

TOSHIBA Diodes for Protecting against ESD

DF10G6M4N

Application

- ESD Protection

Note: This product is designed for protection against electrostatic discharge (ESD) and is not intended for any other purpose, including, but not limited to, voltage regulation.

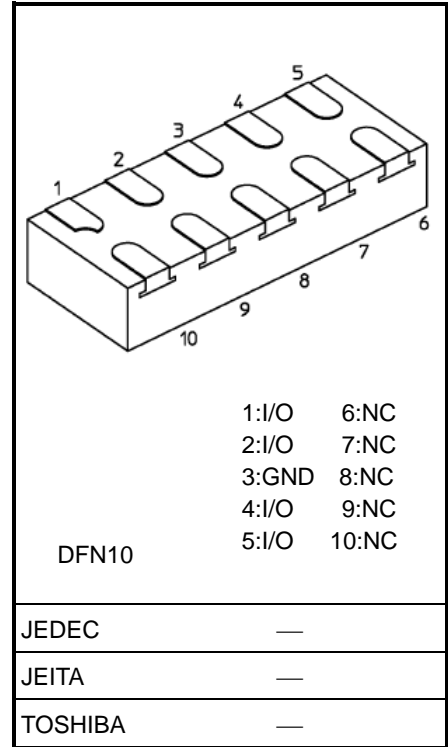
Absolute Maximum Ratings (Ta = 25°C)

| Characteristic | Symbol | Rating | Unit |
|---|-----------------------|---------|------|
| Electrostatic discharge voltage IEC61000-4-2(Contact) IEC61000-4-2(Air) | V_{ESD} (Note 1) | ±23 | kV |
| Peak pulse power (tp = 8 / 20 s) | P_{PK} | 30 | W |
| Maximum peak pulse current (tp = 8 / 20 s) | I_{PP} (Note 2) | 2 | A |
| Junction temperature | T_j | 150 | °C |
| Storage temperature range | T_{stg} | -55~150 | °C |

Note1 : according to IEC61000-4-2

Note2 : according to IEC61000-4-5

Note3:Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.) are within the absolute maximum ratings.Please design the appropriate reliability upon reviewing the Toshiba Semiconductor Reliability Handbook (“Handling Precautions”/ “Derating Concept and Methods”) and individual reliability data (i.e. reliability test report and estimated failure rate, etc).



Weight: 3.2mg (typ.)

Electrical Characteristics (Ta = 25°C)

