

30A, 1200V Ultrafast Dual Diode

The RURG30120CC is an ultrafast dual diode with soft recovery characteristic ($t_{rr} < 110\text{ns}$). 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 recovery with soft recovery characteristic minimize ringing and electrical noise in many power switching circuits, reducing power loss in the switching transistors.

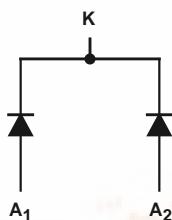
Formally developmental type TA49031.

Ordering Information

| PART NUMBER | PACKAGE | BRAND |
|-------------|---------|-----------|
| RURG30120CC | TO-247 | URG30120C |

NOTE: When ordering, use the entire part number.

Symbol



Features

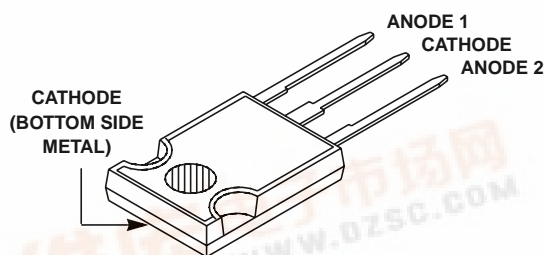
- Ultrafast with Soft Recovery <110ns
- Operating Temperature 175°C
- Reverse Voltage 1200V
- Avalanche Energy Rated
- Planar Construction

Applications

- Switching Power Supplies
- Power Switching Circuits
- General Purpose

Package

JEDEC STYLE TO-247



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

| | RURG30120CC | UNITS |
|--|---------------------------|-------|
| Peak Repetitive Reverse Voltage | V_{RRM} 1200 | V |
| Working Peak Reverse Voltage | V_{RWM} 1200 | V |
| DC Blocking Voltage | V_R 1200 | V |
| Average Rectified Forward Current ($T_C = 110^\circ\text{C}$) | $I_{F(AV)}$ 30 | A |
| Repetitive Peak Surge Current (Square Wave, 20kHz) | I_{FRM} 60 | A |
| Nonrepetitive Peak Surge Current (Halfwave, 1 Phase, 60Hz) | I_{FSM} 300 | A |
| Maximum Power Dissipation | P_D 125 | W |
| Avalanche Energy (See Figures 7 and 8) | E_{AVL} 30 | mJ |
| Operating and Storage Temperature | T_{STG}, T_J -65 to 175 | °C |

RURG30120CC

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

| SYMBOL | TEST CONDITION | MIN | TYP | MAX | UNITS |
|-----------------|---|-----|-----|-----|---------------------------|
| V_F | $I_F = 30\text{A}$ | - | - | 2.1 | V |
| | $I_F = 30\text{A}, T_C = 150^\circ\text{C}$ | - | - | 1.9 | V |
| I_R | $V_R = 1200\text{V}$ | - | - | 250 | μA |
| | $V_R = 1200\text{V}, T_C = 150^\circ\text{C}$ | - | - | 1 | mA |
| t_{rr} | $I_F = 1\text{A}, dI_F/dt = 100\text{A}/\mu\text{s}$ | - | - | 110 | ns |
| | $I_F = 30\text{A}, dI_F/dt = 100\text{A}/\mu\text{s}$ | - | - | 150 | ns |
| t_a | $I_F = 30\text{A}, dI_F/dt = 100\text{A}/\mu\text{s}$ | - | 90 | - | ns |
| t_b | $I_F = 30\text{A}, dI_F/dt = 100\text{A}/\mu\text{s}$ | - | 45 | - | ns |
| $R_{\theta JC}$ | | - | - | 1.2 | $^\circ\text{C}/\text{W}$ |

DEFINITIONS

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

I_R = Instantaneous reverse current.

t_{rr} = Reverse recovery time (See Figure 6), summation of $t_a + t_b$.

t_a = Time to reach peak reverse current (See Figure 6).

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 6).

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

pw = pulse width.

D = duty cycle.

Typical Performance Curves

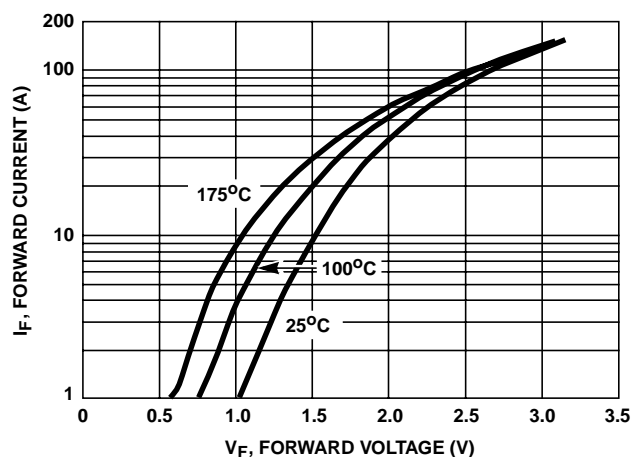


FIGURE 1. FORWARD CURRENT vs FORWARD VOLTAGE

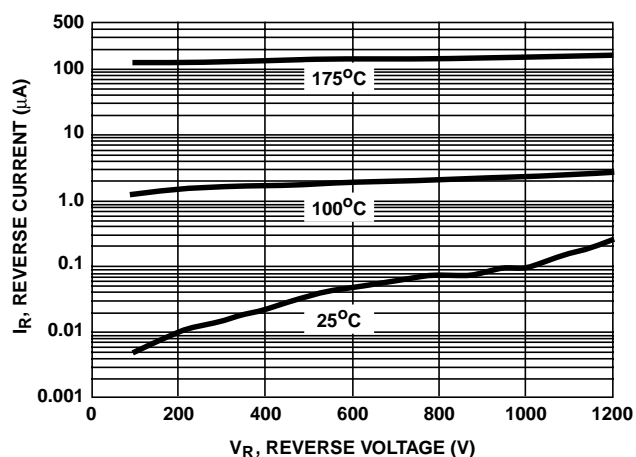


FIGURE 2. REVERSE CURRENT vs REVERSE VOLTAGE

Typical Performance Curves (Continued)

