MUR3040PT, RURH1540CC, MUR3060PT, RURH1560CC

Data Sheet | January 2000 | File Number 2774.4

15A, 400V - 600V Ultrafast Dual Diodes

MUR3040PT, RURH1540CC, MUR3060PT, and RURH1560CC are ultrafast dual diodes (t_{rr} < 55ns) 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.

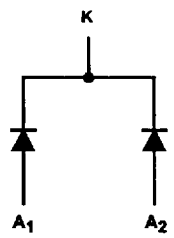
Formerly developmental type TA09905.

Ordering Information

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

NOTE: When ordering, use the entire part number.

Symbol



Features

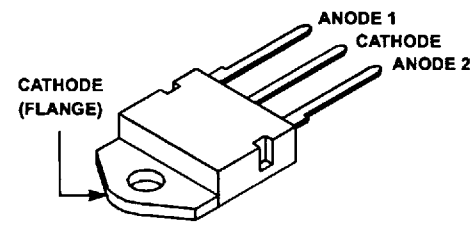
- Ultrafast with Soft Recovery . . . . . <55ns
- Operating Temperature. . . . . 175°C
- Reverse Voltage Up to 600V
- Avalanche Energy Rated
- Planar Construction

Applications

- Switching Power Supply
- Power Switching Circuits
- General Purpose

Packaging

JEDEC TO-218AC



Absolute Maximum Ratings (Per Leg) T_C = 25°C, Unless Otherwise Specified

		MUR3040PT RURH1540CC	MUR3060PT RURH1560CC	UNITS
Peak Repetitive Reverse Voltage	V_{RRM}	400	600	V
Working Peak Reverse Voltage	V_{RWM}	400	600	V
DC Blocking Voltage	V_R	400	600	V
Average Rectified Forward Current (T_C = 145°C)	$I_{F(AV)}$	15	15	A
Repetitive Peak Surge Current (Square Wave 20kHz)	I_{FRM}	42	30	A
Nonrepetitive Peak Surge Current (Halfwave 1 Phase 60Hz)	I_{FSM}	200	200	A
Maximum Power Dissipation	P_D	100	100	W
Avalanche Energy (See Figures 7 and 8)	E_{AVL}	20	20	mJ
Operating and Storage Temperature	T_{STG}, T_J	-55 to 175	-55 to 175	°C

Electrical Specifications (Per Leg) $T_C = 25^oC$, Unless Otherwise Specified

SYMBOL	TEST CONDITION	MUR3040PT, RURH1540CC			MUR3060PT, RURH1560CC			UNITS
		MIN	TYP	MAX	MIN	TYP	MAX	
V_F	I_F = 15A	-	-	1.25	-	-	1.5	V
	I_F = 15A, T_C = 150°C	-	-	1.12	-	-	1.2	V
I_R	V_R = 400V	-	-	100	-	-	-	µA
	V_R = 600V	-	-	-	-	-	100	µA
	V_R = 400V, T_C = 150°C	-	-	500	-	-	-	µA
	V_R = 600V, T_C = 150°C	-	-	-	-	-	500	µA
t_{rr}	I_F = 1A, dI_F/dt = 100A/µs	-	-	55	-	-	55	ns
	I_F = 15A, dI_F/dt = 100A/µs	-	-	60	-	-	60	ns
t_a	I_F = 15A, dI_F/dt = 100A/µs	-	30	-	-	30	-	ns
t_b	I_F = 15A, dI_F/dt = 100A/µs	-	17	-	-	20	-	ns
$R_{\theta JC}$		-	-	1.5	-	-	1.5	°C/W

DEFINITIONS

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

I_R = Instantaneous reverse current.

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

t_a = Time to reach peak reverse current at dI_F/dt = 100A/µs (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

