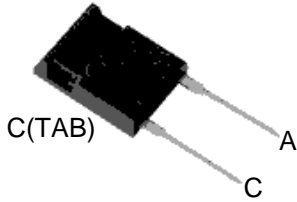
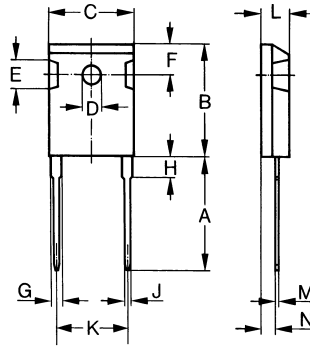


# SUR120120

## Ultra Fast Recovery Epitaxial Diodes



Dimensions TO-247AC



| 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    | 5.4        | 6.2   | 0.212  | 0.244 |
| G    | 1.65       | 2.13  | 0.065  | 0.084 |
| H    | -          | 4.5   | -      | 0.177 |
| J    | 1.0        | 1.4   | 0.040  | 0.055 |
| K    | 10.8       | 11.0  | 0.426  | 0.433 |
| L    | 4.7        | 5.3   | 0.185  | 0.209 |
| M    | 0.4        | 0.8   | 0.016  | 0.031 |
| N    | 1.5        | 2.49  | 0.087  | 0.102 |

A=Anode, C=Cathode, TAB=Cathode

|                 | $V_{RSM}$ | $V_{RRM}$ |
|-----------------|-----------|-----------|
|                 | V         | V         |
| <b>SUR12060</b> | 1200      | 1200      |

| Symbol     | Test Conditions   | Maximum Ratings                                 | Unit             |
|------------|---|---|------------------|
| $I_{FRMS}$ | $T_{VJ}=T_{VJM}$  | 100   | A                |
| $I_{FAVM}$ | $T_C=60^{\circ}C$ ; rectangular, $d=0.5$                        | 120   |                  |
| $I_{FRM}$  | $t_p < 10\mu s$ ; rep. rating, pulse width limited by $T_{VJM}$ | tbd   |                  |
| $I_{FSM}$  | $T_{VJ}=45^{\circ}C$  | $t=10ms$ (50Hz), sine<br>$t=8.3ms$ (60Hz), sine | A                |
|            | $T_{VJ}=150^{\circ}C$   | $t=10ms$ (50Hz), sine<br>$t=8.3ms$ (60Hz), sine |                  |
| $I^2t$     | $T_{VJ}=45^{\circ}C$  | $t=10ms$ (50Hz), sine<br>$t=8.3ms$ (60Hz), sine | A <sup>2</sup> s |
|            | $T_{VJ}=150^{\circ}C$   | $t=10ms$ (50Hz), sine<br>$t=8.3ms$ (60Hz), sine |                  |
| $T_{VJ}$   |   | -40...+150                                      | $^{\circ}C$      |
| $T_{VJM}$  |   | 150   |                  |
| $T_{stg}$  |   | -40...+150                                      |                  |
| $P_{tot}$  | $T_C=25^{\circ}C$   | 357   | W                |
| $M_d$      | Mounting torque   | 0.8...1.2                                       | Nm               |
| Weight     |   | 6   | g                |

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## Ultra Fast Recovery Epitaxial Diodes

