

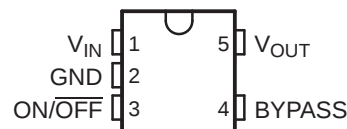
## FEATURES

- Output Tolerance of
  - 1% (A Grade)
  - 1.5% (Standard Grade)
- Ultra-Low Dropout, Typically
  - 280 mV at Full Load of 150 mA
  - 7 mV at 1 mA
- Wide  $V_{IN}$  Range...16 V Max
- Low  $I_Q$  . . . 850  $\mu$ A at Full Load at 150 mA
- Shutdown Current . . . 0.01  $\mu$ A Typ
- Low Noise . . . 30  $\mu$ V<sub>RMS</sub> With 10-nF Bypass Capacitor
- Stable With Low-ESR Capacitors, Including Ceramic
- Overcurrent and Thermal Protection
- High Peak-Current Capability

## PORTABLE APPLICATIONS

- Cellular Phones
- Palmtop and Laptop Computers
- Personal Digital Assistants (PDAs)
- Digital Cameras and Camcorders
- CD Players
- MP3 Players

DBV (SOT-23) PACKAGE  
(TOP VIEW)



## DESCRIPTION/ORDERING INFORMATION

The LP2985 family of fixed-output, low-dropout regulators offers exceptional, cost-effective performance for both portable and nonportable applications. Available in voltages of 1.8 V, 2.5 V, 2.8 V, 2.9 V, 3 V, 3.3 V and 5 V, the family has an output tolerance of 1% for the A version (1.5% for the non-A version) and is capable of delivering 150-mA continuous load current. Standard regulator features, such as overcurrent and overtemperature protection, are included.

The LP2985 has a host of features that makes the regulator an ideal candidate for a variety of portable applications:

- Low dropout: A PNP pass element allows a typical dropout of 280 mV at 150-mA load current and 7 mV at 1-mA load.
- Low quiescent current: The use of a vertical PNP process allows for quiescent currents that are considerably lower than those associated with traditional lateral PNP regulators.
- Shutdown: A shutdown feature is available, allowing the regulator to consume only 0.01  $\mu$ A when the ON/OFF pin is pulled low.
- Low-ESR-capacitor friendly: The regulator is stable with low-ESR capacitors, allowing the use of small, inexpensive, ceramic capacitors in cost-sensitive applications.
- Low noise: A BYPASS pin allows for low-noise operation, with a typical output noise of 30  $\mu$ V<sub>RMS</sub>, with the use of a 10-nF bypass capacitor.
- Small packaging: For the most space-constrained needs, the regulator is available in the SOT-23 package.



Please be aware that an important notice concerning availability, standard warranty, and use in critical applications of Texas Instruments semiconductor products and disclaimers thereto appears at the end of this data sheet.

# LP2985

## 150-mA LOW-NOISE LOW-DROPOUT REGULATOR WITH SHUTDOWN

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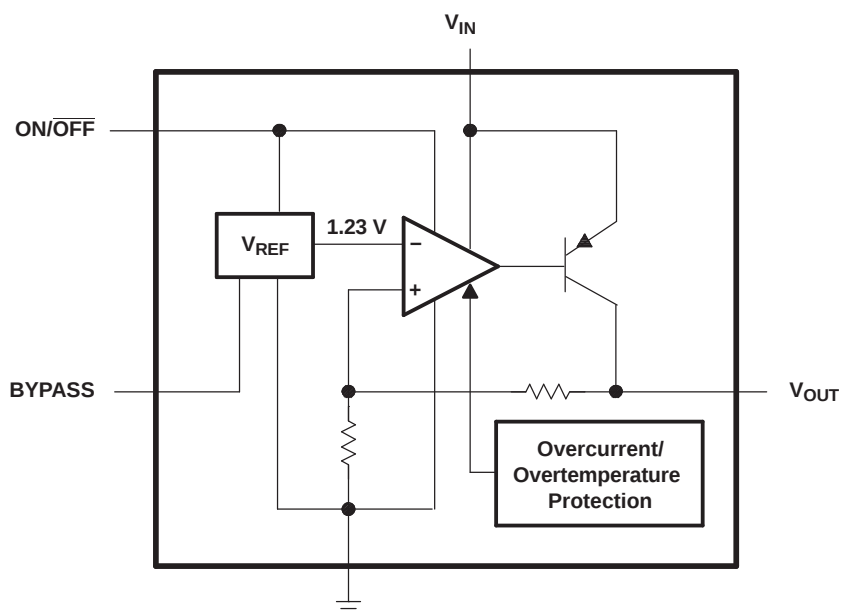
### ORDERING INFORMATION

