

FAIRCHILD

A Schlumberger Company

**FRP1600 Series
Ultra-fast POWERplanar™
Rectifiers 16 A, 50-200 V**

Power And Discrete Division

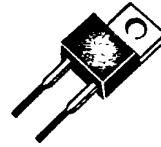
T-03-17

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 $I_{R(REC)}$
- 150°C Operating Junction Temperature
- Popular TO-220AC Package
- Low V_{FM}

TO-220AC



1500030F

FRP1605
FRP1610
FRP1615
FRP1620

2

Maximum Ratings

Symbol	Rating	FRP1605	FRP1610	FRP1615	FRP1620	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, Rated V_R , Square Wave, 20 kHz FRP1605/FRP1620: $T_C = 118^\circ\text{C}$	16	16	16	16	A
I_{FSM}	Non-repetitive Peak Surge Current per Diode, Surge Applied at Rate Load Conditions Halfwave, Single Phase, 60 Hz	200	200	200	200	A
T_J, T_{stg}	Operating Junction Temperature and Storage Temperature	-55 to +150	-55 to +150	-55 to +150	-55 to +150	$^\circ\text{C}$

Maximum Thermal Characteristics

$R_{\theta JC}$	Maximum Thermal Resistance, Junction to Case FRP1605/FRP1620	1.5	1.5	1.5	1.5	$^\circ\text{C}/\text{W}$
$R_{\theta JA}$	Maximum Thermal Resistance, Junction to Ambient	60	60	60	60	

Notes

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

Symbol	Rating	FRP1605	FRP1610	FRP1615	FRP1620	Unit
Electrical Characteristics						
V_{FM}^1	Maximum Instantaneous Forward Voltage $I_F = 16 \text{ A}$, $T_C = 150^\circ\text{C}$ $I_F = 16 \text{ A}$, $T_C = 25^\circ\text{C}$	0.80 0.95	0.80 0.95	0.80 0.95	0.80 0.95	V
I_{RRM}^1	Maximum Instantaneous Repetitive Reverse Current Rated DC Voltage, $T_C = 125^\circ\text{C}$ Rated DC Voltage, $T_C = 25^\circ\text{C}$	10 25	10 25	10 25	10 25	mA μA
t_{rr}	Maximum Reverse Recovery Time $I_F = 1.0 \text{ A}$, $di_F/dt = 50 \text{ A}/\mu\text{s}$ $I_F = 16 \text{ A}$, $di_F/dt = 100 \text{ A}/\mu\text{s}$	35 50	35 50	35 50	35 50	ns
$I_{R(REC)}^2$	Maximum Reverse Recovery Current $I_F = 8 \text{ A}$, $di_F/dt = 100 \text{ A}/\mu\text{s}$, $V_R = V_{RRM}$	2.5	2.5	2.5	2.5	A

Notes

1. Pulse Test: Pulse Width = 300 μs . Duty Cycle $\leq 2.0\%$
2. See Figure 10 for test conditions.

Performance Curves

Figure 1 Maximum Forward Voltage Drop

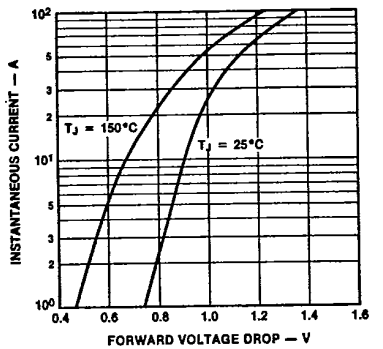
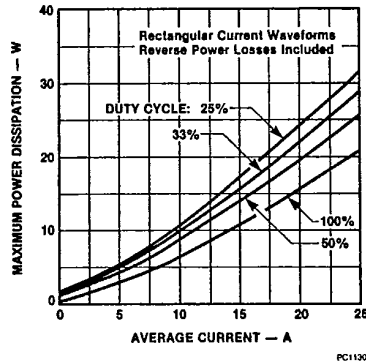
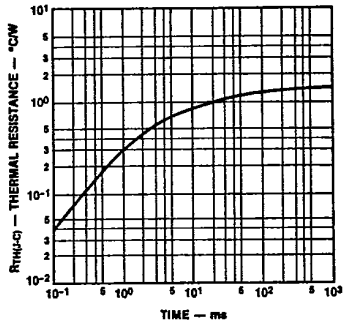


