

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.

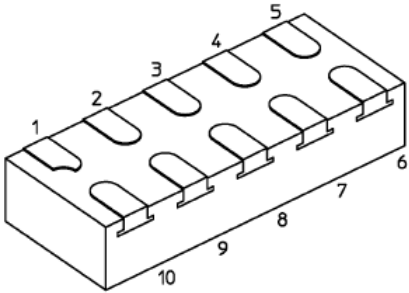
Absolute Maximum Ratings (Ta = 25°C)

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).

	
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

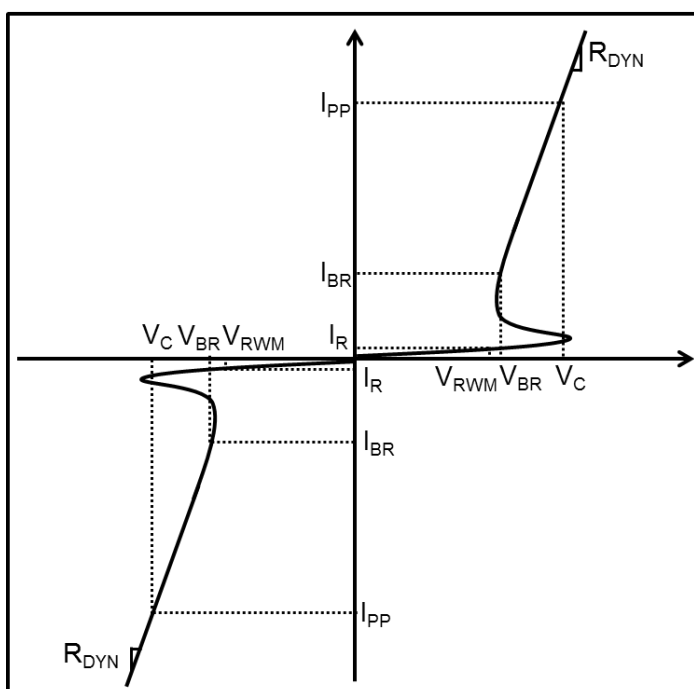
I_{BR} : Reverse breakdown current

I_R : Reverse Current

V_C : Clamping Voltage

I_{PP} : Peak pulse current

R_{DYN} : Dynamic resistance



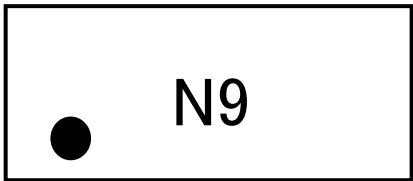
Characteristic	Symbol	Test Condition	Min	Typ.	Max	Unit
Working peak reverse voltage	V_{RWM}	—	—	—	5.5	V
Reverse breakdown voltage	V_{BR}	$I_{BR} = 1\text{ mA}$	5.6	6.2	8	V
Reverse Current	I_R	$V_{RWM} = 5.5\text{ V}$	—	—	0.1	μA
Clamping Voltage	V_C	$I_{PP}=1\text{A}$ (Note1)	—	8.5	—	V
	V_C	$I_{PP}=2\text{A}$ (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 $\mu\text{ s}$ 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 $I_{PP1} = 8\text{A}$ and $I_{PP2} = 16\text{A}$.

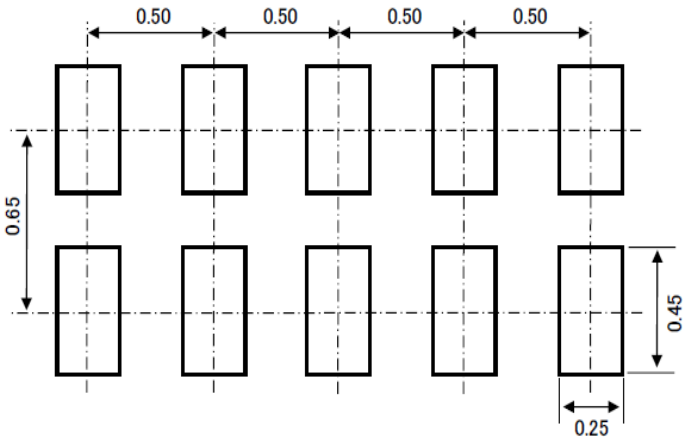
Note3 : Guaranteed by design.

