15A, 1200V Ultrafast Diode

The RURP15120 is an ultrafast diode with soft recovery characteristics (t_{rr} < 100ns). It has low forward voltage drop and is of 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, thus reducing power loss in the switching transistors.

Formerly developmental type TA49097.

Ordering Information

PART NUMBER	PACKAGE	BRAND
RURP15120	TO-220AC	RUR15120

NOTE: When ordering, use the entire part number.

Symbol

Features

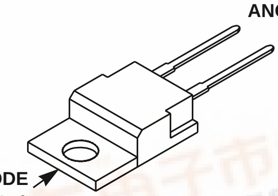
- Ultrafast with Soft Recovery . . . . <100ns
- Operating Temperature. . . . . 175°C
- Reverse Voltage 1200V
- Avalanche Energy Rated
- Planar Construction

Applications

- Switching Power Supplies
- Power Switching Circuits
- General Purpose

Packaging

JEDEC TO-220AC



Absolute Maximum Ratings $T_C = 25^oC$, Unless Otherwise Specified

		RURP15120	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 ($T_C = 140^oC$)	$I_{F(AV)}$	15	A
Repetitive Peak Surge Current (Square Wave, 20kHz)	I_{FRM}	30	A
Nonrepetitive Peak Surge Current (Halfwave, 1 Phase, 60Hz)	I_{FSM}	200	A
Maximum Power Dissipation	P_D	100	W
Avalanche Energy (See Figures 10 and 11)	E_{AVL}	20	mJ
Operating and Storage Temperature	T_{STG}, T_J	-65 to 175	^oC

Electrical Specifications $T_C = 25^oC$, Unless Otherwise Specified

SYMBOL	TEST CONDITION	MIN	TYP	MAX	UNITS
V_F	$I_F = 15A$	-	-	2.1	V
	$I_F = 15A$, $T_C = 150^oC$	-	-	1.9	V
I_R	$V_R = 1200V$	-	-	100	µA
	$V_R = 1200V$, $T_C = 150^oC$	-	-	500	µA
t_{rr}	$I_F = 1A$, $dI_F/dt = 100A/\mu s$	-	-	100	ns
	$I_F = 15A$, $dI_F/dt = 100A/\mu s$	-	-	130	ns
t_a	$I_F = 15A$, $dI_F/dt = 100A/\mu s$	-	65	-	ns
t_b	$I_F = 15A$, $dI_F/dt = 100A/\mu s$	-	40	-	ns
Q_{RR}	$I_F = 15A$, $dI_F/dt = 100A/\mu s$	-	400	-	nC
C_J	$V_R = 10V$, $I_F = 0A$	-	56	-	pF
$R_{\theta JC}$		-	-	1.5	$^oC/W$

DEFINITIONS

V_F = Instantaneous forward voltage (pw = 300µs, 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

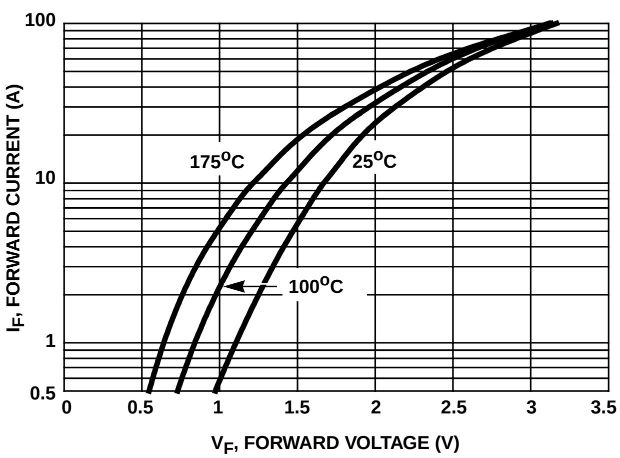


FIGURE 1. FORWARD CURRENT vs FORWARD VOLTAGE

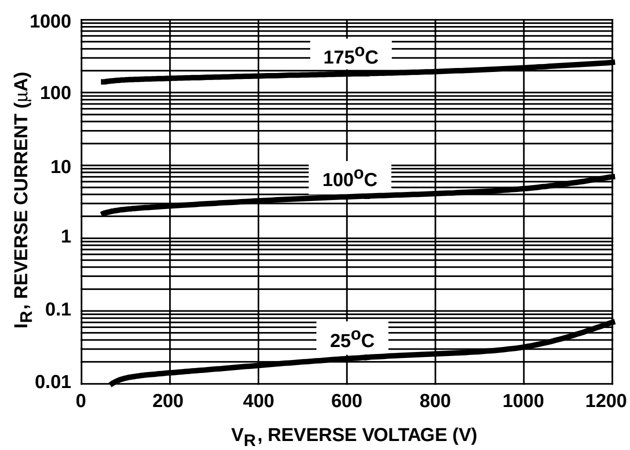


FIGURE 2. REVERSE CURRENT vs REVERSE VOLTAGE

Typical Performance Curves (Continued)

