

PTLC0514TS – ESD Protection Diode

Feature

- 100 Watts peak pulse power (8/20 μ s)
- SOT23-6 package
- Solid state silicon-avalanche technology
- Low clamping voltage
- Low leakage current
- Protect one data/power line
- IEC61000-4-2 (ESD) ± 20 kV (Air), ± 15 kV (Contact)
- IEC61000-4-4 (EFT) 40 A (5/50 ns)
- IEC61000-4-5 (Lightning): 6 A (8/20 μ s)



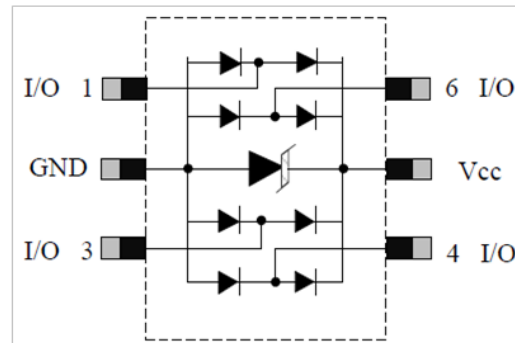
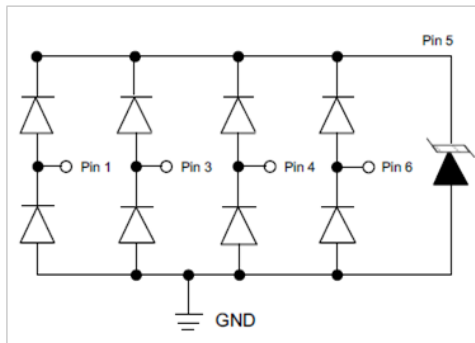
Applications

- Ethernet
- Digital Video Interface (DVI)
- USB2.0
- Notebooks and PC Computers

Mechanical Data

- SOT23-6 package
- Molding compound flammability rating: UL94 V-0
- Tape and Reel Packaging
- RoHS/WEEE Compliant

Schematic and PIN Configuration



Maximum Rating

Parameter	Symbol	Limit	Unit
IEC61000-4-2 ESD Voltage – Air Mode	$V_{ESD}^{(1)}$	± 20	kV
IEC61000-4-2 ESD Voltage – Contact Mode		± 15	
Peak Pulse Power	$P_{PP}^{(2)}$	100	W
Peak Pulse Current	$I_{PP}^{(2)}$	6	A
Maximum Lead Solder Temperature (10 seconds duration)	T_L	260	$^{\circ}$ C
Junction Temperature	T_J	-55~125	$^{\circ}$ C
Storage Temperature Range	T_{stg}	-55~125	$^{\circ}$ C

Note:

1. Device stressed with ten non-repetitive ESD pulses.
2. Non-repetitive current pulse 8/20 μ s exponential decay waveform according to IEC61000-4-5.
3. All ratings are measured at environmental temperature of $T_A = 25^{\circ}$ C unless otherwise noted.

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Electrical Characteristics

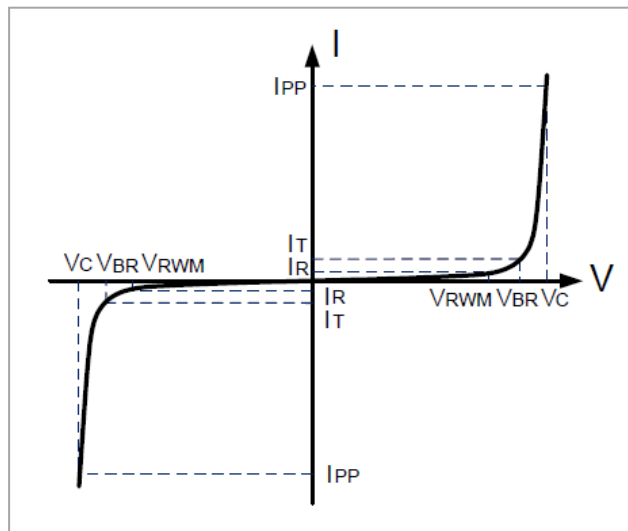
Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Reverse Stand-off Voltage	$V_{RWM}^{(1)}$				5.0	V
Reverse Breakdown Voltage	V_{BR}	$I_T = 1 \text{ mA}$	6.0	6.8	8.5	V
Reverse Leakage Current	I_R	$V_{RWM} = 5 \text{ V}$			500	nA
Clamping Voltage	$V_C^{(2)}$	$I_{PP} = 6 \text{ A}$		14	16	V
Junction Capacitance	C_J	$V_R = 0 \text{ V}, f = 1 \text{ MHz}, I/O \text{ to } I/O$		0.3	0.4	pF
		$V_R = 0 \text{ V}, f = 1 \text{ MHz}, I/O \text{ to } GND$		0.6	0.8	pF

