

## General Description

LTP753H series are a high accuracy, low noise, high speed CMOS Linear regulator with low power consumption and low dropout voltage, which provide large output currents, even when the difference of the input-output voltage is small.

LTP753H consists of a current limiter circuit, a driver transistor, a precision reference voltage and an error correction circuit. LTP753H is compatible with low ESR ceramic capacitors. The current limiters foldback circuit operates as a short circuit protection as well as the output current limiter for the output pin. Output voltages are internally by laser trimming technologies. It can be selectable in 0.1V increments within a range of 1.2V to 5.0V.

LTP753H series are available in SOT23-3L, SOT23-5L, SOT89-3L and DFN1x1-4L packages.

## Features and Benefits

- Input Voltage: 1.5V ~ 8.0V
- Fix Output Voltage: 1.2V to 5.0V
- Low voltage drop: 180mV@I<sub>out</sub>=100mA
- Typically output current: 400mA@V<sub>IN</sub>=4.5V
- Low Quiescent Current: 0.5uA(typ)
- High PSRR: 60dB@1KHz
- Stable with Ceramic Capacitors 1 μF
- Build-in Short-circuit protection and current limiter

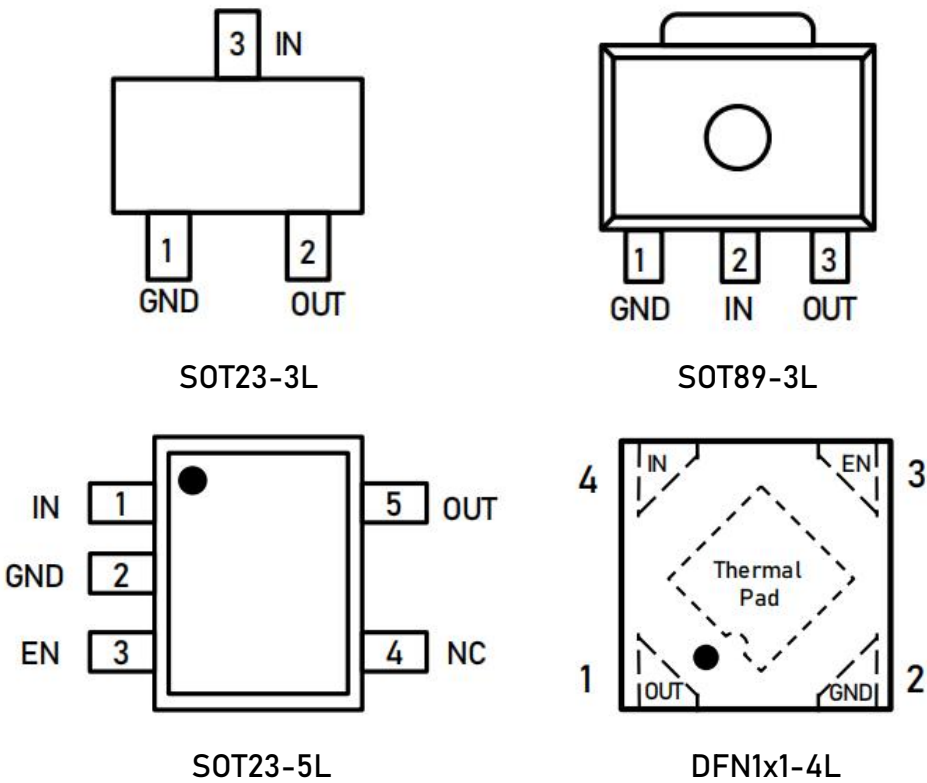
## Applications

- Battery-powered equipment
- Reference voltage sources
- Cameras, video cameras
- Portable AV systems
- Mobile phones
- Portable games

Ordering Information

| Model   | package   | Ordering Number | Packing Option        |
|---------|-----------|-----------------|-----------------------|
| LTP753H | SOT23-3L  | LTP753H-12XT3   | Tape and Reel, 3 000  |
|         |           | LTP753H-18XT3   |                       |
|         |           | LTP753H-25XT3   |                       |
|         |           | LTP753H-28XT3   |                       |
|         |           | LTP753H-30XT3   |                       |
|         |           | LTP753H-33XT3   |                       |
|         |           | LTP753H-50XT3   |                       |
|         | SOT23-5L  | LTP753H-12NXT5  | Tape and Reel, 3 000  |
|         |           | LTP753H-18NXT5  |                       |
|         |           | LTP753H-25NXT5  |                       |
|         |           | LTP753H-28NXT5  |                       |
|         |           | LTP753H-30NXT5  |                       |
|         |           | LTP753H-33NXT5  |                       |
|         | SOT89-3L  | LTP753H-12XT4   | Tape and Reel, 1 000  |
|         |           | LTP753H-18XT4   |                       |
|         |           | LTP753H-25XT4   |                       |
|         |           | LTP753H-28XT4   |                       |
|         |           | LTP753H-30XT4   |                       |
|         |           | LTP753H-33XT4   |                       |
|         |           | LTP753H-50XT4   |                       |
|         | DFN1x1-4L | LTP753H-12NXF4  | Tape and Reel, 10 000 |
|         |           | LTP753H-18NXF4  |                       |
|         |           | LTP753H-25NXF4  |                       |
|         |           | LTP753H-28NXF4  |                       |
|         |           | LTP753H-30NXF4  |                       |
|         |           | LTP753H-33NXF4  |                       |
|         |           | LTP753H-50NXF4  |                       |

Pin Description (Top View)

