



preliminary

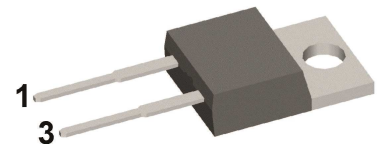
Sonic Fast Recovery Diode

| | | |
|-----------|---|--------------|
| V_{RRM} | = | 600 V |
| I_{FAV} | = | 20 A |
| t_{rr} | = | 40 ns |

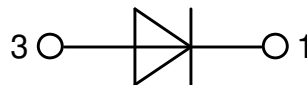
High Performance Fast Recovery Diode
Low Loss and Soft Recovery
Single Diode

Part number

DHG20I600PA



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 | μA | |
| | | $V_R = 600 V$ | $T_{VJ} = 125^{\circ}C$ | | 1.5 | mA | |
| V_F | forward voltage drop | $I_F = 20 A$ | $T_{VJ} = 25^{\circ}C$ | | 2.25 | V | |
| | | $I_F = 40 A$ | | | 3.17 | V | |
| | | $I_F = 20 A$ | $T_{VJ} = 125^{\circ}C$ | | 2.21 | V | |
| | | $I_F = 40 A$ | | | 3.25 | V | |
| I_{FAV} | average forward current | $T_C = 95^{\circ}C$ rectangular $d = 0.5$ | $T_{VJ} = 150^{\circ}C$ | | 20 | A | |
| V_{FO} | threshold voltage | } for power loss calculation only | $T_{VJ} = 150^{\circ}C$ | | 1.15 | V | |
| r_F | slope resistance | | | | 45 | m Ω | |
| R_{thJC} | thermal resistance junction to case | | | | 0.9 | K/W | |
| R_{thCH} | thermal resistance case to heatsink | | | 0.5 | | K/W | |
| P_{tot} | total power dissipation | | $T_C = 25^{\circ}C$ | | 140 | W | |
| I_{FSM} | max. forward surge current | $t = 10 ms; (50 Hz), sine; V_R = 0 V$ | $T_{VJ} = 45^{\circ}C$ | | 150 | A | |
| C_J | junction capacitance | $V_R = 400 V$ $f = 1 MHz$ | $T_{VJ} = 25^{\circ}C$ | | 12 | pF | |
| I_{RM} | max. reverse recovery current | } $I_F = 20 A; V_R = 300 V$ $-di_F / dt = 450 A/\mu s$ | $T_{VJ} = 25^{\circ}C$ | | 8 | A | |
| | | | $T_{VJ} = 125^{\circ}C$ | | 12 | A | |
| t_{rr} | reverse recovery time | | $T_{VJ} = 25^{\circ}C$ | | 40 | ns | |
| | | | $T_{VJ} = 125^{\circ}C$ | | 60 | ns | |



preliminary

| 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 | | 150 | °C |
| T_{op} | operation temperature | | -55 | | 125 | °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 description

- D = Diode
- H = Sonic Fast Recovery Diode
- G = extreme fast
- 20 = Current Rating [A]
- I = Single Diode
- 600 = Reverse Voltage [V]
- PA = TO-220AC (2)

| Ordering | Ordering Number | Marking on Product | Delivery Mode | Quantity | Code No. |
|----------|-----------------|--------------------|---------------|----------|----------|
| Standard | DHG20I600PA | DHG20I600PA | Tube | 50 | 504941 |

| Similar Part | Package | Voltage class |
|--------------|--------------|---------------|
| DHG20I600HA | TO-247AD (2) | 600 |

Equivalent Circuits for Simulation

* on die level

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

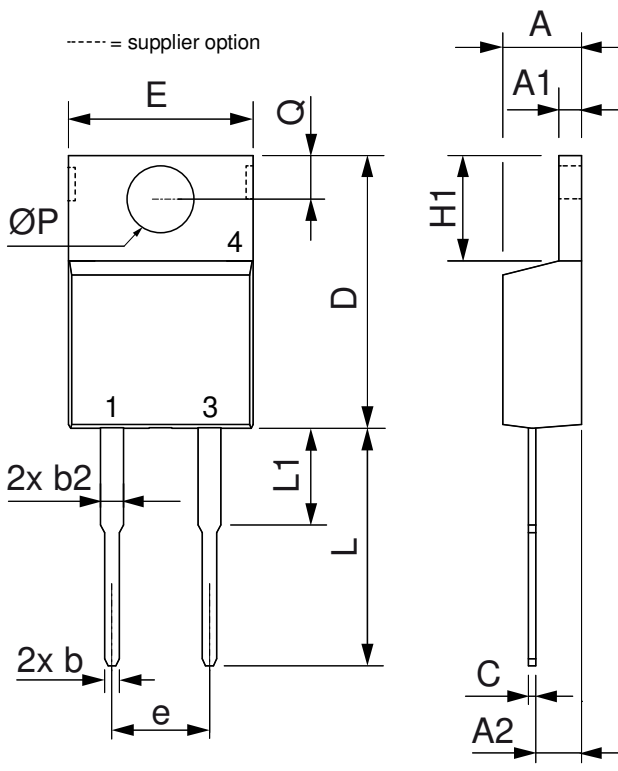


Fast Diode

| | | | |
|--------------|--------------------|------|----|
| $V_{0\ max}$ | threshold voltage | 1.15 | V |
| $R_{0\ max}$ | slope resistance * | 42 | 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 | 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 |





