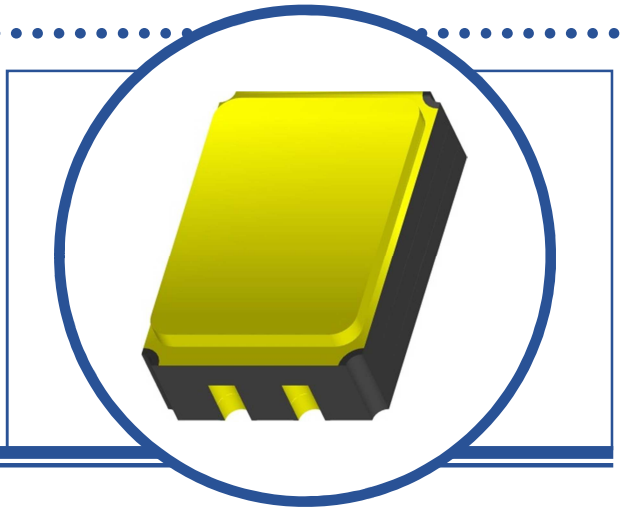
500mW ZENER DIODES

1N5221B TO 1N5261B LCC3

- LCC3 Hermetic Ceramic Surface Mount Package
- Extensive Voltage Selection (2.4V – 47V)
- Standard Zener Voltage Tolerance of ±5% (B Suffix)
- Regulation Over a Large Operating Current & Temperature Range
- High-Reliability Screening Options Available



ABSOLUTE MAXIMUM RATINGS (T_A = 25° C unless otherwise stated)

V_{ZM}	Reference Voltage	See Reference Table
I_{ZM}	Continuous DC Current	See Reference Table
P_T	Total Power Dissipation at T_A = 25° C	500mW
T_J	Junction Temperature Range	-55 to +175° C
T_{STG}	Storage Temperature Range	-65 to +175° C
T_{SP}	Maximum Soldering Pad Temperature for 20s	260° C

THERMAL PROPERTIES

Symbol	Parameter	Max	Units
$R_{\theta JA}$	Thermal Resistance Junction to Ambient	300	° C/W

SERIES ELECTRICAL CHARACTERISTICS (T_A = 25° C unless otherwise)

Symbol	Parameter	Test Conditions	Max	Units
V_F	Forward Voltage	I_F = 200mA	1.5	V

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ELECTRICAL CHARACTERISTICS (T_A = 25° C unless otherwise stated)

P/N	Nominal Zener Voltage	Test Current	Maximum Zener Impedance(1)		Maximum Reverse Leakage Current		Maximum Zener Voltage Coefficient(2)
	V_Z @ I_{ZT}	I_{ZT}	Z_{ZT} @ I_{ZT}	Z_{ZK} @ I_{ZK} = 250µA	I_R	@V_R	αV_Z
	V	mA	Ω		µA	V	%/°C
1N5221	2.4	20	30	1200	100	1.0	–0.085
1N5222	2.5	20	30	1250	100		–0.085
1N5223	2.7	20	30	1300	75		–0.080
1N5224	2.8	20	30	1400	75		–0.080
1N5225	3.0	20	29	1600	50		–0.075
1N5226	3.3	20	28	1600	25		–0.070
1N5227	3.6	20	24	1700	15		–0.065
1N5228	3.9	20	23	1900	10		–0.060
1N5229	4.3	20	22	2000	5.0		±0.055
1N5230	4.7	20	19	1900	5.0	2.0	±0.030
1N5231	5.1	20	17	1600	5.0		±0.030
1N5232	5.6	20	11	1600	5.0	3.0	+0.038
1N5233	6.0	20	7.0	1600	5.0	3.5	+0.038
1N5234	6.2	20	7.0	1000	5.0	4.0	+0.045
1N5235	6.8	20	5.0	750	3.0	5.0	+0.050
1N5236	7.5	20	6.0	500	3.0	6.0	+0.058
1N5237	8.2	20	8.0	500	3.0	6.5	+0.062
1N5238	8.7	20	8.0	600	3.0	6.5	+0.065
1N5239	9.1	20	10	600	3.0	7.0	+0.068
1N5240	10	20	17	600	3.0	8.0	+0.075
1N5241	11	20	22	600	2.0	8.4	+0.076
1N5242	12	20	30	600	1.0	9.1	+0.077
1N5243	13	9.5	13	600	0.5	9.9	+0.079
1N5244	14	9.0	15	600	0.1	10	+0.082
1N5245	15	8.5	16	600	0.1	11	+0.082
1N5246	16	7.8	17	600	0.1	12	+0.083
1N5247	17	7.4	19	600	0.1	13	+0.084
1N5248	18	7.0	21	600	0.1	14	+0.085
1N5249	19	6.6	23	600	0.1	14	+0.086
1N5250	20	6.2	25	600	0.1	15	+0.086
1N5251	22	5.6	29	600	0.1	17	+0.087
1N5252	24	5.2	33	600	0.1	18	+0.088
1N5253	25	5.0	35	600	0.1	19	+0.089
1N5254	27	4.6	41	600	0.1	21	+0.090
1N5255	28	4.5	44	600	0.1	21	+0.091
1N5256	30	4.2	49	600	0.1	23	+0.091
1N5257	33	3.8	58	700	0.1	25	+0.092
1N5258	36	3.4	70	700	0.1	27	+0.093
1N5259	39	3.2	80	800	0.1	30	+0.094
1N5260	43	3.0	93	900	0.1	33	+0.095
1N5261	47	2.7	105	1000	0.1	36	+0.095

