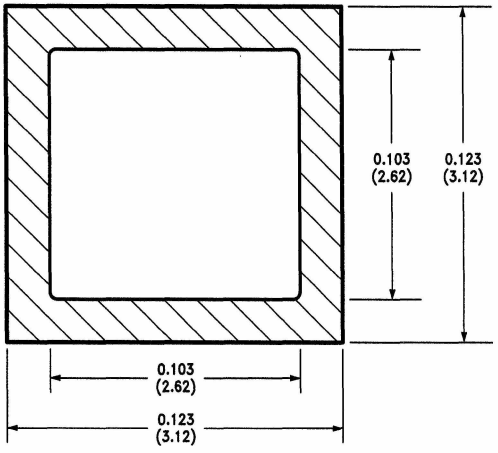
National Semiconductor

Process R5
Ultra-fast Rectifier

RO82



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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		 10 25	 mA μA
V_{FM}	Maximum Instantaneous Forward Voltage	I_F = 16A	0.8		V
$I_{R\,(rec)}$	Maximum Reverse Recovery Current (Note 2)	I_F = 16A; $V_R = V_{RRM}$ dI_F/dt = 100A/μs		2.5	A
t_{RR}	Maximum Reverse Recovery Time	I_F = 1A; dI_F/dt = 50A/μs I_F = 16A; 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-247 (Case 40)
FRK3205CC
FRK3210CC
FRK3215CC
FRK3220CC

TO-220AC (Case 41)
FRP1605
FRP1610
FRP1615
FRP1620

FRP#	1605	1610	1615	1620	FRK#	3205CC	3210CC	3215CC	3220CC	Unit
V_{RM} (I_R = 0.5 mA)	50	100	150	200	V_{RM} (I_R = 0.5 mA)	50	100	150	200	V

Process R5

Performance Characteristics

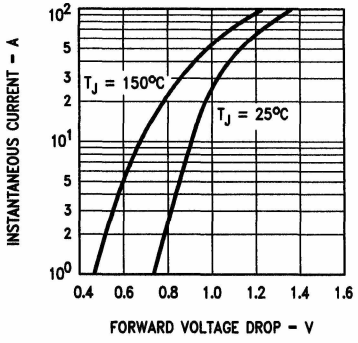

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FIGURE 1. Maximum Forward Voltage Drop

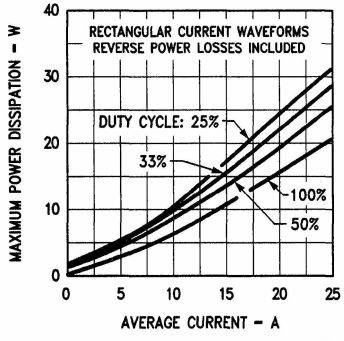

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FIGURE 2. Maximum Power Dissipation

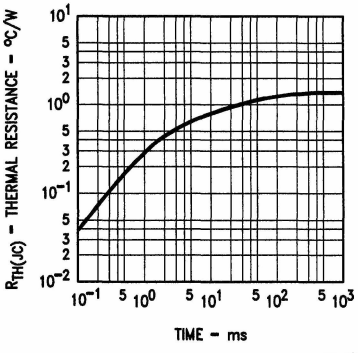

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FIGURE 3. Maximum Transient Thermal Resistance

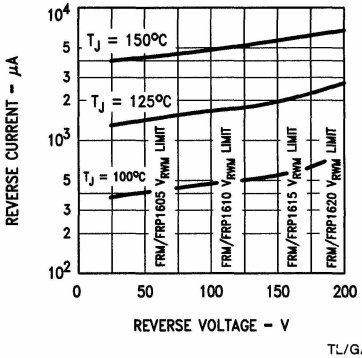

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FIGURE 4. Typical Reverse Leakage Current

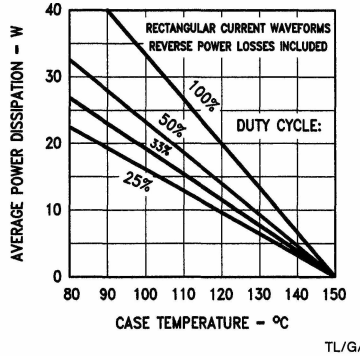

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FIGURE 5. Power Derating

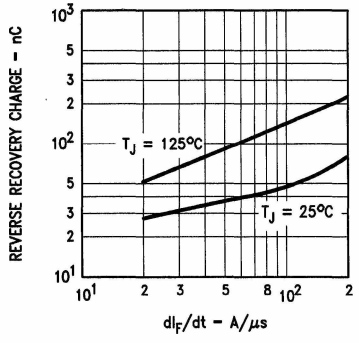

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FIGURE 6. Typical Reverse Recovery Charge

Performance Characteristics (Continued)

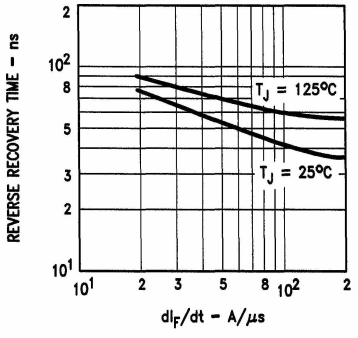

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FIGURE 7. Typical Reverse Recovery Time

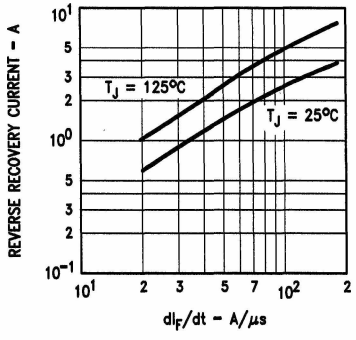

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FIGURE 8. Maximum Reverse Recovery Current

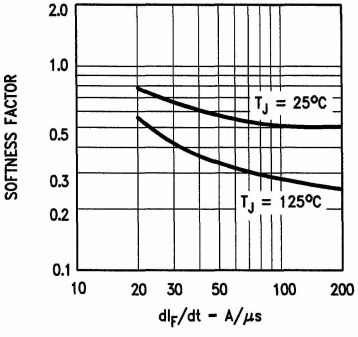

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FIGURE 9. Typical Reverse Recovery Softness

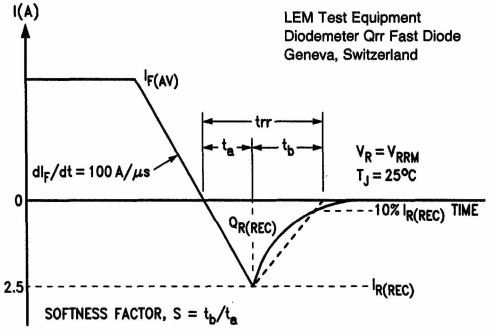

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FIGURE 10. Reverse Recovery Test Waveform

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