

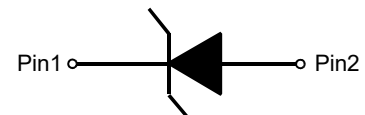
Desicription

- ◆ This low-power TVS (Transient Voltage Suppressor) is mainly used for signal and power supply to protect the back-stage circuit from ESD (Electrostatic Discharge) and EFT (Electrical Fast Transients) and improve the reliability of the product, because its extremely small package is suitable for various portable devices and mobile electronic devices.



Features

- ◆ IEC61000-4-2(ESD): $\pm 30\text{KV}$ Max Air
 $\pm 30\text{KV}$ Max Contact
- ◆ IEC61000-4-4(EFT): 40A (5/50ns)
- ◆ IEC61000-4-5(Surge): 80A (8/20us)
- ◆ Very low reverse current: $I_R < 0.2\mu\text{A}$ (typical)
- ◆ Halogen free, Lead free and RoHs



Circuit Diagram

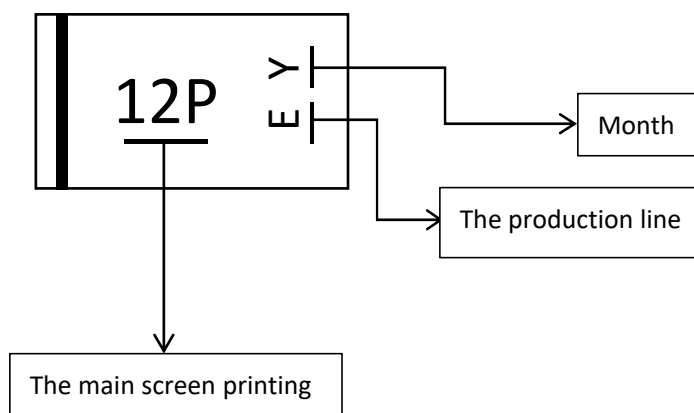
Application

- ◆ Cellular phones
- ◆ Portable devices
- ◆ Digital cameras
- ◆ Player
- ◆ Smart home
- ◆ Robot

Order information

Model	Marking	Package	shipping
ESD12H451TR	12P	DFN1610-2L	3000/Tape&Reel

Screen printing instructions



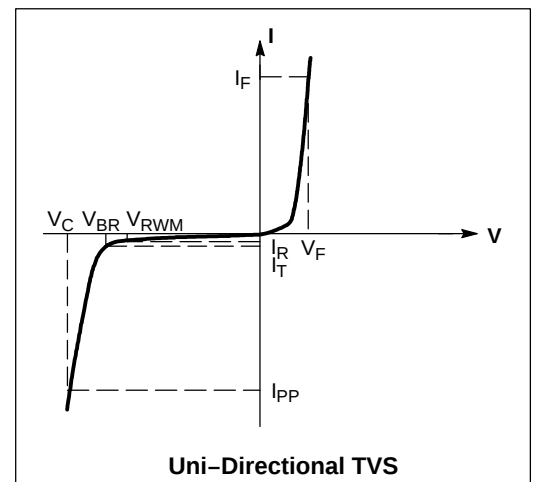
Month	Odd-numbered months code	Even year month code
1	E	1
2	F	2
3	H	3
4	J	4
5	K	5
6	L	6
7	N	7
8	P	8
9	U	9
10	X	T
11	Y	V
12	Z	C

Electrical characteristic(T=25°C, unless otherwise specified)

Parameter	Symbol	Conditions	Min.	TYP.	Max.	Units
Reverse stand-off voltage	V_{RWM} pin1~pin2				12.0	V
Reverse leakage current	I_R	$V_{RWM}=12.0V$			0.2	uA
Reveres breakdown voltage	V_{BR} pin1~pin2	$I_T=1mA$	12.8		15.0	V
Forward voltage	V_F pin2~pin1	$I_T=10mA$	0.5		1.0	V
Clamping voltage	V_C pin1~pin2	$I_{PP}=10A(8/20us)$		15.5		V
		$I_{PP}=80A(8/20us)$		25.0	27.0	V
Junction capacitance	C_J	$V_R=0V$ f=1MHz		400.0	800.0	pF