| T <sub>J</sub> | PART<br>GRADE                     | V <sub>OUT</sub><br>(NOM) | PACKAGE <sup>(1)</sup> |                | ORDERABLE<br>PART NUMBER | TOP-SIDE<br>MARKING <sup>(2)</sup> |
|----------------|-----------------------------------|---------------------------|------------------------|----------------|--------------------------|------------------------------------|
| −40°C to 125°C | A grade:<br>1% tolerance          | 1.8 V                     | SOT-23-5 – DBV         | Reel of 3000   | LP2985A-18DBVR           | LPT_                               |
|                |                                   |                           |                        | Reel of 250    | LP2985A-18DBVT           |                                    |
|                |                                   | 2.5 V                     |                        | Reel of 3000   | LP2985A-25DBVR           | LPU_                               |
|                |                                   |                           |                        | Reel of 250    | LP2985A-25DBVT           |                                    |
|                |                                   | 2.8 V                     |                        | Reel of 3000   | LP2985A-28DBVR           | LPJ_                               |
|                |                                   |                           |                        | Reel of 250    | LP2985A-28DBVT           |                                    |
|                |                                   | 2.9 V                     |                        | Reel of 3000   | LP2985A-29DBVR           | LPZ_                               |
|                |                                   |                           |                        | Reel of 250    | LP2985A-29DBVT           |                                    |
|                |                                   | 3.0 V                     |                        | Reel of 3000   | LP2985A-30DBVR           | LRA_                               |
|                |                                   |                           |                        | Reel of 250    | LP2985A-30DBVT           |                                    |
|                |                                   | 3.3 V                     |                        | Reel of 3000   | LP2985A-33DBVR           | LPK_                               |
|                |                                   |                           |                        | Reel of 250    | LP2985A-33DBVT           |                                    |
|                | 5.0 V                             | Reel of 3000              |                        | LP2985A-50DBVR | LRI_                     |                                    |
|                |                                   | Reel of 250               |                        | LP2985A-50DBVT |                          |                                    |
|                | Standard grade:<br>1.5% tolerance | 1.8 V                     |                        | Reel of 3000   | LP2985-18DBVR            | LPH_                               |
|                |                                   |                           |                        | Reel of 250    | LP2985-18DBVT            |                                    |
|                |                                   | 2.5 V                     |                        | Reel of 3000   | LP2985-25DBVR            | LPL_                               |
|                |                                   |                           |                        | Reel of 250    | LP2985-25DBVT            |                                    |
|                |                                   | 2.8 V                     |                        | Reel of 3000   | LP2985-28DBVR            | LPG_                               |
|                |                                   |                           |                        | Reel of 250    | LP2985-28DBVT            |                                    |
|                |                                   | 2.9 V                     |                        | Reel of 3000   | LP2985-29DBVR            | LPM_                               |
|                |                                   |                           |                        | Reel of 250    | LP2985-29DBVT            |                                    |
|                |                                   | 3.0 V                     |                        | Reel of 3000   | LP2985-30DBVR            | LPN_                               |
|                |                                   |                           |                        | Reel of 250    | LP2985-30DBVT            |                                    |
|                |                                   | 3.3 V                     | Reel of 3000           | LP2985-33DBVR  | LPF_                     |                                    |
|                |                                   |                           | Reel of 250            | LP2985-33DBVT  |                          |                                    |
|                |                                   | 5.0 V                     | Reel of 3000           | LP2985-50DBVR  | LPS_                     |                                    |
|                |                                   |                           | Reel of 250            | LP2985-50DBVT  |                          |                                    |

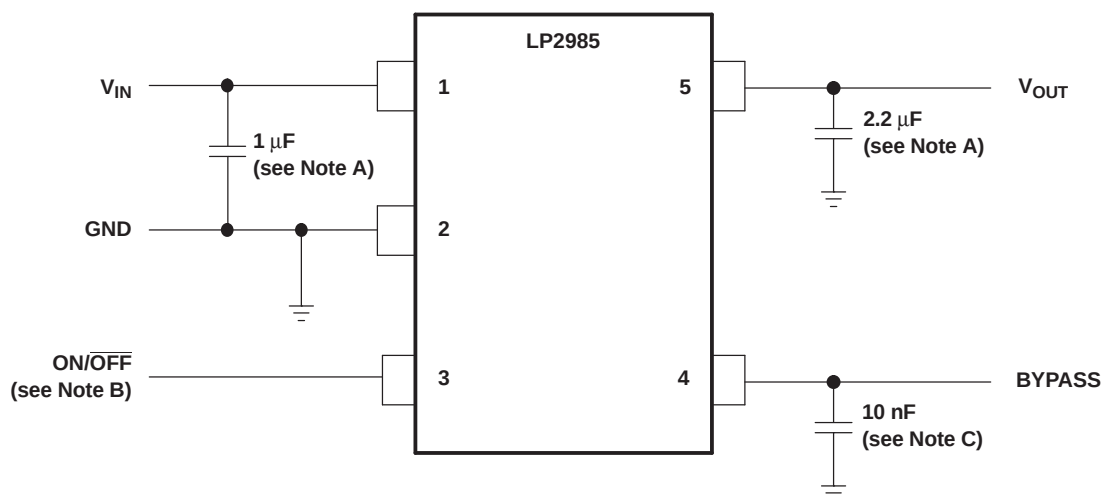
(1) Package drawings, standard packing quantities, thermal data, symbolization, and PCB design guidelines are available at [www.ti.com/sc/package](http://www.ti.com/sc/package).

