

# Sonic Fast Recovery Diode

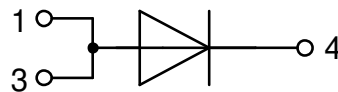
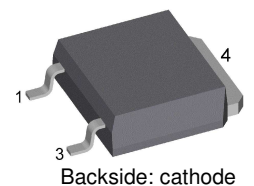
$V_{RRM} = 1800\text{ V}$   
 $I_{FAV} = 10\text{ A}$   
 $t_{rr} = 260\text{ ns}$

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

**Part number**

**DHG10IM1800UZ**

Marking on Product: HAVGZI



## 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-252 (DPak)

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

## Disclaimer Notice

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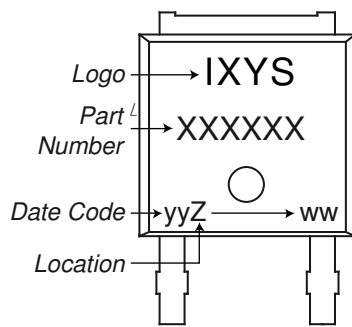


| Fast Diode |  |   |                         | Ratings |      |            |  |
|------------|--|---|-------------------------|---------|------|------------|--|
| Symbol     | Definition                                   | Conditions  | min.                    | typ.    | max. | Unit       |  |
| $V_{RSM}$  | max. non-repetitive reverse blocking voltage | $T_{VJ} = 25^{\circ}C$                                    |                         |         | 1800 | V          |  |
| $V_{RRM}$  | max. repetitive reverse blocking voltage     | $T_{VJ} = 25^{\circ}C$                                    |                         |         | 1800 | V          |  |
| $I_R$      | reverse current, drain current               | $V_R = 1800 V$  | $T_{VJ} = 25^{\circ}C$  |         | 50   | $\mu A$    |  |
|            |  | $V_R = 1800 V$  | $T_{VJ} = 150^{\circ}C$ |         | 0.4  | mA         |  |
| $V_F$      | forward voltage drop                         | $I_F = 10 A$  | $T_{VJ} = 25^{\circ}C$  |         | 2.27 | V          |  |
|            |  | $I_F = 20 A$  |                         |         | 2.94 | V          |  |
|            |  | $I_F = 10 A$  | $T_{VJ} = 150^{\circ}C$ |         | 2.43 | V          |  |
|            |  | $I_F = 20 A$  |                         |         | 3.42 | V          |  |
| $I_{FAV}$  | average forward current                      | $T_C = 110^{\circ}C$<br>rectangular $d = 0.5$             | $T_{VJ} = 175^{\circ}C$ |         | 10   | A          |  |
| $V_{FO}$   | threshold voltage                            | } for power loss calculation only                         | $T_{VJ} = 175^{\circ}C$ |         | 1.40 | V          |  |
| $r_F$      | slope resistance                             |   |                         |         | 101  | m $\Omega$ |  |
| $R_{thJC}$ | thermal resistance junction to case          |   |                         |         | 1.5  | K/W        |  |
| $R_{thCH}$ | thermal resistance case to heatsink          |   |                         | 0.5     |      | K/W        |  |
| $P_{tot}$  | total power dissipation                      |   | $T_C = 25^{\circ}C$     |         | 85   | W          |  |
| $I_{FSM}$  | max. forward surge current                   | $t = 10 ms; (50 Hz), sine; V_R = 0 V$                     | $T_{VJ} = 45^{\circ}C$  |         | 60   | A          |  |
| $C_J$      | junction capacitance                         | $V_R = 200 V \quad f = 1 MHz$                             | $T_{VJ} = 25^{\circ}C$  |         | 3    | pF         |  |
| $I_{RM}$   | max. reverse recovery current                | } $I_F = 10 A; V_R = 900 V$<br>$-di_F / dt = 350 A/\mu s$ | $T_{VJ} = 25^{\circ}C$  |         | 15   | A          |  |
|            |  |   | $T_{VJ} = 150^{\circ}C$ |         | 17.5 | A          |  |
| $t_{rr}$   | reverse recovery time                        |   | $T_{VJ} = 25^{\circ}C$  |         | 260  | ns         |  |
|            |  |   | $T_{VJ} = 150^{\circ}C$ |         | 350  | ns         |  |



| Package TO-252 (DPak) |  | Ratings              |      |      |      |      |
|-----------------------|--|----------------------|------|------|------|------|
| Symbol                | Definition   | Conditions           | min. | typ. | max. | Unit |
| $I_{RMS}$             | RMS current  | per terminal         |      |      | 20   | 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>         |  |                      |      | 0.3  |      | g    |
| $F_C$                 | mounting force with clip                                     |                      | 20   |      | 60   | N    |
| $d_{Spp/App}$         | creepage distance on surface / striking distance through air | terminal to terminal | 3.6  |      |      | mm   |
| $d_{Spb/Apb}$         |  | terminal to backside | 3.0  |      |      | mm   |