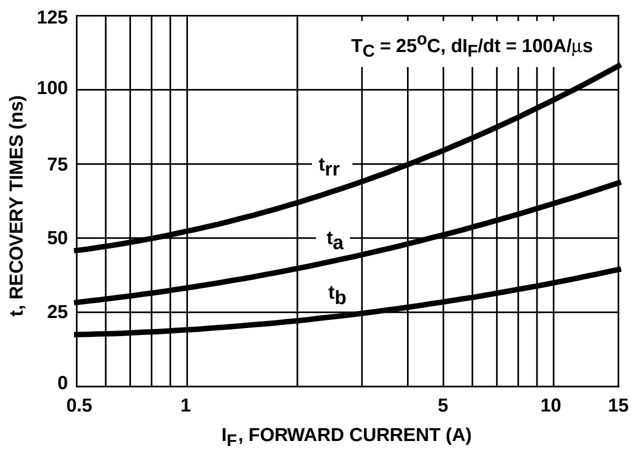


FIGURE 3. t_{rr}, t_a AND t_b CURVES vs FORWARD CURRENT

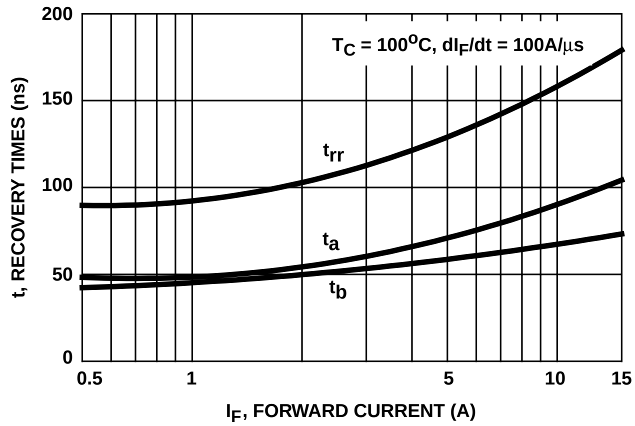


FIGURE 4. t_{rr}, t_a AND t_b CURVES vs FORWARD CURRENT

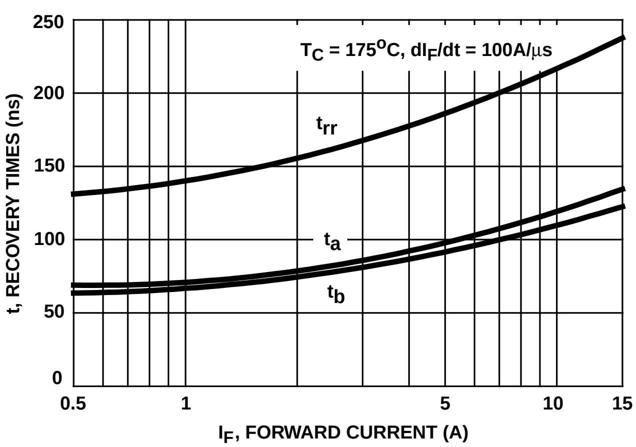


FIGURE 5. t_{rr}, t_a AND t_b CURVES vs FORWARD CURRENT

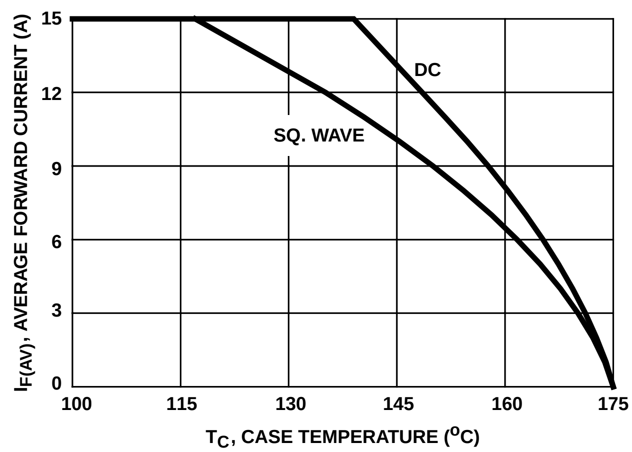


FIGURE 6. CURRENT DERATING CURVE

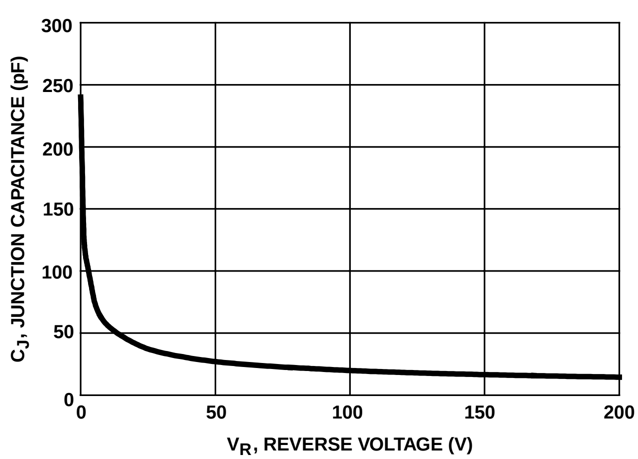


