# FRED

| | | |
|---|---|---|
| $V_{RRM}$ | = | 1200 V |
| $I_{FAV}$ | = 2x | 60 A |
| $t_{rr}$ | = | 50 ns |

Fast Recovery Epitaxial Diode
Low Loss and Soft Recovery
Parallel legs

**Part number**

**DSEI2x61-12B**
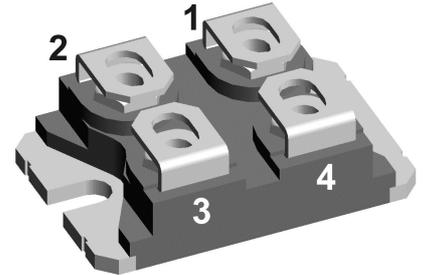
Backside: isolated

 E72873
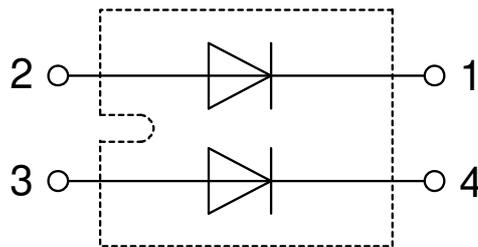


**Features / Advantages:**
● Planar passivated chips
● Low leakage current
● Very short recovery time
● Improved thermal behaviour
● Very low Irm-values
● Very soft recovery behaviour
● Avalanche voltage rated for reliable operation
● Soft reverse recovery for low EMI/RFI
● Low Irm reduces:
  - Power 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:** SOT-227B (minibloc)
● Isolation Voltage: 3000 V~
● Industry standard outline
● RoHS compliant
● Epoxy meets UL 94V-0
● Base plate: Copper internally DCB isolated
● Advanced power cycling

**Disclaimer Notice**

Information furnished is believed to be accurate and reliable. However, users should independently
evaluate the suitability of and test each product selected for their own applications. Littelfuse products are not designed for,
and may not be used in, all applications. Read complete Disclaimer Notice at www.littelfuse.com/disclaimer-electronics.

**Fast Diode**

**Ratings**

| Symbol | Definition | Conditions | | min. | typ. | max. | Unit |
|---|---|---|---|---|---|---|---|
| $V_{RSM}$ | max. non-repetitive reverse blocking voltage | | $T_{VJ} = 25°C$ | | | 1200 | V |
| $V_{RRM}$ | max. repetitive reverse blocking voltage | | $T_{VJ} = 25°C$ | | | 1200 | V |
| $I_R$ | reverse current, drain current | $V_R = 1200$ V | $T_{VJ} = 25°C$ | | | 2.2 | mA |
| | | $V_R = 960$ V | $T_{VJ} = 125°C$ | | | 14 | mA |
| $V_F$ | forward voltage drop | $I_F = 60$ A | $T_{VJ} = 25°C$ | | | 2.44 | V |
| | | $I_F = 120$ A | | | | 2.82 | V |
| | | $I_F = 60$ A | $T_{VJ} = 150°C$ | | | 2.09 | V |
| | | $I_F = 120$ A | | | | 2.63 | V |
| $I_{FAV}$ | average forward current | $T_C = 45°C$ | $T_{VJ} = 150°C$ | | | 60 | A |
| | | rectangular    d = 0.5 | | | | | |
| $V_{F0}$ | threshold voltage | for power loss calculation only | $T_{VJ} = 150°C$ | | | 1.58 | V |
| $r_F$ | slope resistance | | | | | 8.5 | mΩ |
| $R_{thJC}$ | thermal resistance junction to case | | | | | 0.7 | K/W |
| $R_{thCH}$ | thermal resistance case to heatsink | | | | 0.10 | | K/W |
| $P_{tot}$ | total power dissipation | | $T_C = 25°C$ | | | 180 | W |
| $I_{FSM}$ | max. forward surge current | t = 10 ms; (50 Hz), sine; $V_R = 0$ V | $T_{VJ} = 45°C$ | | | 450 | A |
| $C_J$ | junction capacitance | $V_R = 600$ V   f = 1 MHz | $T_{VJ} = 25°C$ | | 31 | | pF |
| $I_{RM}$ | max. reverse recovery current | $I_F = 60$ A; $V_R = 540$ V -$di_F$/dt = 300 A/µs | $T_{VJ} = 25°C$ | | 13 | | A |
| | | | $T_{VJ} = 100°C$ | | 20 | | A |
| $t_{rr}$ | reverse recovery time | | $T_{VJ} = 25°C$ | | 190 | | ns |
| | | | $T_{VJ} = 100°C$ | | 380 | | ns |

