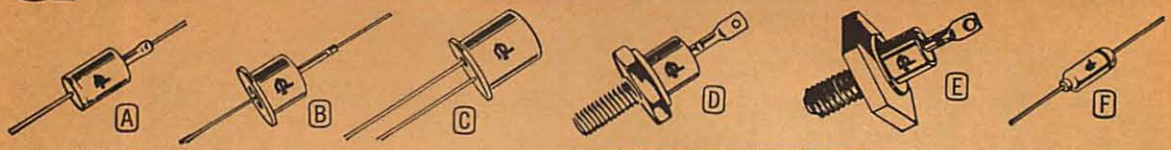

SILICON ZENER DIODES

Zener diodes cover a range of 6.8 to 200 volts with voltage drop essentially independent of current over a wide range. Effective in regulating DC voltages, low impedance DC level changing, biasless clamping, clipping, limiting and surge protection. All units contain single p-n junctions formed by controlled diffusion at 1300° C of phosphorous into boron-doped silicon. All units hermetically sealed. Junctions are biased in reverse direction in normal usage, cathode positive and anode negative. **Polarity:** Standard polarity, cathode connected to case; 10-watt and 50-watt types have anode connected to stud for negative ground use, and are available with reverse polarity (cathode to stud) by adding suffix **R** to part number. **Tolerance:** Dickson units available in 5, 10 and 20% tolerance. See footnotes for ordering information. **Temperature Range:** −65° C to +175° C, junction and storage.

¾-WATT (FIG. A)

Dickson Number ‡	Nom Zener Volts*	I_{zt} Ma
¾Z6.8D	6.8	37
¾Z7.5D	7.5	34
¾Z8.2D	8.2	31
¾Z9.1D	9.1	28
¾Z10D	10	25
¾Z11D	11	23
¾Z12D	12	21
¾Z13D	13	19
¾Z14D	14	18
¾Z15D	15	17
¾Z16D	16	15.5
¾Z17D	17	14.5
¾Z18D	18	14
¾Z19D	19	13
¾Z20D	20	12.5
¾Z22D	22	11.5
¾Z24D	24	10.5
¾Z25D	25	10
¾Z27D	27	9.5
¾Z30D	30	8.5
¾Z33D	33	7.5
¾Z36D	36	7
¾Z39D	39	6.5
¾Z43D	43	6
¾Z45D	45	5.5
¾Z47D	47	5.5
¾Z50D	50	5
¾Z51D	51	5
¾Z52D	52	5
¾Z56D	56	4.5
¾Z62D	62	4
¾Z68D	68	3.7
¾Z75D	75	3.3
¾Z82D	82	3
¾Z91D	91	2.8
¾Z100D	100	2.5
¾Z105D	105	2.5
¾Z110D	110	2.3
¾Z120D	120	2
¾Z130D	130	1.9
¾Z140D	140	1.8
¾Z150D	150	1.7
¾Z160D	160	1.6
¾Z175D	175	1.4
¾Z180D	180	1.4
¾Z200D	200	1.2

1-WATT (FIG. B)

1Z6.8D	6.8	37
1Z7.5D	7.5	34
1Z8.2D	8.2	31
1Z9.1D	9.1	28
1Z10D	10	25
1Z11D	11	23
1Z12D	12	21
1Z13D	13	19
1Z14D	14	18
1Z15D	15	17
1Z16D	16	15.5
1Z17D	17	14.5
1Z18D	18	14
1Z19D	19	13
1Z20D	20	12.5
1Z22D	22	11.5
1Z24D	24	10.5
1Z25D	25	10
1Z27D	27	9.5
1Z30D	30	8.5
1Z33D	33	7.5
1Z36D	36	7
1Z39D	39	6.5
1Z43D	43	6
1Z45D	45	5.5
1Z47D	47	5.5
1Z50D	50	5
1Z51D	51	5
1Z52D	52	5
1Z56D	56	4.5
1Z62D	62	4
1Z68D	68	3.7
1Z75D	75	3.3
1Z82D	82	3
1Z91D	91	2.8
1Z100D	100	2.5
1Z105D	105	2.5
1Z110D	110	2.3
1Z120D	120	2
1Z130D	130	1.9
1Z140D	140	1.8
1Z150D	150	1.7
1Z160D	160	1.6
1Z175D	175	1.4
1Z180D	180	1.4
1Z200D	200	1.2

