

April 1995

80A, 400V - 600V Ultrafast Diodes

Features

- Ultrafast with Soft Recovery <75ns
- Operating Temperature +175°C
- Reverse Voltage Up To 600V
- Avalanche Energy Rated
- Planar Construction

Applications

- Switching Power Supplies
- Power Switching Circuits
- General Purpose

Description

RURU8040, RURU8050 and RURU8060 (TA9886) are ultrafast diodes with soft recovery characteristics ($t_{RR} < 75\text{ns}$). They have low forward voltage drop and are silicon nitride passivated ion-implanted epitaxial planar construction.

These devices are intended for use as freewheeling/clamping diodes and rectifiers in a variety of switching power supplies and other power switching applications. Their low stored charge and ultrafast recovery with soft recovery characteristic minimizes ringing and electrical noise in many power switching circuits reducing power loss in the switching transistors.

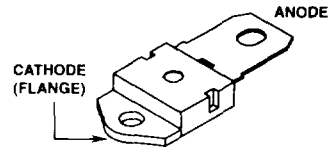
PACKAGING AVAILABILITY

PART NUMBER	PACKAGE	BRAND
RURU8040	TO-218	RURU8040
RURU8050	TO-218	RURU8050
RURU8060	TO-218	RURU8060

NOTE: When ordering, use the entire part number.

Package

JEDEC STYLE SINGLE LEAD TO-218



Symbol



Absolute Maximum Ratings $T_C = +25^\circ\text{C}$, Unless Otherwise Specified

	RURU8040	RURU8050	RURU8060	UNITS
Peak Repetitive Reverse Voltage V_{RRM}	400	500	600	V
Working Peak Reverse Voltage V_{RWM}	400	500	600	V
DC Blocking Voltage V_R	400	500	600	V
Average Rectified Forward Current $I_{F(AV)}$ ($T_C = +84^\circ\text{C}$)	80	80	80	A
Repetitive Peak Surge Current I_{FSM} (Square Wave, 20kHz)	160	160	160	A
Nonrepetitive Peak Surge Current I_{FSM} (Halfwave, 1 Phase, 60Hz)	800	800	800	A
Maximum Power Dissipation P_D	180	180	180	W
Avalanche Energy (L = 40mH) E_{AVL}	50	50	50	mJ
Operating and Storage Temperature T_{STG}, T_J	-65 to +175	-65 to +175	-65 to +175	°C

Specifications RURU8040, RURU8050, RURU8060

Electrical Specifications $T_C = +25^\circ\text{C}$. Unless Otherwise Specified

SYMBOL	TEST CONDITION	LIMITS									UNITS
		RURU8040			RURU8050			RURU8060			
		MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX	
V_F	$I_F = 80\text{A}$, $T_C = +25^\circ\text{C}$	-	-	1.6	-	-	1.6	-	-	1.6	V
V_F	$I_F = 80\text{A}$, $T_C = +150^\circ\text{C}$	-	-	1.4	-	-	1.4	-	-	1.4	V
I_R	$V_R = 400\text{V}$, $T_C = +25^\circ\text{C}$	-	-	500	-	-	-	-	-	-	μA
	$V_R = 500\text{V}$, $T_C = +25^\circ\text{C}$	-	-	-	-	-	500	-	-	-	μA
	$V_R = 600\text{V}$, $T_C = +25^\circ\text{C}$	-	-	-	-	-	-	-	-	500	μA
I_R	$V_R = 400\text{V}$, $T_C = +150^\circ\text{C}$	-	-	2.0	-	-	-	-	-	-	mA
	$V_R = 500\text{V}$, $T_C = +150^\circ\text{C}$	-	-	-	-	-	2.0	-	-	-	mA
	$V_R = 600\text{V}$, $T_C = +150^\circ\text{C}$	-	-	-	-	-	-	-	-	2.0	mA
t_{RR}	$I_F = 1\text{A}$, $dI_F/dt = 100\text{A}/\mu\text{s}$	-	-	75	-	-	75	-	-	75	ns
	$I_F = 80\text{A}$, $dI_F/dt = 100\text{A}/\mu\text{s}$	-	-	85	-	-	85	-	-	85	ns
t_A	$I_F = 80\text{A}$, $dI_F/dt = 100\text{A}/\mu\text{s}$	-	40	-	-	40	-	-	40	-	ns
t_B	$I_F = 80\text{A}$, $dI_F/dt = 100\text{A}/\mu\text{s}$	-	25	-	-	25	-	-	25	-	ns
$R_{\theta JC}$		-	-	0.83	-	-	0.83	-	-	0.83	$^\circ\text{C}/\text{W}$

DEFINITIONS

V_F = Instantaneous forward voltage ($p_w = 300\mu\text{s}$, $D = 2\%$).

I_R = Instantaneous reverse current.

t_{RR} = Reverse recovery time (See Figure 2), summation of $t_A + t_B$.

t_A = Time to reach peak reverse current (See Figure 2).

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 2).

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

E_{AVL} = Controlled avalanche energy (See Figures 7 and 8).

p_w = pulse width.

D = duty cycle.

