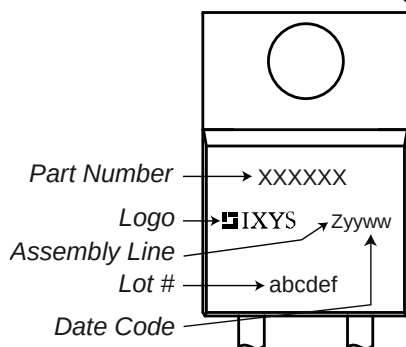


| Fast Diode |                                              |                                                                                          |                                           | Ratings                        |      |      |               |
|------------|----------------------------------------------|------------------------------------------------------------------------------------------|-------------------------------------------|--------------------------------|------|------|---------------|
| Symbol     | Definition                                   | Conditions                                                                               |                                           | min.                           | typ. | max. | Unit          |
| $V_{RSM}$  | max. non-repetitive reverse blocking voltage | $T_{VJ} = 25^{\circ}\text{C}$                                                            |                                           |                                |      | 600  | V             |
| $V_{RRM}$  | max. repetitive reverse blocking voltage     | $T_{VJ} = 25^{\circ}\text{C}$                                                            |                                           |                                |      | 600  | V             |
| $I_R$      | reverse current, drain current               | $V_R = 600\text{ V}$                                                                     | $T_{VJ} = 25^{\circ}\text{C}$             |                                |      | 100  | $\mu\text{A}$ |
|            |                                              | $V_R = 600\text{ V}$                                                                     | $T_{VJ} = 150^{\circ}\text{C}$            |                                |      | 0.5  | mA            |
| $V_F$      | forward voltage drop                         | $I_F = 15\text{ A}$                                                                      | $T_{VJ} = 25^{\circ}\text{C}$             |                                |      | 2.54 | V             |
|            |                                              | $I_F = 30\text{ A}$                                                                      |                                           |                                |      | 2.99 | V             |
|            |                                              | $I_F = 15\text{ A}$                                                                      | $T_{VJ} = 150^{\circ}\text{C}$            |                                |      | 1.59 | V             |
|            |                                              | $I_F = 30\text{ A}$                                                                      |                                           |                                |      | 2.04 | V             |
| $I_{FAV}$  | average forward current                      | $T_C = 130^{\circ}\text{C}$<br>rectangular                                               | $T_{VJ} = 175^{\circ}\text{C}$<br>d = 0.5 |                                |      | 15   | A             |
| $V_{F0}$   | threshold voltage                            | } for power loss calculation only                                                        |                                           | $T_{VJ} = 175^{\circ}\text{C}$ |      | 0.98 | V             |
| $r_F$      | slope resistance                             |                                                                                          |                                           |                                |      | 28   | m $\Omega$    |
| $R_{thJC}$ | thermal resistance junction to case          |                                                                                          |                                           |                                |      | 1.6  | K/W           |
| $R_{thCH}$ | thermal resistance case to heatsink          |                                                                                          |                                           |                                | 0.50 |      | K/W           |
| $P_{tot}$  | total power dissipation                      | $T_C = 25^{\circ}\text{C}$                                                               |                                           |                                |      | 95   | W             |
| $I_{FSM}$  | max. forward surge current                   | t = 10 ms; (50 Hz), sine; $V_R = 0\text{ V}$                                             |                                           | $T_{VJ} = 45^{\circ}\text{C}$  |      | 110  | A             |
| $C_J$      | junction capacitance                         | $V_R = 400\text{ V}$ f = 1 MHz                                                           |                                           | $T_{VJ} = 25^{\circ}\text{C}$  | 12   |      | pF            |
| $I_{RM}$   | max. reverse recovery current                | } $I_F = 15\text{ A}; V_R = 300\text{ V}$<br>-di <sub>F</sub> /dt = 200 A/ $\mu\text{s}$ |                                           | $T_{VJ} = 25^{\circ}\text{C}$  | 2    |      | A             |
|            |                                              |                                                                                          |                                           | $T_{VJ} = 100^{\circ}\text{C}$ | 3    |      | A             |
| $t_{rr}$   | reverse recovery time                        |                                                                                          |                                           | $T_{VJ} = 25^{\circ}\text{C}$  | 25   |      | ns            |
|            |                                              |                                                                                          |                                           | $T_{VJ} = 100^{\circ}\text{C}$ | 80   |      | ns            |

| 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     |      | 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    |

