

## Control Devices: MMP 7000 Series

# Low - High Power PIN Diodes

## Description

The **MicroMetrics** MMP 7000 series PIN diodes are manufactured using very high resistivity silicon epitaxial material grown on a highly doped low resistivity substrate. Combined with a grown junction P++ layer, this yields a very abrupt structured "I" region with minimum outdoping and low voltage punchthrough characteristics.

Our high temperature passivation and state of the art metallization produce diodes that are designed to cover a wide range of applications that fall into the general categories of switching, phase switching, attenuating and limiting. These devices are rugged and able to meet all visual criteria in space and military applications.

## Applications

The MMP series are used in switch applications which include high speed low power switches, medium speed higher power switches, high power switches and attenuators, TR switches, digital phase shifters and duplexers.

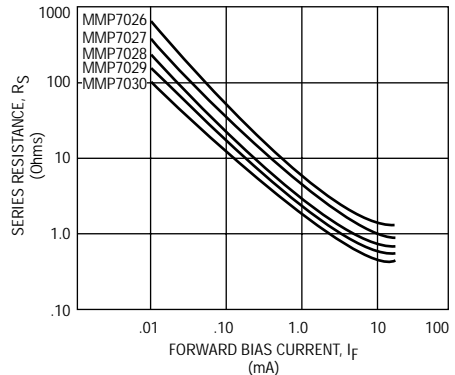
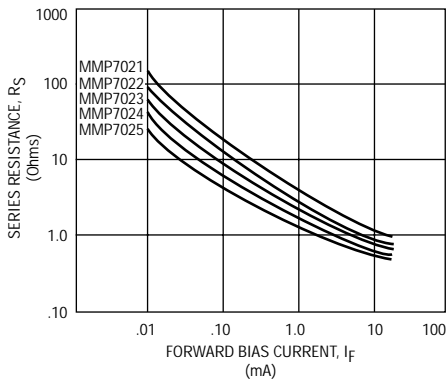
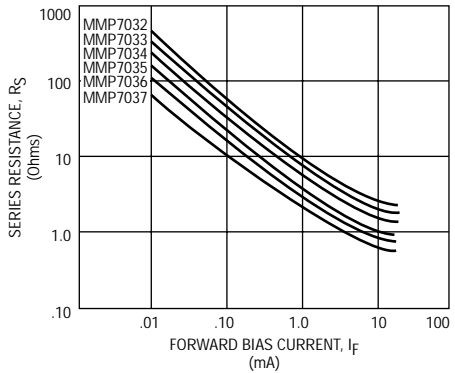
## Features

- High Temperature Passivation for Reliability
- Grown Junction for sharp "I" Region Interface
- Full Area Gold Contact for the Lowest Capacitance and Largest Bonding Pad Available
- Lot Traceability and Lot Control, Assuring High Reproducibility

## Packaging

- Chip, Glass, Ceramic

## Typical Performance



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## Electrical Characteristics

## Ultra Fast Switching

V <sub>br</sub> <sup>1</sup> MIN (V)	C <sub>j-10</sub> V <sup>2</sup> MAX (pF)	T <sub>f</sub> <sup>3</sup> TYP (nS)	∅ <sub>jc</sub> MAX °C/W	TS. Max. NS	RS@ 50 MA OHMS MAX	RS@ 10 MA OHMS TYP	Part Number
25	.1	10	60	1.5	.7	1	MMP7010
25	.15	10	50	1.5	.55	.8	MMP7011
25	.2	10	40	1.5	.45	.7	MMP7012
25	.25	10	35	1.5	.4	.6	MMP7013

## Fast Switching, Low Power

Vbr1 MIN (V)	C <sub>j-10</sub> V <sup>2</sup> MAX (pF)	T <sub>f3</sub> TYP (nS)	∆ <sub>jc</sub> MAX °C/W	TS. MAX. NS	RS@ 75 MA OHMS MAX	RS@ 20 MA OHMS TYP	Part Number
70	.05	60	80	5	.9	1.2	MMP7020
70	.1	60	70	5	.7	1.0	MMP7021
70	.15	60	60	5	.6	.9	MMP7022
70	.2	60	55	5	.5	.7	MMP7023
70	.25	60	50	5	.45	.5	MMP7024
100	.03	100	90	10	1.2	1.9	MMP7025
100	.07	100	80	10	.9	1.5	MMP7026
100	.1	100	70	10	.7	1.2	MMP7027
100	.15	100	60	10	.6	1.0	MMP7028
100	.2	100	55	10	.5	.9	MMP7029
100	.3	100	50	15	.45	.8	MMP7030
200	.03	225	90	15	1.9	3.0	MMP7031
200	.07	225	80	15	1.2	2.2	MMP7032
200	.1	225	70	15	.9	1.6	MMP7033
200	.15	225	60	15	.8	1.0	MMP7034
200	.2	225	55	15	.7	.8	MMP7035
200	.3	225	50	15	.6	.7	MMP7036

