TOSHIBA Zener Diode Silicon Epitaxial Planar Type

MUZ12V

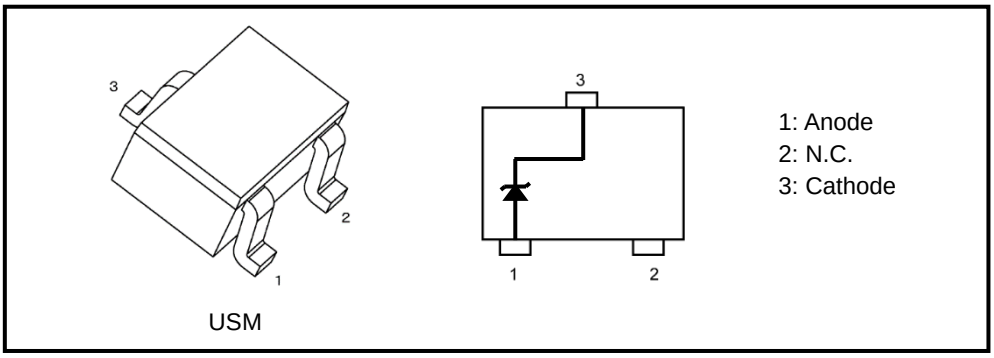
Applications

Voltage surge protection

Features

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

Packaging and Internal Circuit



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

Characteristics	Symbol	Rating	Unit
Power dissipation	P_D *1	150	mW
	P_D *2	600	mW
Junction temperature	T_j	150	°C
Storage temperature	T_{stg}	−55 to 150	°C

Absolute Maximum Ratings 2 (Note) (Unless otherwise specified, T_a = 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		
	V_{ESD}(kV)		P_{PK}(W)	I_{PP}(A)		V_{ESD}(kV)		P_{PK}(W)	I_{PP}(A)
MUZ5V6	± 30		155	12	MUZ12V	± 30		200	7
MUZ6V2	± 30		175	11	MUZ16V	± 30		200	5.5
MUZ6V8	± 30		180	10	MUZ24V	± 30		200	4.5

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: 0.5 mm^2 x 3

*2: Mounted on a glass epoxy circuit board of 25.4 mm × 25.4 mm × 1.6 mm, Cu pad: 645 mm^2

*3: according to IEC61000-4-2

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

Start of commercial production
2020-07

MUZ series Electrical Characteristics (Unless otherwise specified, T_a = 25°C)

Type No.	Zener Voltage				Dynamic Impedance		Dynamic resistance	Clamp voltage	Total capacitance	Reverse Current	
	V_Z (V) *1			Test Current I_Z (mA)	Z_Z (Ω)	Test Current I_Z (mA)	R_{DYN} (Ω) *2	V_C (V) *2*3	C_t (pF) *4	I_R (μA)	Test Voltage V_R (V)
	Min	Typ.	Max		Max		Typ.	Typ.	Typ.	Max	
MUZ5V6	5.3	5.6	6.0	5	30	5	0.16	9	125	1	3.5
MUZ6V2	5.8	6.2	6.6	5	30	5	0.21	10	105	2.5	5.0
MUZ6V8	6.4	6.8	7.2	5	30	5	0.27	13	88	1.5	5.5
MUZ12V	11.4	12	12.6	5	30	5	0.7	26	44	0.1	10
MUZ16V	15.3	16	17.1	5	35	5	0.5	27	35	0.1	14
MUZ24V	22.8	24	25.6	5	70	5	0.6	36.5	26	0.1	19

*1: Test time: t = 30 ms

*2: TLP parameters: Z_0 = 50 Ω, t_p = 100 ns, t_r = 300 ps, averaging window: t_1 = 30 ns to t_2 = 60 ns, extraction of dynamic resistance using least squares fit of TLP characteristics between I_{TLP1} = 16 A and I_{TLP2} = 30 A.

