

April 1995

## 15A, 400V - 600V Ultrafast Dual Diodes

### Features

- Ultrafast with Soft Recovery Characteristic ( $t_{RR} < 55\text{ns}$ )
- +175°C Rated Junction Temperature
- Reverse Voltage Up to 600V
- Avalanche Energy Rated

### Applications

- Switching Power Supply
- Power Switching Circuits
- General Purpose

### Description

MUR3040PT, MUR3050PT, MUR3060PT and RURH1540CC, RURH1550CC, RURH1560CC are ultrafast dual diodes ( $t_{RR} < 55\text{ns}$ ) 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.

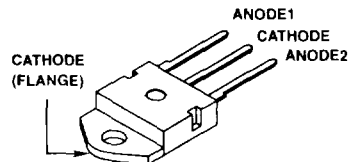
#### PACKAGING AVAILABILITY

PART NUMBER	PACKAGE	BRAND
MUR3040PT	TO-218AC	MUR3040PT
RURH1540CC	TO-218AC	RURH1540C
MUR3050PT	TO-218AC	MUR3050PT
RURH1550CC	TO-218AC	RURH1550C
MUR3060PT	TO-218AC	MUR3060PT
RURH1560CC	TO-218AC	RURH1560C

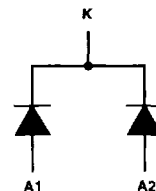
NOTE: When ordering, use the entire part number.

### Package

JEDEC TO-218AC



### Symbol



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

	MUR3040PT RURH1540CC	MUR3050PT RURH1550CC	MUR3060PT RURH1560CC
Peak Repetitive Reverse Voltage..... $V_{RRM}$	400V	500V	600V
Working Peak Reverse Voltage..... $V_{RWM}$	400V	500V	600V
DC Blocking Voltage..... $V_R$	400V	500V	600V
Average Rectified Forward Current..... $I_{F(AV)}$ (Total device forward current at rated $V_R$ and $T_C = +150^\circ\text{C}$ )	15A	15A	15A
Peak Forward Repetitive Current..... $I_{FRM}$ (Rated $V_R$ , square wave 20kHz)	42	42	30A
Nonrepetitive Peak Surge Current..... $I_{FSM}$ (Surge applied at rated load condition halfwave 1phase 60Hz)	200A	200A	200A
Operating and Storage Temperature..... $T_{STG}, T_J$	-55°C to +175°C	-55°C to +175°C	-55°C to +175°C

**MUR3040PT, MUR3050PT, MUR3060PT, RURH1540CC, RURH1550CC, RURH1560CC**

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

SYMBOL	TEST CONDITION	LIMITS									UNITS
		MUR3040PT, RURH1540CC			MUR3050PT, RURH1550CC			MUR3060PT, RURH1560CC			
		MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX	
$V_F$	$I_F = 15\text{A}$ $T_C = +150^\circ\text{C}$	-	-	1.12	-	-	1.20	-	-	1.20	V
	$I_F = 15\text{A}$ $T_C = +25^\circ\text{C}$	-	-	1.25	-	-	1.50	-	-	1.50	V
IR at $T_C = +150^\circ\text{C}$	$V_R = 400\text{V}$	-	-	500	-	-	-	-	-	-	$\mu\text{A}$
	$V_R = 500\text{V}$	-	-	-	-	-	500	-	-	-	$\mu\text{A}$
	$V_R = 600\text{V}$	-	-	-	-	-	-	-	-	500	$\mu\text{A}$
IR at $T_C = +25^\circ\text{C}$	$V_R = 400\text{V}$	-	-	100	-	-	-	-	-	-	$\mu\text{A}$
	$V_R = 500\text{V}$	-	-	-	-	-	100	-	-	-	$\mu\text{A}$
	$V_R = 600\text{V}$	-	-	-	-	-	-	-	-	100	$\mu\text{A}$
$t_{RR}$	$I_F = 1\text{A}$	-	-	55	-	-	55	-	-	55	ns
	$I_F = 15\text{A}$	-	-	60	-	-	60	-	-	60	ns
$t_A$	$I_F = 1\text{A}$	-	20	-	-	20	-	-	20	-	ns
	$I_F = 15\text{A}$	-	30	-	-	30	-	-	30	-	ns
$t_B$	$I_F = 1\text{A}$	-	15	-	-	15	-	-	15	-	ns
	$I_F = 15\text{A}$	-	17	-	-	17	-	-	20	-	ns
$R_{\theta JC}$		-	-	1.5	-	-	1.5	-	-	1.5	$^\circ\text{C/W}$
$E_{AVL}$	see Fig. 7, 8	-	-	20	-	-	20	-	-	20	mj

**DEFINITIONS**

- $V_F$  = Instantaneous forward voltage (pw = 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 2), 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 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).
- pw = pulse width.
- D = duty cycle.