## Product Marking

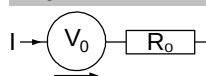


| Ordering | Ordering Number | Marking on Product | Delivery Mode | Quantity | Code No. |
|----------|-----------------|--------------------|---------------|----------|----------|
| Standard | DSEP15-06B      | DSEP15-06B         | Tube          | 50       | 492639   |

| Similar Part | Package              | Voltage class |
|--------------|----------------------|---------------|
| DSEP15-06A   | TO-220AC (2)         | 600           |
| DSEP15-06AS  | TO-263AB (D2Pak) (2) | 600           |
| DSEP15-06BS  | TO-263AB (D2Pak) (2) | 600           |

## Equivalent Circuits for Simulation

\* on die level

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

Fast Diode

 $V_{0\max}$  threshold voltage

0.98

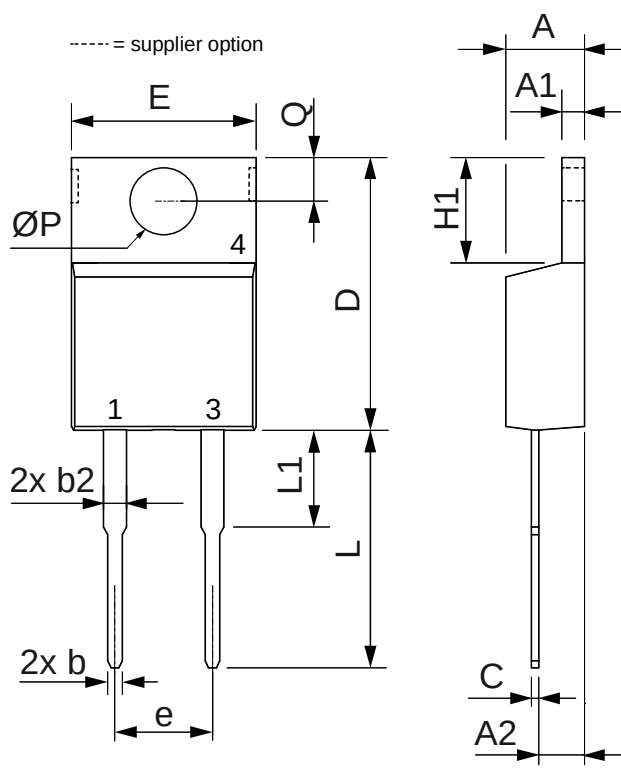
V

 $R_{0\max}$  slope resistance \*

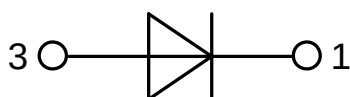
25

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

