

T-11-13

1 W SILICON ZENER DIODES

1N4728 through 1N4752

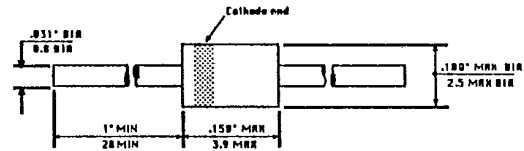
ABSOLUTE MAXIMUM RATINGS

Temperatures

Storage Temperature Range -65 °C to +200 °C
 Maximum Junction Operating Temperature +175 °C
 Lead Temperature +260 °C

Power Dissipation

Maximum Total Power Dissipation at 25°C Ambient 500mW
 Linear Power Derating Factor 3.33 mW/°C



DO-41 PACKAGE

ELECTRICAL CHARACTERISTICS (25 °C Ambient Temperature unless otherwise noted)

SYMBOL	V_z	Z_z	I_{zT}	Z_{zK}	I_{zK}	I_R	V_{RT}	I_{zK}	I_z (surge)
Characteristics	Nominal Zener Voltage @ I_{zT} (See note)	Max Zener Imped. @ I_{zT}	Test Current	Max. Zener Imped. @ I_{zK}	Test Current	Max. Reverse Current @ V_{RT}	Test Voltage	Max. Zener Current	Max. Zener Surge Current
UNIT	V	Ω	mA	Ω	mA	μ A	V	mA	mA
1N4728	3.3	10.0	76.0	400	1.0	100	1.0	276	1380
1N4729	3.6	10.0	69.0	400	1.0	100	1.0	252	1260
1N4730	3.9	9.0	64.0	400	1.0	50	1.0	234	1190
1N4731	4.3	9.0	58.0	400	1.0	10	1.0	217	1070
1N4732	4.7	8.0	53.0	500	1.0	10	1.0	193	970
1N4733	5.1	7.0	49.0	550	1.0	10	1.0	178	89
1N4734	5.6	5.0	45.0	600	1.0	10	2.0	162	810
1N4735	6.2	2.0	41.0	700	1.0	10	3.0	146	730
1N4736	6.8	3.5	37.0	700	1.0	10	4.0	133	660
1N4737	7.5	4.0	34.0	700	0.5	10	5.0	121	605
1N4738	8.2	4.5	31.0	700	0.5	10	6.0	110	550
1N4739	9.1	5.0	28.0	700	0.5	10	7.0	100	500
1N4740	10.0	7.0	25.0	700	0.25	10	7.6	91	454
1N4741	11.0	8.0	23.0	700	0.25	5.0	8.4	83	41
1N4742	12.0	9.0	21.0	700	0.25	5.0	9.1	76	380
1N4743	13.0	10.0	19.0	700	0.25	5.0	9.9	69	344
1N4744	15.0	14.0	17.0	700	0.25	5.0	11.4	61	304
1N4745	16.0	16.0	15.5	700	0.25	5.0	12.2	57	285
1N4746	18.0	20.0	14.0	750	0.25	5.0	13.7	50	250
1N4747	20.0	22.0	12.5	750	0.25	5.0	15.2	45	225
1N4748	22.0	23.0	11.5	750	0.25	5.0	16.7	41	205
1N4749	24.0	25.0	10.5	750	0.25	5.0	18.2	38	190
1N4750	27.0	35.0	9.5	750	0.25	5.0	20.6	34	170
1N4751	30.0	40.0	8.5	1000	0.25	5.0	22.8	30	150
1N4752	33.0	45.0	7.5	1000	0.25	5.0	25.1	27	135

NOTE:

Type numbers without suffix have $\pm 10\%$ tolerance on nominal V_z .
 Type numbers with suffix 'A' have $\pm 5\%$ tolerance on nominal V_z .

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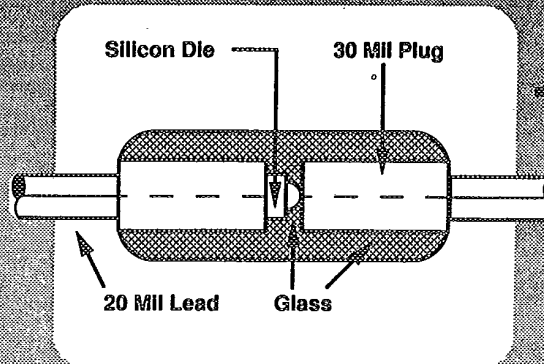
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State-of-the-Art

VOIDLESS

Construction

NEW!



