

TOSHIBA Zener Diode Silicon Epitaxial Planar Type

CUHZ Series

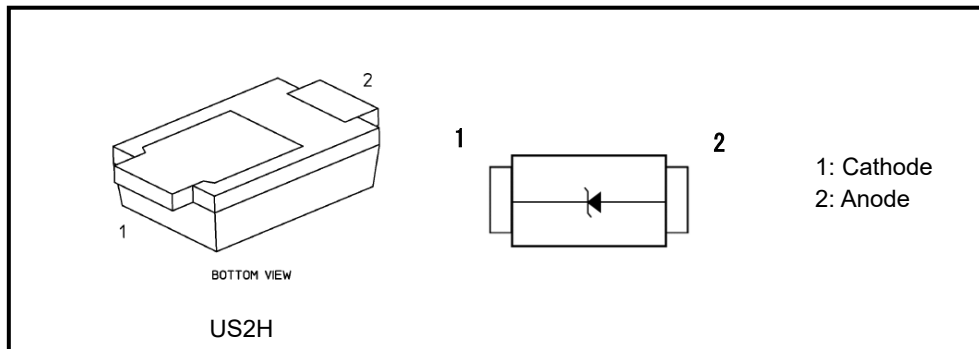
Applications

Voltage surge protection

Features

- Small package
- The typical voltage of VZ is accorded to E24 series

Packaging and Internal Circuit



Absolute Maximum Ratings 1 (Note) (Unless otherwise specified, Ta = 25°C)

Characteristics	Symbol	Rating	Unit
Power dissipation	P_D^{*1}	1200	mW
	P_D^{*2}	500	mW
Junction temperature	T_j	150	°C
Storage temperature	T_{stg}	-55 to 150	°C

Absolute Maximum Ratings 2 (Note) (Unless otherwise specified, Ta = 25°C)

Type No.	Electrostatic discharge voltage ^{*3}		Peak pulse power ^{*4}	Peak pulse current ^{*4}	Type No.	Electrostatic discharge voltage ^{*3}		Peak pulse power ^{*4}	Peak pulse current ^{*4}
	Contact	Air				Contact	Air		
	VESD(kV)					PPK(W)	IPP(A)		
CUHZ5V6	± 30		1750	91	CUHZ16V	± 30		2100	42
CUHZ6V2	± 30		1800	87	CUHZ20V	± 30		2100	36
CUHZ6V8	± 30		1800	73	CUHZ24V	± 30		2100	27
CUHZ8V2	± 30		1900	68	CUHZ30V	± 30		2100	26
CUHZ12V	± 30		2100	60	CUHZ36V	± 30		2100	23

Note: 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: Mounted on a glass epoxy circuit board of 25.4 mm × 25.4 mm × 1.6 mm, Cu pad: 645 mm²

*2: Mounted on a glass epoxy circuit board of 25.4 mm × 25.4 mm × 1.6 mm, pad dimensions of 4 mm × 4 mm.

*3: according to IEC61000-4-2

*4: according to IEC61000-4-5, tp = 8 / 20 μs

Start of commercial production
2021-04

CUHZ series Electrical Characteristics (Unless otherwise specified, $T_a = 25\text{ }^\circ\text{C}$)

Type No.	Zener Voltage			Test Current I_z (mA)	Dynamic Impedance		Dynamic resistance R_{DYN} (Ω) ^{*1}	Clamp voltage V_C (V) ^{*1*2}	Total capacitance C_t (pF) ^{*3}	Reverse Current	
	V_Z (V)				Z_Z (Ω)	Test Current I_z (mA)				I_R (μA)	Test Voltage V_R (V)
	Min	Typ.	Max	Max		Max	Typ.	Typ.	Typ.	Max	
CUHZ5V6	5.3	5.6	6.0	10	30	10	0.02	5.7	860	10	3.5
CUHZ6V2	5.8	6.2	6.6	10	30	10	0.02	6.1	735	10	5.0
CUHZ6V8	6.4	6.8	7.2	10	30	10	0.014	7.2	585	0.5	5.5
CUHZ8V2	7.7	8.2	8.7	10	30	10	0.035	8.5	450	0.1	7
CUHZ12V	11.4	12	12.6	10	30	10	0.13	13.6	280	0.1	10
CUHZ16V	15.3	16	17.1	10	35	10	0.085	17	210	0.1	14
CUHZ20V	18.8	20	21.2	10	35	10	0.13	20.6	180	0.1	17.6
CUHZ24V	22.8	24	25.6	10	70	10	0.14	25.5	150	0.1	19
CUHZ30V	28.0	30	32.0	10	80	10	0.21	33.8	125	0.1	27
CUHZ36V	34.0	36	38.0	9	100	9	0.39	41.2	105	0.1	32.5

*1: TLP parameters: $Z_0 = 50\ \Omega$, $t_p = 100\ \text{ns}$, $t_r = 300\ \text{ps}$, 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 $I_{TLP1} = 16\ \text{A}$ and $I_{TLP2} = 30\ \text{A}$.

*2: $I_{TLP} = 16\ \text{A}$

*3: $V_R = 0\ \text{V}$, $f = 1\ \text{MHz}$

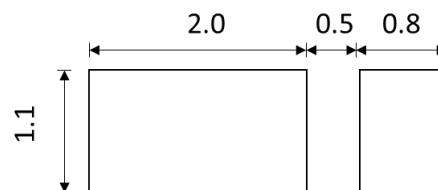
Marking List

Type No.	Marking	Type No.	Marking
CUHZ5V6	LL	CUHZ16V	M7
CUHZ6V2	LM	CUHZ20V	M9
CUHZ6V8	LN	CUHZ24V	MB
CUHZ8V2	LQ	CUHZ30V	MD
CUHZ12V	M4	CUHZ36V	MF

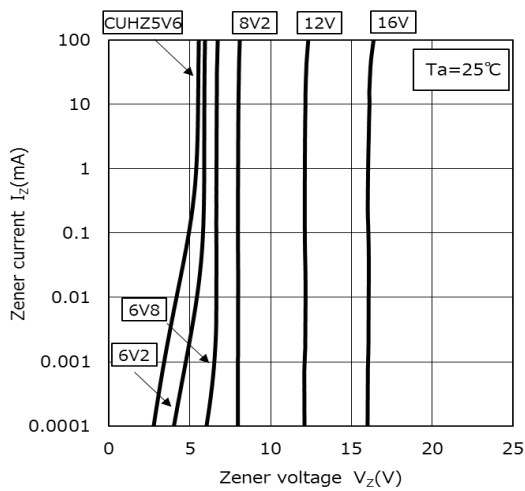
Marking (CUHZ5V6)



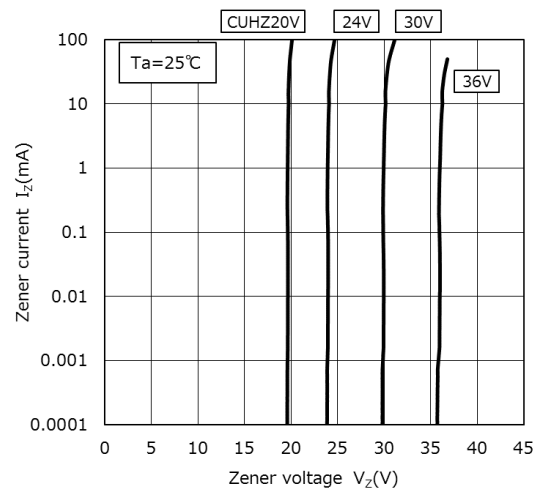
Land Pattern Dimensions (for reference only) (Unit: mm)



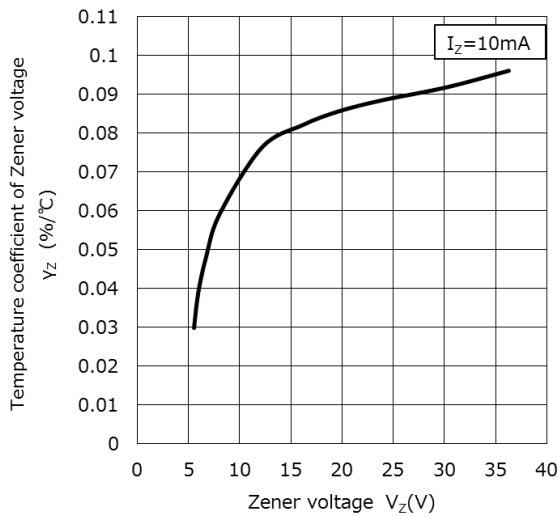
CUHZ series Characteristics Curves (Note)



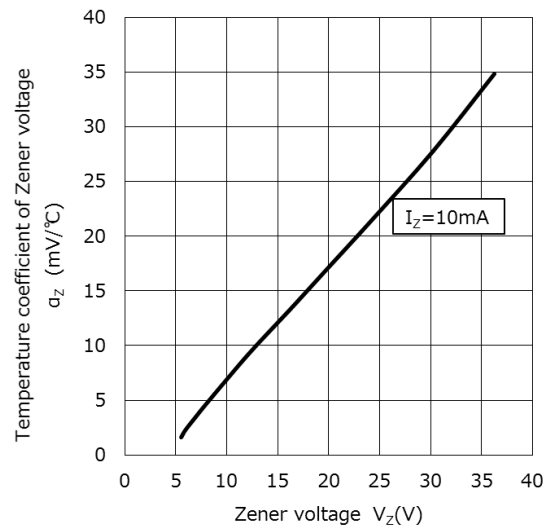
$I_Z - V_Z$ (1)



