

**DESCRIPTION**

The UM9989 diode series was designed to protect MRI receivers from high RF energy fields including long RF pulses and RF spike pulses present in most MRI machines. The UM9989 acts as a passive protector (limiter) for the MRI receiver. No forward bias voltage is required to turn on the diode. It is self-biased by the RF transmitter pulse power. A switch driver is not needed for this receiver protection application.

Receiver protector diodes appear directly across the input port of the receiver. They are connected in anti-parallel pairs to limit the RF carrier excursion in both polarities. They must, therefore, exhibit extremely low insertion loss, both in the “on” state (high power present) and the “off” state (receiver power present) so as not to decrease the receiver’s sensitivity. The UM9989 diodes are available in two package configurations for flexibility in design.

**IMPORTANT:** For the most current data, consult MICROSEMI’s website: <http://www.microsemi.com>

**ABSOLUTE MAXIMUM RATINGS AT 25° C  
(UNLESS OTHERWISE SPECIFIED)**

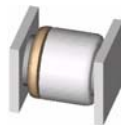
Rating	Symbol	Value	Unit
Peak Repetitive Reverse Voltage Working Peak Reverse Voltage DC Blocking Voltage	$V_{RRM}$ $V_{RWM}$ $V_R$	75	V
RMS Reverse Voltage	$V_{R(RMS)}$	50	V
Non-Repetitive Peak Forward Surge Current 8.3ms Single half sine wave	$I_{FSM}$	2.5	A
Storage Temperature	T stg	-65 to +150	°C
Operating Temperature	T op	-65 to +150	°C

**THERMAL CHARACTERISTICS  
(UNLESS OTHERWISE SPECIFIED)**

Thermal Resistance			
@ Lead length = 3/8 inches	$R_{OLA}$	100	°C/Watt



Style “B”



Style “SM”

**KEY FEATURES**

- Available in surface mount package.
- Metallurgical bond
- Planar passivated chip
- Non-magnetic construction
- Non cavity design
- Thermally matched configuration
- Low capacitance at 0 V bias
- Low conductance at 0 V bias
- Compatible with automatic insertion equipment

