

**FAIRCHILD**

A Schlumberger Company

**FRP1000/FRP2000CC Series**  
**Ultra-fast POWERplanar™**  
**Rectifiers 10-20 A,**  
**50-200 V**

Power And Discrete Division

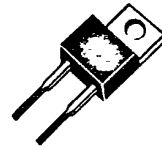
T-03-17

**Description**

Designed for use in switching power supplies, inverters and as free-wheeling diodes, these state-of-the-art devices have the following features:

- Ultrafast 35 ns Reverse Recovery Time
- Soft Recovery ( $S > 0.5$ )
- Low  $I_{R(REC)}$
- Dual Rectifiers Matched to  $\pm 50$  mV
- 150°C Operating Junction Temperature
- Popular TO-220AC and TO-220AB Packages
- Low  $V_{FM}$

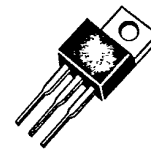
**TO-220AC**



1500030F

FRP1005  
FRP1010  
FRP1015  
FRP1020

**TO-220AB**



1500010F

FRP2005CC  
FRP2010CC  
FRP2015CC  
FRP2020CC

**Maximum Ratings**

Symbol	Rating	FRP1005 FRP2005CC	FRP1010 FRP2010CC	FRP1015 FRP2015CC	FRP1020 FRP2020CC	Unit
$V_{RRM}$	Peak Repetitive Reverse Voltage	50	100	150	180	V
$V_{RSM}$	Non-repetitive Peak Reverse Voltage	50	100	150	200	
$V_R$	DC Blocking Voltage	50	100	150	180	
$I_{F(AV)}$	Average Rectified Forward Current, $T_C = 117^\circ\text{C}$ , Rated $V_R$ ; FRP1000 Series FRP2000CC Series	10 20	10 20	10 20	10 20	A
$I_{FSM}$	Non-repetitive Peak Surge Current per Diode, Halfwave, 60 Hz	150	150	150	150	A
$T_J, T_{stg}$	Operating Junction Temperature and Storage Temperature	-55 to +150	-55 to +150	-55 to +150	-55 to +150	°C

**Maximum Thermal Characteristics**

Symbol	Rating	FRP1005 FRP2005CC	FRP1010 FRP2010CC	FRP1015 FRP2015CC	FRP1020 FRP2020CC	°C/W
$R_{\theta JC}$	Maximum Thermal Resistance, Junction to Case FRP1000 Series FRP2000CC Series	2.5 1.5	2.5 1.5	2.5 1.5	2.5 1.5	
$R_{\theta JA}$	Maximum Thermal Resistance, Junction to Ambient	60	60	60	60	

**Notes**

For information concerning connection diagram and package outline, refer to Section 7.

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Symbol	Rating	FRP1005 FRP2005CC	FRP1010 FRP2010CC	FRP1015 FRP2015CC	FRP1020 FRP2020CC	Unit
<b>Electrical Characteristics per Diode</b>						
$V_{FM}^1$	Maximum Instantaneous Forward Voltage $I_F = 10.0 \text{ A}, T_C = 150^\circ\text{C}$ $I_F = 10.0 \text{ A}, T_C = 25^\circ\text{C}$	0.91 1.0	0.91 1.0	0.91 1.0	0.91 1.0	V
$I_{RRM}^1$	Maximum Instantaneous Repetitive Reverse Current Rated DC Voltage, $T_C = 125^\circ\text{C}$ Rated DC Voltage, $T_C = 25^\circ\text{C}$	5.0 5	5.0 5	5.0 5	5.0 5	mA $\mu\text{A}$
$t_{rr}$	Maximum Reverse Recovery Time $I_F = 1.0 \text{ A}, di_F/dt = 50 \text{ A}/\mu\text{s}$ $I_F = 10 \text{ A}, di_F/dt = 100 \text{ A}/\mu\text{s}$	35 50	35 50	35 50	35 50	ns
$I_{R(REC)}^2$	Maximum Reverse Recovery Current $I_F = 10 \text{ A}, di_F/dt = 100 \text{ A}/\mu\text{s}, V_{RRM}$	2.5	2.5	2.5	2.5	A

