

TOSHIBA Diodes for Protecting against ESD

DF10G5M4N

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.

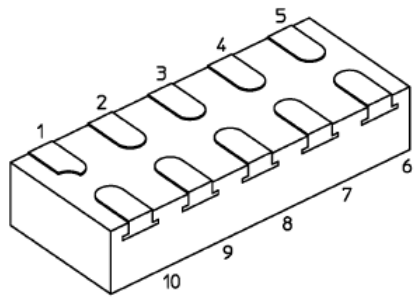
Absolute Maximum Ratings (Ta = 25°C)

Characteristic	Symbol	Rating	Unit
Electrostatic discharge voltage IEC61000-4-2(Contact) IEC61000-4-2(Air)	V_{ESD} (Note 1)	± 23 ± 25	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 to 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).

	
1:I/O	6:NC
2:I/O	7:NC
3:GND	8:NC
4:I/O	9:NC
5:I/O	10:NC
DFN10	
JEDEC	—
JEITA	—
TOSHIBA	—

Weight: 3.2mg (typ.)

Electrical Characteristics (Ta = 25°C)

V_{RWM} : Working peak reverse voltage

V_{BR} : Reverse breakdown voltage

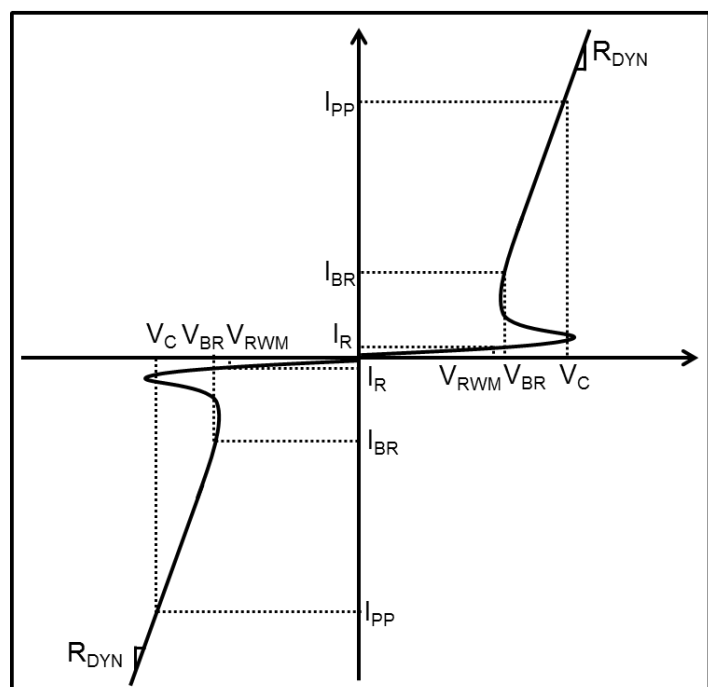
I_{BR} : Reverse breakdown current

I_R : Reverse Current

V_C : Clamping Voltage

I_{PP} : Peak pulse current

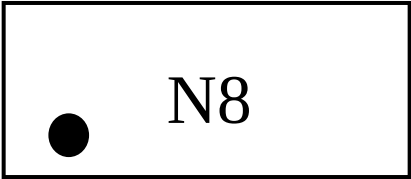
R_{DYN} : Dynamic resistance



Characteristic	Symbol	Test Condition	Min	Typ.	Max	Unit
Reverse stand-off voltage	V_{RWM}	—	—	—	3.6	V
Reverse breakdown voltage	V_{BR}	$I_{BR} = 1\text{ mA}$	4.0	5.0	6.0	V
Reverse current	I_R	$V_{RWM} = 5.5\text{ V}$	—	—	0.1	μA
Clamping Voltage	V_c	$I_{PP}=1\text{A}$ (Note1)	—	7.5	—	V
	V_c	$I_{PP}=2\text{A}$ (Note1)	—	10	15	V
Clamping Voltage	V_c	$ITLP=16\text{A}$ (Note2)	—	17	—	V
	V_c	$ITLP=30\text{A}$ (Note2)	—	24	—	V
Dynamic resistance	R_{DYN}	(Note2)	—	0.5	—	Ω
Total capacitance	C_t	$V_R = 0\text{ V}$, $f = 1\text{ MHz}$ (Note3)	—	0.2	0.3	pF