V_{RWM} : Working peak reverse voltage

V_{BR} : Reverse breakdown voltage

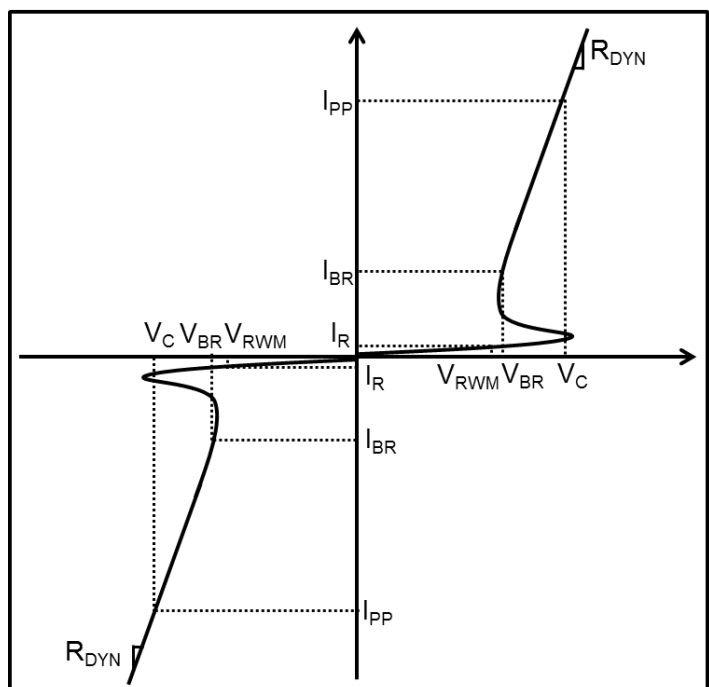
I_{BR} : Reverse breakdown current

I_R : Reverse Current

V_C : Clamping Voltage

I_{PP} : Peak pulse current

R_{DYN} : Dynamic resistance



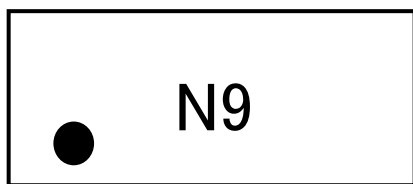
| Characteristic | Symbol | Test Condition | Min | Typ. | Max | Unit |
|------------------------------|-----------|--|-----|------|-----|---------------|
| Working peak reverse voltage | V_{RWM} | — | — | — | 5.5 | V |
| Reverse breakdown voltage | V_{BR} | $I_{BR} = 1 \text{ mA}$ | 5.6 | 6.2 | 8 | V |
| Reverse Current | I_R | $V_{RWM} = 5.5 \text{ V}$ | — | — | 0.1 | μA |
| Clamping Voltage | V_C | $I_{PP}=1\text{A}$ (Note1) | — | 8.5 | — | V |
| | V_C | $I_{PP}=2\text{A}$ (Note1) | — | 10 | 15 | V |
| Clamping Voltage | V_C | $I_{TLP}=16\text{A}$ (Note2) | — | 18 | — | V |
| | V_C | $I_{TLP}=30\text{A}$ (Note2) | — | 25 | — | V |
| Dynamic resistance | R_{DYN} | (Note:2) | — | 0.5 | — | Ω |
| Terminal capacitance | C_t | $V_R = 0 \text{ V}$, $f=1 \text{ MHz}$ (Note.3) | — | 0.2 | 0.3 | pF |

Note1 : Based on IEC61000-4-5 8/20 μ s pulse.

Note2 : TLP parameter: $Z_0 = 50 \Omega$, $t_p = 100\text{ns}$, $t_r = 300\text{ps}$, averaging window: $t_1 = 30 \text{ ns}$ to $t_2 = 60 \text{ ns}$,
extraction of dynamic resistance using least squares fit of TLP characteristics between $I_{PP1} = 8\text{A}$ and $I_{PP2} = 16\text{A}$.

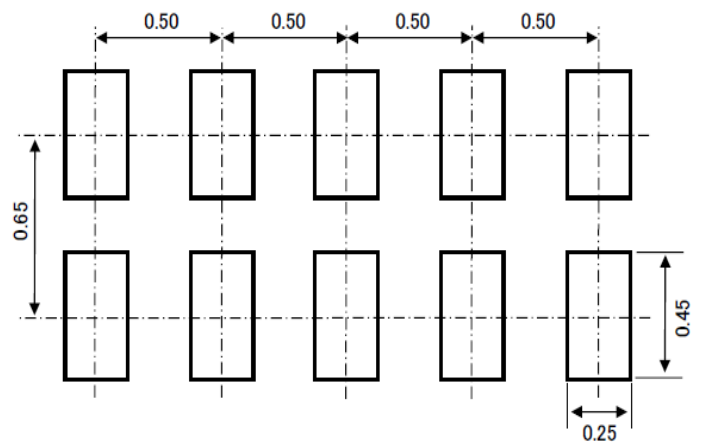
Note3 : Guaranteed by design.

Marking (Unit: mm)



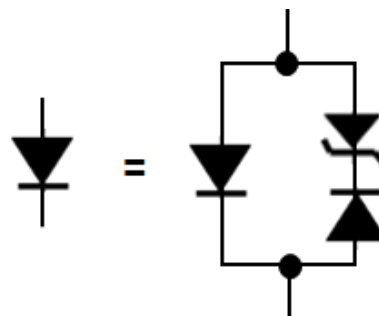
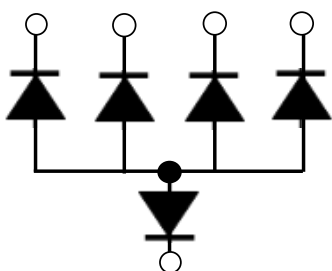
| Marking Code | Part number |
|--------------|-------------|
| N9 | DF10G6M4N |

