- VERY HIGH REVERSE VOLTAGE CAPABILITY
- VERY LOW REVERSE RECOVERY TIME
- VERY LOW SWITCHING LOSSES
- LOW NOISE TURN-OFF SWITCHING


## SUITABLE APPLICATIONS

- FREE WHEELING DIODE IN CONVERTERS AND MOTOR CONTROL CIRCUITS
- RECTIFIER IN S.M.P.S.


## ABSOLUTE MAXIMUM RATINGS

| Symbol | Parameter |  | Value | Unit |
| :---: | :---: | :---: | :---: | :---: |
| $\mathrm{V}_{\text {RRM }}$ | Repetitive Peak Reverse Voltage |  | 1000 | V |
| $\mathrm{V}_{\text {RSM }}$ | Non Repetitive Peak Reverse Voltage |  | 1000 | V |
| $\mathrm{I}_{\text {FRM }}$ | Repetitive Peak Forward Current | $\mathrm{t}_{\mathrm{p}} \leq 10 \mu \mathrm{~s}$ | 150 | A |
| $\mathrm{IF}_{\text {( } \mathrm{RMS} \text { ) }}$ | RMS Forward Current |  | 25 | A |
| $\mathrm{IF}_{\mathrm{F}}(\mathrm{AV})$ | Average Forward Current | $\begin{aligned} & \mathrm{T}_{\text {case }}=100^{\circ} \mathrm{C} \\ & \delta=0.5 \end{aligned}$ | 12 | A |
| $\mathrm{I}_{\text {FSM }}$ | Surge Non Repetitive Forward Current | $\begin{aligned} & \mathrm{t}_{\mathrm{p}}=10 \mathrm{~ms} \\ & \text { Sinusoidal } \end{aligned}$ | 75 | A |
| P | Power Dissipation | $\mathrm{T}_{\text {case }}=100^{\circ} \mathrm{C}$ | 25 | W |
| $\begin{aligned} & \mathrm{T}_{\text {stg }} \\ & \mathrm{T}_{\mathrm{j}} \end{aligned}$ | Storage and Junction Temperature Range |  | $\begin{aligned} & -40 \text { to }+150 \\ & -40 \text { to }+150 \end{aligned}$ | ${ }^{\circ} \mathrm{C}$ |

THERMAL RESISTANCE

| Symbol | Test Conditions | Value | Unit |
| :---: | :--- | :---: | :---: |
| $\mathrm{R}_{\text {th }}(\mathrm{j}-\mathrm{c})$ | Junction-case | 2 | ${ }^{\circ} \mathrm{C} / \mathrm{W}$ |

ELECTRICAL CHARACTERISTICS
STATIC CHARACTERISTICS

| Synbol | Test Conditions |  | Min. | Typ. | Max. | Unit |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| $\mathrm{I}_{\mathrm{R}}$ | $\mathrm{T}_{\mathrm{j}}=25^{\circ} \mathrm{C}$ | $\mathrm{V}_{\mathrm{R}}=\mathrm{V}_{\mathrm{RRM}}$ |  |  | 50 | $\mu \mathrm{A}$ |
|  | $\mathrm{T}_{\mathrm{j}}=100^{\circ} \mathrm{C}$ |  |  |  | 2.5 | mA |
| $V_{F}$ | $\mathrm{T}_{\mathrm{j}}=25^{\circ} \mathrm{C}$ | $I_{F}=12 A$ |  |  | 1.9 | V |
|  | $\mathrm{T}_{\mathrm{j}}=100^{\circ} \mathrm{C}$ |  |  |  | 1.8 |  |

RECOVERY CHARACTERISTICS

| Symbol | Test Conditions |  |  |  | Min. | Typ. | Max. | Unit |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| $\mathrm{trrr}^{\text {r }}$ | $\mathrm{T}_{\mathrm{j}}=25^{\circ} \mathrm{C}$ | $\mathrm{I}_{\mathrm{F}}=1 \mathrm{~A}$ | $\mathrm{di}_{\mathrm{F}} / \mathrm{dt}=-15 \mathrm{~A} / \mu \mathrm{s}$ | $\mathrm{V}_{\mathrm{R}}=30 \mathrm{~V}$ |  |  | 155 | ns |
|  |  | $\mathrm{I}_{\mathrm{F}}=0.5 \mathrm{~A}$ | $\mathrm{I}_{\mathrm{R}}=1 \mathrm{~A}$ | $\mathrm{I}_{\mathrm{rr}}=0.25 \mathrm{~A}$ |  |  | 65 |  |

