IPAD™ – protection and rectifiers for computer applications
## Contents

### Overview mapping kits
- Motherboard (desktop and notebook) 4
- Optical and hard disk drive 4
- Photo, multifunction and standalone printers 5
- Personal Digital Assistant (PDA) 5

### Design guide for point-to-point
- USB 2.0 high-speed 6
- PS/2 6
- Flash card memory slots 7
- IEEE1284 parallel interface 7
- USB 2.0 low and full-speed 7

### Design guide for audio and video
- Handheld audio 8
- Computer audio 9
- DVI 9
- S-VHS 9

### Design guide for networking and power
- IEEE1394a/b 10
- Ethernet 10/100 10
- Modem 56k and ADSL 11
- Battery powered computer application: 11
- Schottky and protection diodes 11
- Battery powered computer application: Transky™ diodes 11

### Power topology in hard disk drive
- Boost converter in hard disk drive 12
- Buck/Boost converter in hard disk drive 12

### Part number list
- Part number list 13/14
This brochure describes the IPAD, ASD protection and rectifier product portfolio suitable for major computer applications:

- Motherboards for desktop and notebook
- Optical and hard disk drives
- Printers
- Personal Digital Assistant (PDA)

To help designers, we have also provided detailed technical explanations for the following sub-applications:

- Point-to-point connection
- Audio and video function
- Networking
- Power management
## Overview mapping kits

### Motherboard (desktop and notebook)

#### ESD protection
- ESDA6V1-4BC6
- ESDA5V3SC6
- ESDA5V2L
- ESDALC6V1P3

#### IEEE1394a/b
- ESD protection
- DVIULC6-4SC6

#### Modem pots
- Lightning protection
- SMP100LC-xxx/MC-xxx
- SMP30-xxx
- SMP50-xxx
- SMP80-xxx

#### Ethernet
- ESD protection
- USBLC6-2SC6/2P6
- USBLC6-4SC6
- DALC208SC6

#### Power management
- Asynchronous V_{\text{em}}
  - High current 30V Schottky

#### Flash card memory slot
- ESD protection
- USBLC6-4SC6
- ESDALC6V1W5/5W6
- DALC208SC6

#### PS/2
- ESD protection
- EMI filter and termination
- KBMF01SC6

#### IEEE1284
- ESD protection
- ESDA6V1S3
- EMI filter and termination
- ST1284-0xA8

#### USB 2.0 high-speed
- ESD protection
- USBLC6-2SC6
- USBLC6-2P6

#### Power rail
- EOS protection
- SM2T3V3A/SM2T6V8A
- SM2T14A
- SMLVT3V
- SMAJ5.0A-TR/SMBJ5.0A-TR
- SMBJ12AVCL/SMBJ13A-TR

### Optical and hard disk drive

#### Power management
- DC/DC
  - STPS0520Z/STPS0530Z
  - STPS120M/STPS130M
  - STPS1L20M/STPS1L30M
  - STPS2L30A/STPS2L25U/
  - STPS2L40U
  - STPS340x/STPS3L40x

#### Signal function – charge pump
- BAT54J/AW/CW/SWFILM

#### USB 2.0 high-speed
- ESD protection
- USBLC6-2SC6
- USBLC6-2P6

#### Power rail
- EOS protection
- DVIULC6-4SC6

#### IEEE1394a/b
- ESD protection
- USBLC6-2SC6
- USBLC6-2P6
- EMI filter and termination
- ST1394-01SC6
Photo, multifunction and standalone printers

**Ethernet**
- ESD protection
- USBLC6-2SC6/2P6
- USBLC6-4SC6

**Modem**
- Lightning protection
- SMP100LC-xxx/MC-xxx
- SMP30-xxx
- SMP50-xxx
- SMP80-xxx

**Print-head**
- ESD protection
- ESDA17SC6
- ESDA17-5SC6
- ESDA19SC6
- ESDA19-5SC6

**USB 2.0 high-speed**
- ESD protection
- USBLC6-4SC6
- USBLC6-2SC6
- USBLC6-2P6

**IEEE1284**
- ESD protection
- ESDA6V1S3
- EMI filter and termination
- ST1284-0xA8

**Power management**
- DC/DC converters/V_{reg}
- Schottky 0.5 to 5A/20 to 60V
- SOD123/STmite/SMA/SMD/DPACK
- STPS160A
- STPS3100B

**Flash card memory slot**
- ESD protection
- ESDALC6V1W5/5W6
- USBLC6-4SC6
- EMI filter
- EMI04-MMCOxF2
- EMI06-HMC01F2
- EMI04-2005QCF

**USB 2.0 low to high-speed**
- ESD protection
- USBLC6-2SC6
- USBLC6-2P6
- EMI filter and termination
- EMI02-USB01/04Fx
- USBUF01/02W6/P6

