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

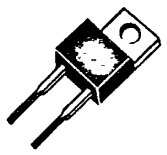
Power And Discrete Division T-03-17

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 ±50 mV**
- **150°C Operating Junction Temperature**
- **Popular TO-220AC and TO-220AB Packages**
- **Low V_{FM}**

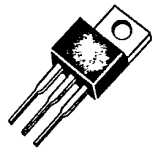
TO-220AC



IS00030F

FRP1005
FRP1010
FRP1015
FRP1020

TO-220AB



IS00010F

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°C, Rated V_R;					A
	FRP1000 Series	10	10	10	10	
	FRP2000CC Series	20	20	20	20	
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

$R_{\theta JC}$	Maximum Thermal Resistance, Junction to Case					°C/W
	FRP1000 Series	2.5	2.5	2.5	2.5	
	FRP2000CC Series	1.5	1.5	1.5	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.

FRP1000/FRP2000CC Series

T-03-17

Symbol	Rating	FRP1005 FRP2005CC	FRP1010 FRP2010CC	FRP1015 FRP2015CC	FRP1020 FRP2020CC	Unit
Electrical Characteristics per Diode						
V_{FM}[1]	Maximum Instantaneous Forward Voltage I_F = 10.0 A, T_C = 150°C I_F = 10.0 A, T_C = 25°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°C Rated DC Voltage, T_C = 25°C	 5.0 5	 5.0 5	 5.0 5	 5.0 5	 mA μA
t_{rr}	Maximum Reverse Recovery Time I_F = 1.0 A, dI_F/dt = 50 A/μs I_F = 10 A, dI_F/dt = 100 A/μs	 35 50	 35 50	 35 50	 35 50	 ns
$I_{R(REC)}$[2]	Maximum Reverse Recovery Current I_F = 10 A, dI_F/dt = 100 A/μs, V_{RRM}	2.5	2.5	2.5	2.5	A

Notes
1. Pulse Test: Pulse Width = 300 μs. Duty Cycle ≤ 2.0%
2. See Figure 11 for test conditions.

Performance Curves per Diode

Figure 1 Maximum Forward Voltage Drop

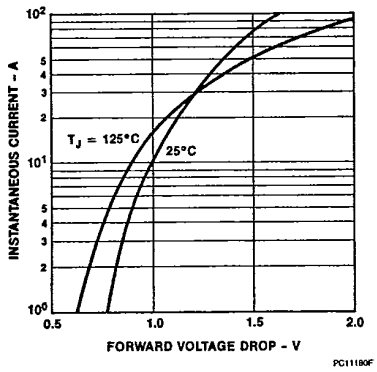
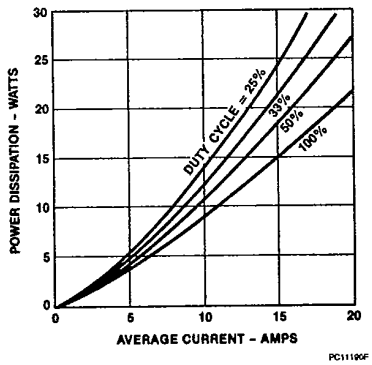


Figure 2 Maximum Power Dissipation



Performance Curves per Diode (Cont.)