Land Pattern Dimensions for Reference Only

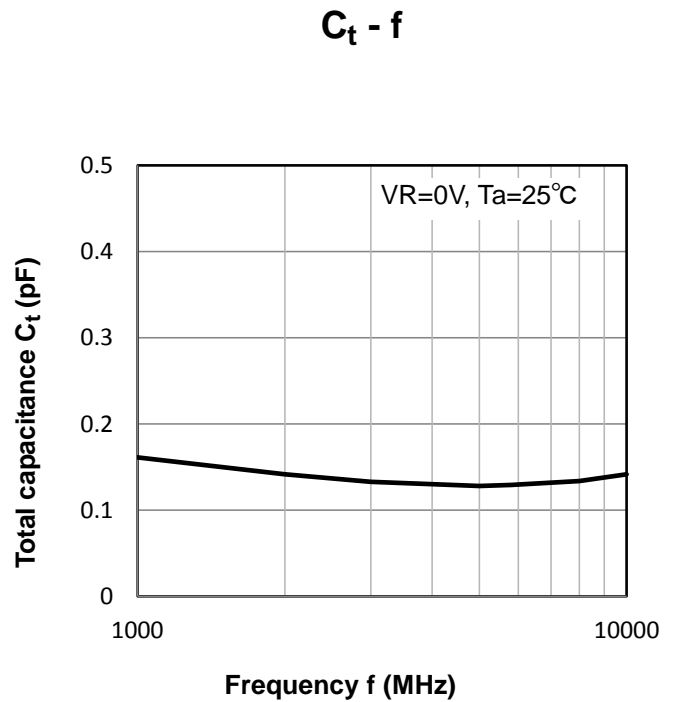
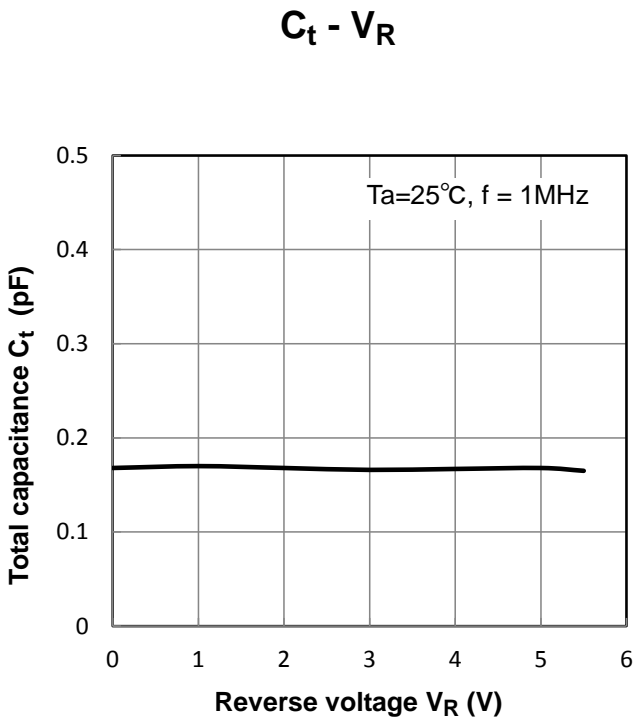
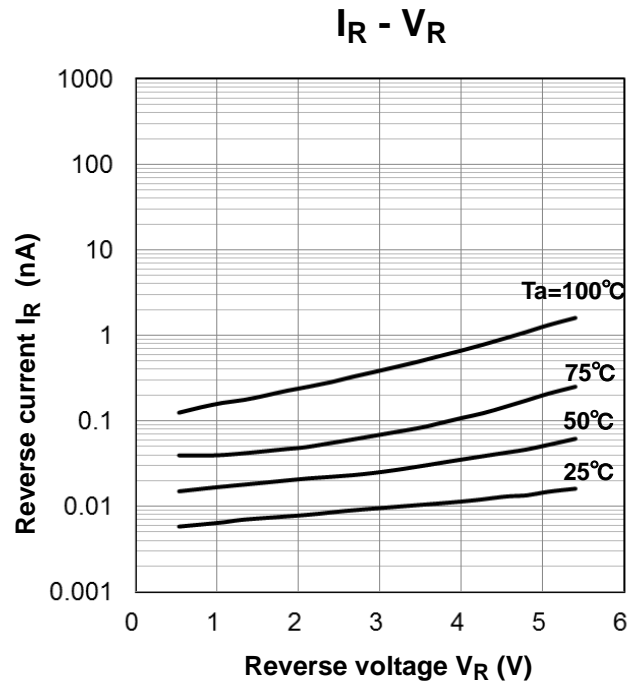
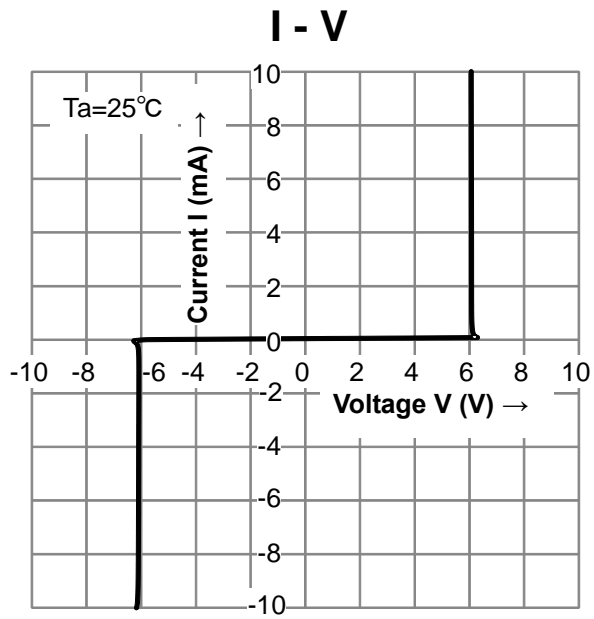