| Symbol                  | Test Conditions   | Characteristic Values |      | Unit       |
|-------------------------|---|-----------------------|------|------------|
|                         |   | typ.                  | max. |            |
| <b>I<sub>R</sub></b>    | $T_{VJ}=25^{\circ}\text{C}; V_R=V_{RRM}$  |                       | 3    | uA         |
|                         | $T_{VJ}=25^{\circ}\text{C}; V_R=0.8 \cdot V_{RRM}$  |                       | 1.5  | uA         |
|                         | $T_{VJ}=125^{\circ}\text{C}; V_R=0.8 \cdot V_{RRM}$   |                       | 20   | mA         |
| <b>V<sub>F</sub></b>    | $I_F=70\text{A}; T_{VJ}=150^{\circ}\text{C}$  |                       | 1.55 | V          |
|                         | $T_{VJ}=25^{\circ}\text{C}$   |                       | 1.8  |            |
| <b>V<sub>TO</sub></b>   | For power-loss calculations only  |                       | 1.2  | V          |
| <b>r<sub>T</sub></b>    | $T_{VJ}=T_{VJM}$  |                       | 4.6  | m $\Omega$ |
| <b>R<sub>thJC</sub></b> |   | 0.25                  | 0.35 | K/W        |
| <b>R<sub>thCK</sub></b> |   |                       | 35   |            |
| <b>R<sub>thJA</sub></b> |   |                       |      |            |
| <b>t<sub>rr</sub></b>   | $I_F=1\text{A}; -di/dt=200\text{A/us}; V_R=30\text{V}; T_{VJ}=25^{\circ}\text{C}$                         | 40                    | 60   | ns         |
| <b>I<sub>RM</sub></b>   | $V_R=350\text{V}; I_F=75\text{A}; -di_F/dt=200\text{A/us}; L<0.05\mu\text{H}; T_{VJ}=100^{\circ}\text{C}$ | 25                    | 30   | A          |

### FEATURES

- \* International standard package JEDEC TO-247AC
- \* Planar passivated chips
- \* Very short recovery time
- \* Extremely low switching losses
- \* Low I<sub>RM</sub>-values
- \* Soft recovery behaviour

### APPLICATIONS

- \* Antiparallel diode for high frequency switching devices
- \* Antisaturation 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

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## Ultra Fast Recovery Epitaxial Diodes

