

Data Sheet January 2000 File Number 2778.4

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

The MUR1540, MUR1560, RURP1540, and RURP1560 are ultrafast diodes ( $t_{rr} < 55$ 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 TA09905.

# Ordering Information

PART NUMBER	PACKAGE	BRAND		
MUR1540	TO-220AC	MUR1540		
RURP1540	TO-220AC	RURP1540		
MUR1560	TO-220AC	MUR1560		
RURP1560	TO-220AC	RURP1560		

NOTE: When ordering, use the entire part number

# Symbol



### **Features**

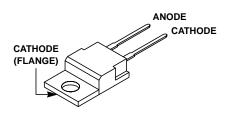
- Avalanche Energy Rated
- · Planar Construction

# **Applications**

- · Switching Power Supply
- · Power Switching Circuits
- · General Purpose

# **Packaging**

JEDEC TO-220AC



#### **Absolute Maximum Ratings** $T_C = 25^{\circ}C$ , Unless Otherwise Specified MUR1540 MUR1560 **RURP1540 RURP1560 UNITS** Peak Repetitive Reverse Voltage......V<sub>RRM</sub> 400 600 ٧ 400 600 V DC Blocking Voltage ......V<sub>R</sub> 600 400 Average Rectified Forward Current ...... I<sub>F(AV)</sub> Α 15 15 $(T_C = 145^{\circ}C)$ 30 30 Α (Square Wave 20kHz) 200 200 Α (Halfwave 1 Phase 60Hz) 100 100 ۱۸/ 20 20 m.J οС -55 to 175 -55 to 175

## MUR1540, MUR1560, RURP1540, RURP1560

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

		MUR1540, RURP1540			MUR1560, RURP1560			
SYMBOL	TEST CONDITION	MIN	TYP	MAX	MIN	TYP	MAX	UNITS
V <sub>F</sub>	I <sub>F</sub> = 15A	-	-	1.25	-	-	1.5	V
	I <sub>F</sub> = 15A, T <sub>C</sub> = 150°C	-	-	1.12	-	-	1.2	V
I <sub>R</sub>	V <sub>R</sub> = 400V	-	-	100	-	-	-	μА
	V <sub>R</sub> = 600V	-	-	-	-	-	100	μА
	V <sub>R</sub> = 400V, T <sub>C</sub> = 150°C	-	-	500	-	-	-	μА
	V <sub>R</sub> = 600V, T <sub>C</sub> = 150°C	-	-	-	-	-	500	μА
t <sub>rr</sub>	$I_F = 1A$ , $dI_F/dt = 100A/\mu s$	-	-	55	-	-	55	ns
	$I_F = 15A$ , $dI_F/dt = 100A/\mu s$	-	-	60	-	-	60	ns
ta	$I_F = 15A$ , $dI_F/dt = 100A/\mu s$	-	30	-	-	30	-	ns
t <sub>b</sub>	$I_F = 15A$ , $dI_F/dt = 100A/\mu s$	-	17	-	-	20	-	ns
$R_{ heta JC}$		-	-	1.5	-	-	1.5	°C/W

### **DEFINITIONS**

 $V_F$  = Instantaneous forward voltage (pw = 300 $\mu$ s, D = 2%).

 $I_R$  = Instantaneous reverse current.

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

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

pw = pulse width.

D = duty cycle.

# **Typical Performance Curves**

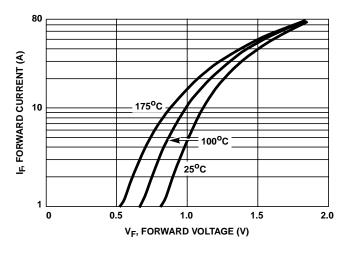


FIGURE 1. FORWARD CURRENT vs FORWARD VOLTAGE

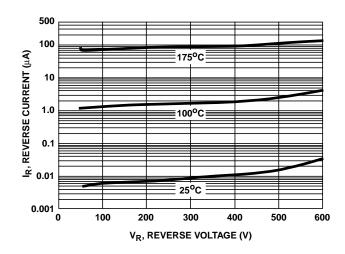


FIGURE 2. REVERSE CURRENT vs REVERSE VOLTAGE

## Typical Performance Curves (Continued)

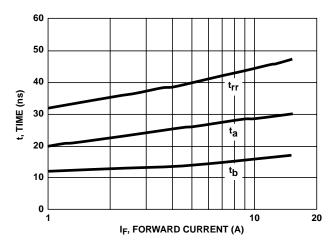


FIGURE 3. t<sub>rr</sub>, t<sub>a</sub> AND t<sub>b</sub> CURVES vs FORWARD CURRENT

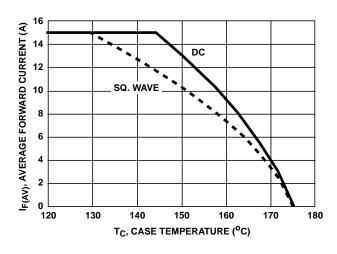


FIGURE 4. CURRENT DERATING CURVE

### Test Circuits and Waveforms

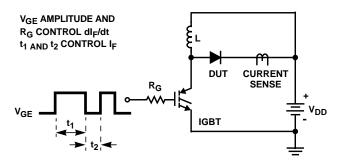


FIGURE 5. t<sub>rr</sub> TEST CIRCUIT

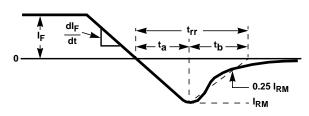


FIGURE 6. t<sub>rr</sub> WAVEFORMS AND DEFINITIONS

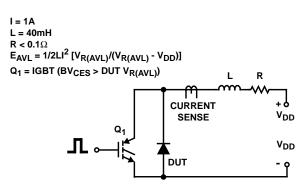


FIGURE 7. AVALANCHE ENERGY TEST CIRCUIT

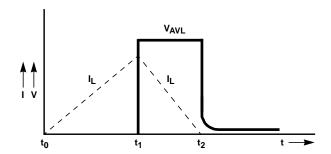


FIGURE 8. AVALANCHE CURRENT AND VOLTAGE WAVEFORMS

All Intersil semiconductor products are manufactured, assembled and tested under ISO9000 quality systems certification.

Intersil semiconductor products are sold by description only. Intersil Corporation reserves the right to make changes in circuit design and/or specifications at any time without notice. Accordingly, the reader is cautioned to verify that data sheets are current before placing orders. Information furnished by Intersil is believed to be accurate and reliable. However, no responsibility is assumed by Intersil or its subsidiaries for its use; nor for any infringements of patents or other rights of third parties which may result from its use. No license is granted by implication or otherwise under any patent or patent rights of Intersil or its subsidiaries.

For information regarding Intersil Corporation and its products, see web site www.intersil.com