

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.

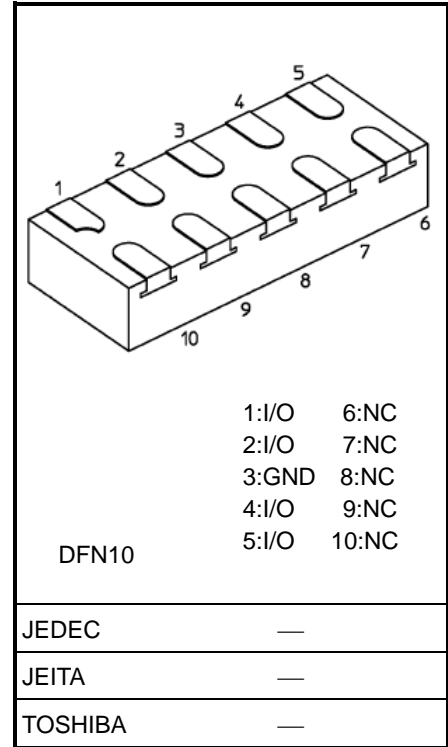
## Absolute Maximum Ratings (Ta = 25°C)

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

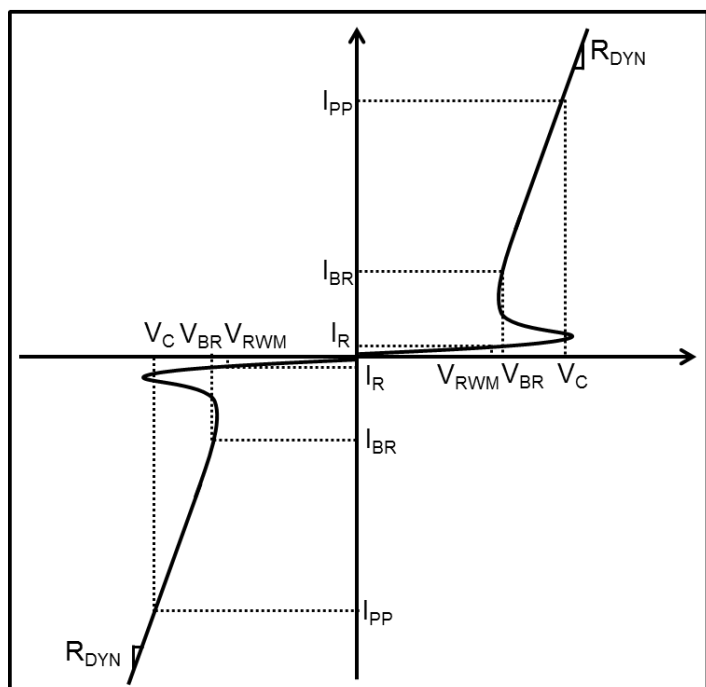
$I_{BR}$  : Reverse breakdown current

$I_R$  : Reverse Current

$V_C$  : Clamping Voltage

$I_{PP}$  : Peak pulse current

$R_{DYN}$  : Dynamic resistance



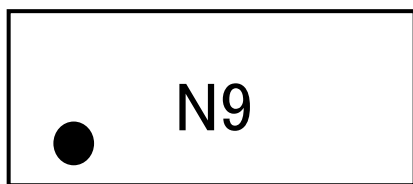
Characteristic	Symbol	Test Condition	Min	Typ.	Max	Unit
Working peak reverse voltage	$V_{RWM}$	—	—	—	5.5	V
Reverse breakdown voltage	$V_{BR}$	$I_{BR} = 1 \text{ mA}$	5.6	6.2	8	V
Reverse Current	$I_R$	$V_{RWM} = 5.5 \text{ V}$	—	—	0.1	$\mu\text{A}$
Clamping Voltage	$V_C$	$I_{PP}=1\text{A}$ (Note1)	—	8.5	—	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	—	$\Omega$
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  $\mu$  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  $I_{PP2} = 16\text{A}$ .

