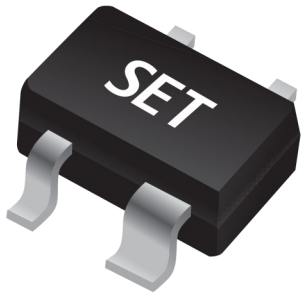
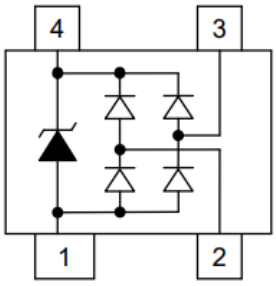
ESD Protection Diodes

Ultra-Low Capacitance ESD and Transient Voltage Protection Diodes Array

SD0505T43U SOT143



Pinout and Functional Block Diagram



PIN1– GND
PIN2– I/O
PIN3– I/O
PIN4– V_{BUS}

Applications

- xDSLI
- USB 1.1/2.0/OTG
- IEEE 1394 Firewire Ports
- Notebooks & Handhelds
- Projection TV & Monitors
- Set-top box
- Flat Panel Displays

Description

SD0505T43U provides a typical line to line capacitance of 0.6 pF and low insertion loss up to 3 GHz providing greater signal integrity making it ideally suited for USB 2.0 applications, such as Digital TVs, DVD players, Computing, set-top boxes and MDDI applications in mobile computing devices.

This device has been specifically designed to protect sensitive components which are connected to high-speed data and transmission lines from overvoltage caused by ESD (electrostatic discharge), CDE (Cable Discharge Events), and EFT (electrical fast transients).

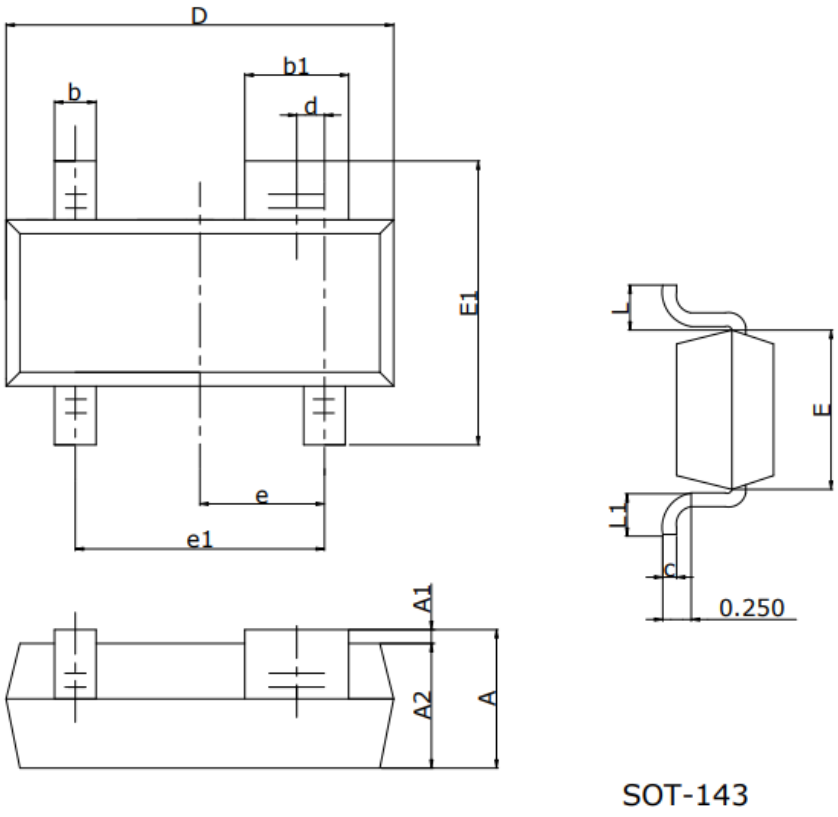
Features

- Protects Two I/O Lines and One Vcc Line
- IEC61000-4-2 (ESD) ± 15 kV (Air), ± 8 kV (Contact)
- No Insertion to 3.0 GHz
- Peak Power Dissipation: 125 W@8 / 20 μs
- Low Clamping Voltage
- Low Leakage Current
- Response Time < 1 ns
- High Temperature to Reflow Soldering Guaranteed: 260 °C / 10 sec
- Device Meets MSL 1 Requirements
- Flammability Rating: UL 94 V-0
- Halogen Free and RoHS Compliant

