

# HiPerFRED

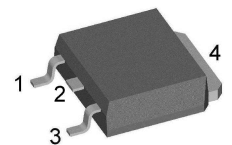
$$\begin{aligned} V_{RRM} &= 600 \text{ V} \\ I_{FAV} &= 6 \text{ A} \\ t_{rr} &= 20 \text{ ns} \end{aligned}$$

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

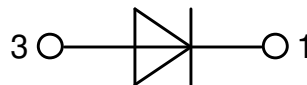
**Part number**

**DSEP6-06AS**

Marking on Product: 6P060AS



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-252 (DPak)

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

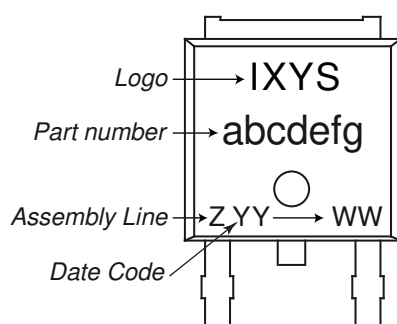
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| Fast Diode        |                                              |                                                                                   |                         | Ratings                  |      |      |      |    |
|-------------------|----------------------------------------------|-----------------------------------------------------------------------------------|-------------------------|--------------------------|------|------|------|----|
| Symbol            | Definition                                   | Conditions                                                                        |                         | min.                     | typ. | max. | Unit |    |
| V <sub>RSM</sub>  | max. non-repetitive reverse blocking voltage | T <sub>VJ</sub> = 25°C                                                            |                         |                          |      | 600  | V    |    |
| V <sub>RRM</sub>  | max. repetitive reverse blocking voltage     | T <sub>VJ</sub> = 25°C                                                            |                         |                          |      | 600  | V    |    |
| I <sub>R</sub>    | reverse current, drain current               | V <sub>R</sub> = 600 V                                                            | T <sub>VJ</sub> = 25°C  |                          |      | 50   | μA   |    |
|                   |                                              | V <sub>R</sub> = 600 V                                                            | T <sub>VJ</sub> = 150°C |                          |      | 0.2  | mA   |    |
| V <sub>F</sub>    | forward voltage drop                         | I <sub>F</sub> = 6 A                                                              | T <sub>VJ</sub> = 25°C  |                          |      | 2.03 | V    |    |
|                   |                                              | I <sub>F</sub> = 12 A                                                             |                         |                          |      | 2.22 | V    |    |
|                   |                                              | I <sub>F</sub> = 6 A                                                              | T <sub>VJ</sub> = 150°C |                          |      | 1.34 | V    |    |
|                   |                                              | I <sub>F</sub> = 12 A                                                             |                         |                          |      | 1.55 | V    |    |
| I <sub>FAV</sub>  | average forward current                      | T <sub>C</sub> = 150°C<br>rectangular      d = 0.5                                | T <sub>VJ</sub> = 175°C |                          |      | 6    | A    |    |
| V <sub>F0</sub>   | threshold voltage                            | } for power loss calculation only                                                 |                         | T <sub>VJ</sub> = 175°C  |      | 1.00 | V    |    |
| r <sub>F</sub>    | slope resistance                             |                                                                                   |                         |                          |      | 34   | mΩ   |    |
| R <sub>thJC</sub> | thermal resistance junction to case          |                                                                                   |                         |                          |      | 2.8  | K/W  |    |
| R <sub>thCH</sub> | thermal resistance case to heatsink          |                                                                                   |                         |                          | 0.50 |      | K/W  |    |
| P <sub>tot</sub>  | total power dissipation                      | T <sub>C</sub> = 25°C                                                             |                         |                          |      | 55   | W    |    |
| I <sub>FSM</sub>  | max. forward surge current                   | t = 10 ms; (50 Hz), sine; V <sub>R</sub> = 0 V                                    |                         | T <sub>VJ</sub> = 45°C   |      | 40   | A    |    |
| C <sub>J</sub>    | junction capacitance                         | V <sub>R</sub> = 400 V   f = 1 MHz                                                |                         | T <sub>VJ</sub> = 25°C   | 5    |      | pF   |    |
| I <sub>RM</sub>   | max. reverse recovery current                | } I <sub>F</sub> = 6 A; V <sub>R</sub> = 300 V<br>-di <sub>F</sub> /dt = 200 A/μs |                         | T <sub>VJ</sub> = 25 °C  | 3    |      | A    |    |
| t <sub>rr</sub>   | reverse recovery time                        |                                                                                   |                         | T <sub>VJ</sub> = 100 °C | 5    |      | A    |    |
|                   |                                              |                                                                                   |                         | T <sub>VJ</sub> = 25 °C  |      | 20   |      | ns |
|                   |                                              |                                                                                   |                         | T <sub>VJ</sub> = 100 °C |      | 80   |      | 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    |