(2) The actual top-side marking has one additional character that designates the assembly/test site.

## FUNCTIONAL BLOCK DIAGRAM



## BASIC APPLICATION CIRCUIT



- A. Minimum  $C_{OUT}$  value for stability (can be increased without limit for improved stability and transient response)
- B.  $ON/OFF$  must be actively terminated. Connect to  $V_{IN}$  if shutdown feature is not used.
- C. Optional  $BYPASS$  capacitor for low-noise operation

# LP2985

## 150-mA LOW-NOISE LOW-DROPOUT REGULATOR WITH SHUTDOWN

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### Absolute Maximum Ratings<sup>(1)</sup>

over virtual junction temperature range (unless otherwise noted)

|                    |                                                        | MIN                                             | MAX | UNIT |
|--------------------|--------------------------------------------------------|-------------------------------------------------|-----|------|
| $V_{IN}$           | Continuous input voltage range                         | –0.3                                            | 16  | V    |
| $V_{ON/OFF}$       | ON/OFF input voltage range                             | –0.3                                            | 16  | V    |
|                    | Output voltage range <sup>(2)</sup>                    | –0.3                                            | 9   | V    |
| $V_{IN} - V_{OUT}$ | Input/output voltage differential range <sup>(3)</sup> | –0.3                                            | 16  | V    |
| $I_O$              | Output current <sup>(4)</sup>                          | Internally limited<br>(short-circuit protected) |     |      |
| $\theta_{JA}$      | Package thermal impedance <sup>(4)(5)</sup>            |                                                 | 206 | °C/W |
| $T_J$              | Operating virtual junction temperature                 |                                                 | 150 | °C   |
| $T_{stg}$          | Storage temperature range                              | –65                                             | 150 | °C   |

- (1) Stresses beyond those listed under "absolute maximum ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under "recommended operating conditions" is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.
- (2) If load is returned to a negative power supply in a dual-supply system, the output must be diode clamped to GND.
- (3) The PNP pass transistor has a parasitic diode connected between the input and output. This diode normally is reverse biased ( $V_{IN} > V_{OUT}$ ), but will be forward biased if the output voltage exceeds the input voltage by a diode drop (see *Application Information* for more details).
- (4) Maximum power dissipation is a function of  $T_J(\text{max})$ ,  $\theta_{JA}$ , and  $T_A$ . The maximum allowable power dissipation at any allowable ambient temperature is  $P_D = (T_J(\text{max}) - T_A)/\theta_{JA}$ . Operating at the absolute maximum  $T_J$  of 150°C can affect reliability.
- (5) The package thermal impedance is calculated in accordance with JESD 51-7.

### Recommended Operating Conditions

|              |                              | MIN                | MAX      | UNIT |
|--------------|------------------------------|--------------------|----------|------|
| $V_{IN}$     | Supply input voltage         | 2.2 <sup>(1)</sup> | 16       | V    |
| $V_{ON/OFF}$ | ON/OFF input voltage         | 0                  | $V_{IN}$ | V    |
| $I_{OUT}$    | Output current               |                    | 150      | mA   |
| $T_J$        | Virtual junction temperature | –40                | 125      | °C   |

- (1) Recommended minimum  $V_{IN}$  is the greater of 2.5 V or  $V_{OUT(\text{max})} + \text{rated dropout voltage (max)}$  for operating  $I_L$ .