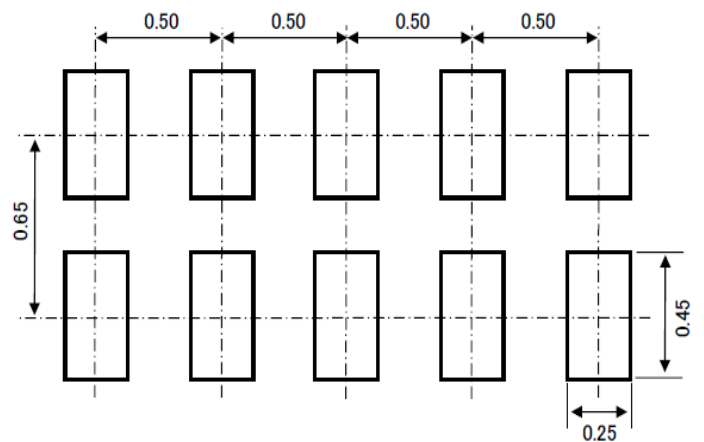
Note3 : Guaranteed by design.

### Marking (Unit: mm)

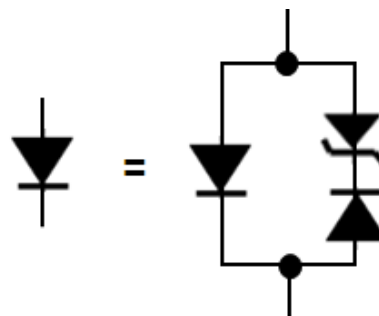
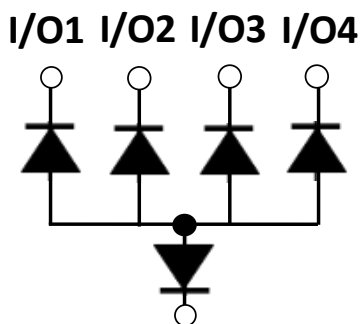


Marking Code	Part number
N9	DF10G6M4N

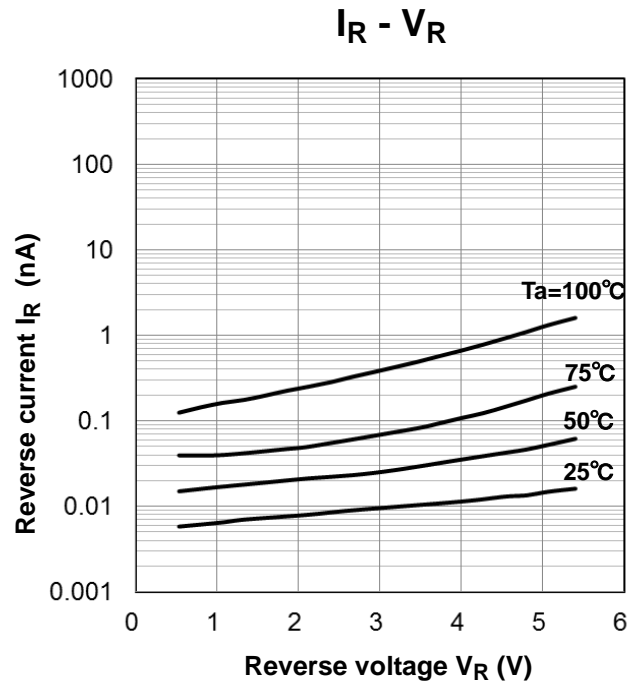
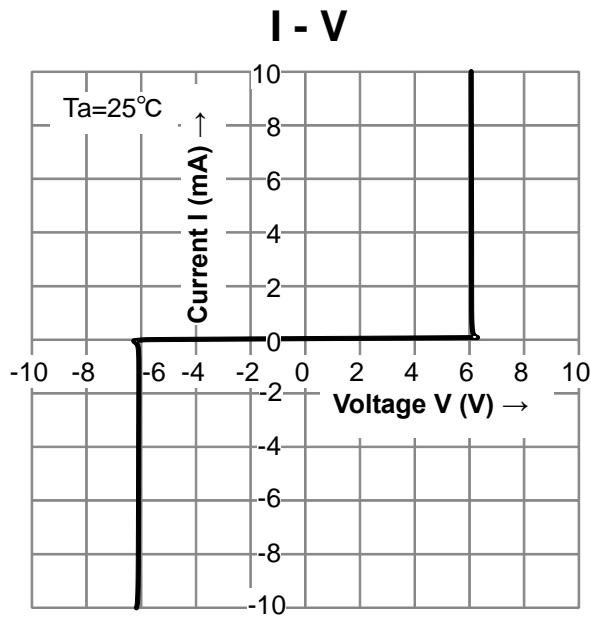
### Land Pattern Dimensions for Reference Only