Zener Diodes
1N750A-1
thru
1N759A-1

FEATURES

- Voidless construction
- Thermally-matched
- Metallurgically bonded
- No PIND test required
- DO-35 package
- The ultimate in reliability

RELIABILITY DATA

- Capable of passing thermal shock -196° C to +150° C (liquid to liquid)
- Capable of passing 2000 cycles of temperature cycling -65° C to +175° C
- Solder plate surpasses requirements of MIL-STD 202, Method 208 8 hour Steam Age Test.

SPECIAL FEATURES

- Available to Source Control Drawings
- Processing available to JAN, JANTX, JANTXV and JAN S Quality Levels

MAXIMUM RATINGS

Power Dissipation at +50 °C Ambient:
Operations (Op) & Storage (Sstg) Temperatures: -65 °C to +200 °C (ambient)

400mW

Izsm (surge):
Vz:

See Izsm column below
See Vz-Nom column below

TYPICAL ELECTRICAL CHARACTERISTICS

WITH TEST CONDITIONS & LIMITS (All limits at maximum unless otherwise specified)

Type	Tests: Cond: Ta Symbols	Vz-Nom Iz = 20 mA 25° C Volts	Reverse Current			Tc 7.5 mA 25° C & 100° C		Zz Iz @ 20 mA Slg @ 2 mA Ohms	Izsm mA
			VR 25° C Volts	IR1 25° C µA	IR2 150° C µA	- %/C	+ %/C		
1N750A-1		4.7	1.5	5	50	.043	.025	16	980
1N751A-1		5.1	2.0	5	50	.030	.030	14	960
1N752A-1		5.6	2.5	5	50	.028	.036	8	950
1N753A-1		6.2	3.5	5	50	0	.045	3	910
1N754A-1		6.8	4.0	2	50	0	.050	3	870
1N755A-1		7.5	5.0	2	50	0	.058	4	810
1N756A-1		8.2	6.0	1	50	0	.062	5	740
1N757A-1		9.1	7.0	1	50	0	.068	6	650
1N758A-1		10	8.0	1	50	0	.075	7	540
1N759A-1		12	9.0	1	50	0	.080	10	400

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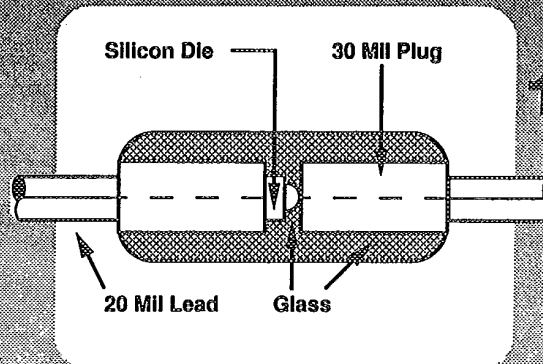
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VOIDLESS

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Zener Diodes
1N962B-1
thru
1N973B-1

FEATURES

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RELIABILITY DATA

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- Capable of passing 2000 cycles of temperature cycling -65° C to +175° C
- Solder plate surpasses requirements of MIL-STD 202, Method 208 8 hour Steam Age Test.

SPECIAL FEATURES

- Available to Source Control Drawings
- Processing available to JAN, JANTX, JANTXV and JAN S Quality Levels

MAXIMUM RATINGS

DC Power Dissipation at +50 °C Ambient:
Operations (Op) & Storage (Tstg):

400mW
-65 °C to +200 °C (ambient)

Izsm (surge):
Vz:

See Izsm column below
See Vz-Nom column below

TYPICAL ELECTRICAL CHARACTERISTICS

WITH TEST CONDITIONS & LIMITS (All limits at maximum unless otherwise specified)

Type	Tests: Cond: Ta Symbols	Vz		Reverse Current Limits			Zz @IZ1* 25° C Ohms	Zzk @250 μA* 25° C Ohms	Tc 7.5 mA 25° C & 100° C + %/C	Izsm 100° C mA
		IZ1 25° C mA	Vz-Nom 25° C Vdc	VR 25° C Vdc	25° C μA	150° C μA				
1N962B-1		11.5	11	8.4	2.5	10	9.5	700	.073	175
1N963B-1		10.5	12	9.1	2.5	10	11.5	700	.076	160
1N964B-1		9.5	13	9.9	2.5	10	13	700	.079	150
1N965B-1		8.5	15	11	2.5	10	16	700	.082	130
1N966B-1		7.8	16	12	2.5	10	17	700	.083	120
1N967B-1		7.0	18	14	2.5	10	21	750	.085	110
1N968B-1		6.2	20	15	2.5	10	25	750	.086	100
1N969B-1		5.6	22	17	2.5	10	29	750	.087	90
1N970B-1		5.2	24	18	2.5	10	33	750	.088	80
1N971B-1		4.6	27	21	2.5	10	41	750	.090	70
1N972B-1		4.2	30	23	2.5	10	49	1000	.091	65
1N973B-1		3.8	33	25	2.5	10	58	1000	.092	60

* (Sig) = 10% of IZ1, & 25 μA for ZZK

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BKC INTERNATIONAL ELECTRONICS, INC.