## Electrical Characteristics

at specified virtual junction temperature range,  $V_{IN} = V_{OUT(NOM)} + 1\text{ V}$ ,  $V_{ON/OFF} = 2\text{ V}$ ,  $C_{IN} = 1\text{ }\mu\text{F}$ ,  $I_L = 1\text{ mA}$ ,  $C_{OUT} = 4.7\text{ }\mu\text{F}$   
(unless otherwise noted)

| PARAMETER                                         | TEST CONDITIONS                                                                              | $T_J$          | LP2985A-xx |       |       | LP2985-xx |       |       | UNIT          |
|---------------------------------------------------|----------------------------------------------------------------------------------------------|----------------|------------|-------|-------|-----------|-------|-------|---------------|
|                                                   |                                                                                              |                | MIN        | TYP   | MAX   | MIN       | TYP   | MAX   |               |
| $\Delta V_{OUT}$ Output voltage tolerance         | $I_L = 1\text{ mA}$                                                                          | 25°C           | –1         |       | 1     | –1.5      |       | 1.5   | % $V_{NOM}$   |
|                                                   | $1\text{ mA} \leq I_L \leq 50\text{ mA}$                                                     | 25°C           | –1.5       |       | 1.5   | –2.5      |       | 2.5   |               |
|                                                   |                                                                                              | –40°C to 125°C | –2.5       |       | 2.5   | –3.5      |       | 3.5   |               |
|                                                   | $1\text{ mA} \leq I_L \leq 150\text{ mA}$                                                    | 25°C           | –2.5       |       | 2.5   | –3        |       | 3     |               |
|                                                   |                                                                                              | –40°C to 125°C | –3.5       |       | 3.5   | –4        |       | 4     |               |
| Line regulation                                   | $V_{IN} = [V_{OUT(NOM)} + 1\text{ V}] \text{ to } 16\text{ V}$                               | 25°C           |            | 0.007 | 0.014 |           | 0.007 | 0.014 | %/ $V$        |
|                                                   |                                                                                              | –40°C to 125°C |            |       | 0.032 |           |       | 0.032 |               |
| $V_{IN} - V_{OUT}$ Dropout voltage <sup>(1)</sup> | $I_L = 0$                                                                                    | 25°C           |            | 1     | 3     |           | 1     | 3     | mV            |
|                                                   |                                                                                              | –40°C to 125°C |            |       | 5     |           |       | 5     |               |
|                                                   | $I_L = 1\text{ mA}$                                                                          | 25°C           |            | 7     | 10    |           | 7     | 10    |               |
|                                                   |                                                                                              | –40°C to 125°C |            |       | 15    |           |       | 15    |               |
|                                                   | $I_L = 10\text{ mA}$                                                                         | 25°C           |            | 40    | 60    |           | 40    | 60    |               |
|                                                   |                                                                                              | –40°C to 125°C |            |       | 90    |           |       | 90    |               |
|                                                   | $I_L = 50\text{ mA}$                                                                         | 25°C           |            | 120   | 150   |           | 120   | 150   |               |
|                                                   |                                                                                              | –40°C to 125°C |            |       | 225   |           |       | 225   |               |
|                                                   | $I_L = 150\text{ mA}$                                                                        | 25°C           |            | 280   | 350   |           | 280   | 350   |               |
|                                                   |                                                                                              | –40°C to 125°C |            |       | 575   |           |       | 575   |               |
| $I_{GND}$ Ground pin current                      | $I_L = 0$                                                                                    | 25°C           |            | 65    | 95    |           | 65    | 95    | $\mu\text{A}$ |
|                                                   |                                                                                              | –40°C to 125°C |            |       | 125   |           |       | 125   |               |
|                                                   | $I_L = 1\text{ mA}$                                                                          | 25°C           |            | 75    | 110   |           | 75    | 110   |               |
|                                                   |                                                                                              | –40°C to 125°C |            |       | 170   |           |       | 170   |               |
|                                                   | $I_L = 10\text{ mA}$                                                                         | 25°C           |            | 120   | 220   |           | 120   | 220   |               |
|                                                   |                                                                                              | –40°C to 125°C |            |       | 400   |           |       | 400   |               |
|                                                   | $I_L = 50\text{ mA}$                                                                         | 25°C           |            | 350   | 600   |           | 350   | 600   |               |
|                                                   |                                                                                              | –40°C to 125°C |            |       | 1000  |           |       | 1000  |               |
|                                                   | $I_L = 150\text{ mA}$                                                                        | 25°C           |            | 850   | 1500  |           | 850   | 1500  |               |
|                                                   |                                                                                              | –40°C to 125°C |            |       | 2500  |           |       | 2500  |               |
|                                                   | $V_{ON/OFF} < 0.3\text{ V (OFF)}$                                                            | 25°C           |            | 0.01  | 0.8   |           | 0.01  | 0.8   |               |
|                                                   |                                                                                              | –40°C to 105°C |            |       | 0.05  |           |       | 0.05  |               |
|                                                   | $V_{ON/OFF} < 0.15\text{ V (OFF)}$                                                           | –40°C to 125°C |            |       | 5     |           |       | 5     |               |
| $V_{ON/OFF}$ ON/OFF input voltage <sup>(2)</sup>  | $V_{ON/OFF} = \text{HIGH} \rightarrow \text{O/P ON}$                                         | 25°C           |            | 1.4   |       |           | 1.4   |       | V             |
|                                                   |                                                                                              | –40°C to 125°C |            | 1.6   |       |           | 1.6   |       |               |
|                                                   | $V_{ON/OFF} = \text{LOW} \rightarrow \text{O/P OFF}$                                         | 25°C           |            | 0.55  |       |           | 0.55  |       |               |
|                                                   |                                                                                              | –40°C to 125°C |            |       | 0.15  |           |       | 0.15  |               |
| $I_{ON/OFF}$ ON/OFF input current                 | $V_{ON/OFF} = 0$                                                                             | 25°C           |            | 0.01  |       |           | 0.01  |       | $\mu\text{A}$ |
|                                                   |                                                                                              | –40°C to 125°C |            |       | –2    |           |       | –2    |               |
|                                                   | $V_{ON/OFF} = 5\text{ V}$                                                                    | 25°C           |            | 5     |       |           | 5     |       |               |
|                                                   |                                                                                              | –40°C to 125°C |            |       | 15    |           |       | 15    |               |
| $V_n$ Output noise (RMS)                          | BW = 300 Hz to 50 kHz,<br>$C_{OUT} = 10\text{ }\mu\text{F}$ ,<br>$C_{BYPASS} = 10\text{ nF}$ | 25°C           |            | 30    |       |           | 30    |       | $\mu\text{V}$ |
| $\Delta V_{OUT}/\Delta V_{IN}$ Ripple rejection   | f = 1kHz, $C_{OUT} = 10\text{ }\mu\text{F}$ ,<br>$C_{BYPASS} = 10\text{ nF}$                 | 25°C           |            | 45    |       |           | 45    |       | dB            |