1-WATT (FIG. A)

JEDEC Number †	Nom. Zener Volts*	I_{zt} Ma
1N1767	6.8	100
1N1768	7.5	100
1N1769	8.2	100
1N1770	9.1	50
1N1771	10	50
1N1772	11	50
1N1773	12	50
1N1774	13	50
1N1775	15	50
1N1776	16	50
1N1777	18	50
1N1778	20	15
1N1779	22	15
1N1780	24	15
1N1781	27	15
1N1782	30	15
1N1783	33	15
1N1784	36	15
1N1785	39	15
1N1786	43	15
1N1787	47	15
1N1788	51	15
1N1789	56	15
1N1790	62	5
1N1791	68	5
1N1792	75	5
1N1793	82	5
1N1794	91	5
1N1795	100	5
1N1796	110	5
1N1797	120	5
1N1798	130	5
1N1799	150	5
1N1800	160	5
1N1801	180	5
1N1802	200	5

1-WATT (FIG. A)

JEDEC Number †	Nom. Zener Volts*	I_{zt} Ma
1N3016	6.8	37
1N3017	7.5	34
1N3018	8.2	31
1N3019	9.1	28
1N3020	10	25
1N3021	11	23
1N3022	12	21
1N3023	13	19
1N3024	15	17
1N3025	16	15.5
1N3026	18	14
1N3027	20	12.5
1N3028	22	11.5
1N3029	24	10.5
1N3030	27	9.5
1N3031	30	8.5
1N3032	33	7.5
1N3033	36	7
1N3034	39	6.5
1N3035	43	6
1N3036	47	5.5
1N3037	51	5
1N3038	56	4.5
1N3039	62	4
1N3040	68	3.7
1N3041	75	3.3
1N3042	82	3
1N3043	91	2.8
1N3044	100	2.5
1N3045	110	2.3
1N3046	120	2
1N3047	130	1.9
1N3048	150	1.7
1N3049	160	1.6
1N3050	180	1.4
1N3051	200	1.2

1.5-WATT (FIG. C)

Dickson Number ‡	Nom. Zener Volts*	I_{zt} Ma
1.5Z6.8D	6.8	55
1.5Z7.5D	7.5	50
1.5Z8.2D	8.2	46
1.5Z9.1D	9.1	41
1.5Z10D	10	37
1.5Z11D	11	34
1.5Z12D	12	31
1.5Z13D	13	29
1.5Z14D	14	26
1.5Z15D	15	25
1.5Z16D	16	23
1.5Z17D	17	22
1.5Z18D	18	21
1.5Z19D	19	20
1.5Z20D	20	19
1.5Z22D	22	17
1.5Z24D	24	16
1.5Z25D	25	15
1.5Z27D	27	14
1.5Z30D	30	12
1.5Z33D	33	11
1.5Z36D	36	10
1.5Z39D	39	10
1.5Z43D	43	9
1.5Z45D	45	8.5
1.5Z47D	47	8
1.5Z50D	50	7.5
1.5Z51D	51	7.3
1.5Z52D	52	7.2
1.5Z56D	56	6.7
1.5Z62D	62	6
1.5Z68D	68	5.5
1.5Z75D	75	5
1.5Z82D	82	4.5
1.5Z91D	91	4.1
1.5Z100D	100	3.7
1.5Z105D	105	3.5
1.5Z110D	110	3.4
1.5Z120D	120	3.1
1.5Z130D	130	2.9
1.5Z140D	140	2.7
1.5Z150D	150	2.5
1.5Z160D	160	2.3
1.5Z175D	175	2.1
1.5Z180D	180	2.1
1.5Z200D	200	1.9

3.5-WATT (FIG. D)

JEDEC Number #	Nom. Zener Volts*	I_{zt} Ma
1N1591	6.8	100
1N1592	8.2	80
1N1593	10	70
1N1594	12	50
1N1595	15	40
1N1596	18	35
1N1597	22	30
1N1598	27	25

10-WATT (FIG. D)

JEDEC Number #	Zener Volts E_z (at I_{zt}) Min.	Max.	I_{zt} Amps
1N2043	6.2	8	1.0
1N2044	7.5	10	1.0
1N2045	9	12	.5
1N2046	11	14.5	.5
1N2047	13.5	18	.5
1N2048	17	21	.5
1N2049	20	27	.15