**IXYS** A **Littelfuse** Technology

## Package    SOT-227B (minibloc)

**Ratings**

| Symbol | Definition | Conditions | | min. | typ. | max. | Unit |
|---|---|---|---|---|---|---|---|
| I$_{RMS}$ | RMS current | per terminal | | | | 150 | A |
| T$_{VJ}$ | virtual junction temperature | | | -40 | | 150 | °C |
| T$_{op}$ | operation temperature | | | -40 | | 125 | °C |
| T$_{stg}$ | storage temperature | | | -40 | | 150 | °C |
| **Weight** | | | | | 30 | | g |
| M$_D$ | mounting torque | | | 1.1 | | 1.5 | Nm |
| M$_T$ | terminal torque | | | 1.1 | | 1.5 | Nm |
| d$_{Spp/App}$ | creepage distance on surface \| striking distance through air | terminal to terminal | 10.5 | 3.2 | | | mm |
| d$_{Spb/Apb}$ | | terminal to backside | 8.6 | 6.8 | | | mm |
| V$_{ISOL}$ | isolation voltage | t = 1 second | 50/60 Hz, RMS; I$_{ISOL}$ ≤ 1 mA | 3000 | | | V |
| | | t = 1 minute | | 2500 | | | V |

## Product Marking



Logo → ▣IXYS XXXXX ®ℛ
Part Number
UL
Date Code → yywwZ    123456
Location    Lot#
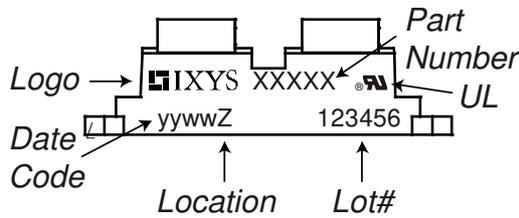
| Ordering | Ordering Number | Marking on Product | Delivery Mode | Quantity | Code No. |
|---|---|---|---|---|---|
| Standard | DSEI2x61-12B | DSEI2x61-12B | Tube | 10 | 460532 |

| Similar Part | Package | Voltage class |
|---|---|---|
| DSEI2x61-10B | SOT-227B (minibloc) | 1000 |

## Equivalent Circuits for Simulation    * on die level    T$_{VJ}$ = 150°C
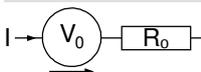


| | | **Fast Diode** | |
|---|---|---|---|
| V$_{0 max}$ | threshold voltage | 1.58 | V |
| R$_{0 max}$ | slope resistance * | 6.6 | mΩ |

IXYS reserves the right to change limits, conditions and dimensions.    Data according to IEC 60747 and per semiconductor unless otherwise specified    20210721c