Note:

1. Other voltages available upon request.
2. Non-repetitive current pulse 8/20 μs exponential decay waveform according to IEC61000-4-5.
3. All ratings are measured at environmental temperature of $T_A = 25^\circ\text{C}$ unless otherwise noted.

Electrical Parameters

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



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Typical Characteristics

Fig.1 Peak Pulse Power Rating Curve

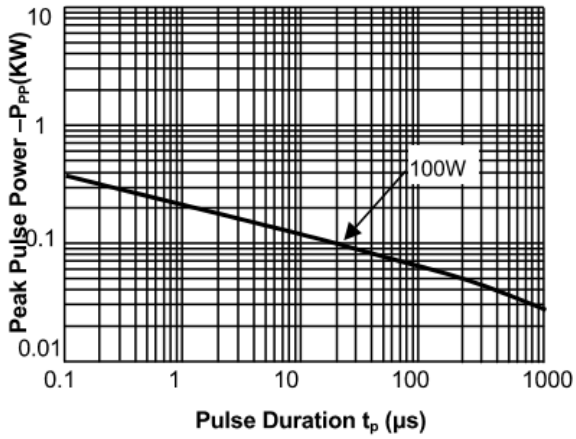


Fig.2 Pulse Derating Curve

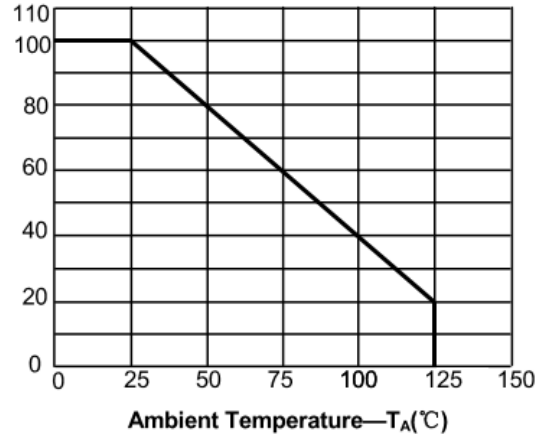


Fig.3 Pulse Waveform-8/20μs

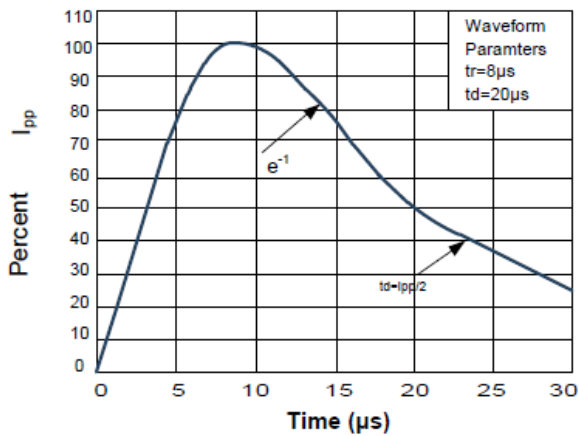


Fig.4 Clamping Voltage vs. I_PP

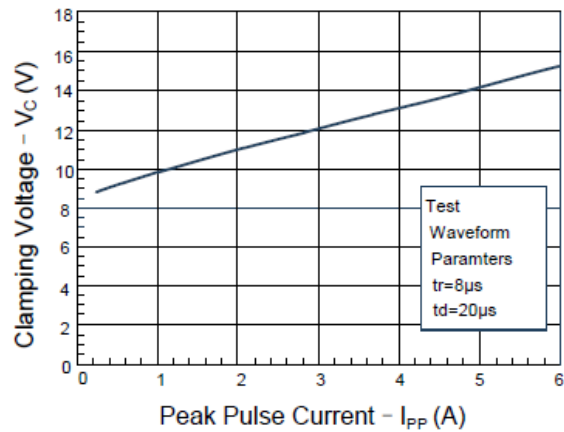


Fig.5 Pulse Waveform-ESD(IEC61000-4-2)

