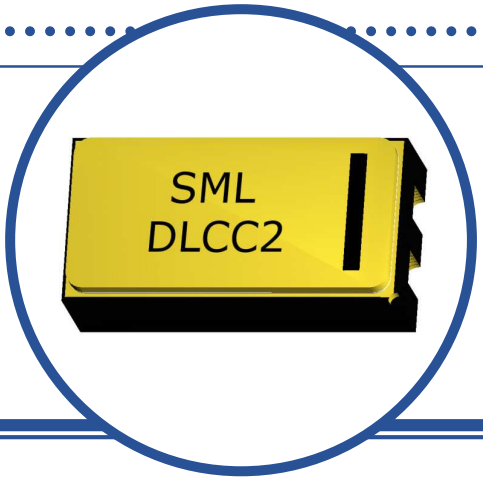
SiC SCHOTTKY DIODE

TT electronics
Semelab Limited

SML01SC06D2A/SML01SC06D2B

- Low Leakage
- Fast Switching
- Low Forward Voltage
- Hermetic Ceramic Surface Mount Package
- Suitable for general purpose, switching applications.
- Space Level and High-Reliability Screening Options Available
- Zero Equivalent Reverse Recovery



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

V_{RRM}	Repetitive Peak Reverse Voltage	600V
V_{RSM}	Surge Peak Reverse Voltage	600V
V_{DC}	DC Blocking Voltage	600V
$I_{F(AVG)}$	Average Forward Current, T_J=175°C	1A
I_{FRM}	Repetitive Peak Forward Surge Current, T_C=25°C, t_p=8.3ms, Half Sine Wave	TBC
I_{FSM}	Non-Repetitive Peak Forward Surge Current, T_C=25°C, t_p=10µs, Pulse	TBC
P_D	Total Power Dissipation at T_A = 25°C	3.81W
	Derate Above 25°C	19mW/°C
T_J	Junction Temperature Range	-55 to +225°C
T_{STG}	Storage Temperature Range	-55 to +225°C

THERMAL PROPERTIES

Symbols	Parameters	Max.	Units
$R_{\theta JSP(IN)}$	Thermal Resistance, Junction To Solder Pads T_{SP} = 25°C	52.5	°C/W
$R_{\theta JA(PCB)}$	Thermal Resistance, Junction To Ambient, On PCB	TBC	°C/W
$R_{\theta JA(PCB)}$	Thermal Resistance, Junction To Ambient, On PCB	TBC	°C/W

Semelab plc
Telephone +44 (0) 1455 556565
Email: sales@semelab-tt.com

Coventry Road, Lutterworth, Leicestershire, LE17 4JB
Fax +44 (0) 1455 552612
Website: http://www.semelab-tt.com

SEMELAB
A subsidiary of TT electronics plc.

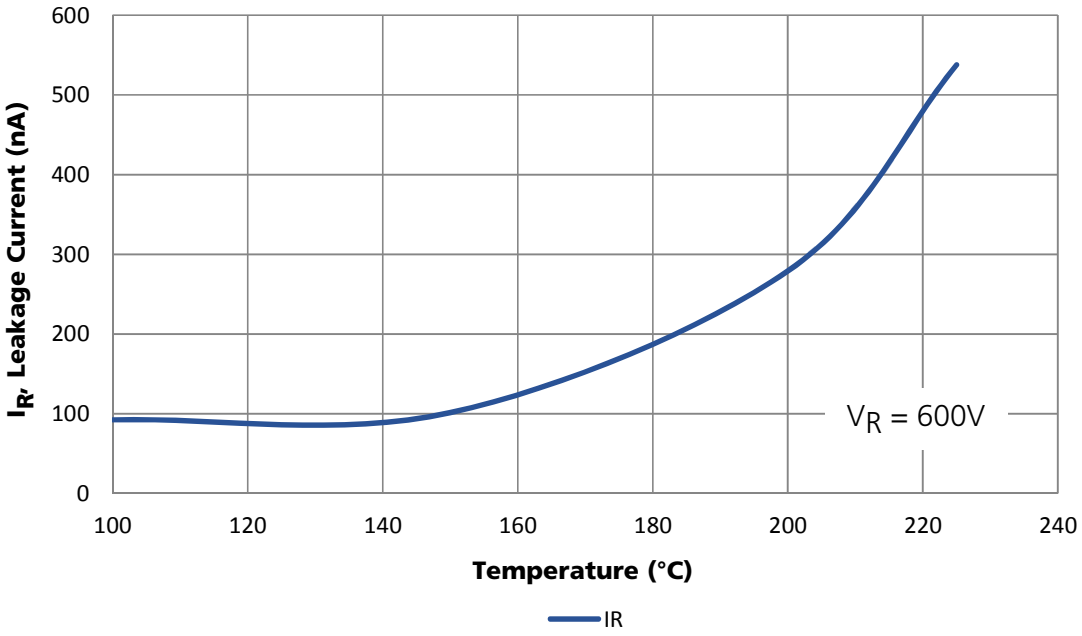
ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise stated)

