intersil

RURU75120

Data Sheet | **January 2000** | **File Number 3413.3**

75A, 1200V Ultrafast Diode

The RURU75120 is an ultrafast diode with soft recovery characteristics (t_{rr} < 125ns). 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.

Formerly developmental type TA49032.

Ordering Information

PART NUMBER	PACKAGE	BRAND
RURU75120	TO-218	RURU75120

NOTE: When ordering, use the entire part number.

Symbol

Features

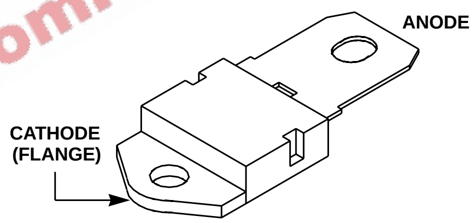
- Ultrafast with Soft Recovery . . . . <125ns
- Operating Temperature. . . . . 175^{o}C
- Reverse Voltage 1200V
- Avalanche Energy Rated
- Planar Construction

Applications

- Switching Power Supplies
- Power Switching Circuits
- General Purpose

Packaging

JEDEC STYLE SINGLE LEAD TO-218



Absolute Maximum Ratings $T_C = 25^oC$

		RURU75120	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 ($T_C = 57^oC$)	$I_{F(AV)}$	75	A
Repetitive Peak Surge Current (Square Wave, 20kHz)	I_{FRM}	150	A
Nonrepetitive Peak Surge Current (Halfwave, 1 Phase, 60Hz)	I_{FSM}	500	A
Maximum Power Dissipation	P_D	190	W
Avalanche Energy (See Figures 7 and 8)	E_{AVL}	50	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	$I_F = 75A$	-	-	2.1	V
	$I_F = 75A$, $T_C = 150^oC$	-	-	1.9	V
I_R	$V_R = 1200V$	-	-	250	µA
	$V_R = 1200V$, $T_C = 150^oC$	-	-	2	mA
t_{rr}	$I_F = 1A$, $dI_F/dt = 100A/\mu s$	-	-	125	ns
	$I_F = 75A$, $dI_F/dt = 100A/\mu s$	-	-	200	ns
t_a	$I_F = 75A$, $dI_F/dt = 100A/\mu s$	-	90	-	ns
t_b	$I_F = 75A$, $dI_F/dt = 100A/\mu s$	-	65	-	ns
$R_{\theta JC}$		-	-	0.8	$^oC/W$

DEFINITIONS

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

I_R = Instantaneous reverse current.

t_{rr} = Reverse recovery time 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

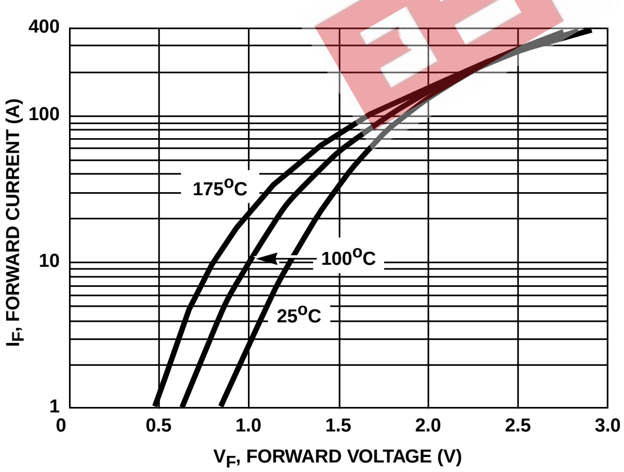


FIGURE 1. FORWARD CURRENT vs FORWARD VOLTAGE

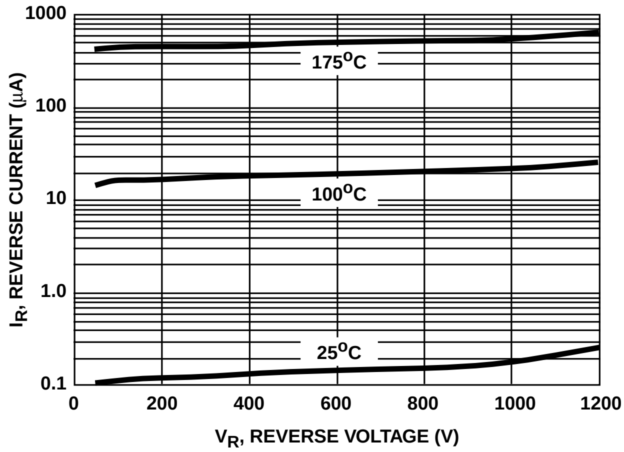


FIGURE 2. REVERSE CURRENT vs REVERSE VOLTAGE

Typical Performance Curves (Continued)

