Features

- 300W peak pulse power (8/20μs)
- Protects two bi-directional lines
- Ultra low leakage: nA level
- Operating voltage: 5V, 12V, 24V, 36V
- Low clamping voltage
- Complies with following standards:
  - – IEC 61000-4-2 (ESD) immunity test
    - Air discharge: ±30kV
    - Contact discharge: ±30kV
  - – IEC61000-4-4 (EFT) 40A (5/50ns)
- RoHS Compliant

Mechanical Characteristics

- Package: SOT-23
- Lead Finish: Matte Tin
- Case Material: “Green” Molding Compound.
- UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 3 per J-STD-020
- Terminal Connections: See Diagram

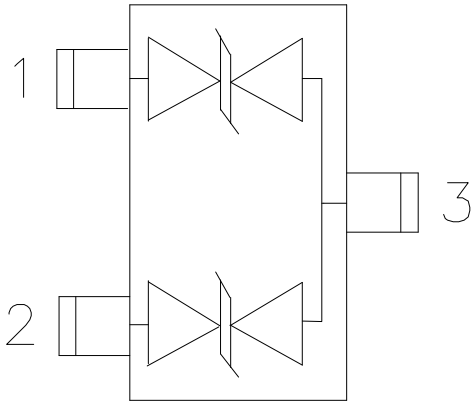
Applications

- Cellular Handsets and Accessories
- Notebooks and Handhelds
- Portable Instrumentation
- Set Top Box
- Industrial Controls
- Server and Desktop PC

Description

The ESDXX20XK is an uni-directional TVS diode array, utilizing leading monolithic silicon technology to provide fast response time and low ESD clamping voltage, making this device an ideal solution for protecting sensitive semiconductor components from damage. The ESDXX20XK complies with the IEC 61000-4-2 (ESD) standard with ±15kV air and ±8kV contact discharge. It is assembled into a lead-free SOT-23 package. It is designed to protect components which are connected to data and transmission lines from voltage surges.

Dimensions and Pin Configuration



Circuit and Pin Schematic

Part Number Code

E	S	D	0	5	1	1	L	1
1	2	3	4	5	6	7	8	9

Product Type	
ESD	TSK Electrostatic suppressor ESD Type

Reverse Working Voltage（V）	
3V3	3.3V
05	5V
16	16V

Line	
1	1-Line
2	2-Line
3	3-Line

directional	
0	Bi
1	Uni

Capacitance Type	
L	Low
X	Normal

Size	
1	0201
2	0402
3	DFN0603
4	DFN1006

★ Code 4 to 9 is optional

Absolute Maximum Ratings (T_A=25°C unless otherwise specified)

Parameter	Symbol	Value	Unit
Peak Pulse Power (8/20μs)	Ppk	300	W
ESD per IEC 61000−4−2 (Air) ESD per IEC 61000−4−2 (Contact)	V_{ESD}	±30 ±30	kV
Operating Temperature Range	T_J	−55 to +125	°C
Storage Temperature Range	Tstg	−55 to +150	°C

Electrical Characteristics (T_A=25°C unless otherwise specified)

ESD0520Xk						
Parameter	**Symbol**	**Min**	**Typ**	**Max**	**Unit**	**Test Condition**
Reverse Working Voltage	V_{RWM}			5	V	
Breakdown Voltage	V_{BR}	6			V	I_T = 1mA
Reverse Leakage Current	I_R			1.0	uA	V_{RWM} = 5V
Clamping Voltage	V_C			10	V	I_{PP} = 1A (8 x 20μs pulse)
Clamping Voltage	V_C			17	V	I_{PP} = 18A (8 x 20μs pulse)
Peak Pulse Current	I_{PP}			20	A	t_p = 8/20μs
Junction Capacitance	C_J		80		pF	VR = 0V, f = 1MHz, Pin 1 to Pin 3 or Pin 2 to Pin 3