**Power rail**
- EOS protection
- Transky SMYT18AM
- SMAJxxA-TR
- SM2T3V3A/SM2T6V8A/SM2T14A

**Bottom connector**
- ESD protection
- ESDA6V1W6/5W6
- EMI filter
- EMI01-10005W5

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**PDA**

**LCD screen**
- ESD protection and EMI filter
- EMI01-LCD01F1

**Microphone, carpiece and speaker-phone**
- ESD protection
- EMI filter and termination
- EMI01-10005W5
- EMI02-MIC0xF2
- EMI02-SPK0xF2
- EMI06-xxxxF2

**Flash card memory slot**
- ESD protection
- USBLC6-4SC6
- ESDALC6V1W5/5W6
- DALC208SC6
- EMI Filter
- EMI04-MMCOxF2
- EMI04-HMC01F2
- EMI04-2005QCF

**USB 2.0**
- ESD protection
- USBLC6-2SC6
- USBLC6-2P6
- EMI filter and termination
- EMI02-USB01/04Fx
- USBUF01/02W6/P6
Design guide for point-to-point

USB 2.0 high-speed

Features
- Data line and $V_{BUS}$ ESD protection
- Very low line capacitance (<3pF typ.)
- SOT23-6L and SOT-666 packages

Benefits
- +/-15kV air and contact discharge ESD protection (compliant with IEC61000-4-2, level 4)
- No signal distortion
- EMI-free layout
- Low-profile and small-footprint solution

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<th>SW2</th>
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<td>Full-speed FS</td>
<td>Closed</td>
<td>Open</td>
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<tr>
<td>High-speed HS</td>
<td>Closed then open</td>
<td>Open</td>
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</table>

![SOT23-6L and SOT-666 packages](image)

PS/2

Features
- Integrated passives components for pull-up and low-pass filter functions
- ESD protection for clock and data line
- SOT23-6L package

Benefits
- Complies with FCC part 15 (EMI) and IEC61000-4-2 (+15kV air and contact discharge, level 4)
- EMI filtering and line termination for mouse and keyboard ports
- Space saving (replaces 11 discretes)

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<td>Tolerance</td>
<td>±10%</td>
<td>±10%</td>
<td>±20%</td>
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</table>

![PS/2 features diagram](image)

![USB 2.0 high-speed diagram](image)
**USB 2.0 low and full-speed**

**Features**
- ESD protection
- EMI Filtering with integrated low-pass filter
- Integrated pull-up, pull-down and series termination resistors
- SOT323-5/6L and SOT-666 packages

**Benefits**
- +/-15kV air and +/-8kV contact discharge ESD protection (compliant with IEC61000-4-2, level 4)
- Low profile and large space savings (replaces 8 discretes)
- EMI-free layout

**Flash card memory slots**

**Features**
- Up to six control/data lines, ESD protection and EMI filter
- Supply pin ESD-protected
- Low line capacitance (<20pF)
- Flip-Chip or QFN packages

**Benefits**
- +/-15kV air and +/-8kV contact discharge ESD protection (compliant with IEC61000-4-2, level 4)
- Provides EMI filter + integrated resistor termination
- Low profile and large space savings (replaces up to 24 discretes)
- Broad frequency range filter (<-26dB rejection at 3GHz)
- Suitable for high data rate exchange

**IEEE1284 parallel interface**

**Features**
- Integrated termination resistors
- EMI filtering with integrated low-pass filter on dataline and strobe
- 17-line ESD protection
- QSOP28 package

**Benefits**
- Complies with FCC part 15 (EMI) and IEC61000-4-2 (15kV ESD protection, air discharge level 4)
- Impedance matching with cable and controller
- Space saving (replaces up to 69 discretes)
Design guide for audio and video

**Handheld audio**

**Features**
- ESD protection
- Integrated low-pass filter for EMIF01-MIC0xF2, EMIF01-1005W5 and EMIF02-SPK0xF2
- Flip-Chip or SOT323-5L package

**Benefits**
- EMI low pass filter with EMIF products
- Replaces up to 10 discretes
- Complies with FCC part 15 (EMI) and IEC61000-4-2 (±15kV ESD protection, air discharge level 4)

![Diagram of Handheld audio components](image)

**Computer audio**

**Features**
- ESD protection
- Integrated low pass-filter and pull up and pull down resistors
- Flip-Chip package

**Benefits**
- EMI low pass filter with EMIF products
- Complies with FCC part 15 (EMI) and IEC61000-4-2 (±15kV ESD protection, air discharge level 4)

![Diagram of Computer audio components](image)
Computer audio

Features
- 5V uni or bidirectional ESD protection for audio lines
- Low capacitance (12pF typ.)
- SOT-23 and SC-89 and SOT-323 packages

