

1N4614 thru 1N4627
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MOTOROLA

**1N4678
thru
1N4717**

**ZENER REGULATOR
DIODES**

250 MILLIWATTS

ZENER REGULATOR DIODES

Low level nitride passivated zener diodes for applications requiring extremely low operating currents, low leakage, and sharp break-down voltage.

- Zener Voltage Specified @ $I_{ZT} = 50 \mu A$
- Maximum Delta V_Z Given from 10 to 100 μA

ABSOLUTE MAXIMUM RATINGS

Rating	Symbol	Value	Unit
DC Power Dissipation @ $T_A = 50^\circ C$ Derate above $T_A = 50^\circ C$	P_D	250 1.67	mW mW/ $^\circ C$
Operating and Storage Junction Temperature Range	T_J, T_{stg}	-65 to +175	$^\circ C$

MECHANICAL CHARACTERISTICS

CASE: Hermetically sealed all glass case.

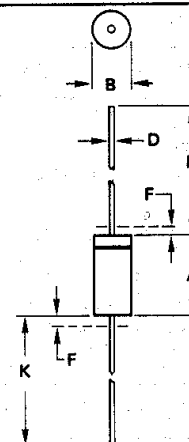
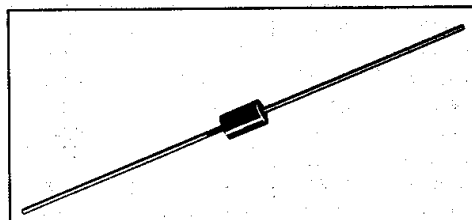
DIMENSIONS: See outline drawing.

FINISH: All external surfaces are corrosion resistant with readily solderable leads.

POLARITY: Cathode end indicated by color band. When operated in zener region, the cathode end will be positive with respect to anode end.

WEIGHT: 0.2 grams (approx.)

MOUNTING POSITION: Any.



NOTES:

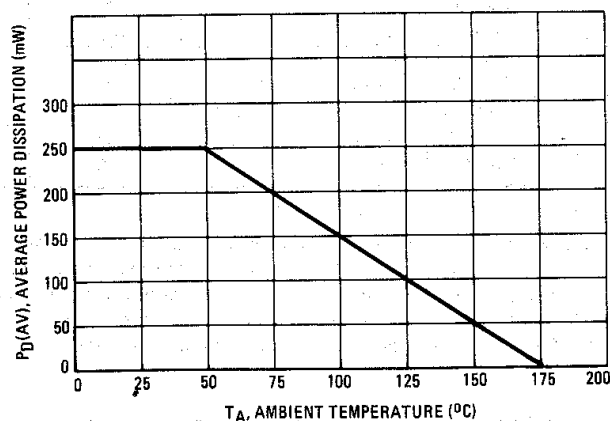
1. PACKAGE CONTOUR OPTIONAL WITHIN A AND B. HEAT SLUGS, IF ANY, SHALL BE INCLUDED WITHIN THIS CYLINDER, BUT NOT SUBJECT TO THE MINIMUM LIMIT OF B.
2. LEAD DIAMETER NOT CONTROLLED IN ZONE F TO ALLOW FOR FLASH, LEAD FINISH BUILDUP AND MINOR IRREGULARITIES OTHER THAN HEAT SLUGS.
3. POLARITY DENOTED BY CATHODE BAND.
4. DIMENSIONING AND TOLERANCING PER ANSI Y14.5, 1973.

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	3.05	5.08	0.120	0.200
B	1.52	2.29	0.060	0.090
D	0.46	0.56	0.018	0.022
F	—	1.27	—	0.050
K	25.40	38.10	1.000	1.500

All JEDEC dimensions and notes apply.