**Product Marking**



**Part description**

- D = Diode
- H = Sonic Fast Recovery Diode
- G = extreme fast
- 10 = Current Rating [A]
- IM = Single Diode
- 1800 = Reverse Voltage [V]
- UZ = TO-252AA (DPak) (2HV)

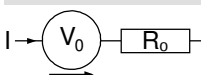
| Ordering    | Ordering Number   | Marking on Product | Delivery Mode | Quantity | Code No. |
|-------------|-------------------|--------------------|---------------|----------|----------|
| Standard    | DHG10IM1800UZ-TRL | HAVGZI             | Tape & Reel   | 2500     | 526360   |
| Alternative | DHG10IM1800UZ-TUB | HAVGZI             | Tube          | 70       | 526353   |

| Similar Part | Package      | Voltage class |
|--------------|--------------|---------------|
| DHG10I1800PA | TO-220AC (2) | 1800          |

**Equivalent Circuits for Simulation**

\* on die level

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

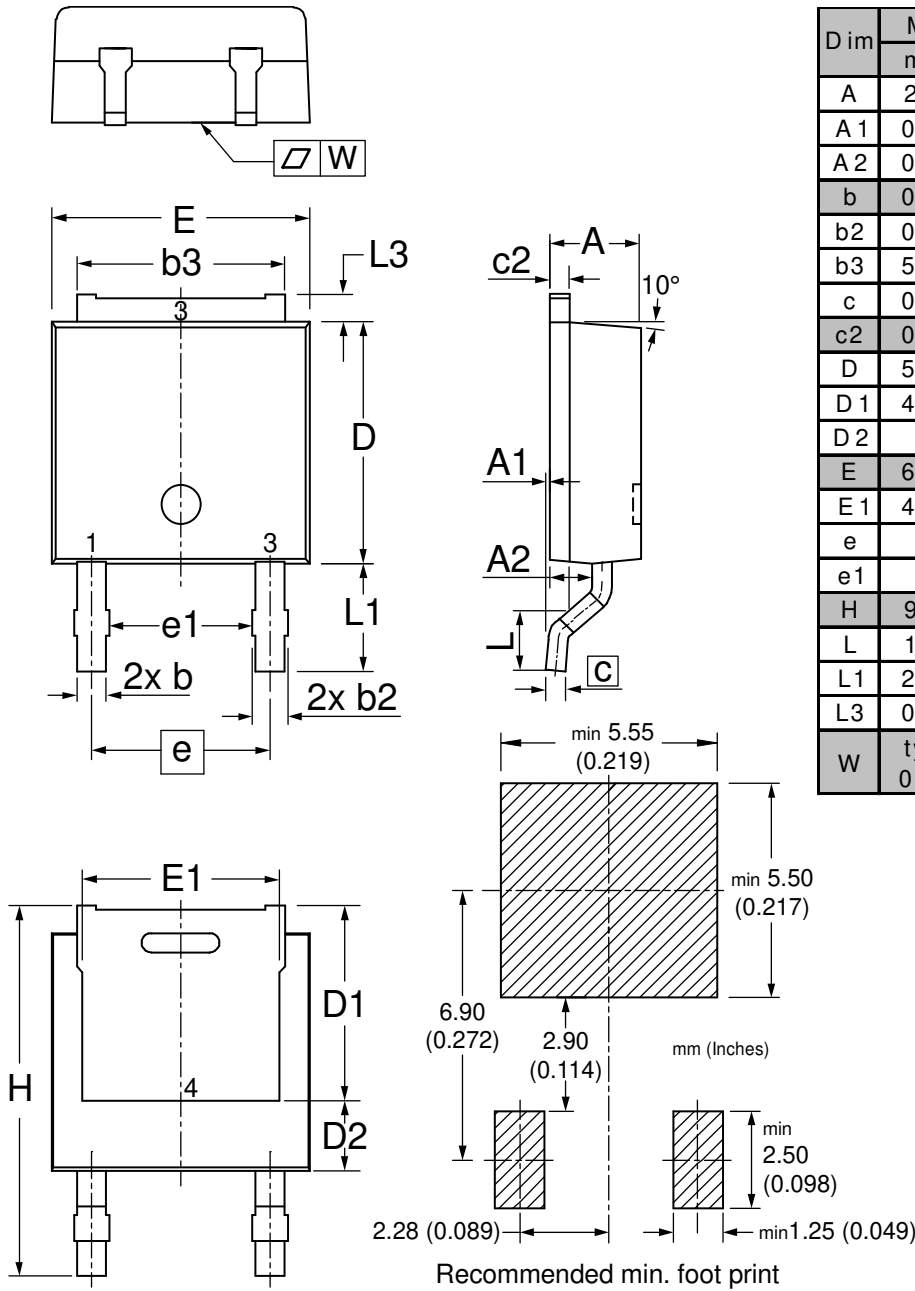


**Fast Diode**

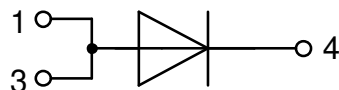
|              |                    |     |    |
|--------------|--------------------|-----|----|
| $V_{0\ max}$ | threshold voltage  | 1.4 | V  |
| $R_{0\ max}$ | slope resistance * | 98  | mΩ |