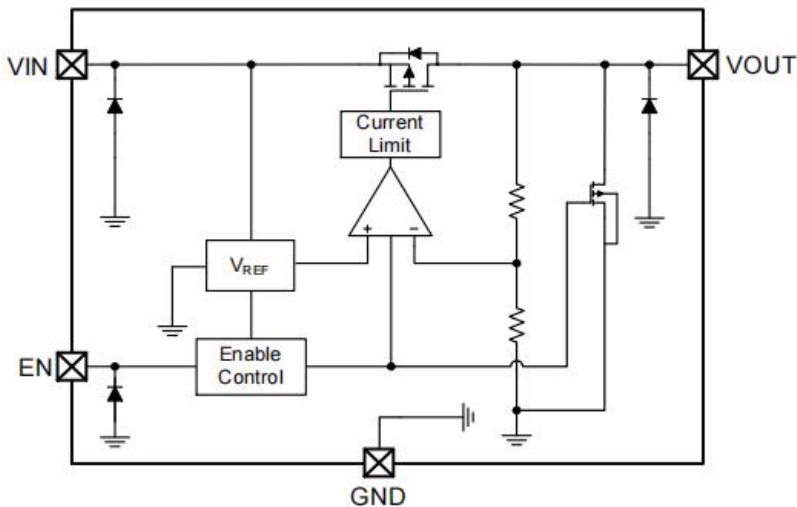


Pin Function

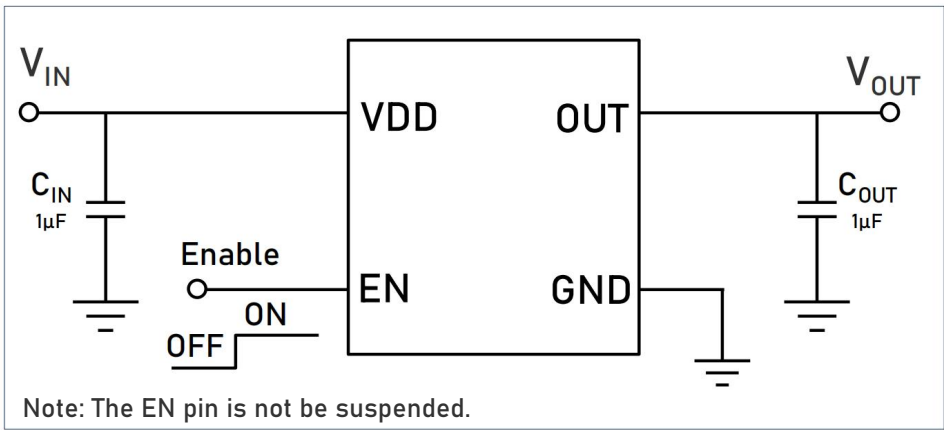
| PackageNC |          |          |           | Symbol              | Function              |
|-----------|----------|----------|-----------|---------------------|-----------------------|
| SOT23-3L  | SOT23-5L | SOT89-3L | DFN1x1-4L |                     |                       |
| 1         | 2        | 1        | 2         | GND                 | Ground.               |
| 3         | 1        | 2        | 4         | IN                  | Supply input pin.     |
| 2         | 5        | 3        | 1         | OUT                 | Output pin.           |
| /         | 3        | /        | 3         | EN <sup>Note2</sup> | Enable control input. |
| /         | 4        | /        | /         | NC                  | No Connection.        |

Note2: Enable Control Input, Active High, NOT floating.

### Block Diagram



### Application Circuits



### Absolute Maximum Ratings

| Parameter                           | Symbol     | Ratings    | Unit |
|-------------------------------------|------------|------------|------|
| Input Voltage                       | $V_{IN}$   | -0.3 ~ 9.0 | V    |
| Output Current                      | $I_{OUT}$  | 450        | mA   |
| Operating Temperature               | $T_{opr}$  | -40~+125   | °C   |
| Storage Temperature                 | $T_{stg}$  | -55~+150   | °C   |
| Lead Temperature (Soldering, 10sec) | $T_{lead}$ | 260        | °C   |

Thermal Information

| Parameter                                | Symbol    | Ratings | Unit |
|------------------------------------------|-----------|---------|------|
| Thermal Resistance (Junction to Ambient) | SOT23-3L  | 360     | °C/W |
|                                          | SOT23-5L  | 250     |      |
|                                          | DFN1x1-4L | 250     |      |
|                                          | SOT89-3L  | 135     |      |
| Power Dissipation(P <sub>D</sub> )       | SOT23-3L  | 0.4     | W    |
|                                          | SOT23-5L  | 0.4     |      |
|                                          | DFN1x1-4L | 0.4     |      |
|                                          | SOT89-3L  | 0.5     |      |

