Data Sheet | January 2000 | File Number 3277.3

30A, 200V Ultrafast Diode

The RURG3020 is an ultrafast diode with soft recovery characteristics (t_{rr} < 45ns). 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 recovery with soft recovery characteristics minimizes ringing and electrical noise in many power switching circuits, reducing power loss in the switching transistors.

Formerly developmental type TA09645.

Ordering Information

PART NUMBER	PACKAGE	BRAND
RURG3020	TO-247	RURG3020

NOTE: When ordering, use the entire part number.

Symbol

Features

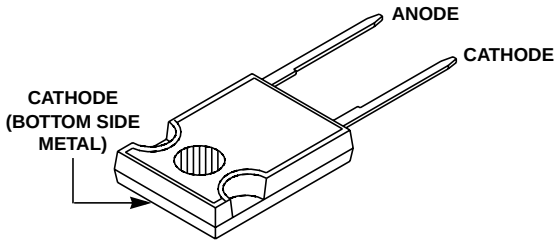
- Ultrafast with Soft Recovery . . . . . <45ns
- Operating Temperature. . . . . 175^{o}C
- Reverse Voltage 200V
- Avalanche Energy Rated
- Planar Construction

Applications

- Switching Power Supplies
- Power Switching Circuits
- General Purpose

Packaging

JEDEC STYLE 2 LEAD TO-247



Absolute Maximum Ratings $T_C = 25^{o}C$, Unless Otherwise Specified

		RURG3020	UNITS
Peak Repetitive Reverse Voltage	V_{RRM}	200	V
Working Peak Reverse Voltage	V_{RWM}	200	V
DC Blocking Voltage	V_R	200	V
Average Rectified Forward Current ($T_C = 145^{o}C$)	$I_{F(AV)}$	30	A
Repetitive Peak Surge Current (Square Wave, 20kHz)	I_{FRM}	70	A
Nonrepetitive Peak Surge Current (Halfwave, 1 Phase, 60Hz)	I_{FSM}	325	A
Maximum Power Dissipation	P_D	125	W
Avalanche Energy (See Figures 7 and 8)	E_{AVL}	20	mJ
Operating and Storage Temperature	T_{STG}, T_J	-65 to 175	^{o}C

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

SYMBOL	TEST CONDITION	MIN	TYP	MAX	UNITS
V_F	I_F = 30A	-	-	1.0	V
	I_F = 30A, $T_C = 150^oC$	-	-	0.85	V
I_R	V_R = 200V	-	-	250	µA
	V_R = 200V, $T_C = 150^oC$	-	-	1	mA
t_{rr}	I_F = 1A, dI_F/dt = 100A/µs	-	-	45	ns
	I_F = 30A, dI_F/dt = 100A/µs	-	-	50	ns
t_a	I_F = 30A, dI_F/dt= 100A/µs	-	20	-	ns
t_b	I_F = 30A, dI_F/dt = 100A/µs	-	15	-	ns
$R_{\theta JC}$		-	-	1.2	$^oC/W$

DEFINITIONS:

V_F = Instantaneous forward voltage (pw = 300µs, 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