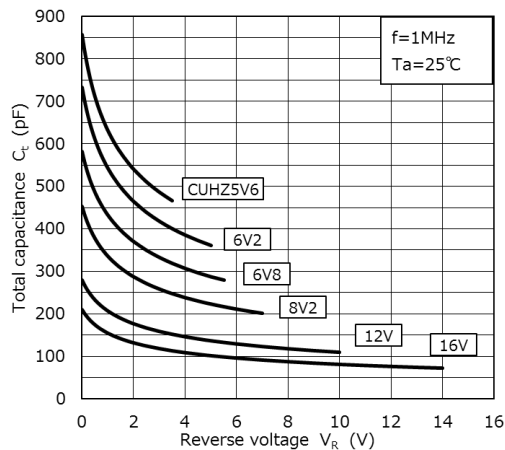
$I_Z - V_Z$ (2)



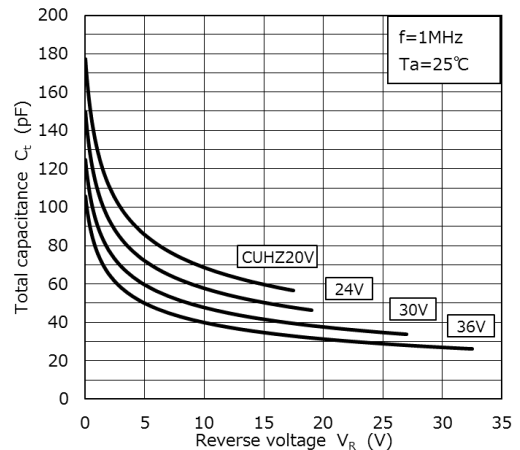
$\gamma_Z - V_Z$



$\alpha_Z - V_Z$



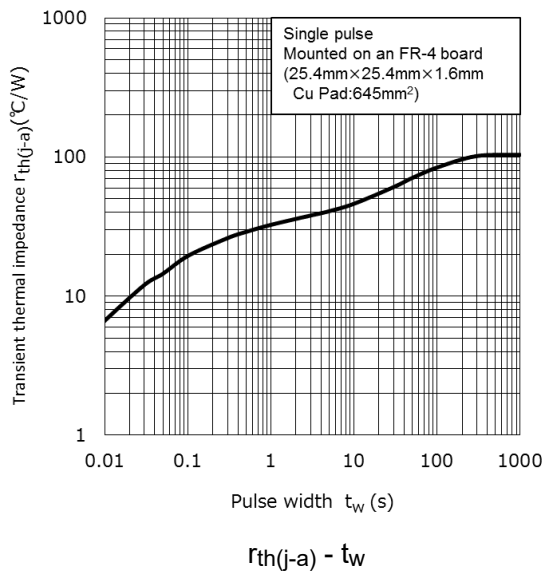
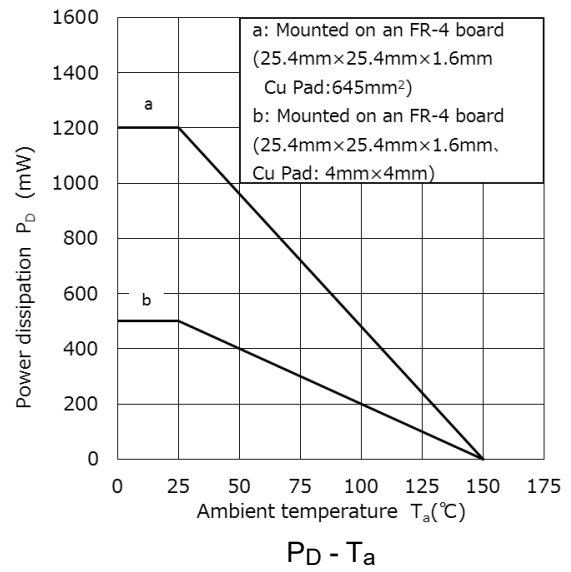
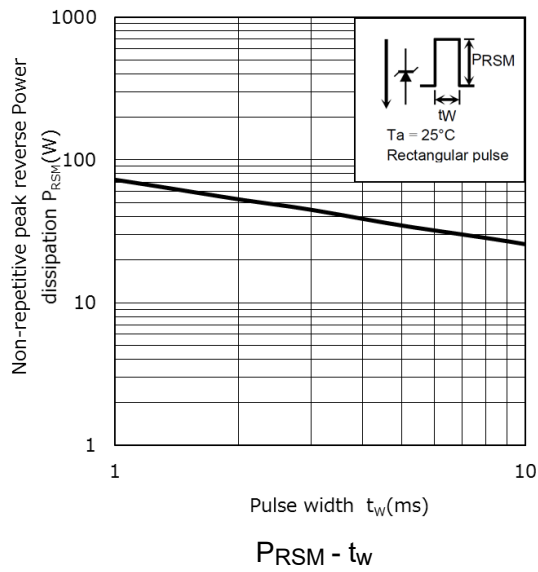
$C_t - V_R$ (1)



$C_t - V_R$ (2)

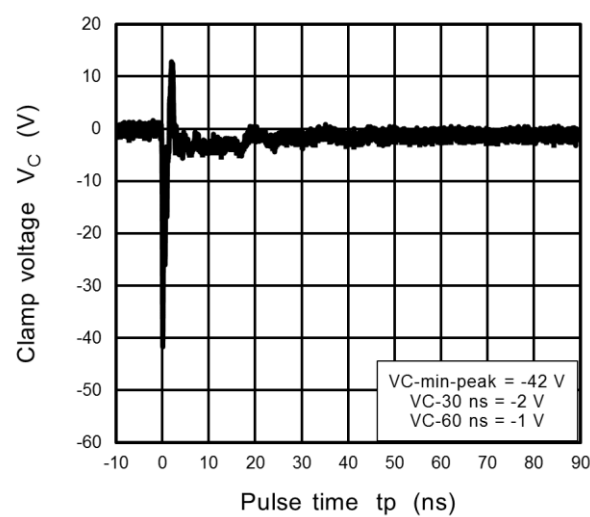
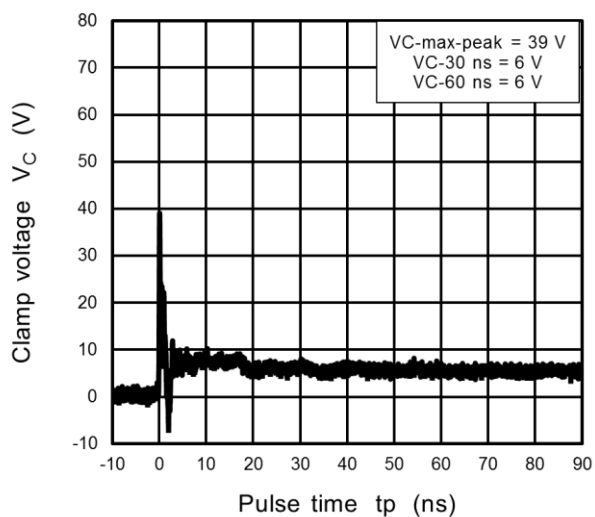
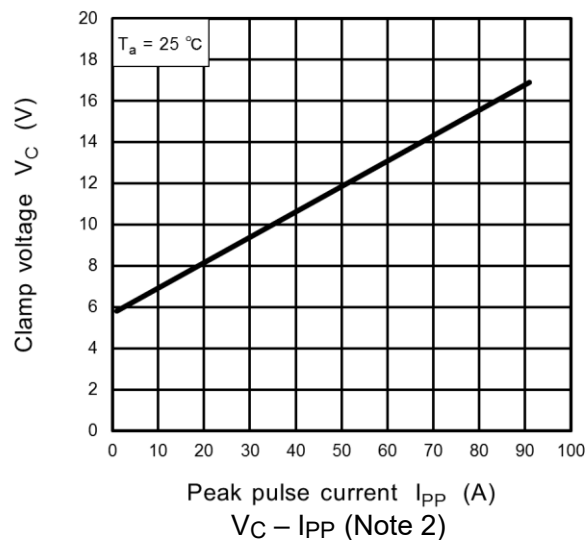
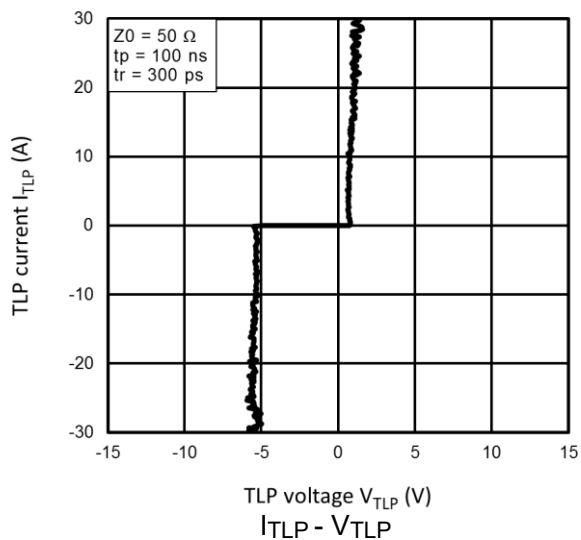
Note: The above characteristics curves are presented for reference only and not guaranteed by production test, unless otherwise noted.