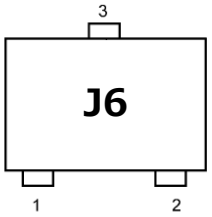
*3: I_{TLP} = 16 A

*4: V_R = 0 V, f = 1 MHz

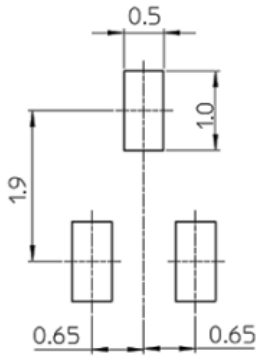
Marking List

Type No.	Marking	Type No.	Marking
MUZ5V6	J1	MUZ12V	J6
MUZ6V2	J2	MUZ16V	J7
MUZ6V8	J3	MUZ24V	JB

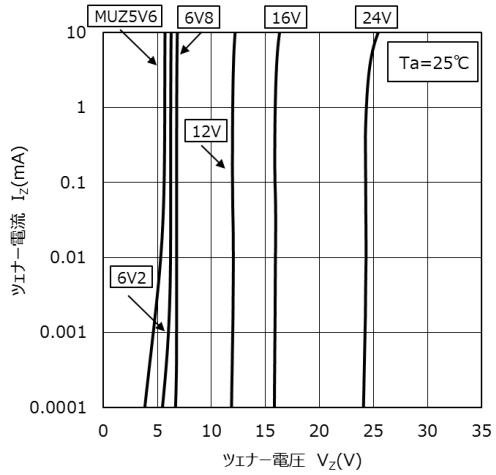
Marking (MSZ12V)



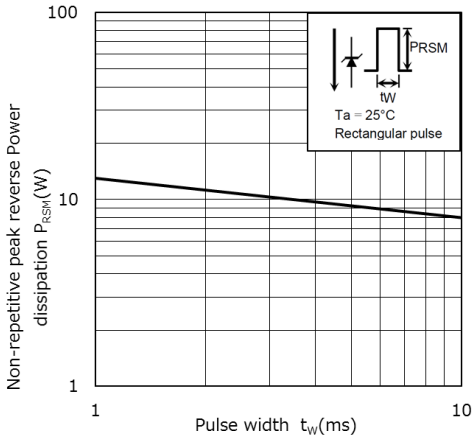
Land Pattern Dimensions (for reference only) (Unit: mm)



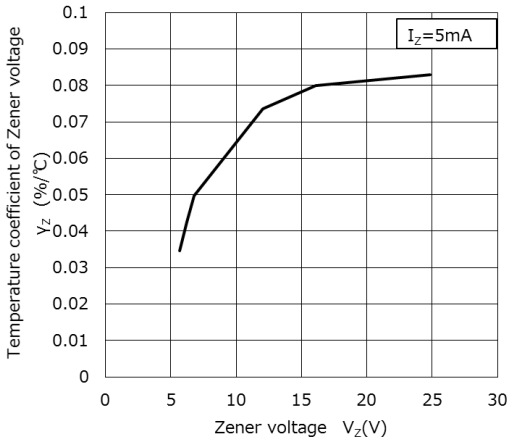
MUZ series Characteristics Curves (Note)