(1) Dropout voltage is defined as the input-to-output differential at which the output voltage drops 100 mV below the value measured with a 1-V differential.

(2) The ON/OFF input must be driven properly for reliable operation (see *Application Information*).

# LP2985

## 150-mA LOW-NOISE LOW-DROPOUT REGULATOR WITH SHUTDOWN

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### Electrical Characteristics (continued)

at specified virtual junction temperature range,  $V_{IN} = V_{OUT(NOM)} + 1\text{ V}$ ,  $V_{ON/OFF} = 2\text{ V}$ ,  $C_{IN} = 1\text{ }\mu\text{F}$ ,  $I_L = 1\text{ mA}$ ,  $C_{OUT} = 4.7\text{ }\mu\text{F}$  (unless otherwise noted)

| PARAMETER                           | TEST CONDITIONS                         | $T_J$ | LP2985A-xx |     |     | LP2985-xx |     |     | UNIT |
|-------------------------------------|-----------------------------------------|-------|------------|-----|-----|-----------|-----|-----|------|
|                                     |                                         |       | MIN        | TYP | MAX | MIN       | TYP | MAX |      |
| $I_{OUT(PK)}$ Peak output current   | $V_{OUT} \geq V_{O(NOM)} - 5\%$         | 25°C  |            | 350 |     |           | 350 |     | mA   |
| $I_{OUT(SC)}$ Short-circuit current | $R_L = 0$ (steady state) <sup>(3)</sup> | 25°C  |            | 400 |     |           | 400 |     | mA   |

(3) See [Figure 5](#) in *Typical Performance Characteristics*.

## TYPICAL PERFORMANCE CHARACTERISTICS

$C_{IN} = 1 \mu\text{F}$ ,  $C_{OUT} = 4.7 \mu\text{F}$ ,  $V_{IN} = V_{OUT(NOM)} + 1 \text{ V}$ ,  $T_A = 25^\circ\text{C}$ , ON/OFF pin tied to  $V_{IN}$  (unless otherwise specified)

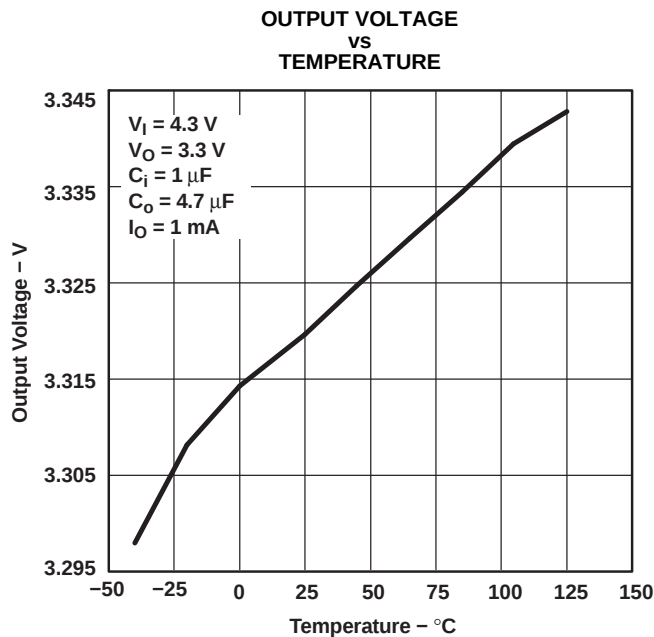


Figure 1.