CUHZ series Characteristics Curves (Note)



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

CUHZ5V6 Characteristics Curves (Note 1)

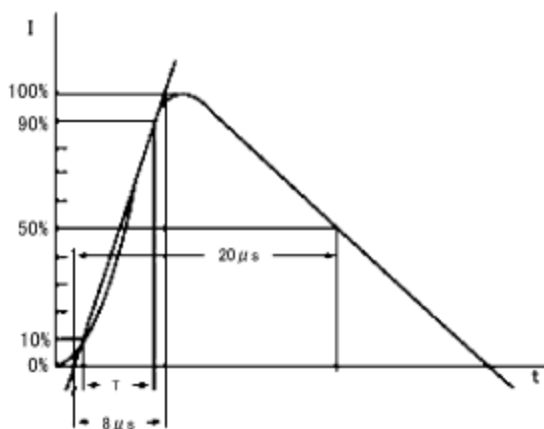


Clamp Waveform +8 kV (Note 3)

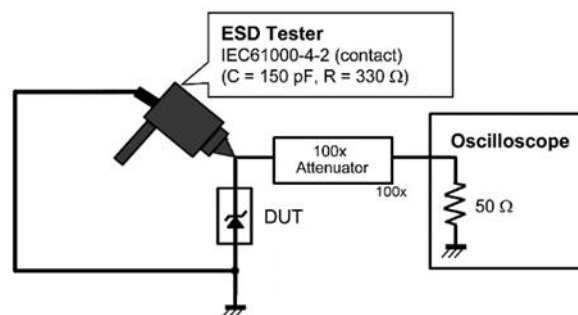
Clamp Waveform -8 kV (Note 3)

(Note 2) Peak Pulse Current ($V_C - I_{PP}$)

(Note 3) Clamp waveform measurement circuit



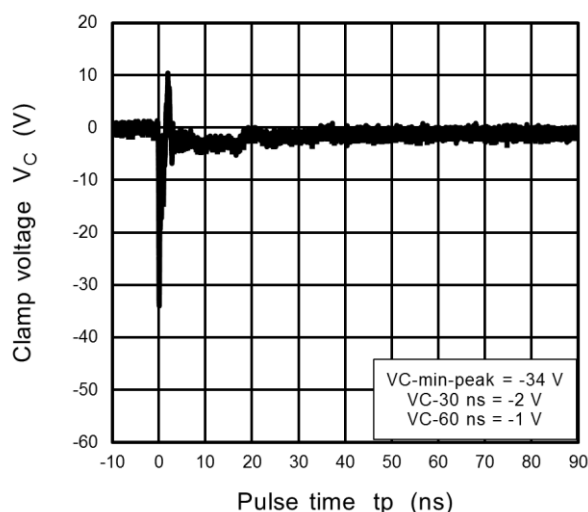
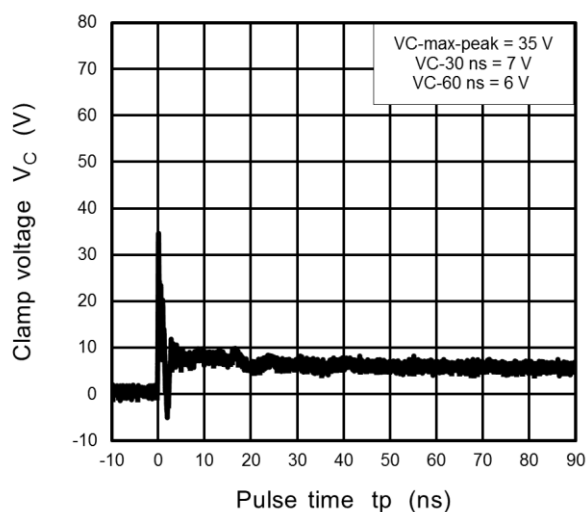
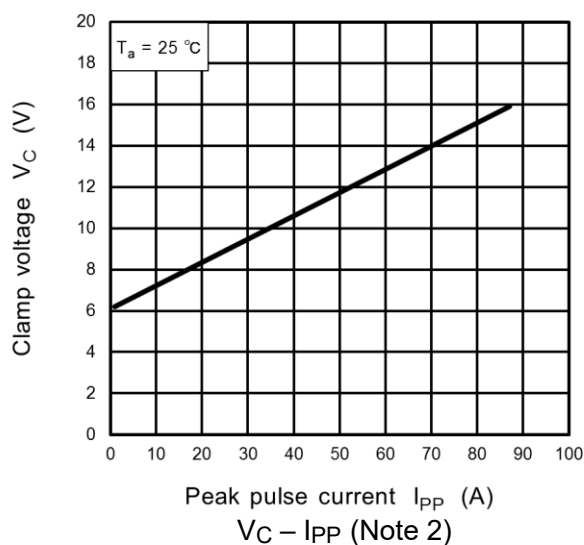
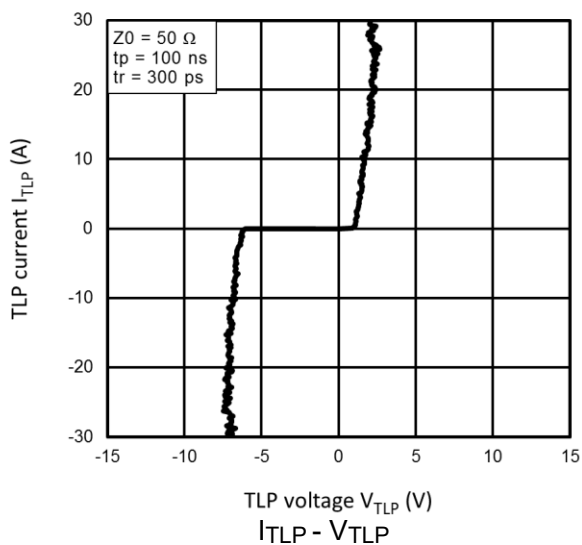
Based on IEC61000-4-5 8/20 μ s pulse.



IEC61000-4-2 (Contact)

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CUHZ6V2 Characteristics Curves (Note 1)

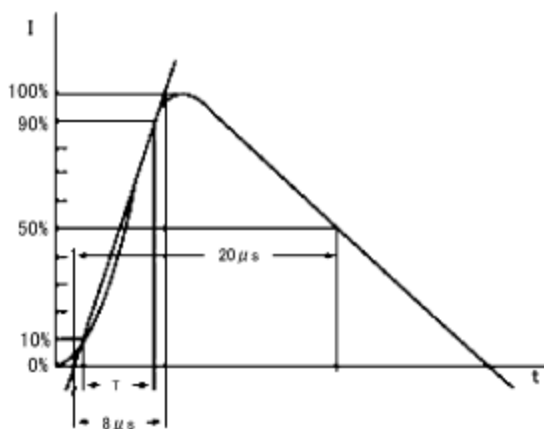


Clamp Waveform +8 kV (Note 3)

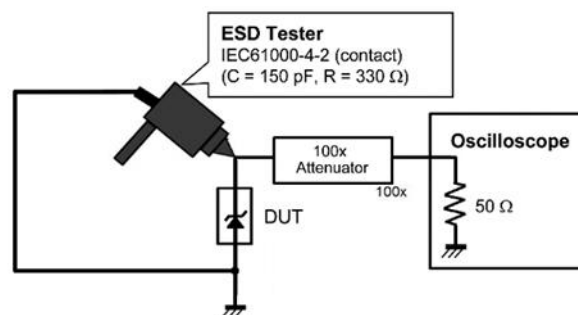
Clamp Waveform -8 kV (Note 3)

(Note 2) Peak Pulse Current ($V_C - I_{PP}$)

(Note 3) Clamp waveform measurement circuit



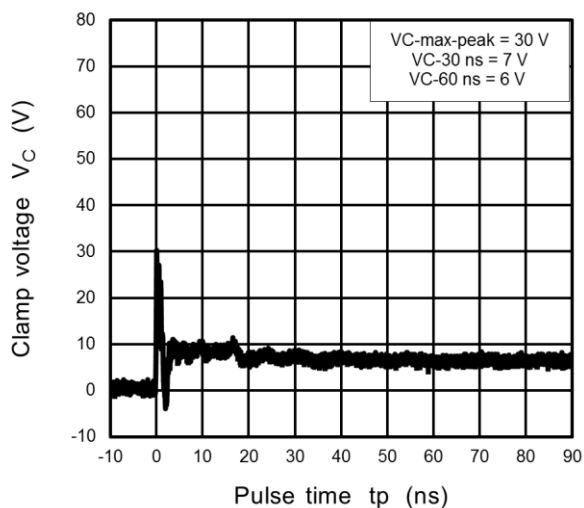
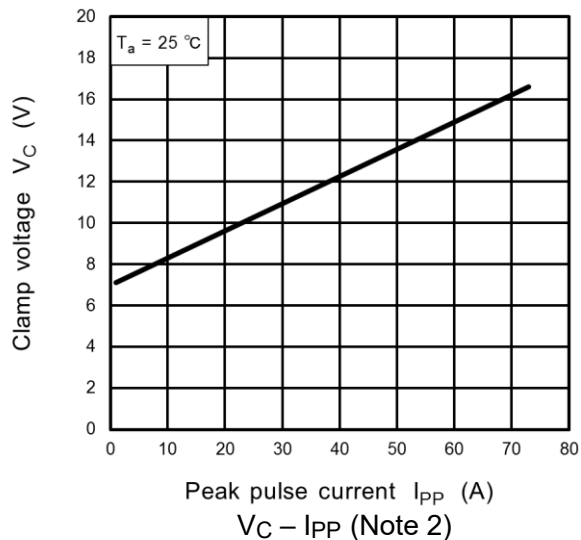
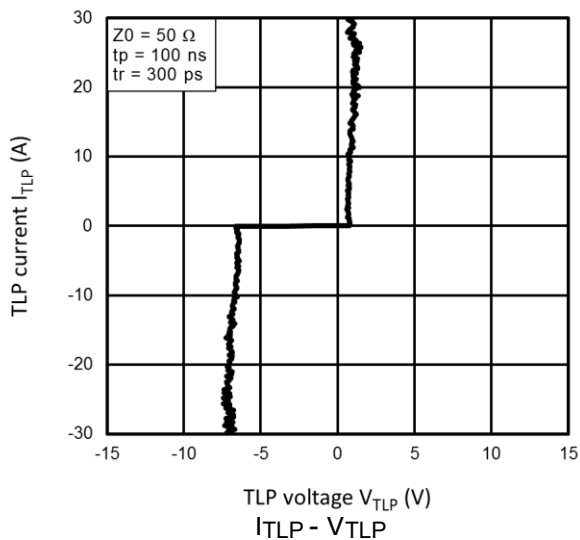
Based on IEC61000-4-5 8/20 μs pulse.