Order Information

Type	Package	Marking Code	Delivery Form	Delivery Quantity
SD0505T43U	SOT-143	SL3 or R05	7” T&R	3000 PCS

Package Dimensions - SOT-143



SOT-143

Symbol	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	0.90	1.15	0.035	0.045
A1	0.00	0.10	0.000	0.004
A2	0.90	1.05	0.035	0.041
b	0.30	0.50	0.012	0.020
b1	0.75	0.90	0.030	0.035
c	0.08	0.15	0.003	0.006
D	2.80	3.00	0.110	0.118
d	0.20 TYP		0.008 TYP	
E	1.20	1.40	0.047	0.055
E1	2.25	2.55	0.089	0.100
e	0.95 TYP		0.037 TYP	
e1	1.80	2.00	0.071	0.079
L	0.55 REF		0.022 REF	
L1	0.30	0.50	0.012	0.020

Limiting Values

(T_A = 25 °C, unless otherwise specified)

Symbol	Parameter	Conditions	Min	Max	Unit
V_{ESD}	Electrostatic Discharge Voltage	IEC 61000-4-2; Contact Discharge	-	8	kV
		IEC 61000-4-2; Air Discharge	-	15	kV
P_{PP}	Peak Pulse Power (8 / 20 μs)	-	-	125	W
T_A	Operating Temperature Range	-	-55	150	°C
T_{stg}	Storage Temperature Range	-	-55	150	°C

Electrical Characteristics

(T_A = 25 °C, unless otherwise specified)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_{RWM}	Reverse Working Voltage	Any I/O pin to GND	-	-	5.0	V
V_{BR}	Reverse Breakdown Voltage	I_T = 1 mA Any I/O pin to GND	6.0	-	-	V
I_R	Reverse Leakage Current	V_{RWM} = 5 V Any I/O pin to GND	-	-	1.0	μA
V_F	Diode Forward Voltage	I_F = 15 mA	-	0.85	1.2	V
V_{C1}	Clamping Voltage1	I_{PP} = 1 A, t_p = 8 / 20 μs Any I/O pin to GND	-	-	15.5	V
V_{C2}	Clamping Voltage2	I_{PP} = 5 A, t_p = 8 / 20 μs Any I/O pin to GND	-	-	25	V
I_{pp}	Peak Pulse Current	t_p = 8 / 20 μs Any I/O pin to GND	-	-	5	A
C_{J1}	Junction Capacitance1	V_R = 0 V, Measured at 1 MHz Between I/O pins	-	0.45	0.6	pF
C_{J2}	Junction Capacitance2	V_R = 0 V, Measured at 1 MHz Any I/O pin to GND	-	0.9	1.2	pF

Note: I/O pins are pin2,3.

Performance Curve for Reference

(T_A=25 °C unless otherwise noted)

