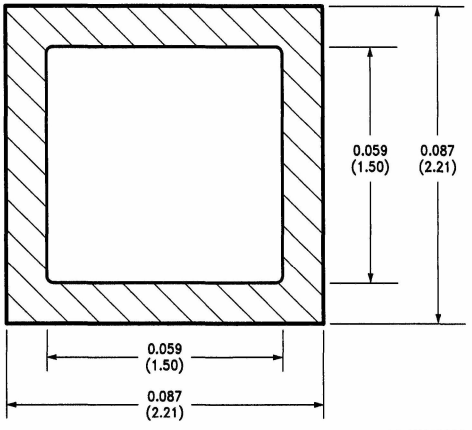
National Semiconductor

Process R4
Ultra-Fast Rectifier

RO72



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Note 1: Dimension Tolerances ±0.0005 in. (0.013mm).
Note 2: Thickness of all die types is 0.010 in. (250 μ).

DESCRIPTION

These dice are designed especially for use in switching power supplies, inverters and PWM motor controls. These dice feature low reverse recovery current with soft recovery.

Electrical Characteristics

Symbol	Parameter	Conditions	Min	Max	Units
V_{RRM}	Peak Repetitive Reverse Voltage (Note 1)	I_R = 0.5 mA	200		V
I_{RRM}	Maximum Instantaneous Reverse Current (Note 1)	$V_R = V_{RRM}$ T_J = 125°C T_J = 25°C		 5 10	 mA μA
V_{FM}	Maximum Instantaneous Forward Voltage	I_F = 8.0A	0.95		V
$I_{R\ (rec)}$	Maximum Reverse Recovery Current (Note 2)	I_F = 8.0A; $V_R = V_{RRM}$ dI_F/dt = 100A/μs		2.5	A
t_{RR}	Maximum Reverse Recovery Time	I_F = 1A; dI_F/dt = 50A/μs I_F = 8A; dI_F/dt = 100A/μs		35 50	ns ns

Note 1: Pulse Test: Pulse Width = 300 μs. Duty Cycle ≤ 2.0%.
Note 2: See *Figure 10* for test conditions.

This process is available in the following device types:

TO-220AB (Case 38)

FRP1605CC	FRP2005CC
FRP1610CC	FRP2010CC
FRP1615CC	FRP2015CC
FRP1620CC	FRP2020CC

TO-220AC (Case 41)

FRP805	FRP1005
FRP810	FRP1010
FRP815	FRP1015
FRP820	FRP1020

FRP#	805	810	815	820	1005	1010	1015	1020	Unit
V_{RRM} (I_R = 0.5 mA)	50	100	150	200	50	100	150	200	V
FRP#	**1605CC**	**1610CC**	**1615CC**	**1620CC**	**2005CC**	**2010CC**	**20150CC**	**2020CC**	**Unit**
V_{RRM} (I_R = 0.5 mA)	50	100	150	200	50	100	150	200	V

Process R4

Performance Characteristics

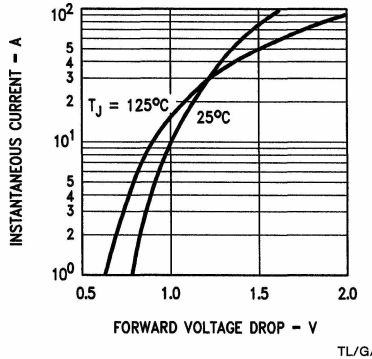

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FIGURE 1. Maximum Forward Voltage Drop

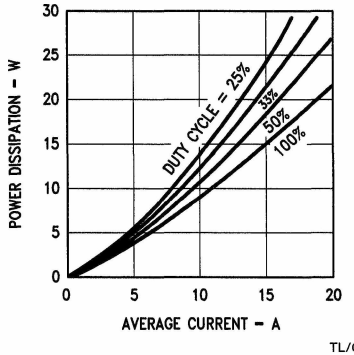

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FIGURE 2. Maximum Power Dissipation

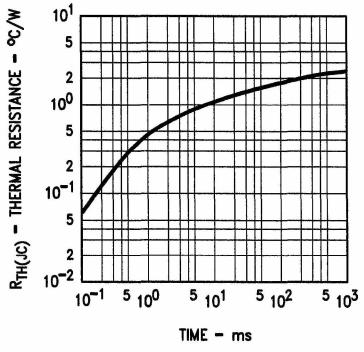

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FIGURE 3. Maximum Transient Thermal Resistance