Notes: 1) Zener Impedance is measured to ensure a sharp knee characteristic on the breakdown curve. Z_{ZT} is specified at the test current and Z_{ZK} is specified near the knee. The given DC operating current (where $I_Z = I_{ZT}$ or I_{ZK} as specified above) is modulated 10% pk-pk at 1KHz (ΔI_Z) and is forced between the anode and cathode. The resulting modulated Zener voltage (ΔV_Z) is then measured and the Zener impedance (Z_Z) is then calculated by $Z_Z = \Delta V_Z / \Delta I_Z$ (where $Z_Z = Z_{ZT}$ or Z_{ZK} as specified above).

2) Temperature Coefficient test conditions:

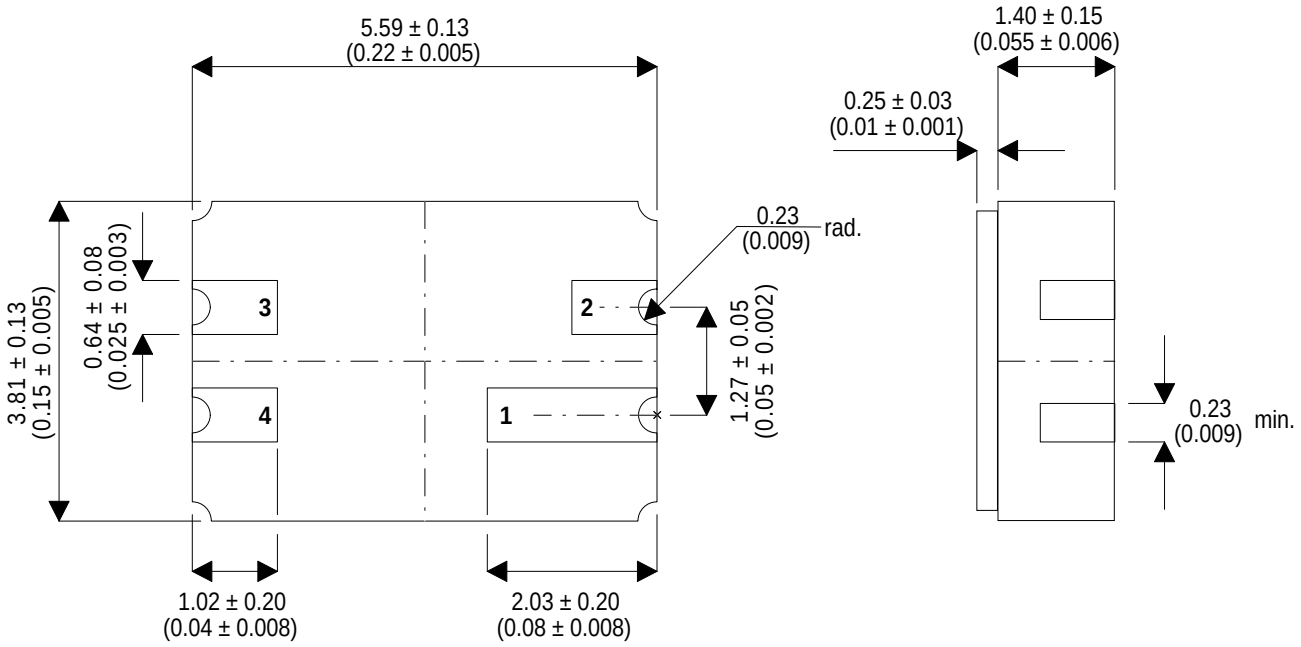
a. I_{ZT} = 7.5mA , T_1 = 25°C, T_2 = 125°C (1N5221 through to 1N5242)

b. I_{ZT} = Rated I_{ZT}, T_1 = 25°C, T_2 = 125°C (1N5243 through to 1N5261)

