

## TQS05-4A

The TQS05-4A has a low typical capacitance of 2.0pF and operates with virtually no insertion loss to 2.0GHz. This makes the device ideal for protection of high-speed data lines such as USB 2.0, Firewire, DVI, and gigabit Ethernet interfaces. The low capacitance array configuration allows the user to protect four high-speed data or transmission lines. The low inductance construction minimizes voltage overshoot during high current surges. It is used to meet the ESD immunity requirements of IEC61000-4-2, Level 4 ( $\pm 15\text{kV}$  air,  $\pm 8\text{kV}$  contact discharge).

It 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 lightning.

### Features

- Protects four I/O lines and one Vcc line
- Low capacitance
- Working voltages : 5V
- Low leakage current
- Response Time is  $< 1\text{ ns}$
- Low capacitance (0.12pF Typ.) for high-speed interfaces
- No insertion loss to 2.0GHz
- Meets MSL 1 Requirements
- Solid-state silicon avalanche technology
- ROHS compliant
- TECHIP technology

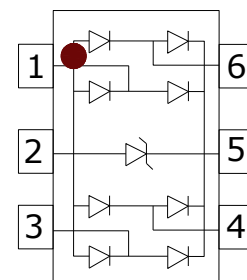


### Main applications

- Digital Visual Interface (DVI)
- 10/100/1000 Ethernet
- USB 1.1/2.0/OTG
- IEEE 1394 Firewire Ports
- Projection TV Monitors and Flat Panel Displays
- Notebook Computers
- Set Top Box
- Projection TV

### Protection solution to meet

- IEC61000-4-2 (ESD)  $\pm 15\text{kV}$  (air),  $\pm 8\text{kV}$  (contact)
- IEC61000-4-4 (EFT) 40A (5/50ns)
- IEC61000-4-5 (Lightning) 5.5A (8/20  $\mu\text{s}$ )



**SOT-23-6L**

### Ordering Information

Device	Qty per Reel	Reel Size
TQS05-4A	3000	7 Inch

### Maximum ratings (Tamb=25°C Unless Otherwise Specified)

Parameter	Symbol	Value	Unit
Peak Pulse Power (tp=8/20µs waveform)	P <sub>PPP</sub>	150	Watts
ESD Rating per IEC61000-4-2:	Contact	8	KV
	Air	15	
Peak Pulse Current(tp=8/20µs waveform)	I <sub>PP</sub>	5.5	A
Lead Soldering Temperature	T <sub>L</sub>	260 (10 sec.)	°C
Operating Temperature Range	T <sub>J</sub>	-55 ~ 150	°C
Storage Temperature Range	T <sub>STG</sub>	-55 ~ 150	°C

Maximum ratings are those values beyond which device damage can occur. Maximum ratings applied to the device are individual stress limit values (not normal operating conditions) and are not valid simultaneously. If these limits are exceeded, device functional operation is not implied, damage may occur and reliability may be affected.

\*Other voltages may be available upon request.

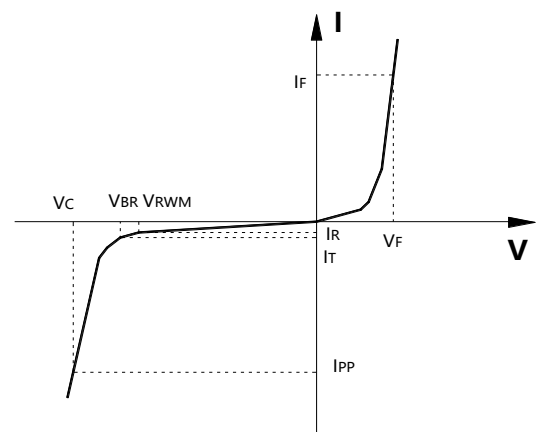
1. Non-repetitive current pulse, per Figure 1.