Notes

1. Pulse Test: Pulse Width = 300  $\mu\text{s}$ . Duty Cycle  $\leq 2.0\%$
2. See Figure 11 for test conditions.

Performance Curves per Diode

Figure 1 Maximum Forward Voltage Drop

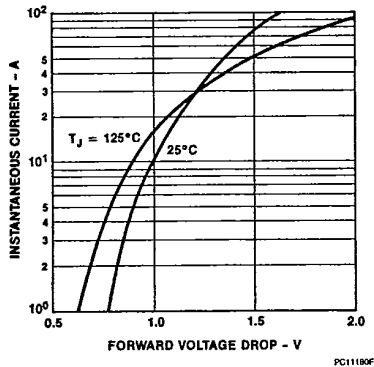
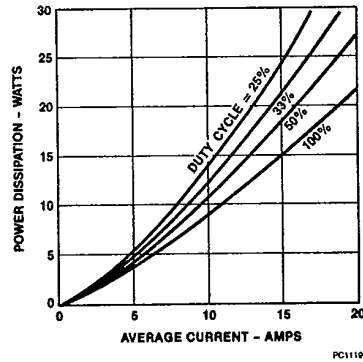


Figure 2 Maximum Power Dissipation

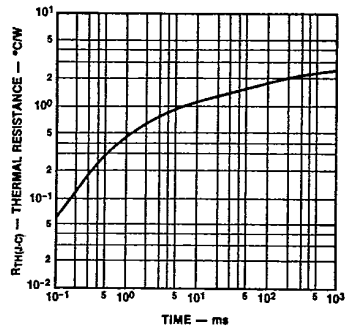


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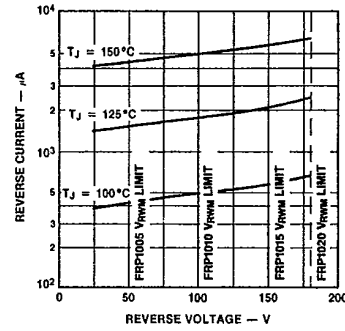
Performance Curves per Diode (Cont.)

Figure 3 Transient Thermal Resistance



PC11200F

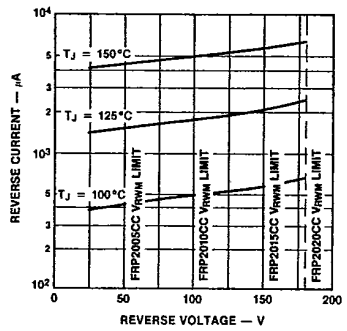
Figure 4 Typical Reverse Leakage Current



PC11270F

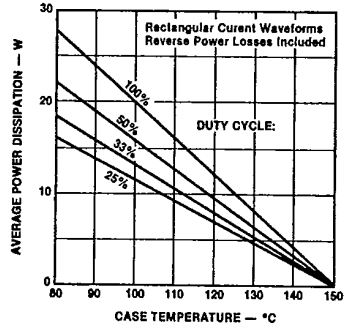
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Figure 5 Typical Reverse Leakage Current



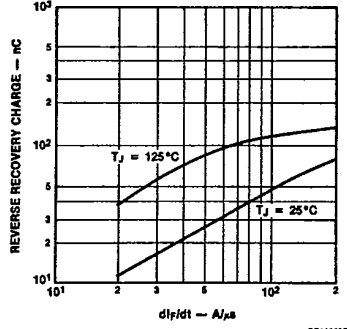
PC11200F

Figure 6 Power Derating



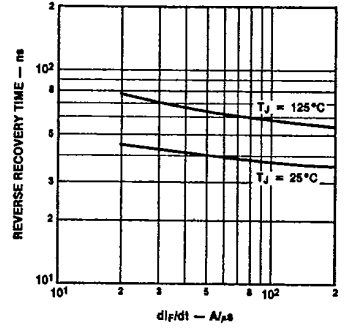
PC11220F

Figure 7 Reverse Recovery Charge



PC11230F

Figure 8 Reverse Recovery Time



PC11240F

Performance Curves per Diode (Cont.)

Figure 9 Reverse Recovery Current

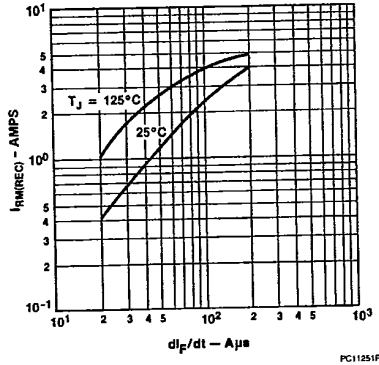


Figure 10 Reverse Recovery Softness

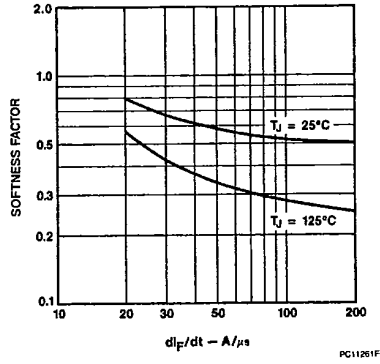


Figure 11 Reverse Recovery Test Waveform

