



# UMX9989AP™

DUAL ULTRA LOW MAGNETIC MOMENT  
FAST DIODES FOR MRI APPLICATIONS

RoHS compliant

## DESCRIPTION

The UMX9989AP is the first MRI switching diode module, designed to optimize performance and reduce assembly labor, cost, and polarity errors.

There are two principle applications for which the UMX9989AP modules are intended:

1) MRI receiver protection from high RF energy fields, including long RF pulses and RF spike pulses present in most MRI machines. The UMX9989AP acts as a passive protector (limiter) for the MRI receiver's LNA.

The diode assembly exhibits extremely low insertion loss, both in the "on" state (high power present) and the "off" state (receiver power present) so the Receiver's Noise Figure is not increased by the protector circuit.

2) Passive switching of surface coil detuning and blocking circuits. In this case, the flow of loop current during transmitter pulse turns on the diodes, without a switch driver.

If the UMX9989AP is combined with a PIN diode (UM7201SM) the combination can be used to implement a semi-active detune or block circuit design. The UMX9989AP's turn on the PIN diode (used for higher power switching) during the sinc(x) sidelobes, before the main pulse of the transmitter waveform,  $\text{sinc}(x) = [\sin(x)]/x$ , occurs. The mechanical drawing shows the structure of the diode pair. Manufacture of dual anti-parallel pairs of UMX9989's ensures that the matched pair of diodes can be inserted in a coil with the correct diode polarities and with the minimum parasitic inductance and capacitance, thermal impedance and labor for the coil manufacturer.

## KEY FEATURES

- Ultra low magnetic construction
- RoHS compliant
- Matched pairs available
- Surface mount package.
- Metallurgical bond
- Planar passivated chip
- 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

- MR passive receiver protection
- MR passive blocking circuits
- MR passive detuning circuits
- MR passive disable circuits

**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
Non-Repetitive Peak Forward Surge Current 8.3ms Single half sine wave	$I_{FSM}$	2	A
Storage Temperature	T stg	-65 to +150	°C
Operating Temperature	T op	-65 to +150	°C



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

Parameter	Symbol	Conditions	Min	Typ.	Max	Units
Forward Voltage (Note 1)	$V_F$	$I_F = 10 \mu A$		$\pm 0.38$	$\pm 0.4$	V
		$I_F = 1 A$		$\pm 1.2$	$\pm 1.4$	V
Capacitance	$C_T$	$V_R = 0 V, F = 1 MHz$		4	8	pF
Conductance	G	$V_R = 0 V, F = 64 MHz$		4	8	pF
		$V_R = 0 V, F = 64 MHz$			80	uS
Parallel Resistance	$R_P$	$V_R = 0 V, F = 64 MHz$	12			kOhms

