

## Excellent Integrated System Limited

Stocking Distributor

Click to view price, real time Inventory, Delivery & Lifecycle Information:

[Fairchild Semiconductor](#)

[MUR1540](#)

For any questions, you can email us directly:

[sales@integrated-circuit.com](mailto:sales@integrated-circuit.com)

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

The MUR1540, MUR1560, RURP1540, and RURP1560 are ultrafast 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
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**



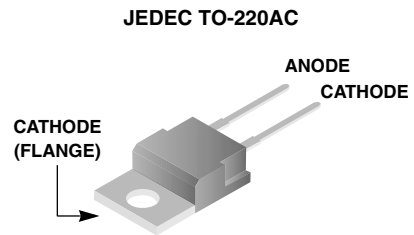
**Features**

- 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**



**Absolute Maximum Ratings**  $T_C = 25^\circ C$ , Unless Otherwise Specified

	MUR1540 RURP1540	MUR1560 RURP1560	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 . . . . . $I_{F(AV)}$ ( $T_C = 145^\circ C$ )	15	15	A
Repetitive Peak Surge Current . . . . . $I_{FRM}$ (Square Wave 20kHz)	30	30	A
Nonrepetitive Peak Surge Current . . . . . $I_{FSM}$ (Halfwave 1 Phase 60Hz)	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

## MUR1540, MUR1560, RURP1540, RURP1560

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

SYMBOL	TEST CONDITION	MUR1540, RURP1540			MUR1560, RURP1560			UNITS
		MIN	TYP	MAX	MIN	TYP	MAX	
$V_F$	$I_F = 15\text{A}$	-	-	1.25	-	-	1.5	V
	$I_F = 15\text{A}, T_C = 150^\circ\text{C}$	-	-	1.12	-	-	1.2	V
$I_R$	$V_R = 400\text{V}$	-	-	100	-	-	-	$\mu\text{A}$
	$V_R = 600\text{V}$	-	-	-	-	-	100	$\mu\text{A}$
	$V_R = 400\text{V}, T_C = 150^\circ\text{C}$	-	-	500	-	-	-	$\mu\text{A}$
	$V_R = 600\text{V}, T_C = 150^\circ\text{C}$	-	-	-	-	-	500	$\mu\text{A}$
$t_{rr}$	$I_F = 1\text{A}, dI_F/dt = 100\text{A}/\mu\text{s}$	-	-	55	-	-	55	ns
	$I_F = 15\text{A}, dI_F/dt = 100\text{A}/\mu\text{s}$	-	-	60	-	-	60	ns
$t_a$	$I_F = 15\text{A}, dI_F/dt = 100\text{A}/\mu\text{s}$	-	30	-	-	30	-	ns
$t_b$	$I_F = 15\text{A}, dI_F/dt = 100\text{A}/\mu\text{s}$	-	17	-	-	20	-	ns
$R_{\theta JC}$		-	-	1.5	-	-	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

