

500mW ZENER DIODE

1N6328D2A / 1N6328D2B

- Standard $\pm 5\%$ Zener Voltage Tolerance
- DLCC2 Hermetic Ceramic Package Designed as a Drop-In Replacement for "D-5A" / "A-MELF" Package
- Space Level and High-Reliability Screening Options Available



ABSOLUTE MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$ unless otherwise stated)

P_T	Total Power Dissipation at $T_A = 25^\circ\text{C}$	500mW
T_J	Junction Temperature Range	-65 to +175°C
T_{STG}	Storage Temperature Range	-65 to +175°C
T_{SP}	Maximum Soldering Pad Temperature for 20s	260°C

THERMAL PROPERTIES

Symbols	Parameters	Max.	Units
$R_{\theta JA(PCB)}$	Thermal Resistance, Junction To Ambient ⁽¹⁾	300	°C/W

(1) PCB = FR4 – 0.0625 Inch (1.59mm), 1 Layer, 1.0-Oz Cu, 0.007 Inch² (1.7mm x 2.76mm²) Pad Size, horizontal, in still air

ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$ unless otherwise stated)

Symbols	Parameters	Test Conditions	Min.	Typ	Max.	Units
V_{Z2}	Zener Voltage	$I_{Z2} = 8.5\text{mA}$	14.25	15	15.75	V
V_{Z1}		$I_{Z1} = 250\mu\text{A}$	13.8			
$V_{Z(\text{reg})}^{(2)}$	Voltage Regulation				0.70	
V_R	Reverse Voltage		11			
Z_Z	Dynamic Impedance	$I_{Z2} = 8.5\text{mA}$			10	Ω
Z_{ZK}	Dynamic Impedance	$I_{Z1} = 250\mu\text{A}$			600	
I_R	Reverse Current	$V_R = 11\text{V}$	$T_A = 25^\circ\text{C}$		0.05	μA
			$T_A = 150^\circ\text{C}$		10	
I_{ZM}	Zener Current				28	mA
I_{ZSM}	Surge Current				0.62	A
N_D	Noise Density	$I_{ZT} = 250\mu\text{A}$	1-3KHz		100	$\mu\text{V}/\sqrt{\text{Hz}}$
αV_Z	Temp Coeff. Of V_Z				+0.082	$\%/^\circ\text{C}$

DYNAMIC CHARACTERISTICS

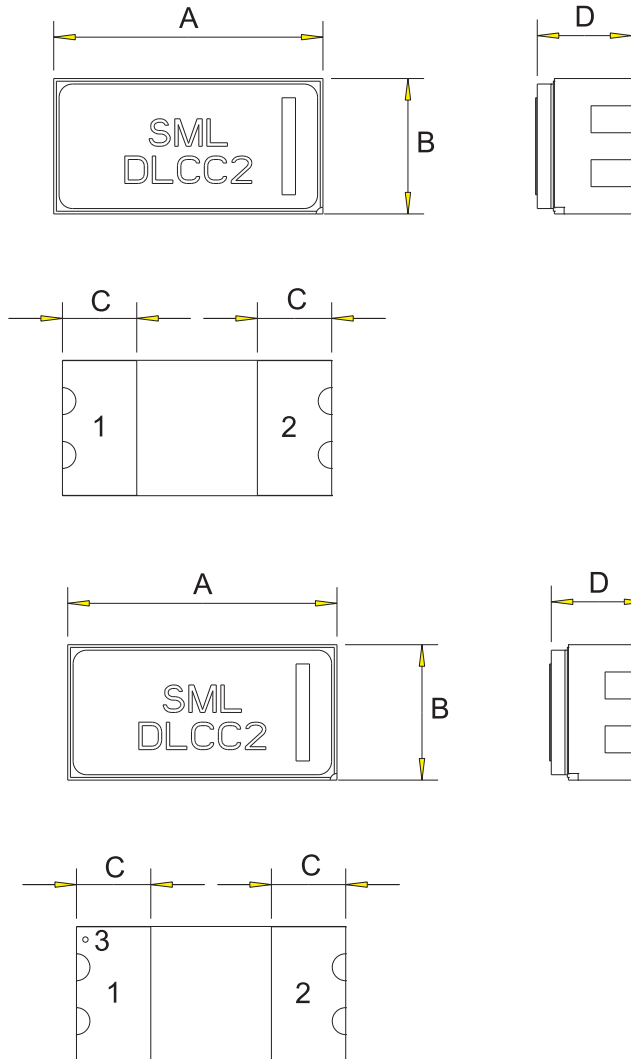
C	Capacitance	$V_R = 0\text{V}$	$f = 1.0\text{MHz}$		350	pF
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Note