Note:P<sub>D</sub> is measured at 25°C

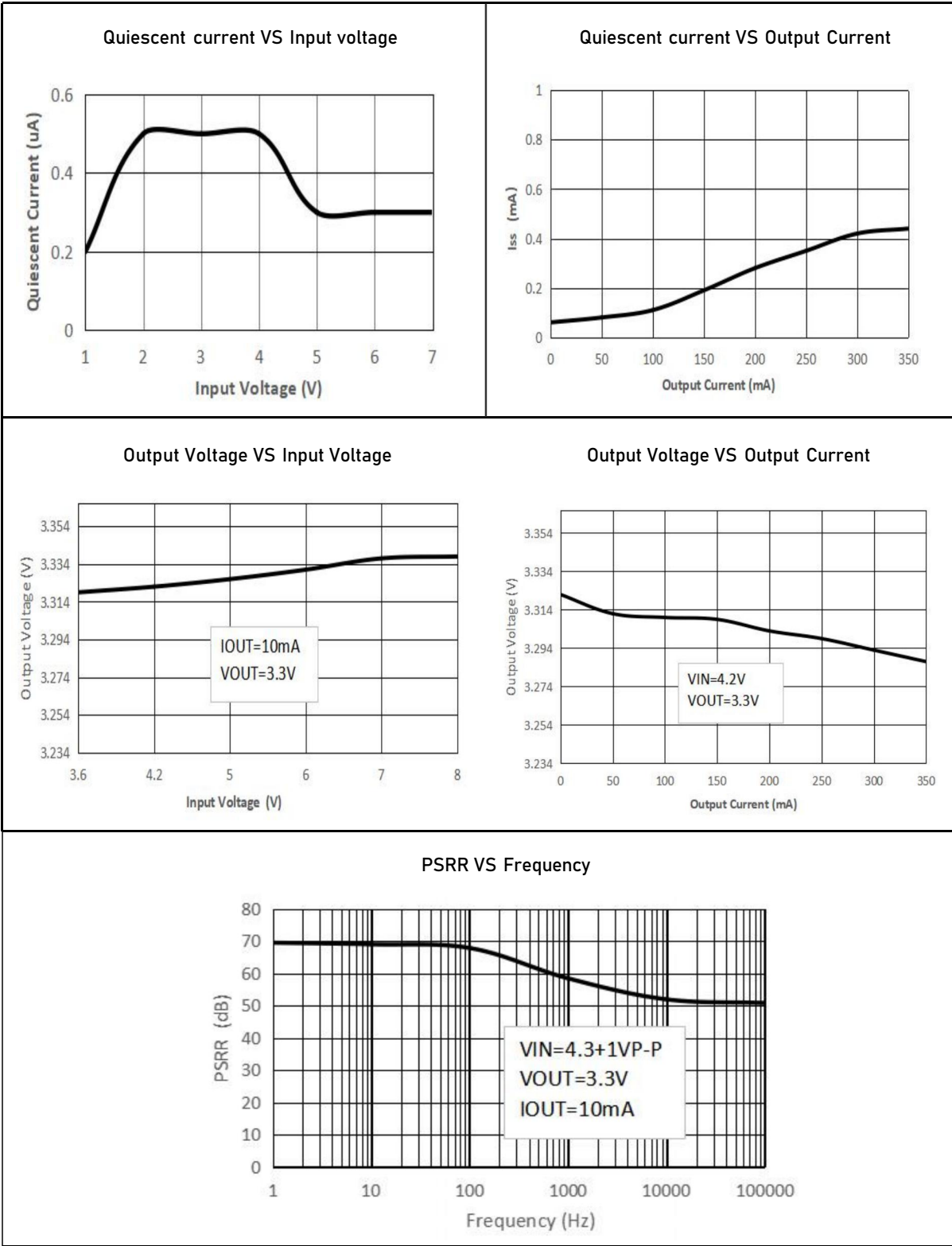
## Electrical Characteristics

(The following specifications apply for  $V_{OUT}=3.3V$ ,  $C_{IN}=C_{OUT}=1.0\mu F$ ,  $T_A=25^\circ C$ , unless otherwise noted )

| Parameter                    | Symbol       | Test Conditions                                                          | MIN | TYP       | MAX  | Unit          |
|------------------------------|--------------|--------------------------------------------------------------------------|-----|-----------|------|---------------|
| Operating Input Voltage      | $V_{IN}$     |                                                                          | 1.5 |           | 8    | V             |
| Output Range                 | $V_{OUT}$    | $I_{OUT}=1\text{ mA}$                                                    | -2  | $V_{OUT}$ | +2   | %             |
| Line Regulation              | $R_{egLINE}$ | $I_{OUT}=1\text{mA}$ ,<br>$V_{IN}=2.7\text{ V}\sim 5.5\text{ V}$         |     | 0.01      | 0.15 | %/V           |
| Dropout Voltage              | $V_{DROP}$   | $V_{OUT}=3.3\text{ V}, I_{OUT}=100\text{mA}$                             |     | 180       |      | mV            |
|                              |              | $V_{OUT}=3.3\text{ V}, I_{OUT}=200\text{mA}$                             |     | 400       |      |               |
| Load Regulation              | $R_{egLOAD}$ | $1\text{mA}\leq I_{OUT}\leq 300\text{mA}$ ,<br>$V_{OUT}=3.3\text{ V}$    |     | 200       |      | mV            |
| Current Limit                | $I_{OUT}$    | $V_{IN}=V_{EN}=4.5\text{V}$                                              |     | 400       |      | mA            |
| Short Current                | $I_{SHORT}$  | $V_{IN}=V_{EN}$ ,<br>$V_{OUT}$ Short to GND with $1\Omega$               |     | 35        |      | mA            |
| Quiescent Current            | $I_Q$        | $V_{OUT}=3.3\text{V}$ , $I_{OUT}=0\text{mA}$                             |     | 0.5       |      | $\mu\text{A}$ |
| Standby Current              | $I_{Q\_OFF}$ | $V_{EN}=0\text{V}, T_A=25^\circ C$                                       |     |           | 1    | $\mu\text{A}$ |
| EN Pin Threshold Voltage     | $V_{ENH}$    | EN Input Voltage "H"                                                     | 1.2 |           |      | V             |
| EN Pin Threshold Voltage     | $V_{ENL}$    | EN Input Voltage "L"                                                     |     |           | 0.4  | V             |
| EN Pin Current               | $I_{EN}$     | $V_{EN}=0\text{ to }5.5\text{V}$                                         |     |           | 1    | $\mu\text{A}$ |
| Power Supply Rejection Ratio | PSRR         | $V_{IN}=5V_{DC}+0.5V_{P-P}$ ,<br>$I_{OUT}=10\text{mA}$ , $f=1\text{kHz}$ |     | 60        |      | dB            |

