National Semiconductor

Process R6
Ultra-Fast Rectifier

RO96
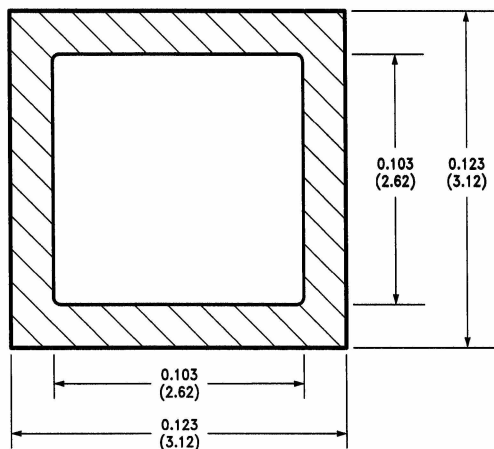

0.103 (2.62) 0.123 (3.12)

0.103 (2.62)

0.123 (3.12)

TL/G/10039–23

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	$I_R = 0.5$ mA	600		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 (Note 1)	$I_F = 8A$		1.5	V
$I_{R\,(rec)}$	Maximum Reverse Recovery Current (Note 2)	$I_F = 8A$; $V_R = 200V$ $dI_F/dt = 100A/\mu s$		5	A
t_{RR}	Maximum Reverse Recovery Time	$I_F = 8A$; $dI_F/dt = 100A/\mu s$		75	ns

Note 1: Pulse width = 300 μs. Duty Cycle $\leq$ 2.0%.
Note 2: See *Figure 8* for test conditions.

This process is available in the following device types:

TO-220AB (Case 38)   TO-220AC Case (41)
FRP1640CC   FRP840
FRP1650CC   FRP850
FRP1660CC   FRP860

FRP #	840	850	860	1640CC	1650CC	1660CC	Unit
V_{RRM} ($I_R = 0.5$ mA)	400	500	600	400	500	600	V

Performance Characteristics
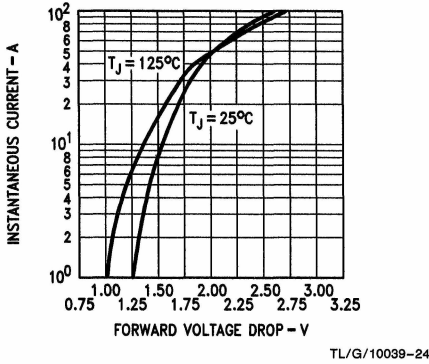
FIGURE 1. Maximum Forward Voltage Drop

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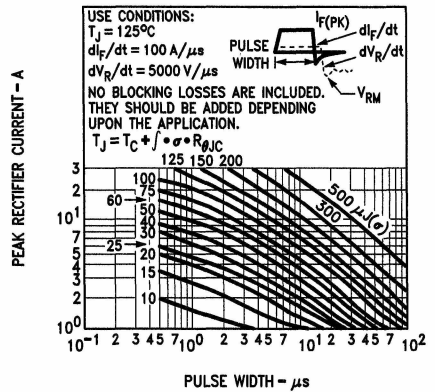
FIGURE 2. Maximum Energy Dissipation Per Pulse
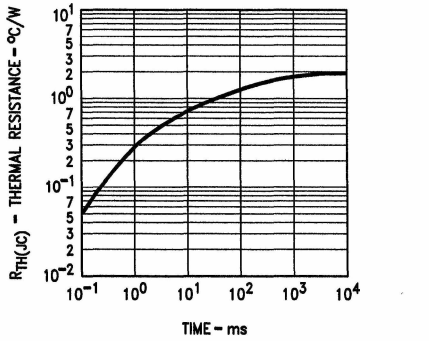
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FIGURE 3. Maximum Transient Thermal Resistance
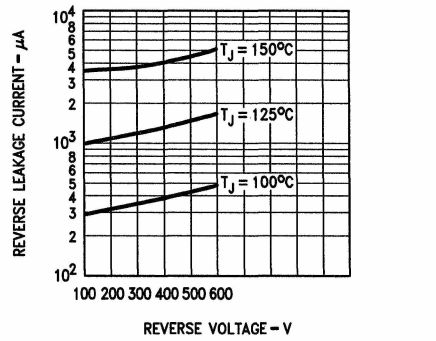
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FIGURE 4. Typical Reverse Leakage Current
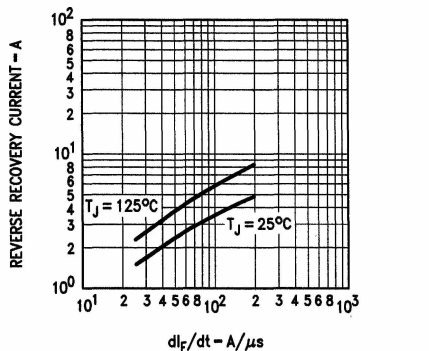
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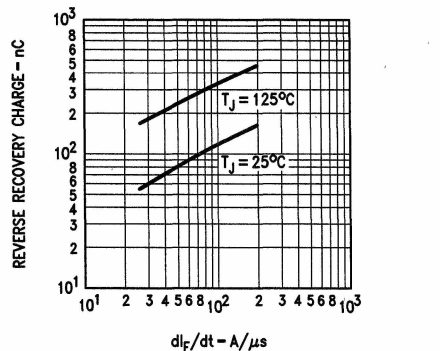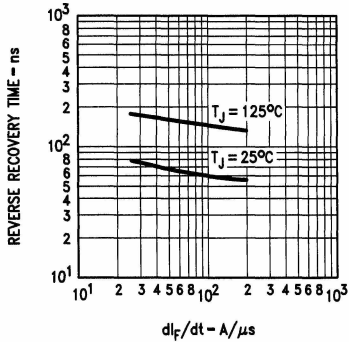FIGURE 5. Typical Reverse Recovery Current

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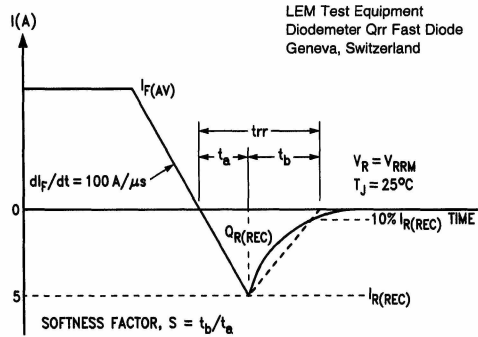FIGURE 6. Typical Reverse Recovery Charge

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Performance Characteristics (Continued)

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FIGURE 7. Typical Reverse Recovery Time

LEM Test Equipment
Diodemeter Qrr Fast Diode
Geneva, Switzerland

SOFTNESS FACTOR, S = t_b/t_a

TL/G/10039–31

FIGURE 8. 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