**Outlines    SOT-227B (minibloc)**
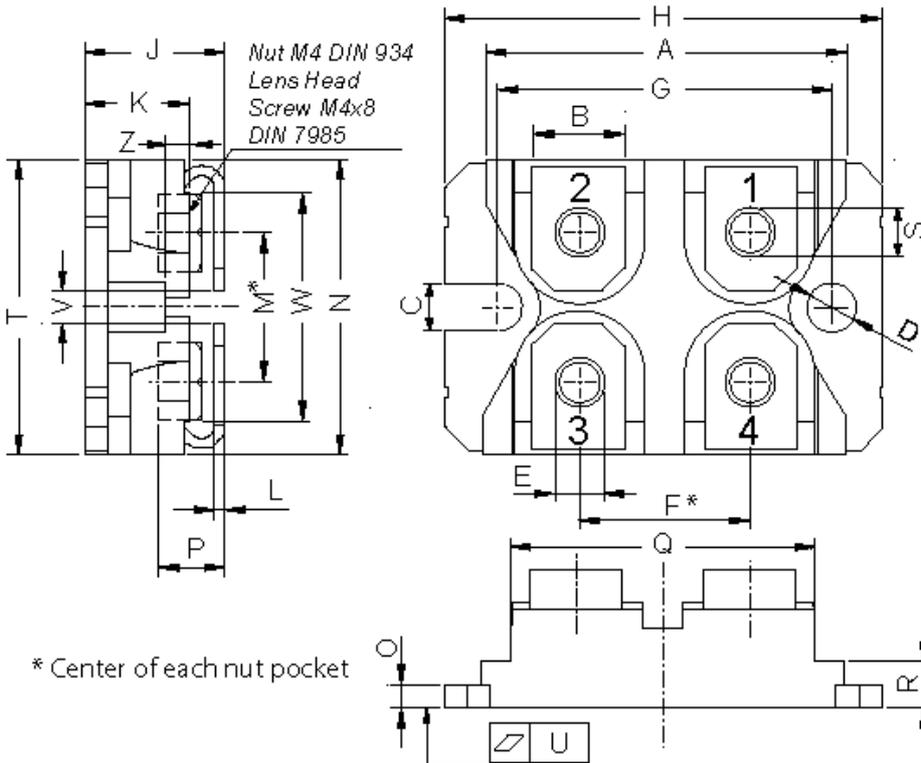


| Dim. | Millimeter | | Inches | |
|------|------|------|------|------|
| | min | max | min | max |
| A | 31.50 | 31.88 | 1.240 | 1.255 |
| B | 7.80 | 8.20 | 0.307 | 0.323 |
| C | 4.09 | 4.29 | 0.161 | 0.169 |
| D | 4.09 | 4.29 | 0.161 | 0.169 |
| E | 4.09 | 4.29 | 0.161 | 0.169 |
| F | 14.91 | 15.11 | 0.587 | 0.595 |
| G | 30.12 | 30.30 | 1.186 | 1.193 |
| H | 37.80 | 38.23 | 1.488 | 1.505 |
| J | 11.68 | 12.22 | 0.460 | 0.481 |
| K | 8.92 | 9.60 | 0.351 | 0.378 |
| L | 0.74 | 0.84 | 0.029 | 0.033 |
| M | 12.50 | 13.10 | 0.492 | 0.516 |
| N | 25.15 | 25.42 | 0.990 | 1.001 |
| O | 1.95 | 2.13 | 0.077 | 0.084 |
| P | 4.95 | 6.20 | 0.195 | 0.244 |
| Q | 26.54 | 26.90 | 1.045 | 1.059 |
| R | 3.94 | 4.42 | 0.155 | 0.167 |
| S | 4.55 | 4.85 | 0.179 | 0.191 |
| T | 24.59 | 25.25 | 0.968 | 0.994 |
| U | -0.05 | 0.10 | -0.002 | 0.004 |
| V | 3.20 | 5.50 | 0.126 | 0.217 |
| W | 19.81 | 21.08 | 0.780 | 0.830 |
| Z | 2.50 | 2.70 | 0.098 | 0.106 |

Nut M4 DIN 934
Lens Head
Screw M4x8
DIN 7985

* Center of each nut pocket
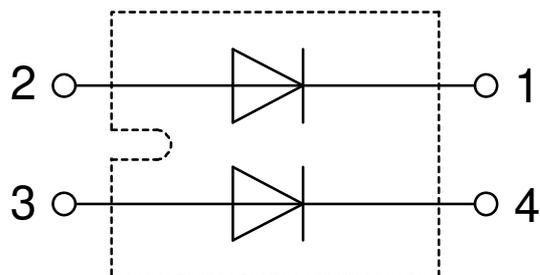
## Fast Diode
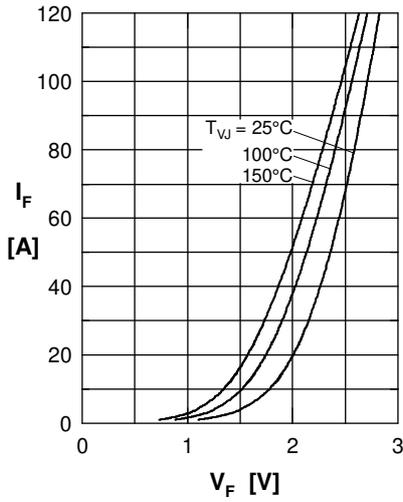


Fig. 1 Forward current $I_F$ versus
max. forward voltage drop $V_F$
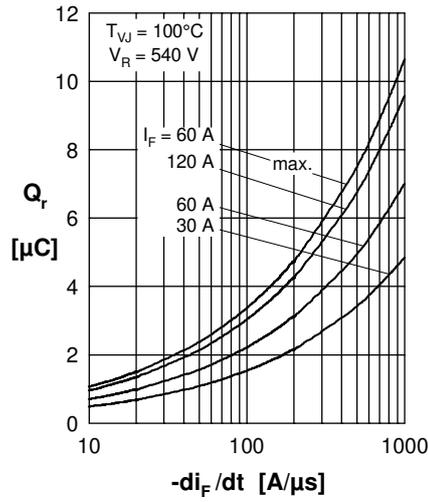


Fig. 2 Typ. reverse recov. charge
$Q_r$ versus $-di_F/dt$
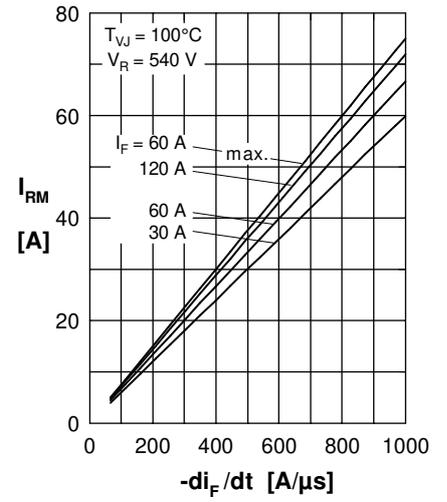


