HARRIS SEMICONDUCTOR

RURP6120CC

October 1995

6A, 1200V Ultrafast Dual Diode

Features

- **Ultrafast with Soft Recovery . . . . <70ns**
- **Operating Temperature . . . . +175^{o}C**
- **Reverse Voltage 1200V**
- **Avalanche Energy Rated**
- **Planar Construction**

Applications

- **Switching Power Supplies**
- **Power Switching Circuits**
- **General Purpose**

Description

The RURP6120CC is an ultrafast dual diode with soft recovery characteristics (t_{RR} < 70ns). 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.

PACKAGE AVAILABILITY

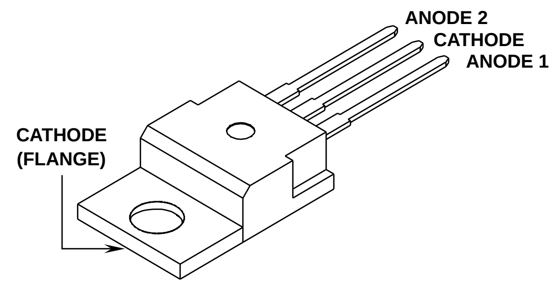
PART NUMBER	PACKAGE	BRAND
RURP6120CC	TO-220AB	RUR6120C

NOTE: When ordering, use the entire part number.

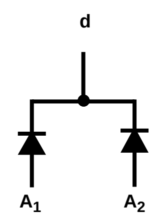
Formerly developmental type TA49039.

Package

JEDEC TO-220AB



Symbol



Absolute Maximum Ratings (per leg) T_C = +25^{o}C, Unless Otherwise Specified

	RURP6120CC	UNITS
Peak Repetitive Reverse Voltages . . . . V_{RRM}	1200	V
Working Peak Reverse Voltage . . . . V_{RWM}	1200	V
DC Blocking Voltage . . . . V_R	1200	V
Average Rectified Forward Current . . . . $I_{F(AV)}$ T_C = +140^{o}C	6	A
Repetitive Peak Surge Current . . . . I_{FSM} Square Wave, 20kHz	12	A
Nonrepetitive Peak Surge Current . . . . I_{FSM} Halfwave, 1 phase, 60Hz	60	A
Maximum Power Dissipation . . . . P_D	50	W
Avalanche Energy (See Figures 10 and 11) . . . . E_{AVL}	10	mj
Operating and Storage Temperature . . . . T_{STG}, T_J	-65 to +175	^{o}C

Electrical Characteristics (per leg) $T_C = +25^oC$, Unless Otherwise Specified

SYMBOL	TEST CONDITION	RURP6120CC LIMITS			UNITS
		MIN	TYP	MAX	
V_F	$I_F = 6A, T_C = +25^oC$	-	-	2.1	V
	$I_F = 6A, T_C = +150^oC$	-	-	1.9	V
I_R	$V_R = 1200V, T_C = +25^oC$	-	-	100	µA
	$V_R = 1200V, T_C = +150^oC$	-	-	500	µA
t_{RR}	$I_F = 1A, dI_F/dt = 200A/\mu s$	-	-	70	ns
	$I_F = 6A, dI_F/dt = 200A/\mu s$	-	-	90	ns
t_A	$I_F = 6A, dI_F/dt = 200A/\mu s$	-	45	-	ns
t_B	$I_F = 6A, dI_F/dt = 200A/\mu s$	-	30	-	ns
Q_{RR}	$I_F = 6A, dI_F/dt = 200A/\mu s$	-	400	-	nC
C_J	$V_R = 10V, I_F = 0A$	-	22	-	pF
$R_{\theta JC}$		-	-	3	$^oC/W$

DEFINITIONS

V_F = Instantaneous forward voltage (pw = 300µs, 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).
Q_{RR} = Reverse recovery charge.
C_J = Junction Capacitance.
$R_{\theta JC}$ = Thermal resistance junction to case.
E_{AVL} = Controlled Avalanche Energy (See Figures 10 and 11).
pw = pulse width.
D = duty cycle.