### Electrical characteristics (Tamb=25°C Unless Otherwise Specified)

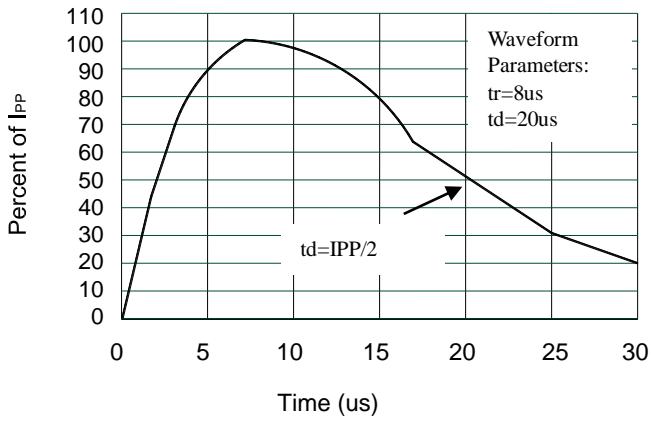
Symbol	Parameter	Conditions	Min.	Typ.	Max.	Units
V <sub>RWM</sub>	Reverse Working Voltage	Any I/O to Ground			5.0	V
V <sub>BR</sub>	Reverse Breakdown Voltage	I <sub>T</sub> = 1mA, Any I/O to Ground	6.0			V
I <sub>R</sub>	Reverse Leakage Current	V <sub>RWM</sub> = 5V, Any I/O to Ground			1	µA
V <sub>F</sub>	Diode Forward Voltage	I <sub>F</sub> = 15mA		0.85	1.2	V
V <sub>C</sub>	Clamping Voltage	I <sub>PP</sub> = 1A, tp = 8/20µs, any I/O pin to Ground			12	V
		I <sub>PP</sub> = 5.5A, tp = 8/20µs, any I/O pin to Ground		9	12	V
C <sub>J</sub>	Junction Capacitance	V <sub>R</sub> = 0V, f = 1MHz, between I/O pins		0.12		pF
		V <sub>R</sub> = 0V, f = 1MHz, any I/O pin to Ground		0.03		pF

Junction capacitance is measured in VR=0V,F=1MHz

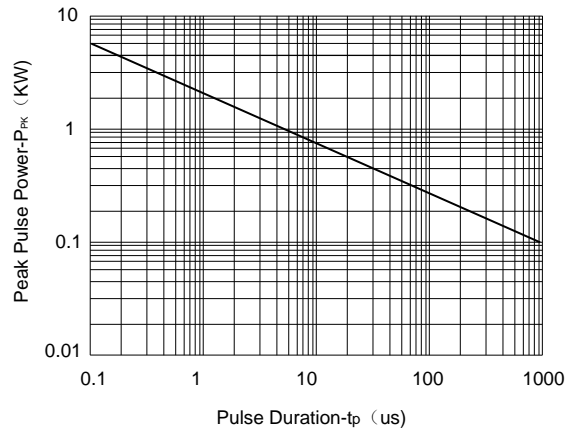
Symbol	Parameter
V <sub>RWM</sub>	Working Peak Reverse Voltage
V <sub>BR</sub>	Breakdown Voltage @ I <sub>T</sub>
V <sub>C</sub>	Clamping Voltage @ I <sub>PP</sub>
I <sub>T</sub>	Test Current
I <sub>RM</sub>	Leakage current at V <sub>RWM</sub>
I <sub>PP</sub>	Peak pulse current
C <sub>O</sub>	Off-state Capacitance
C <sub>J</sub>	Junction Capacitance



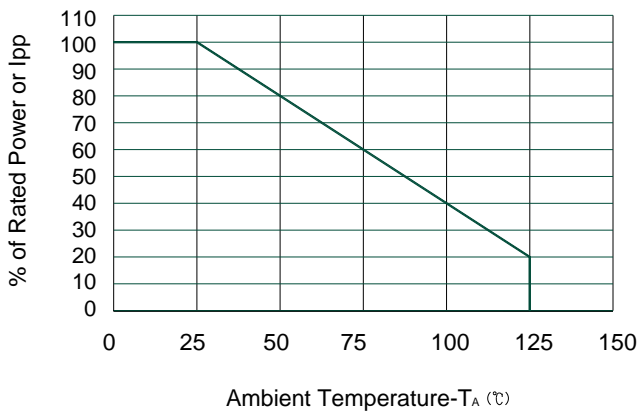
## Typical electrical characterist applications