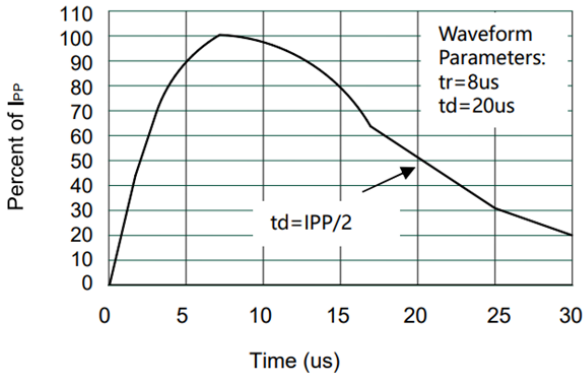


FIGURE 1

Pulse Waveform

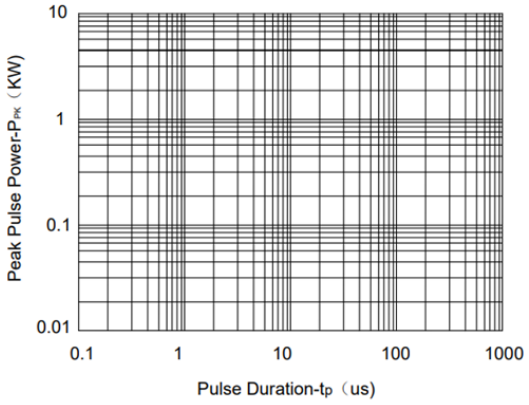


FIGURE 2

Non-Repetitive Peak Pulse Power VS. Pulse Time

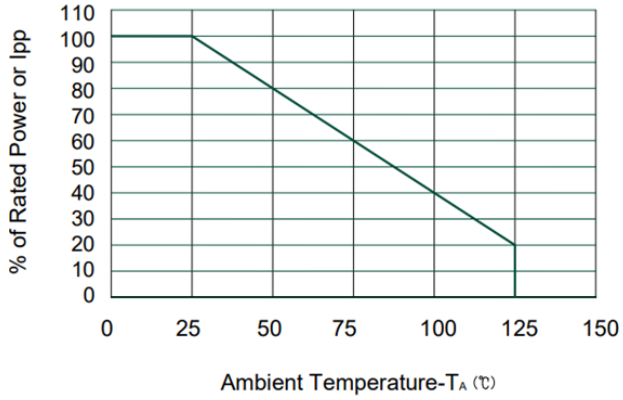


FIGURE 3

Power Derating Curve

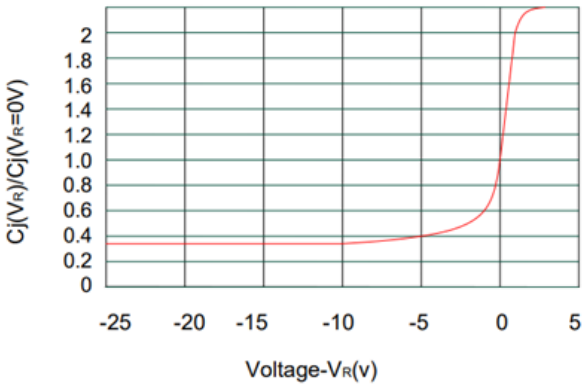
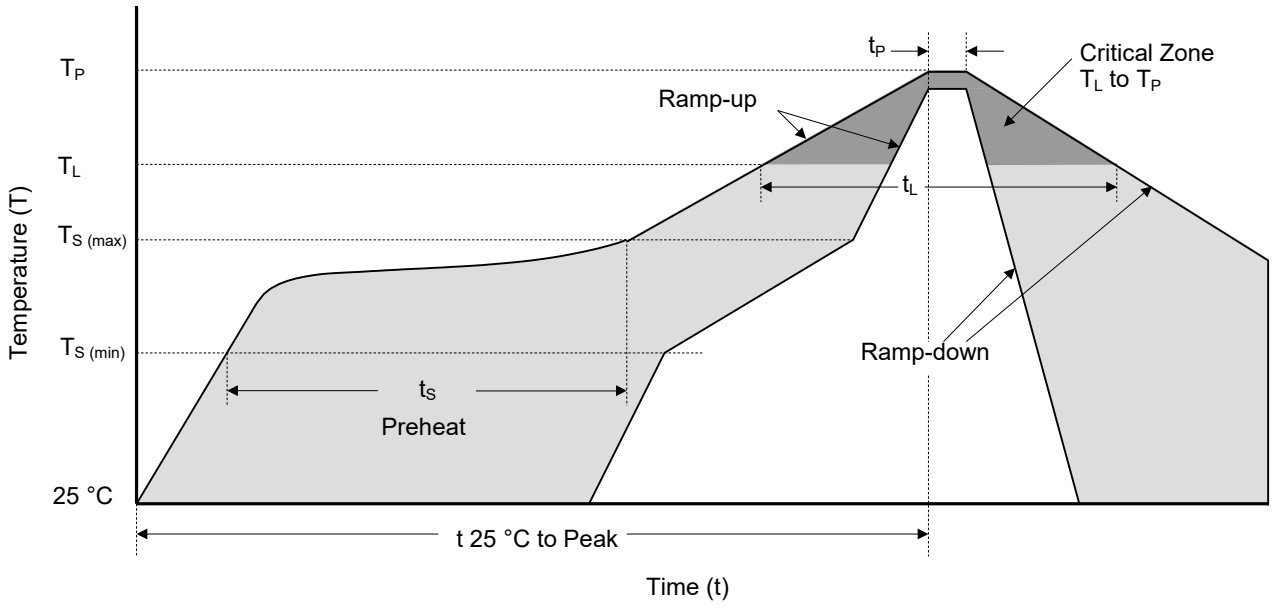