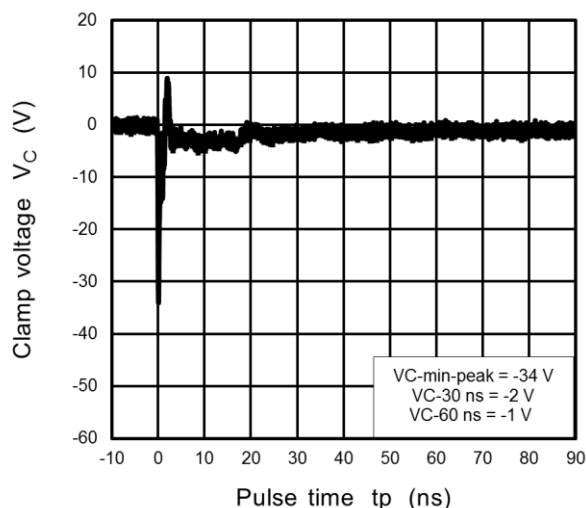
IEC61000-4-2 (Contact)

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CUHZ6V8 Characteristics Curves (Note 1)

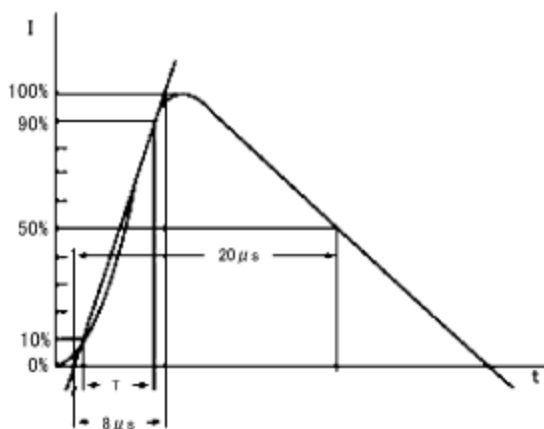


Clamp Waveform +8 kV (Note 3)



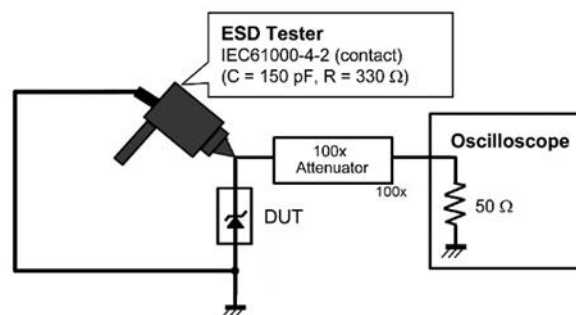
Clamp Waveform -8 kV (Note 3)

(Note 2) Peak Pulse Current ($V_C - I_{PP}$)



Based on IEC61000-4-5 8/20 μs pulse.

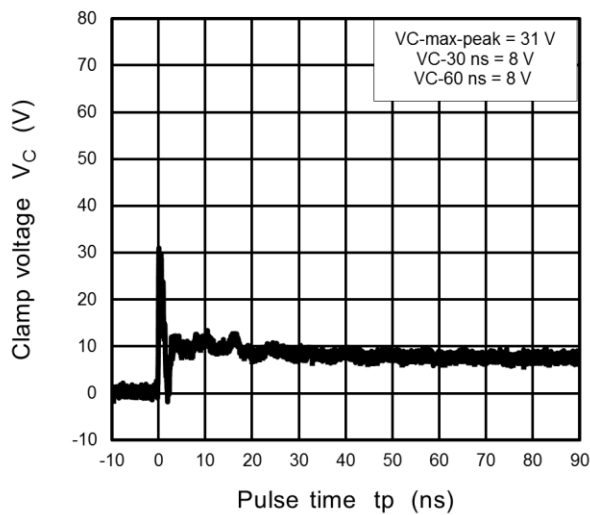
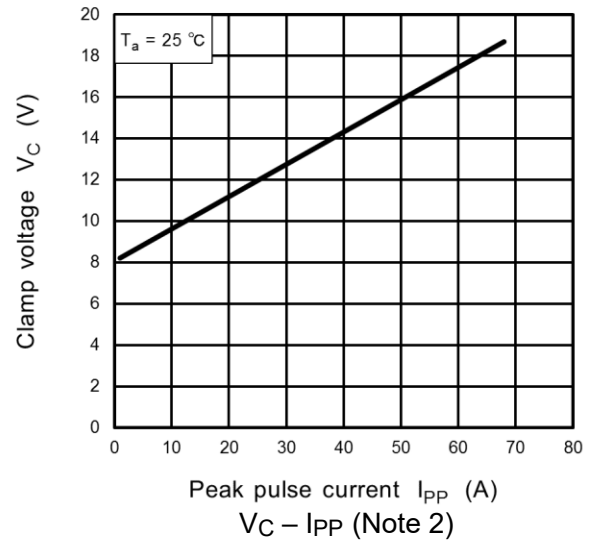
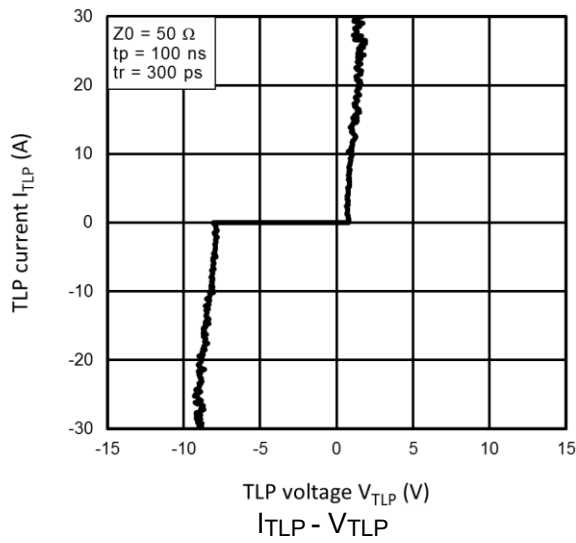
(Note 3) Clamp waveform measurement circuit



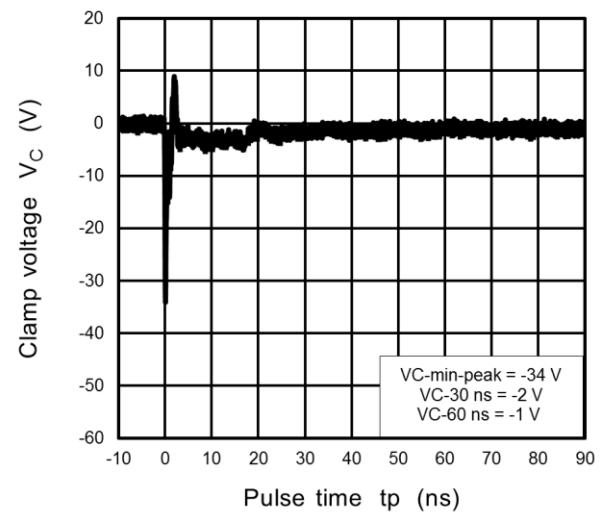
IEC61000-4-2 (Contact)

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CUHZ8V2 Characteristics Curves (Note 1)

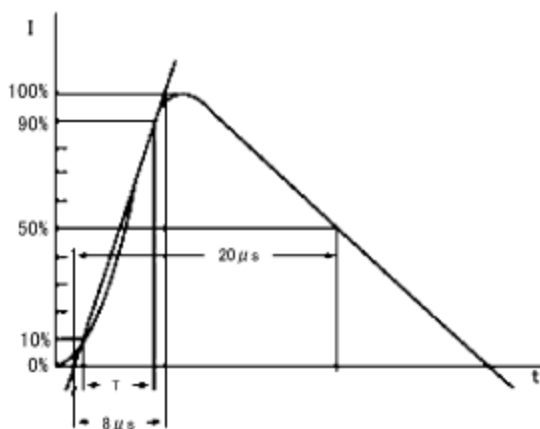


Clamp Waveform +8 kV (Note 3)



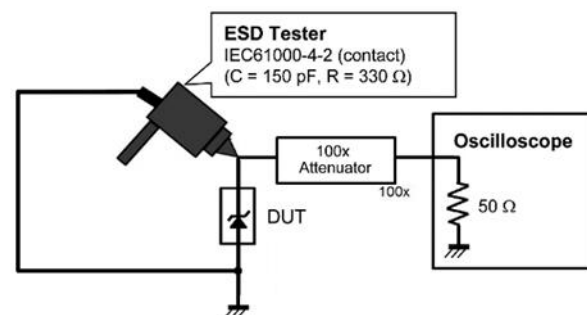
Clamp Waveform -8 kV (Note 3)

(Note 2) Peak Pulse Current ($V_C - I_{PP}$)



Based on IEC61000-4-5 8/20 μs pulse.