Typical Performance Characteristics

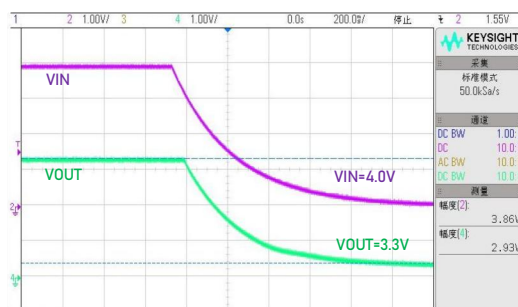
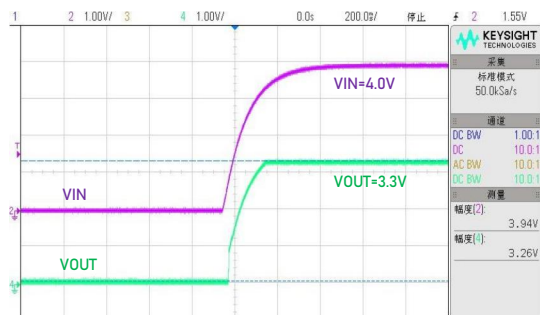
LTP753H-33XT5(SOT23-5L), Vin=4.5V, Vout=3.3V,Cin = Cout = 1μF, Ta = 25°C, unless otherwise specified



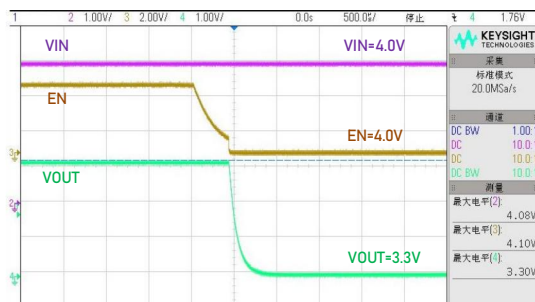
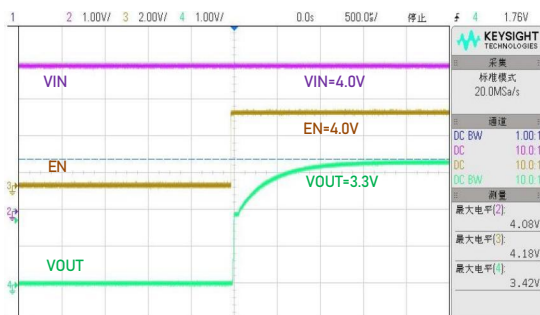
## Typical Performance Characteristics

LTP753H-33XT5(SOT23-5L), Vin=4.5V, Vout=3.3V, Cin = Cout = 1μF, Ta = 25°C, unless otherwise specified

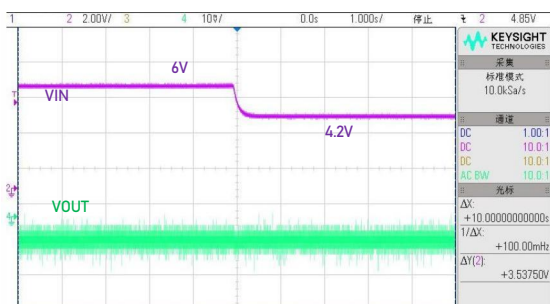
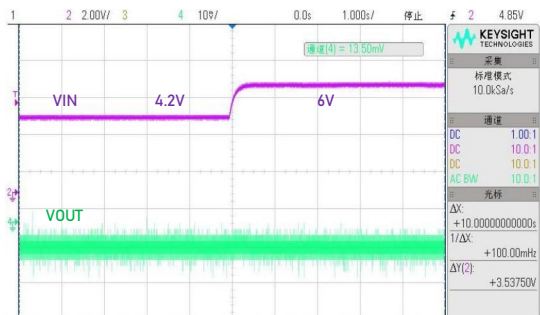
## Power ON/OFF Response



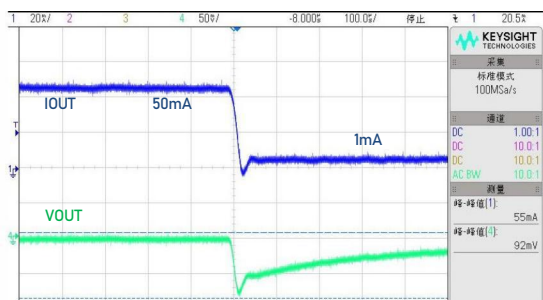
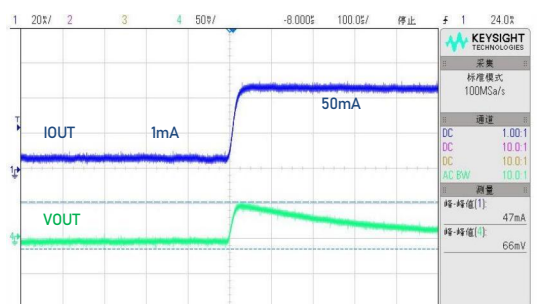
## Enable ON/OFF Response



## Line-Transient Response



## Load-Transient Response



## Application Information

In general, all the capacitors(input and output) need to be low leakage, any leakage current the capacitors have will reduce efficiency and increase the quiescent current.

A recent trend in the design of portable devices has been to use ceramic capacitors to filter DC-DC converter inputs. The ceramic capacitors are often chosen, because of their small size, low equivalent series resistance (ESR) and high RMS current capability. Also, recently designers have been looking to ceramic capacitors due to shortages of tantalum capacitors.

Unfortunately, using ceramic capacitors for input filtering may cause problems. Applying a voltage step to a ceramic capacitor will cause a large current surge, that stores energy in the inductance of the power leads.