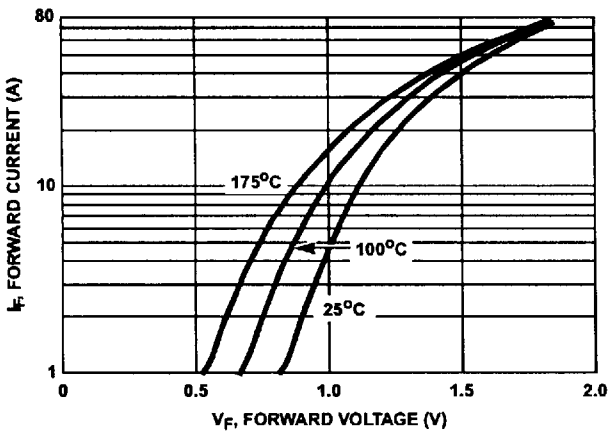


FIGURE 1. FORWARD CURRENT vs FORWARD VOLTAGE

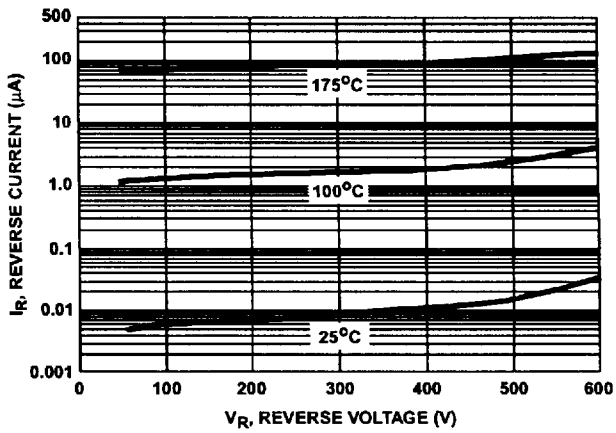


FIGURE 2. REVERSE CURRENT vs REVERSE VOLTAGE

Typical Performance Curves

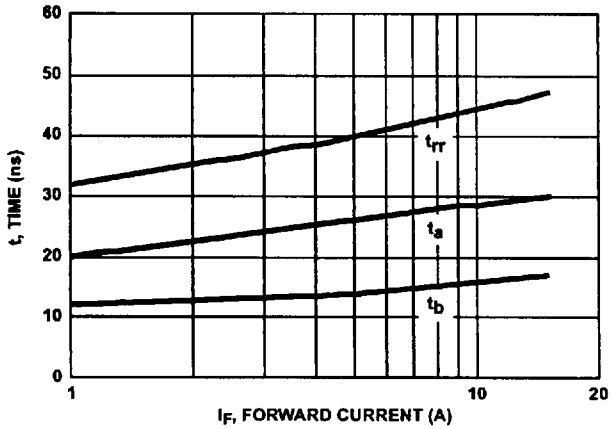


FIGURE 3. t_{rr}, t_a AND t_b CURVES vs FORWARD CURRENT

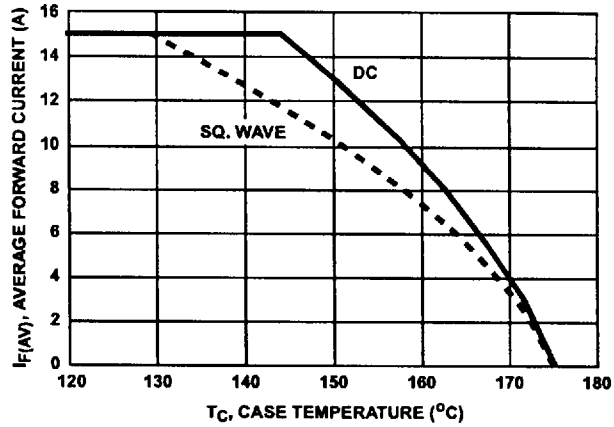


FIGURE 4. CURRENT DERATING CURVE

Test Circuits and Waveforms

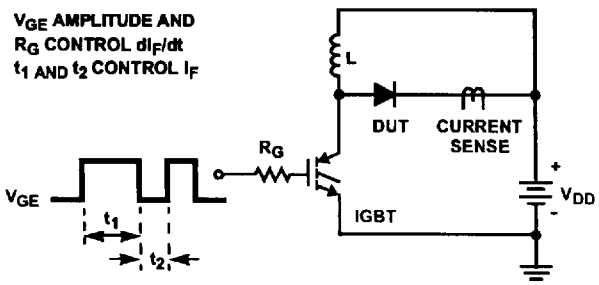


FIGURE 5. t_{rr} TEST CIRCUIT

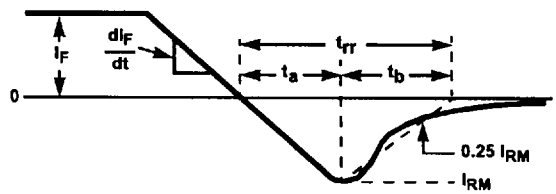


FIGURE 6. t_{rr} WAVEFORMS AND DEFINITIONS

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

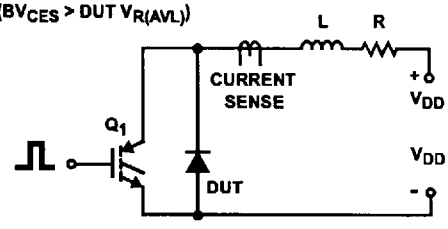


FIGURE 7. AVALANCHE ENERGY TEST CIRCUIT

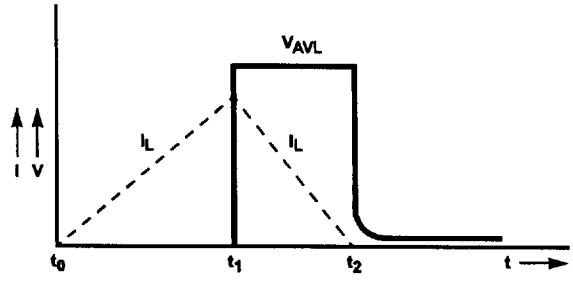


FIGURE 8. AVALANCHE CURRENT AND VOLTAGE WAVEFORMS