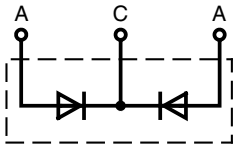
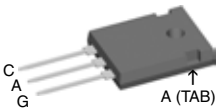
# Common Cathode Fast Recovery Epitaxial Diode (FRED)

$I_{FAVM}$ = 2x34 A
$V_{RRM}$ = 200 V
$t_{rr}$ = 35 ns

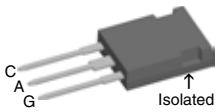
| $V_{RSM}$ V | $V_{RRM}$ V | Type |
|---|---|---|
| 200 | 200 | DSEK 60-02A |
| 200 | 200 | DSEK 60-02AR |




**TO-247 AD**
Version A




**ISOPLUS247™**
Version AR




A = Anode, C = Cathode, G = Gate

| Symbol | Conditions | | Maximum Ratings | |
|---|---|---|---|---|
| $I_{FRMS}$ | $T_{VJ} = T_{VJM}$ | | 50 | A |
| $I_{FAVM}$ ① | $T_C$ = 115°C; rectangular, d = 0.5 | | 34 | A |
| $I_{FRM}$ | $t_P$ < 10 µs; rep. rating, pulse width limited by $T_{VJM}$ | | 375 | |
| $I_{FSM}$ | $T_{VJ}$ = 45°C; | t = 10 ms (50 Hz), sine | 325 | A |
| | | t = 8.3 ms (60 Hz), sine | 350 | A |
| | $T_{VJ}$ = 150°C; | t = 10 ms (50 Hz), sine | 290 | A |
| | | t = 8.3 ms (60 Hz), sine | 310 | A |
| $I^2t$ | $T_{VJ}$ = 45°C; | t = 10 ms (50 Hz), sine | 530 | $A^2s$ |
| | | t = 8.3 ms (60 Hz), sine | 510 | $A^2s$ |
| | $T_{VJ}$ = 150°C; | t = 10 ms (50 Hz), sine | 420 | $A^2s$ |
| | | t = 8.3 ms (60 Hz), sine | 400 | $A^2s$ |
| $T_{VJ}$ | | | -40...+150 | °C |
| $T_{VJM}$ | | | 150 | °C |
| $T_{stg}$ | | | -40...+150 | °C |
| $P_{tot}$ | $T_C$ = 25°C | | 125 | W |
| $M_d$ | mounting torque (Version A only) | | 0.8...1.2 | Nm |
| $F_C$ | mounting force with clip | | 20...120 | N |
| $V_{ISOL}$ | 50/60 Hz, RMS, t = 1 min., leads-to-tab (AR only) | | 2500 | V~ |
| **Weight** | typical | | 6 | g |

| Symbol | Conditions | | Characteristic Values per leg typ. | max. | |
|---|---|---|---|---|---|
| $I_R$ ① | $T_{VJ}$ = 25°C | $V_R = V_{RRM}$ | | 200 | µA |
| | $T_{VJ}$ = 25°C | $V_R = 0.8 \cdot V_{RRM}$ | | 50 | µA |
| | $T_{VJ}$ = 125°C | $V_R = 0.8 \cdot V_{RRM}$ | | 5 | mA |
| $V_F$ | $I_F$ = 30 A | $T_{VJ}$ = 150°C | | 0.85 | V |
| | | $T_{VJ}$ = 25°C | | 1.10 | V |
| $V_{T0}$ | For power-loss calculations only | | | 0.72 | V |
| $r_T$ | | $T_{VJ} = T_{VJM}$ | | 4.2 | mΩ |
| $R_{thJC}$ | | | | 1 | K/W |
| $R_{thCH}$ | | | 0.25 | | K/W |
| $t_{rr}$ | $I_F$ = 1 A; -di/dt = 100 A/µs; $V_R$ = 30 V; $T_{VJ}$ = 25°C | | 35 | 50 | ns |
| $I_{RM}$ | $V_R$ = 100 V; $I_F$ = 30 A; $-di_F/dt$ = 100 A/µs<br>L < 0.05 µH ; $T_{VJ}$ = 25°C | | 4 | 5 | A |

① $I_{FAVM}$ rating includes reverse blocking losses at $T_{VJM}$, $V_R$ = 0.8 $V_{RRM}$, duty cycle d = 0.5
Data according to IEC 60747 refer to a single diode unless otherwise stated.