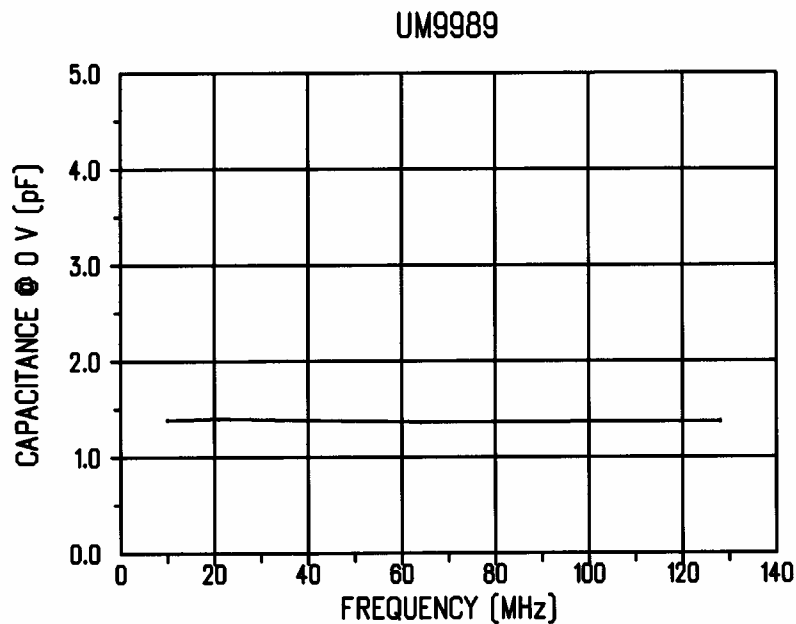
**APPLICATIONS/BENEFITS**

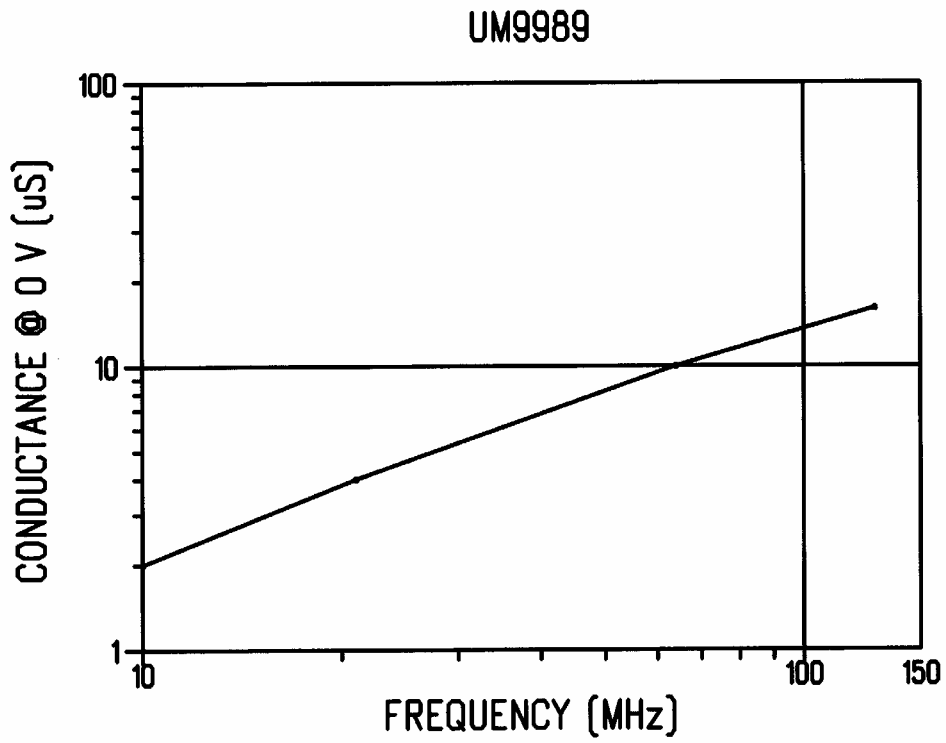
- MRI receiver protection
- Body coil isolation

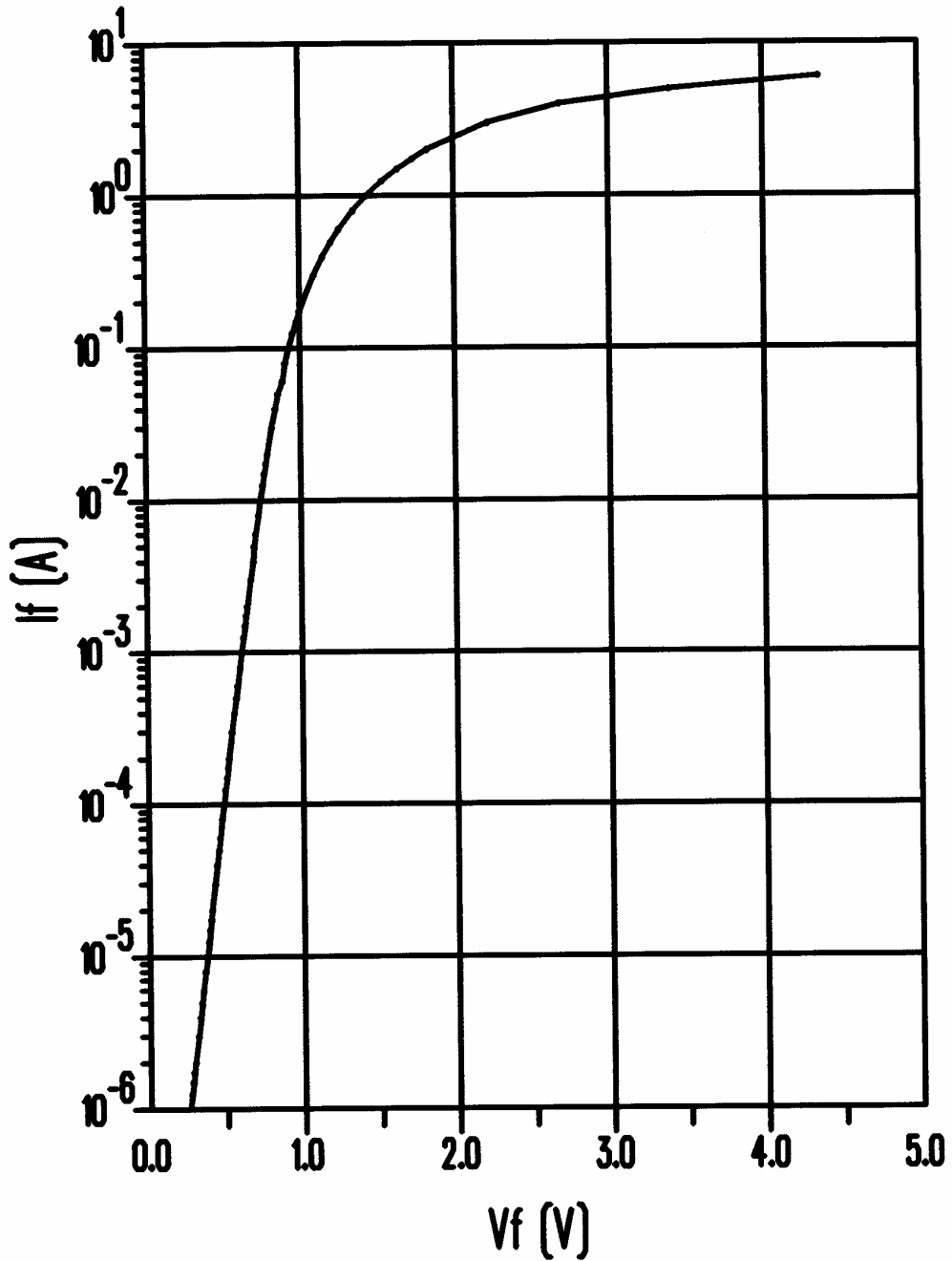
**ELECTRICAL PARAMETERS @ 25°C (unless otherwise specified)**