## Notes:

- Reverse Breakdown Voltage measured at 10µA.
- Junction Capacitance measured at -10 volts at 1 MHz.
- Minority Carrier lifetime measured with IF = 10 mA IR = 6mA.
- RF Switching speed measured from 90% to 10% and 10% to 90% transmission.  
Drive output = +20 mA and -4 volts, 200 mA spike with a rise time of 2 nS.
- Series Resistance is measured at 1 GHz using transmission loss techniques.

## Maximum Ratings

Operating Temperature	-55°C to 150°C
Storage Temperature	-65°C to 200°C
Reverse Breakdown Voltage (V <sub>br</sub> )	from 25 volts to 500 volts
Junction Capacitance (C <sub>j-10</sub> )	from .03 pF to .5 pF at 10 volts
Switching Speed (TS)	from 1 nS to 25 nS
Lifetime (T <sub>f</sub> )	from 5 nS to 2.0 µS
Chip Thickness	.004 - .007" thick

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## Control Devices: MMP 7000 Series (Continued)

## Electrical Characteristics

## Medium Power, General Purpose

V <sub>br1</sub> MIN (V)	C <sub>j-10</sub> V <sub>2</sub> MAX (pF)	TL <sub>3</sub> TYP (nS)	Δj <sub>c</sub> MAX °C/W	TS. MAX. NS	RS@ 75 MA OHMS MAX	RS@ 20MA OHMS TYP	Part Number
200	.03	400	65	20	2.6	3.5	MMP7040
200	.07	400	60	20	1.5	2.2	MMP7041
200	.1	400	55	20	1.3	2.0	MMP7042
200	.15	400	50	20	1.0	1.9	MMP7043
200	.2	400	45	20	.8	1.7	MMP7044
200	.3	400	40	20	.7	1.4	MMP7045
200	.5	400	20	20	.6	1.2	MMP7046
200	.03	600	60	25	2.6	3.5	MMP7047
200	.07	600	55	25	1.6	3.2	MMP7048
200	.1	600	50	25	1.2	2.0	MMP7049
200	.15	600	45	25	.9	1.9	MMP7050
200	.2	600	40	25	.8	1.7	MMP7051
200	.3	600	35	25	.7	1.4	MMP7052
200	.5	600	15	25	.6	1.2	MMP7053

## High Power Switching &amp; Attenuation

V <sub>br</sub> <sup>1</sup> MIN (V)	C <sub>j-10</sub> V <sup>2</sup> MAX (pF)	TL <sup>3</sup> TYP (μS)	R <sub>S</sub> <sup>5</sup> @ 1 mA MAX (Ohms)	R <sub>S</sub> <sup>5</sup> @ 10 mA MAX (Ohms)	R <sub>S</sub> <sup>5</sup> @ 100 mA MAX (Ohms)	∅j <sub>c</sub> MAX °C/W	Part Number
250	.05	1.0	25	10	2.0	20	MMP7060
250	.08	1.0	20	8	1.5	20	MMP7061
250	.1	1.0	15	6	1.2	20	MMP7062
250	.2	1.0	8	3.5	1.0	15	MMP7063
250	.3	1.5	6	2.0	0.8	15	MMP7064
500	.08	1.5	40	8	1.5	15	MMP7065
500	.1	1.5	15	5	1.2	15	MMP7066
500	.2	1.5	10	4	1.0	12	MMP7067
500	.3	2.0	8	3.5	0.8	10	MMP7068
500	.5	2.0	6	2.0	0.7	10	MMP7069

## Notes:

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- RF Switching speed measured from 90% to 10% and 10% to 90% transmission. Drive output = +20 mA and -4 volts, 200 mA spike with a rise time of 2 nS.
- Series Resistance is measured at 1 GHz using transmission loss techniques.

## Maximum Ratings

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Reverse Breakdown Voltage (V <sub>br</sub> )	from 25 volts to 500 volts volts at 10 μA
Junction Capacitance (C <sub>j-10</sub> )	from .03 pF to .5 pF at 10 volts
Switching Speed (T <sub>S</sub> )	from 1 nS to 25 nS
Lifetime (TL)	from 5 nS to 2.0 μS
Chip Thickness	.004" - .007" thick

