

4A, 1200V Ultrafast Dual Diode

The RURP4120CC is an ultrafast dual diode with soft recovery characteristics ($t_{rr} < 70\text{ns}$). It has low forward voltage drop and is silicon nitride passivated ion-implanted epitaxial planar construction.

This device is intended for use as a freewheeling/clamping diode and rectifier in a variety of switching power supplies and other power switching applications. Its low stored charge and ultrafast soft recovery minimize ringing and electrical noise in many power switching circuits reducing power loss in the switching transistors.

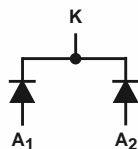
Formerly developmental type TA49036.

Ordering Information

| PART NUMBER | PACKAGE | BRAND |
|-------------|----------|----------|
| RURP4120CC | TO-220AB | RUR4120C |

NOTE: When ordering, use the entire part number.

Symbol



Features

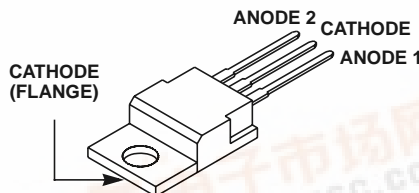
- Ultrafast with Soft Recovery <70ns
- Operating Temperature 175°C
- Reverse Voltage 1200V
- Avalanche Energy Rated
- Planar Construction

Applications

- Switching Power Supplies
- Power Switching Circuits
- General Purpose

Packaging

JEDEC TO-220AB



Absolute Maximum Ratings (Per Leg) $T_C = 25^\circ\text{C}$, Unless Otherwise Specified

| | RURP4120CC | UNITS |
|--|------------|-------|
| Peak Repetitive Reverse Voltage | 1200 | V |
| Working Peak Reverse Voltage | 1200 | V |
| DC Blocking Voltage | 1200 | V |
| Average Rectified Forward Current $T_C = 152^\circ\text{C}$ | 4 | A |
| Repetitive Peak Surge Current Square Wave, 20kHz | 8 | A |
| Nonrepetitive Peak Surge Current Halfwave, 1 Phase, 60Hz | 40 | A |
| Maximum Power Dissipation | 50 | W |
| Avalanche Energy (See Figures 10 and 11) | 10 | mJ |
| Operating and Storage Temperature | -65 to 175 | °C |



RURP4120CC

Electrical Specifications (Per Leg) $T_C = 25^\circ\text{C}$, Unless Otherwise Specified

| SYMBOL | TEST CONDITION | MIN | TYP | MAX | UNITS |
|-----------------|--|-----|-----|-----|---------------------------|
| V_F | $I_F = 4\text{A}$ | - | - | 2.1 | V |
| | $I_F = 4\text{A}, T_C = 150^\circ\text{C}$ | - | - | 1.9 | V |
| I_R | $V_R = 1200\text{V}$ | - | - | 100 | μA |
| | $V_R = 1200\text{V}, T_C = 150^\circ\text{C}$ | - | - | 500 | μA |
| t_{rr} | $I_F = 1\text{A}, dI_F/dt = 200\text{A}/\mu\text{s}$ | - | - | 70 | ns |
| | $I_F = 4\text{A}, dI_F/dt = 200\text{A}/\mu\text{s}$ | - | - | 90 | ns |
| t_a | $I_F = 4\text{A}, dI_F/dt = 200\text{A}/\mu\text{s}$ | - | 40 | - | ns |
| t_b | $I_F = 4\text{A}, dI_F/dt = 200\text{A}/\mu\text{s}$ | - | 28 | - | ns |
| Q_{RR} | $I_F = 4\text{A}, dI_F/dt = 200\text{A}/\mu\text{s}$ | - | 335 | - | nC |
| C_J | $V_R = 10\text{V}, I_F = 0\text{A}$ | - | 15 | - | pF |
| $R_{\theta JC}$ | | - | - | 3 | $^\circ\text{C}/\text{W}$ |

DEFINITIONS

V_F = Instantaneous forward voltage (pw = 300 μs , D = 2%).

I_R = Instantaneous reverse current.

t_{rr} = Reverse recovery time (See Figure 9), summation of $t_a + t_b$.

t_a = Time to reach peak reverse current (See Figure 9).

t_b = Time from peak I_{RM} to projected zero crossing of I_{RM} based on a straight line from peak I_{RM} through 25% of I_{RM} (See Figure 9).

Q_{RR} = Reverse recovery charge.

C_J = Junction Capacitance.

$R_{\theta JC}$ = Thermal resistance junction to case.

pw = Pulse width.

D = Duty cycle.