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



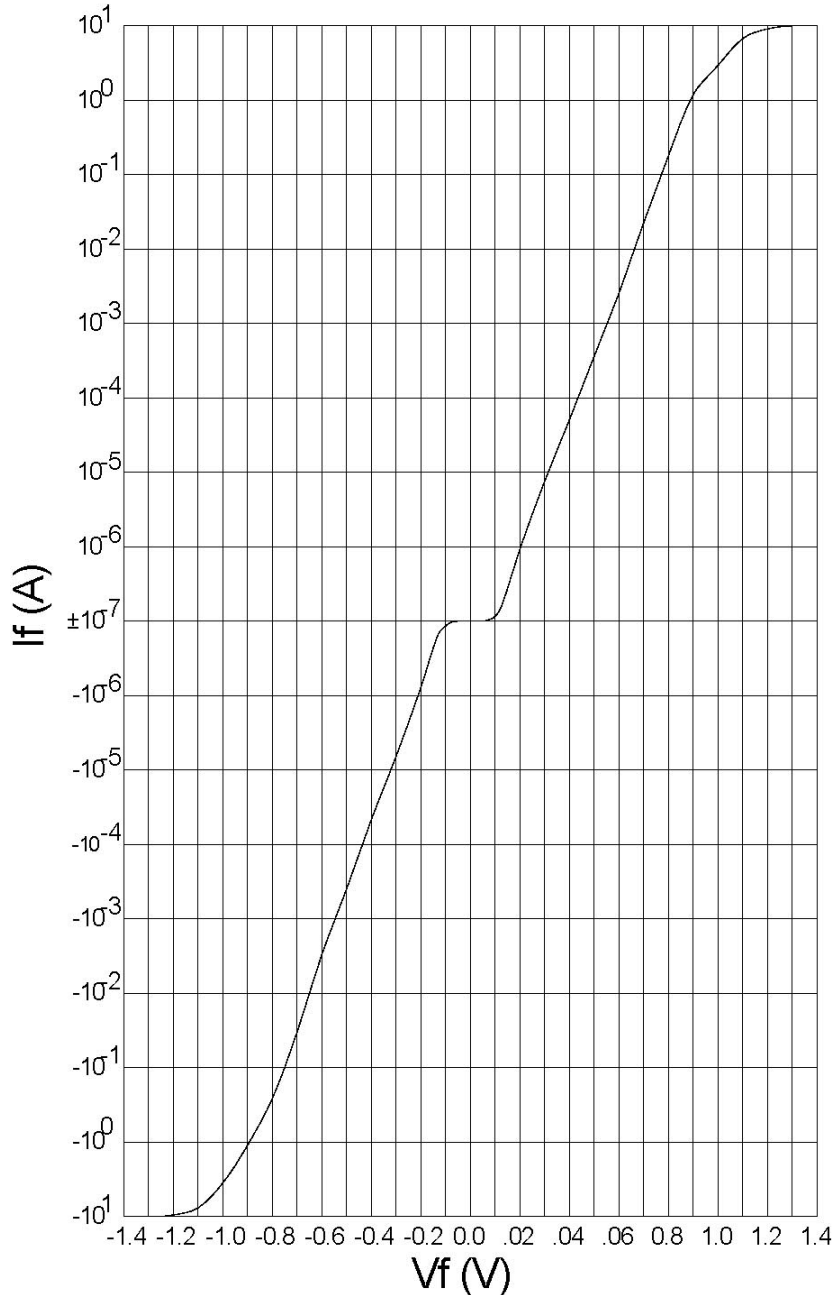


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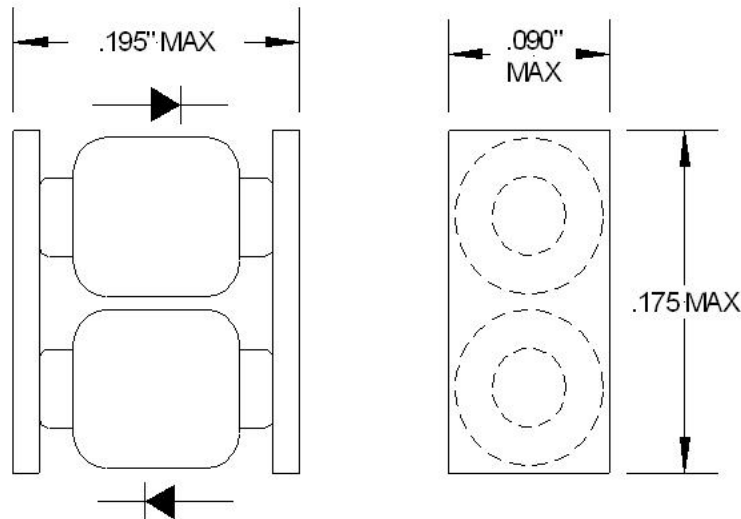
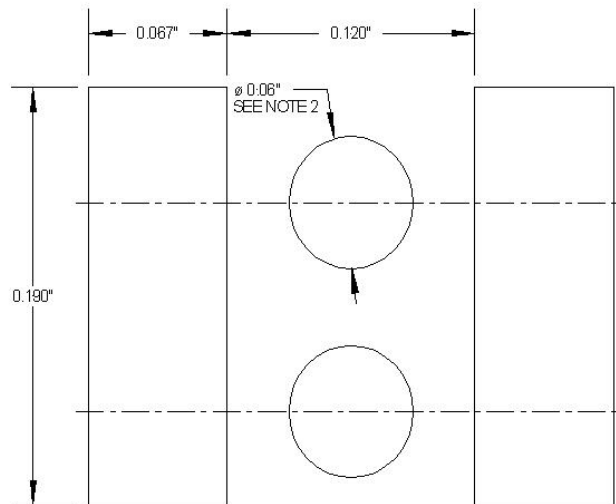
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## UMX9989AP TYPICAL



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**STYLE "UM9989AP" OUTLINE**

**STYLE "UM9989AP" FOOTPRINT**

**NOTES:**

1. These dimensions will match the terminals and provide for additional solder fillets at the outboard ends at least as wide as the terminals themselves, assuming accuracy of device placement within .005 inches
2. If the mounting method chosen requires use of an adhesive separate from the solder compound, a round (or square) spot of cement as shown should be centrally located.
3. Dimensions shown are in inches.



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## NOTES: