

Features

- D+/D- DCP Mode per USB Battery Charging Specification 1.2
- D+/D- Short Mode per Telecommunication Industry Standard YD/T1591-2009 (Chinese)
- Supports non-BC1.2 Charging Modes by Automatic Selection
 - D+/D- Option for Apple Device
 - D+/D- Option for Samsung Device
- Supports Both Channels Applying 2.7V on both D+ and D-
- Operating Voltage Range: 4.5V to 5.5V
- Lead(Pb)-Free, Halogen-Free, SOT23-6L Package
- 8kV HBM ESD Rating on DP/DM Pins

Applications

- Power bank
- USB Ports (Hosts and Hubs)
- MID OTG Port
- Wall Charging Adapters

Order Information

| Name | Operation Temperature | Package | Parameter | Package Mark |
|--------|-----------------------|----------|-----------|--------------|
| ZS5889 | -30°C to 80°C | SOT23-6L | 2.4A+2.4A | 5889 |

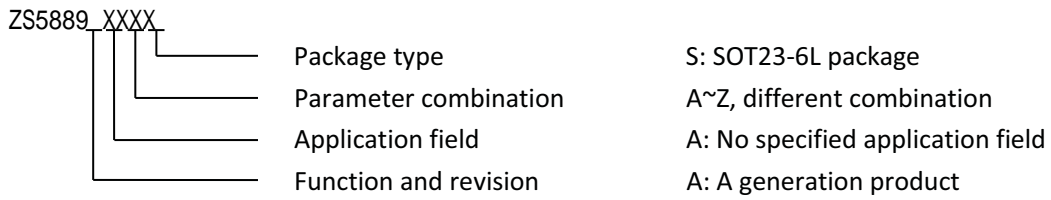
General Description

The ZS5889 is the USB dedicated charging controller ICs, which are fully compatible with BC1.2 and other non-BC1.2 standards like YT/D1591-2009, Apple charging specification (for i-Pad & i-Phones) and specs from Samsung Galaxy family.

The IC is used to facilitate charging procedure when most of the mainstream handheld devices are detected.

The ZS5889 series are suitable for all the charger products using USB interface like power bank and wall adapter. ICs are provided with enhanced ESD protection up to +/-8kV with application on DP/DM Pins. available in tiny SOT23-6L package.

Type number



Absolute Maximum Ratings

| | | |
|-------------------------------------|-------|---------------------|
| Voltage on VCC Pin Relative to GND | | GND-0.3 to GND+6V |
| Voltage on DPx, DMx Relative to GND | | GND-0.3 to VCC+0.3V |
| Operating Temperature Range | | -30°C to 80°C |
| Junction Temperature | | 150°C |
| Store Temperature Range | | -55°C to 125°C |

Caution:

Stresses beyond "Absolute Maximum Ratings" condition may cause permanent damage to the device. These are stress ratings only and functional operation of the device at these or any other beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

Pin Arrangement and Description

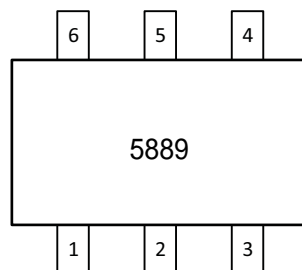


Fig1. Pin arrangement

| Pin No. | Pin Name | Description |
|---------|----------|--|
| 1 | DP2 | USB positive data-channel to external USB device, port 2 |
| 2 | GND | Ground |
| 3 | DP1 | USB positive data-channel to external USB device, port 1 |
| 4 | DM1 | USB negative data-channel to external USB device, port 1 |
| 5 | VCC | USB port VBUS power input |
| 6 | DM2 | USB negative data-channel to external USB device, port 2 |

Table1. Pin Description

Electrical Characteristics Recommended DC Operating Conditions(4.5≤VCC≤5.5, T_A= -40~80°C, unless otherwise specified.)

| PARAMETER | SYMBOL | CONDITIONS | Min. | Typ. | Max. | UNITS |
|--------------------|------------------------|------------|------|------|------|-------|
| VCC Voltage | | | 4.5 | | 5.5 | V |
| VCC POR Voltage | VCC _{POR} | | 3.5 | | 3.9 | V |
| VCC POR Hysteresis | VCC _{POR_HYS} | | | 250 | | mV |

Table2. Electrical Operating Parameters

DC Electrical Characteristics(4.5≤VCC≤5.5, T_A= -40~80°C, unless otherwise specified.)

| PARAMETER | SYMBOL | CONDITIONS | Min. | Typ. | Max. | UNITS |
|----------------------------------|-------------------|--------------------|------|------|------|-------|
| DC Current Consumption | I _{VCC} | | | 360 | 480 | μA |
| Output Resistance on DPx/DMx pin | R _{OUT} | Output voltage=2.7 | | 23 | | kΩ |
| | | Output voltage=2.0 | | 30 | | kΩ |
| Short Condition Resistance | R _{DMDP} | | | 50 | | Ω |

Table3. DC Electrical Characteristics

Function

The ZS5889 is a specified dual-channel USB charger controller IC for external device charging. The ZS5889 is integrated with intelligent USB detection circuits, can identify most of the handheld equipment in market, such as Apple, Samsung, HTC mobile phones and other USB supplied devices. IC monitors the DP/DM voltage all the time, and automatically emulates the corresponding USB type for the attached device. Then, the attached device can employ a big current as MAX as 2.4A to charge itself. Controller IC only changes the DP/DM voltage to suitable value for different devices; it does not control the charging current loop. The actual charge current is determined by the power supply and the charge management IC in attached device.