### Features

- International standard package JEDEC TO-247 AD
- Planar passivated chips
- Very short recovery time
- Extremely low switching losses
- Low $I_{RM}$-values
- Soft recovery behavior
- Epoxy meets UL 94V-0
- Version AR isolated and UL registered E153432

### Applications

- Rectifiers in switch mode power supplies (SMPS)
- Uninterruptible power supplies (UPS)
- Ultrasonic cleaners and welders

### Advantages

- High reliability circuit operation
- Low voltage peaks for reduced protection circuits
- Low noise switching
- Low losses
- Operating at lower temperature or space saving by reduced cooling

IXYS reserves the right to change limits, test conditions and dimensions.

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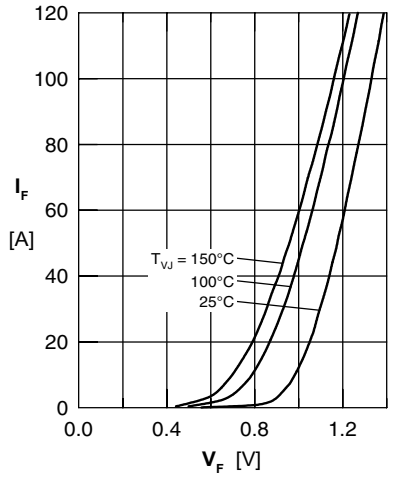