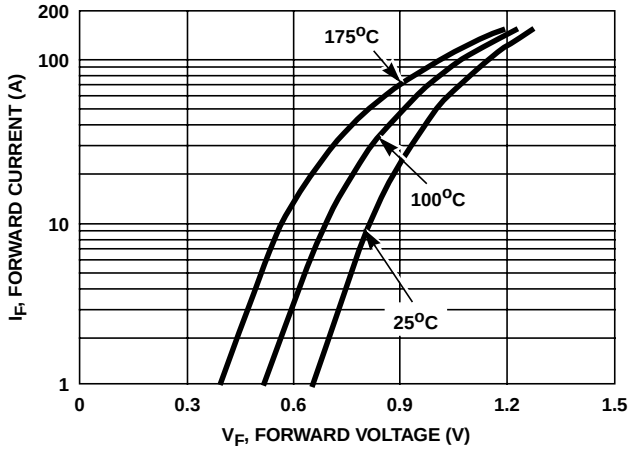


FIGURE 1. FORWARD CURRENT vs FORWARD VOLTAGE

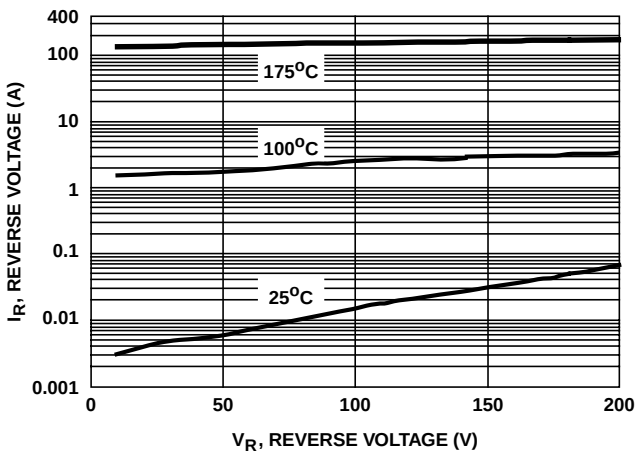


FIGURE 2. REVERSE CURRENT vs REVERSE VOLTAGE

Typical Performance Curves (Continued)