**Outlines TO-252 (DPak)**



| Dim | Millimeters |       | Inches      |       |
|-----|-------------|-------|-------------|-------|
|     | min         | max   | min         | max   |
| A   | 2.18        | 2.39  | 0.086       | 0.094 |
| A1  | 0.00        | 0.13  | 0.000       | 0.005 |
| A2  | 0.97        | 1.17  | 0.038       | 0.046 |
| b   | 0.64        | 0.89  | 0.025       | 0.035 |
| b2  | 0.76        | 1.14  | 0.030       | 0.045 |
| b3  | 5.08        | 5.59  | 0.200       | 0.220 |
| c   | 0.46        | 0.61  | 0.018       | 0.024 |
| c2  | 0.46        | 0.58  | 0.018       | 0.023 |
| D   | 5.97        | 6.22  | 0.235       | 0.245 |
| D1  | 4.57        | 5.21  | 0.180       | 0.205 |
| D2  | 2.03        |       | 0.080       |       |
| E   | 6.35        | 6.73  | 0.250       | 0.265 |
| E1  | 4.32        | 5.21  | 0.170       | 0.205 |
| e   | 4.57        |       | 0.180       |       |
| e1  | 3.62        |       | 0.143       |       |
| H   | 9.15        | 10.34 | 0.360       | 0.407 |
| L   | 1.40        | 1.78  | 0.055       | 0.070 |
| L1  | 2.54        | 2.92  | 0.100       | 0.115 |
| L3  | 0.64        | 1.02  | 0.025       | 0.040 |
| W   | typ. 0.02   | 0.040 | typ. 0.0008 | 0.000 |





