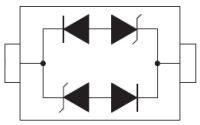
# Ultralow Capacitance ESD Array

# DLC03C-DLC36C

## Features

HF

- 350 Watts peak pulse power ($t_p$ = 8/20μs)
- Replacement for MLV (0805)
- Protects One Power or I/O Port
- Low clamping voltage
- Working voltage: $V_{RWM}$ = 3V, 5V, 8V, 12V, 15V, 24V, 36V
- RoHS compliant with Halogen-free



## Typical Applications

- Ethernet - 10/100/1000 Base T
- Cellular Phones
- Handheld - Wireless Systems
- Personnal Digital Assistant (PDA)
- USB Interface

SOD-323

## Mechanical Data

- Case: SOD-323
- Molding Compound: UL Flammability Classification Rating 94V-0
- Terminals: Matte tin-plated leads; solderability-per MIL-STD-202, Method 208

## Ordering Information

| Part Number | Package | Shipping Quantity | Marking Code |
|---|---|---|---|
| DLC03C | SOD-323 | 3000 pcs / Tape & Reel | 03C |
| DLC05C | SOD-323 | 3000 pcs / Tape & Reel | C05C |
| DLC08C | SOD-323 | 3000 pcs / Tape & Reel | 8C |
| DLC12C | SOD-323 | 3000 pcs / Tape & Reel | 2C |
| DLC15C | SOD-323 | 3000 pcs / Tape & Reel | 6C |
| DLC24C | SOD-323 | 3000 pcs / Tape & Reel | 4C |
| DLC36C | SOD-323 | 3000 pcs / Tape & Reel | 36C |

## Maximum Ratings (@ $T_A$ = 25℃ unless otherwise specified)

| Parameter | Symbol | Value | Unit |
|---|---|---|---|
| IEC 61000-4-2; ESD (Air) | $V_{ESD-A}$ | ±30 | kV |
| IEC 61000-4-2; ESD (Contact) | $V_{ESD-C}$ | ±30 | kV |
| Peak Pulse Power ($t_p$ = 8/20μs) | $P_{PP}$ | 350 | W |

## Thermal Characteristics

| Parameter | Symbol | Value | Unit |
|---|---|---|---|
| Thermal Resistance Junction-to-Air *1 | $R_{\theta JA}$ | 460 | °C/W |
| Thermal Resistance Junction-to-Case *1 | $R_{\theta JC}$ | 290 | °C/W |
| Thermal Resistance Junction-to-Lead *1 | $R_{\theta JL}$ | 310 | °C/W |
| Junction Temperature | $T_J$ | -55 ~ +150 | °C |
| Storage Temperature Range | $T_{STG}$ | -55 ~ +150 | °C |

Note 1: The data tested by surface mounted on a minimum recommended FR-4 board

## Electrical Characteristics (@ $T_A$ = 25℃ unless otherwise specified)

| Parameter | Symbol | Test Condition | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| **DLC03C TVS for 3V Lines** | | | | | | |
| Reverse Stand-off Voltage | $V_{RWM}$ | | - | - | 3.3 | V |
| Reverse Breakdown Voltage | $V_{(BR)}$ | $I_T$ = 1mA | 4 | - | - | V |
| Reverse Leakage Current | $I_R$ | $V_{RWM}$ = 3.3V | - | - | 5 | μA |
| Clamping Voltage | $V_C$ | $I_{PP}$ = 1A, tp = 8/20μs | - | - | 7 | V |
| | | $I_{PP}$ = 20A, tp = 8/20μs | - | - | 19 | V |
| Junction Capacitance | $C_J$ | $V_R$ = 0V, f = 1MHZ | - | 1 | - | pF |
| **DLC05C TVS for 5V Lines** | | | | | | |
| Reverse Stand-off Voltage | $V_{RWM}$ | | - | - | 5 | V |
| Reverse Breakdown Voltage | $V_{(BR)}$ | $I_T$ = 1mA | 6 | - | - | V |
| Reverse Leakage Current | $I_R$ | $V_{RWM}$ = 5V | - | - | 5 | μA |
| Clamping Voltage | $V_C$ | $I_{PP}$ = 1A, tp = 8/20μs | - | - | 9.8 | V |
| | | $I_{PP}$ = 20A, tp = 8/20μs | - | - | 20 | V |
| Junction Capacitance | $C_J$ | $V_R$ = 0V, f = 1MHZ | - | 1 | - | pF |
| **DLC08C TVS for 8V Lines** | | | | | | |
| Reverse Stand-off Voltage | $V_{RWM}$ | | - | - | 8 | V |
| Reverse Breakdown Voltage | $V_{(BR)}$ | $I_T$ = 1mA | 8.5 | - | - | V |
| Reverse Leakage Current | $I_R$ | $V_{RWM}$ = 8V | - | - | 2 | μA |
| Clamping Voltage | $V_C$ | $I_{PP}$ = 1A, tp = 8/20μs | - | - | 13.4 | V |
| | | $I_{PP}$ = 17A, tp = 8/20μs | - | - | 18.5 | V |
| Junction Capacitance | $C_J$ | $V_R$ = 0V, f = 1MHZ | - | 1 | - | pF |

