MUR1610CT, MUR1615CT, MUR1620CT, RURP810CC, RURP815CC, RURP820CC

HARRIS SEMICONDUCTOR

June 1995

8A, 100V - 200V Ultrafast Dual Diodes

Features

- **Ultrafast with Soft Recovery . . . . <25ns**
- **Operating Temperature . . . . +175^{o}C**
- **Reverse Voltage Up To 200V**
- **Avalanche Energy Rated**
- **Planar Construction**

Applications

- **Switching Power Supplies**
- **Power Switching Circuits**
- **General Purpose**

Description

The MUR1610CT, MUR1615CT, MUR1620CT, RURP810CC, RURP815CC and RURP820CC are ultrafast dual diodes with soft recovery characteristics (t_{RR} < 25ns). They have low forward voltage drop and are silicon nitride passivated ionimplanted epitaxial planar construction.

These devices are intended for use as freewheeling/clamping diodes and rectifiers in a variety of switching power supplies and other power switching applications. Their low stored charge and ultrafast soft recovery minimize ringing and electrical noise in many power switching circuits reducing power loss in the switching transistors.

PACKAGE AVAILABILITY

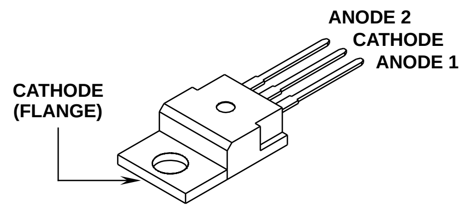
PART NUMBER	PACKAGE	BRAND
MUR1610CT	TO-220AB	MUR1610C
MUR1615CT	TO-220AB	MUR1615C
MUR1620CT	TO-220AB	MUR1620C
RURP810CC	TO-220AB	RURP810C
RURP815CC	TO-220AB	RURP815C
RURP820CC	TO-220AB	RURP820C

NOTE: When ordering, use the entire part number.

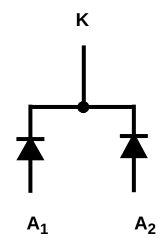
Formerly developmental type TA09224.

Package

JEDEC TO-220AB



Symbol



Absolute Maximum Ratings (per leg) T_C = +25^{o}C, Unless Otherwise Specified

		MUR1610CT RURP810CC	MUR1615CT RURP815CC	MUR1620CT RURP820CC	UNITS
Peak Repetitive Reverse Voltage	V_{RRM}	100	150	200	V
Working Peak Reverse Voltage	V_{RWM}	100	150	200	V
DC Blocking Voltage	V_R	100	150	200	V
Average Rectified Forward Current (T_C = +157^{o}C)	$I_{F(AV)}$	8	8	8	A
Repetitive Peak Surge Current (Square Wave, 20kHz)	I_{FSM}	16	16	16	A
Nonrepetitive Peak Surge Current (Halfwave, 1 Phase, 60Hz)	I_{FSM}	100	100	100	A
Maximum Power Dissipation	P_D	50	50	50	W
Avalanche Energy (See Figures 10 and 11)	E_{AVL}	20	20	20	mJ
Operating and Storage Temperature	T_{STG}, T_J	-65 to +175	-65 to +175	-65 to +175	^{o}C

File Number **1885.4**

Electrical Specifications (per leg) $T_C = +25^oC$, Unless Otherwise Specified

SYMBOL	TEST CONDITION	MUR1610CT RURP810CC			MUR1615CT RURP815CC			MUR1620CT RURP820CC			UNITS
		MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX	
V_F	$I_F = 8A$, $T_C = +25^oC$	-	-	0.975	-	-	0.975	-	-	0.975	V
	$I_F = 8A$, $T_C = +150^oC$	-	-	0.895	-	-	0.895	-	-	0.895	V
I_R	$V_R = 100V$, $T_C = +25^oC$	-	-	100	-	-	-	-	-	-	μA
	$V_R = 150V$, $T_C = +25^oC$	-	-	-	-	-	100	-	-	-	μA
	$V_R = 200V$, $T_C = +25^oC$	-	-	-	-	-	-	-	-	100	μA
I_R	$V_R = 100V$, $T_C = +150^oC$	-	-	500	-	-	-	-	-	-	μA
	$V_R = 150V$, $T_C = +150^oC$	-	-	-	-	-	500	-	-	-	μA
	$V_R = 200V$, $T_C = +150^oC$	-	-	-	-	-	-	-	-	500	μA
t_{RR}	$I_F = 1A$, $dI_F/dt = 200A/\mu s$	-	-	25	-	-	25	-	-	25	ns
	$I_F = 8A$, $dI_F/dt = 200A/\mu s$	-	-	30	-	-	30	-	-	30	ns
t_A	$I_F = 8A$, $dI_F/dt = 200A/\mu s$	-	13	-	-	13	-	-	13	-	ns
t_B	$I_F = 8A$, $dI_F/dt = 200A/\mu s$	-	5	-	-	5	-	-	5	-	ns
Q_{RR}	$I_F = 8A$, $dI_F/dt = 200A/\mu s$	-	25	-	-	25	-	-	25	-	nC
C_J	$V_R = 10V$, $I_F = 0A$	-	60	-	-	60	-	-	60	-	pF
$R_{\theta JC}$		-	-	3	-	-	3	-	-	3	$^oC/W$