Electrical characteristic(T=25°C, unless otherwise specified)
Electrical performance curve

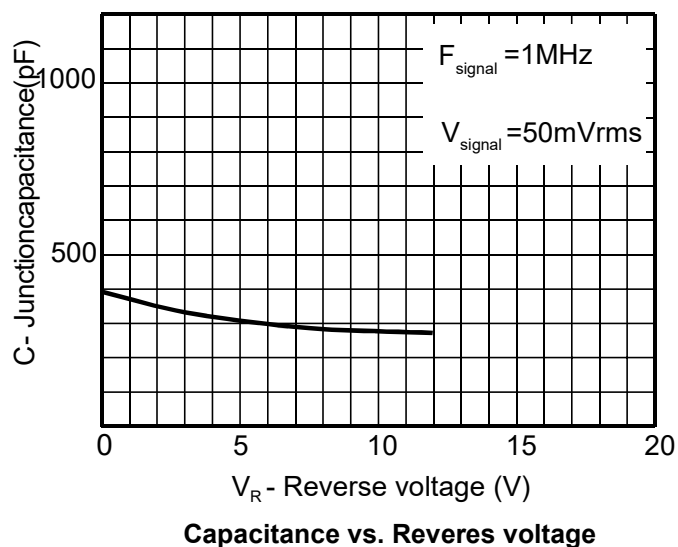
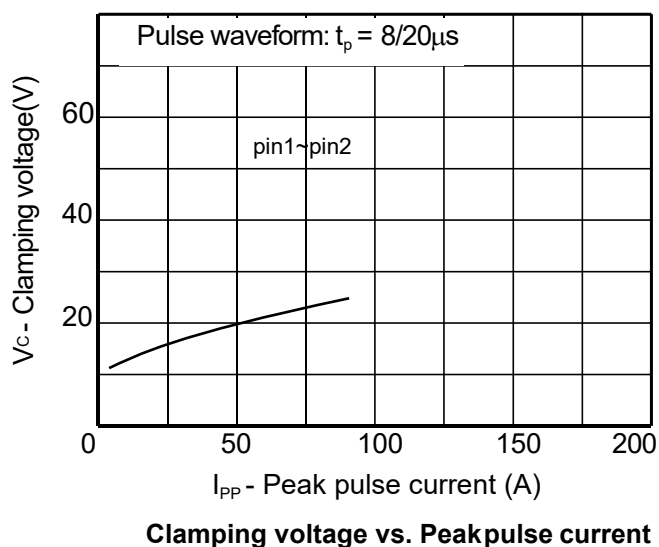
Symbol	Parameter
V_{RWM}	Peak Reverse Working Voltage
I_R	Reverse Leakage Current @ V_{RWM}
V_{BR}	Breakdown Voltage @ I_T
I_T	Test Current
I_{PP}	Maximum Reverse Peak Pulse Current
V_C	Clamping Voltage @ I_{PP}
I_F	Forward Current
V_F	Forward Voltage @ I_F