### Product Marking



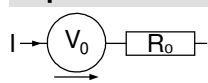
| Ordering    | Ordering Number | Marking on Product | Delivery Mode | Quantity | Code No. |
|-------------|-----------------|--------------------|---------------|----------|----------|
| Standard    | DSEP6-06AS-TRL  | 6P060AS            | Tape & Reel   | 2500     | 509806   |
| Alternative | DSEP6-06AS-TUB  | 6P060AS            | Tube          | 70       | 524993   |

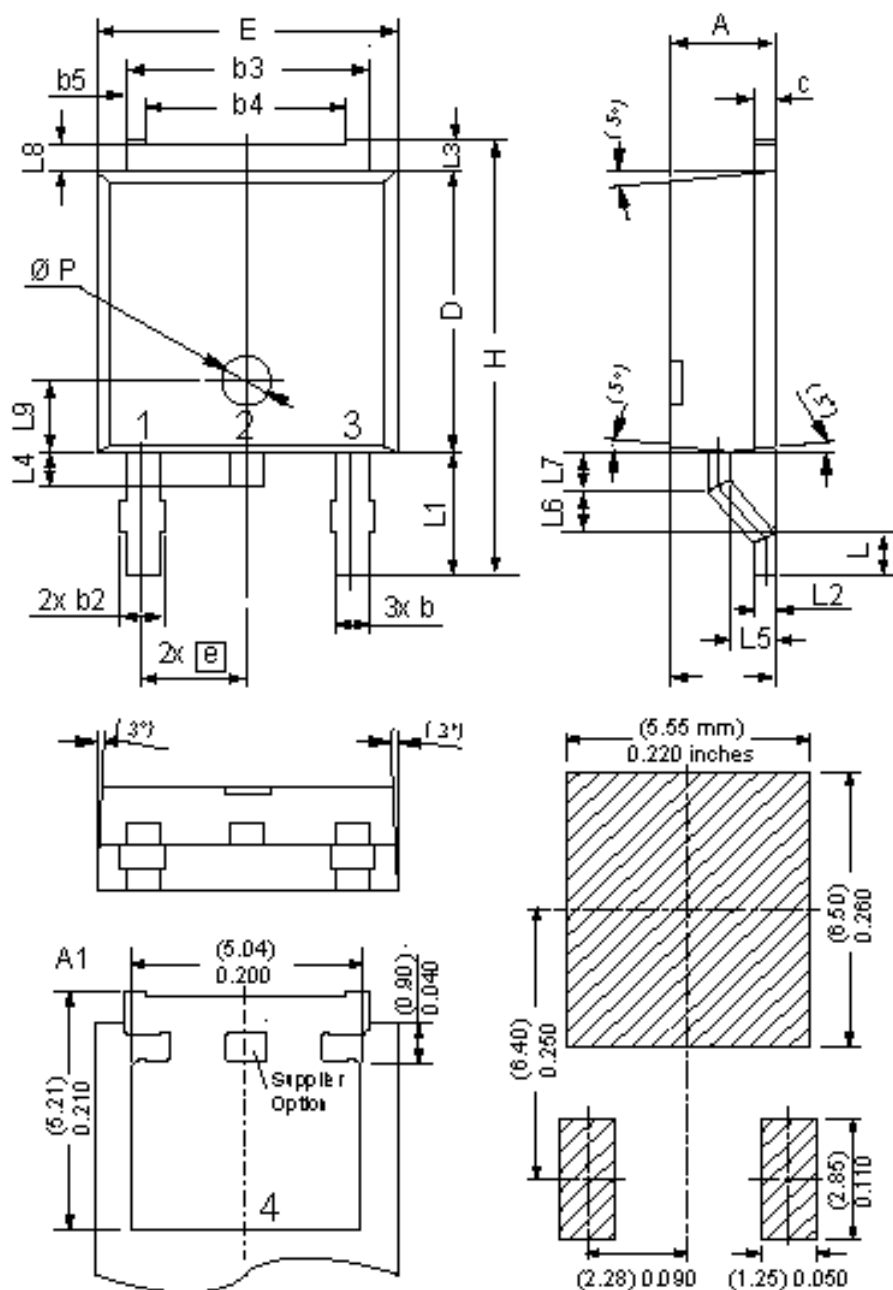
| Similar Part | Package         | Voltage class |
|--------------|-----------------|---------------|
| DSEP6-06BS   | TO-252AA (DPak) | 600           |

