

**UMX502-UMX812 Datasheet**  
**Surface Mount—MELF PIN Diodes**





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## Revision History

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### 1.1 Revision 1.0

Revision 1.0 was the first publication of this document.

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# Contents

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- Revision History..... 3
  - 1.1 Revision 1.0..... 3
- 2 Product Overview ..... 7
  - 2.1 Applications ..... 7
    - 2.1.1 Key Features ..... 7
    - 2.1.2 Applications and Benefits ..... 7
- 3 Electrical Specifications..... 8
  - 3.1 Absolute Maximum Ratings ..... 8
  - 3.2 Device Electrical Parameters..... 8
  - 3.3 Typical RS Curves ..... 9
- 4 Package Outline..... 10

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## List of Figures

---

Figure 1 Typical RS Curves ..... 9

Figure 2 UMX502-UMX812 Package Outlines..... 10

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## List of Tables

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Table 1 Absolute Maximum Ratings .....	8
Table 2 Device Electrical Parameters at 25 °C .....	8
Table 3 UMX502-UMX812 Package Dimensions .....	10

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## 2 Product Overview

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This line of metal electrode leadless face (MELF) high-power PIN diodes consists of hermetically sealed surface mount packaged devices with full-face bonded chips for low-inductance construction. The MELF ceramic package has square-end terminations, which are ideal for surface mount and pick-and-place operations. The PIN diode chips are coated with a special hard glass passivation, which is required both for high-power applications and to enhance the reliability, resulting in mean time between failures (MTBFs) of greater than one million hours.

These RoHS-compliant products meet the requirements of EU Directive 2002/95/EC.

The standard terminal finish is matte tin unless otherwise specified. Alternative terminal finishes are available. Consult the factory if you have special requirements.

### 2.1 Applications

The MELF diodes are used as switching, attenuating, and phase-shifting elements from HF through 2 GHz, and have breakdown voltage ratings up to 500 V. Low-magnetic<sup>1</sup> Cer-Met MELFs are also used as switching elements in magnetic resonance imaging (MRI). Conventional magnetic MELF packages are used in cellular applications, beam-steering units (telephone via satellites), surface mount applications, and switch-filter banks for frequency-hopping radios.

1. RoHS versions are supplied with a matte tin finish.

#### 2.1.1 Key Features

- Low-magnetic (ideal for MRI applications)
  - Very low inductance, full-face bonding
  - High-reliability hermetic design
  - Surface mount devices available in tape and reel
  - RoHS Compliant<sup>2</sup>
  - ESD HMB Class 2
2. RoHS versions are supplied with a matte tin finish.

#### 2.1.2 Applications and Benefits

- Designed for low-loss and low-distortion applications
- Switch-filter bank
- T/R control
- Attenuators
- MRI switching

## 3 Electrical Specifications

### 3.1 Absolute Maximum Ratings

The following table shows the absolute maximum ratings at 25 °C unless otherwise specified.

**Table 1 Absolute Maximum Ratings**

Rating	Symbol	Value	Unit
Maximum leakage current at 80% of minimum rated $V_B$	$I_R$	500	nA
Forward current (1 $\mu$ S pulse)	$I_F$	1	A
Operating temperature	$T_{OP}$	–55 to 150	°C
Storage temperature	$T_{STG}$	–55 to 150	°C
Maximum solder temperature		260	°C

### 3.2 Device Electrical Parameters

The following table shows the absolute maximum ratings at 25 °C.

**Table 2 Device Electrical Parameters at 25 °C**

Model Number	$V_b(V)$ $I_R = 10 \mu A$	$C_T(pF)^3$ @50 V	$R_s(\Omega)^4$ @100 mA	$R_s(\Omega)^4$ @200 mA	$T_L(\mu S)$	$\theta_P (^{\circ}C/W)$ Thermal Resistance
	(Min)	(Max)	(Max)	(Typ)	(Typ)	(Max)
UMX502 – F	500	0.5	0.85	0.55	1.5	35
UMX504 – F	500	0.6	0.65	0.45	3.0	20
UMX508 – F	500	0.9	0.45	0.25	5.0	15
UMX509 – F	500	1.2	0.40	0.2	5.5	15
UMX512 – F	500	1.5	0.30	0.12	4.0	15
UMX812 – F	500	1.3	0.45	0.25	5.5	15