Fig. 3 Typ. peak reverse current
$I_{RM}$ versus $-di_F/dt$
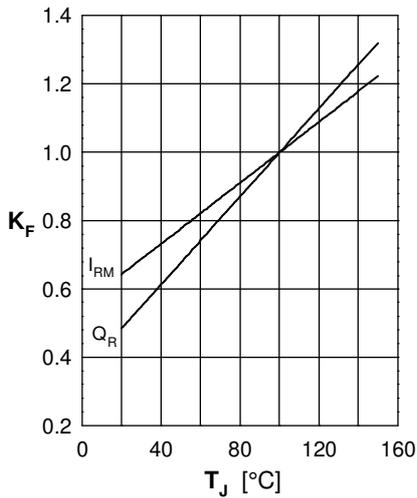


Fig. 4 Dynamic parameters
$Q_r$, $I_{RM}$ versus $T_{VJ}$
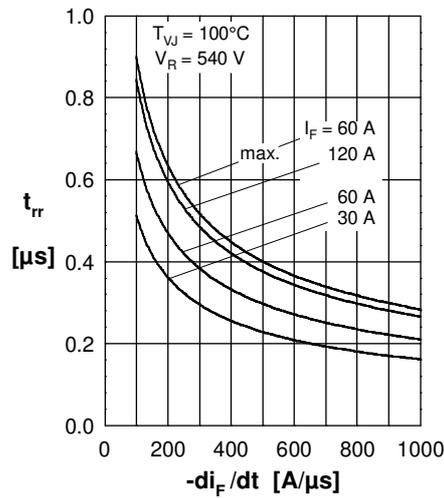


Fig. 5 Typ. recovery time
$t_{rr}$ versus $-di_F/dt$
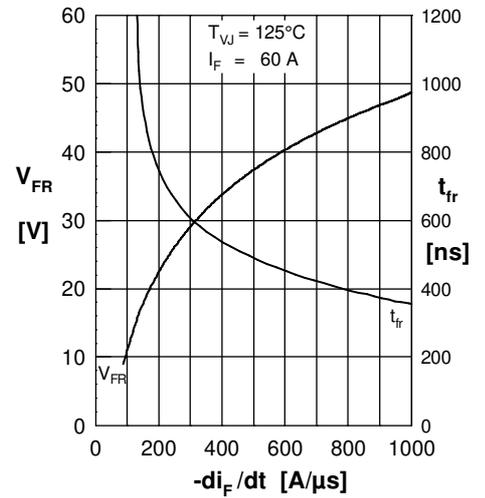


Fig. 6 Typ. peak forward voltage
$V_{FR}$ and $t_{fr}$ versus $di_F/dt$



Constants for $Z_{thJC}$ calculation:

| i | $R_{thi}$ (K/W) | $t_i$ (s) |
|---|---|---|
| 1 | 0.120 | 0.010 |
| 2 | 0.045 | 0.002 |
| 3 | 0.105 | 0.050 |
| 4 | 0.160 | 0.050 |
| 5 | 0.270 | 0.350 |
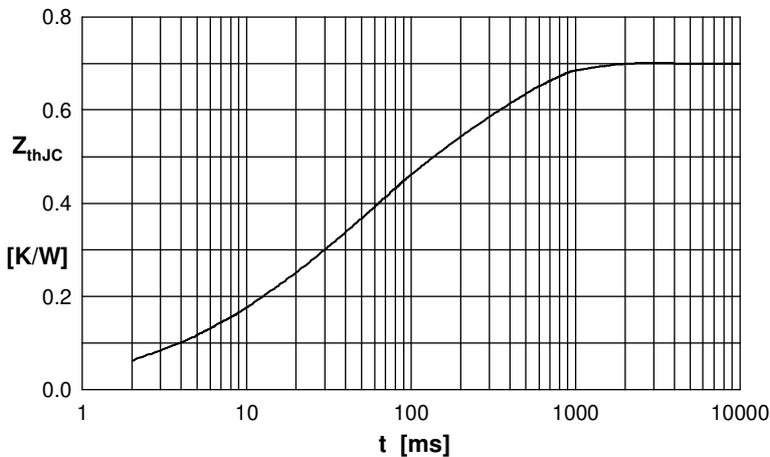
Fig. 7 Transient thermal impedance junction to case