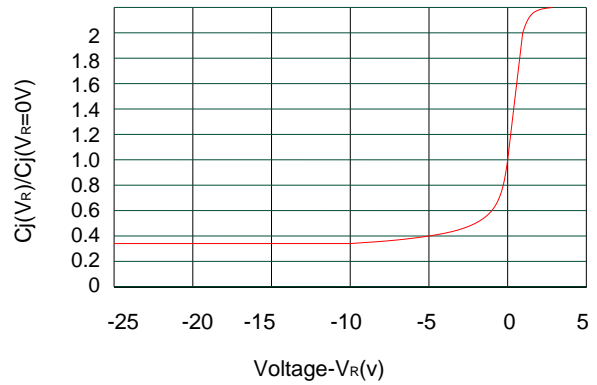
Pulse Waveform



Non-Repetitive Peak Pulse Power vs. Pulse Time



Power Derating Curve



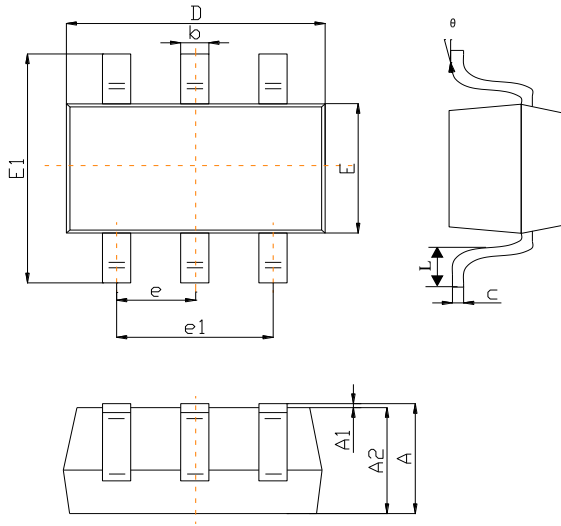
Junction Capacitance vs. Reverse Voltage

## Package Information

### SOT23-6L

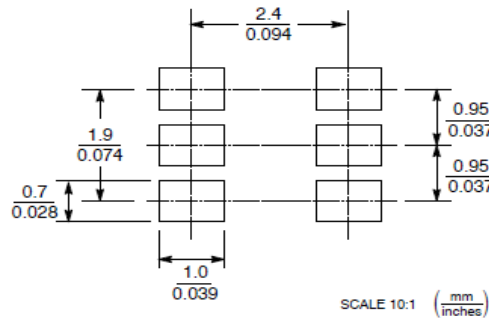
#### Mechanical Data

- Case: SOT23-6L
- Case Material: Molded Plastic. UL Flammability

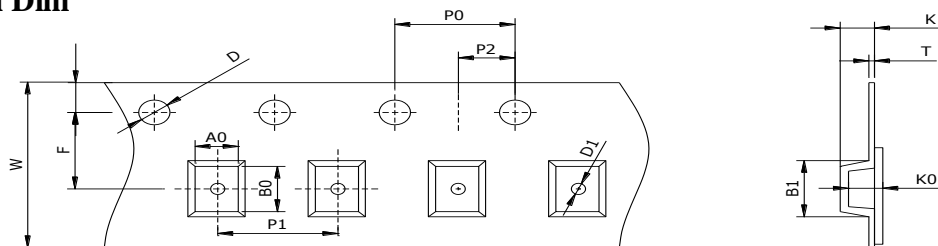


DIM	Millimeters		Inches	
	Min	Max	Min	Max
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E	1.500	1.700	0.059	0.067
E1	2.650	2.950	0.104	0.116
e	0.950(BSC)		0.037(BSC)	
e1	1.800	2.000	0.071	0.079
L	0.300	0.600	0.012	0.024
θ	0	8°	0	8°

#### Recommended Pad outline



#### SOT23-6L Reel Dim



Package	Chip Size	Pocket Size B0×A0×K0(mm)	Tape Width	Reel Diameter	Quantity Per Reel	P0	P1
SOT23-6L	3.00×2.90×1.20	3.20×3.10×1.40	8mm	178mm(7")	3000	4mm	4mm
D0	D1	E	F	K	T	W	
1.5mm	1.0mm	1.75mm	3.5mm	1.25mm	0.2mm	8mm	