**CASE 299-02
DO-204 AH**

FIGURE 1 — POWER TEMPERATURE DERATING CURVE



1N4678 thru 1N4717

ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$, $V_F = 1.5\text{ V}$ max at $I_F = 100\text{ mA}$ for all types)

Type Number (Note 1)	Zener Voltage V_Z @ $I_{ZT} = 50\text{ }\mu\text{A}$ Volts			Maximum Reverse Current $I_R\text{ }\mu\text{A}$ (Note 3)	Test Voltage $V_R\text{ Volts}$ (Note 3)	Maximum Zener Current $I_{ZM}\text{ mA}$ (Note 2)	Maximum Voltage Change $\Delta V_Z\text{ Volts}$ (Note 4)
	Nom (Note 1)	Min	Max				
1N4678	1.8	1.710	1.890	7.5	1.0	120	0.70
1N4679	2.0	1.900	2.100	5.0	1.0	110	0.70
1N4680	2.2	2.090	2.310	4.0	1.0	100	0.75
1N4681	2.4	2.280	2.520	2.0	1.0	95	0.80
1N4682	2.7	2.565	2.835	1.0	1.0	90	0.85
1N4683	3.0	2.850	3.150	0.8	1.0	85	0.90
1N4684	3.3	3.135	3.465	7.5	1.5	80	0.95
1N4685	3.6	3.420	3.780	7.5	2.0	75	0.95
1N4686	3.9	3.705	4.095	5.0	2.0	70	0.97
1N4687	4.3	4.085	4.515	4.0	2.0	65	0.99
1N4688	4.7	4.465	4.935	10	3.0	60	0.99
1N4689	5.1	4.845	5.355	10	3.0	55	0.97
1N4690	5.6	5.320	5.880	10	4.0	50	0.96
1N4691	6.2	5.890	6.510	10	5.0	45	0.95
1N4692	6.8	6.460	7.140	10	5.1	35	0.90
1N4693	7.5	7.125	7.875	10	5.7	31.8	0.75
1N4694	8.2	7.790	8.610	1.0	6.2	29.0	0.50
1N4695	8.7	8.265	9.135	1.0	6.6	27.4	0.10
1N4696	9.1	8.645	9.555	1.0	6.9	26.2	0.08
1N4697	10	9.500	10.50	1.0	7.6	24.8	0.10
1N4698	11	10.45	11.55	0.05	8.4	21.6	0.11
1N4699	12	11.40	12.60	0.05	9.1	20.4	0.12
1N4700	13	12.35	13.65	0.05	9.8	19.0	0.13
1N4701	14	13.30	14.70	0.05	10.6	17.5	0.14
1N4702	15	14.25	15.75	0.05	11.4	16.3	0.15
1N4703	16	15.20	16.80	0.05	12.1	15.4	0.16
1N4704	17	16.15	17.85	0.05	12.9	14.5	0.17
1N4705	18	17.10	18.90	0.05	13.6	13.2	0.18
1N4706	19	18.05	19.95	0.05	14.4	12.5	0.19
1N4707	20	19.00	21.00	0.01	15.2	11.9	0.20
1N4708	22	20.90	23.10	0.01	16.7	10.8	0.22
1N4709	24	22.80	25.20	0.01	18.2	9.9	0.24
1N4710	25	23.75	26.25	0.01	19.0	9.5	0.25
1N4711	27	25.65	28.35	0.01	20.4	8.8	0.27
1N4712	28	26.60	29.40	0.01	21.2	8.5	0.28
1N4713	30	28.50	31.50	0.01	22.8	7.9	0.30
1N4714	33	31.35	34.65	0.01	25.0	7.2	0.33
1N4715	36	34.20	37.80	0.01	27.3	6.6	0.36
1N4716	39	37.05	40.95	0.01	29.6	6.1	0.39
1N4717	43	40.85	45.15	0.01	32.6	5.5	0.43

NOTES: 1. TOLERANCE AND VOLTAGE DESIGNATION (V_Z)

The type numbers shown have a standard tolerance of $\pm 5\%$ on the nominal Zener voltage.

2. MAXIMUM ZENER CURRENT RATINGS (I_{ZM})

Maximum Zener current ratings are based on maximum Zener voltage of the individual units.

3. REVERSE LEAKAGE CURRENT (I_R)

Reverse leakage currents are guaranteed and measured at V_R as shown on the table.

4. MAXIMUM VOLTAGE CHANGE (ΔV_Z)

Voltage change is equal to the difference between V_Z at $100\text{ }\mu\text{A}$ and V_Z at $10\text{ }\mu\text{A}$.