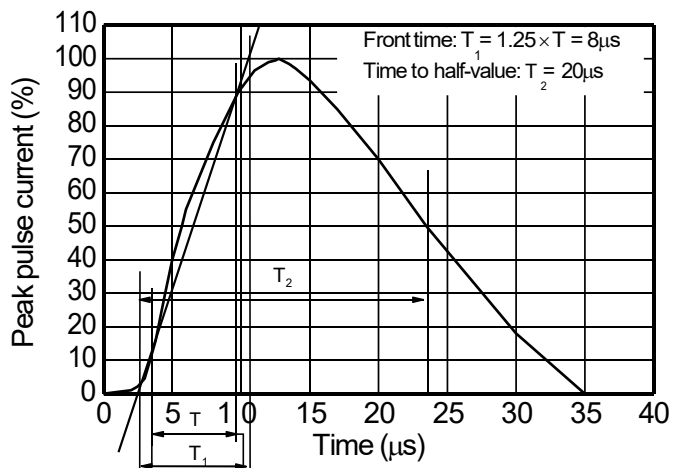


Maximum Rating

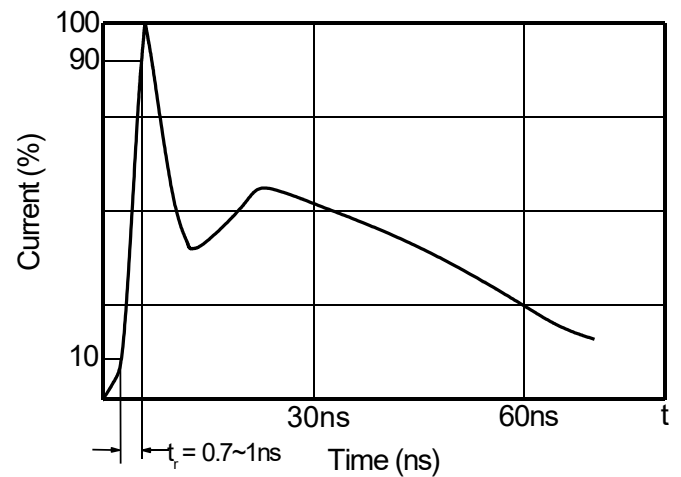
Rating	symbol	value	Units
Peak Pulse Current($t_p=8/20\mu s$)	I_{pp}	80.0	A
ESD per IEC61000-4-2(Contact)	V_{ESD}	± 30	KV
ESD per IEC61000-4-2(Air)		± 30	
Operating Temperature	T_J	-40~125	°C
Storage Temperature	T_{STG}	-55~155	°C