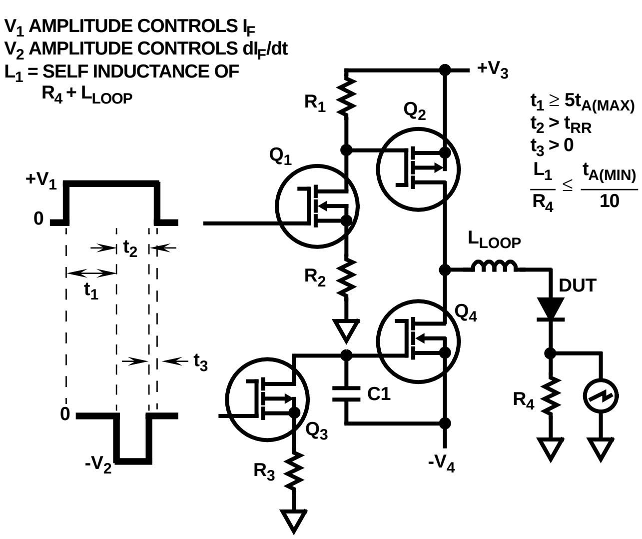


FIGURE 1. t_{RR} TEST CIRCUIT

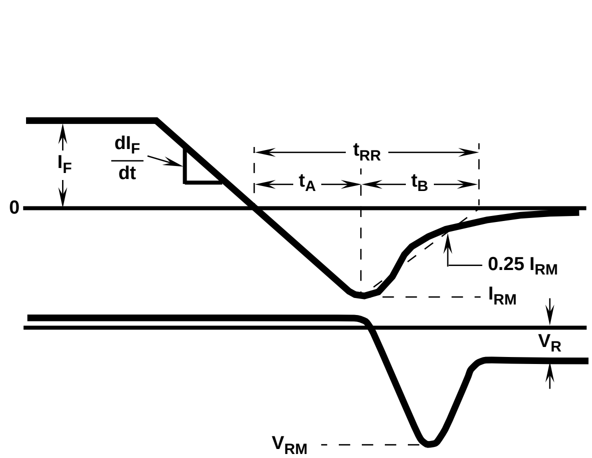


FIGURE 2. t_{RR} WAVEFORMS AND DEFINITIONS

Typical Performance Curves

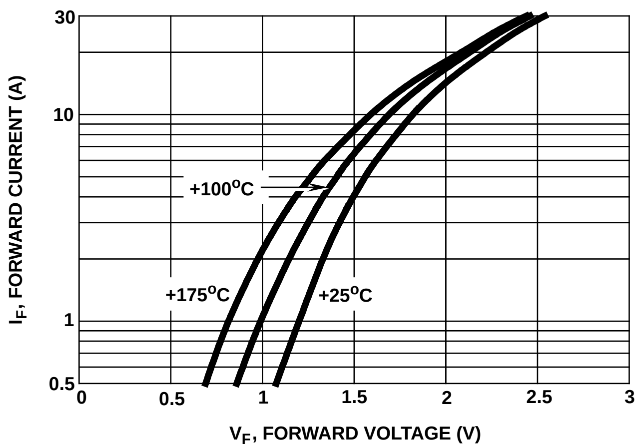


FIGURE 3. TYPICAL FORWARD CURRENT vs FORWARD VOLTAGE DROP

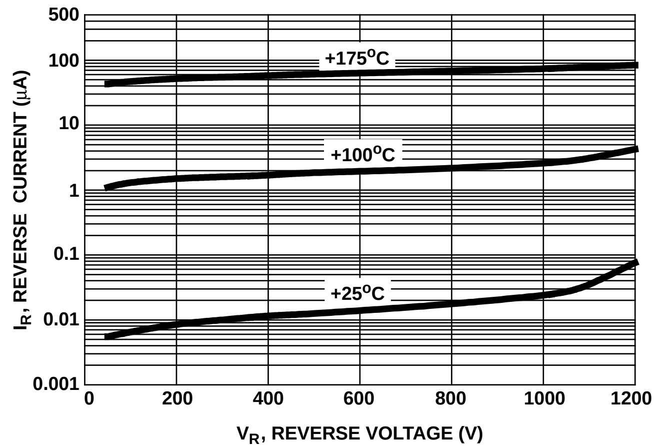


FIGURE 4. TYPICAL REVERSE CURRENT vs REVERSE VOLTAGE

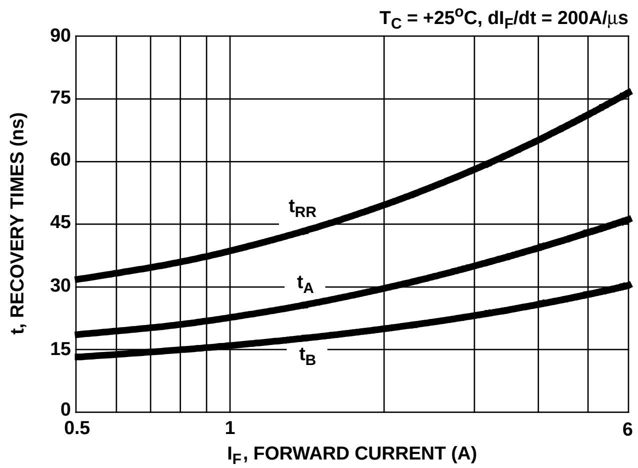


