Electrical Specifications: T_A = +25°C

Low Capacitance PIN

Part Number	Maximum Characteristics			Nominal Characteristics			
	Reverse Voltage[2] V_R <10 µA	Capacitance 1 MHz C_J @ -10 V	Series Res. 500 MHz R_S @ 10 mA	Carrier Lifetime[3] T_L	Reverse Recovery Time[4] T_{RR}	I Region Length	Theta
	VDC	pF	Ω	ηs	ηs	µm	°C/W
MA4P161-134	100	0.10	1.50	150	15	13	65
MA4P203-134	100	0.15	1.50	150	25	13	75
MA4P7493-134	150	0.05	1.80	80	8	19	60
MADP-000165-01340W	200	0.06	2.50	200	20	19	30
MADP-000135-01340W	200	0.15	1.20	440	44	19	30

Attenuator PIN

Part Number	Maximum Characteristics			Nominal Characteristics				
	Reverse Voltage[2] V_R <10 µA	Capacitance 1 MHz C_J @ -100 V	Series Res. 100 MHz R_S @ 10 mA	Carrier Lifetime[3] T_L	Series Res. 100 MHz R_S @ 10 µA	Series Res. 100 MHz R_S @ 1 mA	I Region Length	Theta
	V_{DC}	pF	Ω	µs	Ω	Ω	mils	°C/W
MA47416-132	200	0.15	6	2	2000	30	4	30
MA47418-134	200	0.15	3	1	500	15	2	25

2. Reverse Voltage (V_R) is sourced and the resultant reverse leakage current (I_R) is measured to be <10 µA.
3. Nominal carrier life time (T_L) specified at I_F = +10 mA, I_{REV} = -6 mA.
4. Nominal reverse recovery time specified at I_F = +20 mA, I_{REV} = -200 mA.

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Electrical Specifications: T_A = +25°C (cont.)

Cermachip PIN

Part Number	Maximum Characteristics			Nominal Characteristics		
	Reverse Voltage[5] V_R <10 µA	Capacitance 1 MHz C_J @ -100 V	Series Res. 100 MHz R_S @ 100 mA	Carrier Lifetime[6]	I Region Length	Theta
	V_{DC}	pF	Ω	µs	µm	°C/W
MA4P303-134	200	0.15 @ 10 V	1.5 @ 10 mA[8]	0.3	20	30
MA4P404-132	250	0.20 @ 50 V	0.70 @ 50 mA[8]	0.6	30	20
MA4P504-132	500	0.20	0.60	1	50	20
MA4P505-131	500	0.35	0.45	2	50	14
MA4P506-131	500	0.70	0.30	3	50	11
MADP-000488-13740W	900	0.19 @ 50 V	1.6 @ 50 mA	4	140	45
MA4P604-131	1000	0.30	1.00	3	90	10
MA4P606-131	1000	0.60	0.70	4	90	8
MA4P607-212	1000	1.30	0.40	12	127	4
MADP-011141-13160W	1100	0.40	0.70	7	140	10
MA4PK3000-1252[7]	3000	2.90	0.25 @ 500 mA[9]	60	350	1.5

5. Reverse Voltage (V_R) is sourced and the resultant reverse leakage current (I_R) is measured to be <10 µA.
6. Nominal carrier life time (T_L) specified at I_F = +10 mA, I_{REV} = -6 mA.
7. Upon completion of circuit installation, the chip must be covered with a dielectric conformal coating such as SYLGARD 539® to prevent voltage arcing.
8. Test Frequency = 500 MHz.
9. Test Frequency = 4 MHz.

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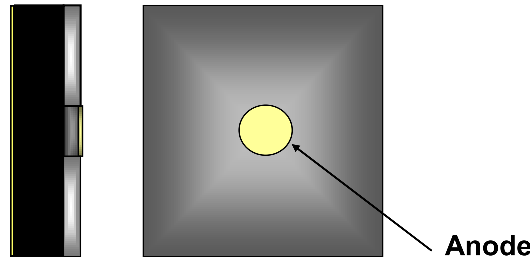
Chip Dimensions



Low Capacitance PIN Chip

Part Number	Nominal Characteristics (mils.)		
	Anode Diameter ± 0.5	Chip Size ± 0.5	Chip Thickness ± 0.5
MA4P161-134	3.5	13 x 13	6.0
MA4P203-134	3.1	13 x 13	6.0
MA4P7493-134	3.8	13 x 13	6.5
MADP-000165-01340W	2.3	13 x 13	10.0
MADP-000135-01340W	3.1	13 x 13	10.0

Attenuator PIN Chip

Part Number	Nominal Characteristics (mils.)		
	Anode Diameter ± 0.5	Chip Size ± 2.0	Chip Thickness ± 1.0
MA47416-132	7.5 x 7.5[10]	19 x 19	7.0
MA47418-134	7.5	13 x 13	7.0