10-WATT (FIG. D)

JEDEC Number #	Nom. Zener Volts*	I_{zt} Ma
1N1602	6.8	300
1N1603	8.2	250
1N1604	10	200
1N1605	12	170
1N1606	15	140
1N1607	18	110
1N1608	22	90
1N1609	27	70
1N1805	6.8	1000
1N1806	7.5	1000
1N1807	8.2	1000
1N1808	9.1	500
1N1351	10	500
1N1352	11	500
1N1353	12	500
1N1354	13	500
1N1355	15	500
1N1356	16	500
1N1357	18	150
1N1358	20	150
1N1359	22	150
1N1360	24	150
1N1361	27	150
1N1362	30	150
1N1363	33	150
1N1364	36	150
1N1365	39	150
1N1366	43	150
1N1367	47	150
1N1368	51	150
1N1369	56	150
1N1370	62	50
1N1371	68	50
1N1372	75	50
1N1373	82	50
1N1374	91	50
1N1375	100	50
1N1809	110	50
1N1810	120	50
1N1811	130	50
1N1812	150	50
1N1813	160	50
1N1814	180	50
1N1815	200	50
1N2498	10	500
1N2499	11	500
1N2500	12	500
1N1816	13	500
1N1817	15	500
1N1818	16	500
1N1819	18	500
1N1820	20	250
1N1821	22	250
1N1822	24	250
1N1823	27	250
1N1824	30	250
1N1825	33	150
1N1826	36	150
1N1827	39	150
1N1828	43	150
1N1829	47	150
1N1830	51	150
1N1831	56	150
1N1832	62	50
1N1833	68	50
1N1834	75	50
1N1835	82	50
1N1836	91	50
1N2008	100	50
1N2009	110	50
1N2010	120	50
1N2011	130	50
1N2012	150	50

*Zener voltage at test current (I_{zt}) shown. †No suffix indicates 20% tolerance. For 10% tolerance add suffix **A** to number shown (example: 1N2970A); for 5% tolerance, add suffix **B** to number. ‡Number as shown indicates 20% tolerance. For 10% tolerance, add suffix **10** to number (example: ¾Z19D**10**); for 5% tolerance, add suffix **5** to number. #No suffix denotes 10% tolerance, suffix **A** denotes 5% tolerance.

SEE FOLLOWING PAGE FOR COMPLETE PRICING INFORMATION

SILICON ZENER DIODES (CONTINUED)

10-WATT (FIG. D)

JEDEC Number†	Dickson Number 10Z-‡	Nom. Zener Volts*	I_{zt} Ma
1N2970	6.8D	6.8	370
1N2971	7.5D	7.5	335
1N2972	8.2D	8.2	305
1N2973	9.1D	9.1	275
1N2974	10D	10	250
1N2975	11D	11	230
1N2976	12D	12	210
1N2977	13D	13	190
1N2978	14D	14	180
1N2979	15D	15	170
1N2980	16D	16	155
1N2981	17D	17	145
1N2982	18D	18	140
1N2983	19D	19	130
1N2984	20D	20	125
1N2985	22D	22	115
1N2986	24D	24	105
1N2987	25D	25	100
1N2988	27D	27	95
1N2989	30D	30	85
1N2990	33D	33	75
1N2991	36D	36	70
1N2992	39D	39	65
1N2993	43D	43	60
1N2994	45D	45	55
1N2995	47D	47	55
1N2996	50D	50	50
1N2997	51D	51	50
1N2998	52D	52	50
1N2999	56D	56	45
1N3000	62D	62	40
1N3001	68D	68	37
1N3002	75D	75	33
1N3003	82D	82	30
1N3004	91D	91	28
1N3005	100D	100	25
1N3006	105D	105	25
1N3007	110D	110	23
1N3008	120D	120	20
1N3009	130D	130	19
1N3010	140D	140	18
1N3011	150D	150	17
1N3012	160D	160	16
1N3013	175D	175	14
1N3014	180D	180	14
1N3015	200D	200	12

50-WATT (FIG. E)