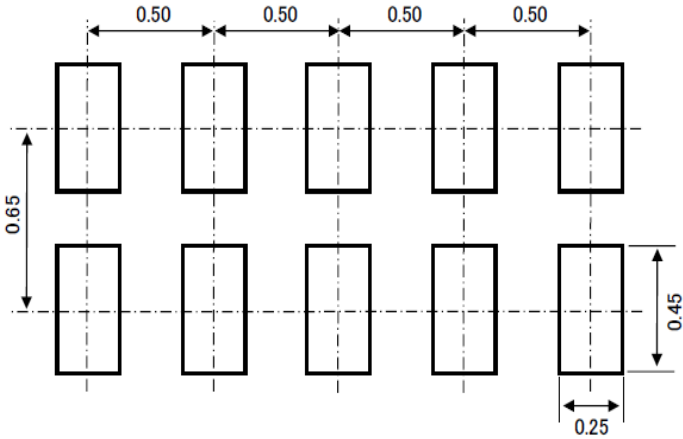
Note1 : Based on IEC61000-4-5 8/20 $\mu\text{ s}$ pulse.
Note2 : TLP parameter: $Z_0 = 50\ \Omega$, $t_p = 100\text{ns}$, $t_r = 300\text{ps}$, averaging window: $t_1 = 30\text{ ns}$ to $t_2 = 60\text{ ns}$,
extraction of dynamic resistance using least squares fit of TLP characteristics between $IPP1 = 8\text{A}$ and $IPP2 = 16\text{A}$.
Note3 : Guaranteed by design.

Marking (Unit: mm)

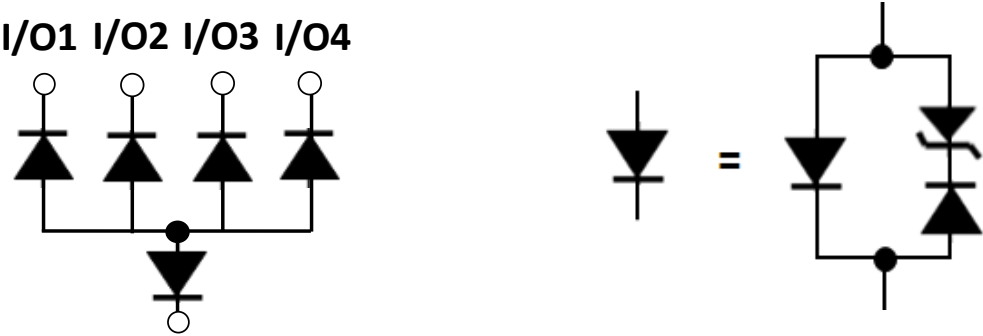


Marking Code	Part number
N8	DF10G5M4N

Land Pattern Dimensions for Reference Only

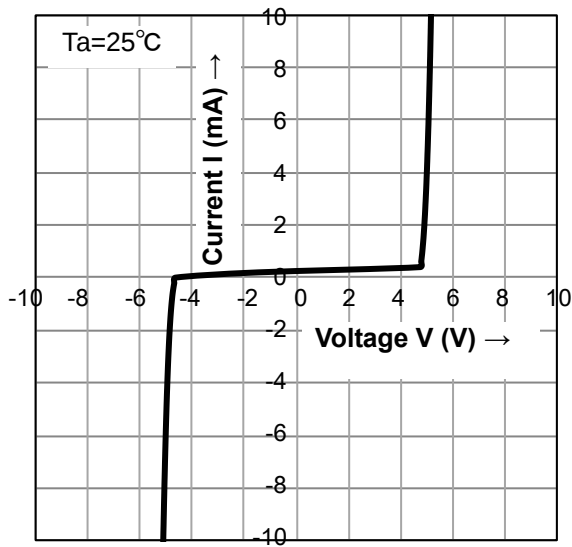


Equivalent Circuit

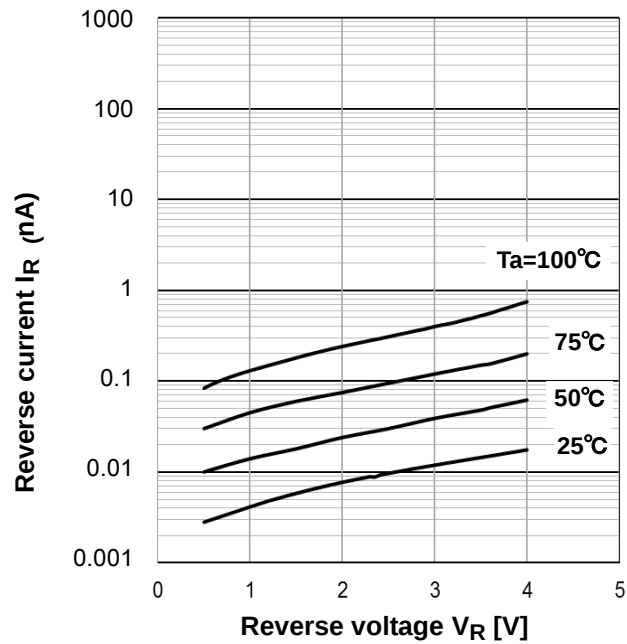


Characteristics Curves (Note)

