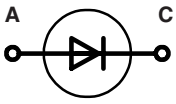
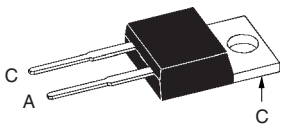
# Fast Recovery Epitaxial Diode (FRED)

$V_{RRM}$ = 600 V
$I_{FAVM}$ = 14 A
$t_{rr}$ = 35 ns

| $V_{RSM}$ V | $V_{RRM}$ V | Type |
|---|---|---|
| 640 | 600 | DSEI 12-06A |




TO-220 AC




A = Anode, C = Cathode

| Symbol | Conditions | Maximum Ratings | |
|---|---|---|---|
| $I_{FRMS}$ | $T_{VJ} = T_{VJM}$ | 25 | A |
| $I_{FAVM}$ ① | $T_C$ = 100°C; rectangular, d = 0.5 | 14 | A |
| $I_{FRM}$ | $t_P$ < 10 µs; rep. rating, pulse width limited by $T_{VJM}$ | 150 | A |
| $I_{FSM}$ | $T_{VJ}$ = 45°C; t = 10 ms (50 Hz), sine | 100 | A |
| | t = 8.3 ms (60 Hz), sine | 110 | A |
| | $T_{VJ}$ = 150°C; t = 10 ms (50 Hz), sine | 85 | A |
| | t = 8.3 ms (60 Hz), sine | 95 | A |
| $I^2t$ | $T_{VJ}$ = 45°C t = 10 ms (50 Hz), sine | 50 | $A^2s$ |
| | t = 8.3 ms (60 Hz), sine | 50 | $A^2s$ |
| | $T_{VJ}$ = 150°C; t = 10 ms (50 Hz), sine | 36 | $A^2s$ |
| | t = 8.3 ms (60 Hz), sine | 37 | $A^2s$ |
| $T_{VJ}$ | | -40...+150 | °C |
| $T_{VJM}$ | | 150 | °C |
| $T_{stg}$ | | -40...+150 | °C |
| $P_{tot}$ | $T_C$ = 25°C | 62 | W |
| $M_d$ | Mounting torque | 0.4...0.6 | Nm |
| Weight | | 2 | g |

| Symbol | Conditions | Characteristic Values typ. | max. | |
|---|---|---|---|---|
| $I_R$ | $T_{VJ}$ = 25°C; $V_R = V_{RRM}$ | | 50 | µA |
| | $T_{VJ}$ = 25°C; $V_R = 0.8 \cdot V_{RRM}$ | | 25 | µA |
| | $T_{VJ}$ = 125°C; $V_R = 0.8 \cdot V_{RRM}$ | | 3 | mA |
| $V_F$ | $I_F$ = 16 A; $T_{VJ}$ = 150°C | | 1.5 | V |
| | $T_{VJ}$ = 25°C | | 1.7 | V |
| $V_{T0}$ | For power-loss calculations only | | 1.12 | V |
| $r_T$ | $T_{VJ} = T_{VJM}$ | | 23.2 | mΩ |
| $R_{thJC}$ | | | 2 | K/W |
| $R_{thCH}$ | | 0.5 | | K/W |
| $R_{thJA}$ | | | 60 | K/W |
| $t_{rr}$ | $I_F$ = 1 A; -di/dt = 50 A/µs; $V_R$ = 30 V; $T_{VJ}$ = 25°C | 35 | 50 | ns |
| $I_{RM}$ | $V_R$ = 350 V; $I_F$ = 12 A; $-di_F/dt$ = 100 A/µs; L ≤ 0.05 µH; $T_{VJ}$ = 100°C | 4 | 4.4 | 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

### Features

- International standard package JEDEC TO-220 AC
- Planar passivated chips
- Very short recovery time
- Extremely low switching losses
- Low $I_{RM}$-values
- Soft recovery behaviour
- Epoxy meets UL 94V-0

### Applications

- Antiparallel diode for high frequency switching devices
- Anti saturation diode
- Snubber diode
- Free wheeling diode in converters and motor control circuits
- Rectifiers in switch mode power supplies (SMPS)
- Inductive heating and melting
- 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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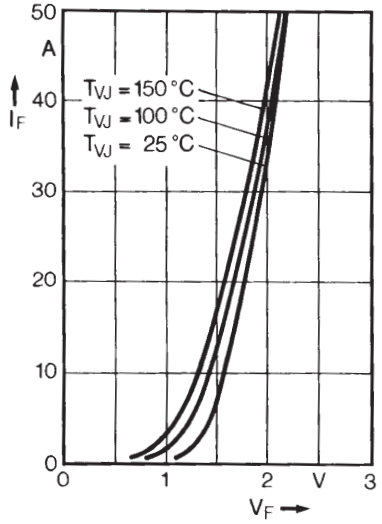



Fig. 1 Forward current versus voltage drop.

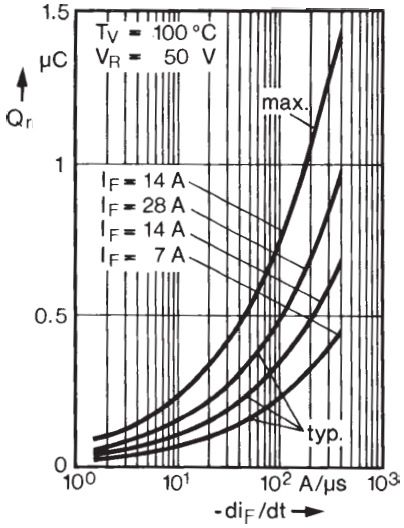



Fig. 2 Recovery charge versus $-di_F/dt$.