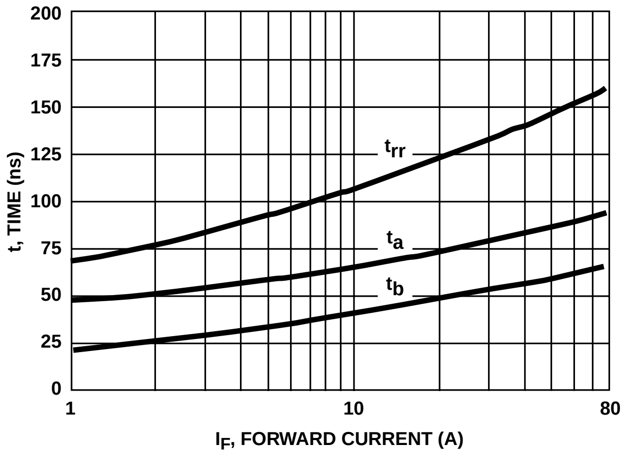


FIGURE 3. t_{rr}, t_a AND t_b CURVES vs FORWARD CURRENT

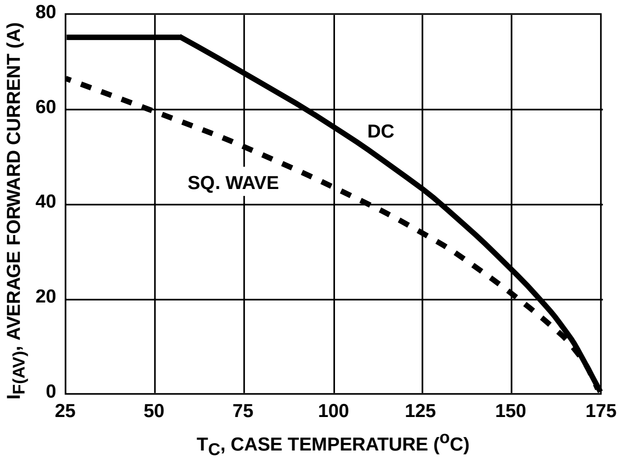


FIGURE 4. CURRENT DERATING CURVE

Test Circuits and Waveforms

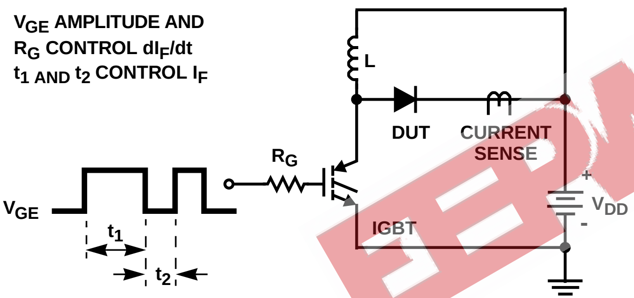


FIGURE 5. t_{rr} TEST CIRCUIT

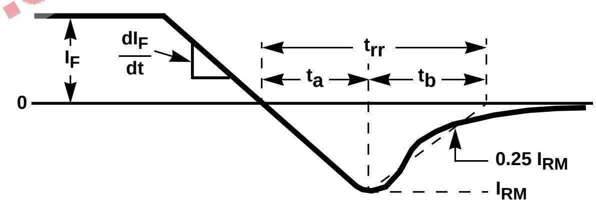


FIGURE 6. t_{rr} WAVEFORMS AND DEFINITIONS

I = 1.6A
L = 40mH
R < 0.1Ω
$E_{AVL} = 1/2LI^2 [V_{R(AVL)}/(V_{R(AVL)} - V_{DD})]$
Q_1 = IGBT (BV_{CES} > DUT $V_{R(AVL)}$)

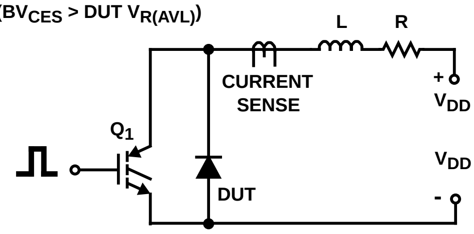


FIGURE 7. AVALANCHE ENERGY TEST CIRCUIT

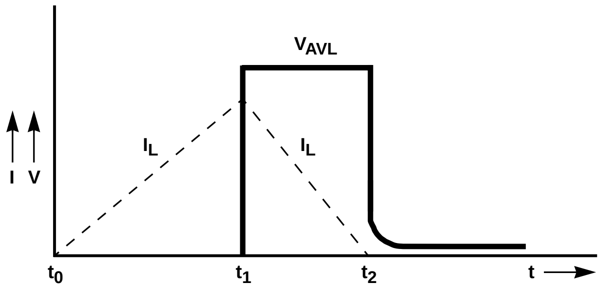


FIGURE 8. AVALANCHE CURRENT AND VOLTAGE WAVEFORMS