Typical Performance Curves

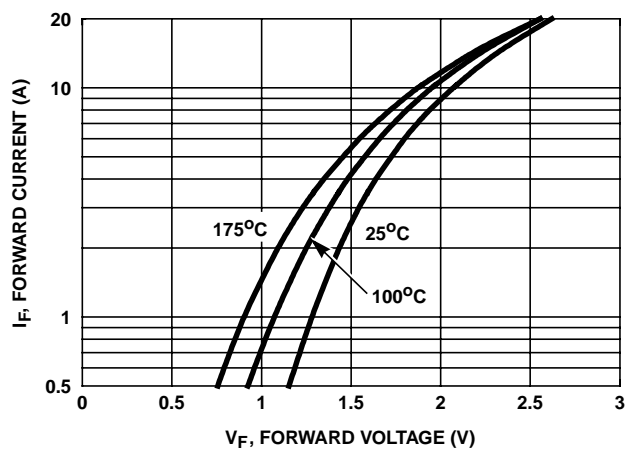


FIGURE 1. FORWARD CURRENT vs FORWARD VOLTAGE

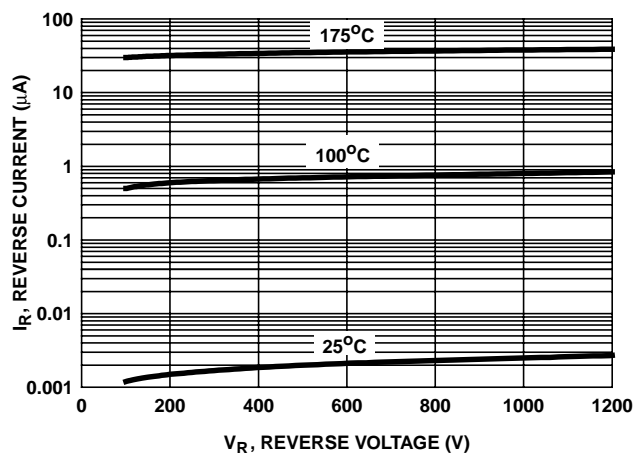


FIGURE 2. REVERSE CURRENT vs REVERSE VOLTAGE

RURP4120CC

Typical Performance Curves (Continued)