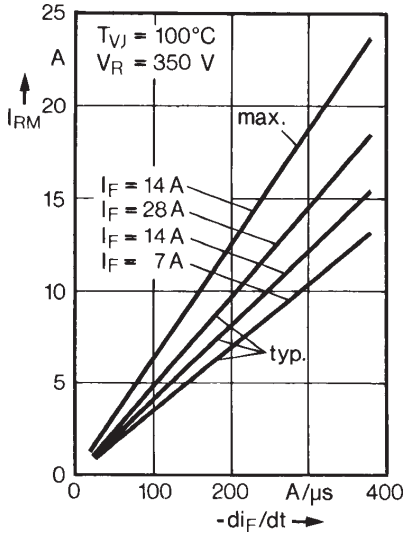



Fig. 3 Peak reverse current versus $-di_F/dt$.

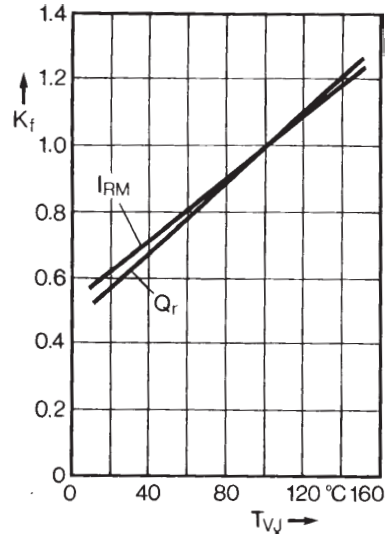



Fig. 4 Dynamic parameters versus junction temperature.

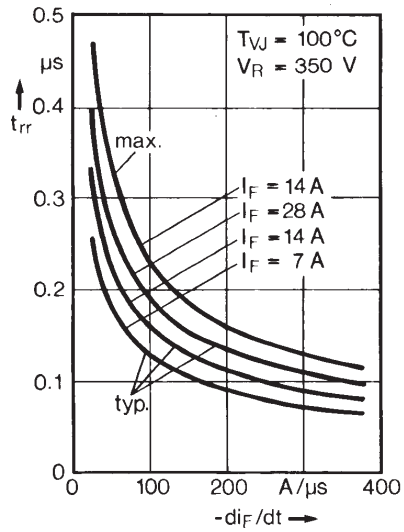



Fig. 5 Recovery time versus $-di_F/dt$.

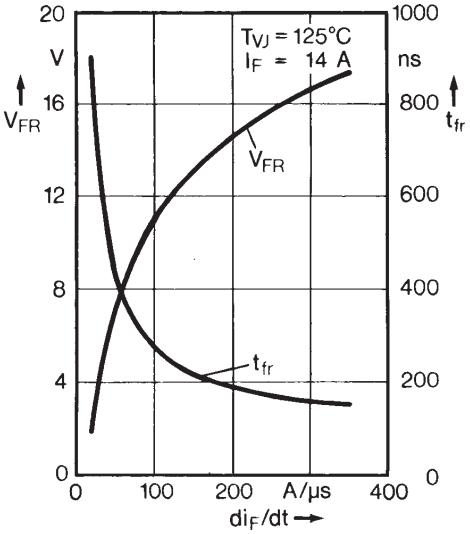



Fig. 6 Peak forward voltage versus $di_F/dt$.

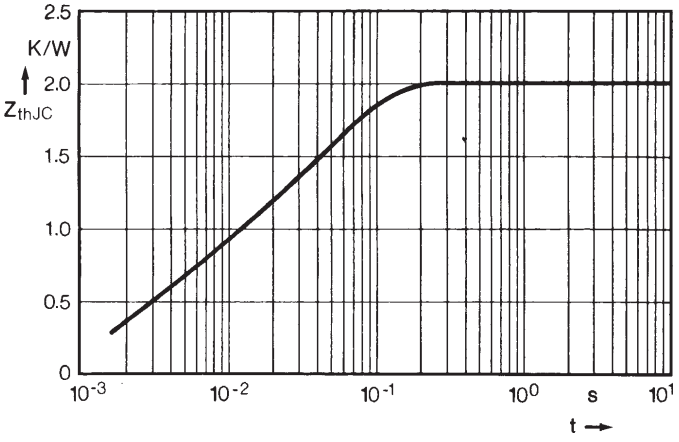
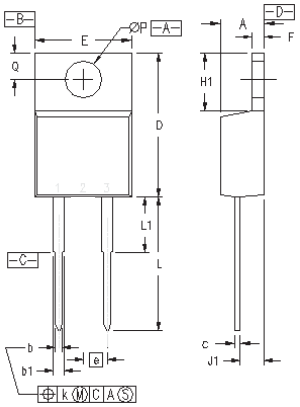



Fig. 7 Transient thermal impedance junction to case.

## Dimensions




| Dim. | Millimeter Min. | Max. | Inches Min. | Max. |
|---|---|---|---|---|
| A | 4..32 | 4.83 | 0.170 | 0.190 |
| b | 0.64 | 1.02 | 0.025 | 0.040 |
| b1 | 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 | 2.54 BSC | | 0.100 BSC | |
| F | 1.14 | 1.40 | 0.045 | 0.055 |
| H1 | 5.85 | 6.85 | 0.230 | 0.270 |
| J1 | 2.29 | 2.79 | 0.090 | 0.110 |
| k | 0 | 0.38 | 0 | 0.015 |
| L | 12.70 | 13.97 | 0.500 | 0.550 |
| L1 | 2.79 | 5.84 | 0.110 | 0.230 |
| ØP | 3.53 | 4.08 | 0.139 | 0.161 |
| Q | 2.54 | 3.18 | 0.100 | 0.125 |

Note: This drawing will meet all dimensions requirement of JEDEC outline TO-220 AB

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