Marking (Unit: mm)

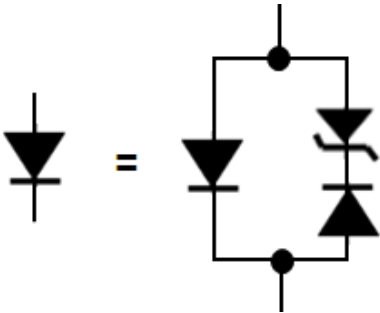
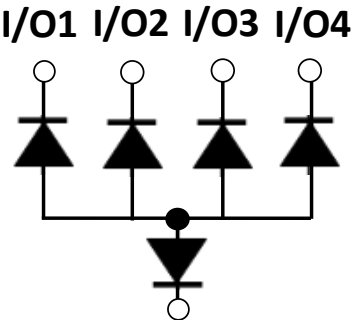


Marking Code	Part number
N9	DF10G6M4N

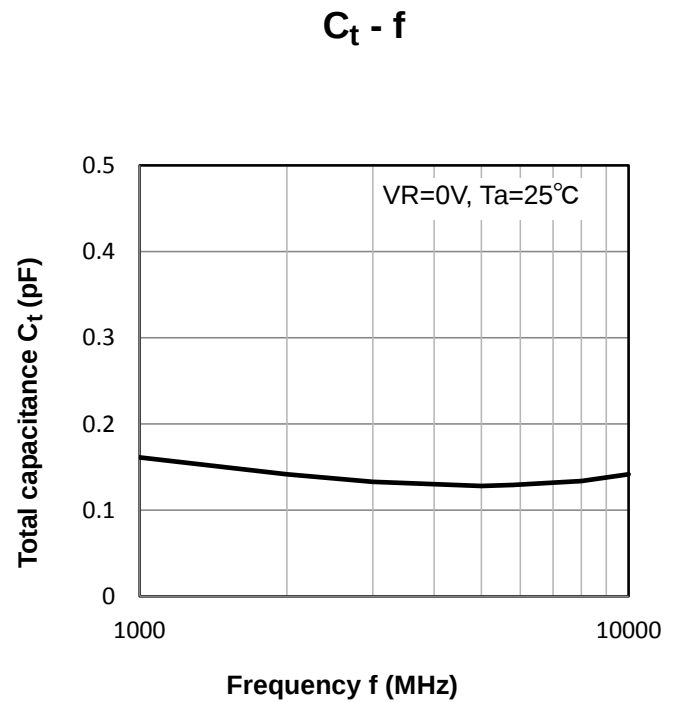
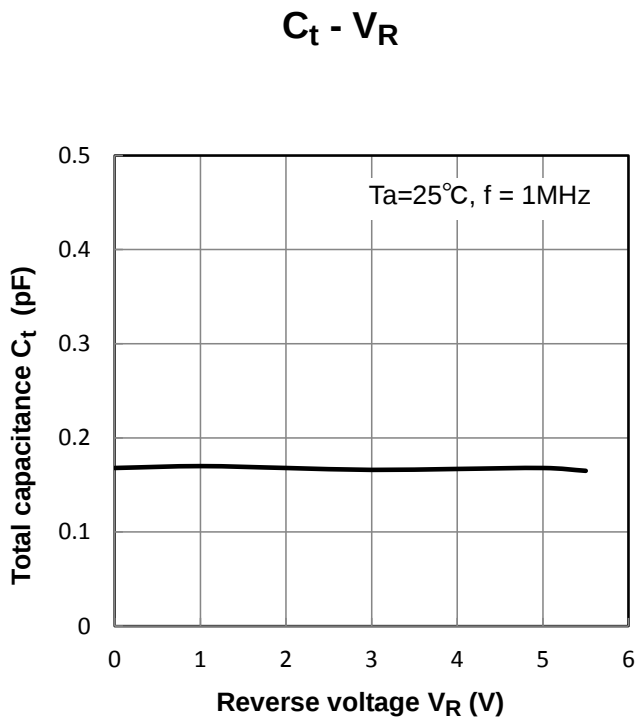
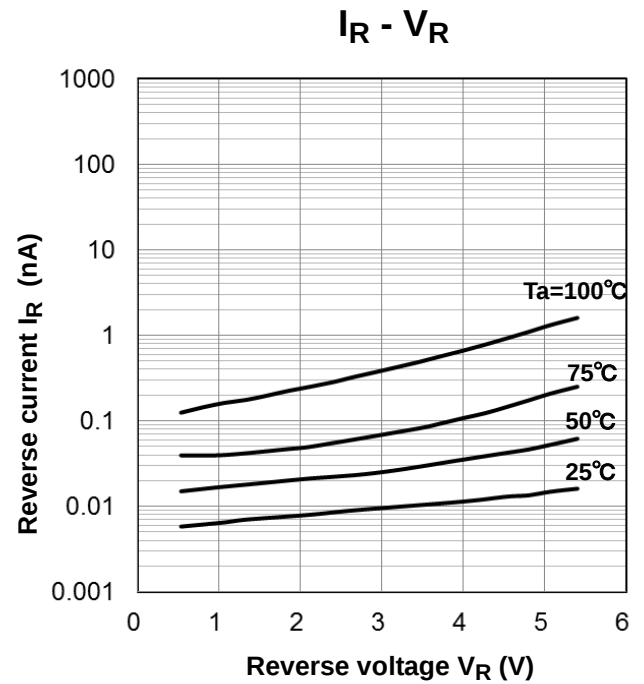
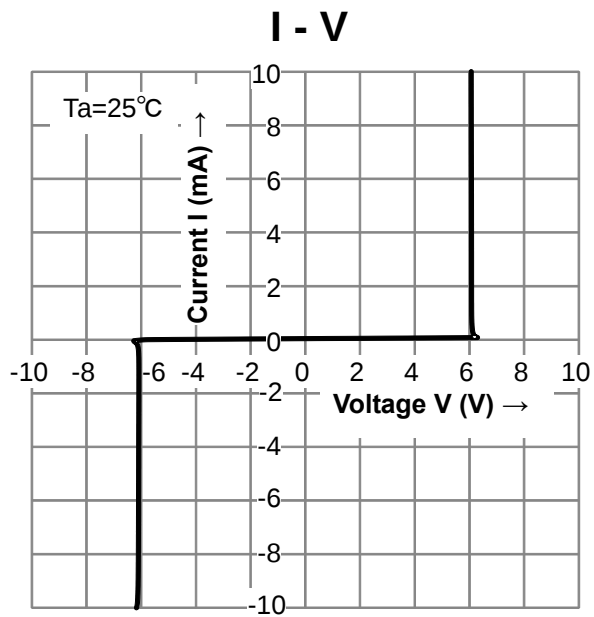
Land Pattern Dimensions for Reference Only



Equivalent Circuit



Characteristics Curves (Note)



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)

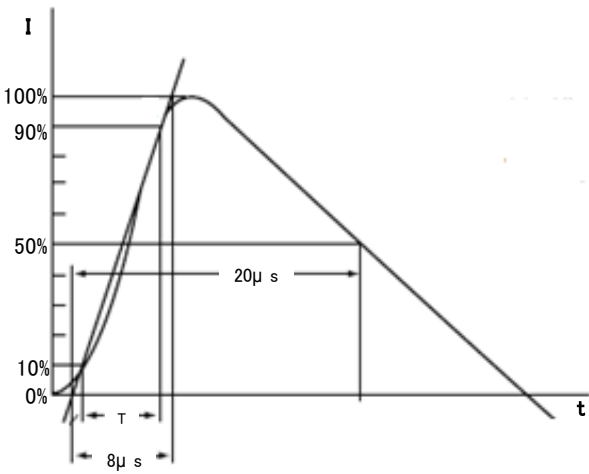
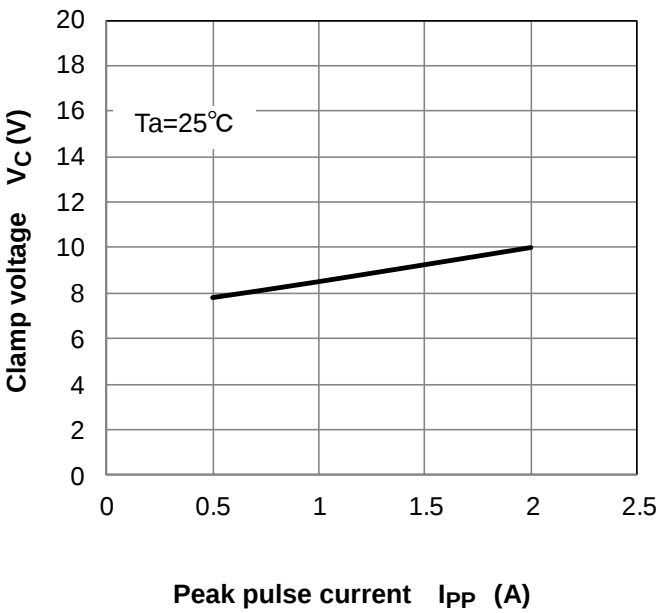
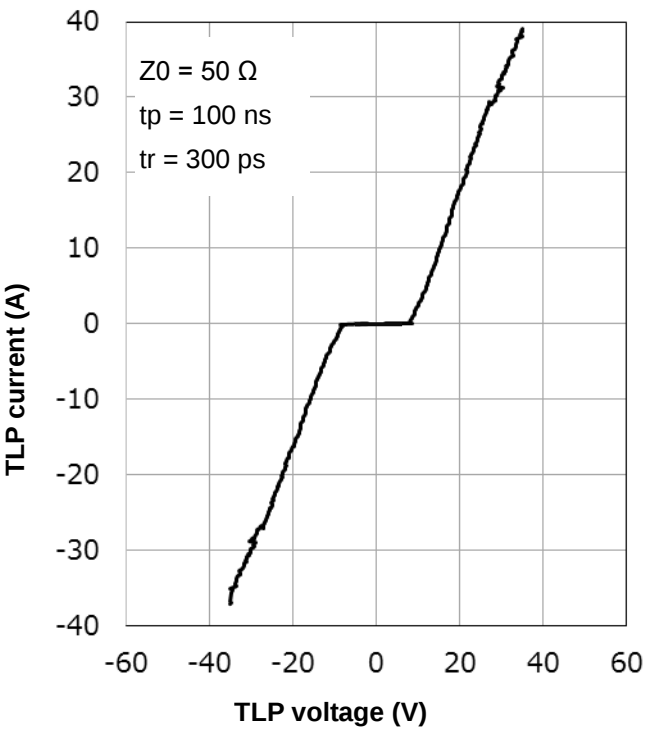


Fig Based on IEC61000-4-5 8/20 μ s pulse.(Ed.2)

TLP



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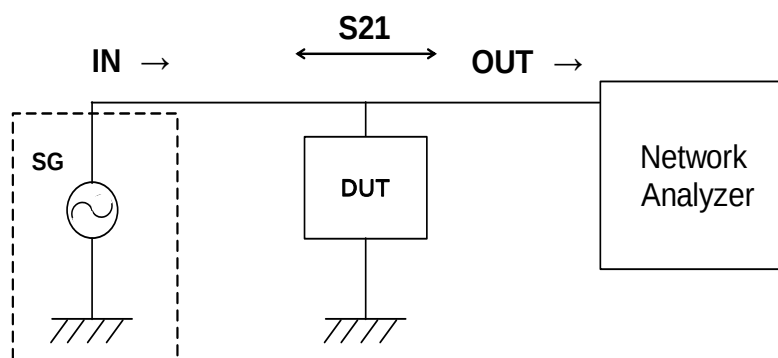
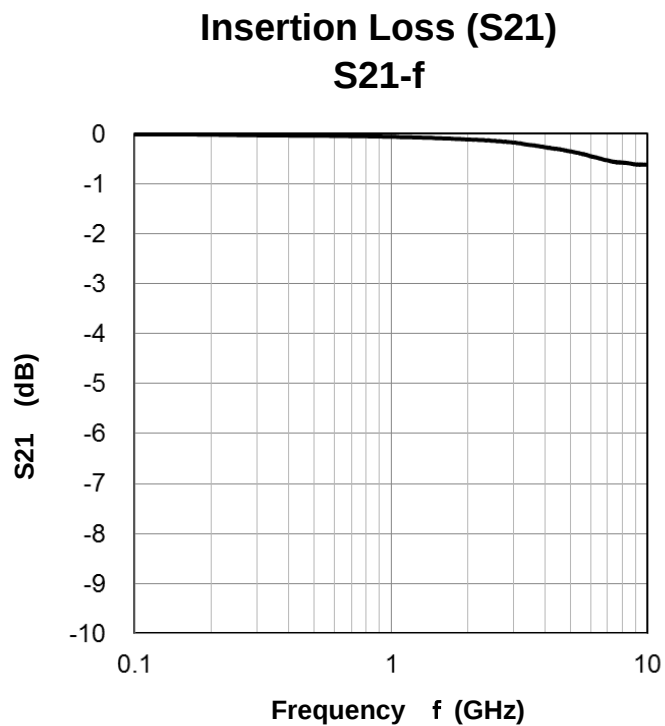
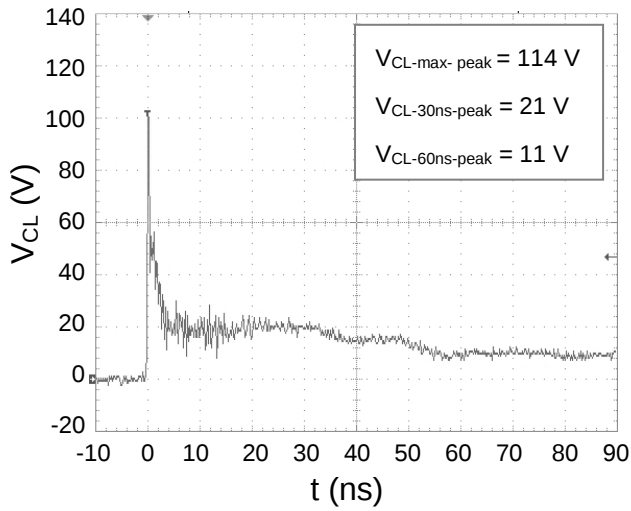