Typical characteristic

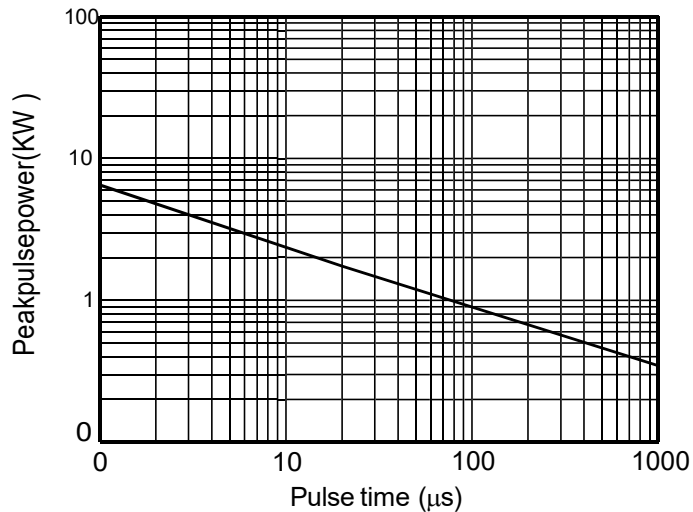




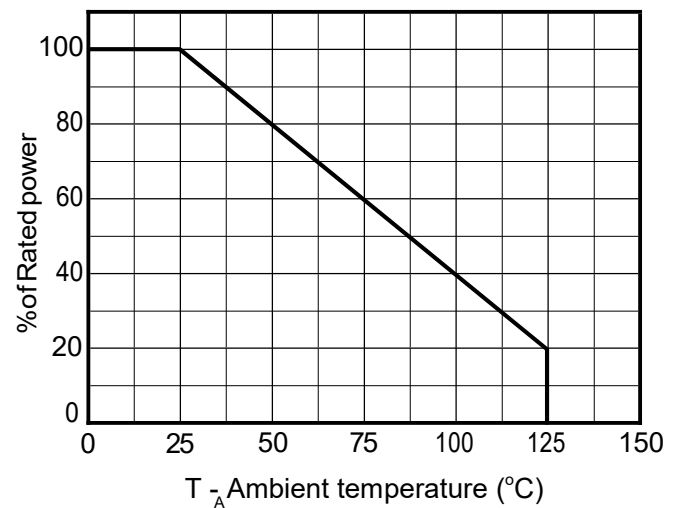
8/20 μs waveform per IEC61000-4-5



Contact discharge current waveform per IEC61000-4-2

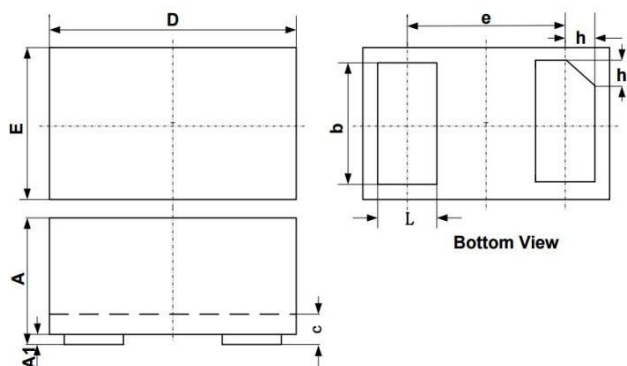


Non-repetitive peak pulse power vs. Pulse time



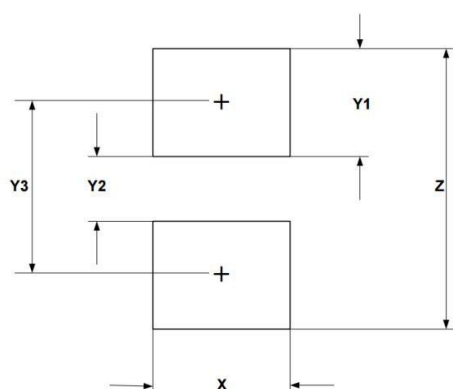
Power derating vs. Ambient temperature

Dimension outline Unit:mm



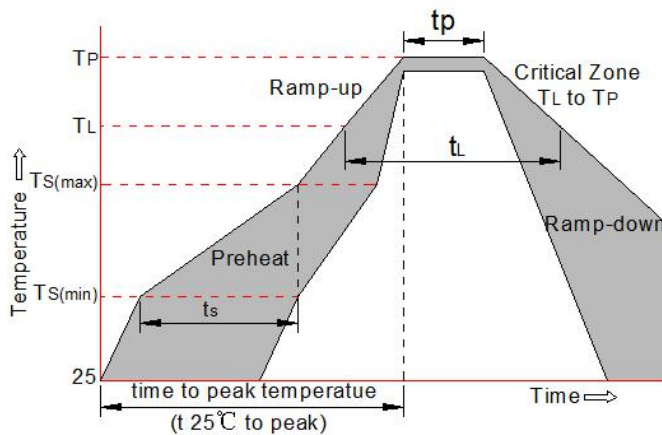
SYM	DIMENSIONS					
	MILLIMETERS			INCHES		
	MIN	NOM	MAX	MIN	NOM	MAX
A	0.45	0.50	0.60	0.018	0.020	0.022
A1	0.00	0.02	0.05	0.000	0.001	0.002
b	0.75	0.80	0.85	0.030	0.032	0.034
c	0.10	0.15	0.20	0.004	0.006	0.007
D	1.55	1.60	1.65	0.062	0.064	0.066
e	1.10 BSC			0.044 BSC		
E	0.95	1.00	1.05	0.038	0.040	0.042
L	0.35	0.40	0.45	0.014	0.016	0.018
h	0.15	0.20	0.25	0.006	0.008	0.010

Recommended Mounting Pad Layout Unit:mm



SYM	DIMENSIONS	
	MILLIMETERS	INCHES
X	1.00	0.040
Y1	0.62	0.025
Y2	0.60	0.024
Y3	1.22	0.049
Z	1.85	0.074

Soldering Parameters



Reflow Condition		Pb-Free assembly (see as bellow)
Pre Heat	-Temperature Min ($T_{s(min)}$)	+150°C
	-Temperature Max($T_{s(max)}$)	+200°C
	-Time (Min to Max) (t_s)	60-180 secs.
Average ramp up rate (Liquid us Temp (T_L) to peak)		3°C/sec. Max
$T_{s(max)}$ to T_L - Ramp-up Rate		3°C/sec. Max
Reflow	-Temperature(T_L) (Liquid us)	+217°C
	-Temperature(t_L)	60-150 secs.
Peak Temp (T_p)		+260(+0/-5)°C
Time within 5°C of actual Peak Temp (t_p)		30 secs. Max
Ramp-down Rate		6°C/sec. Max
Time 25°C to Peak Temp (T_P)		8 min. Max
Do not exceed		+260°C