DEFINITIONS

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

I_R = Instantaneous reverse current .

t_{RR} = Reverse recovery time (See Figure 2), summation of $t_A + t_B$.

t_A = Time to reach peak reverse current (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).

Q_{RR} = Reverse recovery charge.

C_J = Junction Capacitance.

$R_{\theta JC}$ = Thermal resistance junction to case.

E_{AVL} = Controlled Avalanche Energy (See Figures 10 and 11).

pw = pulse width.

D = duty cycle.

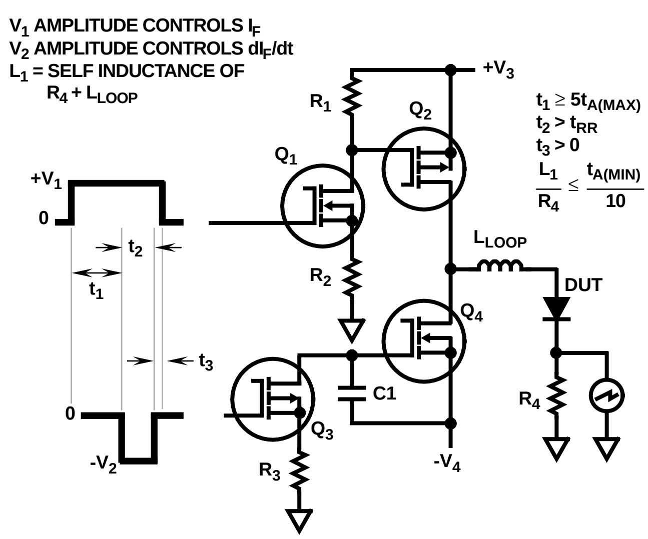


FIGURE 1. t_{RR} TEST CIRCUIT