Figure 2 Maximum Power Dissipation



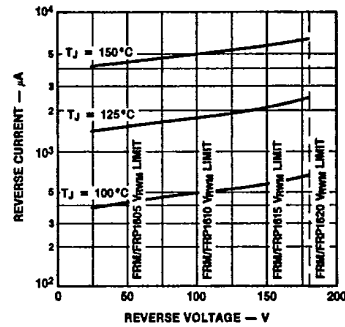
Performance Curves (Cont.)

Figure 3 Transient Thermal Resistance



PC11310F

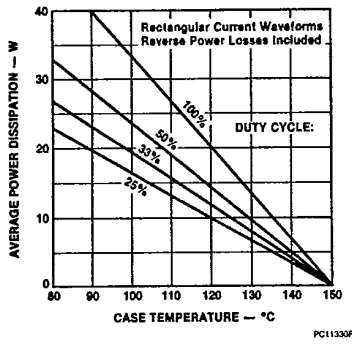
Figure 4 Typical Reverse Leakage Current



PC11320F

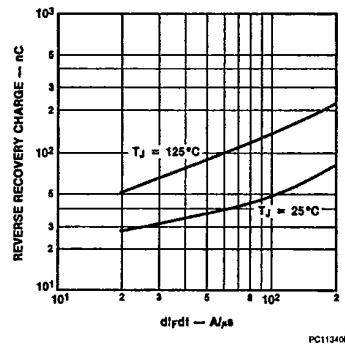
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Figure 5 Power Derating



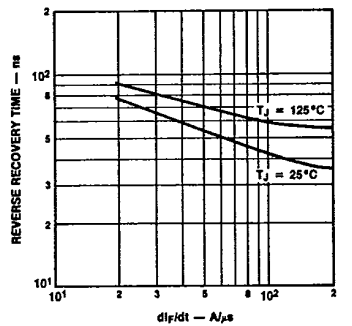
PC11330F

Figure 6 Reverse Recovery Charge



PC11340F

Figure 7 Reverse Recovery Time



PC11350F

FRP1600 Series

T-03-17

Performance Curves (Cont.)

Figure 8 Reverse Recovery Current

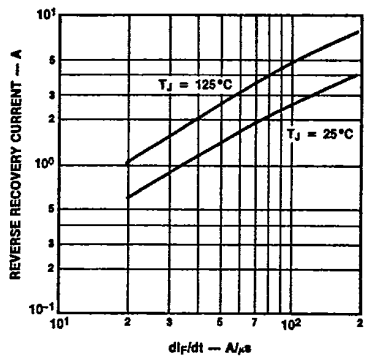


Figure 9 Reverse Recovery Softness

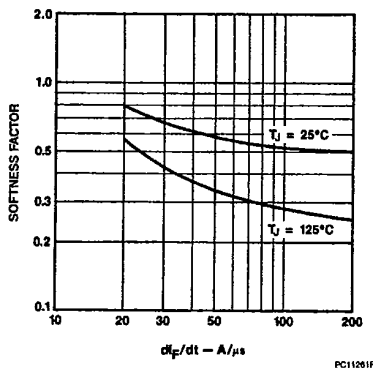
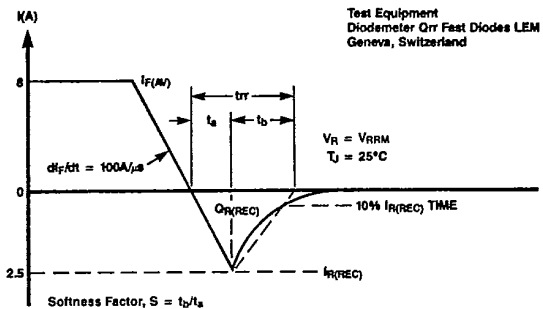


Figure 10 Reverse Recovery Test Waveform



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