### Equivalent Circuits for Simulation

\* on die level

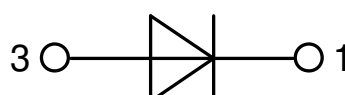
$T_{VJ} = 175^{\circ}\text{C}$

|                                                                                     |                    |    |                   |    |
|-------------------------------------------------------------------------------------|--------------------|----|-------------------|----|
|  |                    |    | <b>Fast Diode</b> |    |
| $V_{0\max}$                                                                         | threshold voltage  | 1  |                   | V  |
| $R_{0\max}$                                                                         | slope resistance * | 30 |                   | mΩ |

**Outlines TO-252 (DPak)**


| Dim | Millimeters |       | Inches    |       |
|-----|-------------|-------|-----------|-------|
|     | min         | max   | min       | max   |
| A   | 2.20        | 2.40  | 0.087     | 0.094 |
| A1  | 2.10        | 2.50  | 0.083     | 0.098 |
| b   | 0.66        | 0.86  | 0.026     | 0.034 |
| b2  | -           | 0.96  | -         | 0.038 |
| b3  | 5.04        | 5.64  | 0.198     | 0.222 |
| b4  | 4.34 BSC    |       | 0.171 BSC |       |
| b5  | 0.50 BSC    |       | 0.020 BSC |       |
| c   | 0.40        | 0.86  | 0.016     | 0.034 |
| D   | 5.90        | 6.30  | 0.232     | 0.248 |
| E   | 6.40        | 6.80  | 0.252     | 0.268 |
| e   | 2.10        | 2.50  | 0.083     | 0.098 |
| H   | 9.20        | 10.10 | 0.362     | 0.398 |
| L   | 0.55        | 1.28  | 0.022     | 0.050 |
| L1  | 2.50        | 2.90  | 0.098     | 0.114 |
| L2  | 0.40        | 0.60  | 0.016     | 0.024 |
| L3  | 0.50        | 0.90  | 0.020     | 0.035 |
| L4  | 0.60        | 1.00  | 0.024     | 0.039 |
| L5  | 0.82        | 1.22  | 0.032     | 0.048 |
| L6  | 0.79        | 0.99  | 0.031     | 0.039 |
| L7  | 0.81        | 1.01  | 0.032     | 0.040 |
| L8  | 0.40        | 0.80  | 0.016     | 0.031 |
| L9  | 1.50 BSC    |       | 0.059 BSC |       |
| Ø P | 1.00 BSC    |       | 0.039 BSC |       |