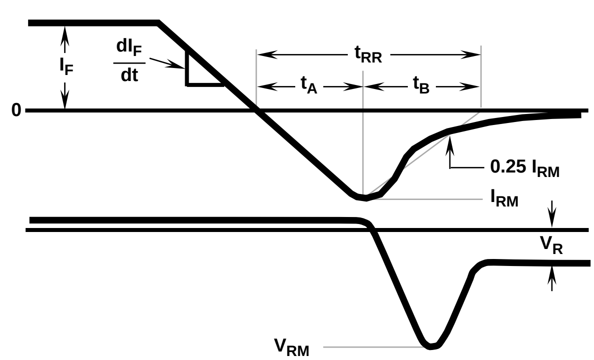


FIGURE 2. t_{RR} WAVEFORMS AND DEFINITIONS

Typical Performance Curves

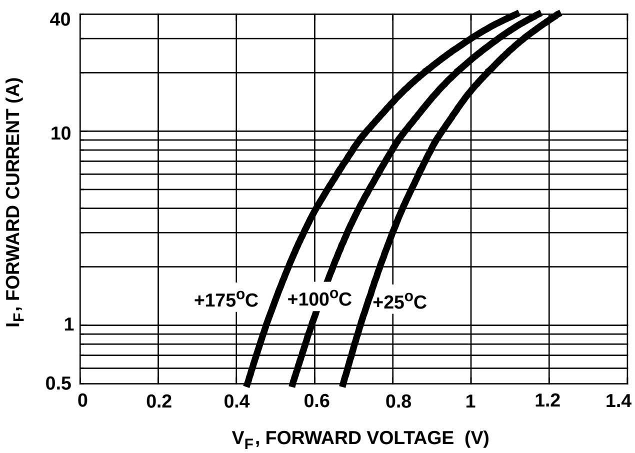


FIGURE 3. TYPICAL FORWARD CURRENT vs FORWARD VOLTAGE DROP

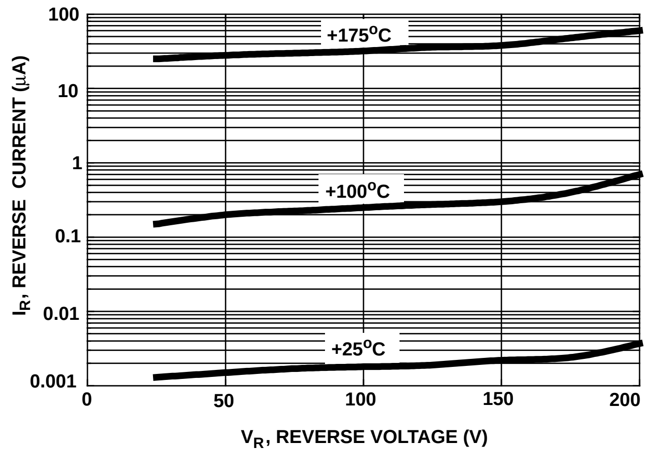


FIGURE 4. TYPICAL REVERSE CURRENT vs REVERSE VOLTAGE

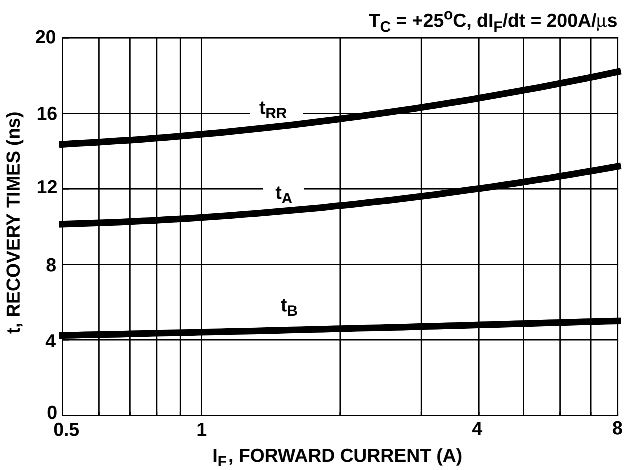


FIGURE 5. TYPICAL t_{RR}, t_A AND t_B CURVES vs FORWARD CURRENT AT +25°C

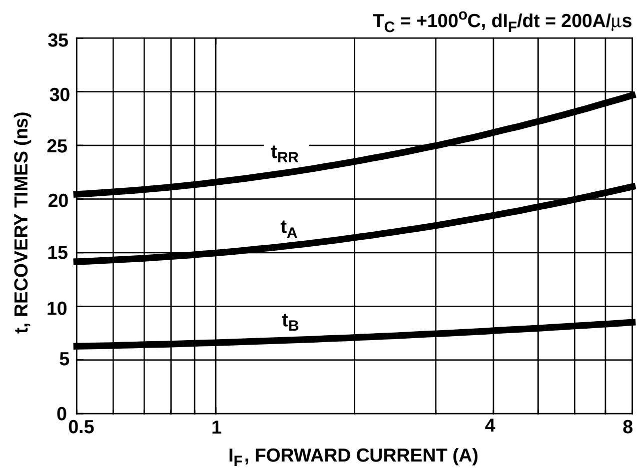


FIGURE 6. TYPICAL t_{RR}, t_A AND t_B CURVES vs FORWARD CURRENT AT +100°C