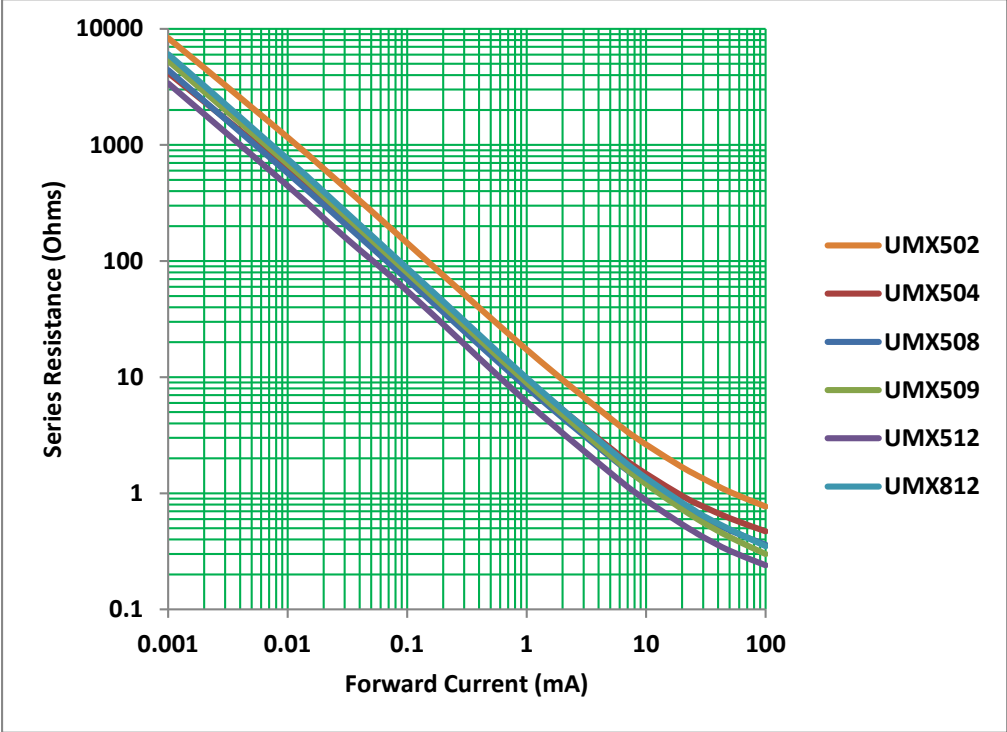
- Capacitance ( $C_T$ ) is measured at  $f = 1$  MHz.
- Series resistance ( $R_S$ ) is measured at  $f = 100$  MHz.



### 3.3 Typical RS Curves

The following illustration shows the typical RS curves.

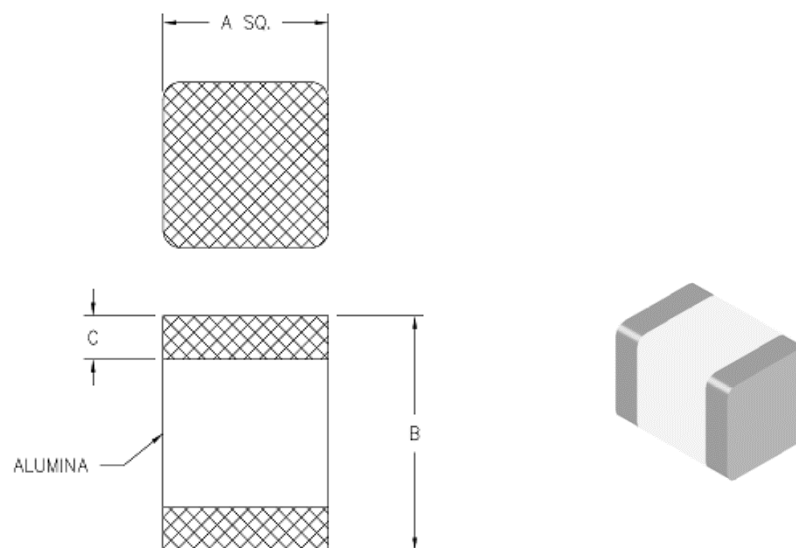
Figure 1 Typical RS Curves



## 4 Package Outline

The UMX502-UMX812 devices have the following package outline specifications.

**Figure 2 UMX502-UMX812 Package Outlines**



**Table 3 UMX502-UMX812 Package Dimensions**

DIM	Inches			Millimeters		
	Min	Typ	Max	Min	Typ	Max
A	0.080		0.095	2.032		2.413
B	0.115		0.135	2.921		3.429
C	0.008		0.030	0.203		0.762