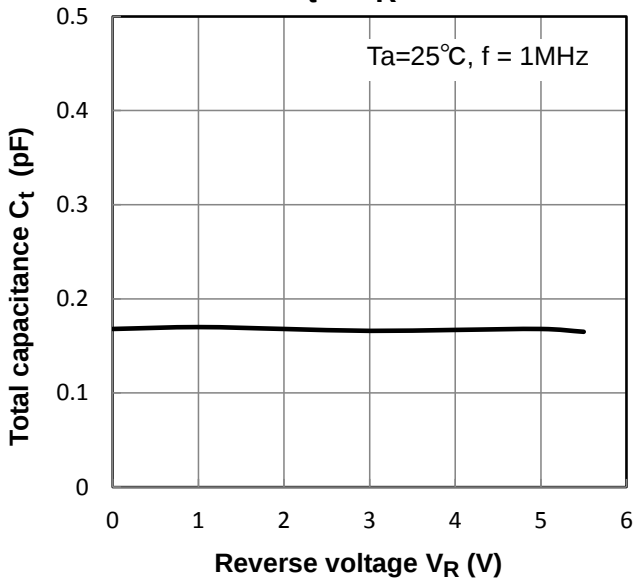
I - V



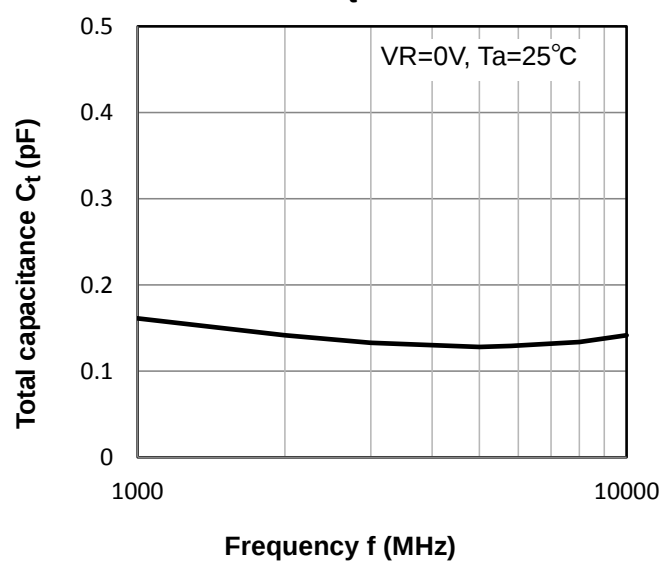
$I_R - V_R$



$C_t - V_R$

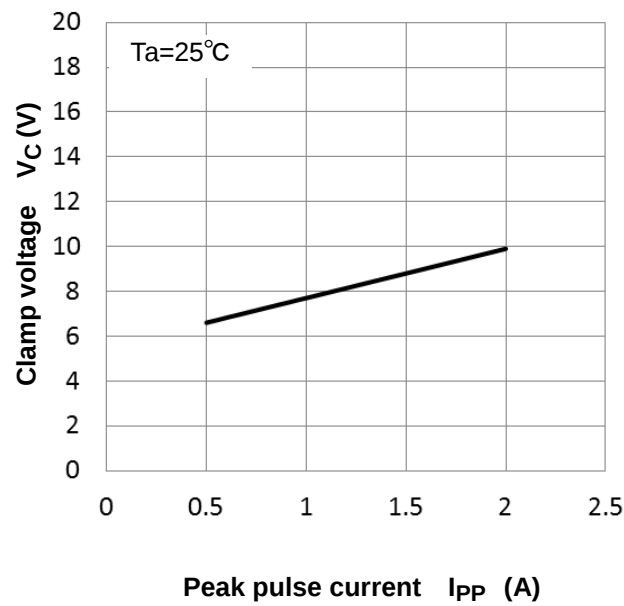


$C_t - f$



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

VC - I_{PP}



