



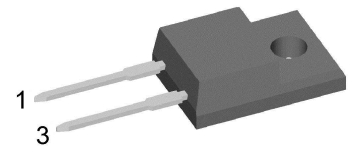
HiPerFRED²

| | | |
|-----------|---|-------|
| V_{RRM} | = | 400 V |
| I_{FAV} | = | 10 A |
| t_{rr} | = | 45 ns |

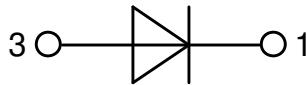
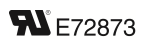
High Performance Fast Recovery Diode
Low Loss and Soft Recovery
Single Diode

Part number

DPG10I400PM



Backside: isolated



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

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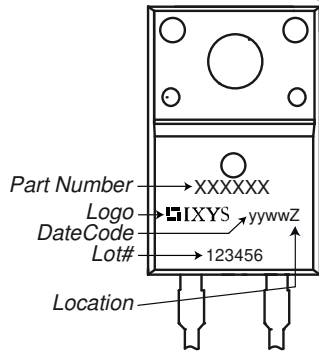


| Fast Diode | | | | Ratings | | | |
|------------|--|---|-------------------------|---------|------|------------|--|
| Symbol | Definition | Conditions | min. | typ. | max. | Unit | |
| V_{RSM} | max. non-repetitive reverse blocking voltage | $T_{VJ} = 25^{\circ}C$ | | | 400 | V | |
| V_{RRM} | max. repetitive reverse blocking voltage | $T_{VJ} = 25^{\circ}C$ | | | 400 | V | |
| I_R | reverse current, drain current | $V_R = 400 V$ | $T_{VJ} = 25^{\circ}C$ | | 1 | μA | |
| | | $V_R = 400 V$ | $T_{VJ} = 150^{\circ}C$ | | 0.15 | mA | |
| V_F | forward voltage drop | $I_F = 10 A$ | $T_{VJ} = 25^{\circ}C$ | | 1.32 | V | |
| | | $I_F = 20 A$ | | | 1.51 | V | |
| | | $I_F = 10 A$ | $T_{VJ} = 150^{\circ}C$ | | 1.03 | V | |
| | | $I_F = 20 A$ | | | 1.24 | V | |
| I_{FAV} | average forward current | $T_C = 125^{\circ}C$ rectangular $d = 0.5$ | $T_{VJ} = 175^{\circ}C$ | | 10 | A | |
| V_{FO} | threshold voltage | } for power loss calculation only | $T_{VJ} = 175^{\circ}C$ | | 0.77 | V | |
| r_F | slope resistance | | | | 19.8 | m Ω | |
| 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 | | $T_C = 25^{\circ}C$ | | 35 | W | |
| I_{FSM} | max. forward surge current | $t = 10 \text{ ms}; (50 \text{ Hz}), \text{ sine}; V_R = 0 V$ | $T_{VJ} = 45^{\circ}C$ | | 150 | A | |
| C_J | junction capacitance | $V_R = 150 V \quad f = 1 \text{ MHz}$ | $T_{VJ} = 25^{\circ}C$ | | 12 | pF | |
| I_{RM} | max. reverse recovery current | } $I_F = 10 A; V_R = 270 V$ $-di_F / dt = 200 A/\mu s$ | $T_{VJ} = 25^{\circ}C$ | | 4 | A | |
| | | | $T_{VJ} = 125^{\circ}C$ | | 6 | A | |
| t_{rr} | reverse recovery time | | $T_{VJ} = 25^{\circ}C$ | | 45 | ns | |
| | | | $T_{VJ} = 125^{\circ}C$ | | 65 | 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 |
| Weight | | | | 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 |
| | | 50/60 Hz, RMS; $I_{ISOL} \leq 1$ mA | | | | |

Product Marking



Part description

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

| Ordering | Ordering Number | Marking on Product | Delivery Mode | Quantity | Code No. |
|----------|-----------------|--------------------|---------------|----------|----------|
| Standard | DPG10I400PM | DPG10I400PM | Tube | 50 | 503778 |

| Similar Part | Package | Voltage class |
|--------------|--------------|---------------|
| DPG10I400PA | TO-220AC (2) | 400 |