Equivalent Circuit

I/O1 I/O2 I/O3 I/O4



Characteristics Curves (Note)



Note: The above characteristics curves are presented for reference only and not guaranteed by production test, unless otherwise noted.

V_C - I_{PP}

Based on IEC61000-4-5 8/20 μ s pulse.(Ed2)

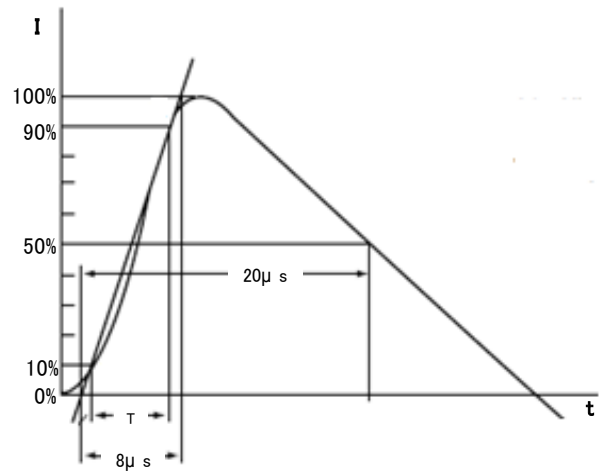
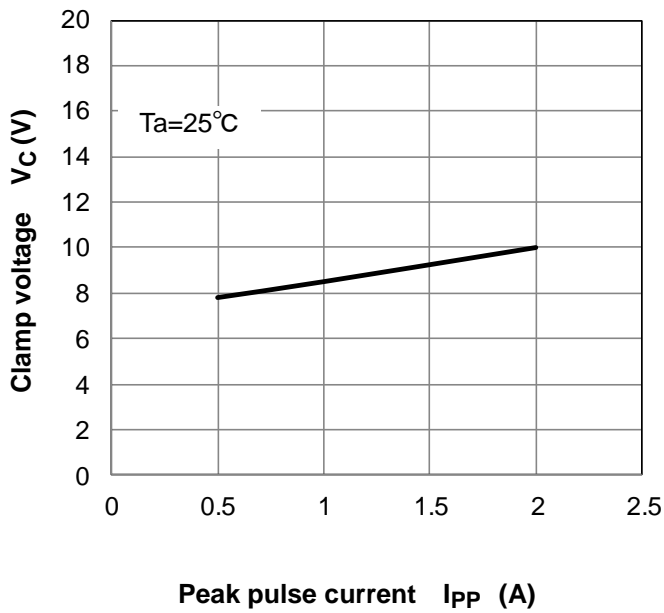
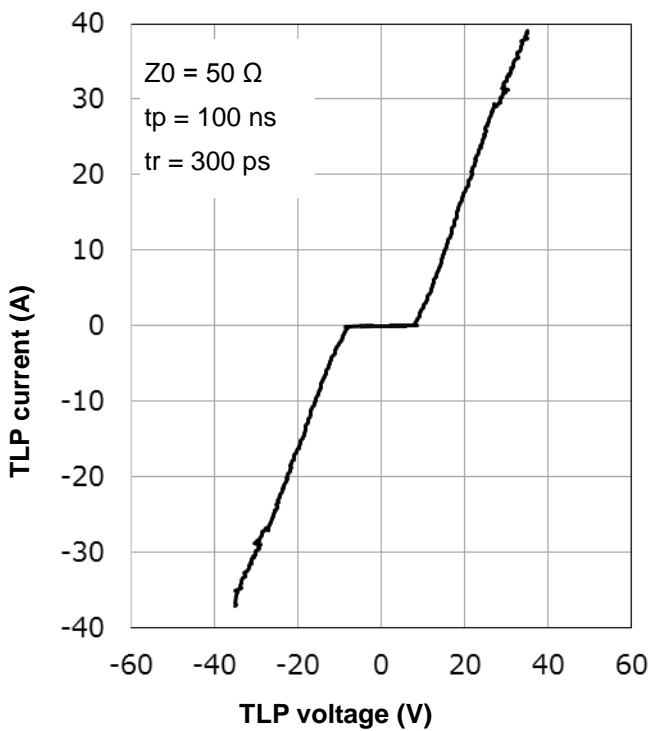


