

# SILICON EPITAXIAL PLANAR DIODE

## 1N6642D1A

- Low Leakage
- Fast Switching
- Low Forward Voltage
- Hermetic Ceramic Package Designed as a Drop-In Replacement for "MELF-4.5 (D-5D)" / "DO-213AA" Package.
- Suitable for general purpose, switching applications.
- Space Level and High-Reliability Screening Options Available



### ABSOLUTE MAXIMUM RATINGS (T<sub>A</sub> = 25°C unless otherwise stated)

V <sub>BR</sub>	Breakdown Voltage	100V
V <sub>RWM</sub>	Working Peak Reverse Voltage	75V
I <sub>O</sub> <sup>(1)</sup>	Average Rectified Output Current, T <sub>A</sub> = 75°C	300mA
I <sub>FSM</sub>	Surge Current (half sine wave, t <sub>p</sub> = 8.3ms	2.5A
P <sub>D</sub> <sup>(1)</sup>	Total Power Dissipation at T <sub>A</sub> = 75°C	TBD
	Derate Above 75°C	TBD
P <sub>D</sub>	Total Power Dissipation at T <sub>SP</sub> = 75°C	TBD
	Derate Above 75°C	TBD
T <sub>J</sub>	Junction Temperature Range	-65 to +200°C
T <sub>stg</sub>	Storage Temperature Range	-65 to +200°C

### THERMAL PROPERTIES

Symbols	Parameters	Max.	Units
R <sub>θJA</sub> <sup>(1)</sup>	Thermal Resistance, Junction To Ambient	TBD	°C/W
R <sub>θJSP(IN)</sub>	Thermal Resistance, Junction To Solder Pads. T <sub>SP</sub> = 25°C	TBD	°C/W

#### Notes

(1) Thermal PCB rating to be determined.

‡ Recommended solder pad layout dimensions for this device, as detailed within this datasheet for the MELF-4.5 (D-5D) device.

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

Symbols	Parameters	Test Conditions	Min.	Typ	Max.	Units	
$V_{BR}$	Breakdown Voltage	$I_R = 100\mu\text{A}$	100			V	
$V_F^{(2)}$	Forward Voltage	$I_F = 10\text{mA}$			0.8		
		$I_F = 100\text{mA}$			1.2		
		$I_F = 10\text{mA}$ $T_A = 150^\circ\text{C}$			0.8		
		$I_F = 100\text{mA}$ $T_A = -55^\circ\text{C}$			1.2		
$I_R$	Reverse Current	$V_R = 20\text{V}$			25	nA	
		$V_R = 75\text{V}$			500		
		$V_R = 20\text{V}$	$T_A = 150^\circ\text{C}$			50	$\mu\text{A}$
		$V_R = 75\text{V}$				100	

**DYNAMIC CHARACTERISTICS**

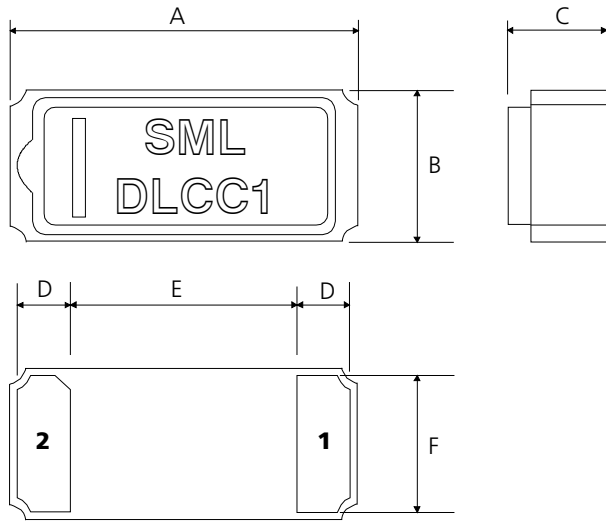
C	Capacitance	$V_R = 0\text{V}$	$f = 1.0\text{MHz}$			5	pF
		$V_R = 1.5\text{V}$				2.8	
$t_{rr}$	Reverse Recovery Time	$I_F = I_R = 10\text{mA}$ $I_{REC} = 1.0\text{mA}$	$R_L = 100\Omega$			5	ns

**Notes**

(2) Pulse Width  $\leq 300\mu\text{s}$ ,  $\delta \leq 2\%$

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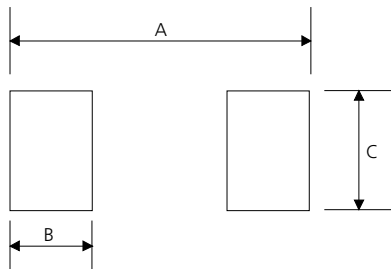
**MECHANICAL DATA**



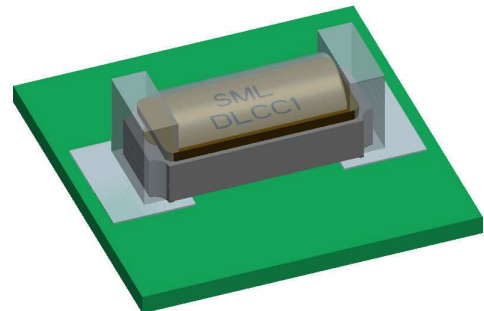
**DLCC1 Variant A (D1A)**

PAD 1	ANODE	
PAD 2	CATHODE	
DIMENSION	mm	Inches
A	4.60 ±0.20	0.181 ±0.007
B	2.00 ±0.20	0.079 ±0.007
C	1.30 ±0.20	0.051 ±0.007
D	0.70 ±0.20	0.028 ±0.007
E	3.00 ±0.20	0.118 ±0.007
F	1.80 ±0.20	0.071 ±0.007

**SOLDER PAD LAYOUT**



DIMENSION	mm	Inches
A	6.45	0.254
B	1.70	0.067
C	2.41	0.095



The physical dimensions for the DLCC1 ceramic package are designed to be different from the published dimensions for the "MELF-4.5 (D-5D)". The DLCC1 design fully utilises the recommended solder footprint for the "MELF-4.5 (D-5D)" Package, and as such presents a drop in replacement for existing board designs.

Soldering temperature should be 260°C for a maximum of 10 seconds

**PACKAGE MASS**

Gold Plated Solder Pad Finish = 40mg

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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.

Semelab's 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.

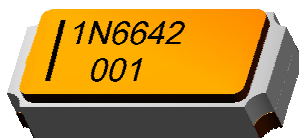
Alternative or additional customer specific conformance or screening requirements would be considered. Contact Semelab sales with enquiries.

## 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	.GCMD (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 1N6642 part with package variant A, JQRS screening, additional Group C conformance testing and a Data pack.

Part Numbers:

1N6642D1A-JQRS (Include quantity for flight parts)

1N6642D1A-JQRS.GRPC (chargeable conformance option)

1N6642D1A-JQRS.GCDE (charge for destructive parts)

1N6642D1A-JQRS.GCMD (charge for destructive parts)

1N6642D1A-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](http://www.semelab.co.uk/pdf/misc/documents/hirel_and_screening_options.pdf)