FIGURE 5. TYPICAL t_{RR}, t_A AND t_B CURVES vs FORWARD CURRENT AT +25°C

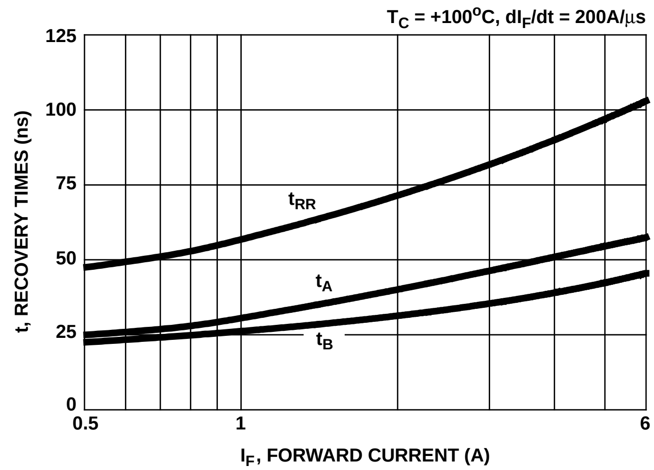


FIGURE 6. TYPICAL t_{RR}, t_A AND t_B CURVES vs FORWARD CURRENT AT +100°C

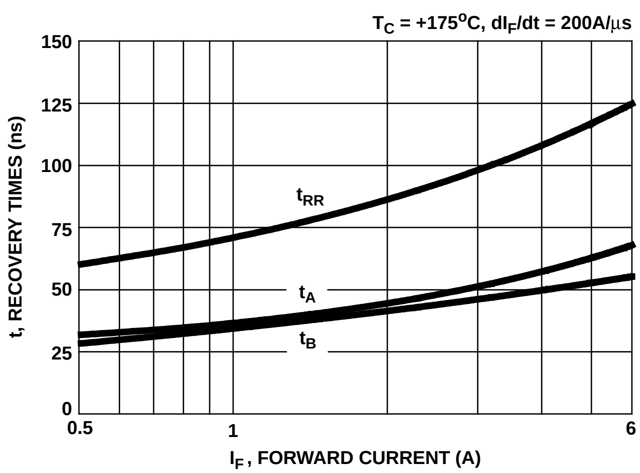


FIGURE 7. TYPICAL t_{RR}, t_A AND t_B CURVES vs FORWARD CURRENT AT +175°C

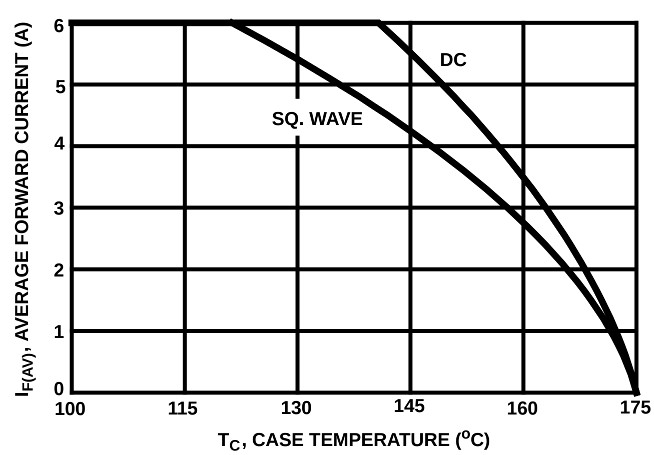


FIGURE 8. CURRENT DERATING CURVE

Typical Performance Curves (Continued)

