

# Fast Recovery Epitaxial Diode (FRED)

$$V_{RRM} = 600 \text{ V}$$

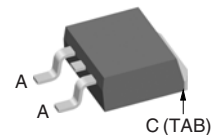
$$I_{FAVM} = 37 \text{ A}$$

$$t_{rr} = 35 \text{ ns}$$

| $V_{RSM}$<br>V | $V_{RRM}$<br>V | Type         |
|----------------|----------------|--------------|
| 600            | 600            | DSEI 36-06AS |



TO-263 AB



A = Anode, C = Cathode, TAB = Cathode

| Symbol                                  | Test Conditions                                                                                                                                   | Maximum Ratings                 |                                                          |
|-----------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------|----------------------------------------------------------|
| $I_{FRMS}$<br>$I_{FAVM}$ ①<br>$I_{FRM}$ | $T_{VJ} = T_{VJM}$<br>$T_C = 85^\circ\text{C}$ ; rectangular, $d = 0.5$<br>$t_p < 10 \mu\text{s}$ ; rep. rating, pulse width limited by $T_{VJM}$ | 70<br>37<br>375                 | A<br>A<br>A                                              |
| $I_{FSM}$                               | $T_{VJ} = 45^\circ\text{C}$ ; $t = 10 \text{ ms}$ (50 Hz), sine<br>$t = 8.3 \text{ ms}$ (60 Hz), sine                                             | 300<br>320                      | A<br>A                                                   |
|                                         | $T_{VJ} = 150^\circ\text{C}$ ; $t = 10 \text{ ms}$ (50 Hz), sine<br>$t = 8.3 \text{ ms}$ (60 Hz), sine                                            | 260<br>280                      | A<br>A                                                   |
| $I^2t$                                  | $T_{VJ} = 45^\circ\text{C}$ ; $t = 10 \text{ ms}$ (50 Hz), sine<br>$t = 8.3 \text{ ms}$ (60 Hz), sine                                             | 450<br>420                      | $\text{A}^2\text{s}$<br>$\text{A}^2\text{s}$             |
|                                         | $T_{VJ} = 150^\circ\text{C}$ ; $t = 10 \text{ ms}$ (50 Hz), sine<br>$t = 8.3 \text{ ms}$ (60 Hz), sine                                            | 340<br>320                      | $\text{A}^2\text{s}$<br>$\text{A}^2\text{s}$             |
| $T_{VJ}$<br>$T_{VJM}$<br>$T_{stg}$      |                                                                                                                                                   | -40...+150<br>150<br>-40...+150 | $^\circ\text{C}$<br>$^\circ\text{C}$<br>$^\circ\text{C}$ |
| $P_{tot}$                               | $T_C = 25^\circ\text{C}$                                                                                                                          | 125                             | W                                                        |
| Weight                                  |                                                                                                                                                   | 2                               | g                                                        |

## Features

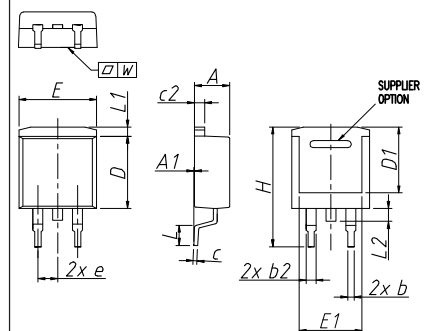
- International standard surface mount package JEDEC TO-263 AB
- Planar passivated chips
- Very short recovery time
- Extremely low switching losses
- Low  $I_{RM}$ -values
- Soft recovery behaviour
- Epoxy meets UL 94V-0