10. Anode top contact is square.

Cermachip PIN Chip

Part Number	Nominal Characteristics (mils.)		
	Anode Diameter ± 0.5	Chip Size ± 2.0	Chip Thickness ± 1.0
MA4P303-134	3.0	13 x 13	10.0
MA4P404-132	6.8	20 x 20	10.0
MA4P504-132	6.8	20 x 20	10.0
MA4P505-131	13.0	27 x 27	11.0
MA4P506-131	15.8	27 x 27	12.0
MADP-000488-13740W	12.2	23 x 23	13.5
MA4P604-131	17.0	27 x 27	13.5
MA4P606-131	21.0	32 x 32	14.0
MA4P607-212	37.0	62 x 62	18.5
MA4PK3000-1252	85.0	172 x 172	28.0
MADP-011141-13160W	17.5	32 x 32	16.0

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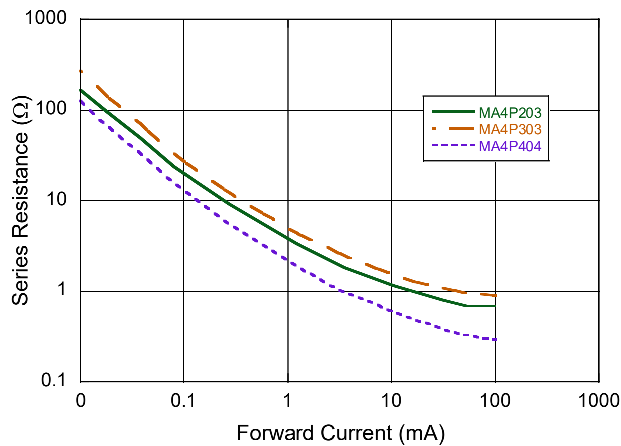
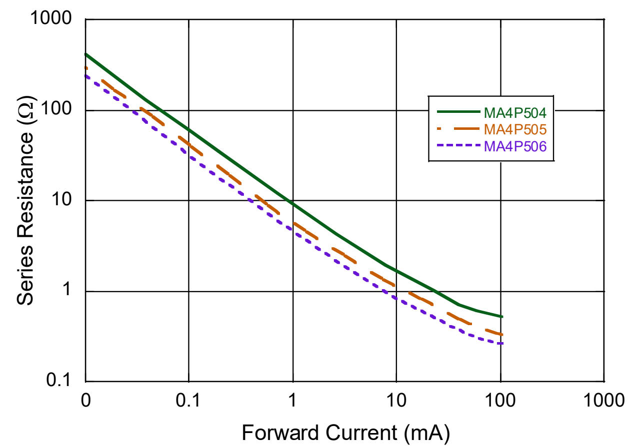
Typical Series Resistance vs. Forward Current Performance