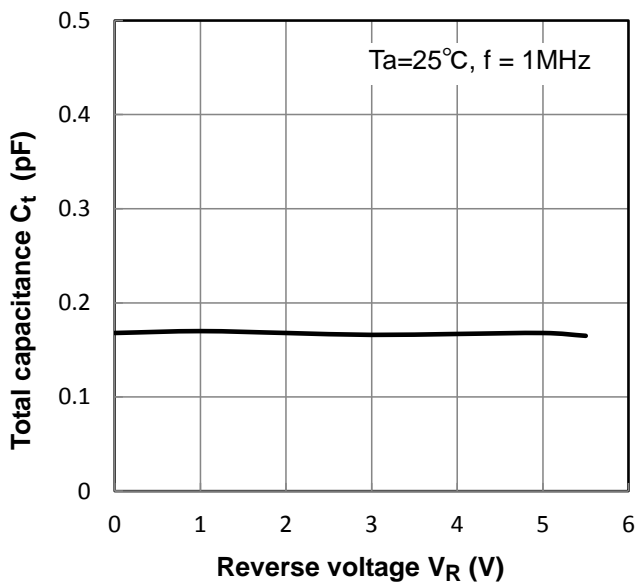
### Equivalent Circuit



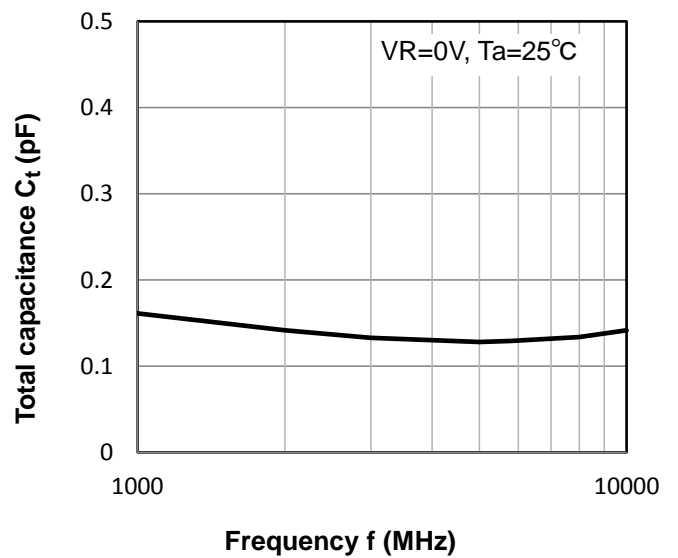
**Characteristics Curves (Note)**



**C<sub>t</sub> - V<sub>R</sub>**



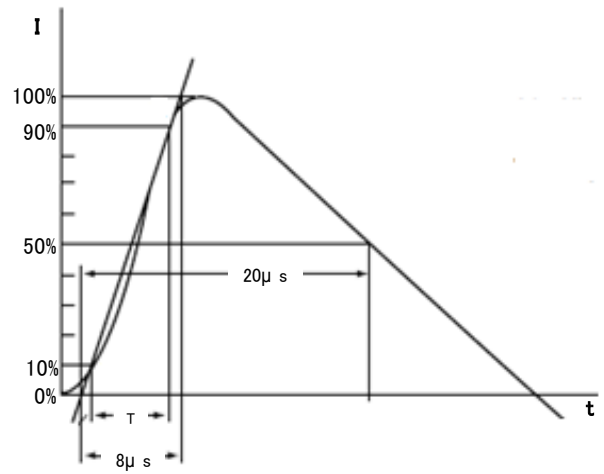
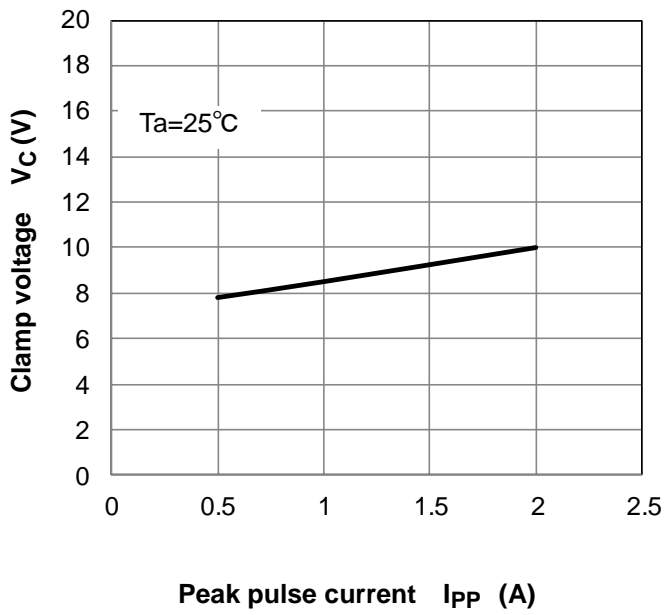
**C<sub>t</sub> - f**



