

TOSHIBA Zener Diode Silicon Epitaxial Planar Type

MSZ24V

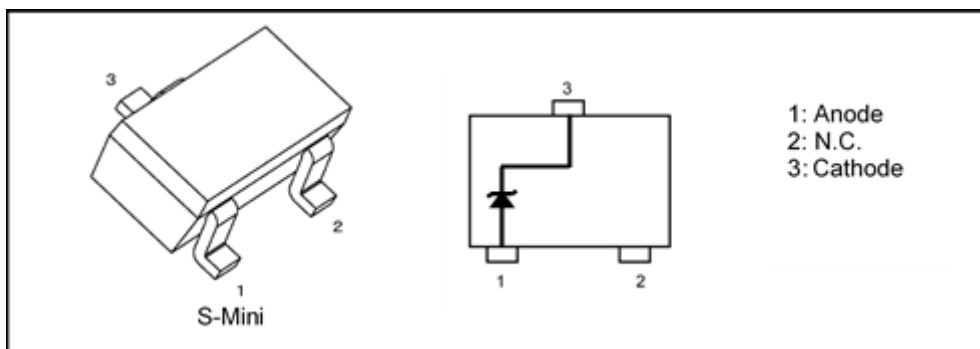
Applications

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	200	mW
	P _D ^{*1}	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 *2		Peak pulse power *3	Peak pulse current *3	Type No.	Electrostatic discharge voltage *2		Peak pulse power *3	Peak pulse current *3
	Contact	Air				Contact	Air		
	VESD(kV)					VESD(kV)			
MSZ5V6	± 30		155	12	MSZ12V	± 30		200	7
MSZ6V2	± 30		175	11	MSZ16V	± 30		200	5.5
MSZ6V8	± 30		180	10	MSZ24V	± 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, Cu pad: 645 mm²

*2: according to IEC61000-4-2

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

Start of commercial production
2020-07

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

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	
MSZ5V6	5.3	5.6	6.0	5	30	5	0.16	9	125	1	3.5
MSZ6V2	5.8	6.2	6.6	5	30	5	0.21	10	105	2.5	5.0
MSZ6V8	6.4	6.8	7.2	5	30	5	0.27	13	88	1.5	5.5
MSZ12V	11.4	12	12.6	5	30	5	0.7	26	44	0.1	10
MSZ16V	15.3	16	17.1	5	35	5	0.5	27	35	0.1	14
MSZ24V	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: $Z_0 = 50\ \Omega$, $t_p = 100$ 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.

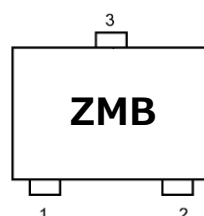
*3: $I_{TLP} = 16$ A

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

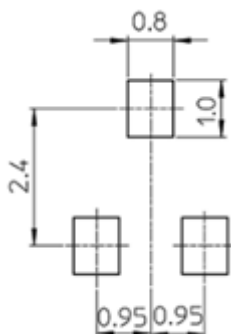
Marking List

Type No.	Marking	Type No.	Marking
MSZ5V6	ZLL	MSZ12V	ZM4
MSZ6V2	ZLM	MSZ16V	ZM7
MSZ6V8	ZLN	MSZ24V	ZMB

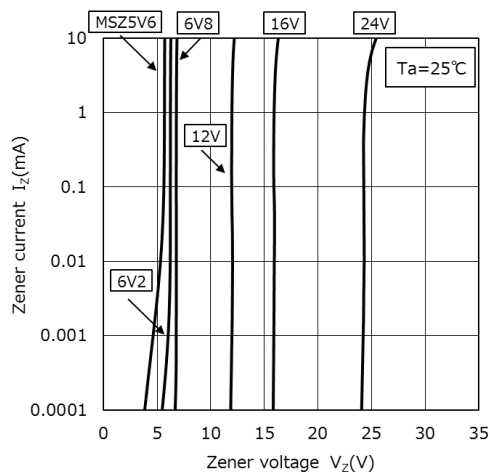
Marking (MSZ24V)