Fig. 1 Forward current $I_F$ vs. $V_F$

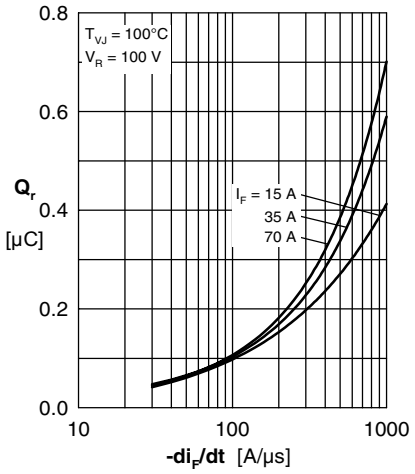



Fig. 2 Typ. reverse recov. charge $Q_r$

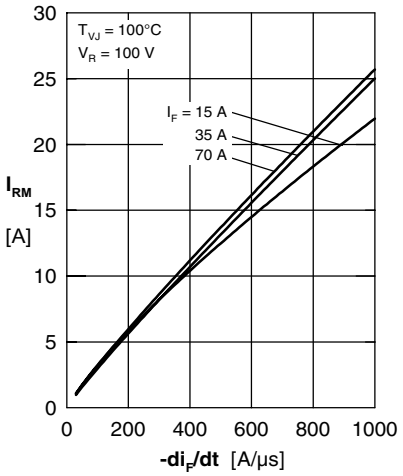



Fig. 3 Typ. peak reverse current $I_{RM}$

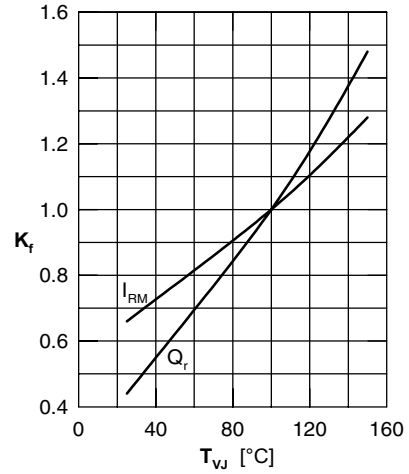



Fig. 4 Typ. dynamic parameters $Q_r$, $I_{RM}$

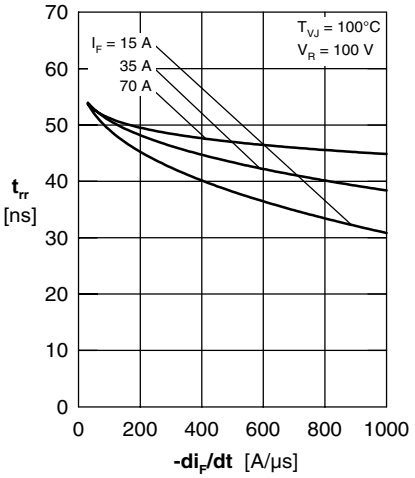



Fig. 5 Typ. recovery time $t_{rr}$ vs. -$di_F$/dt

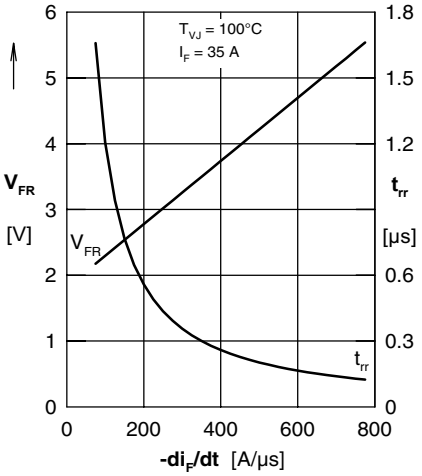



Fig. 6 Typ. peak forward voltage $V_{FR}$ and $t_{fr}$

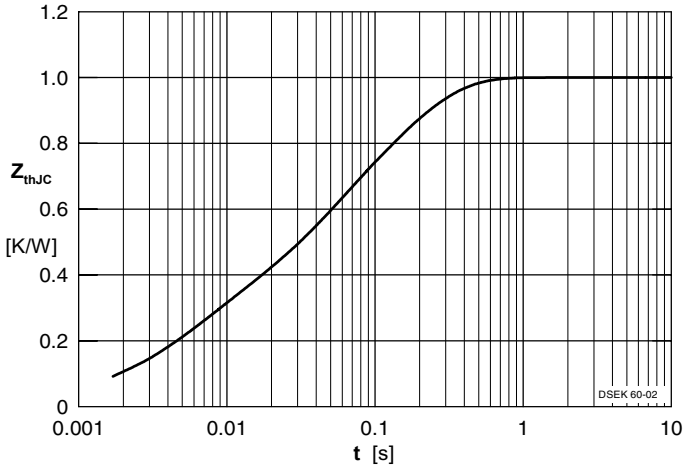
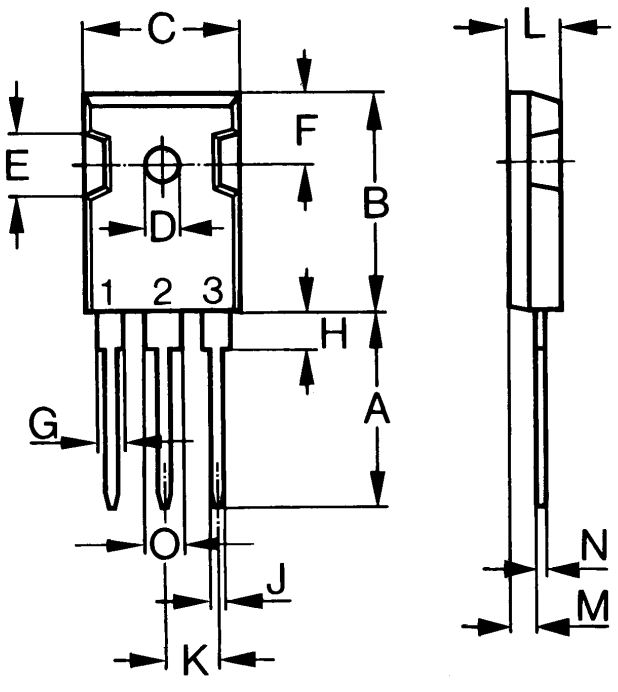