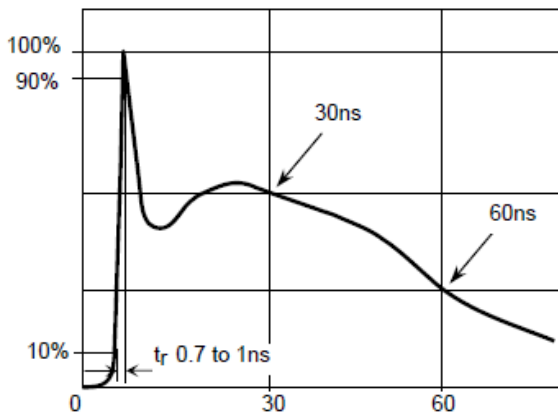
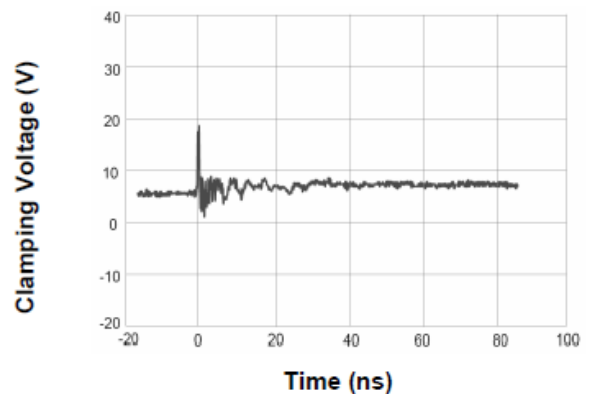


Fig.6 ESD Clamping(IEC61000-4-2:+8kV)



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Typical Characteristics

Fig.7 Eye Diagram - HDMI mask at 3.4Gbps per channel

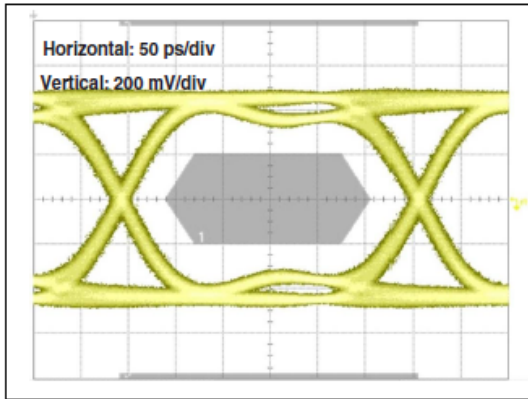
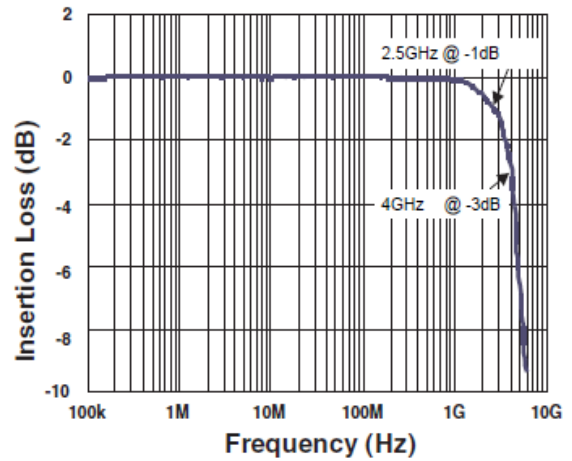
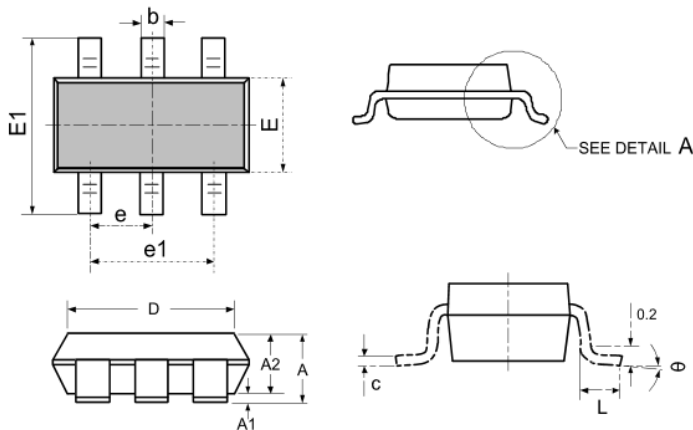