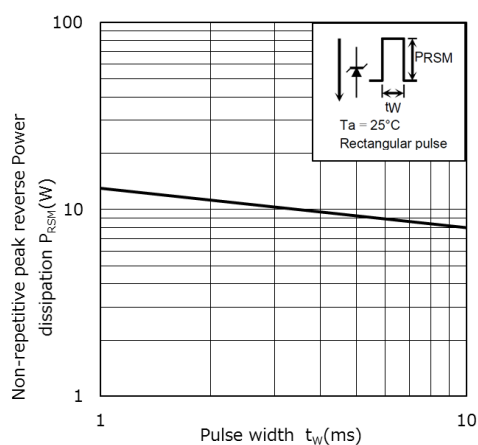
Land Pattern Dimensions (for reference only) (Unit: mm)



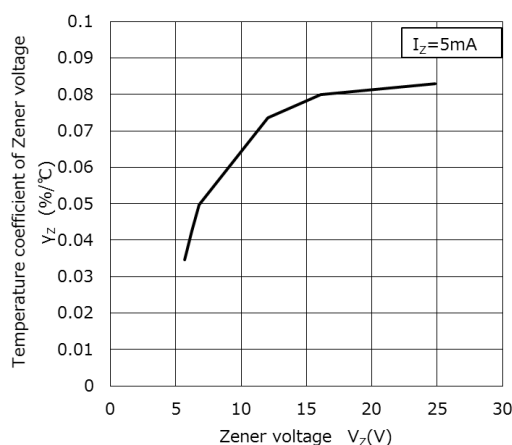
MSZ series Characteristics Curves (Note)