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

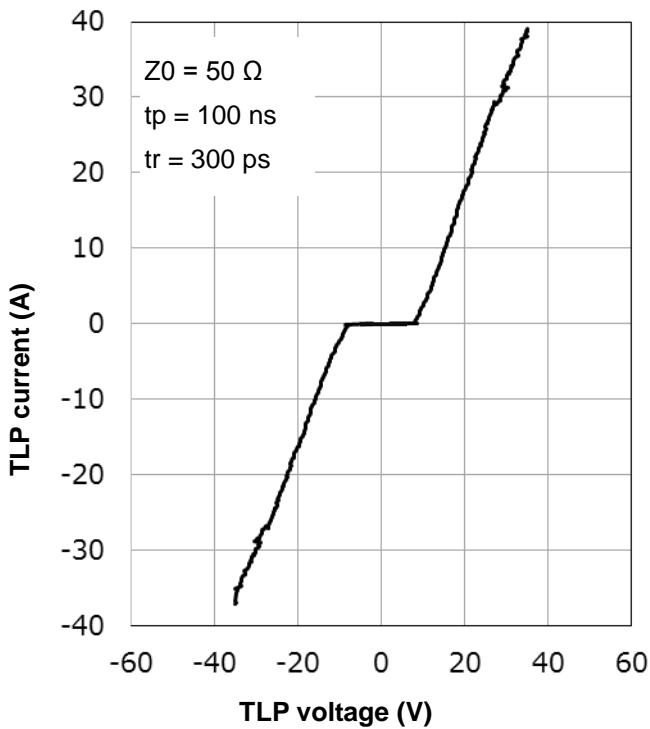
**V<sub>C</sub> - I<sub>PP</sub>**

Based on IEC61000-4-5 8/20  $\mu$  s pulse.(Ed2)

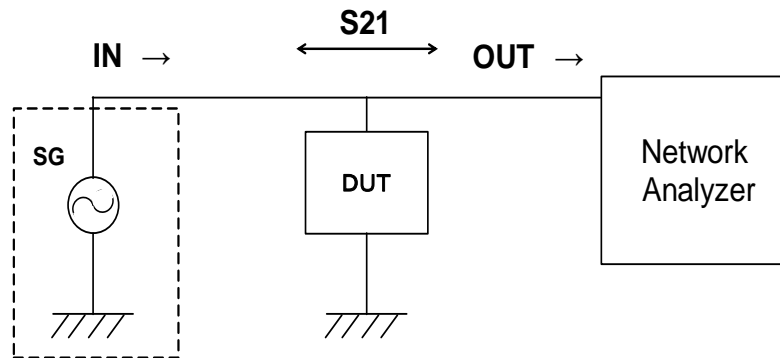
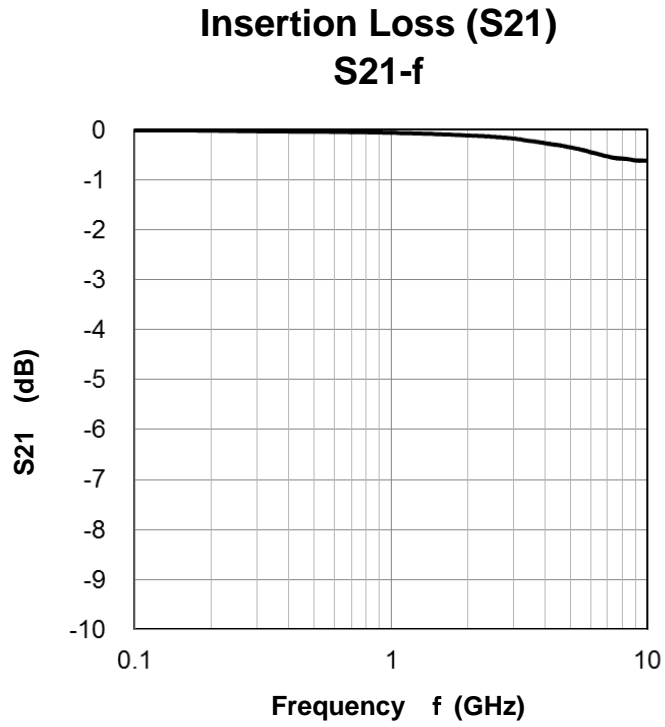