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ULTRAFAST
SINGLE DIODES

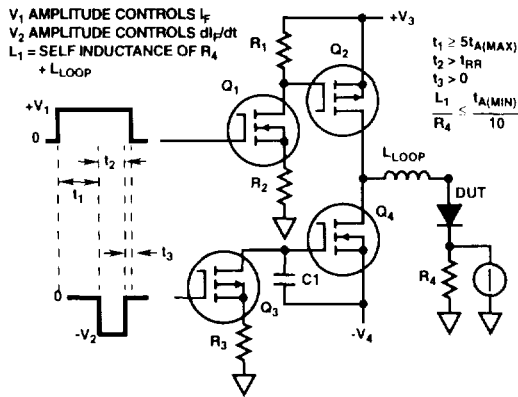


FIGURE 1. t_{RR} TEST CIRCUIT

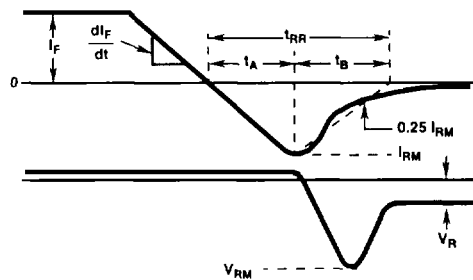


FIGURE 2. t_{RR} WAVEFORMS AND DEFINITIONS

Typical Performance Curves

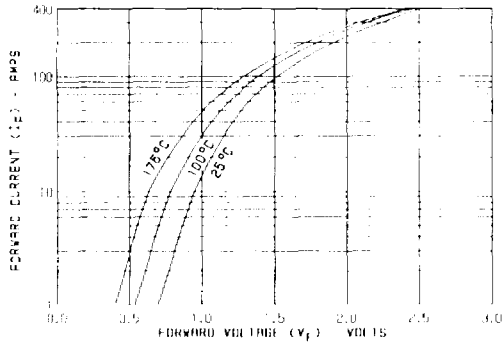


FIGURE 3. TYPICAL FORWARD CURRENT vs FORWARD VOLTAGE DROP

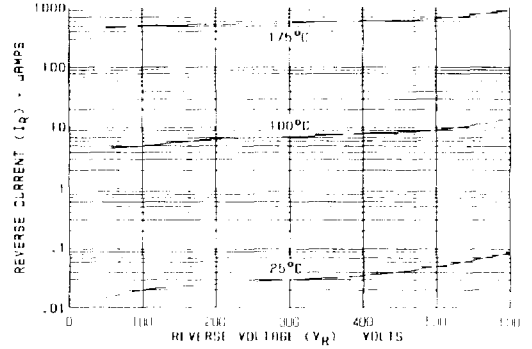


FIGURE 4. TYPICAL REVERSE CURRENT vs VOLTAGE

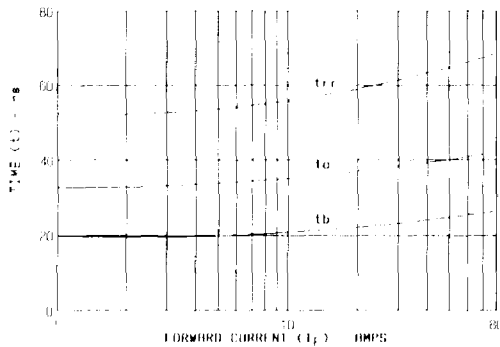


FIGURE 5. TYPICAL t_{RRn} , t_A AND t_B CURVES vs FORWARD CURRENT

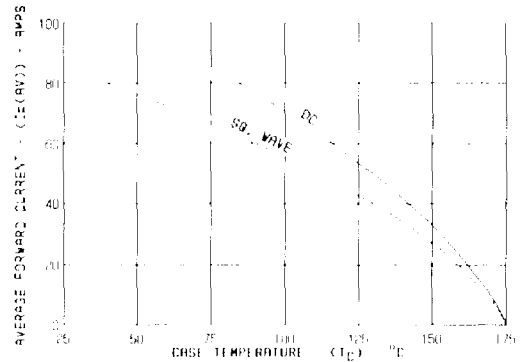


FIGURE 6. CURRENT DERATING CURVE FOR ALL TYPES

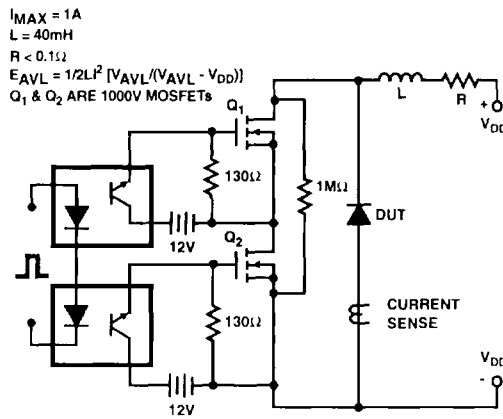


FIGURE 7. AVALANCHE ENERGY TEST CIRCUIT

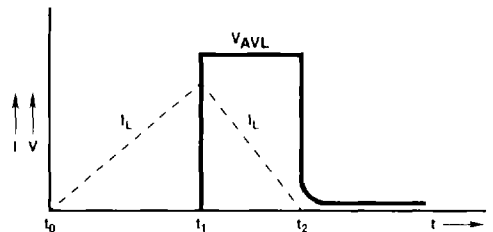


FIGURE 8. AVALANCHE CURRENT AND VOLTAGE WAVEFORMS