TURN-OFF SWITCHING CHARACTERISTICS (Without Series Inductance)

| Symbol | Test Conditions |  | Min. | Typ. | Max. | Unit |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| tIRM | $\mathrm{diF}_{\mathrm{F}} / \mathrm{dt}=-50 \mathrm{~A} / \mu \mathrm{s}$ | $\begin{array}{ll} \mathrm{V}_{\mathrm{CC}}=200 \mathrm{~V} & \mathrm{I}_{\mathrm{F}}=12 \mathrm{~A} \\ \mathrm{~L}_{\mathrm{p}} \leq 0.05 \mu \mathrm{H} & \mathrm{~T}_{\mathrm{j}}=100^{\circ} \mathrm{C} \end{array}$ <br> See figure 11 |  |  | 200 | ns |
|  | $\mathrm{diF}_{\mathrm{F}} / \mathrm{dt}=-100 \mathrm{~A} / \mu \mathrm{s}$ |  |  | 120 |  |  |
| $\mathrm{I}_{\mathrm{RM}}$ | $d i_{F} / \mathrm{dt}=-50 \mathrm{~A} / \mu \mathrm{s}$ |  |  |  | 7.8 | A |
|  | $\mathrm{di}_{\mathrm{F}} / \mathrm{dt}=-100 \mathrm{~A} / \mu \mathrm{s}$ |  |  | 9 |  |  |

TURN-OFF OVERVOLTAGE COEFFICIENT (With Series Inductance)

| Symbol | Test Conditions |  |  | Min. | Typ. | Max. | Unit |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| $\mathrm{C}=\frac{\mathrm{V}_{\mathrm{RP}}}{\mathrm{~V}_{\mathrm{CC}}}$ | $\begin{aligned} & \mathrm{T}_{\mathrm{j}}=100^{\circ} \mathrm{C} \\ & \mathrm{diF} / \mathrm{dt}=-12 \mathrm{~A} / \mu \mathrm{s} \end{aligned}$ | $\begin{aligned} & V_{\mathrm{cC}}=200 \mathrm{~V} \\ & \mathrm{~L}_{\mathrm{p}}=12 \mu \mathrm{H} \end{aligned}$ | $\begin{aligned} & I_{F}=I_{F}(A V) \\ & \text { See figure } 12 \end{aligned}$ |  |  | 4.5 |  |

To evaluate the conduction losses use the following equations:

$$
\mathrm{V}_{\mathrm{F}}=1.47+0.026 \mathrm{I}_{\mathrm{F}} \quad \mathrm{P}=1.47 \times \mathrm{IF}_{(\mathrm{AV})}+0.026 \mathrm{IF}^{2}(\mathrm{RMS})
$$

Figure 1. Low frequency power losses versus average current


Figure 2. Peak current versus form factor


Figure 3. Non repetitive peak surge current versus overload duration


Figure 5. Voltage drop versus forward current


Figure 7. Recovery time versus $\mathrm{di}_{\mathrm{F}} / \mathbf{d}_{\mathrm{t}}-$


Figure 4. Thermal impedance versus pulse width


Figure 6. Recovery charge versus $\mathrm{dif}_{\mathrm{F}} / \mathrm{dt}$


Figure 8. Peak reverse current versus $\mathrm{di}_{\mathrm{F}} / \mathrm{d}_{\mathrm{t}}-$


Figure 9. Peak forward voltage versus $\mathrm{diF}_{\mathrm{F}} / \mathrm{d}_{\mathrm{t}}$


Figure 10. Dynamic parameters versus junction temperature.


Figure 11. Turn-off switching characteristics (without series inductance).
$\square$

Figure 12. Turn-off switching characteristics (with series inductance)
$\square$

## PACKAGE MECHANICAL DATA :

TO220AC Plastic


- Marking: type number
- Cooling method: by conduction (method C)
- Weight: 1.86 g
- Recommended torque value : $80 \mathrm{~cm} . \mathrm{N}$
- Maximum torque value : $100 \mathrm{~cm} . \mathrm{N}$

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