**Fig Based on IEC61000-4-5 8/20  $\mu$  s pulse.(Ed.2)**

**TLP**



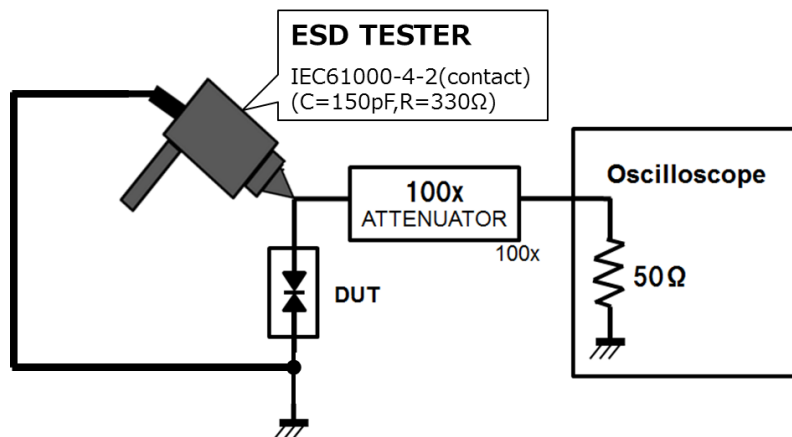
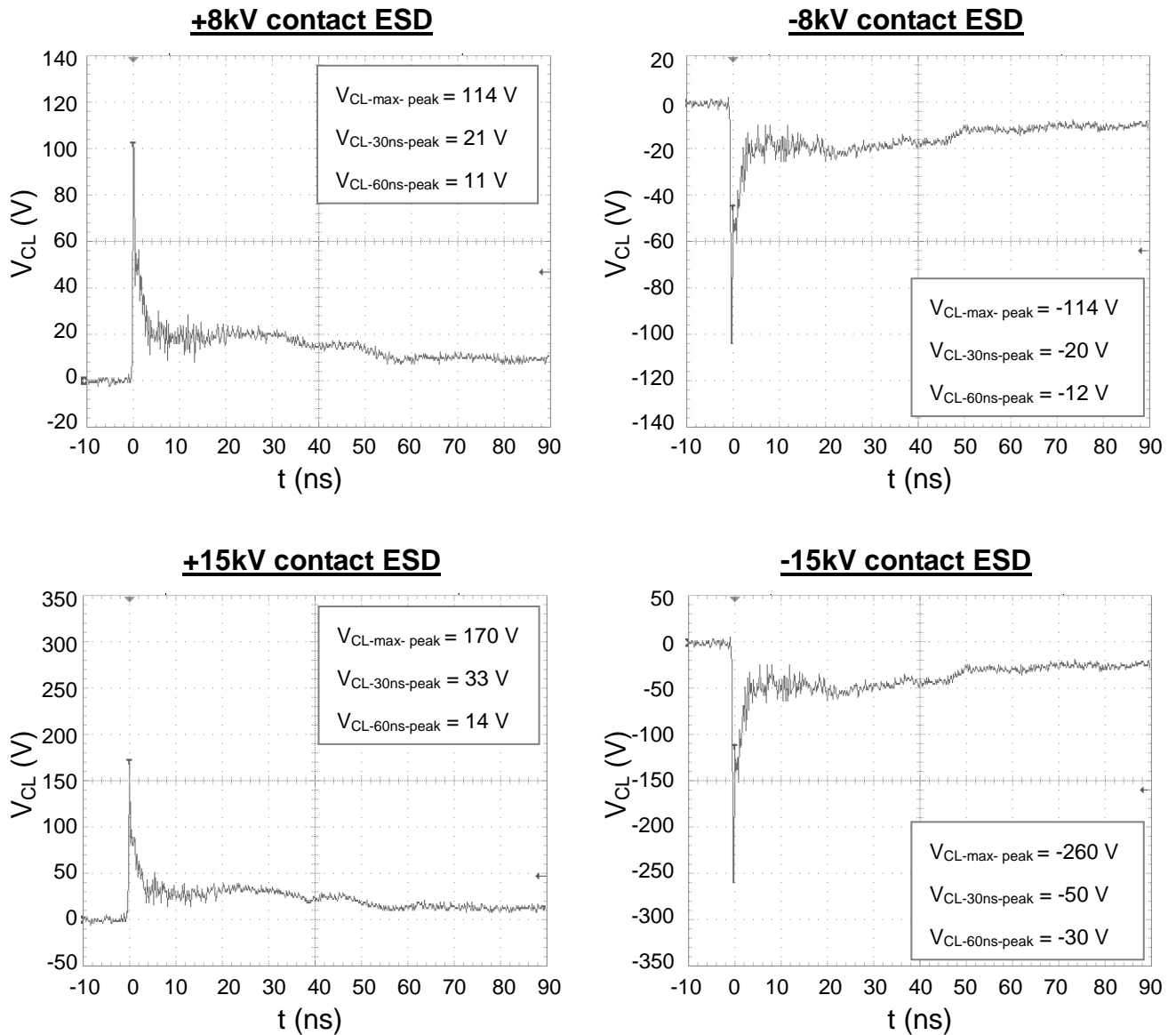
Note: The above characteristics curves are presented for reference only and not guaranteed by production test, unless otherwise noted.