FIGURE 7. JUNCTION CAPACITANCE vs REVERSE VOLTAGE

Test Circuits and Waveforms

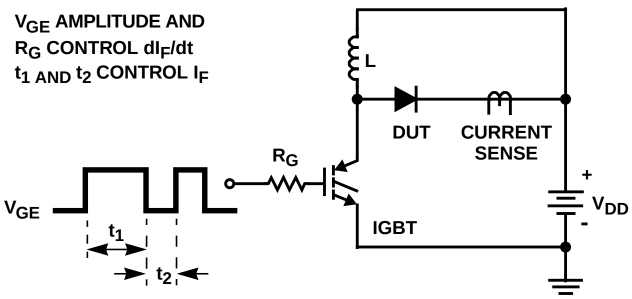


FIGURE 8. t_{rr} TEST CIRCUIT

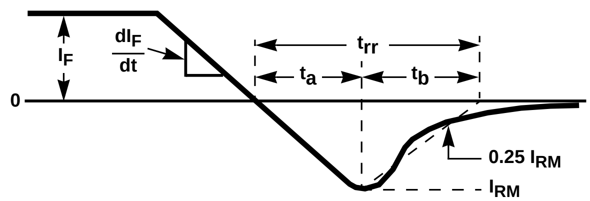


FIGURE 9. t_{rr} WAVEFORMS AND DEFINITIONS

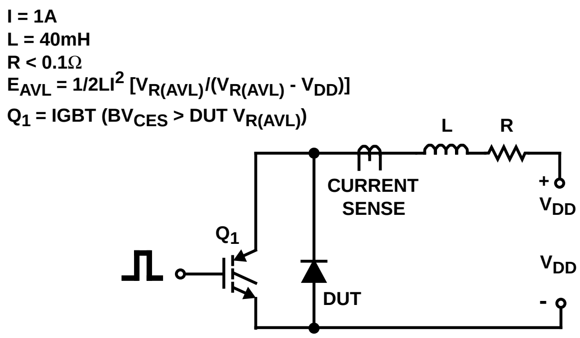


FIGURE 10. AVALANCHE ENERGY TEST CIRCUIT

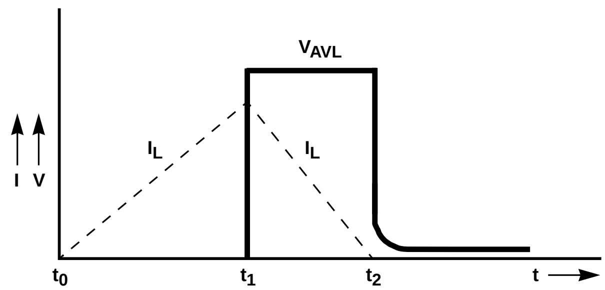


FIGURE 11. AVALANCHE CURRENT AND VOLTAGE WAVEFORMS