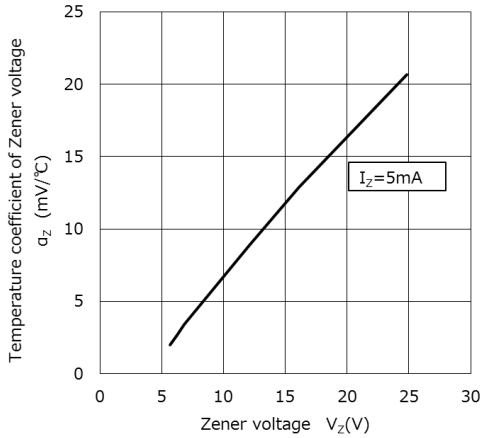
I_Z - V_Z



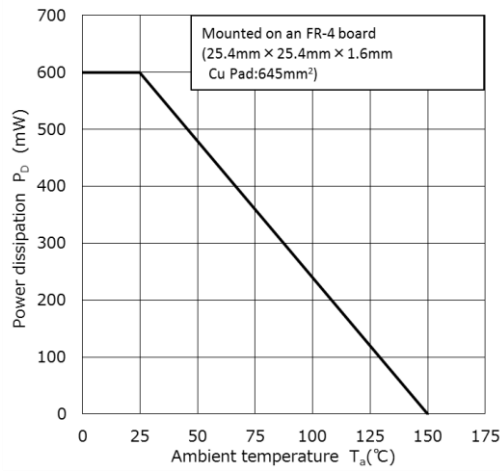
P_{RSM} - t_w



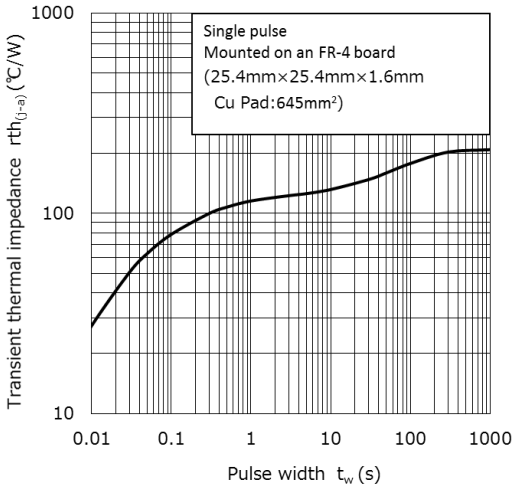
γ_Z - V_Z



α_Z - V_Z



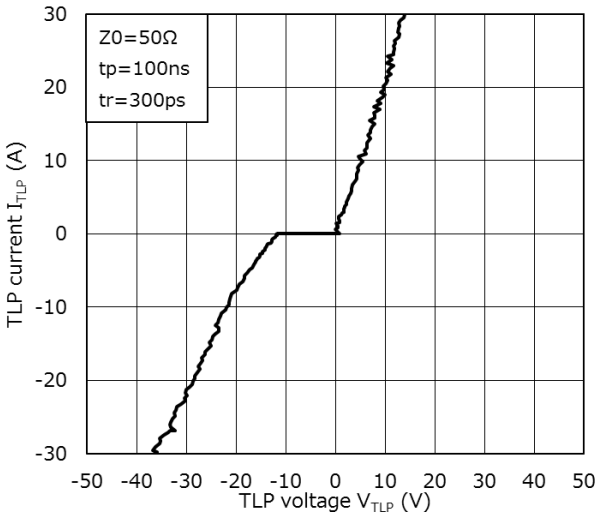
P_D - T_a



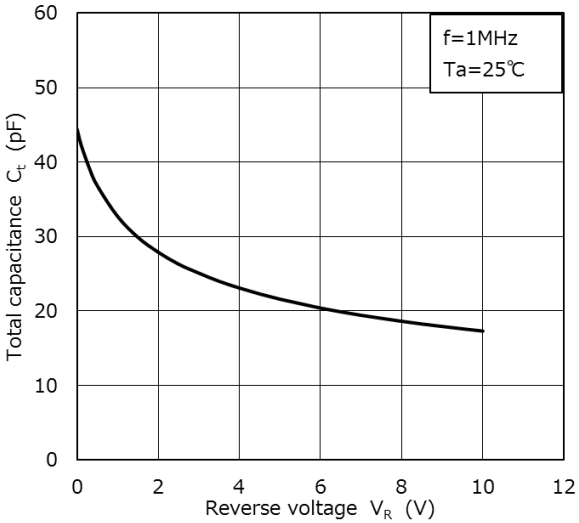
$r_{th(j-a)}$ - t_w

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

MUZ12V Characteristics Curves (Note)