Equivalent Circuits for Simulation

* on die level

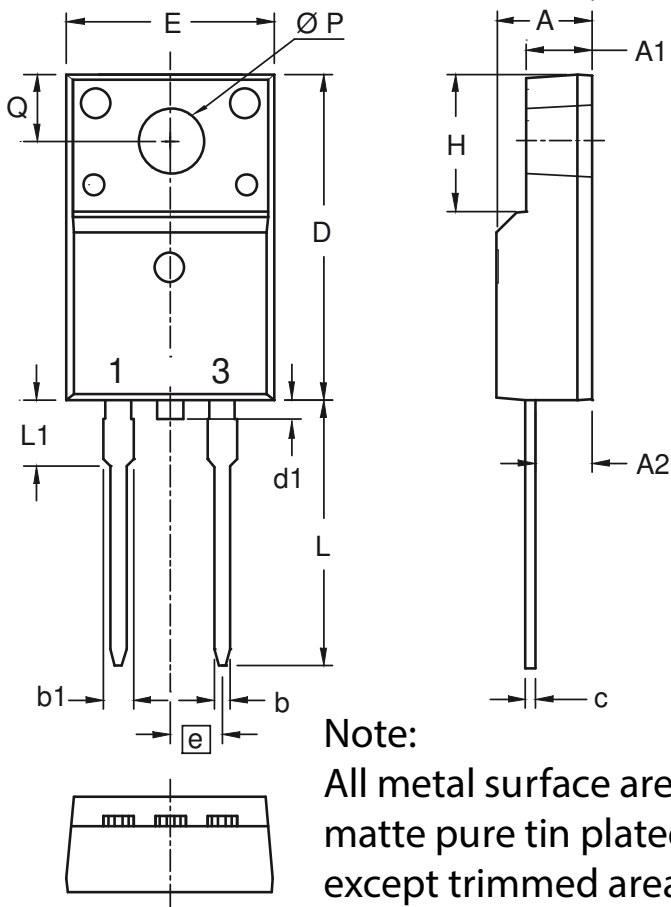
$T_{VJ} = 175^\circ\text{C}$



| Symbol | Definition | Fast Diode | Unit |
|--------------|--------------------|------------|------|
| $V_{0\ max}$ | threshold voltage | 0.77 | V |
| $R_{0\ max}$ | slope resistance * | 16.6 | mΩ |