JEDEC Number†	Dickson Number 50SZ-‡	Nom. Zener Volts*	I_{zt} Ma
1N3305	6.8D	6.8	1850
1N3306	7.5D	7.5	1700
1N3307	8.2D	8.2	1500
1N3308	9.1D	9.1	1370
1N3309	10D	10	1200
1N3310	11D	11	1100
1N3311	12D	12	1000
1N3312	13D	13	960
1N3313	14D	14	890
1N3314	15D	15	830
1N3315	16D	16	780
1N3316	17D	17	740
1N3317	18D	18	700
1N3318	19D	19	660
1N3319	20D	20	630
1N3320	22D	22	570
1N3321	24D	24	520
1N3322	25D	25	500
1N3323	27D	27	460
1N3324	30D	30	420
1N3325	33D	33	380
1N3326	36D	36	350
1N3327	39D	39	320
1N3328	43D	43	290
1N3329	45D	45	280
1N3330	47D	47	270
1N3331	50D	50	250
1N3332	51D	51	245
1N3333	52D	52	240
1N3334	56D	56	220
1N3335	62D	62	200
1N3336	68D	68	180
1N3337	75D	75	170
1N3338	82D	82	150
1N3339	91D	91	140
1N3340	100D	100	120
1N3341	105D	105	120
1N3342	110D	110	110
1N3343	120D	120	100
1N3344	130D	130	95
1N3345	140D	140	90
1N3346	150D	150	85
1N3347	160D	160	80
1N3348	175D	175	70
1N3349	180D	180	68
1N3350	200D	200	65

*At I_{zt} shown. †No suffix indicates 20% tolerance. Add suffix **A** for 10% tolerance; suffix **B** for 5% tol. ‡No suffix indicates 20% tolerance. Add suffix **10** for 10% tolerance; **5** for 5% tolerance.

TEMPERATURE-COMPENSATED ZENER REFERENCE DIODES

Diffused junction, temperature compensated Zener diodes intended for industrial and military applications. Hermetically sealed and designed to meet or exceed military requirements mechanically and environmentally. External surfaces are corrosion resistant.

9.0-VOLT (FIG. F)

Rated 9.0 volts ±5% at 7.5 ma. Max. impedance, 20 ohms.

JEDEC Number*	Volt./Temp. Coefficient %/° C	Net Each, Lots of 1-24	25-99	100-999
1N935	.01	$ 3.45	$ 3.00	$ 2.60
1N935A	.01	3.80	3.35	2.90
1N935B	.01	4.40	3.90	3.35
1N936	.005	3.80	3.40	3.00
1N936A	.005	4.45	4.20	3.65
1N936B	.005	5.25	4.85	4.20
1N937	.002	6.55	6.05	5.25
1N937A	.002	7.20	6.55	5.70
1N937B	.002	8.00	7.35	6.40
1N938	.001	7.60	7.00	6.10
1N938A	.001	8.60	7.90	6.85
1N938B	.001	11.60	10.65	9.25
1N939	.0005	17.60	16.20	14.10
1N939A	.0005	24.25	22.30	19.40
1N939B	.0005	27.00	24.85	21.60

9.3-VOLT (FIG. A)

Rated 9.3 volts ±5% at 10 ma. Max. impedance, 15 ohms.

JEDEC Number*	Volt./Temp. Coefficient %/° C	Net Each, Lots of 1-24	25-99	100-999
1N2620	.01	$ 3.80	$ 3.55	$ 3.05
1N2620A	.01	4.05	3.75	3.25
1N2620B	.01	4.55	4.20	3.65
1N2621	.005	4.30	3.95	3.45
1N2621A	.005	5.20	4.80	4.15
1N2621B	.005	6.30	5.85	5.05
1N2622	.002	7.15	6.55	5.70
1N2622A	.002	7.65	7.05	6.10
1N2622B	.002	8.75	8.05	7.00
1N2623	.001	8.40	7.60	6.60
1N2623A	.001	9.45	8.70	7.55
1N2623B	.001	12.70	11.65	10.15
1N2624	.0005	20.70	19.00	16.55
1N2624A	.0005	27.05	24.90	21.65
1N2624B	.0005	36.20	33.30	28.95

11.7-VOLT (FIG. F)

Rated 11.7 volts ±5% at 7.5 ma. Max. impedance, 30 ohms.