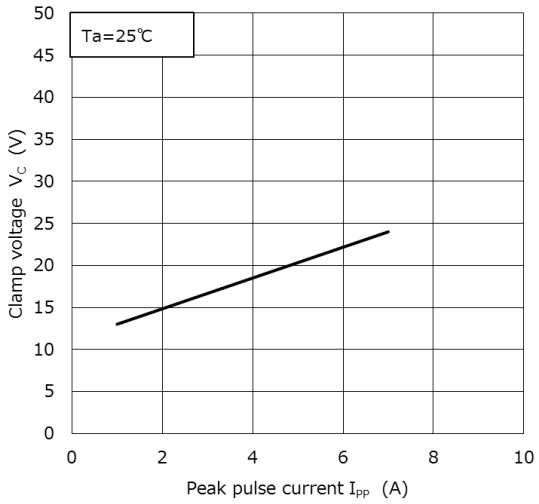


I_{TLP} - V_{TLP}

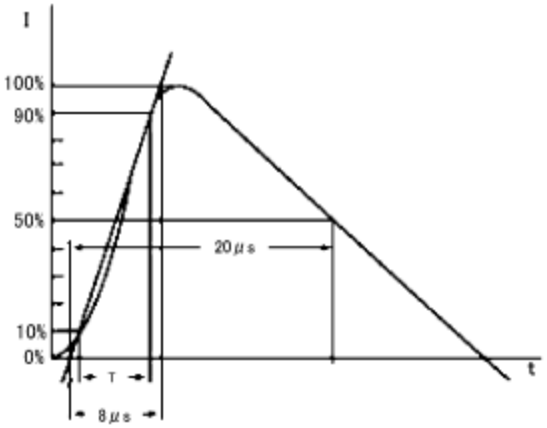


C_t - V_R

MUZ12V Clamp Voltage - Peak Pulse Current (V_C - I_{PP}) (Note)



V_C – I_{PP}



Based on IEC61000-4-5 8/20 μs pulse

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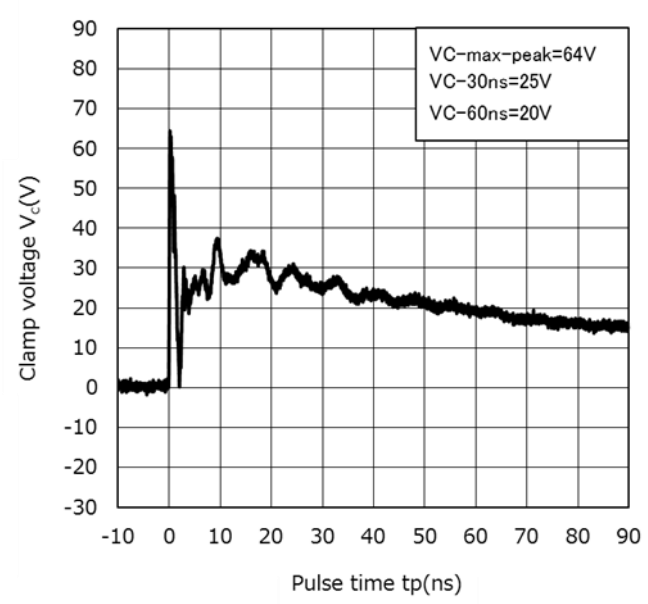
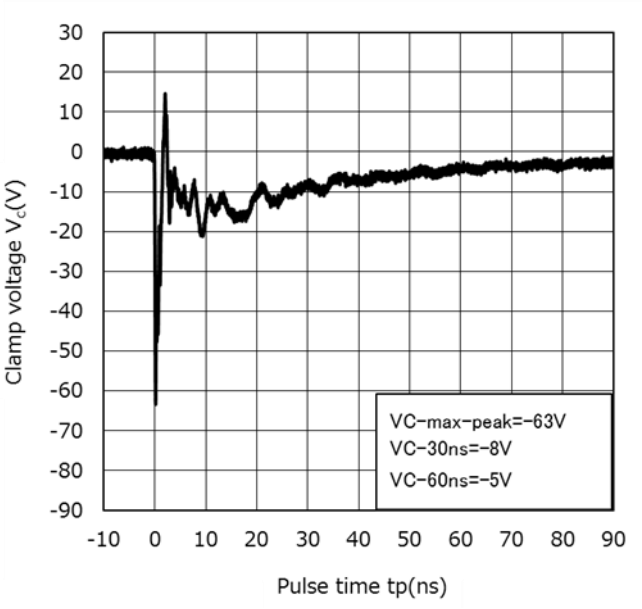
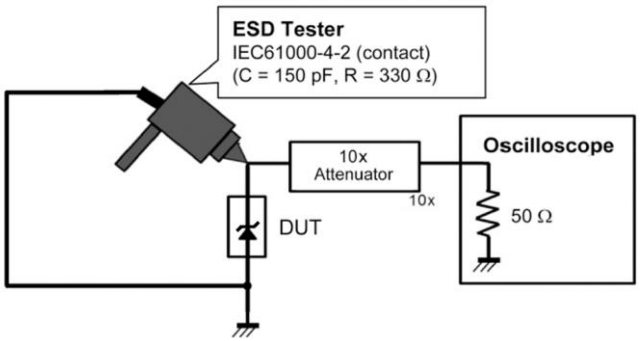
MUZ12V Clamp Waveform (Note)