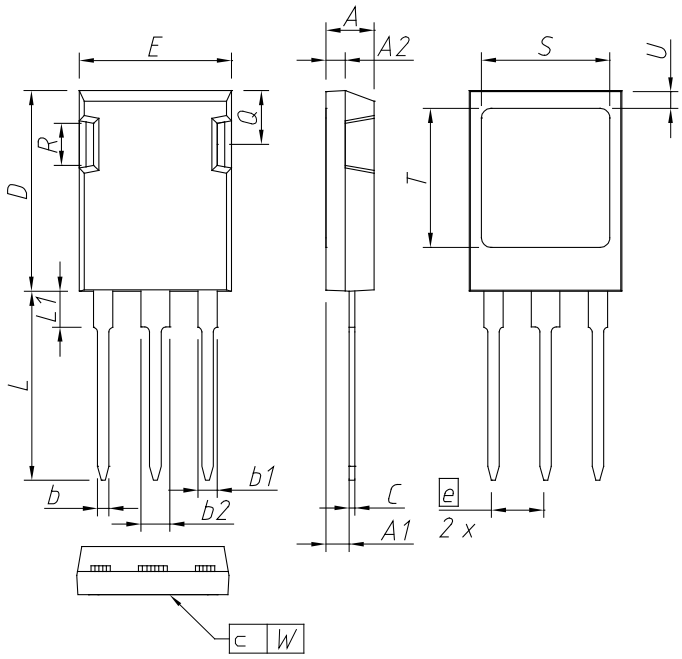

Fig. 7 Transient thermal resistance junction to case

**TO-247 AD**




| Dim. | Millimeter | | Inches | |
|---|---|---|---|---|
| | Min. | Max. | Min. | Max. |
| A | 19.81 | 20.32 | 0.780 | 0.800 |
| B | 20.80 | 21.46 | 0.819 | 0.845 |
| C | 15.75 | 16.26 | 0.610 | 0.640 |
| D | 3.55 | 3.65 | 0.140 | 0.144 |
| E | 4.32 | 5.49 | 0.170 | 0.216 |
| F | 5.40 | 6.20 | 0.212 | 0.244 |
| G | 1.65 | 2.13 | 0.065 | 0.084 |
| H | - | 4.50 | - | 0.177 |
| J | 1.00 | 1.40 | 0.040 | 0.055 |
| K | 10.80 | 11.00 | 0.426 | 0.433 |
| L | 4.70 | 5.30 | 0.185 | 0.209 |
| M | 0.40 | 0.80 | 0.016 | 0.031 |
| N | 1.50 | 2.49 | 0.087 | 0.102 |

**ISOPLUS 247™**




| DIM. | MILLIMETER | | INCHES | |
|---|---|---|---|---|
| | MIN | MAX | MIN | MAX |
| A | 4,83 | 5,21 | 0,190 | 0,205 |
| A1 | 2,29 | 2,54 | 0,090 | 0,100 |
| A2 | 1,91 | 2,16 | 0,075 | 0,085 |
| b | 1,14 | 1,40 | 0,045 | 0,055 |
| b1 | 1,91 | 2,15 | 0,075 | 0,085 |
| b2 | 2,92 | 3,20 | 0,115 | 0,126 |
| C | 0,61 | 0,83 | 0,024 | 0,033 |
| D | 20,80 | 21,34 | 0,819 | 0,840 |
| E | 15,75 | 16,13 | 0,620 | 0,635 |
| e | 5,45 BSC | | 0,215 BSC | |
| L | 19,81 | 20,60 | 0,780 | 0,811 |
| L1 | 3,81 | 4,38 | 0,150 | 0,172 |
| Q | 5,59 | 6,20 | 0,220 | 0,244 |
| R | 4,32 | 4,85 | 0,170 | 0,191 |
| S | 13,21 | 13,72 | 0,520 | 0,540 |
| T | 15,75 | 16,26 | 0,620 | 0,640 |
| U | 1,65 | 2,03 | 0,065 | 0,080 |
| W | – | 0,10 | – | 0,004 |

The convex bow of substrate is typ. < 0.04 mm over plastic surface level of device bottom side
This drawing will meet all dimensions requirement of JEDEC outline TO-247 AD except screw hole and except Lmax.



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