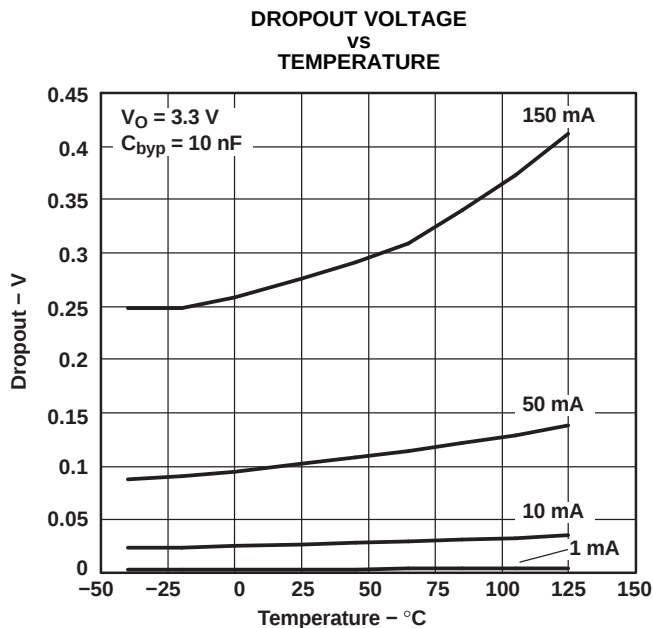


Figure 2.

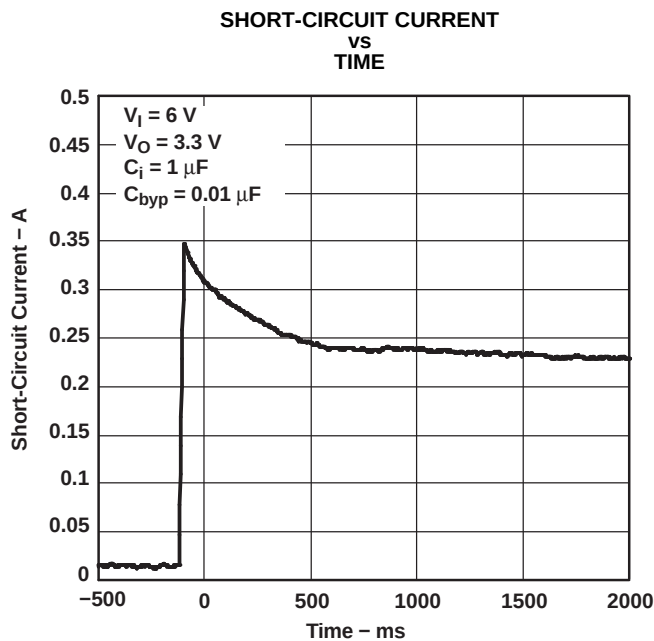


Figure 3.

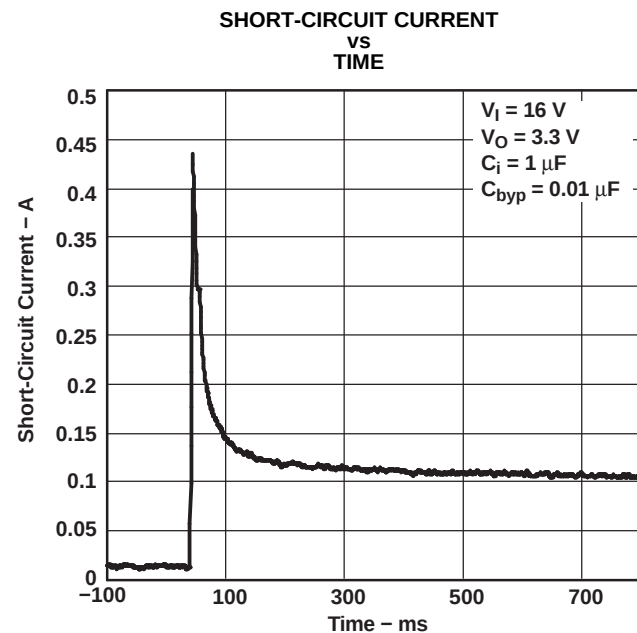


Figure 4.