Fig Based on IEC61000-4-5 8/20 μ s pulse.(Ed.2)

TLP



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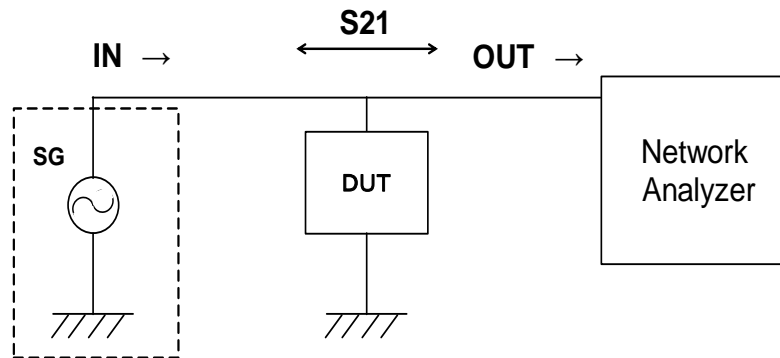
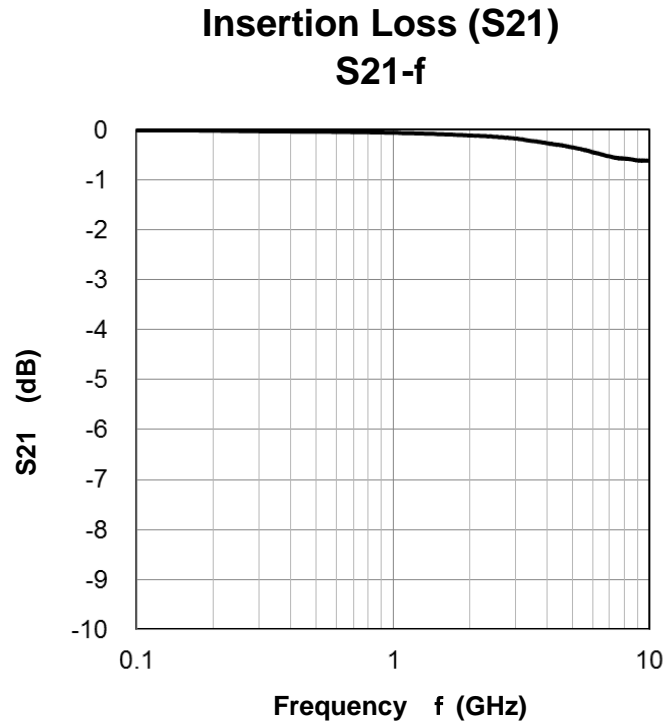


Fig. S21 measurement circuit

Note: The above characteristics curves are presented for reference only and not guaranteed by production test, unless otherwise noted.

