

Space Qualified Diodes

ML4000 Series

V2.00

GaAs Gunn Diodes

Operating Frequency	Minimum Output Power P_o (mW)	Maximum Operating Current I_{op} (mA)	Type No.	ESA/SCC Detail Specification No.	Package Styles
5 to 8GHz	100 to 250 500	500 to 700 1500	ML4901 to ML4902 ML4910	5511/002 5511/002	30, 111, 118, 148, 275
8 to 12.4GHz	100 to 250 500	650 to 1050 1500	ML4903 to ML4904 ML4911	5511/002 5511/002	As Above
12.4 to 18.0GHz	100 to 250	750 to 1050	ML4905 to ML4906	5511/002	As Above
18.0 to 22.0GHz	250 to 50	1700 to 800	ML4921 to ML4923	5511/001	111, 118, 138, 275
22.0 to 27.0GHz	250 to 50	1700 to 800	ML4931 to ML4933	5511/001	As Above
27.0 to 32.0GHz	200 to 50	1700 to 800	ML4941 to ML4943	5511/001	As Above
32.0 to 40.0GHz	150 to 50	1700 to 800	ML4951 to ML4953	5511/001	118, 138, 275
40.0 to 50.0GHz	100 to 50	1700 to 800	ML4961 to ML4963	5511/001	As Above
50.0 to 60.0GHz	60 to 30	1700 to 800	ML4971 to ML4973	5511/001	As Above
90.0 to 100.0GHz	5 to 15	1100 to 1500	ML4981 to ML4983	5511/001	As Above

1. Available in pill packages only.
2. Chart III(a) Category 2 (Power Burn-In only).

Silicon Abrupt Tuning Varactor Diodes

Breakdown Voltage	Typical Total Capacitance C_T (at -4V) (pF)	Capacitance Ratio (Min)	Type No.	ESA/SCC Detail Specification No.	Package Styles
25V	0.50 to 3.00	2.3 to 4.4	ML4310 to ML4316	5512/003	30, 31, 33, 36, 96, 97, 103, 118, 120, 186, 276
	3.30 to 4.70	4.6 to 4.7	ML4317 to ML4319	5512/003	30, 31, 36, 103, 118, 186
40V	0.70 to 2.15	3.4 to 5.3	ML4331 to ML4335	5512/004	30, 31, 33, 36, 96, 97, 103, 118, 120, 186, 276
	2.70 to 9.95	5.5 to 6.3	ML4336 to ML4343	5512/005	30, 31, 36, 103, 118, 186
60V	0.70 to 1.75	3.4 to 5.5	ML4351 to ML4354	5512/006	30, 31, 33, 36, 96, 97, 103, 118, 120, 186, 276
	2.20 to 6.8	5.8 to 6.9	ML4335 to ML4361	5512/007	30, 31, 36, 103, 118, 186
	8.2 to 15.1	7.0 to 7.3	ML4362 to ML4365	5512/007	30, 31, 36, 103

1. Available in pill, stripline and pill-with-tabs packages.
2. Chart III(a) Category 1 (HTRB only).

Specifications Subject to Change Without Notice.

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GaAs Tuning Varactor Diodes

Breakdown Voltage	Typical Total Capacitance C_T (at -4V) (pF)	Minimum Total Capacitance Ratio	Type No.	ESA/SCC Detail Specification No.	Package Styles
30V Abrupt Junction	0.57 to 3.50 4.50 to 5.50	1.8 to 3.6 3.7 to 3.8	ML4512 to ML4518 ML4519 to ML4520	5512/002 5512/014	30, 31, 33, 36, 94, 95, 96, 97, 103, 118, 120, 186, 276
45V Abrupt Junction	0.57 to 3.50 4.50 to 5.50	2.2 to 4.6 4.7 to 4.8	ML4532 to ML4538 ML4539 to ML4540	5512/008 5512/014	As Above.
60V Abrupt Junction	0.57 to 3.50 4.50 to 5.50	2.3 to 4.9 5.1 to 5.3	ML4552 to ML4558 ML4559 to ML4560	5512/009 5512/014	As Above.
25V Hyper-abrupt Junction	0.57 to 2.25 2.75 to 5.50	5.5 to 9.0 9.0 to 10.0	ML4572 to ML4576 ML4577 to ML4580	5512/013 5512/012	As Above.