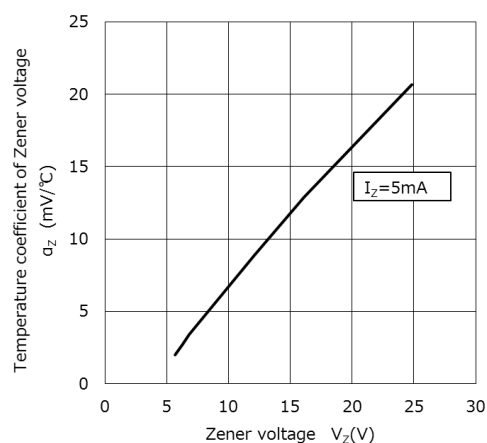
$I_Z - V_Z$



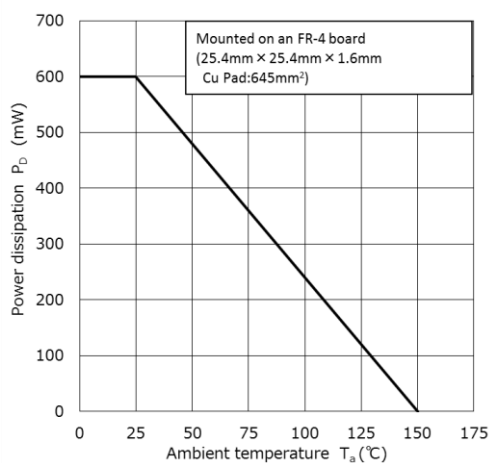
$P_{RSM} - t_w$



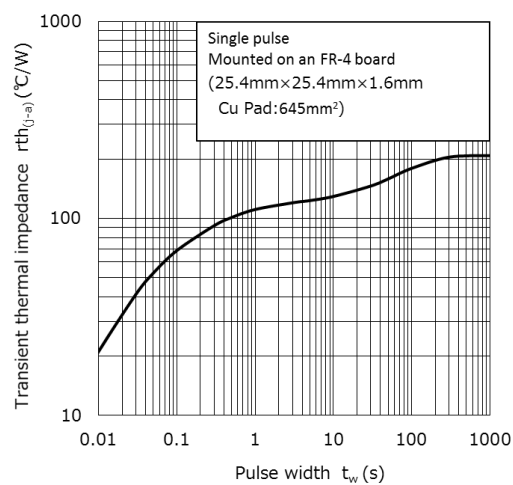
$\gamma_Z - V_Z$



$\alpha_Z - V_Z$



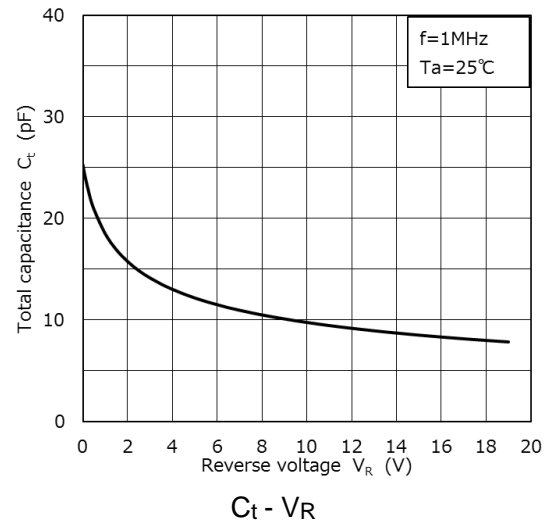
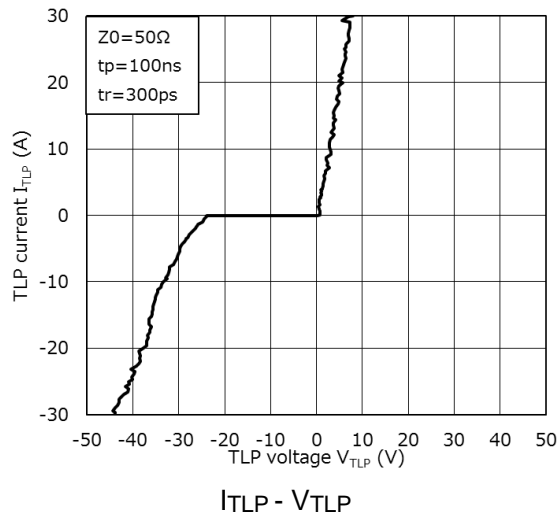
$P_D - T_a$



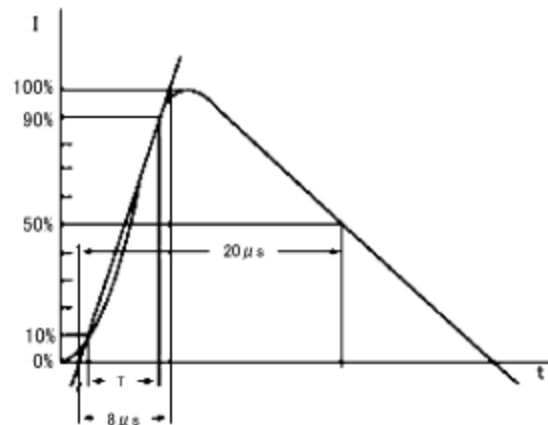
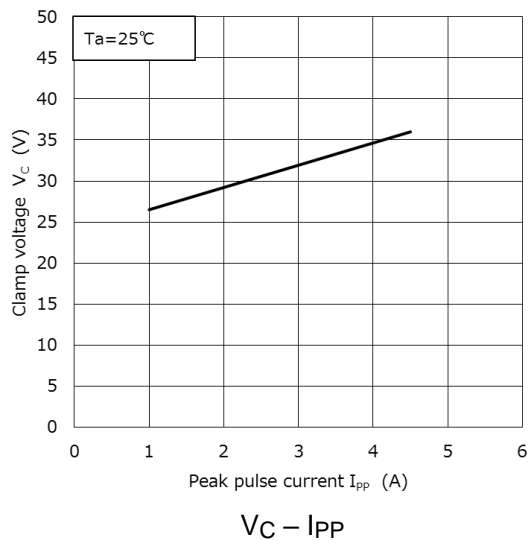
$r_{th(j-a)} - t_w$