Parameter	Symbol	Conditions	Min	Typ.	Max	Units
Forward Voltage (Note 1)	$V_{Fm}$	$I_F = 10 \text{ mA}$ , $T_j = 25 \text{ }^\circ\text{C}$ $I_F = 100 \text{ mA}$ , $T_j = 25 \text{ }^\circ\text{C}$			1.0 1.2	V V
Reverse Break Down Voltage (Note 1)	$V_{BR}$	$I_R = 100 \text{ } \mu\text{A}$	75			V
Reverse Current (Note1)	$I_{rm}$	$V_R = 20 \text{ V}$ , $T_j = 25 \text{ }^\circ\text{C}$ $V_R = 50 \text{ V}$ , $T_j = 25 \text{ }^\circ\text{C}$			50 500	nA nA
Capacitance	$C_T$	$V_R = 0 \text{ V}$ , $F = 1 \text{ MHz}$		1.2	5	pF
Conductance	$G$	$V_R = 0 \text{ V}$ , $F = 64 \text{ MHz}$			40	$\mu\text{S}$

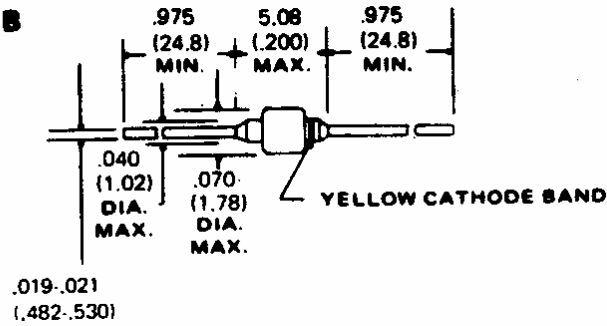
Note: 1 Short duration test pulse used to minimize self – heating effect.



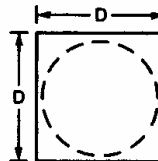
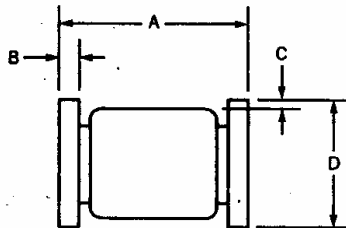




**STYLE B**

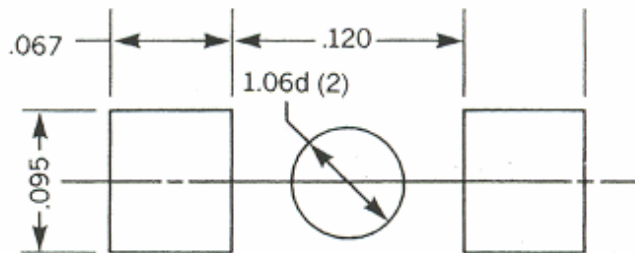


**STYLE "SM"**



DIM.	INCHES		MM	
	MIN.	MAX.	MIN.	MAX.
A	.165	.195	4.19	4.95
B	.019	.028	0.48	0.71
C	.003	—	0.08	—
D	.070	.085	1.78	2.16

**STYLE "SM" FOOTPRINT**



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**MECHANICAL**



**UM9989**

**FAST MRI PROTECTION DIODES**

**NOTES:**