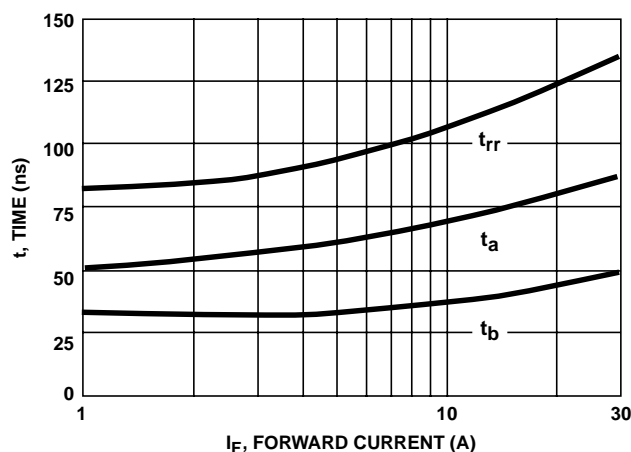


FIGURE 3. t_{rr} , t_a AND t_b CURVES vs FORWARD CURRENT

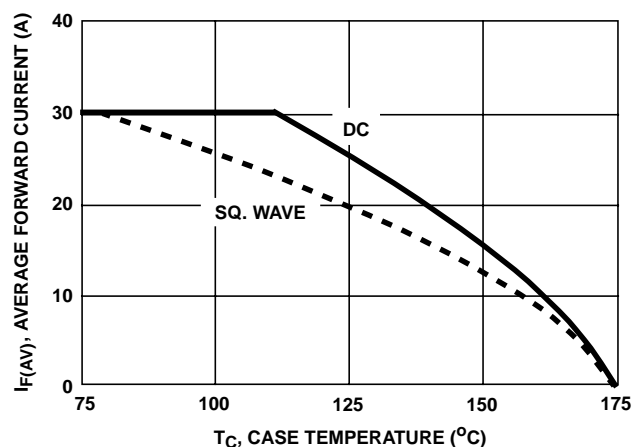


FIGURE 4. CURRENT DERATING CURVE

Test Circuits and Waveforms

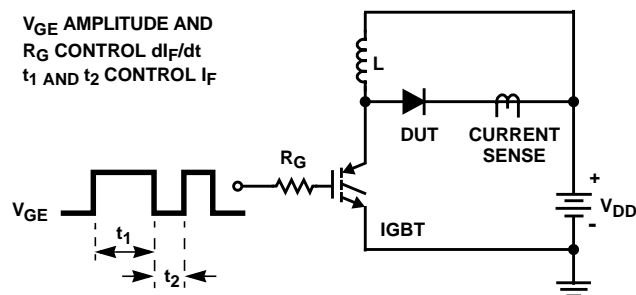


FIGURE 5. t_{rr} TEST CIRCUIT

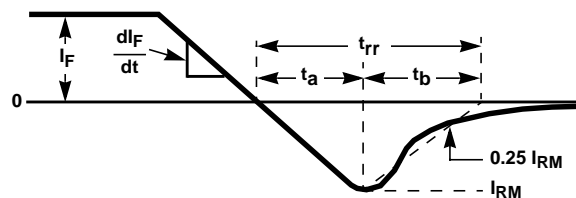


FIGURE 6. t_{rr} WAVEFORMS AND DEFINITIONS

$I = 1.225A$
 $L = 40mH$
 $R < 0.1\Omega$
 $E_{AVL} = 1/2LI^2 [V_{R(AVL)}/(V_{R(AVL)} - V_{DD})]$
 $Q_1 = IGBT (BV_{CES} > DUT V_{R(AVL)})$

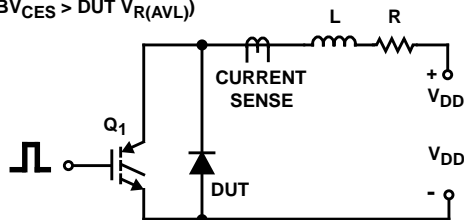


FIGURE 7. AVALANCHE ENERGY TEST CIRCUIT

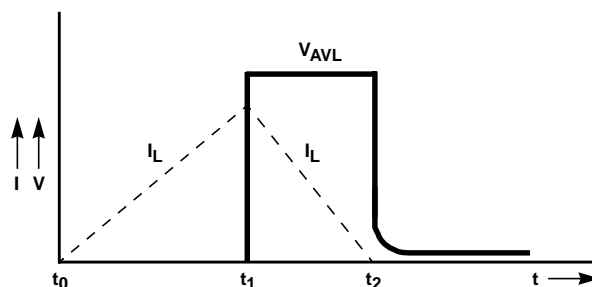


FIGURE 8. AVALANCHE CURRENT AND VOLTAGE WAVEFORMS

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