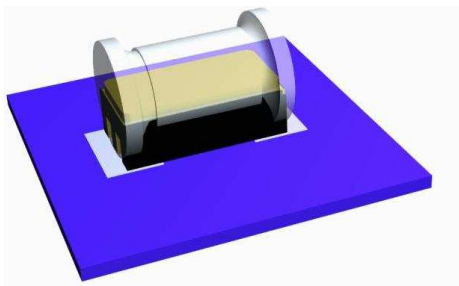
- (2) Voltage regulation $V_{Z(\text{reg})}$ is the measured voltage change at thermal equilibrium between the current of 10% and 50% of Maximum Zener current I_{ZM} when the pad temperature is maintained at $25^\circ\text{C} \pm 8^\circ\text{C}$, -2°C .

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MECHANICAL DATA



DLCC2/ D-5A MELF OVERLAY



DLCC2 Variant A (D2A)

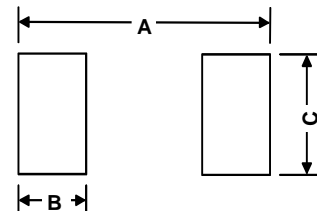
PAD 1	ANODE	
PAD 2	CATHODE	
DIMENSION	mm	Inches
A	5.00 ±0.10	0.197 ±0.004
B	2.61 ±0.10	0.103 ±0.004
C	1.08 ±0.10	0.043 ±0.004
D	1.76 ±0.10	0.069 ±0.004

DLCC2 Variant B (D2B)

PAD 1	ANODE	
PAD 2	CATHODE	
PAD 3	LID CONTACT TO ANODE*	
DIMENSION	mm	Inches
A	5.00 ±0.10	0.197 ±0.004
B	2.61 ±0.10	0.103 ±0.004
C	1.08 ±0.10	0.043 ±0.004
D	1.76 ±0.10	0.069 ±0.004

SOLDER PAD LAYOUT D-5A

DIMENSION	mm	Inches
A	6.25	0.246
B	1.70	0.067
C	2.67	0.105



* The additional contact provides a connection to the lid in the application. Connecting the metal lid to a known electrical potential stops deep dielectric discharge in space applications; see the Space Weather link www.semelab.co.uk/dlcc2.html on the Semelab web site. Package variant to be specified at order.

Other Package Outlines may be available – Contact Semelab Sales to Enquire

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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.

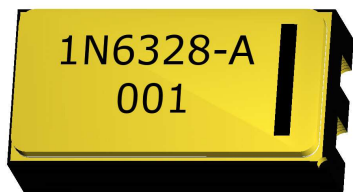
Alternative or additional customer specific conformance or screening requirements would be considered. Contact Semelab sales with enquiries.

MARKING DETAILS

Parts can be laser marked with approximately 7 characters on two lines and always includes cathode identification. Typical marking would include part or specification number, week of seal 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 Stability 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 1N6328 part with package variant A, JQRS screening, additional Group C conformance testing and a Data pack.

Part Numbers:

- 1N6328D2A-JQRS (Include quantity for flight parts)
- 1N6328D2A-JQRS.GRPC (chargeable conformance option)
- 1N6328D2A-JQRS.GCDE (charge for destructive parts)
- 1N6328D2A-JQRS.GCDM (charge for destructive parts)
- 1N6328D2A-JQRS.DA (charge for Data pack)

Customers with any 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