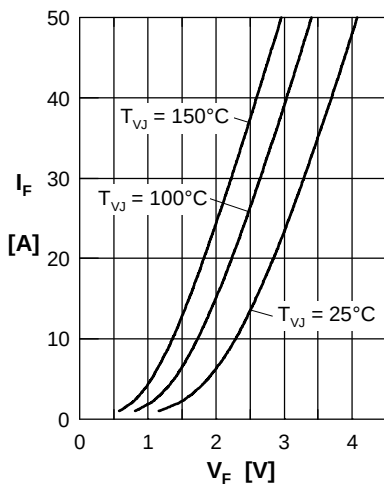


Fig. 1 Forward current  $I_F$  versus  $V_F$

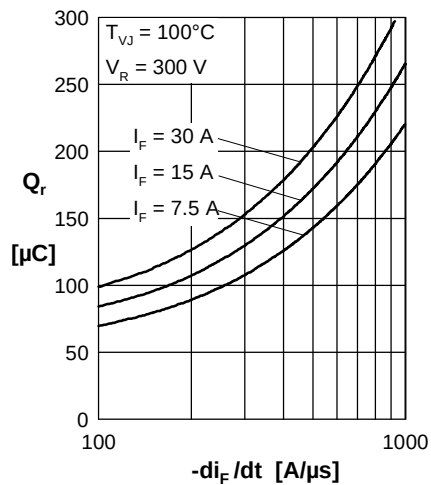


Fig. 2 Typ. reverse recov. charge  $Q_r$  versus  $-di_F/dt$

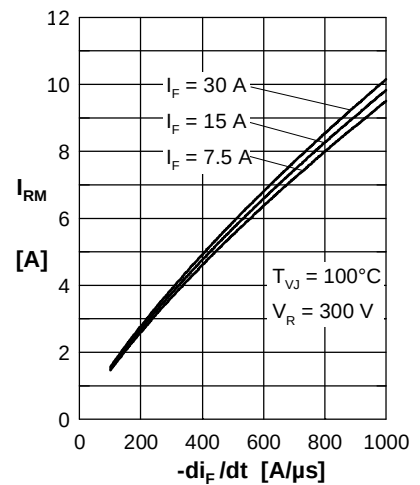


Fig. 3 Typ. peak reverse current  $I_{RM}$  versus  $-di_F/dt$

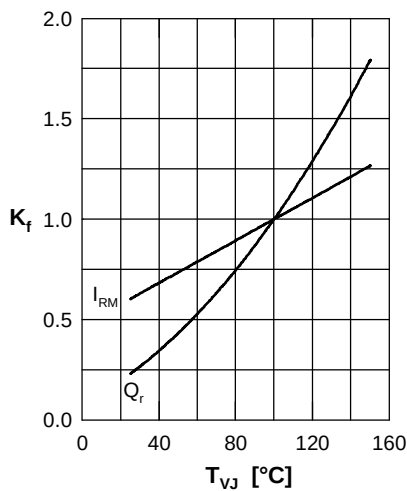


Fig. 4 Dynamic parameters  $Q_r$ ,  $I_{RM}$  versus  $T_{VJ}$

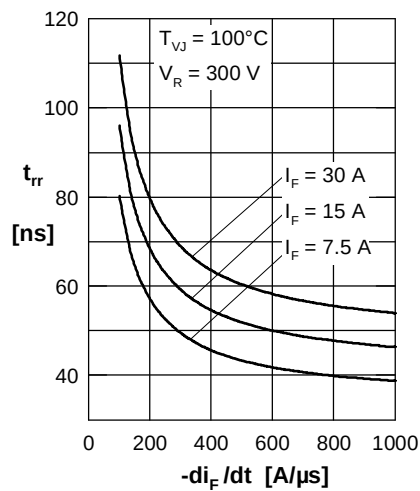


Fig. 5 Typ. recovery time  $t_{rr}$  versus  $-di_F/dt$

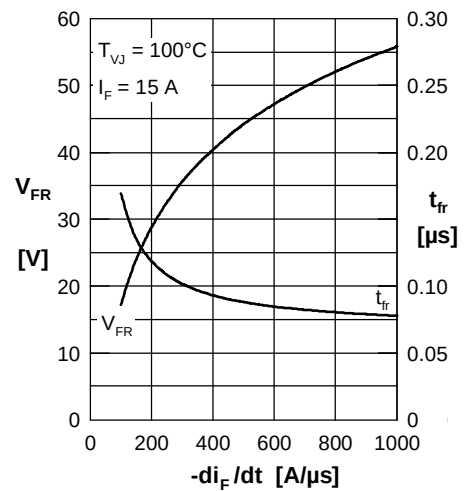


Fig. 6 Typ. peak forward voltage  $V_{FR}$  and  $t_{fr}$  versus  $di_F/dt$

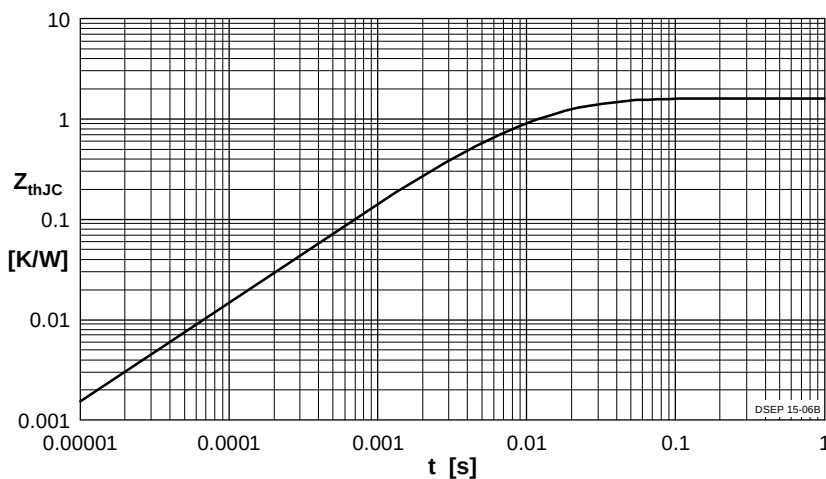


Fig. 7 Transient thermal impedance junction to case

Constants for  $Z_{thJC}$  calculation:

| i | $R_{thi}$ (K/W) | $t_i$ (s) |
|---|-----------------|-----------|
| 1 | 0.908           | 0.0052    |
| 2 | 0.350           | 0.0003    |
| 3 | 0.342           | 0.017     |