| Symbol            | Test Conditions                                                                                                                                                | Characteristic Values |                                      |
|-------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|--------------------------------------|
|                   |                                                                                                                                                                | typ.                  | max.                                 |
| $I_R$             | $T_{VJ} = 25^\circ\text{C}$ $V_R = V_{RRM}$<br>$T_{VJ} = 25^\circ\text{C}$ $V_R = 0.8 \cdot V_{RRM}$<br>$T_{VJ} = 125^\circ\text{C}$ $V_R = 0.8 \cdot V_{RRM}$ | 100<br>50<br>7        | $\mu\text{A}$<br>$\mu\text{A}$<br>mA |
| $V_F$             | $I_F = 37 \text{ A}$ ; $T_{VJ} = 150^\circ\text{C}$<br>$T_{VJ} = 25^\circ\text{C}$                                                                             | 1.4<br>1.6            | V<br>V                               |
| $V_{T0}$<br>$r_T$ | For power-loss calculations only<br>$T_{VJ} = T_{VJM}$                                                                                                         | 1.01<br>7.1           | V<br>$\text{m}\Omega$                |
| $R_{thJC}$        |                                                                                                                                                                | 1.0                   | K/W                                  |
| $t_{rr}$          | $I_F = 1 \text{ A}$ ; $-di/dt = 100 \text{ A}/\mu\text{s}$ ; $V_R = 30 \text{ V}$ ; $T_{VJ} = 25^\circ\text{C}$                                                | 35                    | ns                                   |
| $I_{RM}$          | $V_R = 350 \text{ V}$ ; $I_F = 30 \text{ A}$ ; $-di_F/dt = 240 \text{ A}/\mu\text{s}$<br>$L \leq 0.05 \mu\text{H}$ ; $T_{VJ} = 100^\circ\text{C}$              | 10                    | 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

## TO-263 AB Outline



| Dim. | Millimeter |       | Inches      |        |
|------|------------|-------|-------------|--------|
|      | min        | max   | min         | max    |
| A    | 4.06       | 4.83  | 0.160       | 0.190  |
| A1   | typ. 0.10  |       | typ. 0.004  |        |
| b    | 0.51       | 0.99  | 0.020       | 0.039  |
| b2   | 1.14       | 1.40  | 0.045       | 0.055  |
| c    | 0.40       | 0.74  | 0.016       | 0.029  |
| c2   | 1.14       | 1.40  | 0.045       | 0.029  |
| D    | 8.38       | 9.40  | 0.330       | 0.370  |
| D1   | 8.00       | 8.89  | 0.315       | 0.350  |
| E    | 9.65       | 10.41 | 0.380       | 0.410  |
| E1   | 6.22       | 8.20  | 0.245       | 0.323  |
| e    | 2.54 BSC   |       | 0.100 BSC   |        |
| H    | 14.61      | 15.88 | 0.575       | 0.625  |
| L    | 1.78       | 2.79  | 0.070       | 0.110  |
| L1   | 1.02       | 1.68  | 0.040       | 0.066  |
| L2   | 1.02       | 1.52  | 0.040       | 0.060  |
| W    | typ. 0.02  | 0.040 | typ. 0.0008 | 0.0016 |

All dimensions conform with and/or are within JEDEC standard.

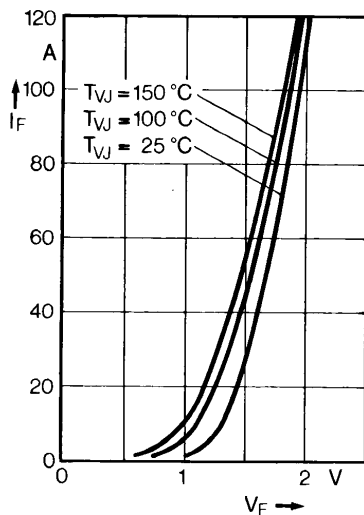


Fig. 1 Forward current versus voltage drop.

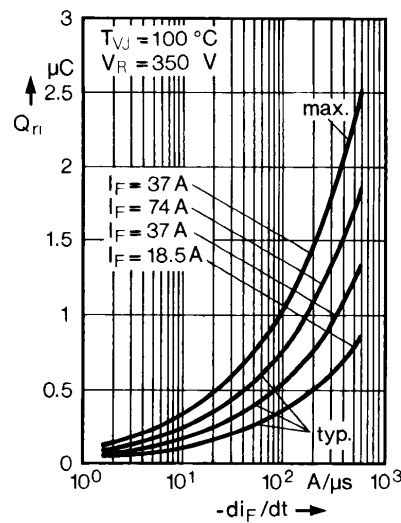


Fig. 2 Recovery charge versus  $-di_F/dt$ .