JEDEC Number*	Volt./Temp. Coefficient %/° C	Net Each, Lots of 1-24	25-99	100-999
1N941	.01	$ 4.55	$ 4.20	$ 3.65
1N941A	.01	4.95	4.55	3.95
1N941B	.01	5.65	5.20	4.55
1N942	.005	5.00	4.60	4.00
1N942A	.005	5.95	5.50	4.75
1N942B	.005	6.90	6.35	5.50
1N943	.002	8.55	7.85	6.85
1N943A	.002	9.30	8.55	7.45
1N943B	.002	10.45	9.60	8.35
1N944	.001	9.90	9.10	7.90
1N944A	.001	11.25	10.35	9.00
1N944B	.001	14.95	13.75	11.95
1N945	.0005	23.00	21.15	18.40
1N945A	.0005	31.35	28.85	25.10
1N945B	.0005	35.20	32.45	28.20

11.7-VOLT (FIG. A)

Rated 11.7 volts ±5% at 7.5 ma. Max. impedance, 25 ohms.

JEDEC Number*	Dickson Number ¾T-	V./T. Coef. %/° C	Net Each, Lots of 1-24	25-99	100-999
1N3580	100A11.7	.01	$4.60	$4.20	$3.65
1N3580A	100B11.7	.01	4.90	4.50	3.90
1N3580B	100C11.7	.01	5.65	5.20	4.50
1N3581	50A11.7	.005	5.20	4.80	4.15
1N3581A	50B11.7	.005	6.10	5.60	4.85
1N3581B	50C11.7	.005	7.30	6.70	5.80
1N3582	20A11.7	.002	8.45	7.75	6.70
1N3582A	20B11.7	.002	9.20	8.45	7.35
1N3582B	20C11.7	.002	10.20	9.40	8.20
1N3583	10A11.7	.001	10.20	9.40	8.20
1N3583A	10B11.7	.001	11.10	10.20	8.85
1N3583B	10C11.7	.001	14.75	13.55	11.75
1N3584	5A11.7	.0005	23.75	21.85	19.00
1N3584A	5B11.7	.0005	30.85	28.35	24.65
1N3584B	5C11.7	.0005	34.60	31.80	27.65

Temp. Range: *No suffix, 0 to +75° C; suffix **A**, −55° to +100° C; suffix **B**, −55° to +150° C; †9 to +70° C; ‡−55° to +125° C; §−55° to +185° C.

9.4-VOLT (FIG. A)

Rated 9.4 volts ±5% at 10 ma. Max. impedance, 15 ohms.

JEDEC Number	Volt./Temp. Coefficient %/° C	Net Each, Lots of 1-24	25-99	100-999
1N2163†	.005	$3.60	$3.40	$2.90
1N2163A†	.005	5.00	4.80	4.00
1N2164‡	.005	4.80	4.60	3.85
1N2164A‡	.005	5.80	5.50	4.60
1N2165§	.005	7.20	6.60	5.75
1N2165A§	.005	10.70	9.80	8.50
1N2166†	.001	7.00	6.75	5.60
1N2166A†	.001	8.40	8.05	6.70
1N2167‡	.001	8.80	8.40	7.00
1N2167A‡	.001	11.20	10.75	8.95
1N2168§	.001	15.00	13.80	12.00
1N2168A§	.001	18.50	17.00	14.75
1N2169†	.0005	20.70	19.20	16.55
1N2169A†	.0005	26.00	24.80	20.00
1N2170‡	.0005	25.00	23.45	19.50
1N2170A‡	.0005	37.50	35.50	29.75
1N2171§	.0005	34.95	33.40	28.00
1N2171A§	.0005	44.95	43.60	36.00