| Parameter | Symbol | Test Condition | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| **DLC12C TVS for 12V Lines** | | | | | | |
| Reverse Stand-off Voltage | $V_{RWM}$ | | - | - | 12 | V |
| Reverse Breakdown Voltage | $V_{(BR)}$ | $I_T$ = 1mA | 13.3 | - | - | V |
| Reverse Leakage Current | $I_R$ | $V_{RWM}$ = 12V | - | - | 1 | μA |
| Clamping Voltage | $V_C$ | $I_{PP}$ = 1A, tp = 8/20μs | - | - | 19 | V |
| | | $I_{PP}$ = 11A, tp = 8/20μs | - | - | 28.6 | V |
| Junction Capacitance | $C_J$ | $V_R$ = 0V, f = 1MHZ | - | 1 | - | pF |
| **DLC15C TVS for 15V Lines** | | | | | | |
| Reverse Stand-off Voltage | $V_{RWM}$ | | - | - | 15 | V |
| Reverse Breakdown Voltage | $V_{(BR)}$ | $I_T$ = 1mA | 16.7 | - | - | V |
| Reverse Leakage Current | $I_R$ | $V_{RWM}$ = 15V | - | - | 1 | μA |
| Clamping Voltage | $V_C$ | $I_{PP}$ = 1A, tp = 8/20μs | - | - | 24 | V |
| | | $I_{PP}$ = 10A, tp = 8/20μs | - | - | 31.8 | V |
| Junction Capacitance | $C_J$ | $V_R$ = 0V, f = 1MHZ | - | 1 | - | pF |
| **DLC24C TVS for 24V Lines** | | | | | | |
| Reverse Stand-off Voltage | $V_{RWM}$ | | - | - | 24 | V |
| Reverse Breakdown Voltage | $V_{(BR)}$ | $I_T$ = 1mA | 26.7 | - | - | V |
| Reverse Leakage Current | $I_R$ | $V_{RWM}$ = 24V | - | - | 1 | μA |
| Clamping Voltage | $V_C$ | $I_{PP}$ = 1A, tp = 8/20μs | - | - | 43 | V |
| | | $I_{PP}$ = 6A, tp = 8/20μs | - | - | 56 | V |
| Junction Capacitance | $C_J$ | $V_R$ = 0V, f = 1MHZ | - | 1 | - | pF |
| **DLC36C TVS for 36V Lines** | | | | | | |
| Reverse Stand-off Voltage | $V_{RWM}$ | | - | - | 36 | V |
| Reverse Breakdown Voltage | $V_{(BR)}$ | $I_T$ = 1mA | 40 | - | - | V |
| Reverse Leakage Current | $I_R$ | $V_{RWM}$ = 36V | - | - | 1 | μA |
| Clamping Voltage | $V_C$ | $I_{PP}$ = 1A, tp = 8/20μs | - | - | 48 | V |
| | | $I_{PP}$ = 4A, tp = 8/20μs | - | - | 90 | V |
| Junction Capacitance | $C_J$ | $V_R$ = 0V, f = 1MHZ | - | 1.5 | - | pF |