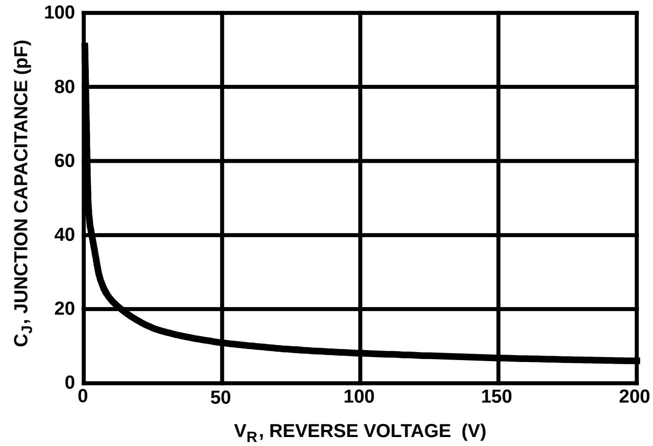


FIGURE 9. TYPICAL JUNCTION CAPACITANCE vs REVERSE VOLTAGE

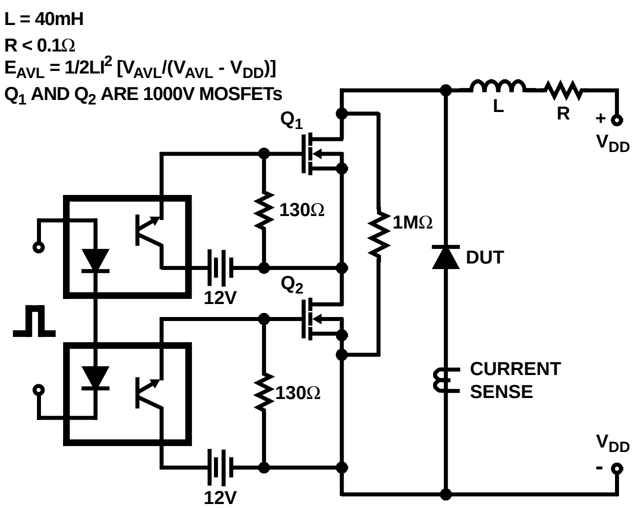


FIGURE 10. AVALANCHE ENERGY TEST CIRCUIT

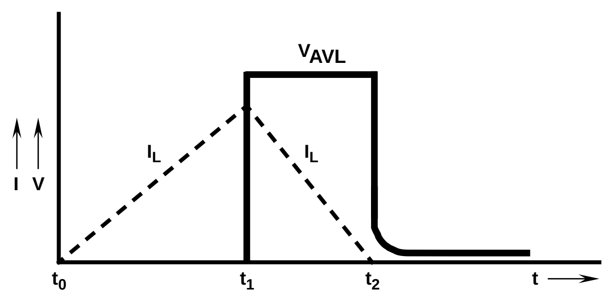
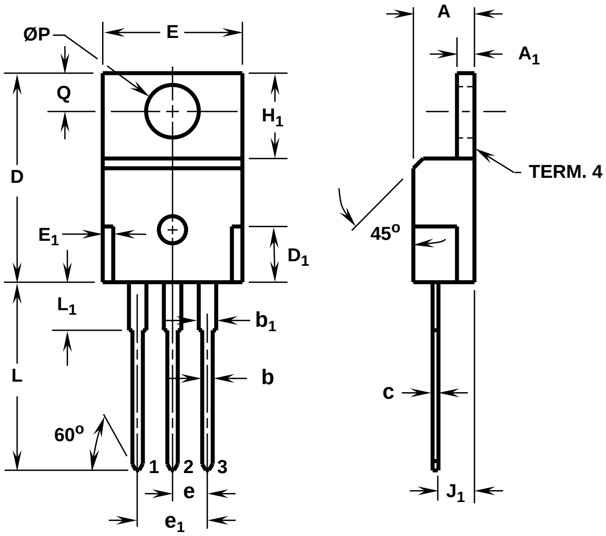


FIGURE 11. AVALANCHE CURRENT AND VOLTAGE WAVEFORMS

Plastic Packages



LEAD 1. ANODE 1
LEAD 2. CATHODE
LEAD 3. ANODE 2
TERM. 4. CATHODE

TO-220AB

3 LEAD JEDEC TO-220AB PLASTIC PACKAGE

SYMBOL	INCHES		MILLIMETERS		NOTES
	MIN	MAX	MIN	MAX	
A	0.170	0.180	4.32	4.57	-
A_1	0.048	0.052	1.22	1.32	-
b	0.030	0.034	0.77	0.86	3, 4
b_1	0.045	0.055	1.15	1.39	2, 3
c	0.014	0.019	0.36	0.48	2, 3, 4
D	0.590	0.610	14.99	15.49	-
D_1	-	0.160	-	4.06	-
E	0.395	0.410	10.04	10.41	-
E_1	-	0.030	-	0.76	-
e	0.100 TYP		2.54 TYP		5
e_1	0.200 BSC		5.08 BSC		5
H_1	0.235	0.255	5.97	6.47	-
J_1	0.100	0.110	2.54	2.79	6
L	0.530	0.550	13.47	13.97	-
L_1	0.130	0.150	3.31	3.81	2
ØP	0.149	0.153	3.79	3.88	-
Q	0.102	0.112	2.60	2.84	-

NOTES:

1. These dimensions are within allowable dimensions of Rev. J of JEDEC TO-220AB outline dated 3-24-87.