NET PRICES

JEDEC or Dickson Number	Net Each, Lots of 1-24	25-99	100-999
1N1351 thru 1N1375	$4.95	$4.70	$3.85
1N1351A thru 1N1375A	5.95	4.95	4.15
1N1591 thru 1N1598	3.50	3.50	2.85
1N1591A thru 1N1598A	4.20	4.20	3.65
1N1602 thru 1N1609	6.15	6.15	4.90
1N1602A thru 1N1609A	7.70	7.70	6.40
1N1767 thru 1N1781	2.65	2.65	2.10
1N1767A thru 1N1781A	3.00	3.00	2.35
1N1782 thru 1N1799	3.00	3.00	2.30
1N1782A thru 1N1799A	3.95	3.95	2.95
1N1800 thru 1N1802	4.85	4.85	3.85
1N1800A thru 1N1802A	7.15	7.15	5.85
1N1805 thru 1N1812	5.10	4.85	3.90
1N1805A thru 1N1812A	6.05	5.60	4.20
1N1813 thru 1N1815	7.45	6.85	5.15
1N1813A thru 1N1815A	12.20	11.90	10.05
1N1816 thru 1N1836	5.60	5.10	4.50
1N1816A thru 1N1836A	7.05	6.50	5.65
1N2008 thru 1N2012	5.05	4.70	3.90
1N2008A thru 1N2012A	5.65	5.10	4.25
1N2043 thru 1N2049	5.20	5.20	4.40
1N2043A thru 1N2049A	7.15	6.55	5.70
1N2498 thru 1N2500	5.10	5.10	3.90
1N2498A thru 1N2500A	6.10	6.10	4.25
1N2970 thru 1N3011	5.15	4.70	4.10
1N2970A thru 1N3011A	5.70	5.05	4.40
1N2970B thru 1N3011B	7.10	6.30	5.50
1N3012 thru 1N3015	5.65	5.15	4.50
1N3012A thru 1N3015A	8.45	7.75	6.75
1N3012B thru 1N3015B	13.00	11.90	10.35
1N3016 thru 1N3044	2.60	2.45	2.15
1N3016A thru 1N3044A	3.00	2.75	2.40
1N3016B thru 1N3044B	3.55	3.20	2.80
1N3045 thru 1N3051	2.75	2.55	2.20
1N3045A thru 1N3051A	3.25	2.80	2.45
1N3045B thru 1N3051B	4.35	4.05	3.50
1N3305 thru 1N3331	5.75	5.25	4.55
1N3332 thru 1N3340	5.40	5.25	4.55
1N3305A thru 1N3340A	7.10	6.90	6.00
1N3305B thru 1N3340B	10.15	9.95	8.65
1N3341 thru 1N3350	6.05	5.85	5.10
1N3341A thru 1N3350A	9.50	9.25	8.50
1N3341B thru 1N3350B	15.00	14.50	13.50
¾Z6.8D thru 150D	2.60	2.45	2.15
¾Z6.8D10 thru 150D10	3.00	2.75	2.40
¾Z6.8D5 thru 150D5	3.55	3.20	2.80
¾Z160D thru 200D	2.75	2.55	2.20
¾Z160D10 thru 200D10	3.25	2.80	2.45
¾Z160D5 thru 200D5	4.35	4.05	3.50
1Z6.8D thru 33D	2.90	2.65	2.30
1Z6.8D10 thru 33D10	3.00	2.80	2.45
1Z6.8D5 thru 33D5	3.70	3.40	2.95
1Z36D thru 150D	3.25	3.00	2.60
1Z36D10 thru 150D10	3.55	3.25	2.80
1Z36D5 thru 150D5	5.25	4.85	4.20
1Z160D thru 200D	4.25	3.90	3.40
1Z160D10 thru 200D10	5.55	5.10	4.45
1Z160D5 thru 200D5	8.20	7.55	6.55
1.5Z6.8D thru 150D	3.50	3.20	2.80
1.5Z6.8D10 thru 150D10	5.00	4.60	4.00
1.5Z6.8D5 thru 150D5	6.55	6.00	5.25
1.5Z160D thru 200D	4.45	4.10	3.55
1.5Z160D10 thru 200D10	6.65	6.10	5.30
1.5Z160D5 thru 200D5	8.25	7.60	6.60
10Z6.8D thru 150D	5.15	4.70	4.10
10Z6.8D10 thru 150D10	5.70	5.05	4.40
10Z6.8D5 thru 150D5	7.10	6.30	5.50
10Z160D thru 200D	5.65	5.15	4.50
10Z160D10 thru 200D10	8.45	7.75	6.75
10Z160D5 thru 200D5	13.00	11.90	10.35
50SZ6.8D thru 50D	5.75	5.25	4.55
50SZ6.8D10 thru 50D10	7.10	6.90	6.00
50SZ6.8D5 thru 50D5	10.15	9.95	8.65
50SZ51D thru 100D	5.40	5.25	4.55
50SZ51D10 thru 100D10	7.10	6.90	6.00
50SZ51D5 thru 100D5	10.15	9.95	8.65
50SZ105D thru 200D	6.05	5.85	5.10
50SZ105D10 thru 200D10	9.50	9.25	8.50
50SZ105D5 thru 200D5	15.00	14.50	13.50