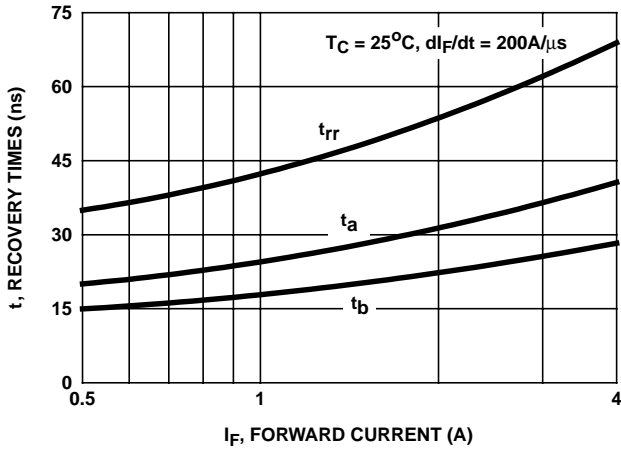


FIGURE 3. t_{rr} , t_a AND t_b CURVES vs FORWARD CURRENT

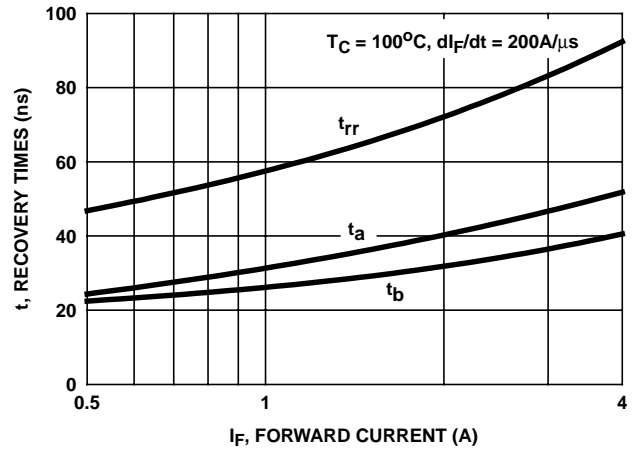


FIGURE 4. t_{rr} , t_a AND t_b CURVES vs FORWARD CURRENT

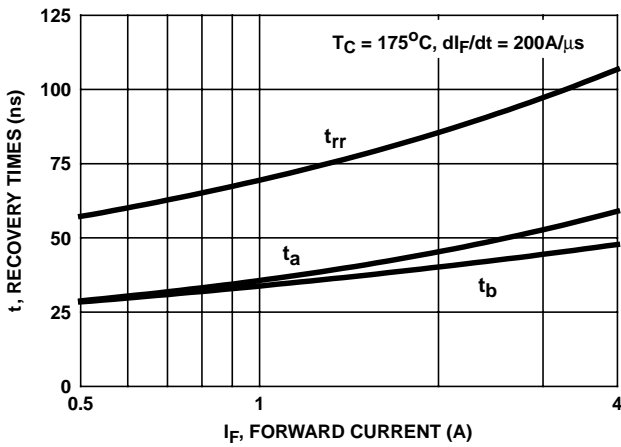


FIGURE 5. t_{rr} , t_a AND t_b CURVES vs FORWARD CURRENT

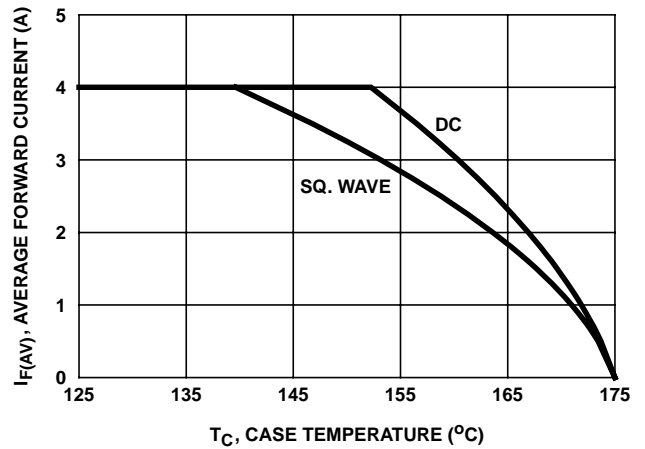


FIGURE 6. CURRENT DERATING CURVE

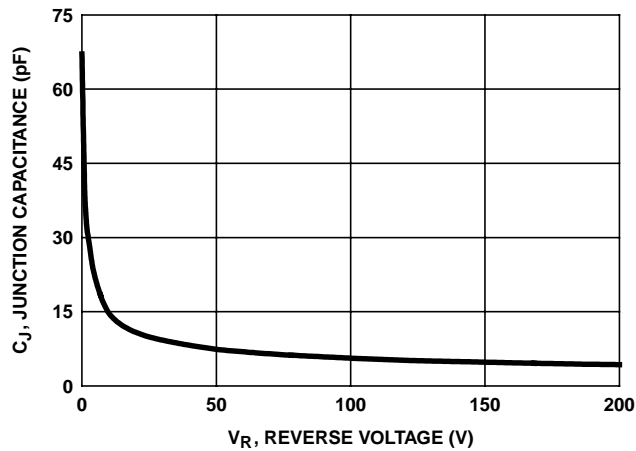


FIGURE 7. JUNCTION CAPACITANCE vs REVERSE VOLTAGE

Test Circuits and Waveforms

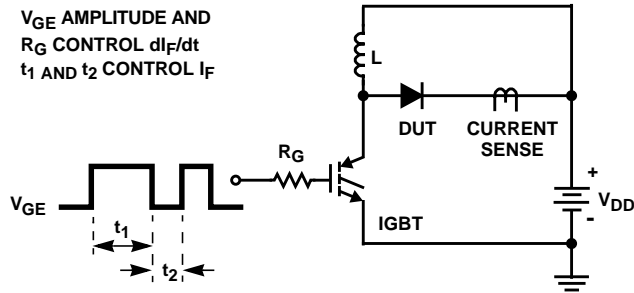


FIGURE 8. t_{rr} TEST CIRCUIT

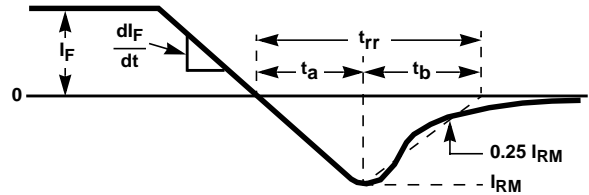


FIGURE 9. t_{rr} WAVEFORMS AND DEFINITIONS

$I = 1A$
 $L = 20mH$
 $R < 0.1\Omega$
 $E_{AVL} = 1/2Li^2 [V_{R(AVL)}/(V_{R(AVL)} - V_{DD})]$
 $Q_1 = IGBT (BV_{CES} > DUT V_{R(AVL)})$

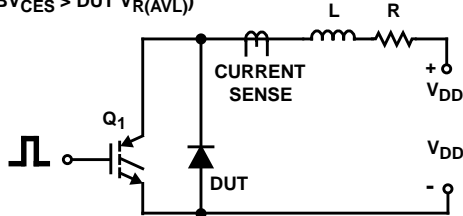


FIGURE 10. AVALANCHE ENERGY TEST CIRCUIT

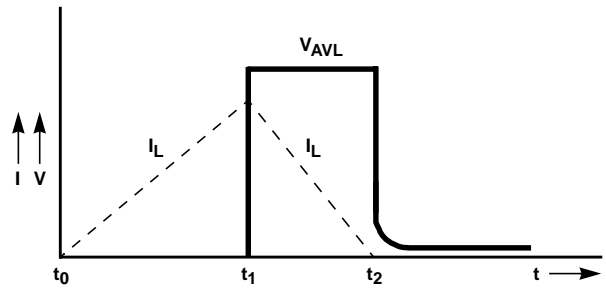


FIGURE 11. AVALANCHE CURRENT AND VOLTAGE WAVEFORMS

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