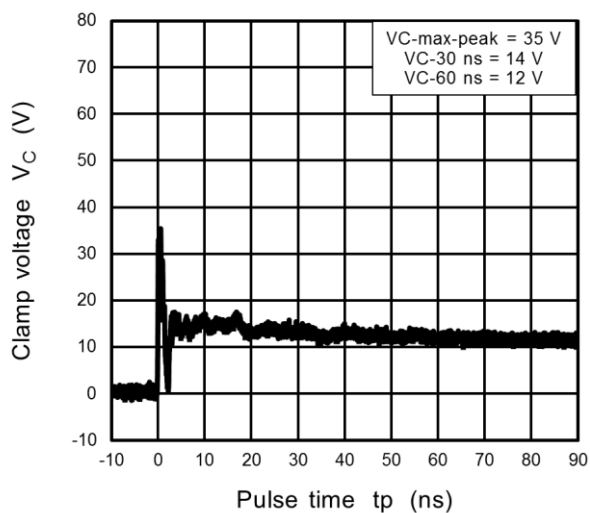
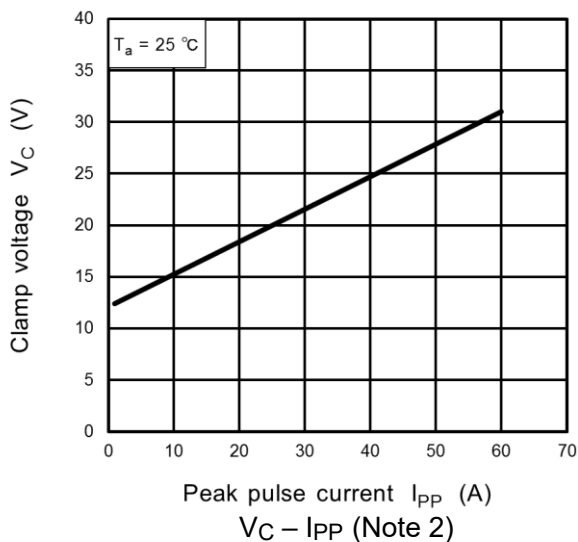
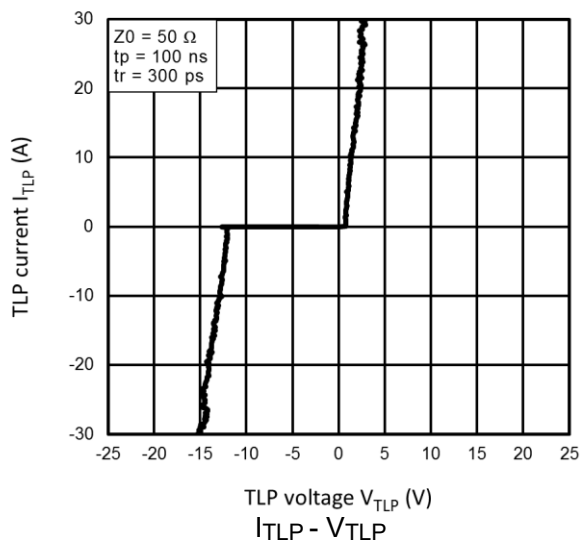
(Note 3) Clamp waveform measurement circuit



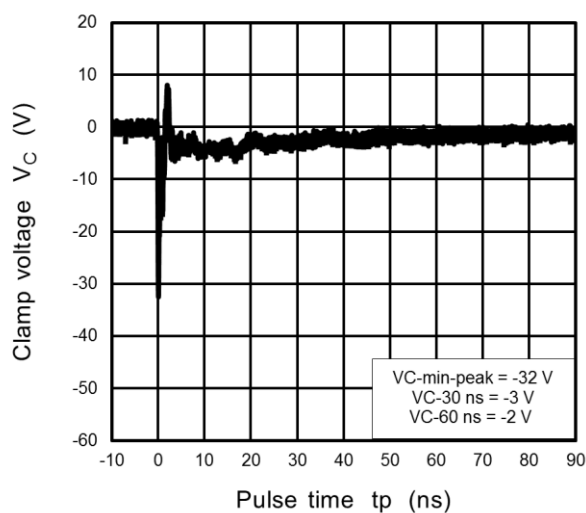
IEC61000-4-2 (Contact)

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CUHZ12V Characteristics Curves (Note 1)

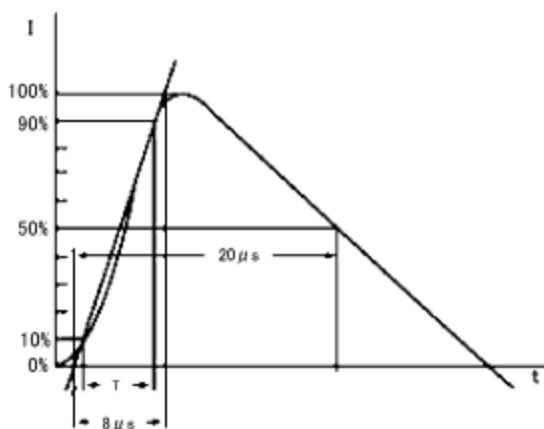


Clamp Waveform +8 kV (Note 3)



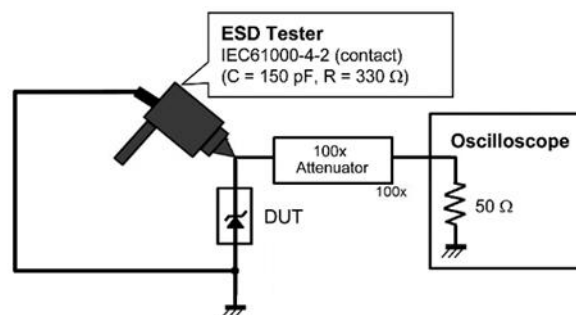
Clamp Waveform -8 kV (Note 3)

(Note 2) Peak Pulse Current ($V_C - I_{PP}$)



Based on IEC61000-4-5 8/20 μ s pulse.

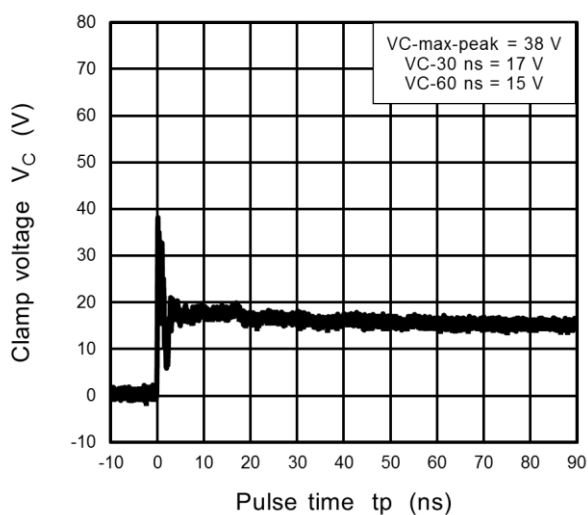
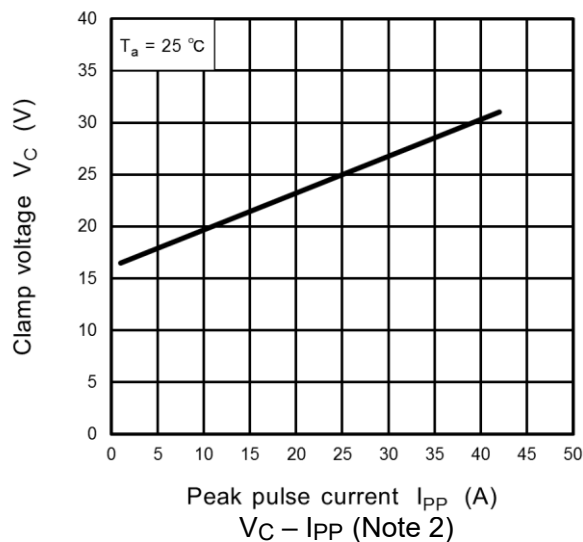
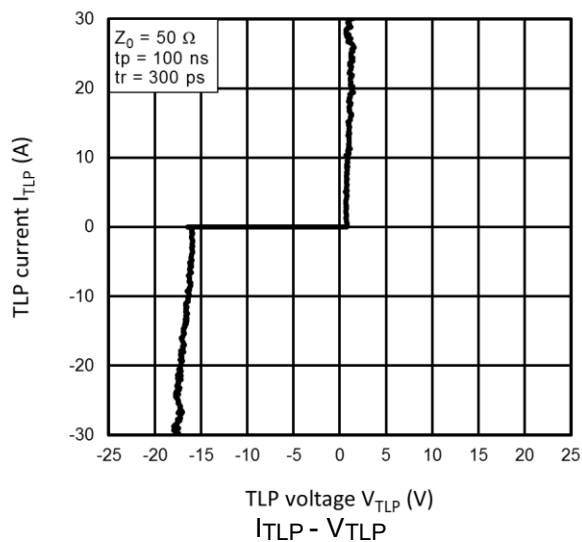
(Note 3) Clamp waveform measurement circuit



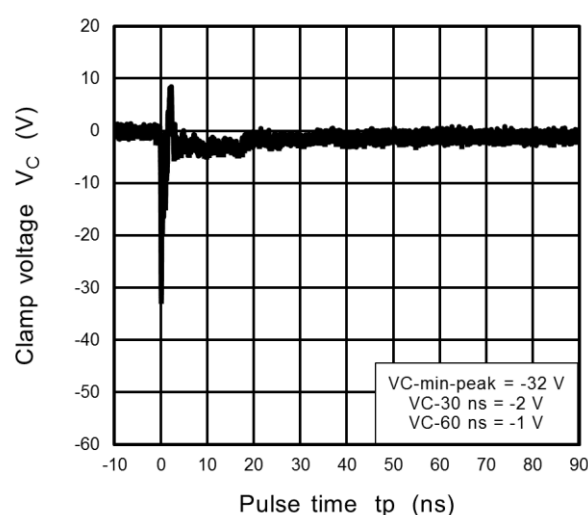
IEC61000-4-2 (Contact)

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CUHZ16V Characteristics Curves (Note 1)

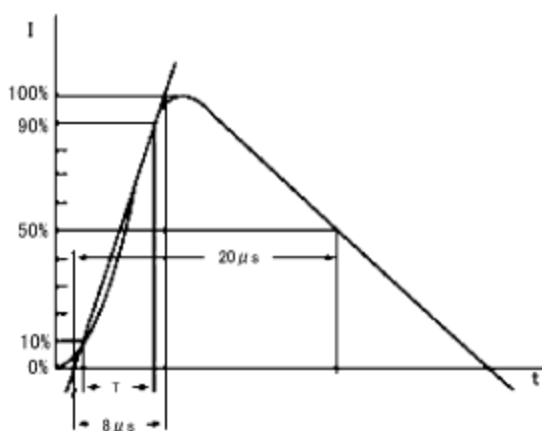


Clamp Waveform +8 kV (Note 3)



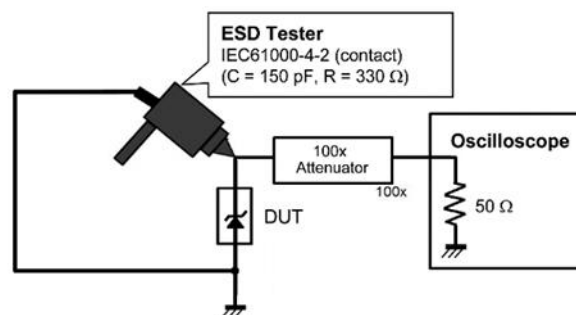
Clamp Waveform -8 kV (Note 3)

(Note 2) Peak Pulse Current ($V_C - I_{PP}$)



Based on IEC61000-4-5 8/20 μs pulse.