+8 kV



-8 kV



IEC61000-4-2 (Contact)

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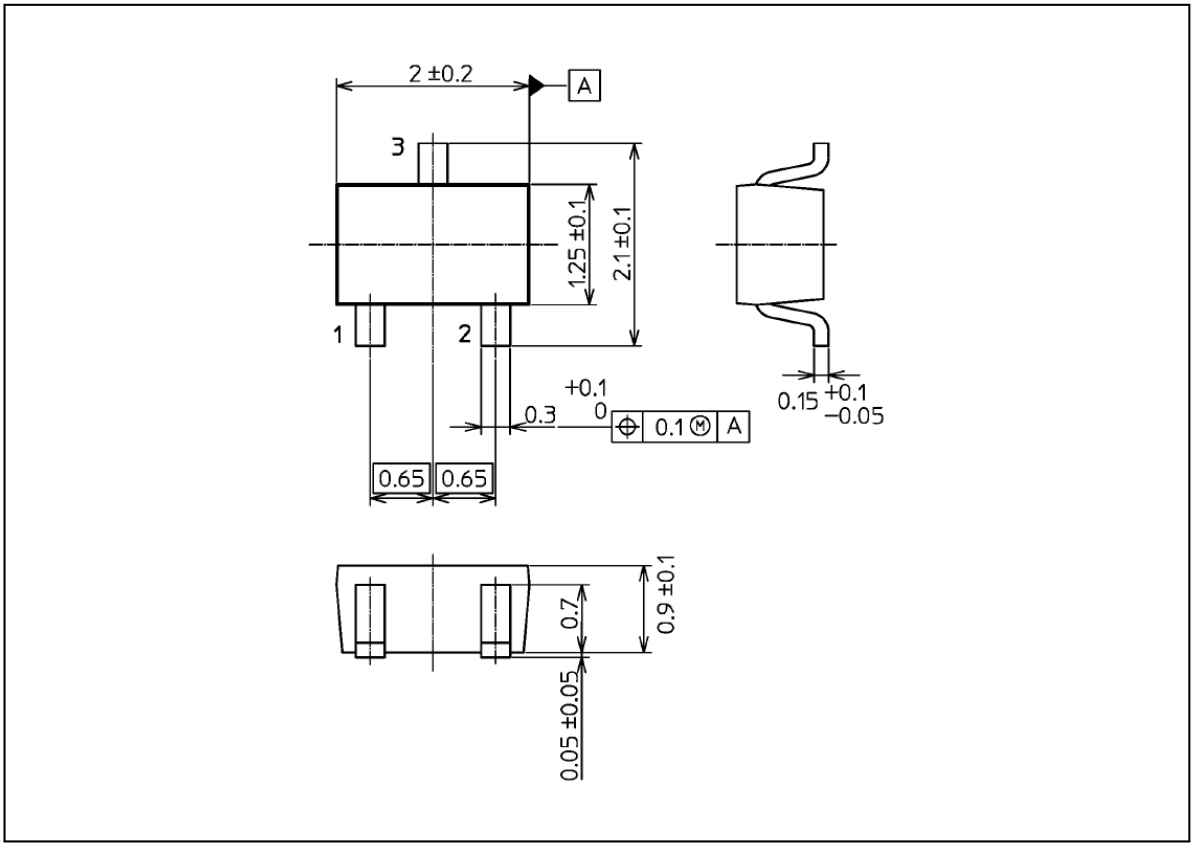
Package Dimensions

Unit: mm



Weight: 6.0 mg (typ.)

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