Symbol	Parameters	Test Conditions		Min.	Typ.	Max.	Unit
V_F	Diode Forward Voltage	I_F = 1A	T_J = 25°C		1.45	1.8	V
		I_F = 1A	T_J = 175°C		0.9	2.4	
I_R	Leakage Current	V_R = 450V	T_J = 25°C			5	µA
		V_R = 600V	T_J = 25°C			100	
		V_R = 600V	T_J = 175°C			500	

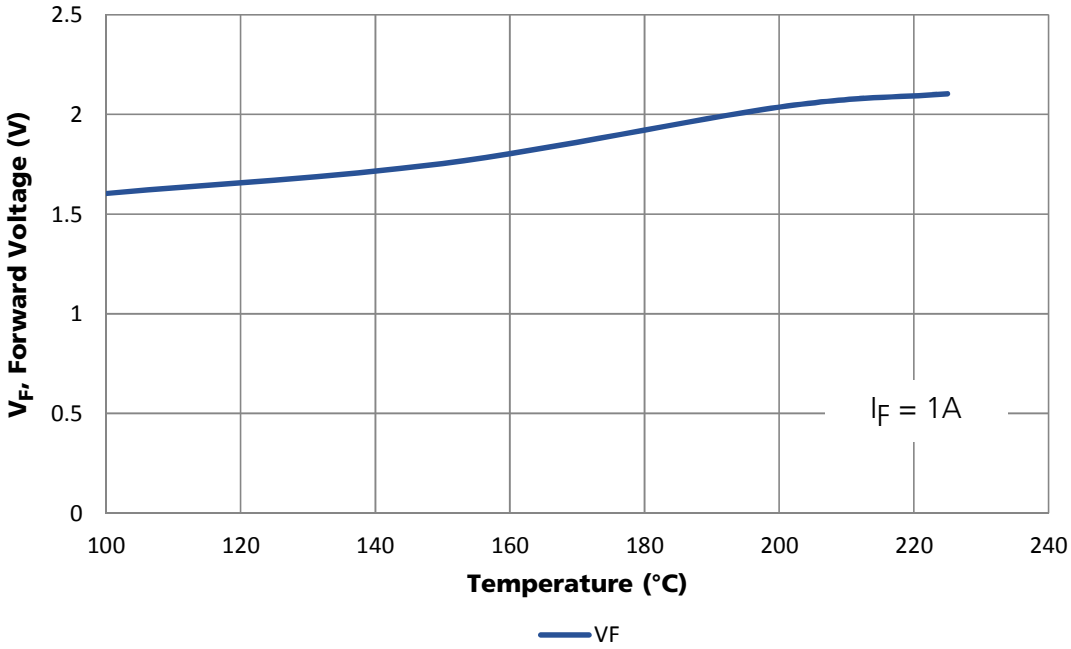
DYNAMIC CHARACTERISTICS

Q_C	Total Capacitive Charge	V_R = 500V d_i/d_t = 500A/µs	I_F = 1A T_J = 25°C		3.3		nC
C	Total Capacitance	V_R = 0V f = 1MHz	T_J = 25°C		80		pF
		V_R = 200V f = 1MHz	T_J = 25°C		11		

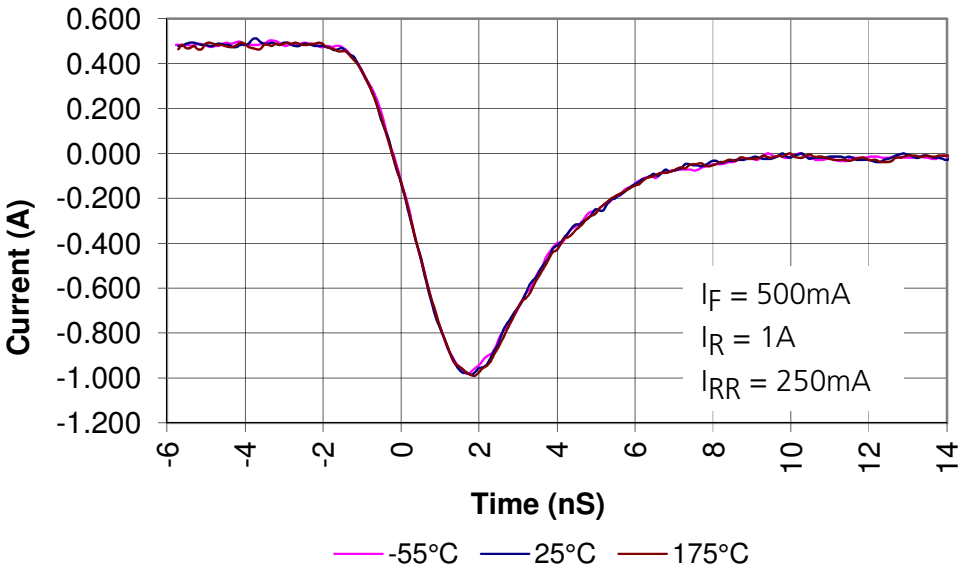
Leakage Current (I_R)