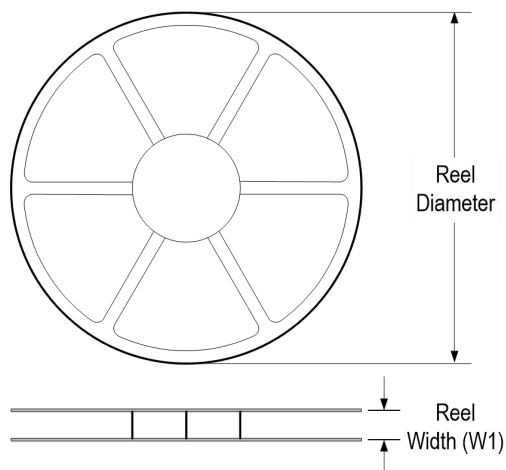
A large voltage spike is created, when the stored energy is transferred from these inductance into the ceramic capacitor, these voltage spikes can easily be twice the amplitude of the input voltage step.

Many types of capacitors can be used for input by-pass or filters, however, caution must be exercised when using multilayer ceramic capacitors (MLCC). Because of the self-resonant frequency generated under some start-up conditions, such as connecting the LDO input to a live power source.

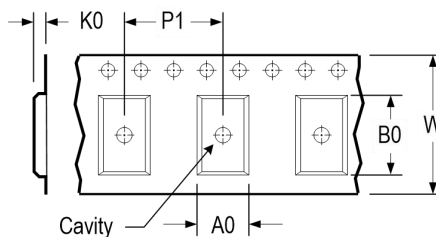
The LDO also requires an output capacitor for loop stability. Connect a 1 $\mu$ F tantalum capacitor from OUT to GND close to the pins. For improved transient response, this output capacitor may be ceramic.

## Tape and Reel Information

## REEL DIMENSIONS

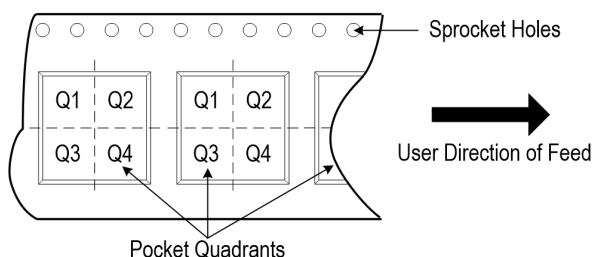


## TAPE DIMENSIONS



|    |                                                           |
|----|-----------------------------------------------------------|
| A0 | Dimension designed to accommodate the component width     |
| B0 | Dimension designed to accommodate the component length    |
| K0 | Dimension designed to accommodate the component thickness |
| W  | Overall width of the carrier tape                         |
| P1 | Pitch between successive cavity centers                   |

## QUADRANT ASSIGNMENTS FOR PIN 1 ORIENTATION IN TAPE



\* All dimensions are nominal

| Device         | Package Type | Pins | SPQ   | Reel Diameter (mm) | Reel Width W1 (mm) | A0 (mm) | B0 (mm) | K0 (mm) | P1 (mm) | W (mm) | Pin 1 Quadrant |
|----------------|--------------|------|-------|--------------------|--------------------|---------|---------|---------|---------|--------|----------------|
| LTP753H-12XT3  | SOT23        | 3    | 3 000 | 178                | 9.5                | 3.2     | 3.2     | 1.4     | 4.0     | 8.0    | Q3             |
| LTP753H-18XT3  | SOT23        | 3    | 3 000 | 178                | 9.5                | 3.2     | 3.2     | 1.4     | 4.0     | 8.0    | Q3             |
| LTP753H-25XT3  | SOT23        | 3    | 3 000 | 178                | 9.5                | 3.2     | 3.2     | 1.4     | 4.0     | 8.0    | Q3             |
| LTP753H-28XT3  | SOT23        | 3    | 3 000 | 178                | 9.5                | 3.2     | 3.2     | 1.4     | 4.0     | 8.0    | Q3             |
| LTP753H-30XT3  | SOT23        | 3    | 3 000 | 178                | 9.5                | 3.2     | 3.2     | 1.4     | 4.0     | 8.0    | Q3             |
| LTP753H-33XT3  | SOT23        | 3    | 3 000 | 178                | 9.5                | 3.2     | 3.2     | 1.4     | 4.0     | 8.0    | Q3             |
| LTP753H-50XT3  | SOT23        | 3    | 3 000 | 178                | 9.5                | 3.2     | 3.2     | 1.4     | 4.0     | 8.0    | Q3             |
| LTP753H-12NXT5 | SOT23        | 5    | 3 000 | 178                | 9.5                | 3.3     | 3.2     | 1.5     | 4.0     | 8.0    | Q3             |
| LTP753H-18NXT5 | SOT23        | 5    | 3 000 | 178                | 9.5                | 3.3     | 3.2     | 1.5     | 4.0     | 8.0    | Q3             |
| LTP753H-25NXT5 | SOT23        | 5    | 3 000 | 178                | 9.5                | 3.3     | 3.2     | 1.5     | 4.0     | 8.0    | Q3             |
| LTP753H-28NXT5 | SOT23        | 5    | 3 000 | 178                | 9.5                | 3.3     | 3.2     | 1.5     | 4.0     | 8.0    | Q3             |
| LTP753H-30NXT5 | SOT23        | 5    | 3 000 | 178                | 9.5                | 3.3     | 3.2     | 1.5     | 4.0     | 8.0    | Q3             |
| LTP753H-33NXT5 | SOT23        | 5    | 3 000 | 178                | 9.5                | 3.3     | 3.2     | 1.5     | 4.0     | 8.0    | Q3             |
| LTP753H-50NXT5 | SOT23        | 5    | 3 000 | 178                | 9.5                | 3.3     | 3.2     | 1.5     | 4.0     | 8.0    | Q3             |

CAUTION: These devices are sensitive to electrostatic discharge; follow proper IC Handling Procedures.