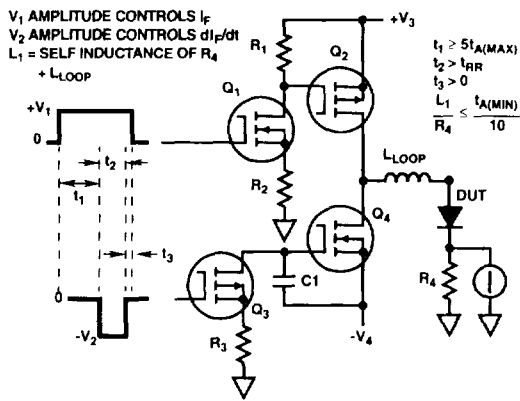


FIGURE 1.  $t_{RR}$  TEST CIRCUIT

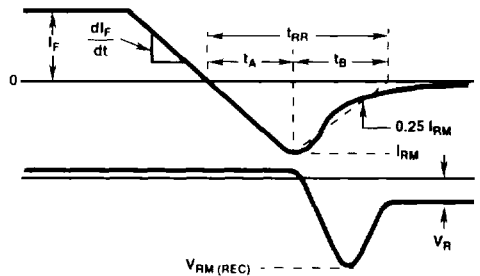


FIGURE 2. DEFINITIONS OF  $t_{RR}$ ,  $t_A$  AND  $t_B$

Typical Performance Curves

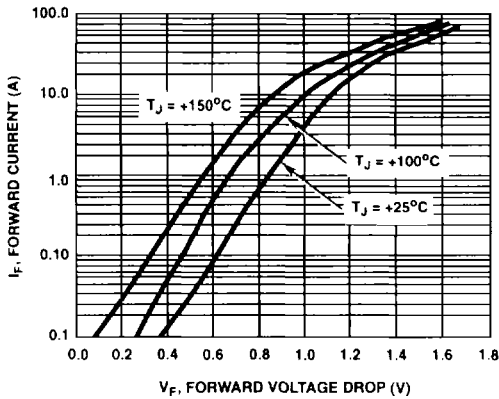


FIGURE 3. FORWARD VOLTAGE vs FORWARD CURRENT CHARACTERISTIC

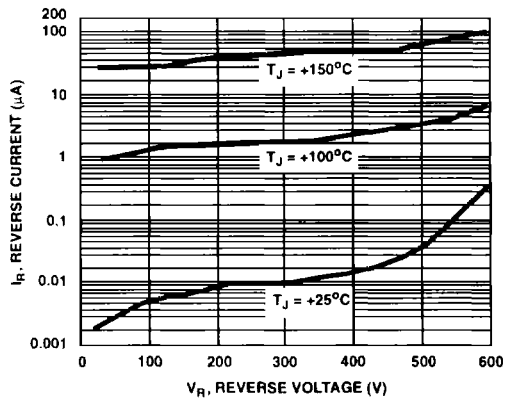


FIGURE 4. REVERSE VOLTAGE vs REVERSE CURRENT CHARACTERISTIC

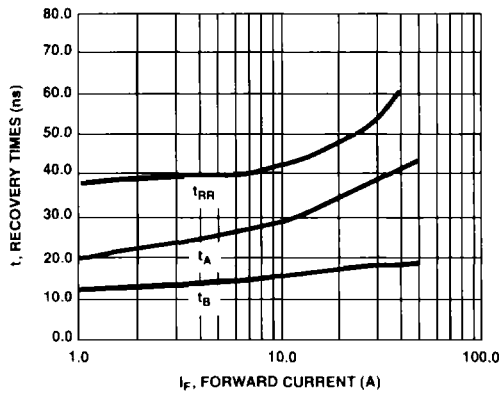


FIGURE 5. TYPICAL  $t_{RR}$ ,  $t_A$  AND  $t_B$  CURVES vs FORWARD CURRENT

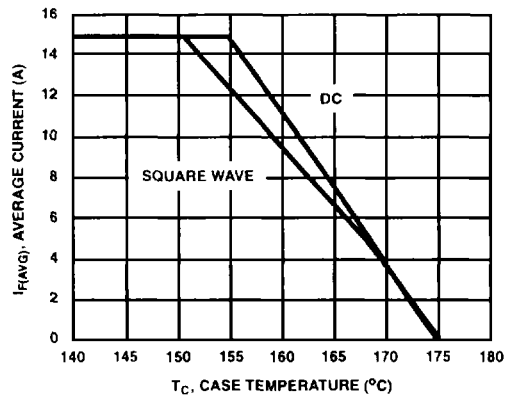


FIGURE 6. TYPICAL CURRENT DERATING CURVE vs CASE TEMPERATURE

6

ULTRAFAST  
DUAL DIODES

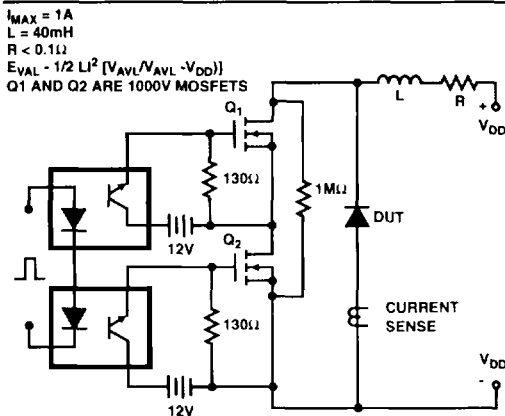


FIGURE 7. AVALANCHE ENERGY TEST CIRCUIT

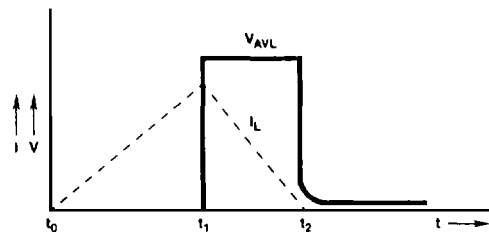


FIGURE 8. CURRENT VOLTAGE WAVEFORM