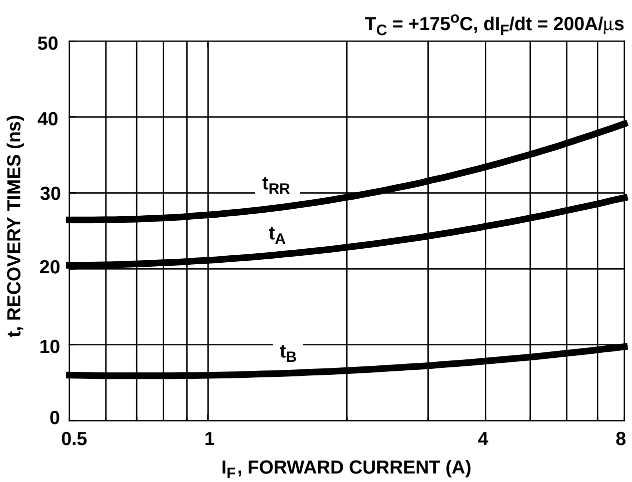


FIGURE 7. TYPICAL t_{RR}, t_A AND t_B CURVES vs FORWARD CURRENT AT +175°C

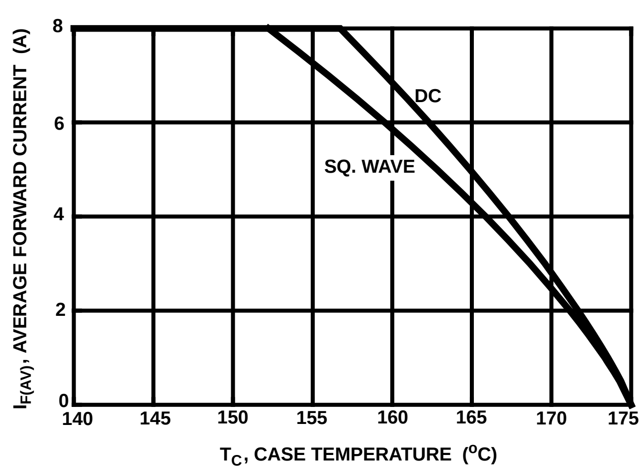


FIGURE 8. CURRENT DERATING CURVE FOR ALL TYPES

Typical Performance Curves (Continued)

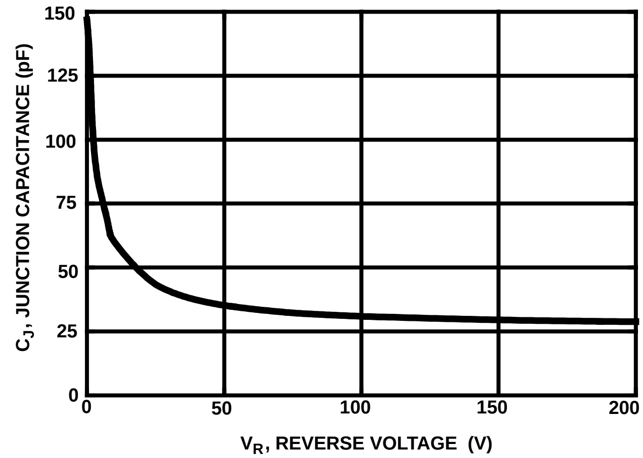


FIGURE 9. TYPICAL JUNCTION CAPACITANCE vs REVERSE VOLTAGE

Test Circuit and Waveforms

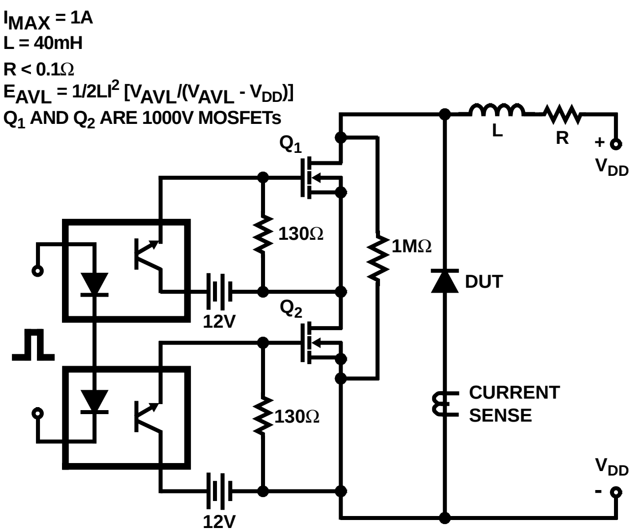


FIGURE 10. AVALANCHE ENERGY TEST CIRCUIT

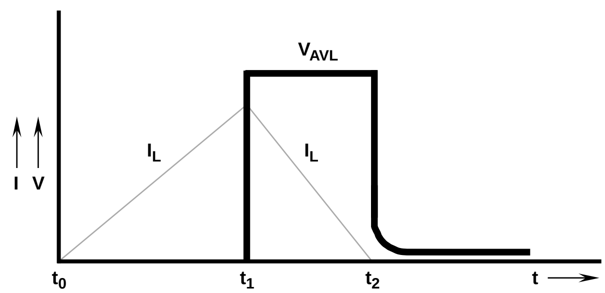


FIGURE 11. AVALANCHE CURRENT AND VOLTAGE WAVEFORMS