## Ratings and Characteristic Curves (@ $T_A$ = 25°C unless otherwise specified)

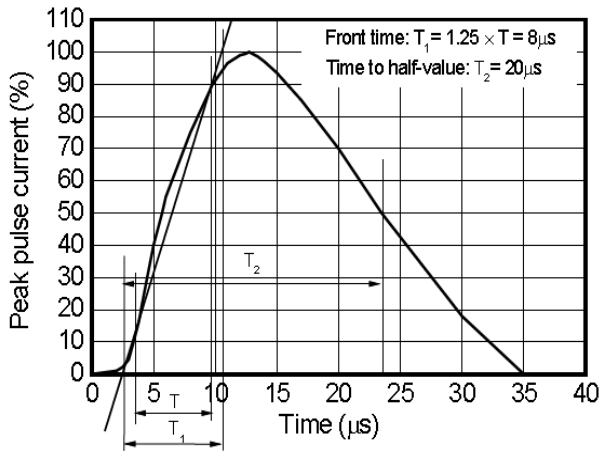



Fig 1 8/2 0μs waveform per IEC61000-4-5

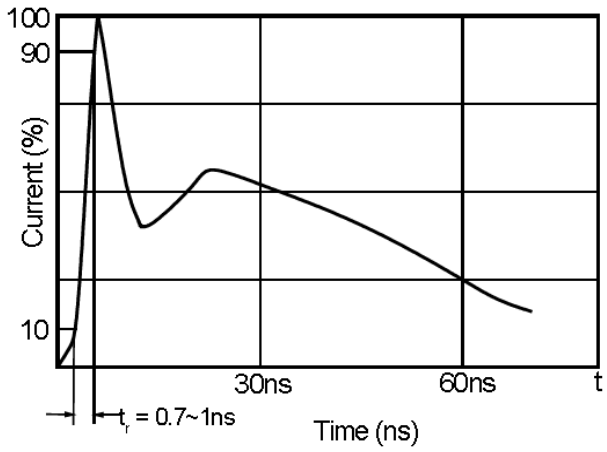



Fig 2 ESD pulse waveform according to IEC61000-4-2

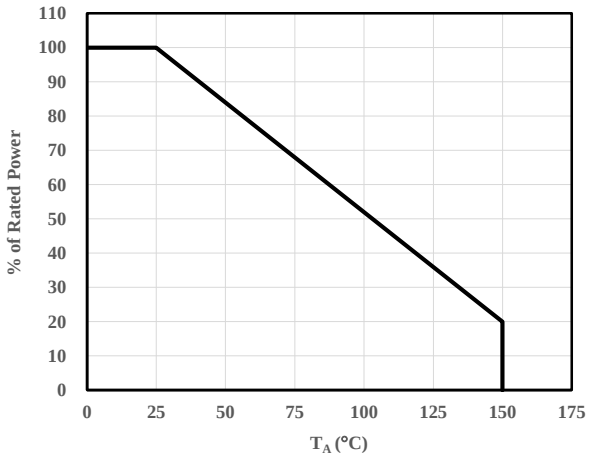
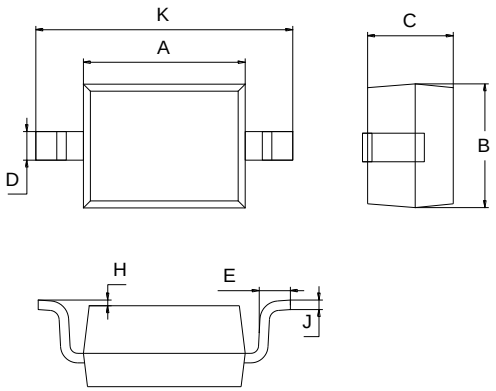



Fig 3 Power Derating Curve

## Package Outline Dimensions (Unit: mm)




| SOD-323 | | |
|---|---|---|
| **Dimension** | **Min.** | **Max.** |
| A | 1.60 | 1.80 |
| B | 1.20 | 1.40 |
| C | 0.80 | 0.90 |
| D | 0.25 | 0.35 |
| E | 0.22 | 0.42 |
| H | 0.02 | 0.10 |
| J | 0.05 | 0.15 |
| K | 2.55 | 2.75 |

## Package Outline Dimensions (Unit: mm)

### SOD-323