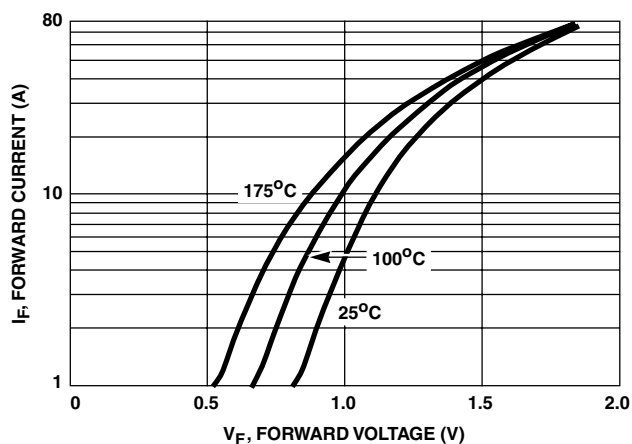


FIGURE 1. FORWARD CURRENT vs FORWARD VOLTAGE

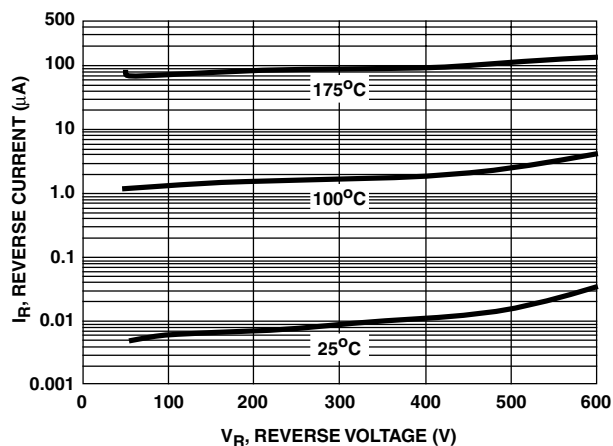


FIGURE 2. REVERSE CURRENT vs REVERSE VOLTAGE

**MUR1540, MUR1560, RURP1540, RURP1560**

**Typical Performance Curves (Continued)**

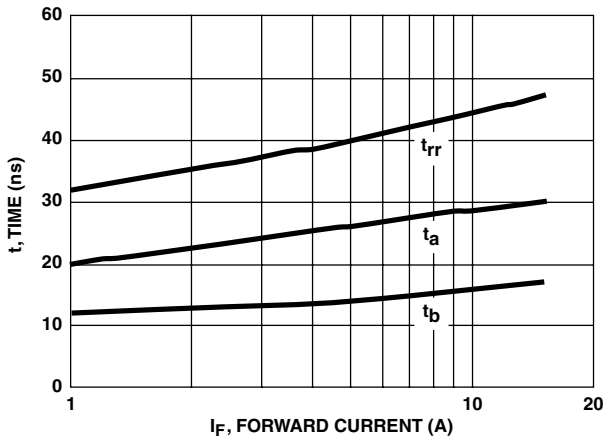


FIGURE 3.  $t_{rr}$ ,  $t_a$  AND  $t_b$  CURVES vs FORWARD CURRENT

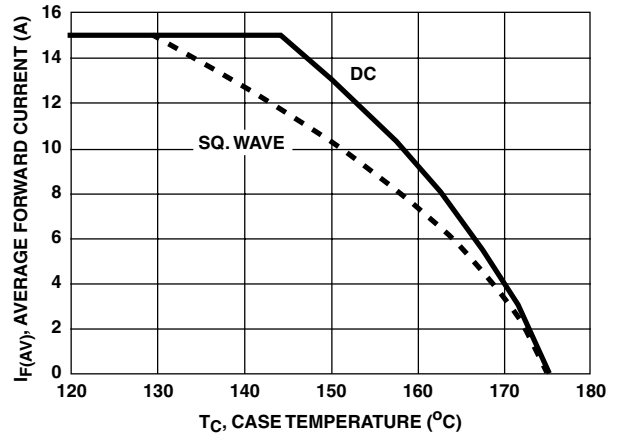


FIGURE 4. CURRENT DERATING CURVE

**Test Circuits and Waveforms**

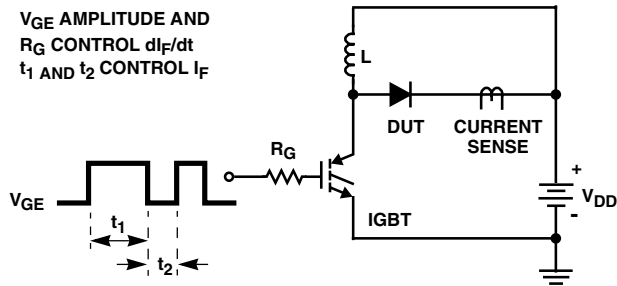


FIGURE 5.  $t_{rr}$  TEST CIRCUIT

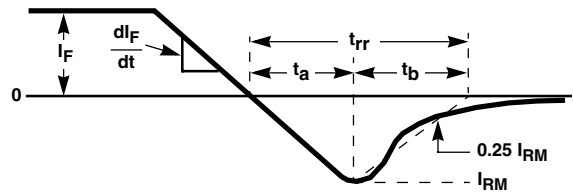


FIGURE 6.  $t_{rr}$  WAVEFORMS AND DEFINITIONS

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

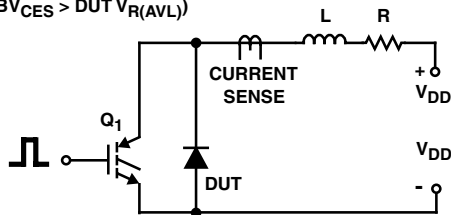


FIGURE 7. AVALANCHE ENERGY TEST CIRCUIT

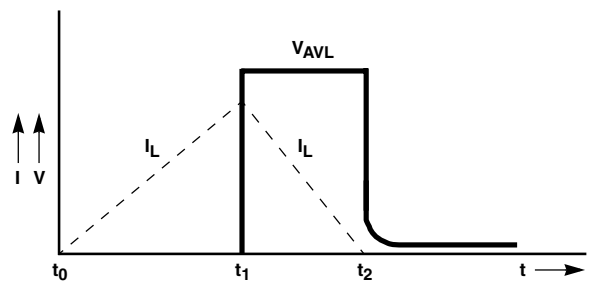


FIGURE 8. AVALANCHE CURRENT AND VOLTAGE WAVEFORMS

**TRADEMARKS**

The following are registered and unregistered trademarks Fairchild Semiconductor owns or is authorized to use and is not intended to be an exhaustive list of all such trademarks.

ACEx™	FAST ®	OPTOLOGIC™	SMART START™	VCX™
Bottomless™	FASTr™	OPTOPLANAR™	STAR*POWER™	
CoolFET™	FRFET™	PACMAN™	Stealth™	
CROSSVOLT™	GlobalOptoisolator™	POP™	SuperSOT™-3	
DenseTrench™	GTO™	Power247™	SuperSOT™-6	
DOME™	HiSeC™	PowerTrench®	SuperSOT™-8	
EcoSPARK™	ISOPLANAR™	QFET™	SyncFET™	
E <sup>2</sup> C MOS™	LittleFET™	QST™	TinyLogic™	
EnSigna™	MicroFET™	QT Optoelectronics™	TruTranslation™	
FACT™	MicroPak™	Quiet Series™	UHC™	
FACT Quiet Series™	MICROWIRE™	SILENT SWITCHER®	UltraFET®	

STAR\*POWER is used under license