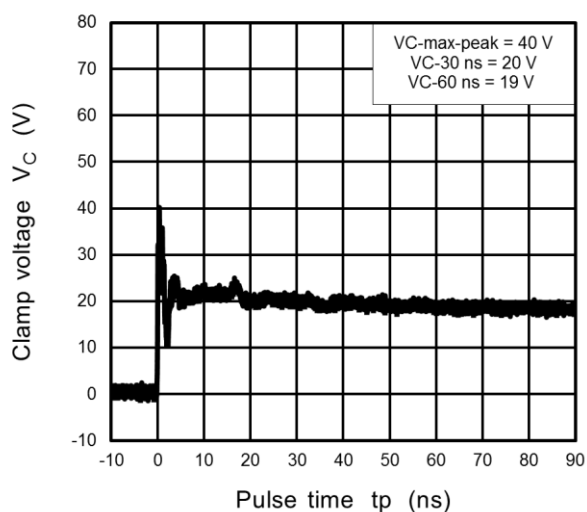
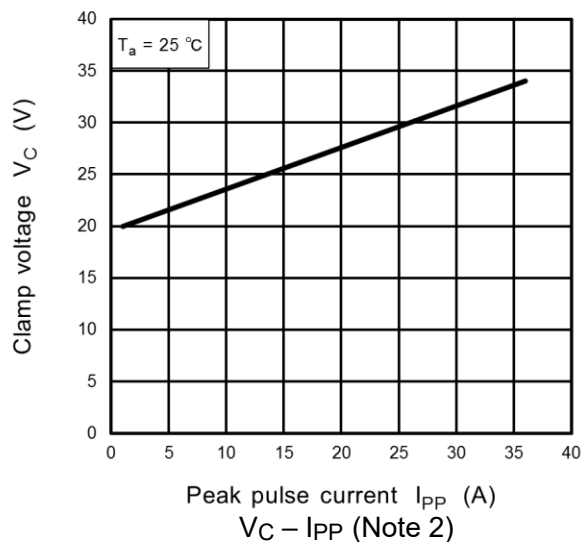
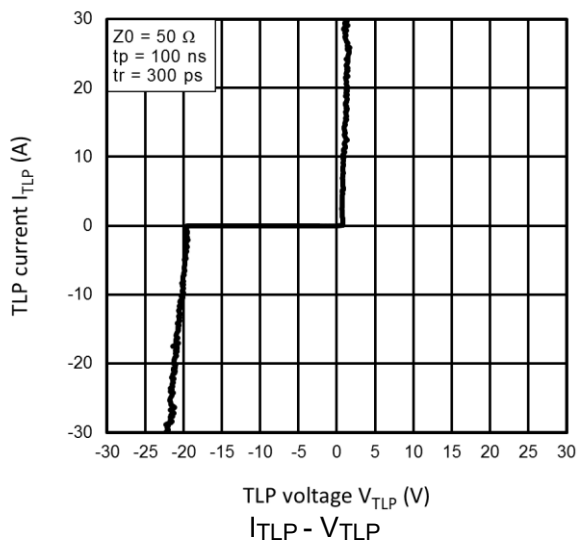
(Note 3) Clamp waveform measurement circuit



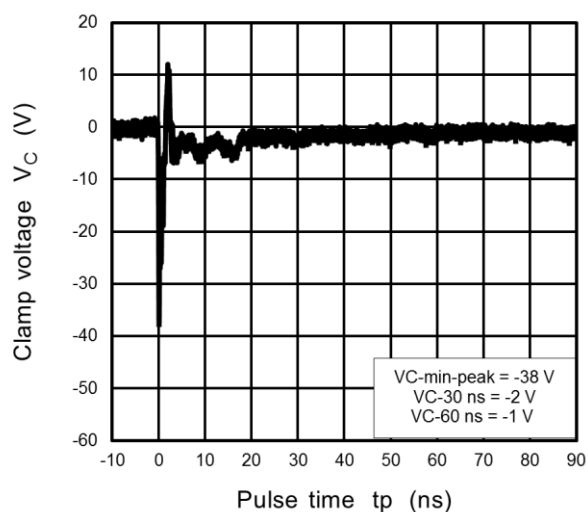
IEC61000-4-2 (Contact)

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CUHZ20V Characteristics Curves (Note 1)

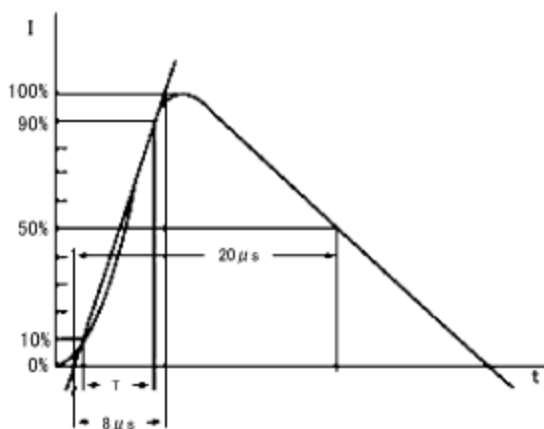


Clamp Waveform +8 kV (Note 3)



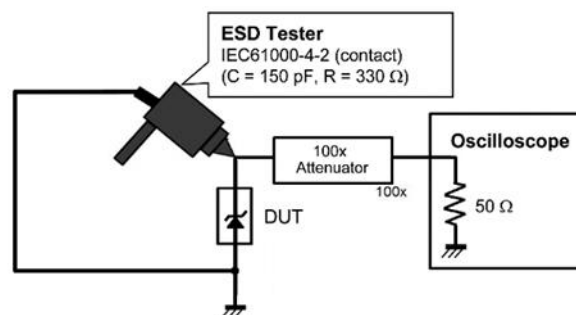
Clamp Waveform -8 kV (Note 3)

(Note 2) Peak Pulse Current ($V_C - I_{PP}$)



Based on IEC61000-4-5 8/20 μs pulse.

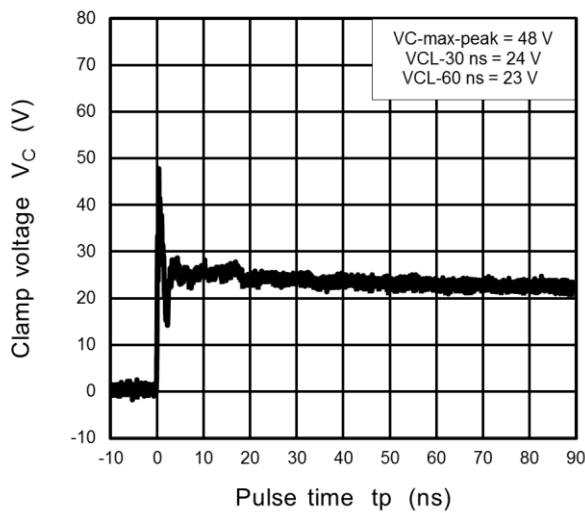
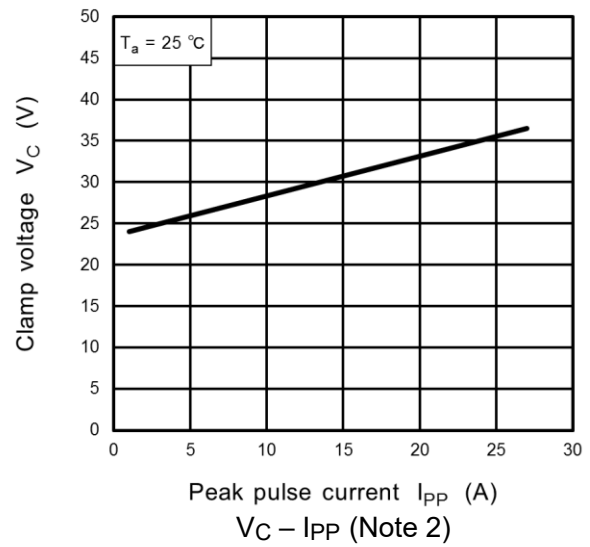
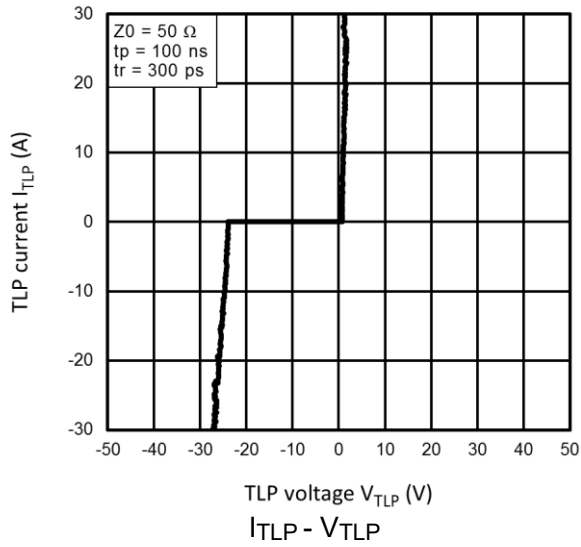
(Note 3) Clamp waveform measurement circuit