**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)**

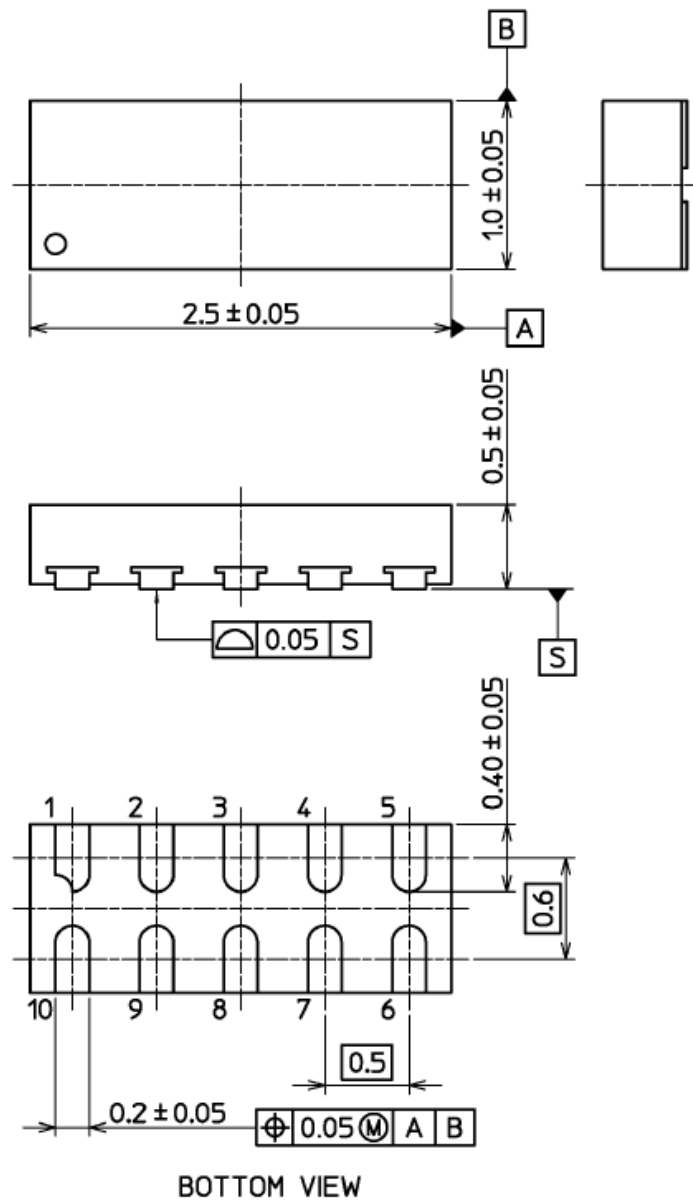


**Fig. IEC61000-4-2 (Contact)**

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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