Recommended  
min. foot print



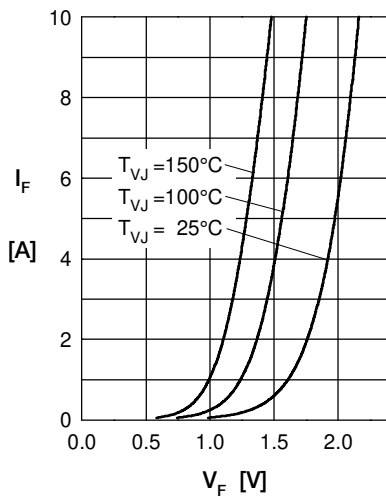
**Fast Diode**


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

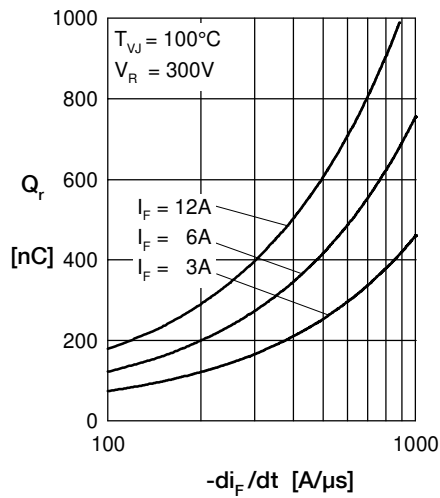


Fig. 2 Typ. reverse recov. charge  
 $Q_r$  versus  $-di_F/dt$

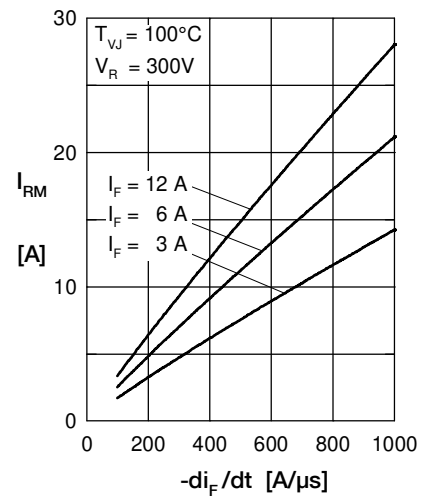


Fig. 3 Typ. peak reverse current  
 $I_{RM}$  versus  $-di_F/dt$

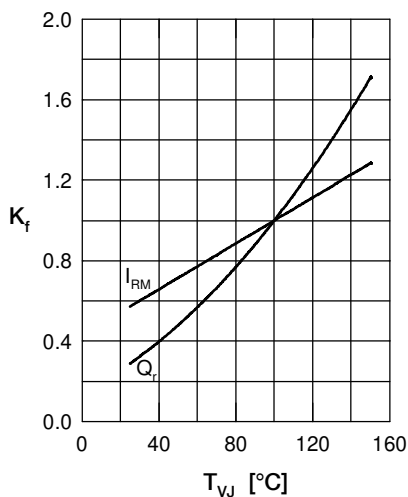


Fig. 4 Typ. dynamic parameters  
 $Q_r$ ,  $I_{RM}$  versus  $T_{VJ}$

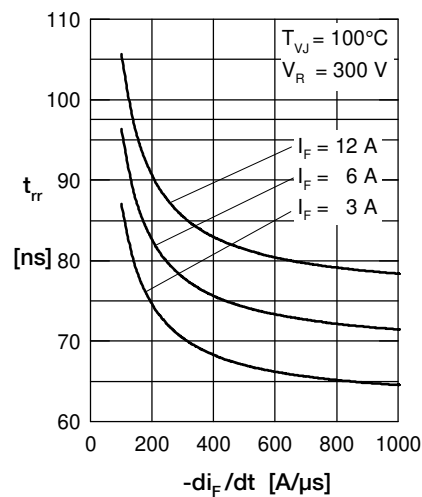


Fig. 5 Recovery time  
 $t_{rr}$  versus  $-di_F/dt$

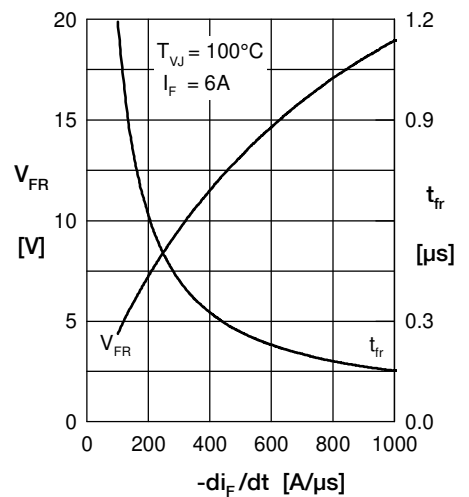


Fig. 6 Typ. peak forward voltage  
 $V_{FR}$  and  $t_{fr}$  versus  $di_F/dt$

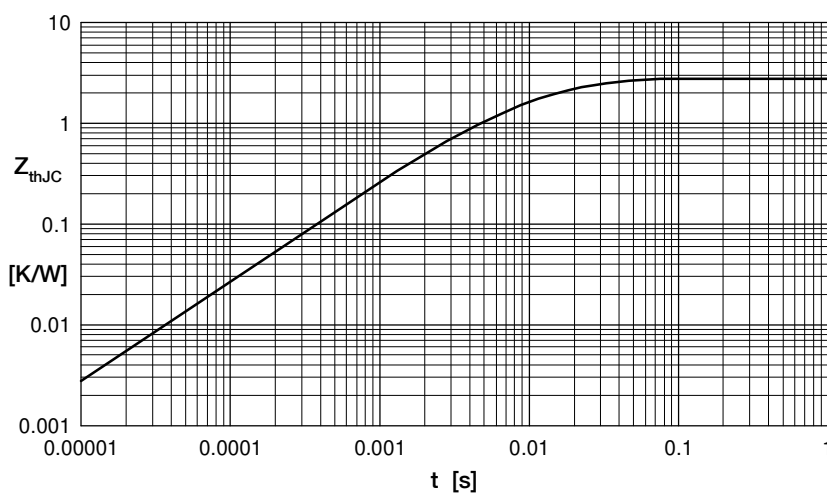


Fig. 7 Transient thermal resistance junction to case

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Система менеджмента качества компании отвечает требованиям в соответствии с ГОСТ Р ИСО 9001, ГОСТ РВ 0015-002 и ЭС РД 009

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