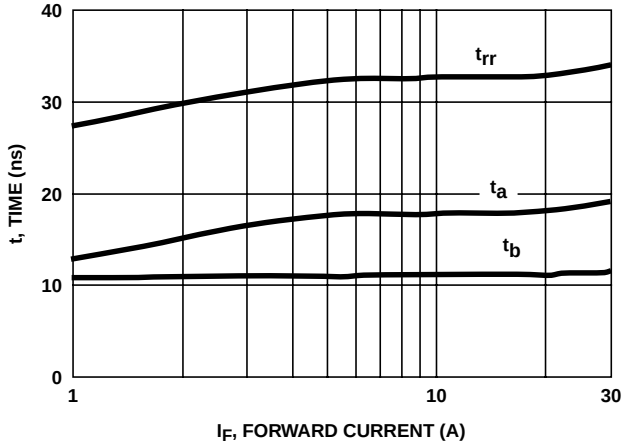


FIGURE 3. t_{rr}, t_a AND t_b CURVES vs FORWARD CURRENT

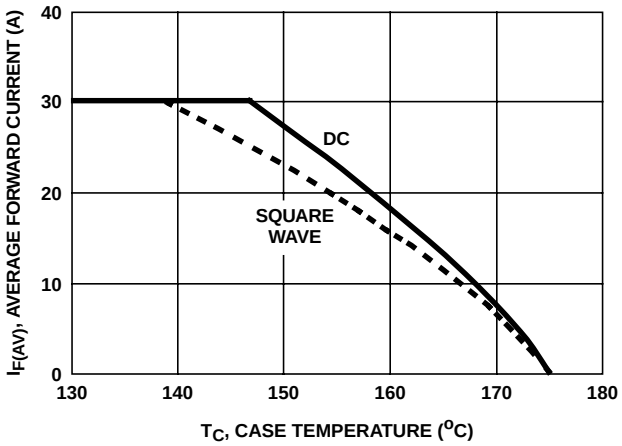


FIGURE 4. CURRENT DERATING CURVE

Test Circuits and Waveforms

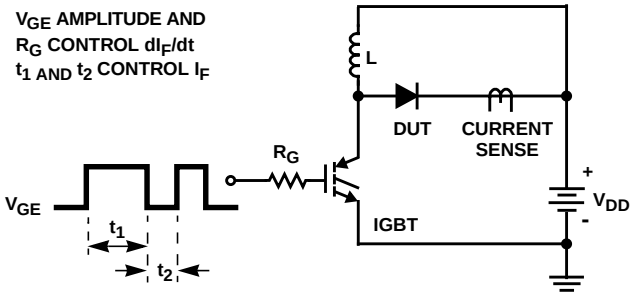


FIGURE 5. t_{rr} TEST CIRCUIT

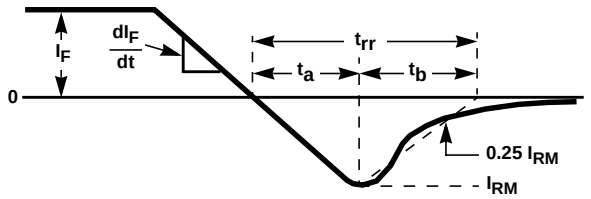


FIGURE 6. t_{rr} WAVEFORMS AND DEFINITIONS

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

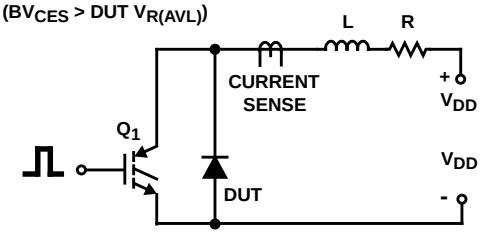


FIGURE 7. AVALANCHE ENERGY TEST CIRCUIT

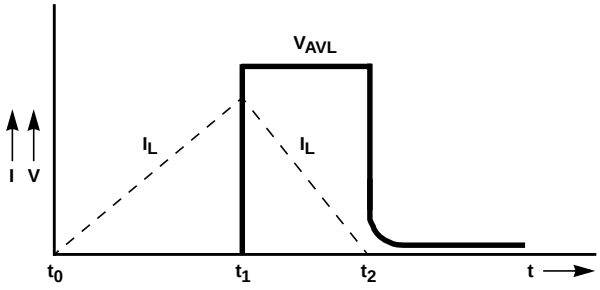


FIGURE 8. AVALANCHE CURRENT AND VOLTAGE WAVEFORMS

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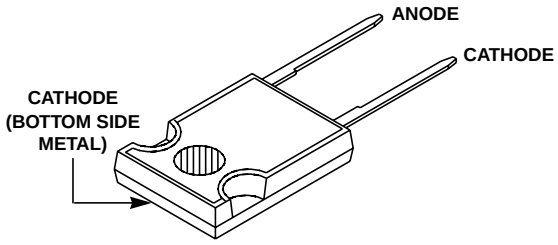

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t_{rr}	I_F = 1A, dI_F/dt = 100A/µs	-	-	45	ns
	I_F = 30A, dI_F/dt = 100A/µs	-	-	50	ns
t_a	I_F = 30A, dI_F/dt= 100A/µs	-	20	-	ns
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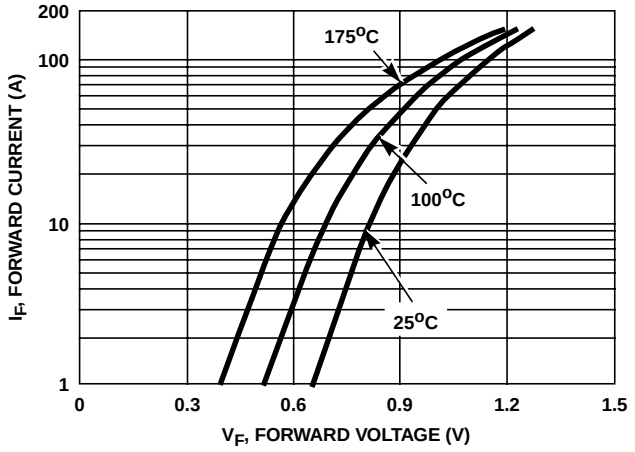

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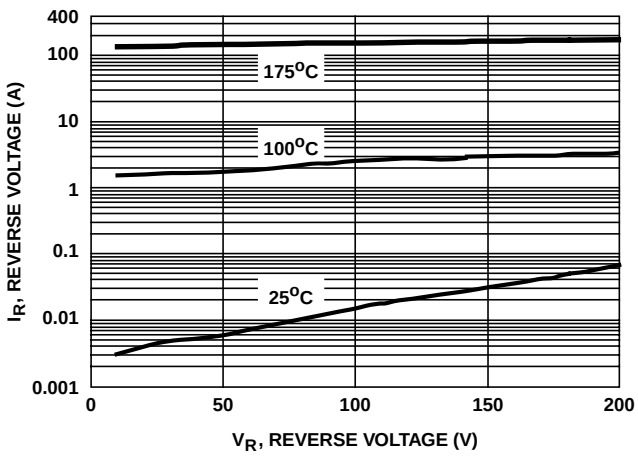