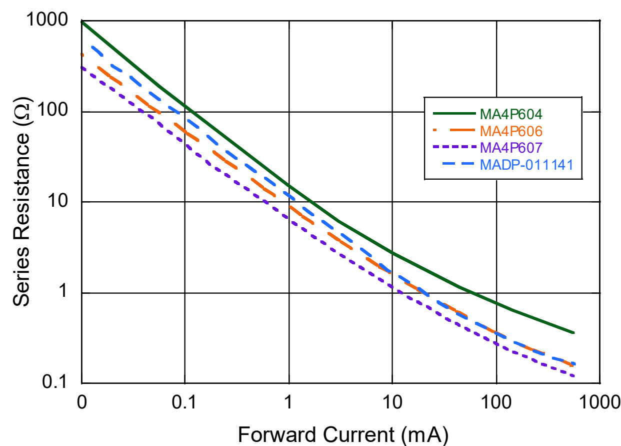
MA4P203, MA4P303, MA4P404



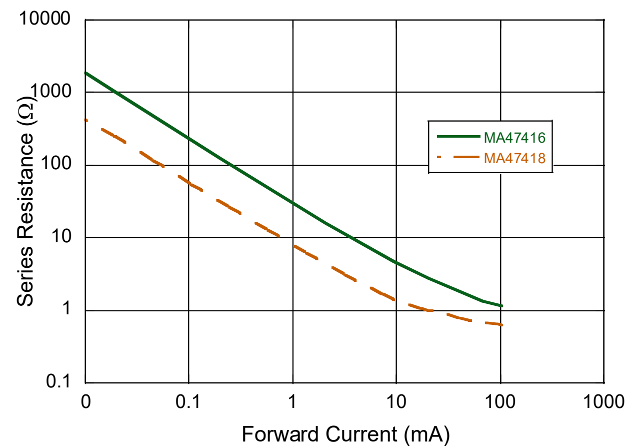
MA4P504, MA4P505, MA4P506



MA4P604, MA4P606, MA4P607, MADP-011141



MA47416, MA47418



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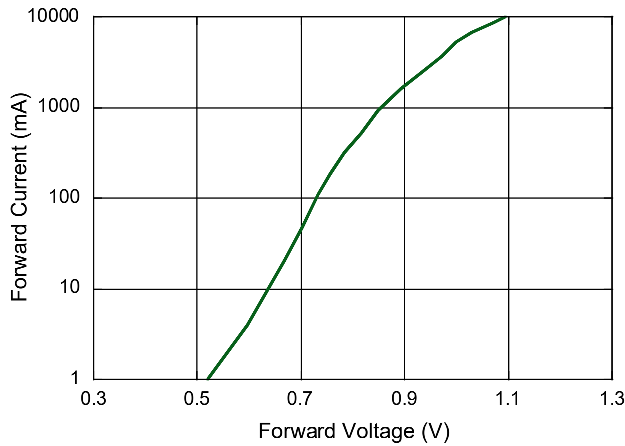
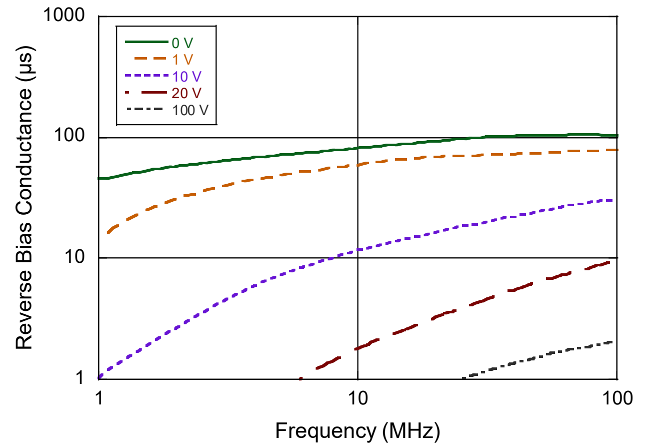
MA4PK3000 (3kV) Chip

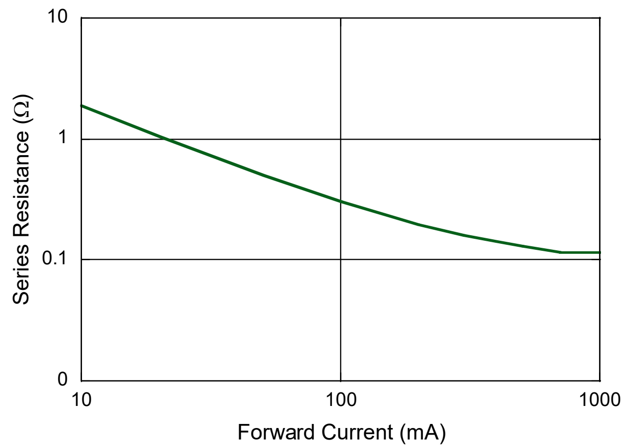
Forward Current vs. DC Forward Voltage @ 100 MHz



Reverse Bias Conductance vs. Frequency



Series Resistance vs. Forward Current @ 100 MHz



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Die Handling and Bonding Information:

Handling:

All semiconductor chips should be handled with care to avoid damage or contamination from perspiration, salts, and skin oils. The use of plastic tipped tweezers or vacuum pickup is strongly recommended for the handling and placing of individual components. Bulk handling should ensure that abrasion and mechanical shock are minimized.

Die Attach Surface:

Die can be mounted with an 80Au/Sn20, eutectic solder preform, RoHS compliant solders or electrically conductive silver epoxy. The metal RF and DC ground plane mounting surface must be free of contamination and should have a surface flatness of < ±0.002”.

Eutectic Die Attachment Using Hot Gas Die Bonder:

A work surface temperature of +255°C is recommended. When hot forming gas (95%N/5%H) is applied, the work area temperature should be approximately +290°C. The chip should not be exposed to temperatures greater than +320°C for more than 10 seconds.

Eutectic Die Attachment Using Reflow Oven:

For recommended reflow profile refer to Application Note 538 “Surface Mounting Instructions”.

Electrically Conductive Epoxy Die Attachment:

A controlled amount of electrically conductive, silver epoxy, approximately 1 - 2 mils in thickness, should be used to minimize ohmic and thermal resistance. A thin epoxy fillet should be visible around the perimeter of the chip after placement to ensure full area coverage. Cure conductive epoxy per manufacturer’s schedule. Typically +150°C for 1 hour.

Wire and Ribbon Bonding:

The die anode bond pads have a Ti-Pt-Au metallization scheme, with a final gold thickness of 1.0 micron. Thermo-compression or thermo-sonic wedge bonding of either gold wire or ribbon is recommended. A bonder heat stage temperature setting of +200°C, tool tip temperature of +150°C and a force of 18 to 50 grams is suggested. Ultrasonic energy may also be used but should be adjusted to the minimum amplitude required to achieve an acceptable bond. Excessive energy may cause the anode metallization to separate from the chip. Automatic ball or wedge bonding may also be used.

For more detailed handling and assembly instructions, see Application Note M541, “Bonding and Handling Procedures for Chip Diode Devices”.

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