1. Available in pill, stripline and pill-with-tabs packages.
2. Chart III(a) Category 1 (HTRB only).

Silicon Multiplier Varactor Diodes

Breakdown Voltage	Typical Junction Capacitance C_J (at -6V) (pF)	Typical Minority Carrier Lifetime T_L (ns)	Typical Transition Time T_S (ps)	Type No.	Package Styles
15V	0.3	15 to 20	40 to 70	ML4402 to ML4404	30, 31, 32, 34, 43, 56, 91, 92, 96, 97, 111, 120, 144B, 148, 186
20V	0.6	20	90	ML4405	As Above.
30V	0.9	30	100	ML4406	As Above.
45V	1.7	80	150	ML4407	As Above.
60V	3.0	150	350	ML4408	30, 31, 32, 34, 43, 56, 91, 92, 111, 144B, 148
75V	5.7	400	600	ML4409	34, 43, 56, 101, 144B

1. Available in pill, module, and stripline.
2. Chart III(a) Category 3 (HTRB & Power Burn-In).

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GaAs Multiplier Varactor Diodes

Breakdown Voltage	Typical Total Capacitance C_T (at 0V) (pF)	Typical Junction Capacitance C_T (at 0V) (pF)	Type No.	ESA/SCC Detail Specification No.	Package Styles
15V	0.40 to 0.80	0.20 to 0.60	ML48701E to ML48705E	5512/010	30, 31, 36, 94, 95, 96, 97, 118, 120, 138
25V	0.40 to 0.60 0.70 to 0.80	0.20 to 0.40 0.50 to 0.60	ML48706C to ML48708C ML48709B to ML48710B	5512/011 5512/011	As Above.

1. Available in pill, stripline and pill-with-tabs packages.
2. Chart III(a) Category 1 (HTRB only).

Silicon Pin Diodes (Normal Device Polarity)

Breakdown Voltage	Typical Total Capacitance C_j (at -10V) (pF)	Typical Minority Carrier Lifetime T_L (ns)	Type No.	ESA/SCC Detail Specification No.	Package Styles
15V	0.15	10	ML4610	5513/009	30, 31, 32, 34, 36, 43, 56, 91, 92, 94, 95, 97, 101, 103, 118, 120, 128, 138, 148, 186, 255, 275, 276
40V	0.10 to 0.2	20	ML4611 to ML4612	5513/010	As Above.
70V	0.10 to 0.2	60	ML4614 to ML4615	5513/010	As Above.
100V	0.10 to 0.30	120	ML4617 to ML4619	5513/009	As Above.
150V	0.10 to 0.30	250	ML4622 to ML4624	5513/014	As Above.
200V	0.10 to 0.30	500	ML4627 to ML4629	5513/015	As Above.
300V	0.10 to 0.20	500 to 800	ML4640 to ML4641	5513/012	30, 31, 32, 34, 36, 43, 56, 91, 92, 101, 103, 186, 255
	0.30 to 0.50	1000 to 1000	ML4642 to ML4643	5513/012	30, 31, 32, 34, 36, 43, 56, 91, 92, 101, 103, 255
400V	0.1	1000	ML4644	5513/012	30, 31, 32, 34, 36, 43, 56, 91, 92, 101, 103, 186, 255
	0.20 to 0.30	1500 to 2000	ML4645 to ML4646	5513/012	30, 31, 32, 34, 36, 43, 56, 91, 92, 101, 103, 186, 255
	0.5	2000	ML4647	5513/012	36, 43, 56, 101
500V	0.1	1000	ML4648	5513/013	30, 31, 32, 34, 36, 43, 56, 91, 92, 101, 103, 186, 255
	0.20 to 0.30	1500 to 2000	ML4649 to ML4650	5513/013	30, 31, 32, 34, 36, 43, 56, 91, 92, 101, 103, 186, 255
	0.5	2000	ML4651	5513/013	36, 43, 56, 101
600V	0.1	1500	ML4652	5513/013	30, 31, 32, 34, 36, 43, 56, 91, 92, 101, 103, 186, 255
	0.20 to 0.30	2000 to 3000	ML4653 to ML4654	5513/013	30, 31, 32, 34, 36, 43, 56, 91, 92, 101, 103, 186, 255
	0.5	3000	ML4655	5513/013	36, 43, 56, 101

1. Available in pill, stripline and pill-with-tabs packages.
2. Chart III(a) Category 3 (HTRB & Power Burn-In).

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Silicon Pin Diodes (Reverse Device Polarity)

Breakdown Voltage	Typical Junction Capacitance C_T (at -10V) (pF)	Typical Minority Carrier Lifetime T_L (ns)	Type No.	ESA/SCC Detail Specification No.	Package Styles
15V	0.20	10	ML4609	5513/008	30, 31, 32, 34, 36, 43, 56, 91, 92, 94, 95, 96, 97, 101, 103, 118, 120, 128, 138, 148, 186, 255, 275, 276
40V	0.10 to 0.20 0.20	20 20	ML4611P to ML4612P ML4613	5513/020 5513/008	As Above.
70V	0.10 to 0.20 0.20	60 60	ML4614P to ML4615P ML4616	5513/020 5513/008	As Above.
100V	0.10 to 0.30 0.20 to 0.30	120 120	ML4617P to ML4619P ML4620 to ML4621	5513/002 5513/011	As Above.
150V	0.10 to 0.30 0.20 to 0.30	250 250	ML4622P to ML4624P ML4625 to ML4626	5513/018 5513/011	As Above.
200V	0.10 to 0.30 0.20 to 0.30	400 400	ML4627P to ML4629P ML4630 to ML4631	5513/019 5513/003	As Above.