FIGURE 4

Junction Capacitance VS. Reverse Voltage

Soldering Parameters



Reflowing Condition

Reflow Soldering Parameters		Lead-Free Assembly
Pre-heat	Temperature Min ($T_{S\ (min)}$)	150 °C
	Temperature Max ($T_{S\ (max)}$)	200 °C
	Time (min to max) (t_s)	60 ~ 120 seconds
Average Ramp Up Rate (Liquidus Temp (TL) to Peak		3 °C / second max.
T_S (max) to T_L Ramp-up Rate		3 °C / second max.
Reflow	Temperature (T_L) (Liquidus)	217 °C
	Time (min to max) (t_L)	60 ~ 150 seconds
Peak Temperature (T_P)		$260^{+0/-5}$ °C
Time of within 5 °C of Actual Peak Temperature (t_P)		20 ~ 40 seconds
Ramp-down Rate		6 °C / second max.
Time from 25 °C to Peak Temperature		8 Minutes max.
Do Not Exceed		260 °C

ATTENTION

Usage

1. TVS must be operated in the specified ambient temp.
2. Do not clean the TVS with strong polar solvent such as ketone, esters, benzene and halogenated hydrocarbon, to avoid damaging the encapsulating layer.
3. Please do not apply severe vibration, shock or pressure to TVS, to avoid element cracking.

Replacement

1. If TVS is visually damaged, please replace it.
2. TVS is a non-repairable product. For safety sake, please use equivalent TVS for replacement.

Storage

1. Storage Temp. Range: (-55 to 150) °C.
2. Do not store the TVS at the high temp., high humidity or corrosive gas environment, to avoid influencing the solder- ability of the lead wires. The product shall be used up within 1 year after receiving the goods.

Environmental Conditions

1. TVS should not be exposed to the open air, nor direct sunshine.
2. TVS should avoid rain, water vapor or other condition of high temp. and high humidity.
3. TVS should avoid sand dust, salt mist, or other harmful gases.

Max. Typical Capacitance of TVS

The typical capacitance of TVS is listed in the specifications. Designers may refer to it when designing TVS in High frequency circuit.

Installation Mechanical Stress

1. Do not knock TVS when installing, to avoid mechanical damage.
2. Please do not apply severe vibration, shock or pressure to TVS, to avoid surface resin or element cracking.

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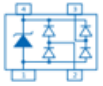
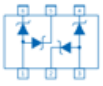
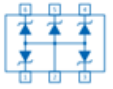
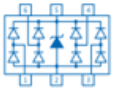
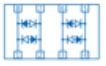
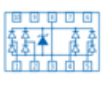
SD0505T43U SOT143

SETsafe | SETfuse

Package Outline					Circuit Diagram					
										
DFN0603	DFN1006	DFN1006-3L	DFN1610	DFN2020-3L	1CH/UNI	1CH/BI	2CH/UNI	2CH/BI	1CH/BI	1CH/UNI
										
DFN1610-6L	DFN2010-8L	DFN2510	DFN2626-10L	DFN3810-9L	1CH/UNI	1CH/BI	1CH/UNI	1CH/BI	2CH/UNI	2CH/BI
										
SOD-923	SOD-523	SOD-323	SOD-123	SOT-143	1CH/UNI	2CH/UNI	2CH/UNI	4CH/UNI	5CH/UNI	4CH/UNI
										
SOT-523	SOT-323	SOT-23	SOT-363	SOT-23-6L	2CH/BI	4CH/UNI	4CH/UNI	8CH/UNI	8CH/UNI	8CH/UNI

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