6 LAKE STREET, LAWRENCE, MA 01841

TEL. (508) 681-0392

TYPE

1N5231A & 1N5231B

(DO-35)

MAXIMUM RATINGS.

DC POWER DISSIPATION @ TL = +75C, LEAD LENGTH = 3/8": 500mW

OPERATING & STORAGE JUNCTION TEMPERATURE RANGE: -65C TO +200C

ELECTRICAL CHARACTERISTICS

VZ	IR	IR	ZZT	ZZK	VF	TC
20mA	1.9V	2V	250uA	250uA	100mA	7.5mA
25C	25C	25C	25C	25C	25C	25/125C
Volts	uA	uA	OHMS	OHMS	mA	%/C
5.1	5	5	30	1500	1.0V	+/-0.030
NOMINAL	1N5231A	1N5231B				

400mW SILICON LINEAR DIODES

T-11-09

1N746 through 1N759

ABSOLUTE MAXIMUM RATINGS

Temperatures

Storage Temperature Range
Maximum Junction Operating Temperature
Lead Temperature

-65 °C to +200 °C
+175 °C
+260 °C

Power Dissipation

Maximum Total Power Dissipation at 25 °C Ambient
Linear Power Derating Factor (from 25 °C)

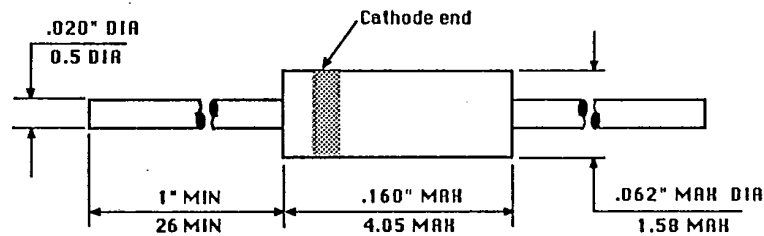
500mW
3.33 mW/ °C

ELECTRICAL CHARACTERISTICS (25 °C Ambient Temperature unless otherwise noted)

SYMBOL	Z_z	V_z	I_R		TC
			Maximum Reverse Current ($V_R = 1.0$ V)		
Characteristic	Maximum Zener Impedance ($I_z = 20$ mA)	Nominal Zener Voltage (See note) ($I_z = 20$ mA)	@ 25 °C	@ 150 °C	Typical Temperature Coefficient of V_z
			UNIT	UNIT	
	Ω	V	μ A	μ A	% / °C
1N746	28.0	3.3	10.0	30.0	- 0.070
1N747	24.0	3.6	10.0	30.0	- 0.065
1N748	23.0	3.9	10.0	30.0	- 0.060
1N749	22.0	4.3	2.0	30.0	- 0.055
1N750	19.0	4.7	2.0	30.0	- 0.043
1N751	17.0	5.1	1.0	20.0	\pm 0.030
1N752	11.0	5.6	1.0	20.0	\pm 0.028
1N753	7.0	6.2	0.1	20.0	+ 0.045
1N754	5.0	6.8	0.1	20.0	+ 0.050
1N755	6.0	7.5	0.1	20.0	+ 0.058
1N756	8.0	8.2	0.1	20.0	+ 0.062
1N757	10.0	9.1	0.1	20.0	+ 0.068
1N758	17.0	10.0	0.1	20.0	+ 0.075
1N759	30.0	12.0	0.1	20.0	+ 0.077

NOTE:

Type numbers without suffix have \pm 10 % tolerance on nominal V_z .
Type numbers with suffix 'A' have \pm 5 % tolerance on nominal V_z .



DO-35 PACKAGE

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SPEC. NO: IN4444
 REVISION: C
 Page: 1

MATERIAL
 *DO-35, SILICON DIODE, TYPE 4148, PC 20a WITH SOLDER PLATED LEADS.