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

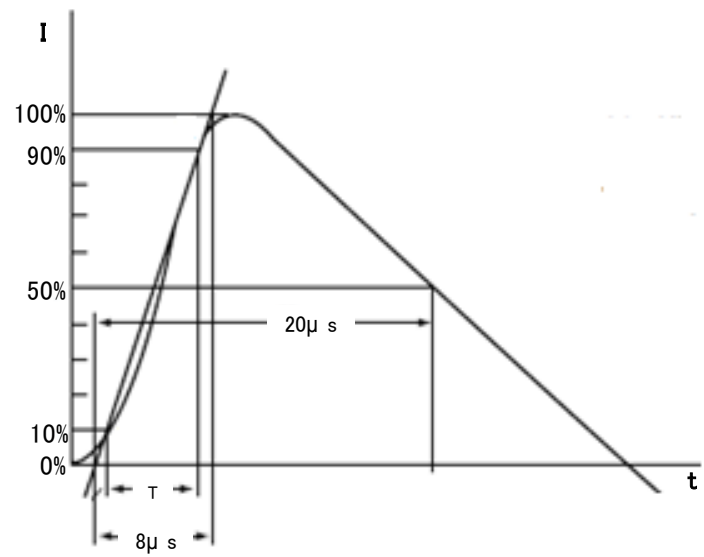
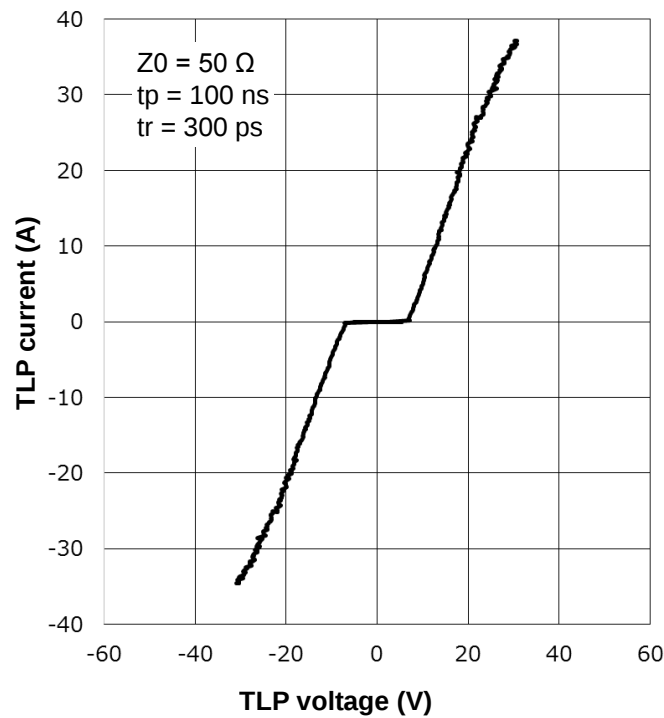


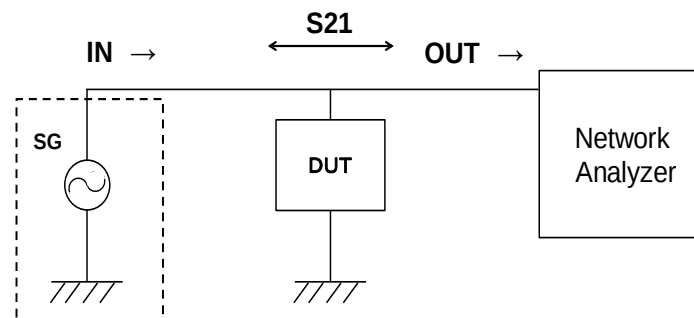
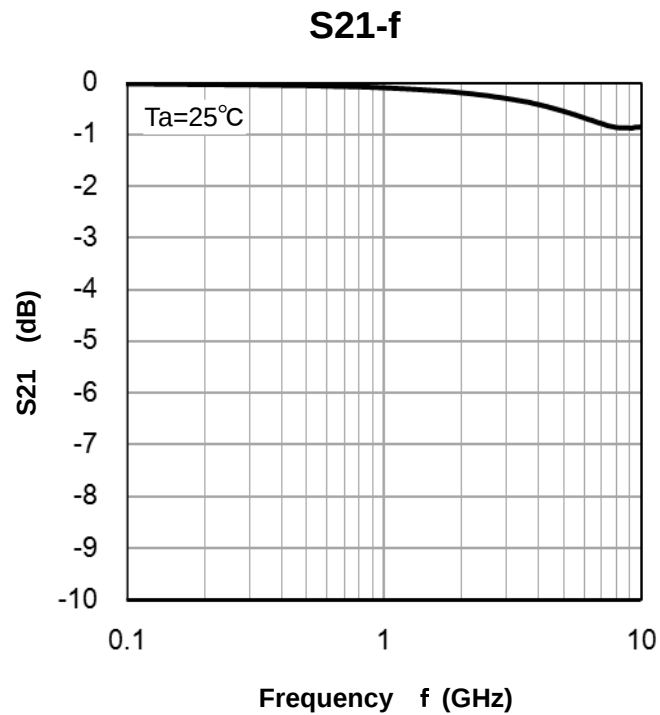
Fig Based on IEC61000-4-5 8/20 μ s pulse.(Ed.2)