Benefits
- +/-15kV air and +/-8kV contact discharge ESD protection (compliant with IEC61000-4-2, level 4)
- Very low crosstalk

DVI*

Features
- 4-line ESD protection
- Ultra-low capacitance (0.85pF typ.)
- SOT23-6L package
- Deviates clamping current to ground

Benefits
- +/-15kV air and +/-8kV contact discharge ESD protection (compliant with IEC61000-4-2, level 4)
- No signal distortion due to world leading trade-off line capacitance value/ESD performance

S-VHS

Features
- 5V unidirectional ESD protection for video lines
- Low capacitance (12pF typ.)
- SOT-23 and SC-89 packages

Benefits
- +/-15kV air and +/-8kV contact discharge ESD protection (compliant with IEC61000-4-2, level 4)
- Very low crosstalk

* Released in 2005
IEEE1394a/b

Features (ST1394-01SC6)
- Line termination for two twisted pairs TPA and TPB (1% matching tolerance resistor)
- Complies with IEEE1394 requirement for differential and common mode impedance on TPA and TPB line

Features (ST1394-01SC6 and DVIULC6-4SC6*)
- ESD protection
- SOT23-6L package

Benefits
- ST1394-01SC6 replaces 7 discretes
- ST1394-01SC6 provides full impedance matching for data integrity with optimized ESD protection
- DVIULC6-4SC6 complies with IEC61000-4-2, level 4 (+/-15kV air and +/-8kV contact discharge ESD protection) while providing optimized signal integrity

* Released in 2005

Ethernet 10/100

Secondary protection (USBLC6-4SC6)

Features
- Maximum parasitic line capacitance = 5pF

Benefits
- 4-line protection in one package
- Complies with IEC61000-4-2, level 4 (+/-15kV air and +/-8kV contact discharge ESD protection)

Primary protection (SMP75-8)

Features
- Very low stand-off voltage: 8V
- Low leakage current (<2µA max.)

Benefits
- Bellcore TR-NWT-000974 compliant
Modem 56k and ADSL

Features
- Lightning protection of modem up to 100A, 10/100µs
- Low capacitance (15pF typ @ 270V)
- Low-profile SMA/SMB and SOT23-6L

Benefits
- Complies with FCC Part 68
- Complies with ITU-T K20/K21
- Suitable for xDSL

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<thead>
<tr>
<th>Part number</th>
<th>Features</th>
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<th>Package</th>
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<td>SMB</td>
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<td>SMP50-xxx</td>
<td>50A, 10/100µs</td>
<td>15pF</td>
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<td>SMAJxxA</td>
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<td>SMA</td>
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<td>DALC208SC6</td>
<td>VRRM=9V</td>
<td>7pF</td>
<td>SOT23-6L</td>
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</table>

Battery powered computer application: Schottky and protection diodes

- Combination of Transil (TVS) + Schottky diode on the same die
- Operating voltage up to 16V
- STmite package

Benefits
- Single power device in place of two
- Offers low clamping voltages for both over and undershoots
Power topology in hard disc drive

Boost converter in HDD

- 3.3V output: Memory DC/DC converter
- Switching converter: STPS0520Z, STPS0530Z
- Charge pump: BAT54SW/SY
- 1.2 to 1.8V output: Controller DC/DC converter
- Desktop: STPS2L30A/STPS2L25U
  Mobile: STPS1L20M/STPS1L30M
  Enterprises: STPS3L25S/STPS2L40U/STPS3L40S

Buck converter in HDD

- -3 to -5V output: Pre-Amp DC/DC converter
  STPS0520Z
  STPS0530Z (if higher V_{rrm} rating required)
  STPS1L20M

Buck/boost converter

* Released in 2005
## Part number list

<table>
<thead>
<tr>
<th>Subsystem</th>
<th>Part number rectifier</th>
<th>Description</th>
<th>Specifications</th>
<th>Package</th>
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<td><strong>DC/DC</strong></td>
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<td>STPS0xxZ/M</td>
<td>0.5A, 20, 30 and 40V Schottky low leakage current</td>
<td>V_RM (V)</td>
<td>SOD-123 STmite</td>
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<td>STPS1LxxA/UM</td>
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<td>Charge pump</td>
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<td>SOT-323</td>
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<td>BAT54J/1W/C/SWFILM</td>
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<td><strong>IEEE1284</strong></td>
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### Part number list

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### Power rail list

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<th>Description</th>
<th>Specifications</th>
<th>Package</th>
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<td>Power rail 3.3V</td>
<td>SM2T3V3A</td>
<td>Transient voltage protection</td>
<td>Peak pulse power (W)</td>
<td>V_{BR} min @ I_{RM} (V @ µA)</td>
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<td>3.3 @ 500</td>
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<td>SMLVT3V3</td>
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