**Fast Diode**

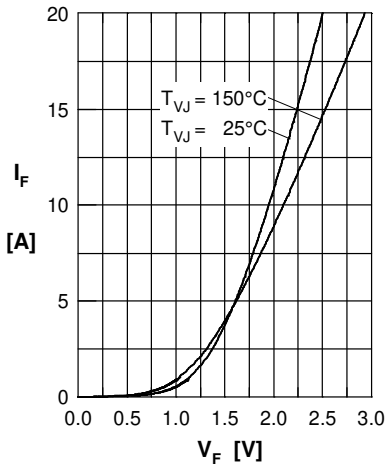


Fig. 1 Typ. Forward current versus  $V_F$

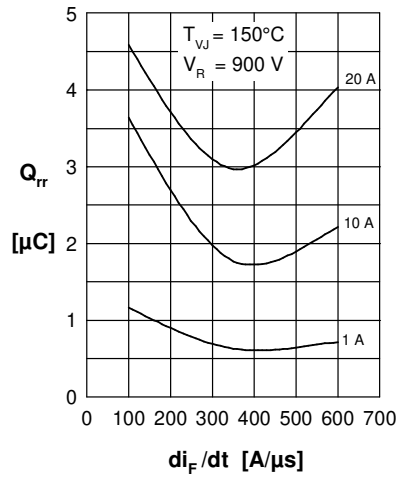


Fig. 2 Typ. reverse recov. charge  $Q_{rr}$  versus  $di/dt$

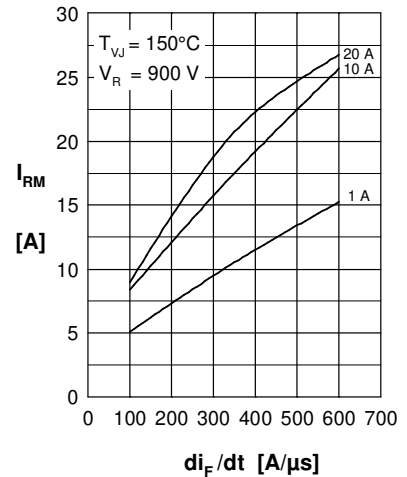


Fig. 3 Typ. peak reverse current  $I_{RM}$  versus  $di/dt$

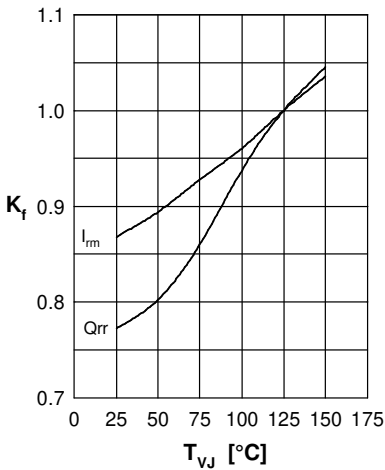


Fig. 4 Dynamic parameters  $Q_{rr}$ ,  $I_{RM}$  versus  $T_{VJ}$

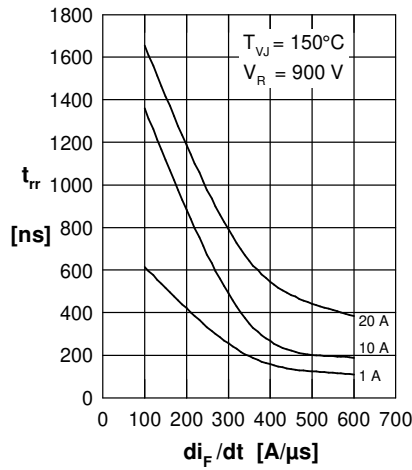


Fig. 5 Typ. recovery time  $t_{rr}$  versus  $di_F/dt$

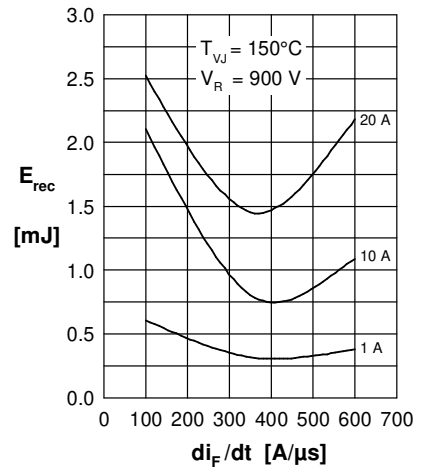


Fig. 6 Typ. recovery energy  $E_{rec}$  versus  $di/dt$

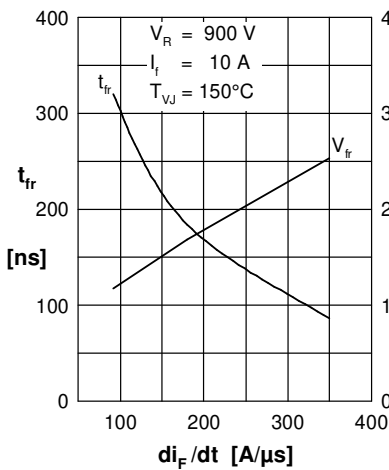


Fig. 7 Typ. peak forward voltage  $V_{fr}$  and  $t_{rr}$  versus  $di_F/dt$

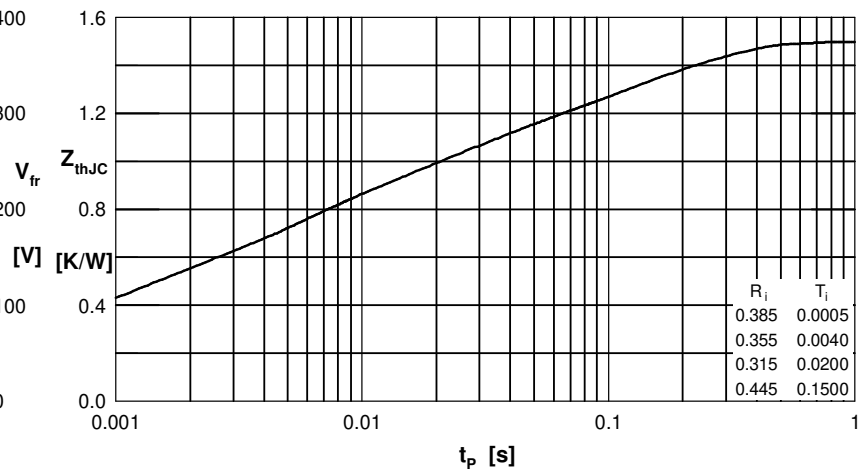


Fig. 8 Typ. transient thermal impedance junction to case