Fig.8 Insertion Loss S21 - I/O to GND

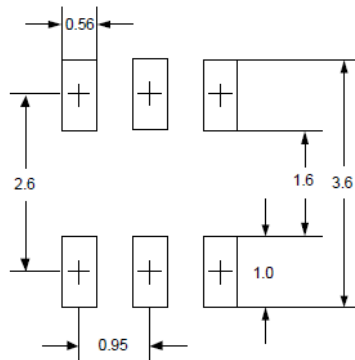


SOT23-6 Package Outline Dimensions



Symbol	Dimensions (mm)	
	Min	Max
A	1.050	1.250
A1	0.000	0.100
A2	1.050	1.150
D	2.820	3.020
E	1.500	1.700
E1	2.650	2.950
b	0.300	0.500
e	0.950 (BSC)	
e1	1.800	2.000
L	0.300	0.600
θ	0°	8°

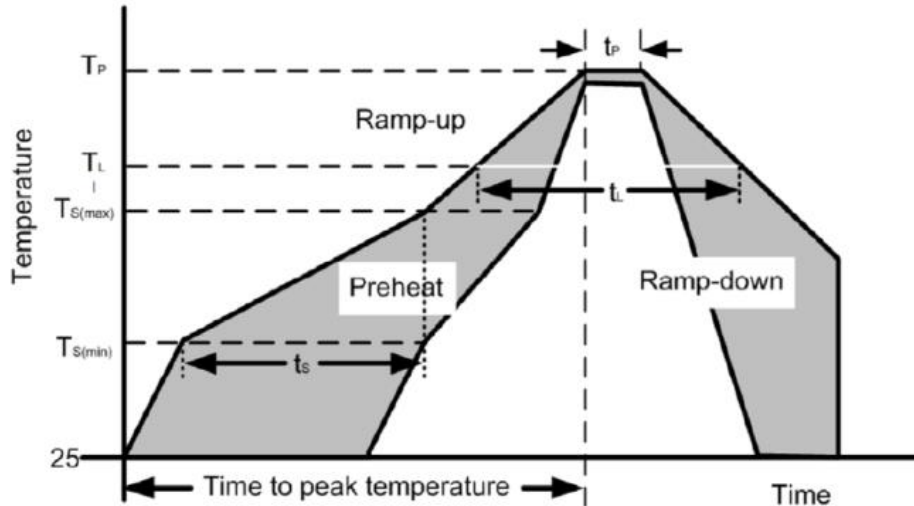
SOT23-6 Recommended Pad Layout



Note : Controlling dimensions in millimeters

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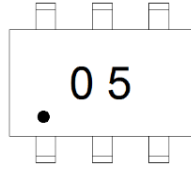
Soldering Parameters



Reflow Condition	Pb-Free assembly
Pre Heat Temperature Min (Ts (min)) 150°C	Temperature Min (Ts (min)) 150°C
Pre Heat Temperature Min (Ts (max)) 200°C	Temperature Min (Ts (max)) 200°C
Pre Heat Time (min to max) (ts) 60-190 secs	Time (min to max) (ts) 60-190 secs
Average ramp up rate (Liquidus Temp) (TL) to peak	5°C/seconds max
Ts(max)to TL—Ramp-up Rate	5°C/seconds max
Reflow Temperature (TL) (Liquidus)	217°C
Reflow Temperature (tl)	60-150 seconds
Peak Temperature (Tp)	260+0/-5°C
Time within actual peak Temperature (tp)	20-40 seconds
Ramp-down Rate	5°C/seconds max
Time 25°C to peak Temperature (Tp)	8 minutes Max.
Do not exceed	280°C