Figure 3 Transient Thermal Resistance

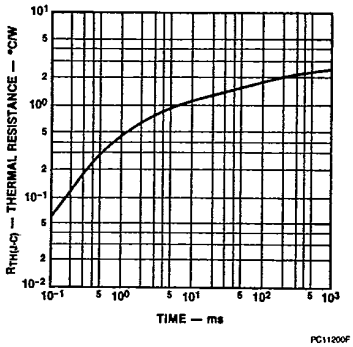


Figure 4 Typical Reverse Leakage Current

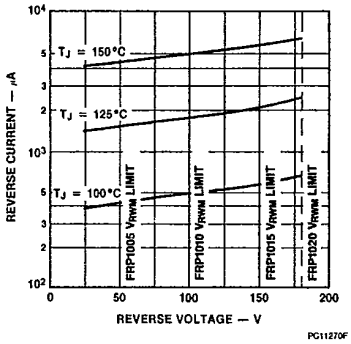


Figure 5 Typical Reverse Leakage Current

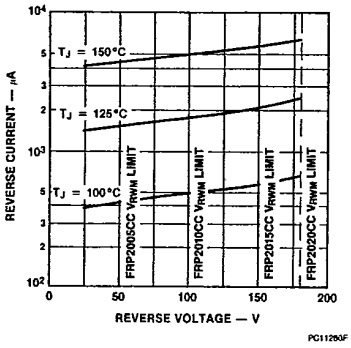


Figure 6 Power Derating

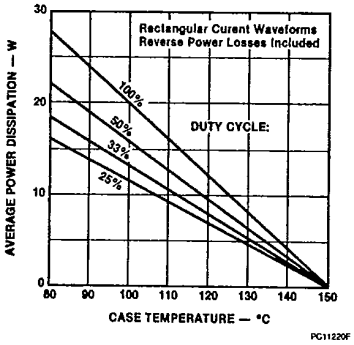


Figure 7 Reverse Recovery Charge

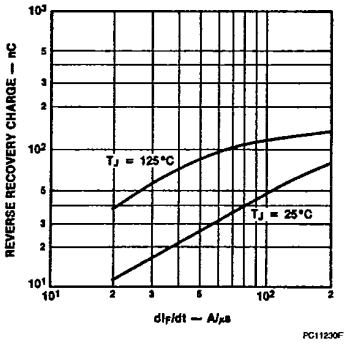
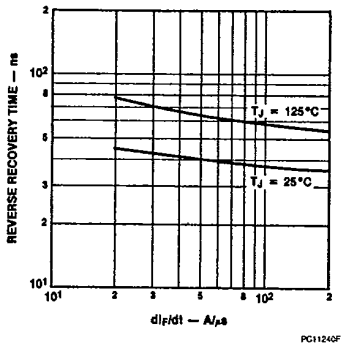


Figure 8 Reverse Recovery Time



Performance Curves per Diode (Cont.)

Figure 9 Reverse Recovery Current

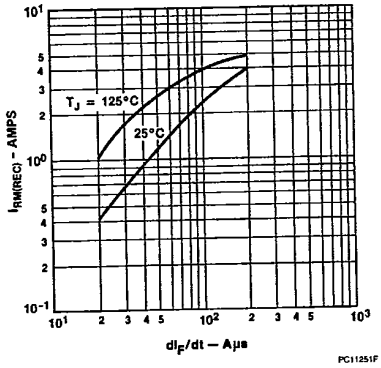


Figure 10 Reverse Recovery Softness

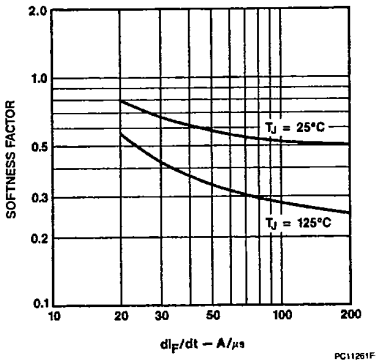
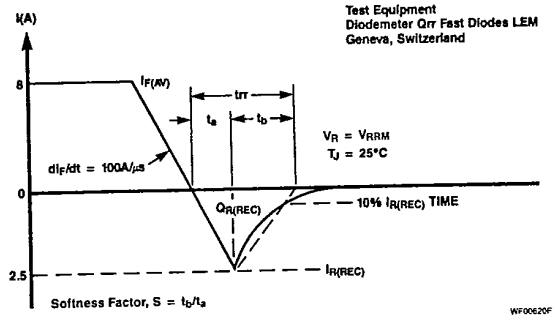


Figure 11 Reverse Recovery Test Waveform



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