**DISCLAIMER**

FAIRCHILD SEMICONDUCTOR RESERVES THE RIGHT TO MAKE CHANGES WITHOUT FURTHER NOTICE TO ANY PRODUCTS HEREIN TO IMPROVE RELIABILITY, FUNCTION OR DESIGN. FAIRCHILD DOES NOT ASSUME ANY LIABILITY ARISING OUT OF THE APPLICATION OR USE OF ANY PRODUCT OR CIRCUIT DESCRIBED HEREIN; NEITHER DOES IT CONVEY ANY LICENSE UNDER ITS PATENT RIGHTS, NOR THE RIGHTS OF OTHERS.

**LIFE SUPPORT POLICY**

FAIRCHILD'S PRODUCTS ARE NOT AUTHORIZED FOR USE AS CRITICAL COMPONENTS IN LIFE SUPPORT DEVICES OR SYSTEMS WITHOUT THE EXPRESS WRITTEN APPROVAL OF FAIRCHILD SEMICONDUCTOR CORPORATION. As used herein:

- |   |   |
|---|---|
| <p>1. Life support devices or systems are devices or systems which, (a) are intended for surgical implant into the body, or (b) support or sustain life, or (c) whose failure to perform when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in significant injury to the user.</p> | <p>2. A critical component is any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.</p> |
|---|---|

**PRODUCT STATUS DEFINITIONS**

**Definition of Terms**

Datasheet Identification	Product Status	Definition
Advance Information	Formative or In Design	This datasheet contains the design specifications for product development. Specifications may change in any manner without notice.
Preliminary	First Production	This datasheet contains preliminary data, and supplementary data will be published at a later date. Fairchild Semiconductor reserves the right to make changes at any time without notice in order to improve design.
No Identification Needed	Full Production	This datasheet contains final specifications. Fairchild Semiconductor reserves the right to make changes at any time without notice in order to improve design.
Obsolete	Not In Production	This datasheet contains specifications on a product that has been discontinued by Fairchild semiconductor. The datasheet is printed for reference information only.