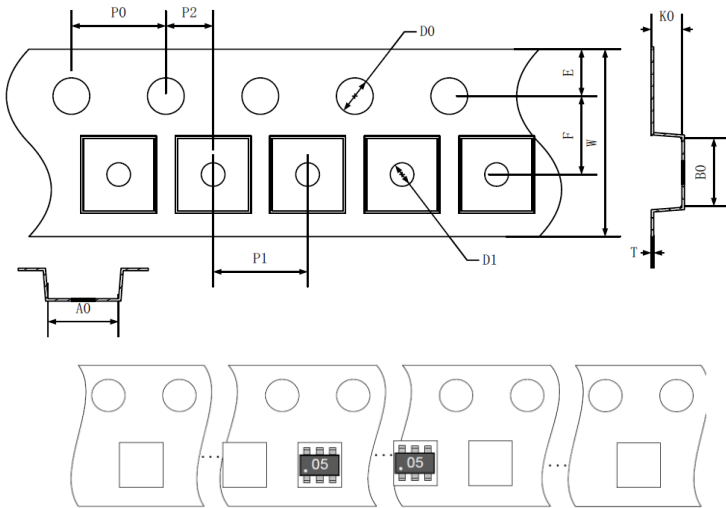
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Marking

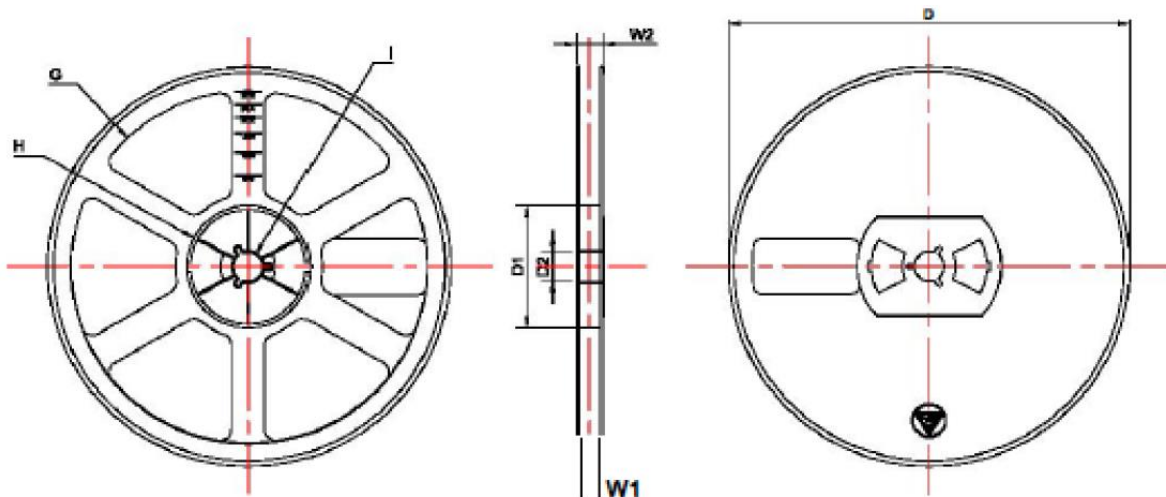


Packaging Information

Order Code	Packaging	Reel Size	PCS/Reel
PTLC0514TS	SOT23-6	7 inch	3,000



Symbol	Dimensions (mm)		
	Min	Typ	Max
A0	3.07	3.17	3.27
B0	3.13	3.23	3.33
K0	1.27	1.37	1.47
P0	3.90	4.00	4.10
P1	3.90	4.00	4.10
P2	1.95	2.00	2.05
T	0.22	0.25	0.28
E	1.65	1.75	1.85
F	3.40	3.50	3.60
W	7.90	8.00	8.30
D0	1.45	1.55	1.65
D1	0.75	1.00	1.25



Reel Option	D	D1	D2	G	H	I	W1	W1
Dimensions (mm)	Φ178.00	54.40	13.00	R78.00	R25.60	R6.50	9.50	12.30
Tolerance	±2	±1	±1	±1	±1	±1	±1	±1