ESD Clamp Waveform (IEC61000-4-2) (Note)

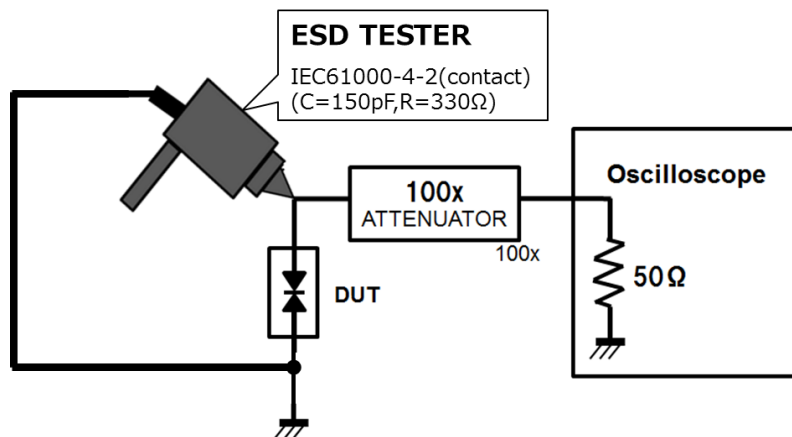
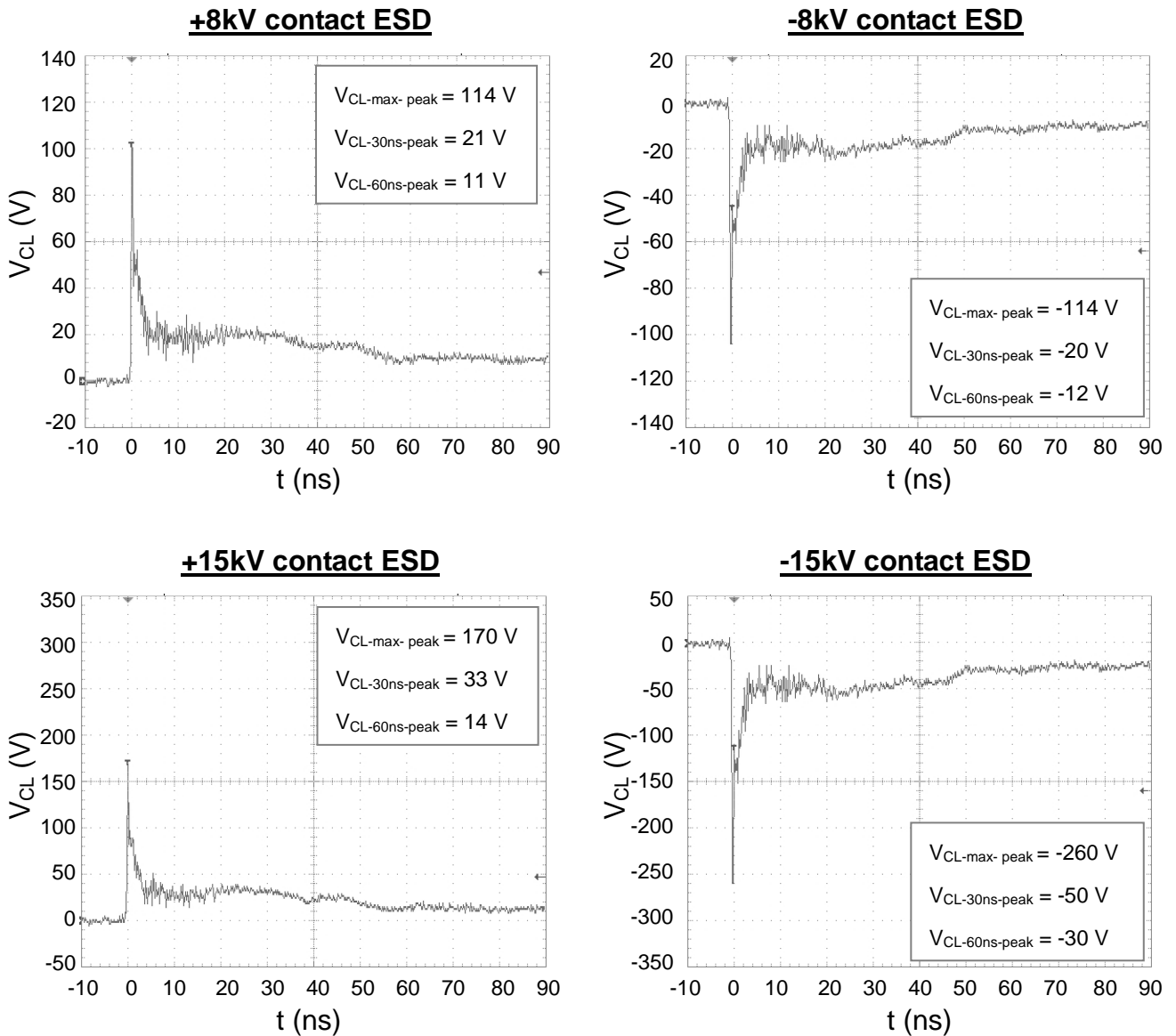
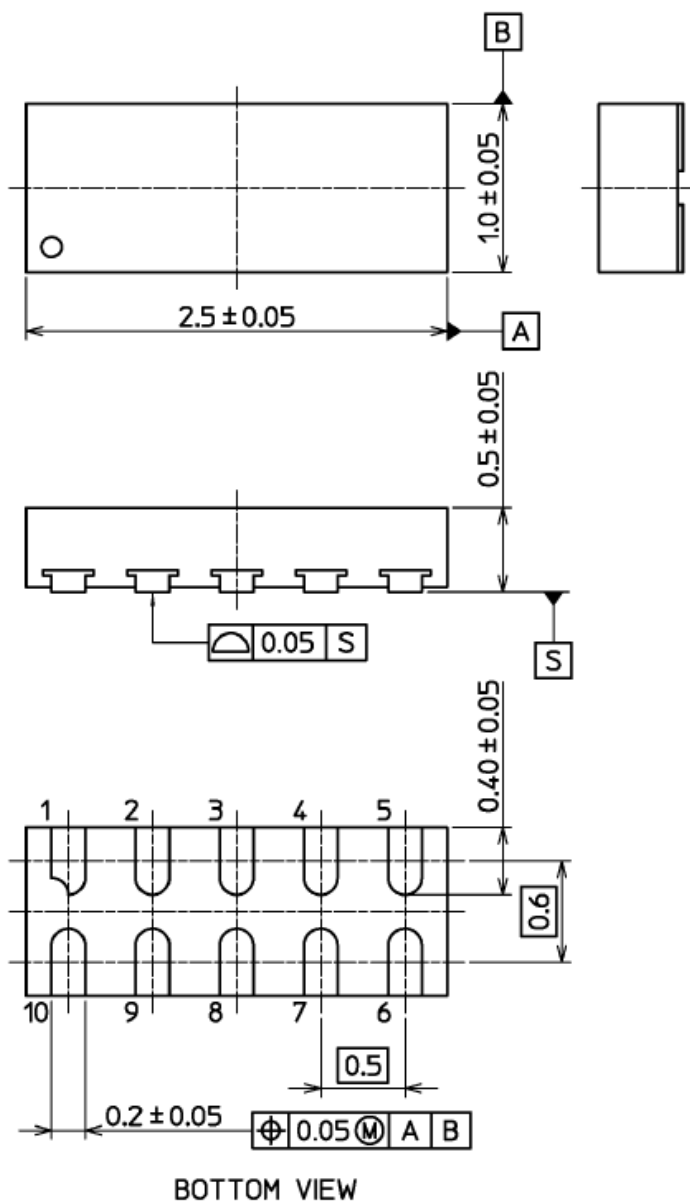


Fig. IEC61000-4-2 (Contact)

Note: The above characteristics curves are presented for reference only and not guaranteed by production test,

— unless otherwise noted.

Package Dimensions (Unit: mm)



Weight: 0.0032 g (typ.)

| Package Name(s) |
|-----------------|
| TOSHIBA: 1-3V1A |
| Nickname: DFN10 |

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