# LP2985

## 150-mA LOW-NOISE LOW-DROPOUT REGULATOR WITH SHUTDOWN

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### TYPICAL PERFORMANCE CHARACTERISTICS (continued)

$C_{IN} = 1 \mu F$ ,  $C_{OUT} = 4.7 \mu F$ ,  $V_{IN} = V_{OUT(NOM)} + 1 V$ ,  $T_A = 25^\circ C$ , ON/OFF pin tied to  $V_{IN}$  (unless otherwise specified)

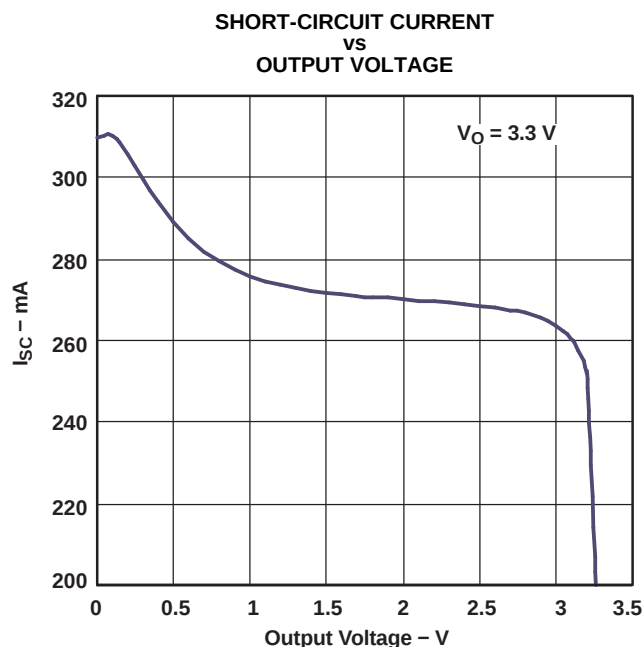


Figure 5.

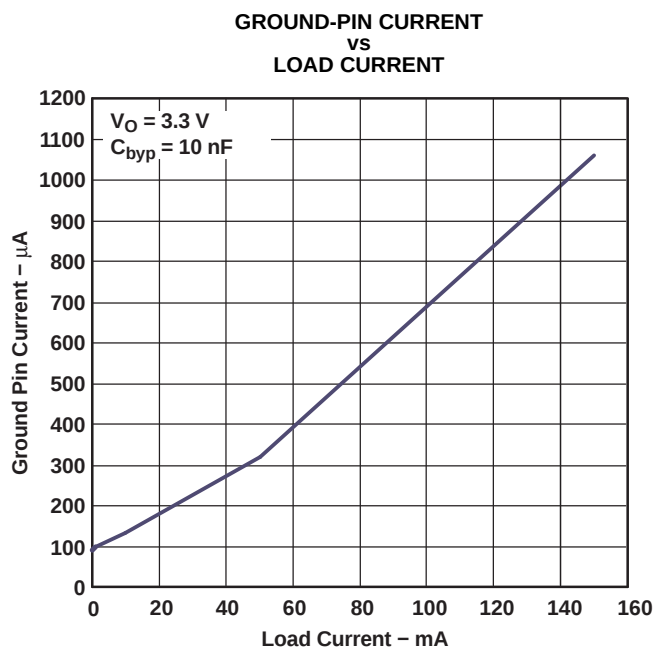


Figure 6.

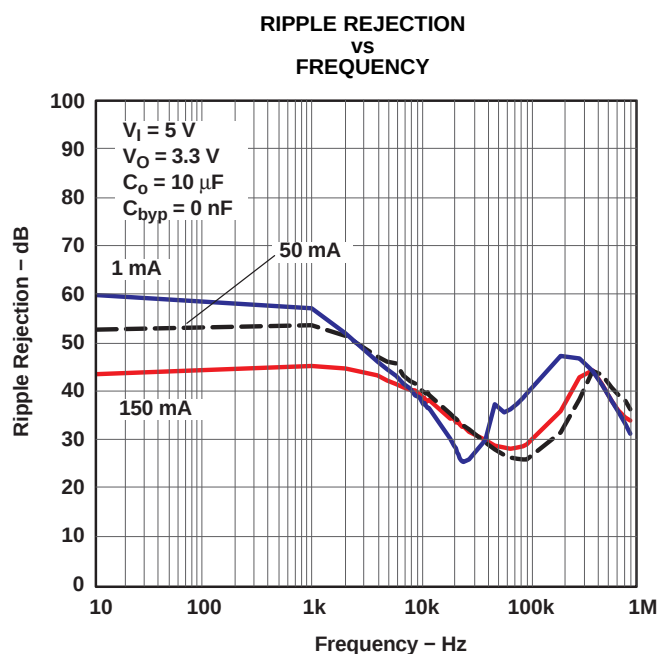


Figure 7.