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

MSZ24V Characteristics Curves (Note)



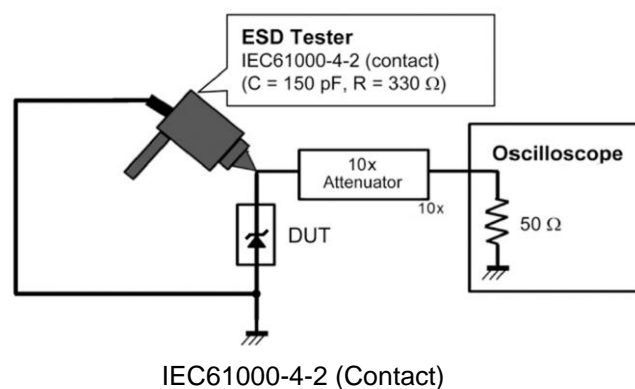
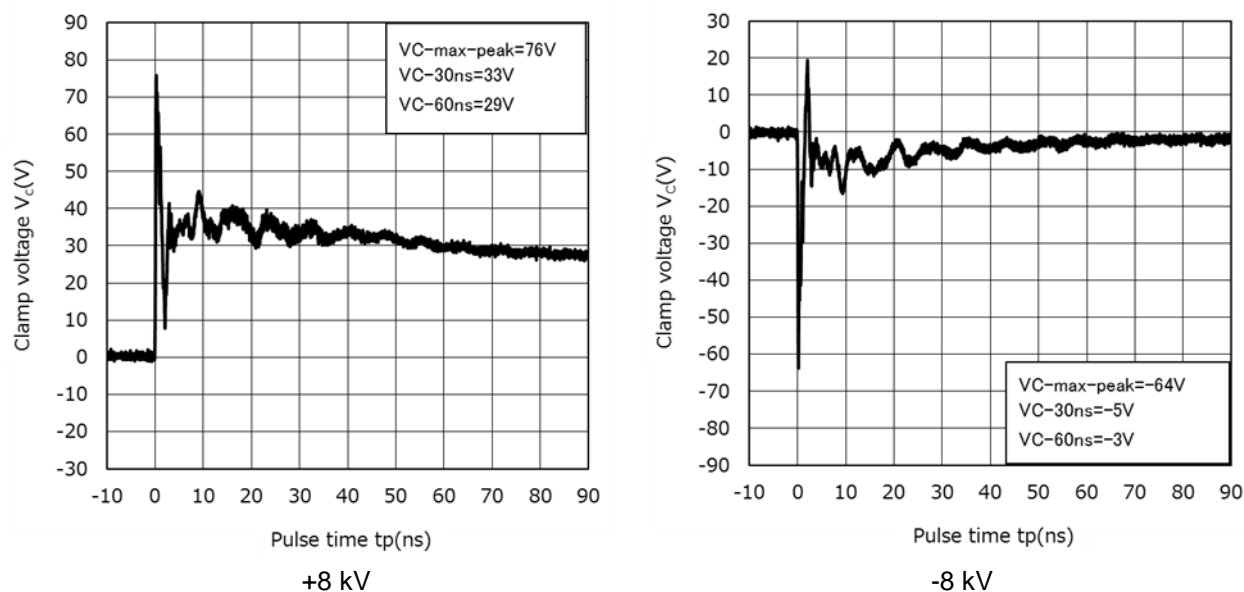
MSZ24V Clamp Voltage - Peak Pulse Current ($V_C - I_{PP}$) (Note)