2. Lead dimension and finish uncontrolled in L_1.
3. Lead dimension (without solder).
4. Add typically 0.002 inches (0.05mm) for solder coating.
5. Position of lead to be measured 0.250 inches (6.35mm) from bottom of dimension D.
6. Position of lead to be measured 0.100 inches (2.54mm) from bottom of dimension D.
7. Controlling dimension: Inch.
8. Revision 1 dated 1-93.

All Harris Semiconductor products are manufactured, assembled and tested under **ISO9000** quality systems certification.

Sales Office Headquarters

For general information regarding Harris Semiconductor and its products, call **1-800-4-HARRIS**

NORTH AMERICA
Harris Semiconductor
P. O. Box 883, Mail Stop 53-210
Melbourne, FL 32902
TEL: 1-800-442-7747
(407) 729-4984
FAX: (407) 729-5321

EUROPE
Harris Semiconductor
Mercure Center
100, Rue de la Fusee
1130 Brussels, Belgium
TEL: (32) 2.724.2111
FAX: (32) 2.724.22.05

ASIA
Harris Semiconductor PTE Ltd.
No. 1 Tannery Road
Cencon 1, #09-01
Singapore 1334
TEL: (65) 748-4200
FAX: (65) 748-0400

HARRIS
SEMICONDUCTOR