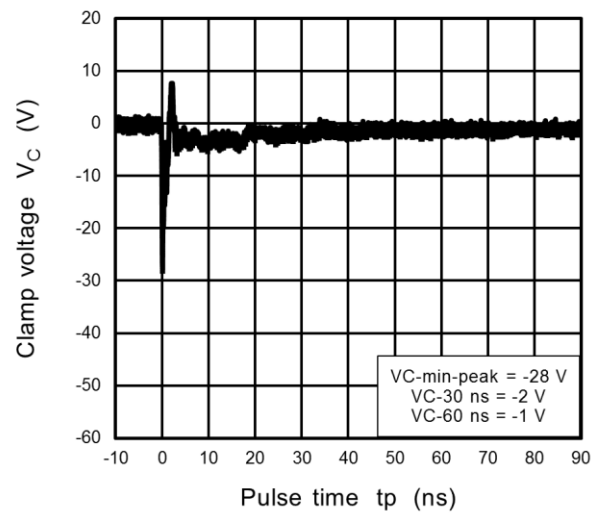
IEC61000-4-2 (Contact)

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CUHZ24V Characteristics Curves (Note 1)

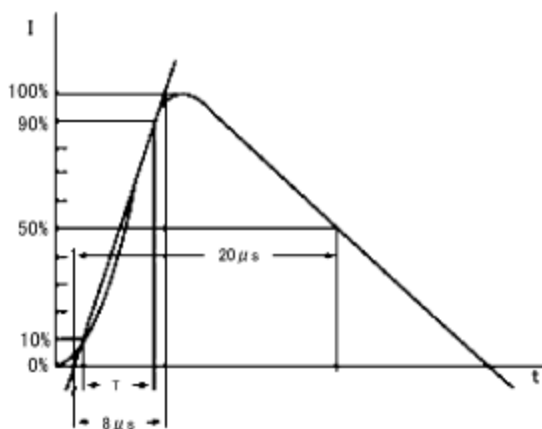


Clamp Waveform +8 kV (Note 3)

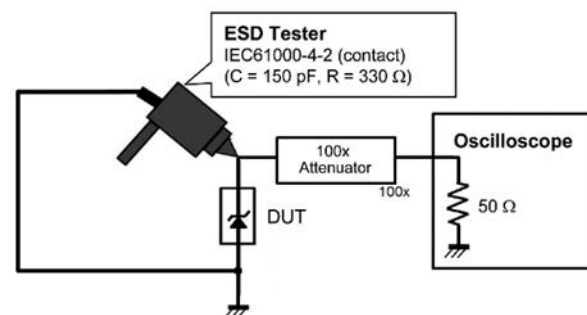


Clamp Waveform -8 kV (Note 3)

(Note 2) Peak Pulse Current ($V_C - I_{PP}$)



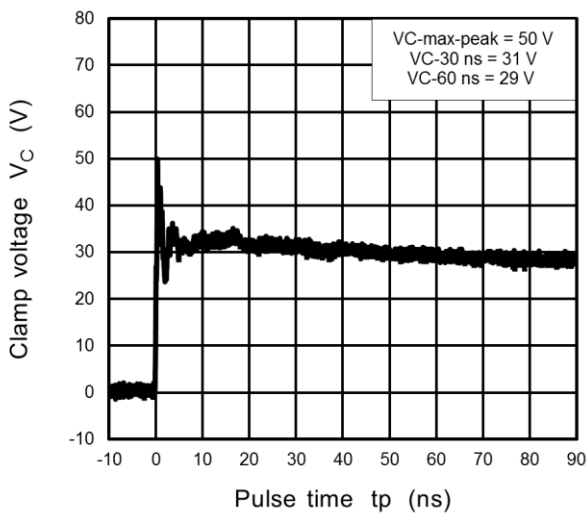
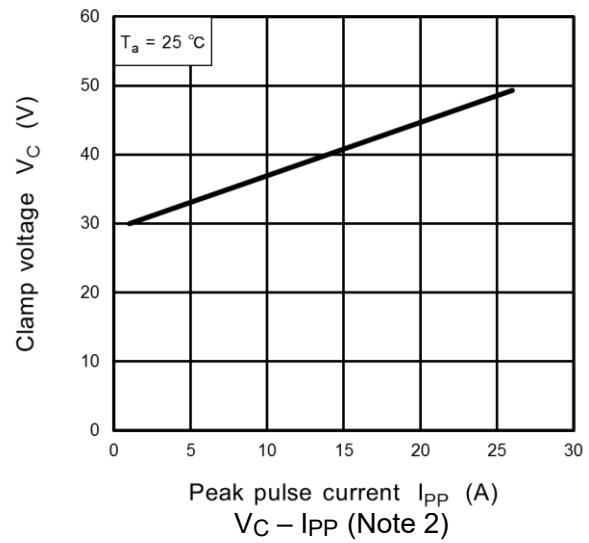
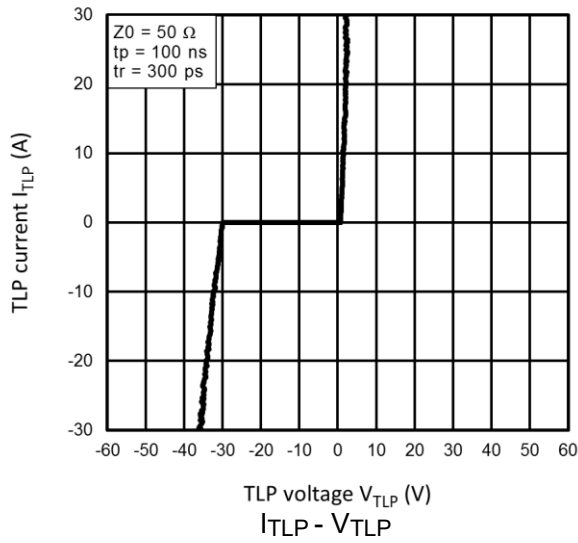
(Note 3) Clamp waveform measurement circuit



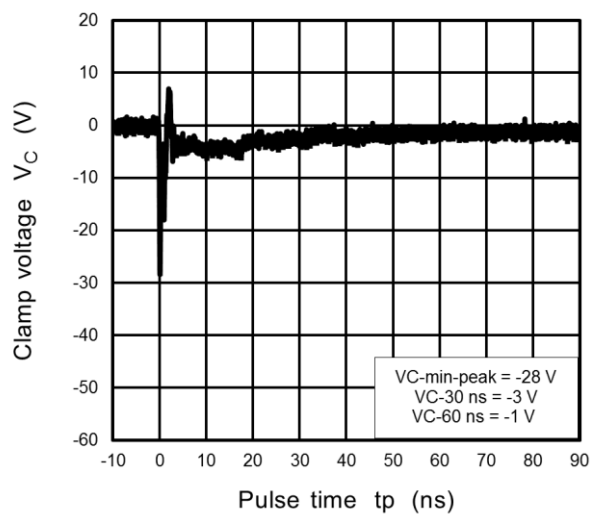
IEC61000-4-2 (Contact)

Note 1: The above characteristics curves are presented for reference only and not guaranteed by production test, unless otherwise noted.

CUHZ30V Characteristics Curves (Note 1)

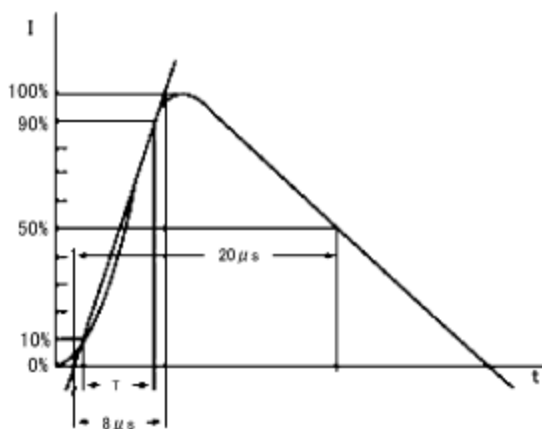


Clamp Waveform +8 kV (Note 3)



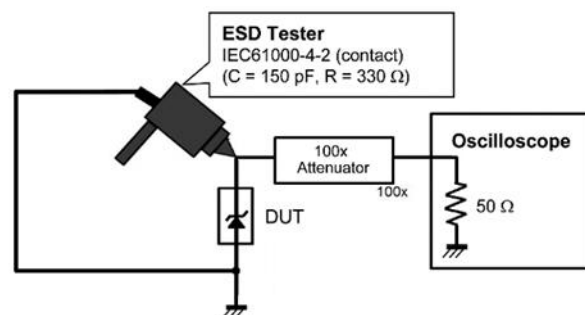
Clamp Waveform -8 kV (Note 3)

(Note 2) Peak Pulse Current ($V_C - I_{PP}$)



Based on IEC61000-4-5 8/20 μs pulse.