Based on IEC61000-4-5 8/20 μs pulse

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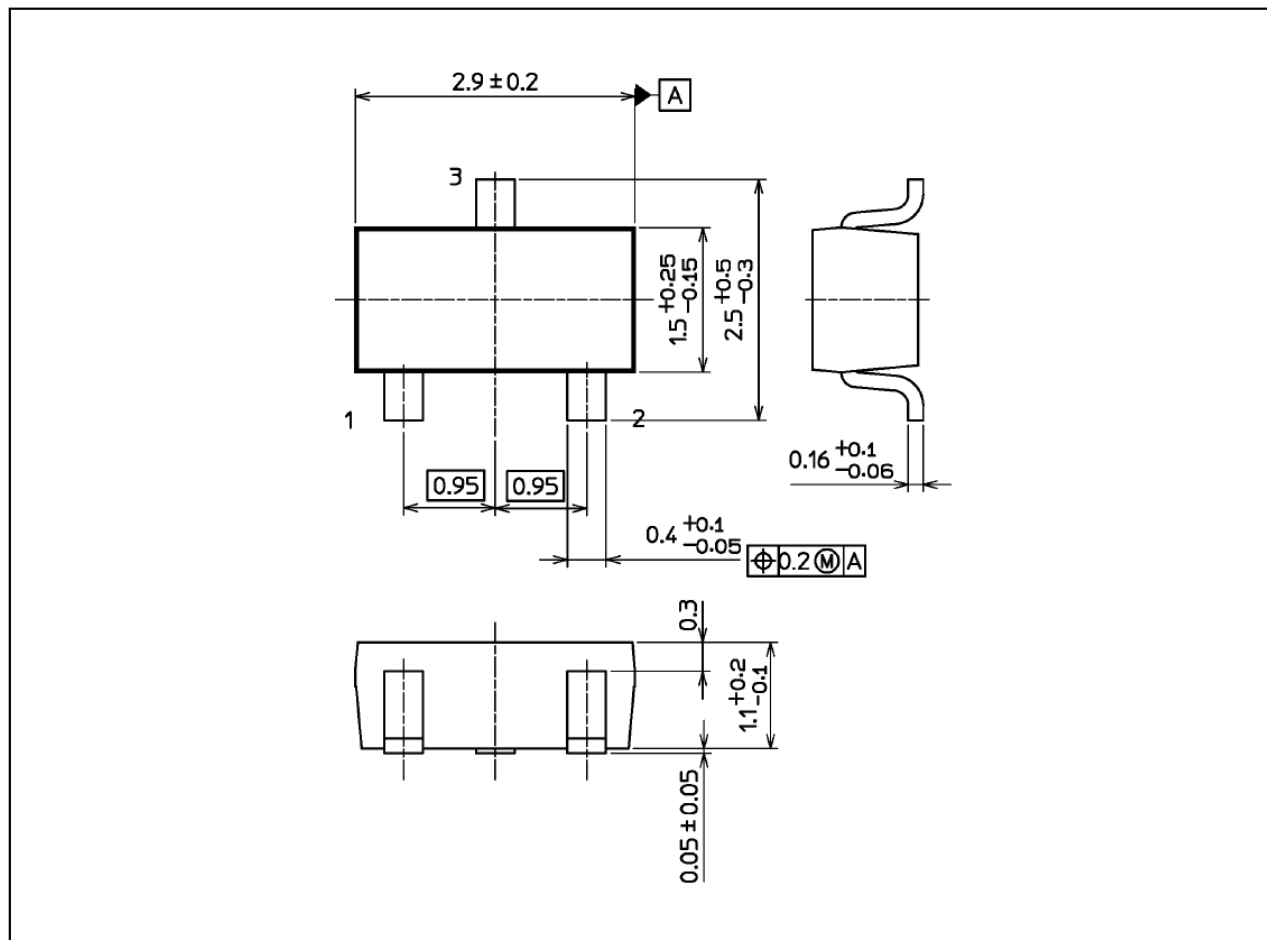
MSZ24V Clamp Waveform (Note)



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

Package Dimensions

Unit: mm



Weight: 12mg (typ.)

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