



preliminary

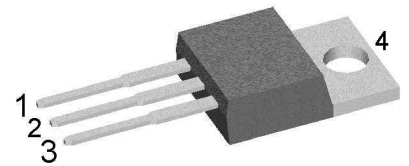
# Sonic Fast Recovery Diode

$V_{RRM} = 600\text{ V}$   
 $I_{FAV} = 2 \times 10\text{ A}$   
 $t_{rr} = 35\text{ ns}$

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

Part number

**DHG20C600PB**



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-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 | $T_{VJ} = 25^{\circ}C$                                    |                              |         | 600  | V          |  |
| $V_{RRM}$  | max. repetitive reverse blocking voltage     | $T_{VJ} = 25^{\circ}C$                                    |                              |         | 600  | V          |  |
| $I_R$      | reverse current, drain current               | $V_R = 600 V$                                             | $T_{VJ} = 25^{\circ}C$       |         | 30   | $\mu A$    |  |
|            |                                              | $V_R = 600 V$                                             | $T_{VJ} = 125^{\circ}C$      |         | 1.2  | mA         |  |
| $V_F$      | forward voltage drop                         | $I_F = 10 A$                                              | $T_{VJ} = 25^{\circ}C$       |         | 2.23 | V          |  |
|            |                                              | $I_F = 20 A$                                              |                              |         | 3.13 | V          |  |
|            |                                              | $I_F = 10 A$                                              | $T_{VJ} = 125^{\circ}C$      |         | 2.18 | V          |  |
|            |                                              | $I_F = 20 A$                                              |                              |         | 3.29 | V          |  |
| $I_{FAV}$  | average forward current                      | $T_C = 95^{\circ}C$<br>rectangular $d = 0.5$              | $T_{VJ} = 150^{\circ}C$      |         | 10   | A          |  |
| $V_{FO}$   | threshold voltage                            | } for power loss calculation only                         | $T_{VJ} = 150^{\circ}C$      |         | 1.04 | V          |  |
| $r_F$      | slope resistance                             |                                                           |                              |         | 104  | m $\Omega$ |  |
| $R_{thJC}$ | thermal resistance junction to case          |                                                           |                              |         | 1.8  | K/W        |  |
| $R_{thCH}$ | thermal resistance case to heatsink          |                                                           |                              | 0.5     |      | K/W        |  |
| $P_{tot}$  | total power dissipation                      |                                                           | $T_C = 25^{\circ}C$          |         | 70   | W          |  |
| $I_{FSM}$  | max. forward surge current                   | $t = 10 ms; (50 Hz), sine; V_R = 0 V$                     | $T_{VJ} = 45^{\circ}C$       |         | 80   | A          |  |
| $C_J$      | junction capacitance                         | $V_R = 400 V f = 1 MHz$                                   | $T_{VJ} = 25^{\circ}C$       |         | 6    | pF         |  |
| $I_{RM}$   | max. reverse recovery current                | } $I_F = 10 A; V_R = 400 V$<br>$-di_F / dt = 200 A/\mu s$ | $T_{VJ} = 25^{\circ}C$       |         | 4    | A          |  |
|            |                                              |                                                           | $T_{VJ} = \text{ }^{\circ}C$ |         | tbd  | A          |  |
| $t_{rr}$   | reverse recovery time                        |                                                           | $T_{VJ} = 25^{\circ}C$       |         | 35   | ns         |  |
|            |                                              |                                                           | $T_{VJ} = \text{ }^{\circ}C$ |         | tbd  | ns         |  |



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| Package TO-220 |                              |                            | 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     |      | 150  | °C   |
| $T_{op}$       | operation temperature        |                            | -55     |      | 125  | °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    |

**Product Marking**



**Part description**

- D = Diode
- H = Sonic Fast Recovery Diode
- G = extreme fast
- 20 = Current Rating [A]
- C = Common Cathode
- 600 = Reverse Voltage [V]
- PB = TO-220AB (3)

| Ordering | Ordering Number | Marking on Product | Delivery Mode | Quantity | Code No. |
|----------|-----------------|--------------------|---------------|----------|----------|
| Standard | DHG20C600PB     | DHG20C600PB        | Tube          | 50       | 505287   |

| Similar Part | Package   | Voltage class |
|--------------|-----------|---------------|
| DHG20C600QB  | TO-3P (3) | 600           |

**Equivalent Circuits for Simulation**

\* on die level

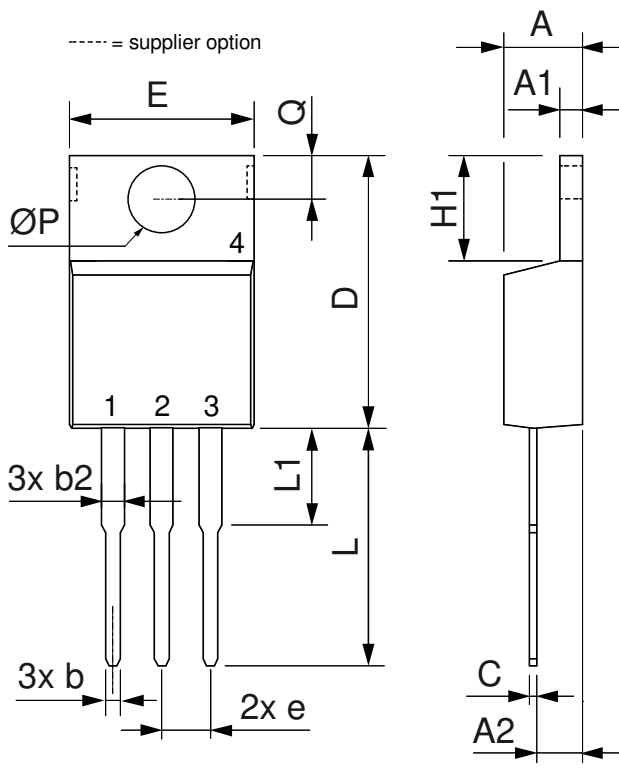
$T_{VJ} = 150^{\circ}C$



| Symbol       | Definition         | Fast Diode | Unit |
|--------------|--------------------|------------|------|
| $V_{0\ max}$ | threshold voltage  | 1.04       | V    |
| $R_{0\ max}$ | slope resistance * | 101        | mΩ   |



**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    | 2.54       | BSC   | 0.100  | 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 |