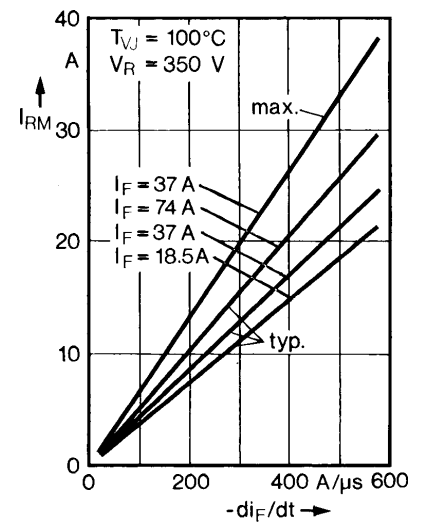


Fig. 3 Peak reverse current versus  $-di_F/dt$ .

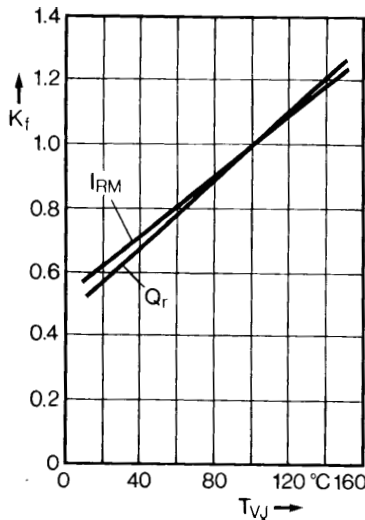


Fig. 4 Dynamic parameters versus junction temperature.

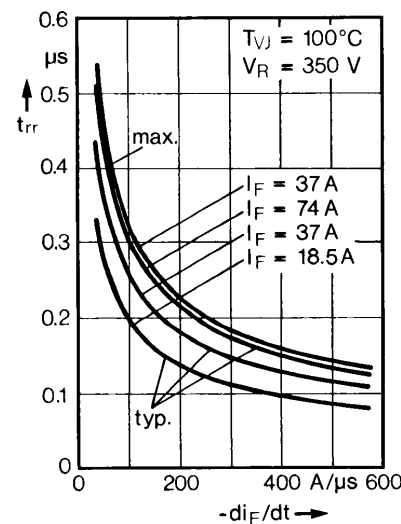


Fig. 5 Recovery time versus  $-di_F/dt$ .

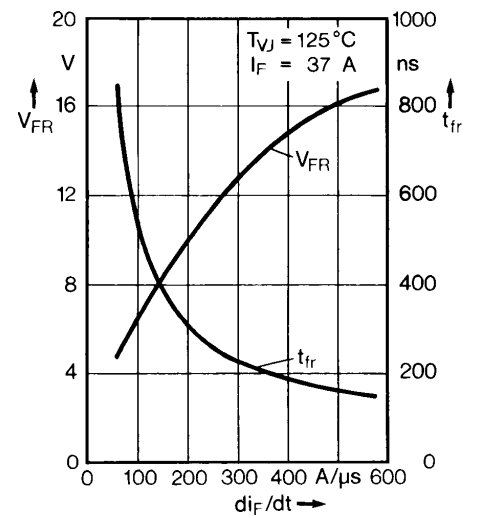


Fig. 6 Peak forward voltage versus  $di_F/dt$ .

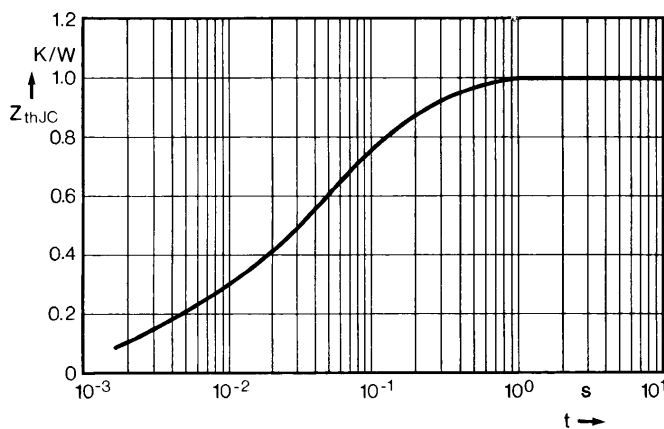


Fig. 7 Transient thermal impedance junction to case.