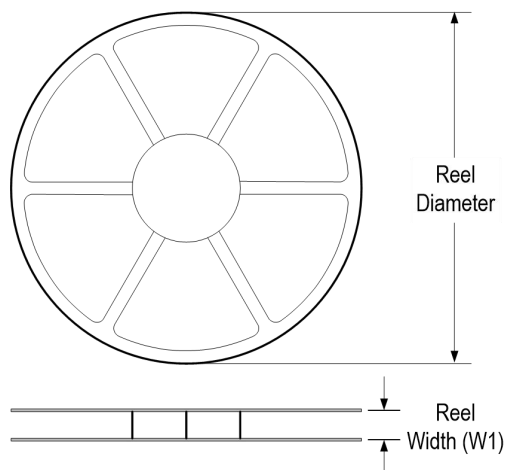
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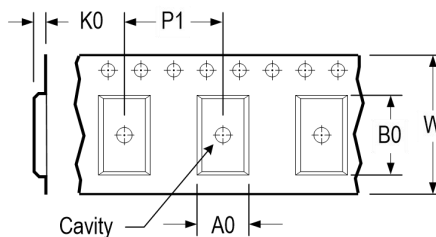
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## Tape and Reel Information (Cont.)

## REEL DIMENSIONS

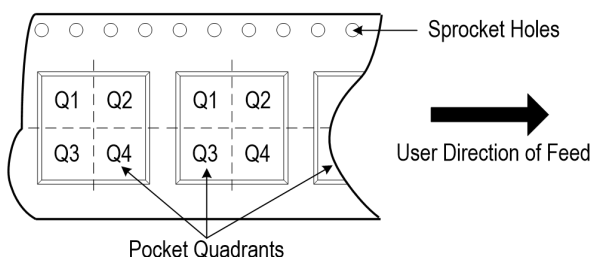


## TAPE DIMENSIONS



|    |                                                           |
|----|-----------------------------------------------------------|
| A0 | Dimension designed to accommodate the component width     |
| B0 | Dimension designed to accommodate the component length    |
| K0 | Dimension designed to accommodate the component thickness |
| W  | Overall width of the carrier tape                         |
| P1 | Pitch between successive cavity centers                   |

## QUADRANT ASSIGNMENTS FOR PIN 1 ORIENTATION IN TAPE



\* All dimensions are nominal

| Device        | Package Type | Pins | SPQ    | Reel Diameter (mm) | Reel Width W1 (mm) | A0 (mm) | B0 (mm) | K0 (mm) | P1 (mm) | W (mm) | Pin 1 Quadrant |
|---------------|--------------|------|--------|--------------------|--------------------|---------|---------|---------|---------|--------|----------------|
| LTP753-12XT4  | SOT89        | 3    | 1 000  | 178                | 12.0               | 4.9     | 4.5     | 1.85    | 8.0     | 12.0   | Q3             |
| LTP753-18XT4  | SOT89        | 3    | 1 000  | 178                | 12.0               | 4.9     | 4.5     | 1.85    | 8.0     | 12.0   | Q3             |
| LTP753-25XT4  | SOT89        | 3    | 1 000  | 178                | 12.0               | 4.9     | 4.5     | 1.85    | 8.0     | 12.0   | Q3             |
| LTP753-28XT4  | SOT89        | 3    | 1 000  | 178                | 12.0               | 4.9     | 4.5     | 1.85    | 8.0     | 12.0   | Q3             |
| LTP753-30XT4  | SOT89        | 3    | 1 000  | 178                | 12.0               | 4.9     | 4.5     | 1.85    | 8.0     | 12.0   | Q3             |
| LTP753-33XT4  | SOT89        | 3    | 1 000  | 178                | 12.0               | 4.9     | 4.5     | 1.85    | 8.0     | 12.0   | Q3             |
| LTP753-50XT4  | SOT89        | 3    | 1 000  | 178                | 12.0               | 4.9     | 4.5     | 1.85    | 8.0     | 12.0   | Q3             |
| LTP753-12NXF4 | DFN1x1       | 4    | 10 000 | 178                | 9.5                | 1.1     | 1.1     | 0.5     | 2.0     | 8.0    | Q1             |
| LTP753-18NXF4 | DFN1x1       | 4    | 10 000 | 178                | 9.5                | 1.1     | 1.1     | 0.5     | 2.0     | 8.0    | Q1             |
| LTP753-25NXF4 | DFN1x1       | 4    | 10 000 | 178                | 9.5                | 1.1     | 1.1     | 0.5     | 2.0     | 8.0    | Q1             |
| LTP753-28NXF4 | DFN1x1       | 4    | 10 000 | 178                | 9.5                | 1.1     | 1.1     | 0.5     | 2.0     | 8.0    | Q1             |
| LTP753-30NXF4 | DFN1x1       | 4    | 10 000 | 178                | 9.5                | 1.1     | 1.1     | 0.5     | 2.0     | 8.0    | Q1             |
| LTP753-33NXF4 | DFN1x1       | 4    | 10 000 | 178                | 9.5                | 1.1     | 1.1     | 0.5     | 2.0     | 8.0    | Q1             |
| LTP753-50NXF4 | DFN1x1       | 4    | 10 000 | 178                | 9.5                | 1.1     | 1.1     | 0.5     | 2.0     | 8.0    | Q1             |