1. Available in pill, stripline and pill-with-tabs packages.
2. Chart III(a) Category 3 (HTRB & Power Burn-In).

Silicon Pin Diodes – Glass Encapsulated

Breakdown Voltage	Typical Junction Capacitance C_j (at -10V) (pF)	Typical Minority Carrier Lifetime T_L (ns)	Type No.	ESA/SCC Detail Specification No.	Package Styles
35V	0.10 to 1.05	150	ML4603 to ML4605	5513/004	54
100V	0.10 to 1.05	350	ML4606 to ML4608	5513/004	54

Chart III(a) Category 3 (HTRB & Power Burn-In).

Silicon Pin Diodes Broadband

Breakdown Voltage	Typical Insertion Loss (dB)	Typical Isolation (dB)	Typical Minority Carrier Lifetime T_L (ns)	Type No.	ESA/SCC Detail Specification No.
15V	1.0	25	15	ML4660*	5513/005
40V	0.5	25	25	ML4661 ML4661P ML4662	5513/005 5513/016 5513/016
70V	0.5	25	80	ML4663 ML4663P ML4664	5513/005 5513/016 5513/016
100V	0.5	25	150	ML4665 ML4665P ML4666	5513/005 5513/016 5513/016
150V	0.5	25	250	ML4667 ML4667P ML4668	5513/005 5513/016 5513/016
200V	0.7	25	400	ML4669 ML4669P ML4670	5513/005 5513/016 5513/016
300V to 600V	0.7 to 1.0	25	600 to 2400	ML4671 to ML4674	5513/005

1. Frequency range 0.1 to 12 GHz.
2. Available in stripline and module packages (case styles 116 & 144).
3. Chart III(a) Category 3 (HTRB & Power Burn-In).

* Extended frequency range 0.1 to 18 GHz.

Silicon Schottky Mixer Diodes (Medium Barrier)

Test Frequency	Maximum Total Capacitance C_T (at 0V) (pF) (ODS 119)	Maximum Noise Figure N.F. (dB)	Type No.	ESA/SCC Detail Specification No.	Package Styles
3.000 GHz	0.77	7.0 to 6.0	ML40019 to ML40021	5513/006	118, 119, 120, 148, 186, 255, 275, 276
9.375 GHz	0.42	6.5 to 7.5	ML40150 to ML40152	5513/006	As Above.
16.000 GHz	0.37	7.0 to 7.5	ML40160 to ML40161	5513/006	As Above.

1. Available in pill, stripline and pill-with-tabs packages.
2. Chart III(a) Category 3 (HTRB & Power Burn-in).

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GaAs Schottky Mixer Diodes

Test Frequency	Maximum Total Capacitance C_T (at 0V) (pF) (ODS 119)	Noise Figure N.F. (dB) Typ Max	Type No.	ESA/SCC Detail Specification No.	Package Styles
9.375 GHz	0.31	5.0 to 6.5	ML40461	5513/021	118, 119, 120, 148, 186, 255, 275, 276
16.000 GHz	0.31	5.5 to 7.0	ML40462	5513/021	As Above.
24.000 GHz	0.29	6.5 to 7.5	ML40463	5513/021	As Above.
36.000 GHz	0.28	7.0 to 7.5	ML40464	5513/021	As Above.

1. Available in pill, stripline and pill-with-tabs packages.
2. Chart III(a) Category 3 (HTRB & Power Burn-In).

Silicon Limiter Diodes

Breakdown Voltage	Typical Junction Capacitance C_j (at 0V) (pF)	Typical Minority Carrier Lifetime T_L (ns)	Type No.	ESA/SCC Detail Specification No.	Package Styles
15V	0.30 0.2 0.10	15 15 10	ML4202 ML4204 ML4206	5513/001 5513/001 5513/001	30, 31, 32, 34, 36, 43, 56, 91, 92, 94, 95, 96, 97, 101, 103, 118, 120, 128, 138, 148, 186, 255, 275, 276
50V	0.30 to 0.10	20 to 15	ML4207 to ML4209	5513/007	As Above.

1. Available in pill, stripline and pill-with-tabs packages.
2. Chart III(a) Category 3 (HTRB & Power Burn-In).