Fast Diode

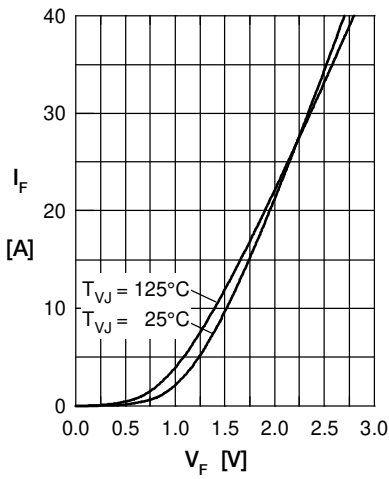


Fig. 1 Typ. Forward current versus V_F

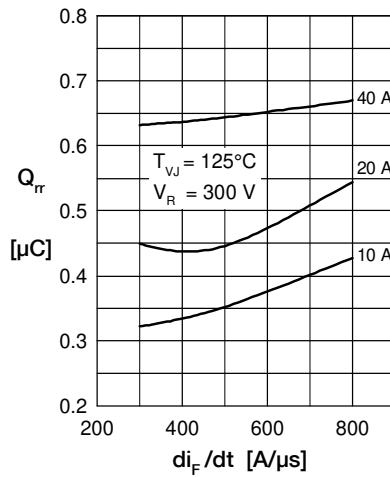


Fig. 2 Typ. reverse recov. charge Q_{rr} versus di/dt

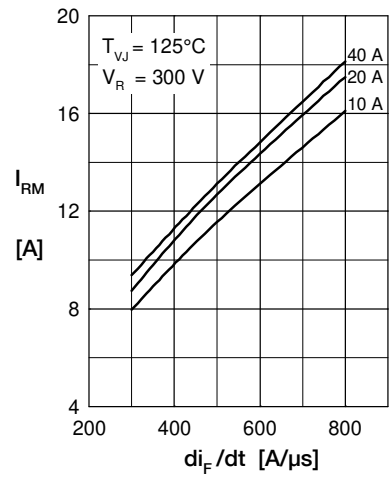


Fig. 3 Typ. peak reverse current I_{RM} versus di/dt

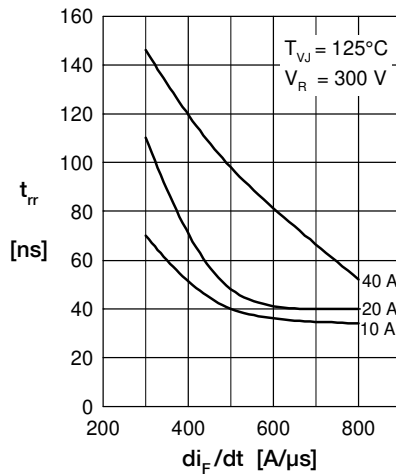


Fig. 4 Dynamic parameters Q_{rr} , I_{RM} versus T_{VJ}

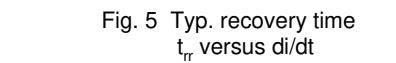


Fig. 5 Typ. recovery time t_{rr} versus di/dt

Fig. 6 Typ. recovery energy E_{rec} versus di/dt

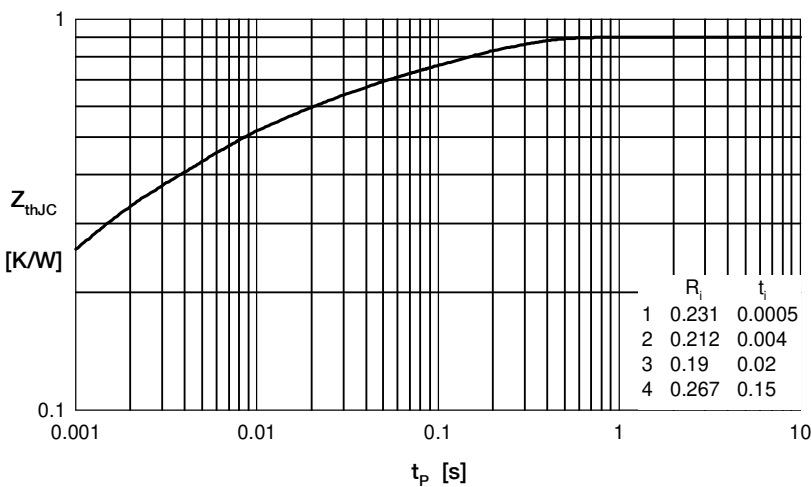


Fig. 7 Typ. transient thermal impedance junction to case