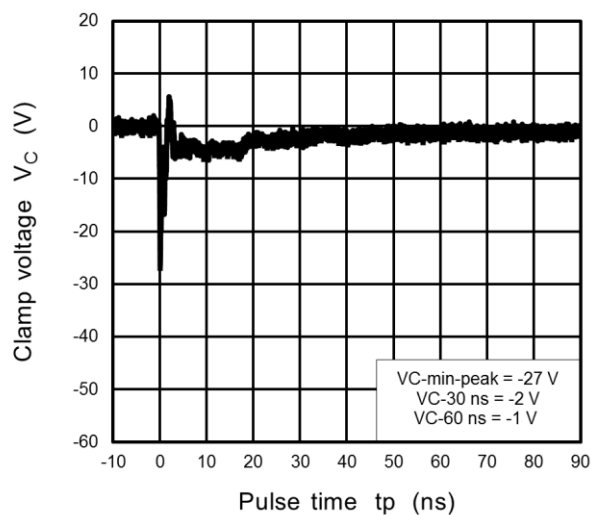
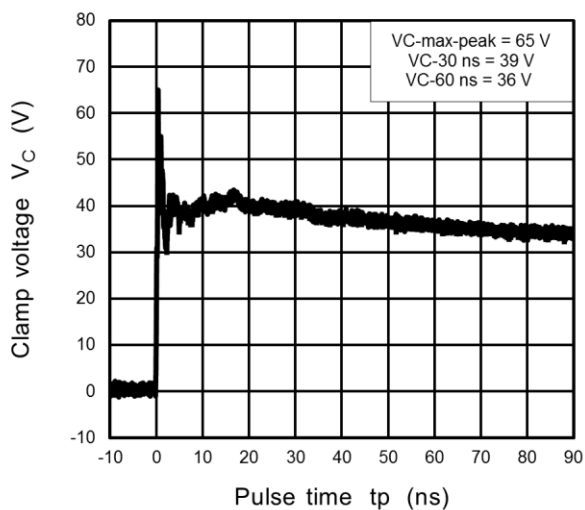
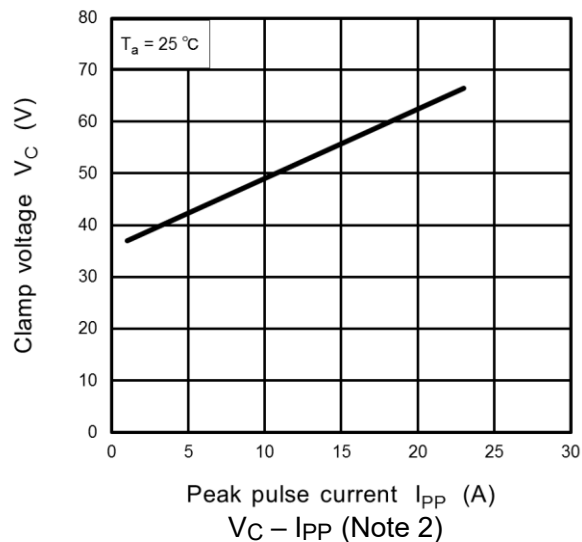
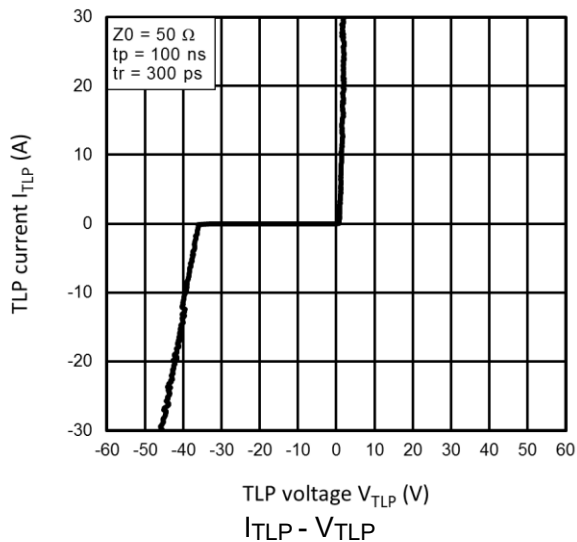
(Note 3) Clamp waveform measurement circuit



IEC61000-4-2 (Contact)

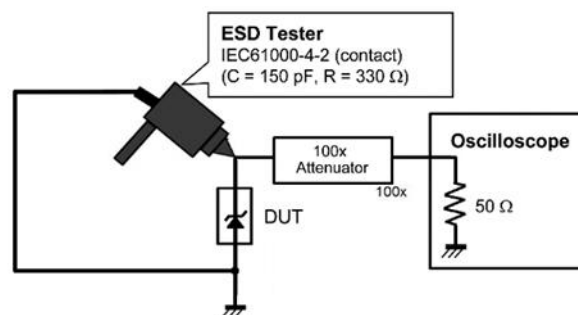
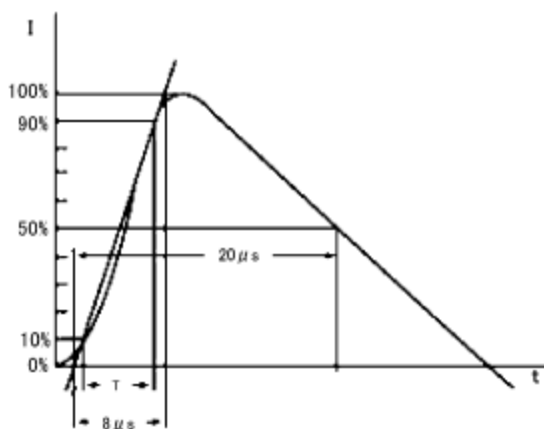
Note 1: The above characteristics curves are presented for reference only and not guaranteed by production test, unless otherwise noted.

CUHZ36V Characteristics Curves (Note 1)



(Note 2) Peak Pulse Current ($V_C - I_{PP}$)

(Note 3) Clamp waveform measurement circuit

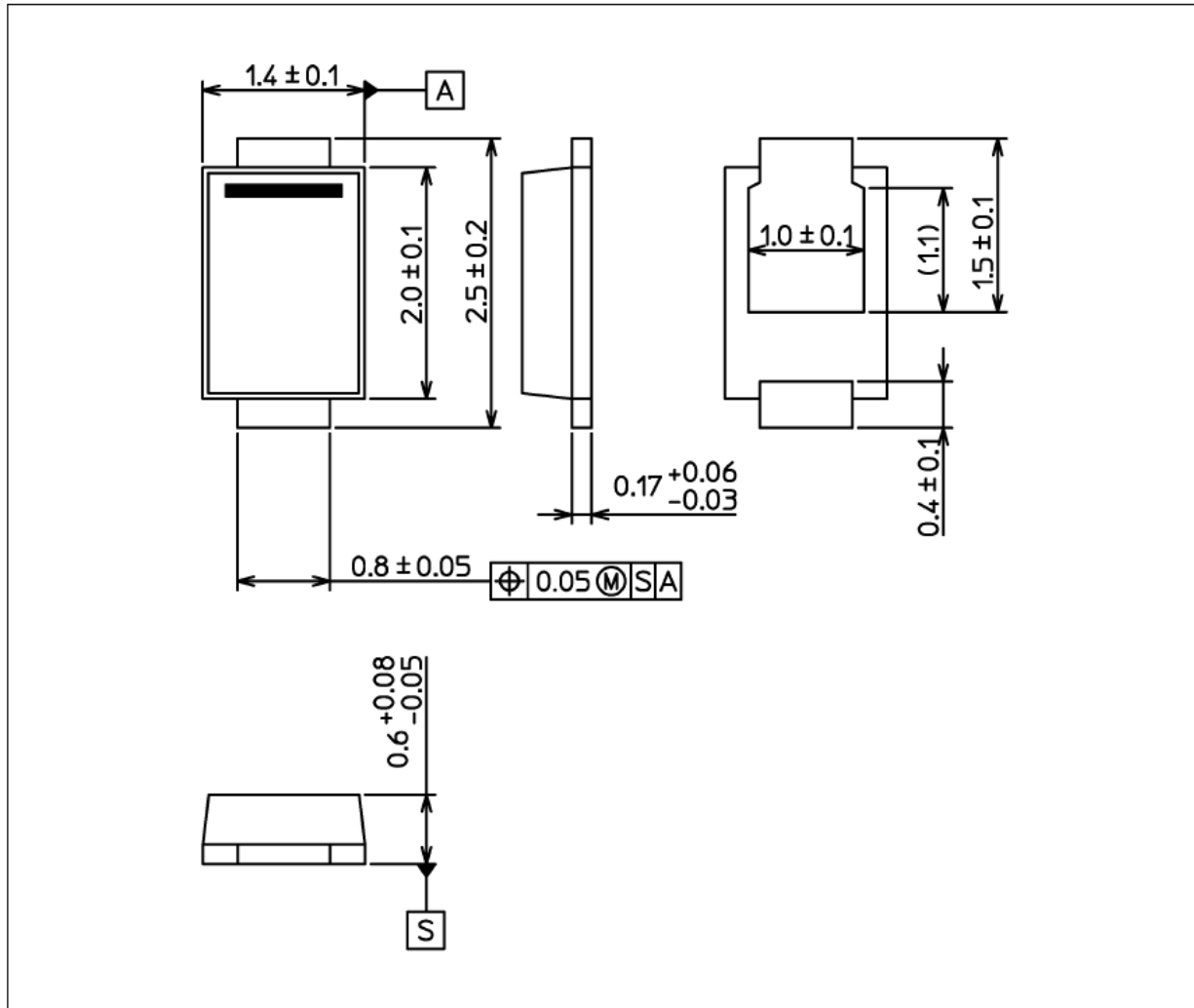


IEC61000-4-2 (Contact)

Note 1: The above characteristics curves are presented for reference only and not guaranteed by production test, unless otherwise noted.

Package Dimensions

Unit: mm



Weight: 5.4 mg (typ.)

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