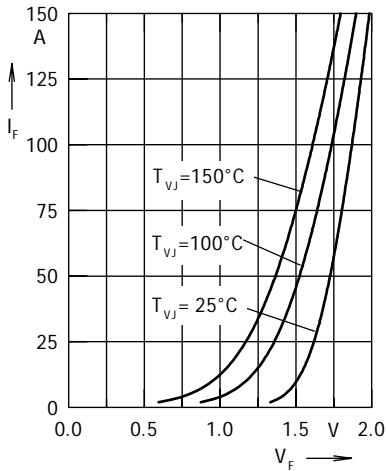


Fig. 1 Forward current  $I_F$  versus  $V_F$

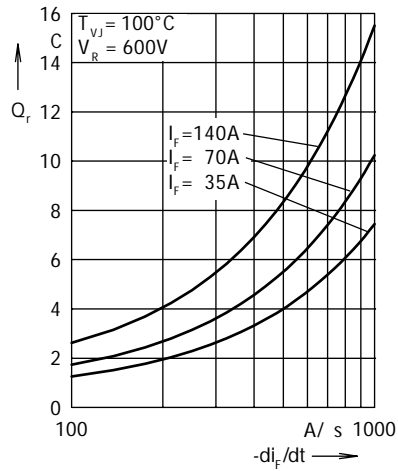


Fig. 2 Reverse recovery charge  $Q_r$  versus  $-di_F/dt$

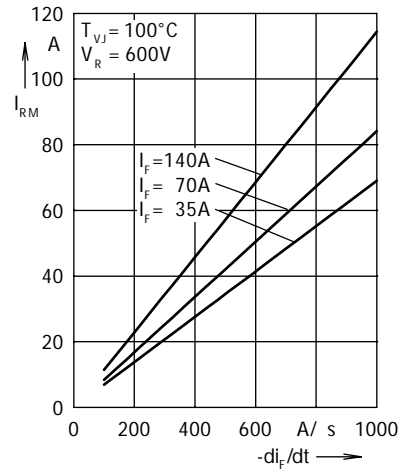


Fig. 3 Peak reverse current  $I_{RM}$  versus  $-di_F/dt$

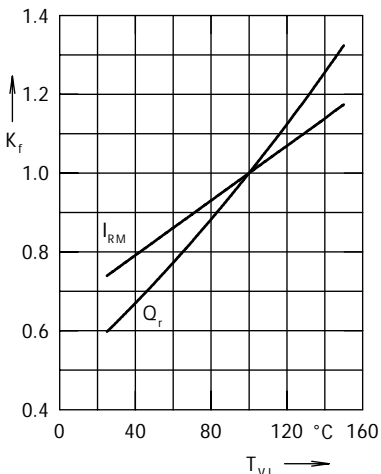


Fig. 4 Dynamic parameters  $Q_r$ ,  $I_{RM}$  versus  $T_{VJ}$

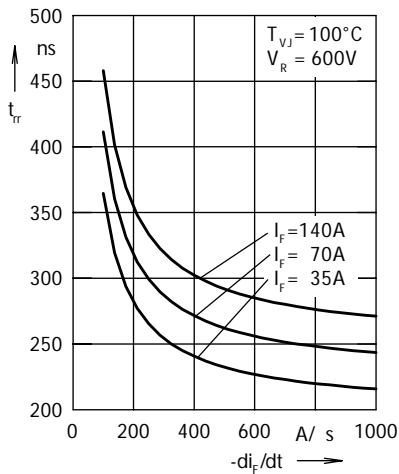


Fig. 5 Recovery time  $t_{tr}$  versus  $-di_F/dt$

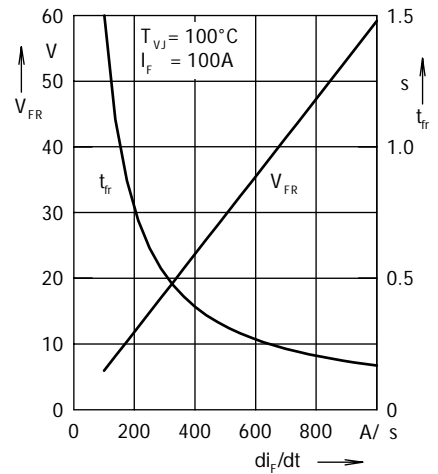


Fig. 6 Peak forward voltage  $V_{FR}$  and  $t_{tr}$  versus  $di_F/dt$

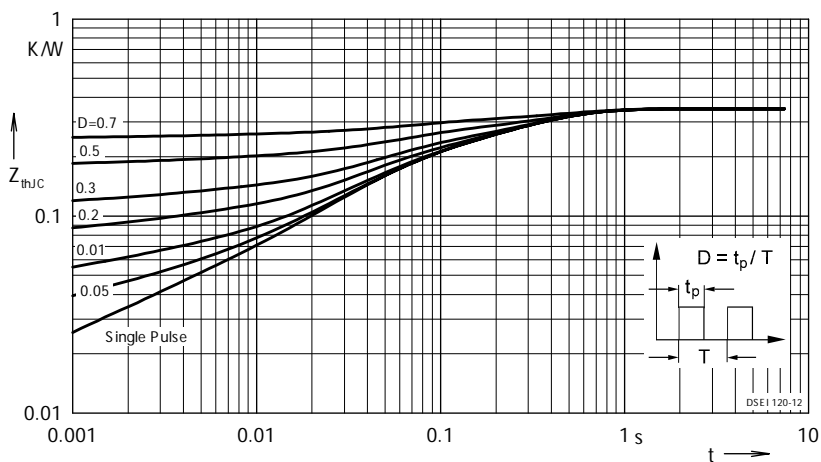


Fig. 7 Transient thermal resistance junction to case

Constants for  $Z_{thjC}$  calculation:

| i | $R_{thi}$ (K/W) | $t_i$ (s) |
|---|-----------------|-----------|
| 1 | 0.017           | 0.00038   |
| 2 | 0.0184          | 0.0026    |
| 3 | 0.1296          | 0.0387    |
| 4 | 0.185           | 0.274     |