

15A, 200V Ultrafast Diodes

The MUR1520 and RURP1520 are ultrafast diodes ($t_{rr} < 30\text{ns}$) with soft recovery characteristics. They have a low forward voltage drop and are of planar, silicon nitride passivated, ion-implanted, epitaxial construction.

These devices are intended for use as energy steering/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 characteristics minimizes ringing and electrical noise in many power switching circuits, thus reducing power loss in the switching transistor.

Formerly developmental type TA09926.

Ordering Information

PART NUMBER	PACKAGE	BRAND
MUR1520	TO-220AC	MUR1520
RURP1520	TO-220AC	RURP1520

NOTE: When ordering, use the entire part number.

Symbol



Features

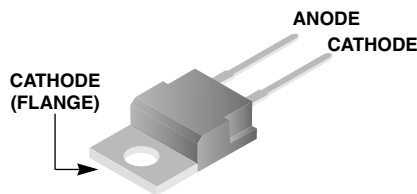
- Ultrafast with Soft Recovery <30ns
- Operating Temperature 175°C
- Reverse Voltage 200V
- Avalanche Energy Rated
- Planar Construction

Applications

- Switching Power Supply
- Power Switching Circuits
- General Purpose

Packaging

JEDEC TO-220AC



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

	MUR1520 RURP1520	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 $I_{F(AV)}$ ($T_C = 157^\circ\text{C}$)	15	A
Repetitive Peak Surge Current I_{FRM} (Square Wave 20kHz)	30	A
Nonrepetitive Peak Surge Current I_{FSM} (Halfwave 1 Phase 60Hz)	200	A
Maximum Power Dissipation P_D	100	W
Avalanche Energy (See Figures 7 and 8) E_{AVL}	20	mJ
Operating and Storage Temperature T_{STG}, T_J	-55 to 175	°C

MUR1520, RURP1520

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

SYMBOL	TEST CONDITION	MIN	TYP	MAX	UNITS
V_F	$I_F = 15\text{A}$	-	-	1.05	V
	$I_F = 15\text{A}, T_C = 150^\circ\text{C}$	-	-	0.85	V
I_R	$V_R = 200\text{V}$	-	-	100	μA
	$V_R = 200\text{V}, T_C = 150^\circ\text{C}$	-	-	500	μA
t_{rr}	$I_F = 1\text{A}, dI_F/dt = 100\text{A}/\mu\text{s}$	-	-	30	ns
	$I_F = 15\text{A}, dI_F/dt = 100\text{A}/\mu\text{s}$	-	-	35	ns
t_a	$I_F = 15\text{A}, dI_F/dt = 100\text{A}/\mu\text{s}$	-	20	-	ns
t_b	$I_F = 15\text{A}, dI_F/dt = 100\text{A}/\mu\text{s}$	-	10	-	ns
$R_{\theta JC}$		-	-	1.5	$^\circ\text{C}/\text{W}$

DEFINITIONS

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

I_R = Instantaneous reverse current.

t_{rr} = Reverse recovery time at $dI_F/dt = 100\text{A}/\mu\text{s}$ (See Figure 6), summation of $t_a + t_b$.

t_a = Time to reach peak reverse current at $dI_F/dt = 100\text{A}/\mu\text{s}$ (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.

p_w = pulse width.

D = duty cycle.

Typical Performance Curves

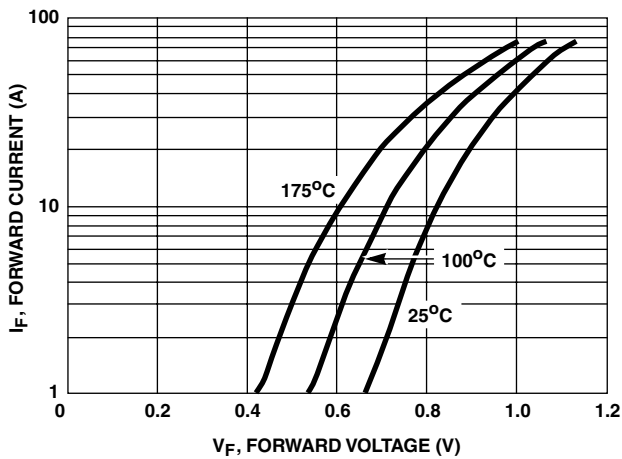


FIGURE 1. FORWARD CURRENT vs FORWARD VOLTAGE

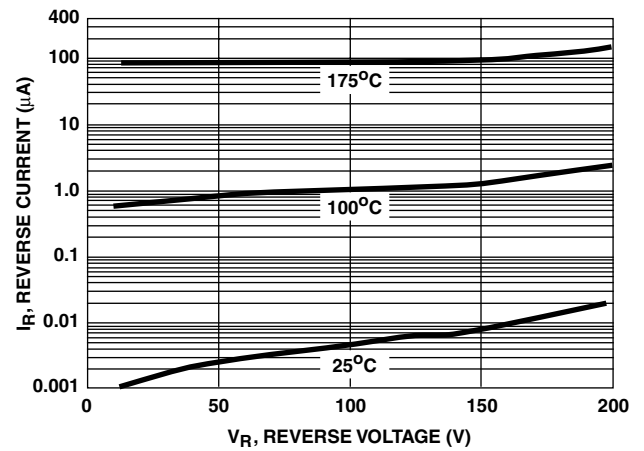


FIGURE 2. REVERSE CURRENT vs REVERSE VOLTAGE

Typical Performance Curves (Continued)