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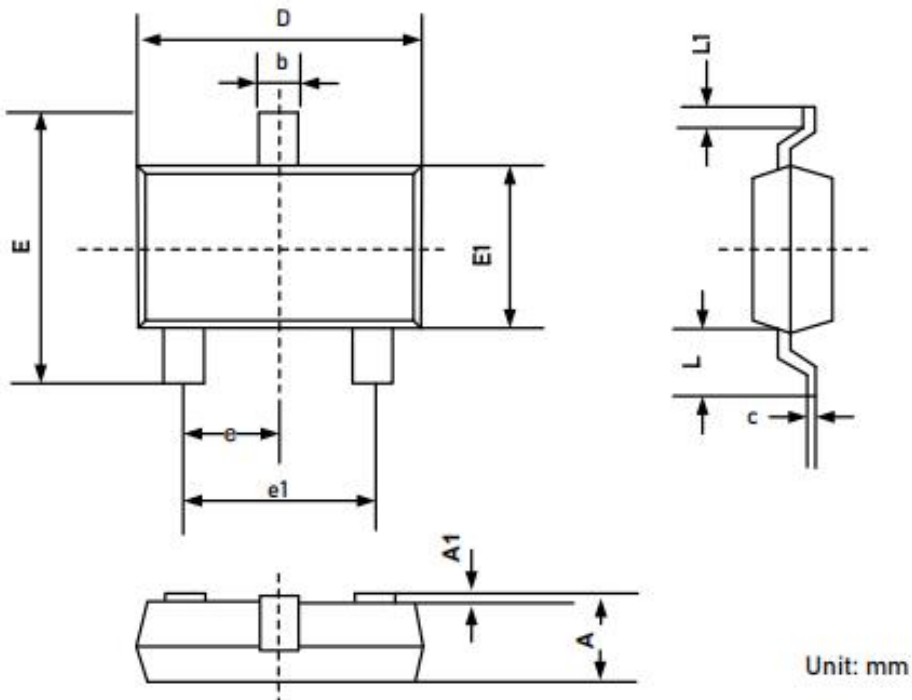
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## Outline Dimensions

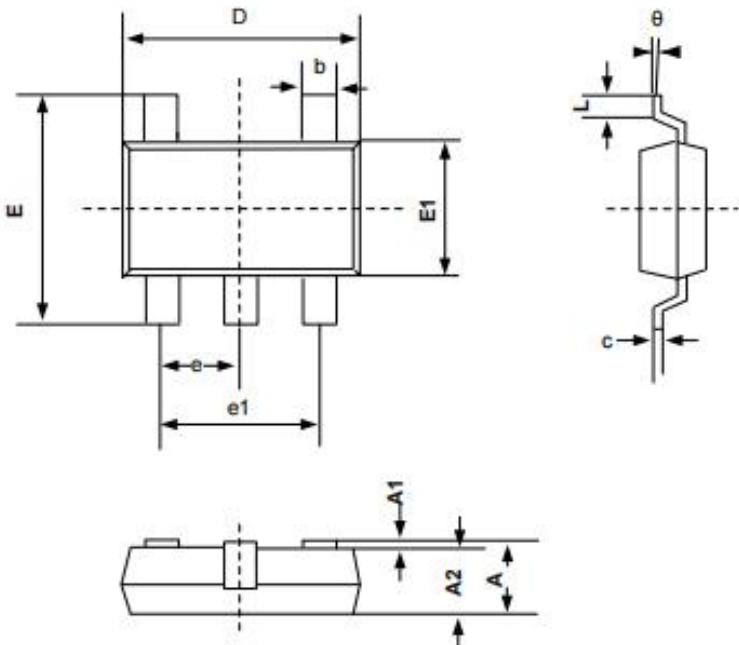
SOT23-3L



| Symbol | Dimensions In Millimeters |       |
|--------|---------------------------|-------|
|        | MIN                       | MAX   |
| A      | 1.050                     | 1.250 |
| A1     | 0.000                     | 0.100 |
| b      | 0.300                     | 0.400 |
| c      | 0.100                     | 0.200 |
| D      | 2.820                     | 3.020 |
| E      | 2.600                     | 3.000 |
| E1     | 1.500                     | 1.700 |
| e      | 0.950BSC                  |       |
| e1     | 1.800                     | 2.000 |
| L1     | 0.300                     | 0.600 |
| L      | /                         | 0.700 |

Outline Dimensions (Cont.)