*INDICATES WHERE CHANGES FROM PREVIOUS ISSUE WERE MADE.
 +INDICATES WHERE ADDITIONS FROM PREVIOUS ISSUE WERE MADE.
 PROCESS TIME

CUSTOMER COMMERCIAL	CUSTOMER PART NO. IN4444	CSD JEDEC REL #4728A	REV -	DATE 12/19/66
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TEST/CONDITIONS

INITIAL ELECTRICAL TESTS
 *PIV @ 100uA
 *IR1 @ 50V
 *IR2 @ 50V
 VF1 @ 100uA
 *VF2 @ 1mA
 *VF3 @ 10mA
 *VF4 @ 100mA
 *VF5 @ 200mA-SEE NOTE 1
 *C @ 0V, f= 1 MHz
 +QS @ 10mA
 *Trr @ SEE NOTE 2

QCA ELECTRICAL INSPECTION
 *SAME AS INITIAL ELECTRICAL

THERMAL STRESS
 *PROPRIETARY

MARKING REQUIREMENTS
 *SEE BELOW

QC MECHANICAL INSPECTION

PACKAGING REQUIREMENTS
 *SEE OPEN ORDER REPORT

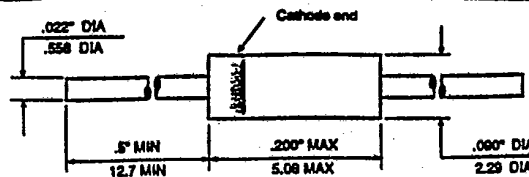
QC ELECTRICAL INSPECTION
 *SAME AS INITIAL ELECTRICAL

SHIPPING REQUIREMENTS
 *SEE OPEN ORDER REPORT

CUSTOMER	TA	NOTE	MATERIAL FLOW
70V Min	25C		001 INITIAL ELECTRICAL TESTS
50nA	25C		002 QCA ELECTRICAL INSPECTION
50uA	150C		003 THERMAL STRESS
.440V-.550V	25C		004 MARKING REQUIREMENTS
.560V-.680V	25C		005 QC MECHANICAL INSPECTION
.690V-.820V	25C		006 PACKAGING REQUIREMENTS
.850V-1.0V	25C		007 QC ELECTRICAL INSPECTION
N/A	25C		008 SHIPPING REQUIREMENTS
2.0Pf	25C		
N/A	25C		
7.0nS @ 1.0mA	25C		
N/A	25/150C		
N/A	25/150C		

**JEDEC
 DO-35
 PACKAGE**

in
mm



MARKING:
 *BLACK CATHODE BAND
 & BLACK DIGITAL PRINT.

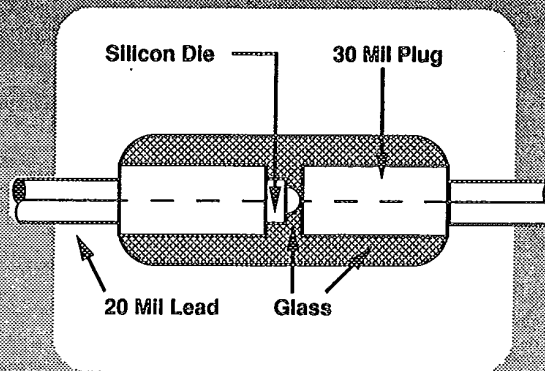
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8004-9188

State-of-the-Art

VOIDLESS
Construction

NEW!



Silicon Diodes
1N5194
1N5195
1N5196

FEATURES

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RELIABILITY DATA

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SPECIAL FEATURES

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MAXIMUM RATINGS

Type	Peak Inverse Voltage	Working Inverse Voltage	Average Rectified Current	Continuous Forward Current	Peak Surge Current 1/120 Sec	Max Power Dissipation	Operations & Storage Temperature
1N5194	80 Vpk	70 Vdc	200 mA	650 mA	2 A	500 mW	-65° C to +200° C
1N5195	200 Vpk	180 Vdc	200 mA	650 mA	2 A	500 mW	-65° C to +200° C
1N5196	250 Vpk	225 Vdc	50 mA	650 mA	2 A	500 mW	-65° C to +200° C

TYPICAL ELECTRICAL CHARACTERISTICS (Temperature @ 25° C unless otherwise specified)

Type	IR1	IR2	IR3 @ 150° C	VF
1N5194	70 V	80 V	70 V	100 mA
1N5195	180 V	200 V	180 V	100 mA
1N5196	225 V	250 V	225 V	100 mA
	nA	µA	µA	Vdc
	25	100	5.0	1.0

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