Outlines TO-220FP



| 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 |



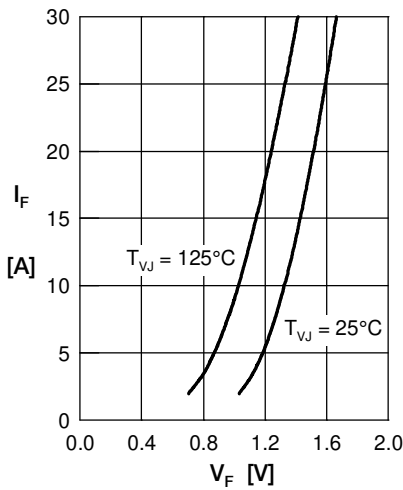
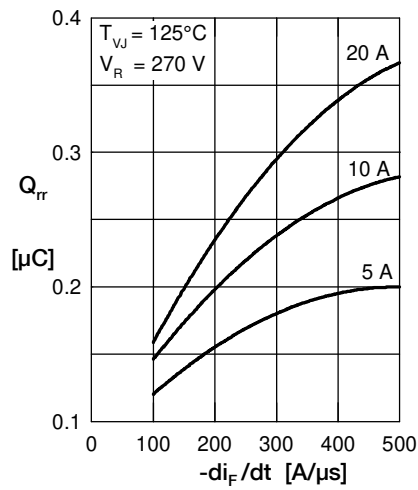
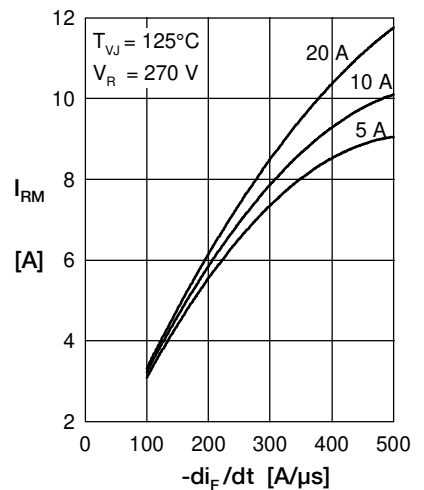
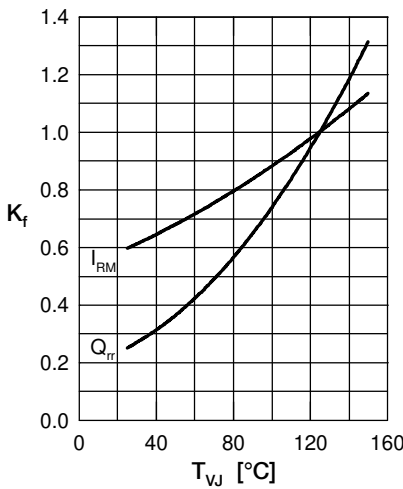
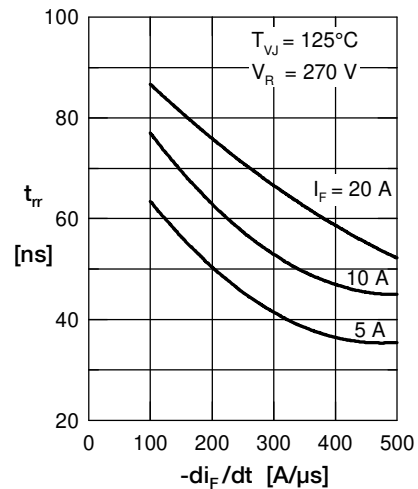
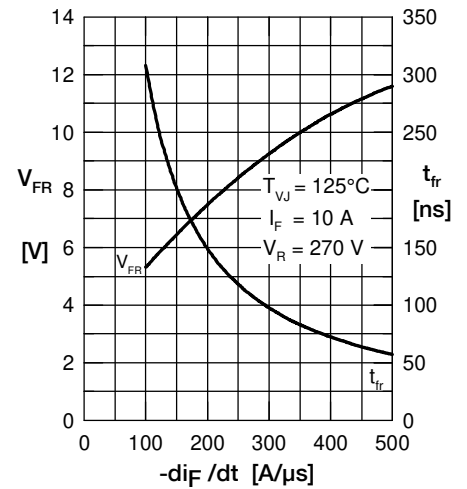
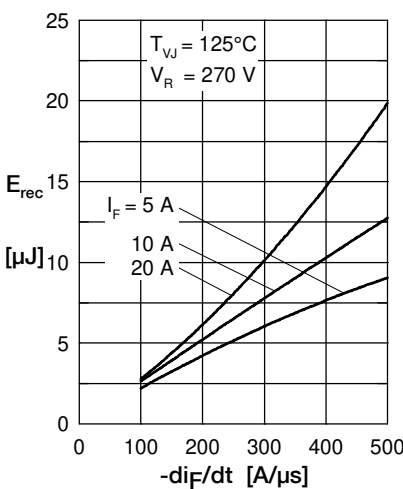
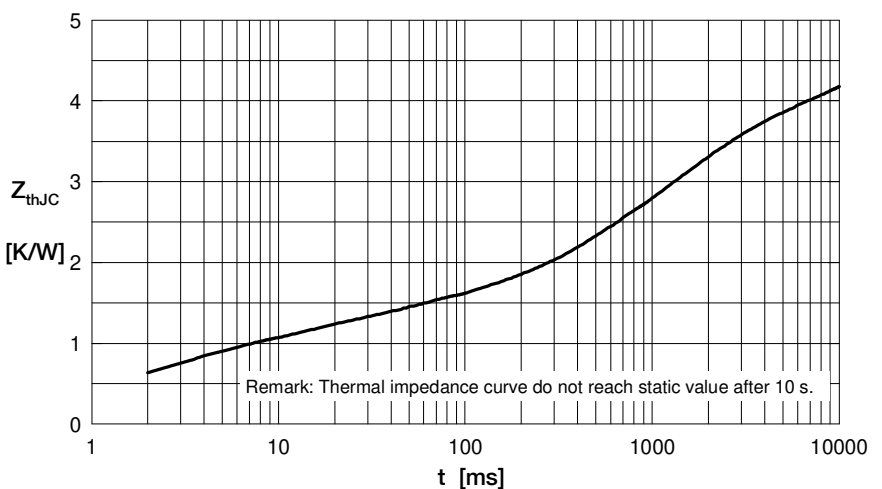
Fast Diode

 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_{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 recovery 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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