Diode Forward Voltage (V_F)



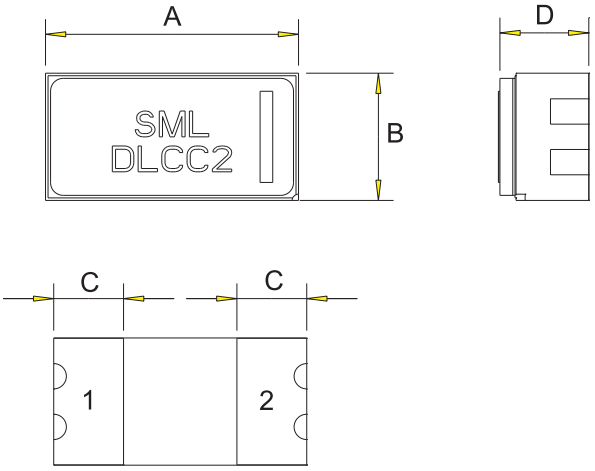
Equivalent Reverse Recovery Time (1)



Notes

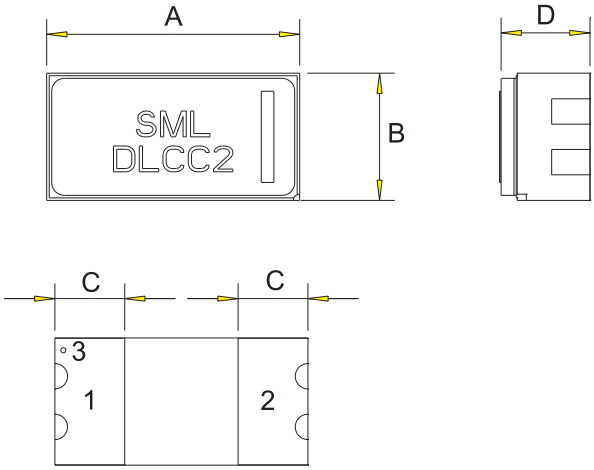
(1) SiC Schottky Diode, no minority carrier recombination thus zero reverse recovery. Recovery time shown is due to a small junction capacitance charge and is independent of junction temperature.

MECHANICAL DATA



DLCC2 Variant A (D2A)

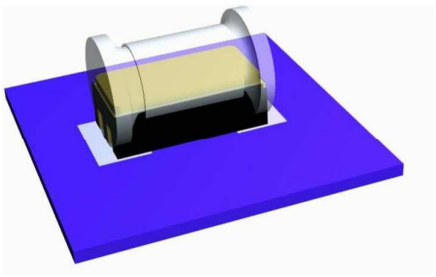
PAD 1	ANODE	
PAD 2	CATHODE	
DIMENSION	mm	Inches
A	5.00 ±0.10	0.197 ±0.004
B	2.61 ±0.10	0.103 ±0.004
C	1.08 ±0.10	0.043 ±0.004
D	1.76 ±0.10	0.069 ±0.004



DLCC2 Variant B (D2B)

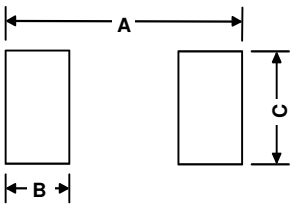
PAD 1	ANODE	
PAD 2	CATHODE	
PAD 3	LID CONTACT TO ANODE*	
DIMENSION	mm	Inches
A	5.00 ±0.10	0.197 ±0.004
B	2.61 ±0.10	0.103 ±0.004
C	1.08 ±0.10	0.043 ±0.004
D	1.76 ±0.10	0.069 ±0.004

DLCC2/ D-5A MELF OVERLAY



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

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.

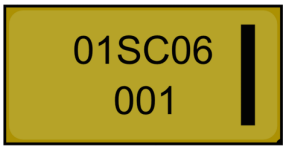
Alternative or additional customer specific conformance or screening requirements would be considered. Contact Semelab sales with enquires.

MARKING DETAILS

Parts 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 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 SML01SC06D2A part with package variant A, JQRS screening, additional Group C conformance testing and a Data pack.

Part Numbers:
SML01SC06D2A-JQRS (Include quantity for flight parts)
SML01SC06D2A-JQRS.GRPC (chargeable conformance option)
SML01SC06D2A-JQRS.GCDE (charge for destructive parts)
SML01SC06D2A-JQRS.GCDM (charge for destructive parts)
SML01SC06D2A-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