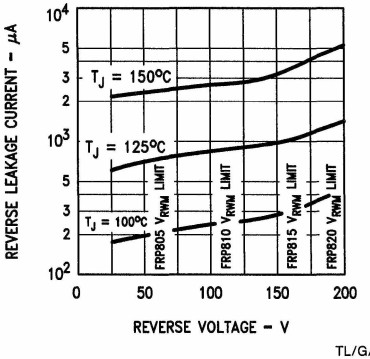

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FIGURE 4. Typical Reverse Leakage Current

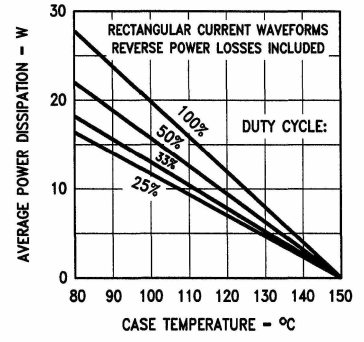

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FIGURE 5. Power Derating

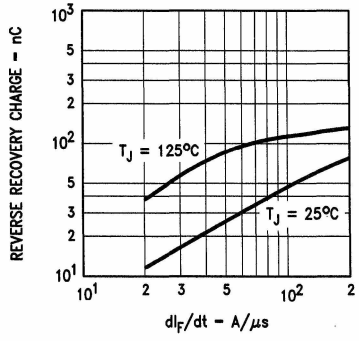

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FIGURE 6. Typical Reverse Recovery Charge

Performance Characteristics (Continued)

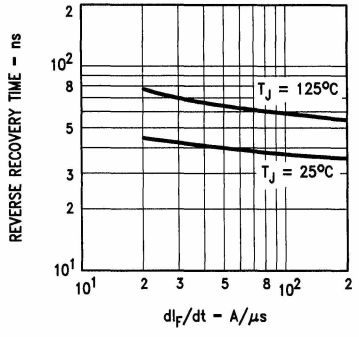

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FIGURE 7. Typical Reverse Recovery Time

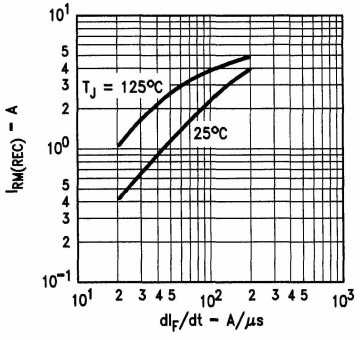

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FIGURE 8. Maximum Reverse Recovery Current

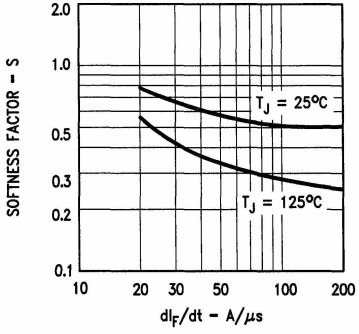

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FIGURE 9. Typical Reverse Recovery Softness

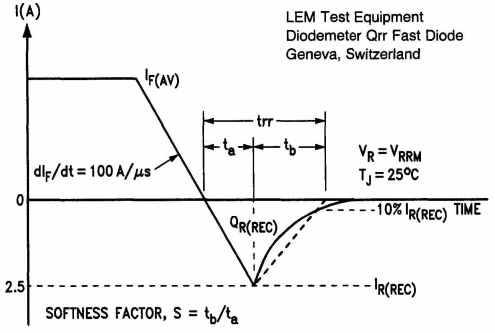

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FIGURE 10. Reverse Recovery Test Waveform

Probe Testing

Each die is probed and electrically tested to the limits specified in the Electrical Characteristics Table. However, high current parameters and thermal characteristics specified in the packaged device data sheets cannot be tested or guaranteed in die form because of the power dissipation limits of unmounted die and current handling limits of probe tips. These parameters are:

Thermal Resistance
Forward Voltage Drop at Rated Current
Reverse Recovery Characteristics at Rated Current
Surge Current