USB Charge Scheme

The ZS5889 is contain the entire popular USB charge modes. However, for Apple device charging, ZS5889 supports 2.4A+2.4A mode.

| IC Type | Channel | DP Voltage | DM Voltage | Current |
|---------|---------|------------|------------|---------|
| ZS5889 | 1 | 2.7V | 2.7V | 2.4A |
| | 2 | 2.7V | 2.7V | 2.4A |

Table4. Charging Schemes

Application Circuits

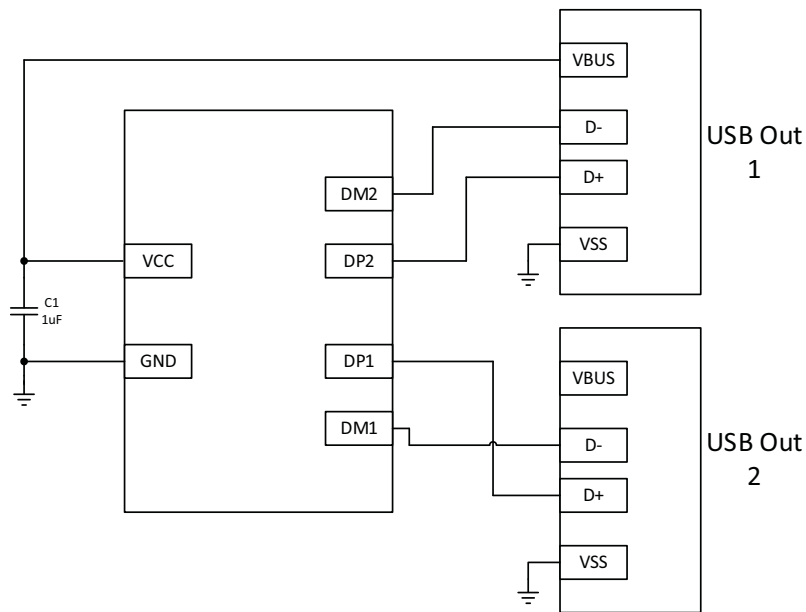
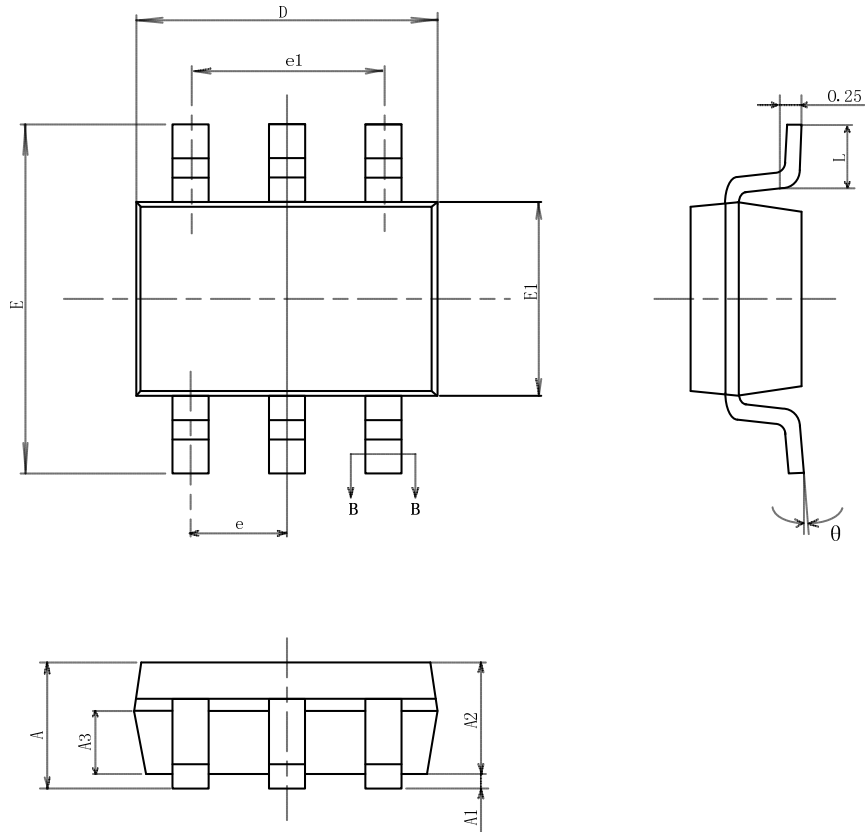


Fig. Typical application circuits

Package Information



| SYMBOL | MILLIMETER | | |
|--------|------------|------|------|
| | MIN | TYP | MAX |
| A | — | — | 1.35 |
| A1 | 0.04 | — | 0.15 |
| A2 | 1.00 | 1.10 | 1.20 |
| A3 | 0.55 | 0.65 | 0.75 |
| b | 0.38 | — | 0.48 |
| b1 | 0.37 | 0.40 | 0.43 |
| c | 0.11 | — | 0.21 |
| c1 | 0.10 | 0.13 | 0.16 |
| D | 2.72 | 2.92 | 3.12 |
| E | 2.60 | 2.80 | 3.00 |
| E1 | 1.40 | 1.60 | 1.80 |
| e | 0.95BSC | | |
| e1 | 1.90BSC | | |
| L | 0.30 | — | 0.60 |
| θ | 0 | — | 8° |
| | * | — | * |