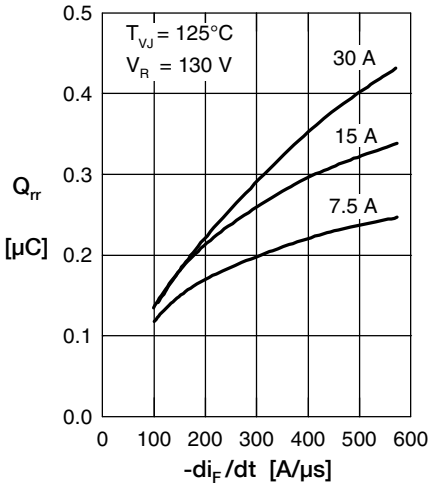



Fig. 2 Typ. reverse recov. charge $Q_{rr}$ versus -di$_F$/dt

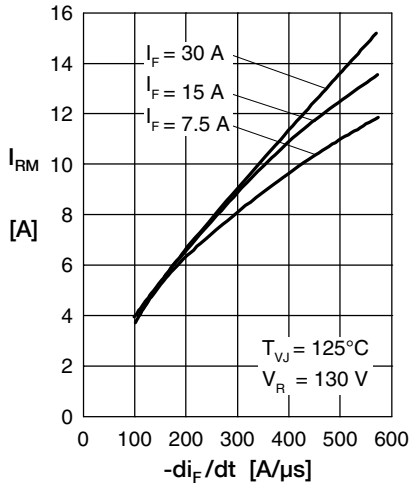



Fig. 3 Typ. peak reverse current $I_{RM}$ versus -di$_F$/dt

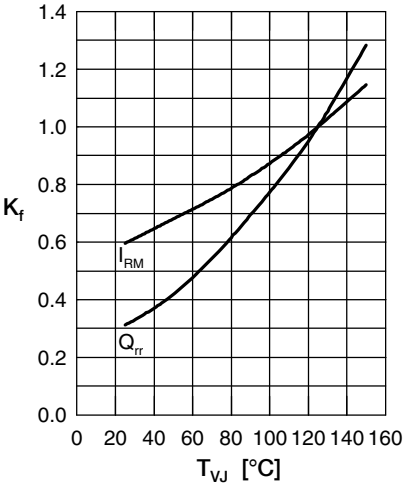



Fig. 4 Typ. dynamic parameters $Q_{rr}$, $I_{RM}$ versus $T_{VJ}$

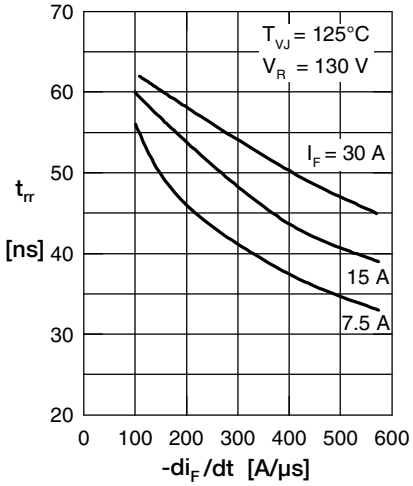



Fig. 5 Typ. recov. time $t_{rr}$ versus -di$_F$/dt

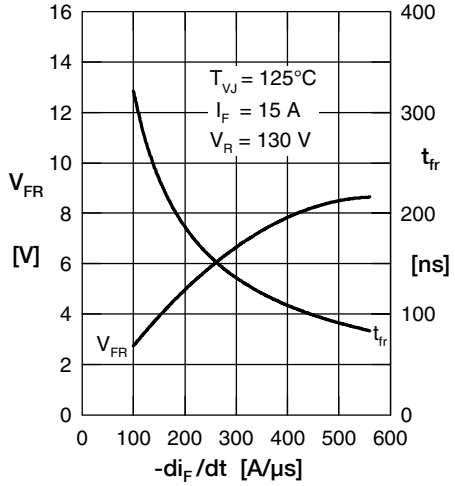



Fig. 6 Typ. peak forward voltage $V_{FR}$ and $t_{fr}$ versus di$_F$/dt

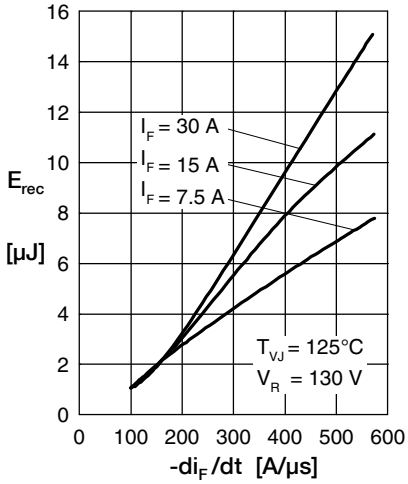



Fig. 7 Typ. recovery energy $E_{rec}$ versus -di$_F$/dt

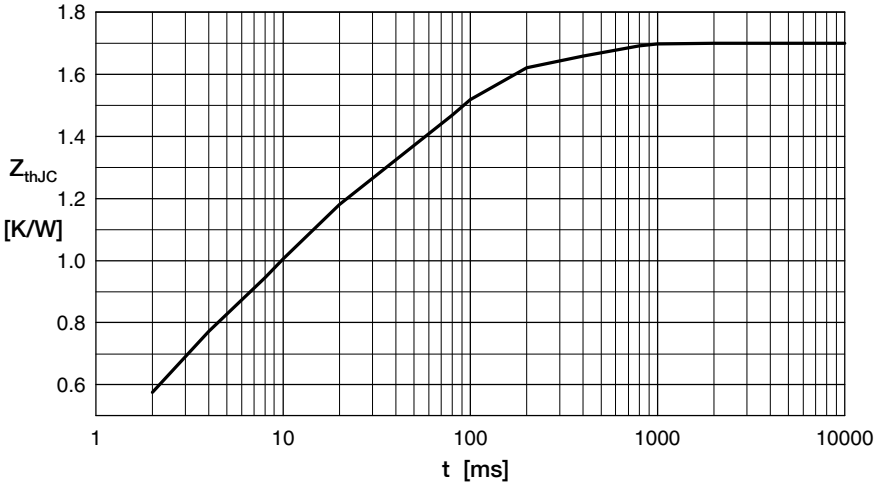



Fig. 8 Transient thermal resistance junction to case



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