TLP



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Insertion Loss (S21)

**Fig. S21 measurement circuit**

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

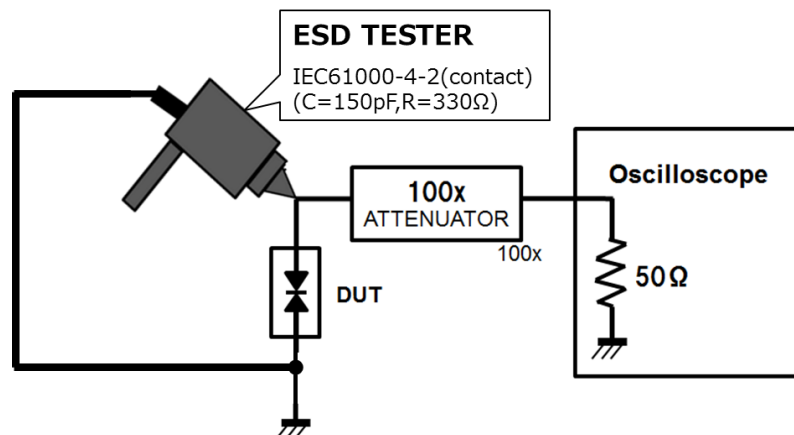
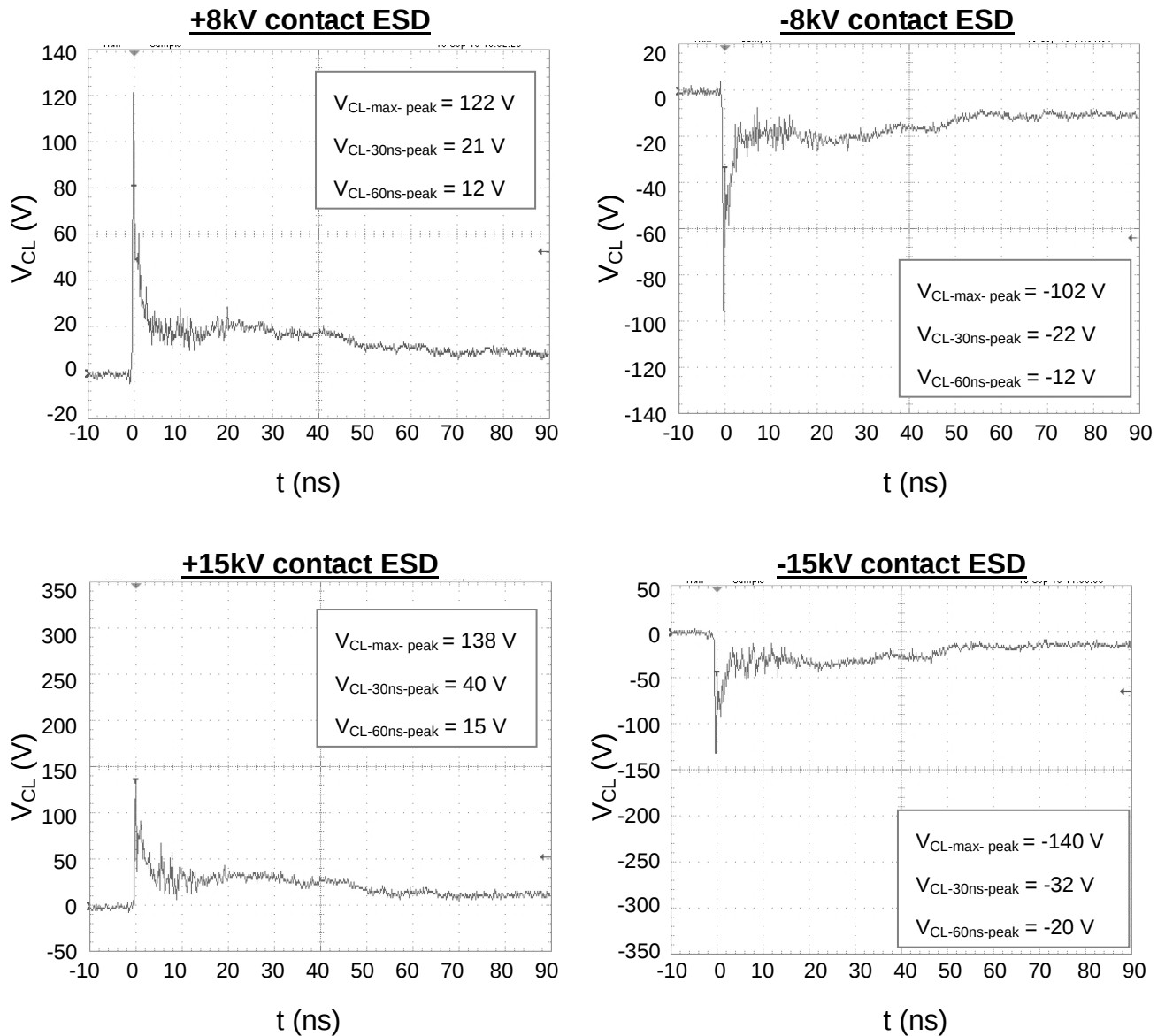
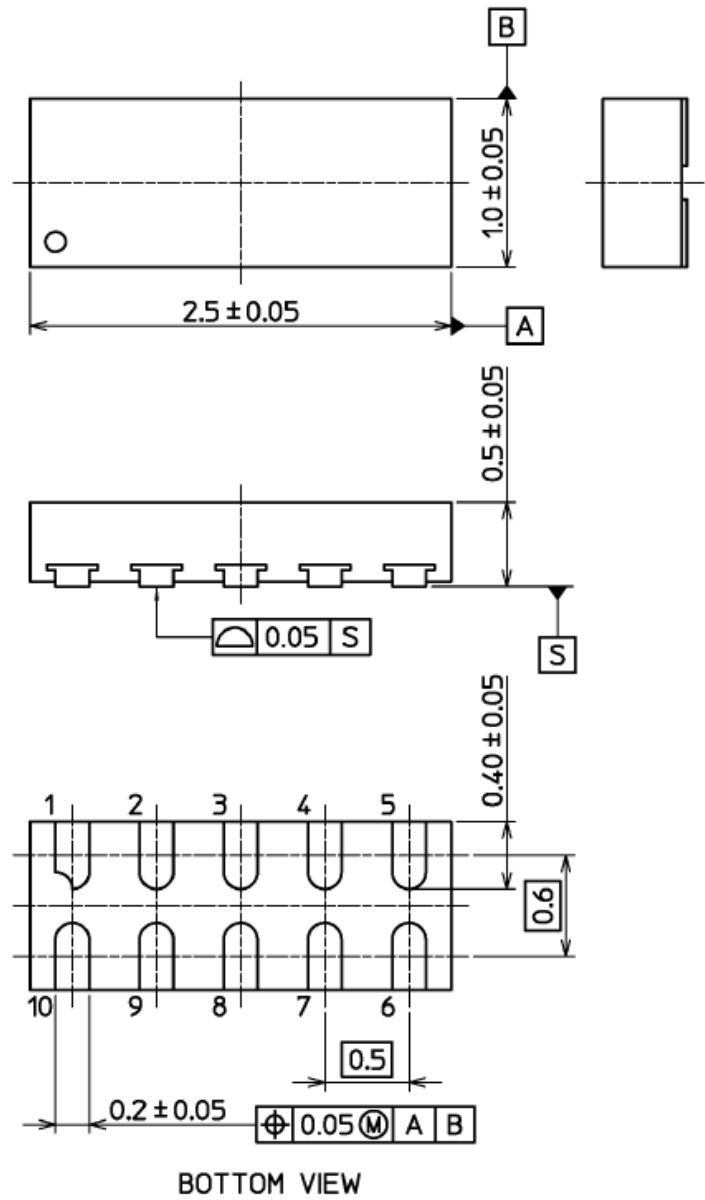


Fig. IEC61000-4-2 (Contact)

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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Адрес: 198099, Санкт-Петербург,
Промышленная ул, дом № 19, литера Н,
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