Fig. S21 measurement circuit

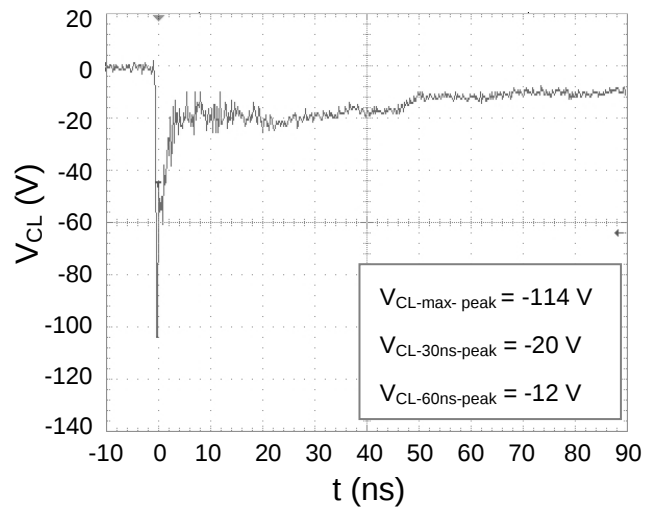
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ESD Clamp Waveform (IEC61000-4-2) (Note)

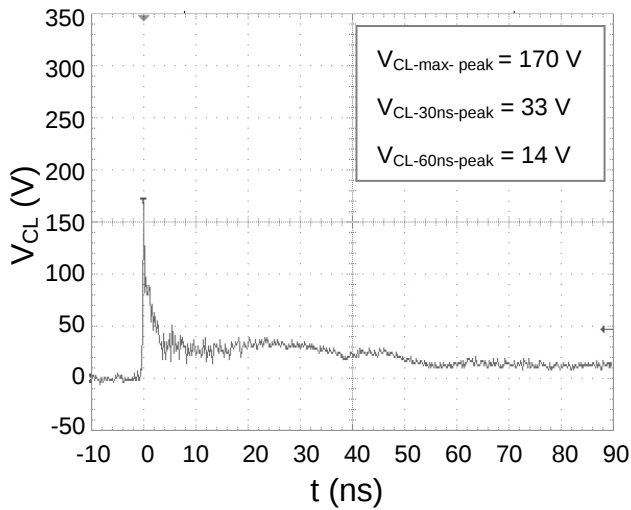
+8kV contact ESD



-8kV contact ESD



+15kV contact ESD