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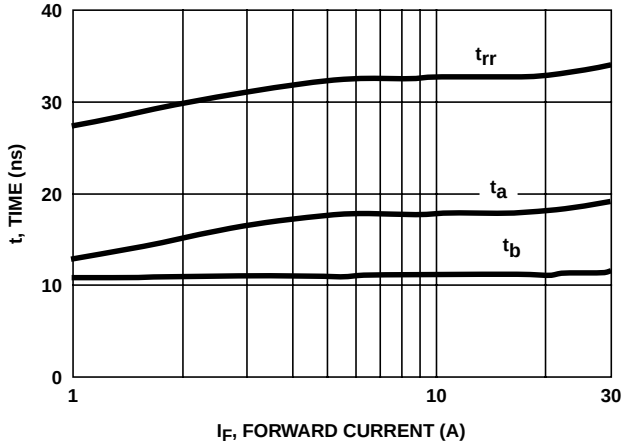

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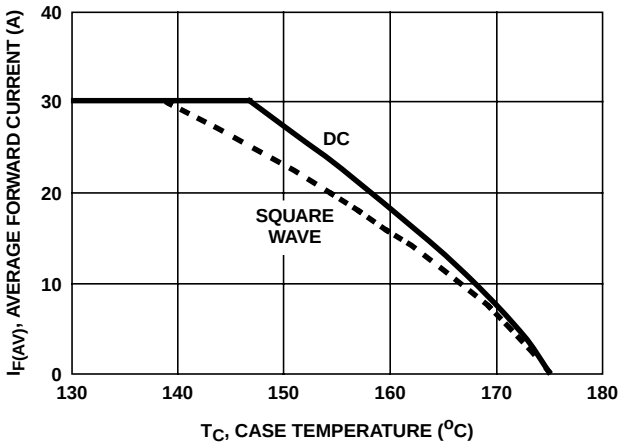

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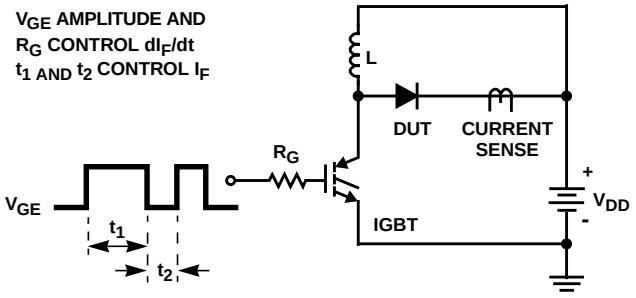

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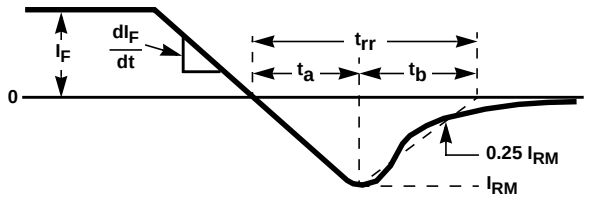

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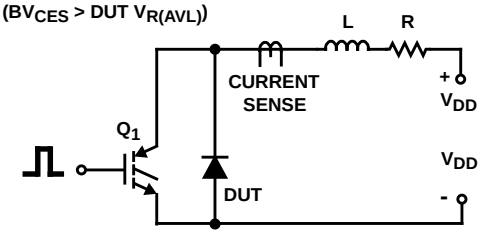

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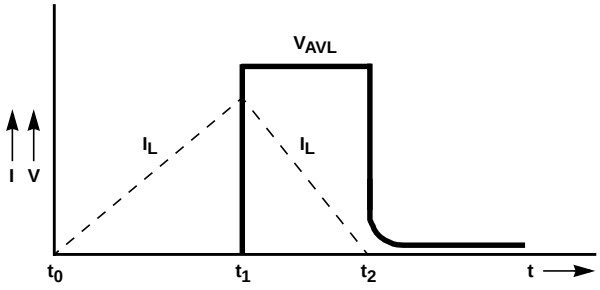

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