SOT23-5L



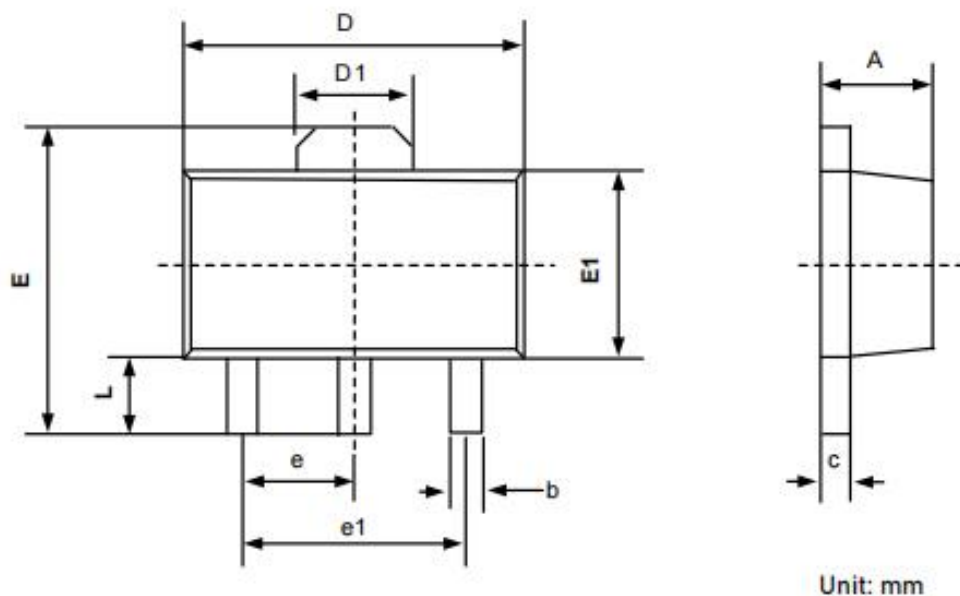
Unit: mm

| Symbol | Dimensions In Millimeters |       |
|--------|---------------------------|-------|
|        | MIN                       | MAX   |
| A      | 0.700                     | 1.250 |
| A1     | 0.000                     | 0.100 |
| A2     | 1.050                     | 1.150 |
| b      | 0.350                     | 0.500 |
| c      | 0.080                     | 0.200 |
| D      | 2.820                     | 3.020 |
| E      | 2.650                     | 2.950 |
| E1     | 1.600                     | 1.700 |
| e      | 0.950BSC                  |       |
| E1     | 1.800                     | 2.000 |
| L      | 0.300                     | 0.600 |
| θ      | 0°                        | 8°    |

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## Outline Dimensions (Cont.)

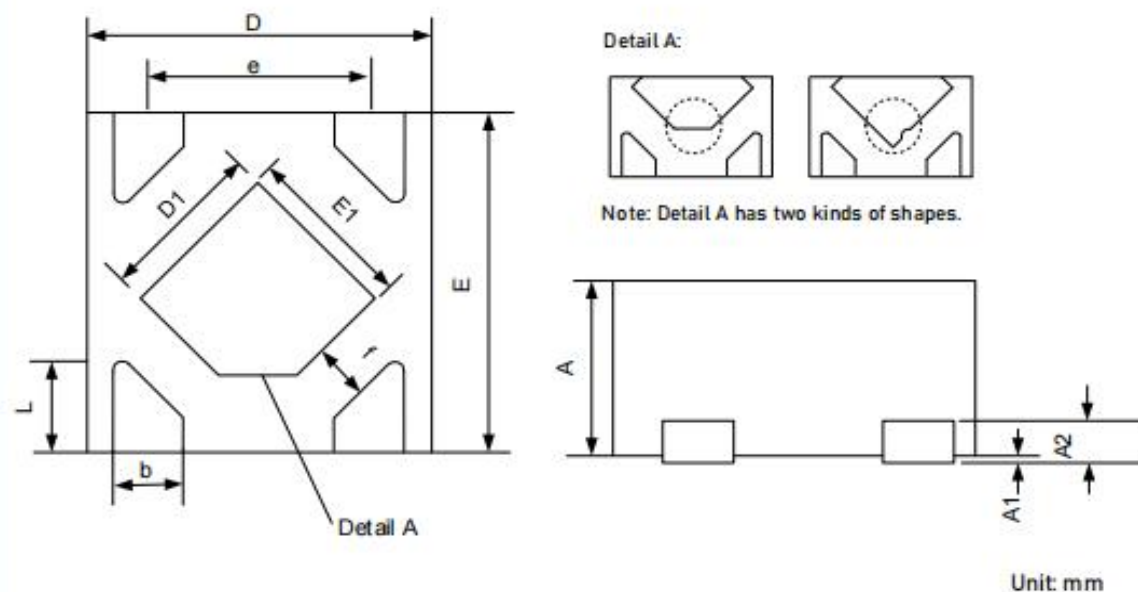
SOT89-3L



| Symbol | Dimensions In Millimeters |       |
|--------|---------------------------|-------|
|        | Min                       | Max   |
| A      | 1.400                     | 1.600 |
| b      | 0.320                     | 0.520 |
| c      | 0.350                     | 0.440 |
| D      | 4.400                     | 4.600 |
| D1     | 1.550REF                  |       |
| E      | 3.940                     | 4.250 |
| E1     | 2.300                     | 2.600 |
| e      | 1.500BSC                  |       |
| e1     | 3.000BSC                  |       |
| L      | 0.900                     | 1.200 |

## Outline Dimensions (Cont.)

DFN1x1-4L



| Symbol | Dimensions In Millimeters |       |       |
|--------|---------------------------|-------|-------|
|        | MIN                       | MOD   | MAX   |
| A      | 0.340                     | 0.370 | 0.400 |
| A1     | 0.000                     | 0.020 | 0.050 |
| A2     | 0.100REF                  |       |       |
| D      | 0.950                     | 1.000 | 1.050 |
| D1     | 0.430                     | 0.480 | 0.530 |
| E      | 0.950                     | 1.000 | 1.050 |
| E1     | 0.430                     | 0.480 | 0.530 |
| b      | 0.170                     | 0.220 | 0.270 |
| e      | 0.650BSC                  |       |       |
| f      | 0.190                     | 0.195 | 0.200 |
| L      | 0.200                     | 0.250 | 0.300 |

## Important Notice

Linearin is a global fabless semiconductor company specializing in advanced high-performance high-quality analog/mixed-signal IC products and sensor solutions. The company is devoted to the innovation of high performance, analog-intensive sensor front-end products and modular sensor solutions, applied in multi-market of medical & wearable devices, smart home, sensing of IoT, intelligent industrial & smart factory (industrial 4.0), and automotives. Linearin's product families include widely-used standard catalog products, solution-based application specific standard products (ASSPs) and sensor modules that help customers achieve faster time-to-market products. Go to <http://www.linearin.com> for a complete list of Linearin product families.

For additional product information, or full datasheet, please contact with the Linearin's Sales Department or Representatives.