-15kV contact ESD

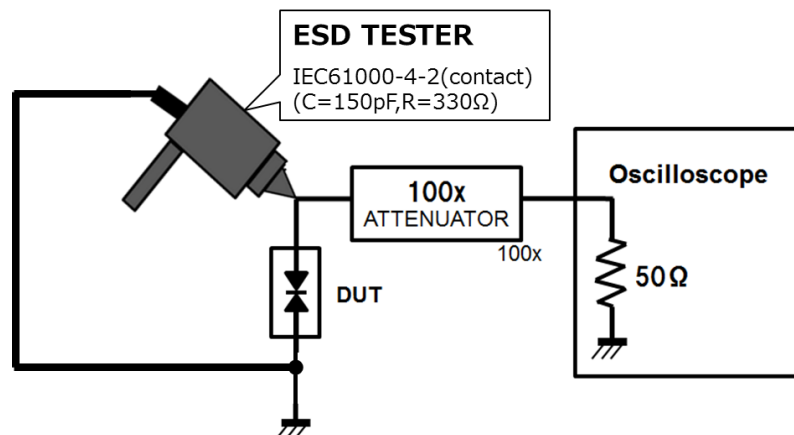
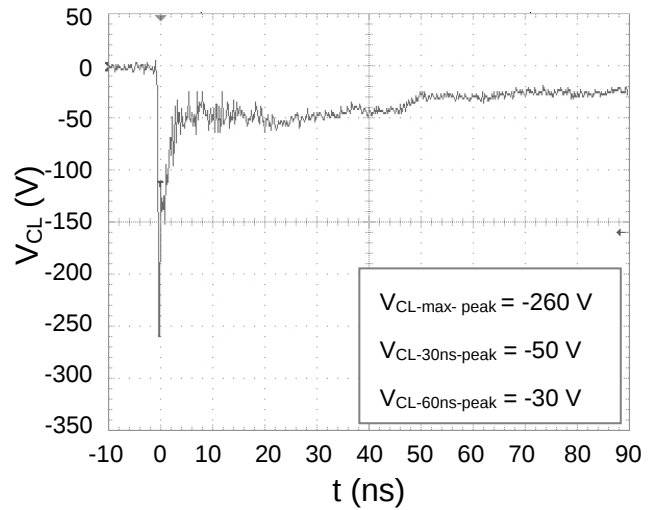
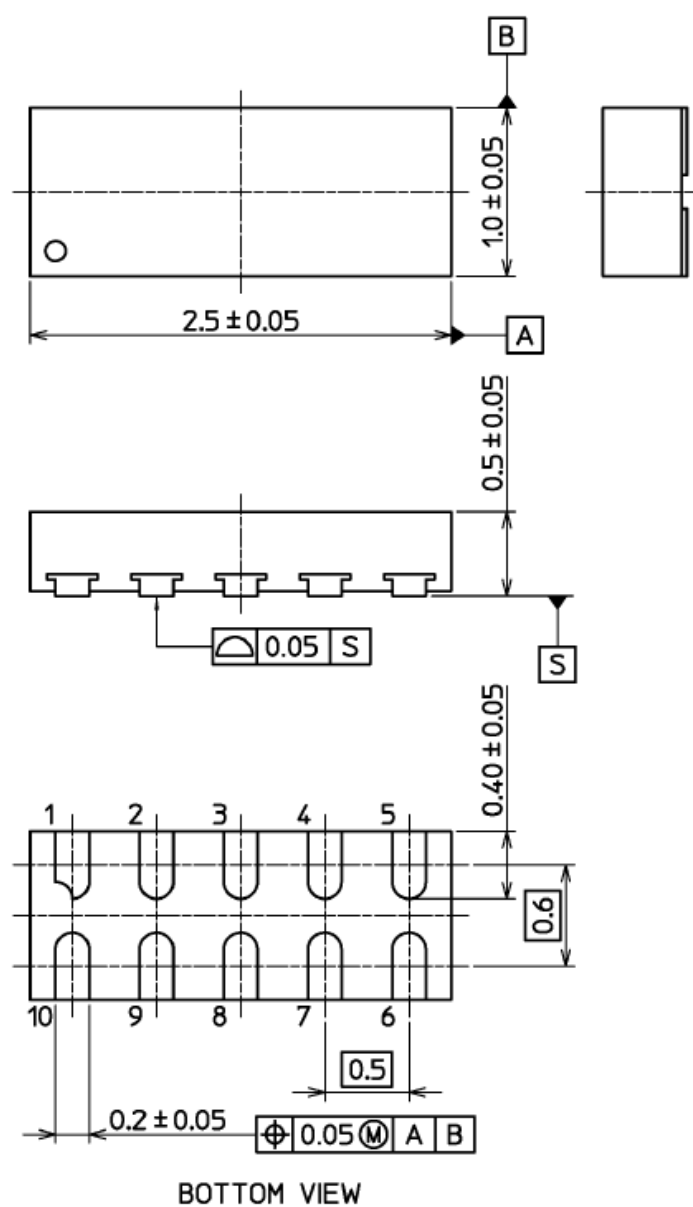


Fig. IEC61000-4-2 (Contact)

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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