DUT temperature stabilised with constant current for αV_Z measurement @ T_1,T_2

MECHANICAL DATA

Dimensions in mm (inches)



LCC3 (MO-041BA, UA)

PAD 1 – CATHODE PAD 3 – N/C
PAD 2 – N/C PAD 4 – ANODE

Pad metallisation typically 100µ inches Au over 50-250µ inches Ni

SCREENING OPTIONS

Space Level (JQRS/ESA) and High Reliability options are available in accordance with the High Reliability and Screening Options Handbook available for download from the from the TT electronics Semelab web site.

ESA Quality Level Products are based on the testing procedures specified in the generic ESCC 5000 and in the corresponding part detail specifications.

Semelabs QR216 and QR217 processing specifications (JQRS), in conjunction with the companies ISO 9001:2000 approval present a viable alternative to the American MIL-PRF-19500 space level processing.

QR217 (Space Level Quality Conformance) is based on the quality conformance inspection requirements of MIL-PRF-19500 groups A (table V), B (table VIa), C (table VII) and also ESA / ESCC 5000 (chart F4) lot validation tests.

QR216 (Space Level Screening) is based on the screening requirements of MIL-PRF-19500 (table IV) and also ESA /ESCC 5000 (chart F3).

JQRS parts are processed to the device data sheet and screened to QR216 with conformance testing to Q217 groups A and B in accordance with MIL-STD-750 methods and procedures.

Additional conformance options are available, for example Pre-Cap Visual Inspection, Buy-Off Visit or Data Packs. These are chargeable and must be specified at the order stage (See Ordering Information). Minimum order quantities may apply.

Alternative or additional customer specific conformance or screening requirements would be considered. Contact Semelab sales with enquires.

MARKING DETAILS

Parts are typically laser marked with up to 7 characters on two lines. High reliability screened parts have 3 lines.
Typical marking would include a pin 1 identifier, part or specification number, week of seal (High Rel) or serial number subject to available space and legibility.

Customer specific marking requirements can be arranged at the time of order.

Example Marking:

ORDERING INFORMATION

Part numbers are built up from Type, Package Variant, and screening level. The part numbers are extended to include the additional options as shown below.

Type – See Electrical Characteristics Table
Package Variant – See Mechanical Data
Screening Level – See Screening Options (ESA / JQRS)

Additional Options:

Customer Pre-Cap Visual Inspection	.CVP
Customer Buy-Off visit	.CVB
Data Pack	.DA
Solderability Samples	.SS
Scanning Electron Microscopy	.SEM
Radiography (X-ray)	.XRAY
Total Dose Radiation Test	.RAD
MIL-PRF-19500 (QR217)	
Group B charge	.GRPB
Group B destructive mechanical samples	.GBDM (12 pieces)
Group C charge	.GRPC
Group C destructive electrical samples	.GCDE (12 pieces)
Group C destructive mechanical samples	.GCDM (6 pieces)
ESA/ESCC	
Lot Validation Testing (subgroup 1) charge	.LVT1
LVT1 destructive samples (environmental)	.L1DE (15 pieces)
LVT1 destructive samples (mechanical)	.L1DM (15 pieces)
Lot Validation Testing (subgroup 2) charge	.LVT2
LVT2 endurance samples (electrical)	.L2D (15 pieces)
Lot Validation Testing (subgroup 3) charge	.LVT3
LVT3 destructive samples (mechanical)	.L3D (5 pieces)

Additional Option Notes:
1) All 'Additional Options' are chargeable and must be specified at order stage.
2) When Group B,C or LVT is required, additional electrical and mechanical destructive samples must be ordered
3) All destructive samples are marked the same as other production parts unless otherwise requested.

Example ordering information:
The following example is for the 1N5245B part with JQRS screening, additional Group C conformance testing and a Data pack.

Part Numbers:
1N5245BLCC3-JQRS (Include quantity for flight parts)
1N5245BLCC3.GRPC (chargeable conformance option)
1N5245BLCC3.GCDE (charge for destructive parts)
1N5245BLCC3.GCDM (charge for destructive parts)
1N5245BLCC3.DA (charge for Data pack)

Customers with specific requirements (e.g. marking or screening) may be supplied with a similar alternative part number (there is maximum 20 character limit to part numbers). Contact Semelab sales with enquiries.

High Reliability and Screening Options Handbook link: http://www.semelab.co.uk/pdf/misc/documents/hirel_and_screening_options.pdf