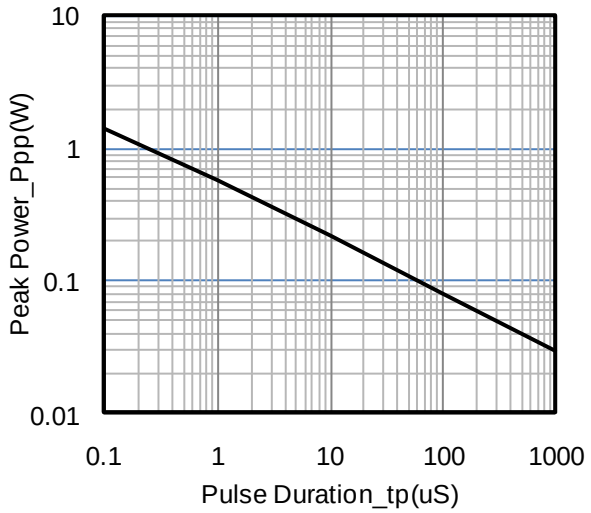
ESD1221Xk						
Parameter	**Symbol**	**Min**	**Typ**	**Max**	**Unit**	**Test Condition**
Reverse Working Voltage	V_{RWM}			12	V	
Breakdown Voltage	V_{BR}	13.3			V	I_T = 1mA
Reverse Leakage Current	I_R			0.5	uA	V_{RWM} = 12V
Clamping Voltage	V_C			20	V	I_{PP} = 1A (8 x 20μs pulse)
Clamping Voltage	V_C			30	V	I_{PP} = 10A (8 x 20μs pulse)
Peak Pulse Current	I_{PP}			10	A	t_p = 8/20μs
Junction Capacitance	C_J		32		pF	VR = 0V, f = 1MHz, Pin 1 to Pin 3 or Pin 2 to Pin 3

ESD1521Xk						
Parameter	**Symbol**	**Min**	**Typ**	**Max**	**Unit**	**Test Condition**
Reverse Working Voltage	V_{RWM}			24	V	
Breakdown Voltage	V_{BR}	16.7			V	I_T = 1mA
Reverse Leakage Current	I_R			0.2	uA	V_{RWM} = 24V
Clamping Voltage	V_C			25	V	I_{PP} = 1A (8 x 20μs pulse)
Clamping Voltage	V_C			35	V	I_{PP} = 8A (8 x 20μs pulse)
Peak Pulse Current	I_{PP}			8	A	t_p = 8/20μs
Junction Capacitance	C_J		25		pF	VR = 0V, f = 1MHz, Pin 1 to Pin 3 or Pin 2 to Pin 3

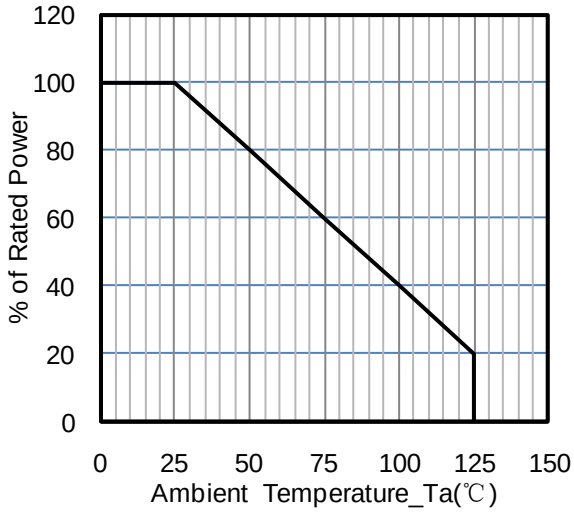
ESD2421Xk						
Parameter	**Symbol**	**Min**	**Typ**	**Max**	**Unit**	**Test Condition**
Reverse Working Voltage	V_{RWM}			24	V	
Breakdown Voltage	V_{BR}	27			V	I_T = 1mA
Reverse Leakage Current	I_R			0.2	uA	V_{RWM} = 24V
Clamping Voltage	V_C			42	V	I_{PP} = 1A (8 x 20μs pulse)
Clamping Voltage	V_C			70	V	I_{PP} = 4A (8 x 20μs pulse)
Peak Pulse Current	I_{PP}			4	A	t_p = 8/20μs
Junction Capacitance	C_J		20		pF	VR = 0V, f = 1MHz, Pin 1 to Pin 3 or Pin 2 to Pin 3

ESD3621Xk						
Parameter	**Symbol**	**Min**	**Typ**	**Max**	**Unit**	**Test Condition**
Reverse Working Voltage	V_{RWM}			36	V	
Breakdown Voltage	V_{BR}	38			V	I_T = 1mA
Reverse Leakage Current	I_R			0.2	uA	V_{RWM} = 36V
Clamping Voltage	V_C			53	V	I_{PP} = 1A (8 x 20μs pulse)
Clamping Voltage	V_C			90	V	I_{PP} = 3A (8 x 20μs pulse)
Peak Pulse Current	I_{PP}			3	A	t_p = 8/20μs
Junction Capacitance	C_J		15		pF	VR = 0V, f = 1MHz, Pin 1 to Pin 3 or Pin 2 to Pin 3