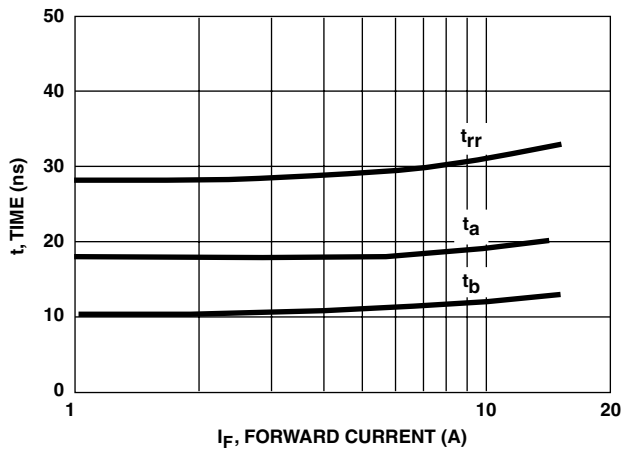


FIGURE 3. t_{rr} , t_a AND t_b CURVES vs FORWARD CURRENT

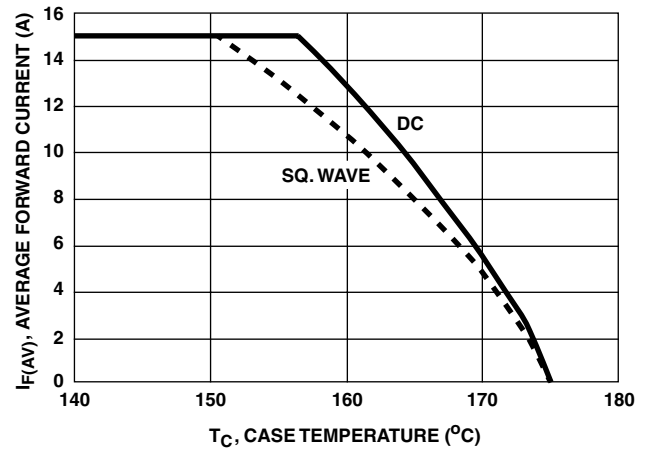


FIGURE 4. CURRENT DERATING CURVE

Test Circuits and Waveforms

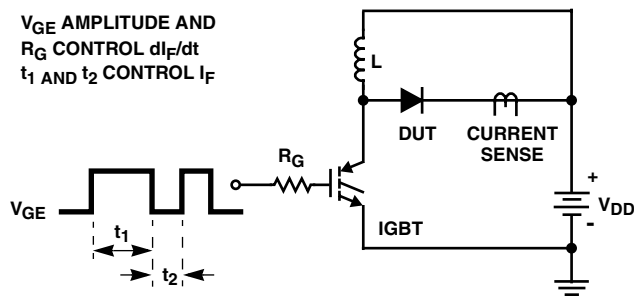


FIGURE 5. t_{rr} TEST CIRCUIT

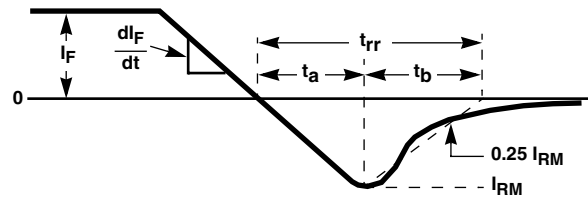


FIGURE 6. t_{rr} WAVEFORMS AND DEFINITIONS

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

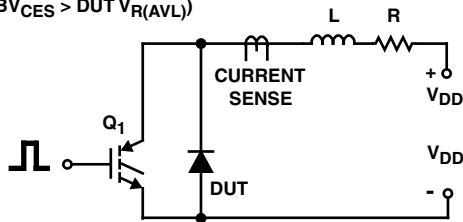


FIGURE 7. AVALANCHE ENERGY TEST CIRCUIT

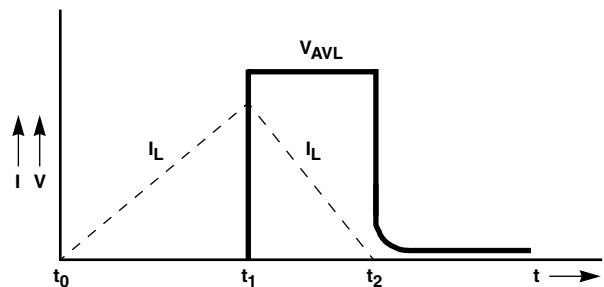


FIGURE 8. AVALANCHE CURRENT AND VOLTAGE WAVEFORMS

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