SILICON SINGLE DRIFT IMPATT DIODES

The ML 4700 Series of single drift silicon impatt diodes are specifically designed for use as fundamental frequency (direct dc to RF conversion) microwave oscillators and amplifiers in the frequency range 5-35GHz.

The devices feature a P+NN+ silicon mesa construction on an integral plated heat sink. (PHS). When reverse biased into avalanche breakdown, electrons generated in the avalanche zone travel across the drift region and are collected at the N+ contact. The resultant phase delay between voltage and current produces negative resistance at microwave frequencies. The low thermal resistance PHS construction gives maximum DC power dissipation capability and hence high RF output powers. Diodes operating at frequencies higher than 35GHz are available on request.

SPECIFICATIONS @ +25°C

Type Number	Frequency Range (GHz)	CW Power Output (mW)		Efficiency (%)		Thermal Resistance (°/W)		Case Style
		Typ.	Min.	Typ.	Min.	Typ.	Max.	
ML4703	5 - 8	750	600	7.0	6.0	14	16	30
ML4704	8 - 10	750	600	7.0	6.0	10	18	30
ML4705	10 - 12	700	550	6.0	5.0	10	18	30
ML4706	12 - 14	450	400	5.0	4.0	20	23	30
ML4707	14 - 17	300	250	4.0	3.0	23	25	30
ML4708	17 - 20	250	200	4.0	3.0	25	30	118
ML4709	20 - 24	250	200	4.0	3.0	25	30	118
ML4710	24 - 28	250	200	4.0	3.0	28	30	118
ML4711	28 - 32	250	200	4.0	3.0	32	35	118
ML4712	32 - 36	200	150	4.0	3.0	40	45	118
ML4703S	5 - 8	1000	900	6.5	5.5	10	12	30
ML4704S	8 - 10	900	800	6.5	5.5	11	13	30
ML4705S	10 - 12	900	800	6.5	5.5	12	14	30
ML4803	5 - 8	1600	1500	6.5	6.0	6	7	101
ML4804	8 - 10	1300	1200	6.5	6.0	7.5	8.5	101

Type Number	Breakdown Voltage (V) Typ.	Junction Capacitance (pF) Typ.	Operating Voltage (V) Typ.	Operating Current (mA) Typ.
ML4703	100	0.60	120	90
ML4704	82	0.50	100	105
ML4705	70	0.50	90	110
ML4706	60	0.45	80	110
ML4707	45	0.40	55	13
ML4708	42	0.30	48	130
ML4709	35	0.30	40	160
ML4710	32	0.30	38	160
ML4711	28	0.25	34	170
ML4712	24	0.25	30	170
ML4703S	100	1.10	125	125
ML4704S	82	1.00	105	140
ML4705S	70	0.80	92	160
ML4803	100	1.40	135	180
ML4804	82	1.00	110	190

NOTES

1. Efficiency = $\frac{RF\ Power\ Out}{DC\ Power\ In} x1$
2. Thermal Resistance (Junction to Case). Change in breakdown voltage is directly proportional to the rise in junction temperature for junction temperatures between 25°C and 100C. Using the Haitz method (♦) thermal resistance is calculated from measurements of this change and of the power dissipated in the junction.
3. Alternative case styles are available on request.
4. Reverse breakdown voltage, measured at I_R= 10μA.
5. Junction capacitance, measured at 1.0MHz at (VB -1) volts.
6. A current stabilised power supply is recommended.

♦ *R.H. Haitz et al. "a method for heat flow resistance measurements in avalanche diodes". I.E.E.E. TRANS Electron Devices ED-16 P438 May 1969.*