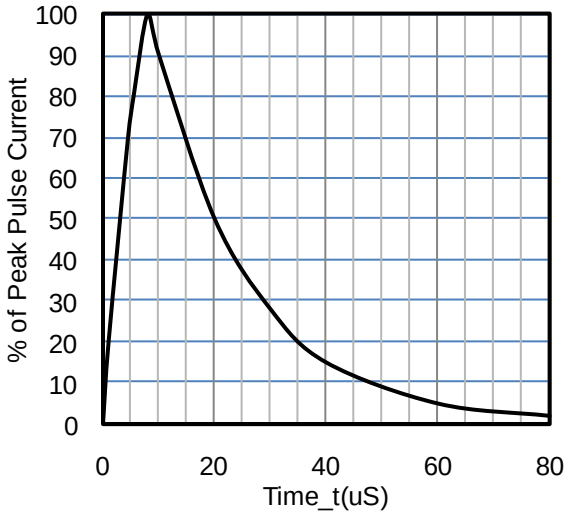
Typical Performance Characteristics (TA=25°C unless otherwise Specified)



Peak Pulse Power vs. Pulse Time

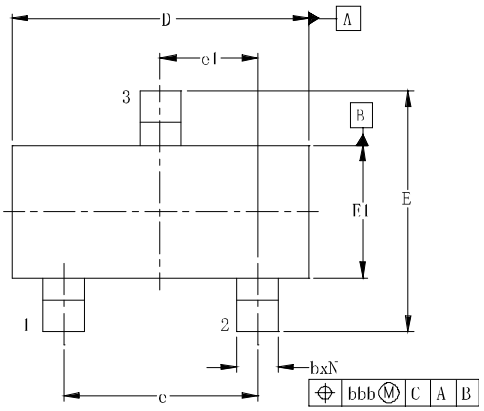


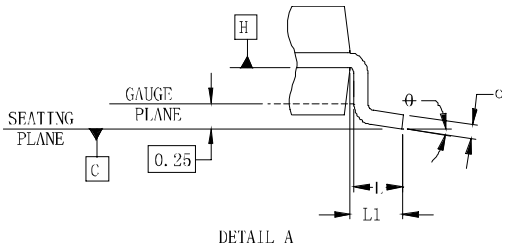
Power Derating Curve

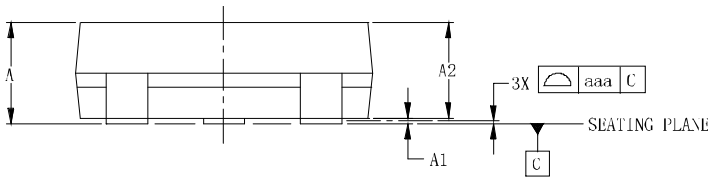


8 X 20us Pulse Waveform

SOT-23 Package Outline Drawing

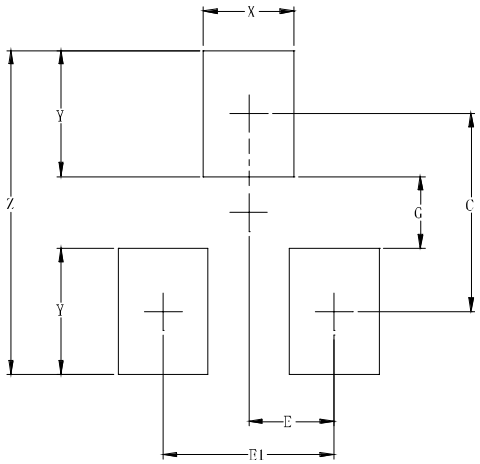






DIMENSIONS						
DIM	INCHES			MILLIMETERS		
	MIN	NOM	MAX	MIN	NOM	MAX
A	.035	–	.044	0.89	–	1.12
A1	.000	–	.004	0.01	–	0.10
A2	.035	.037	.040	0.88	0.95	1.02
b	.012	–	.020	0.30	–	0.51
c	.003	–	.007	0.08	–	0.18
D	.110	.114	.120	2.80	2.90	3.04
E	.082	.093	.104	2.10	2.37	2.64
E1	.047	.051	.055	1.20	1.30	1.40
e	.075			1.90 BSC		
e1	.037			0.95 BSC		
L	.015	.020	.024	0.40	0.50	0.60
L1	.022			(0.55)		
N	3			3		
θ	0°	–	8°	0°	–	8°
aaa	.001			0.10		
bbb	.008			0.20		

Suggested Land Pattern



DIMENSIONS		
DIM	INCHES	MILLIMETERS
C	.087	2.20
E	.037	0.95
E1	.075	1.90
G	.031	0.80
X	.039	1.00
Y	.055	1.40
Z	.141	3.60

Ordering Information

Part Number	Packaging	Reel Size
ESD0520Xk	3000/Tape & Reel	7 inch
ESD1220Xk	3000/Tape & Reel	7 inch
ESD1520Xk	3000/Tape & Reel	7 inch
ESD2420Xk	3000/Tape & Reel	7 inch
ESD3620Xk	3000/Tape & Reel	7 inch