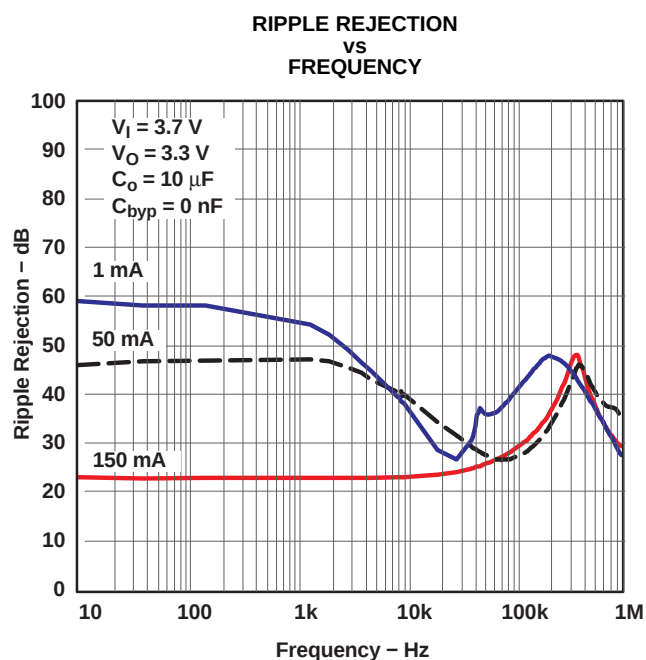


Figure 8.

# TYPICAL PERFORMANCE CHARACTERISTICS (continued)

$C_{IN} = 1 \mu F$ ,  $C_{OUT} = 4.7 \mu F$ ,  $V_{IN} = V_{OUT(NOM)} + 1 V$ ,  $T_A = 25^\circ C$ , ON/OFF pin tied to  $V_{IN}$  (unless otherwise specified)

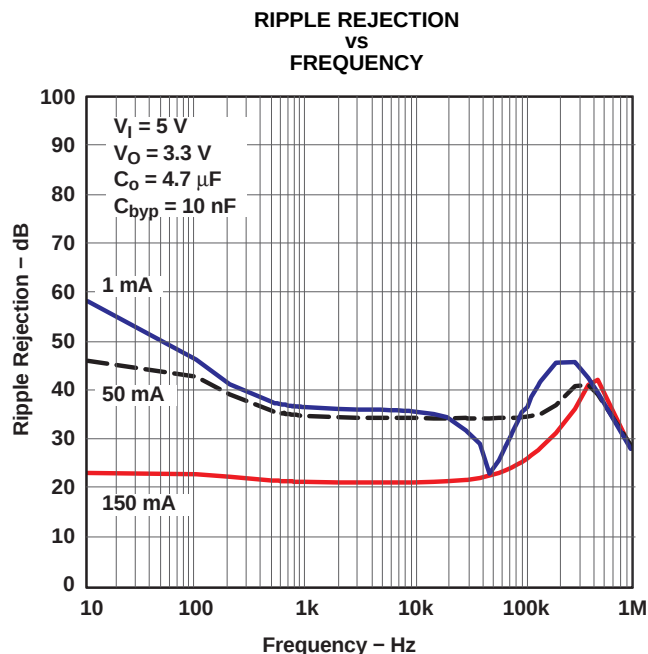


Figure 9.

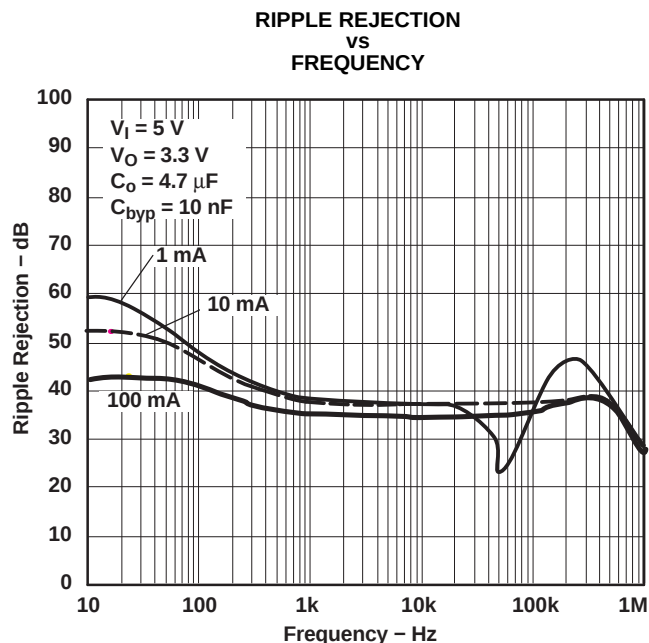


Figure 10.

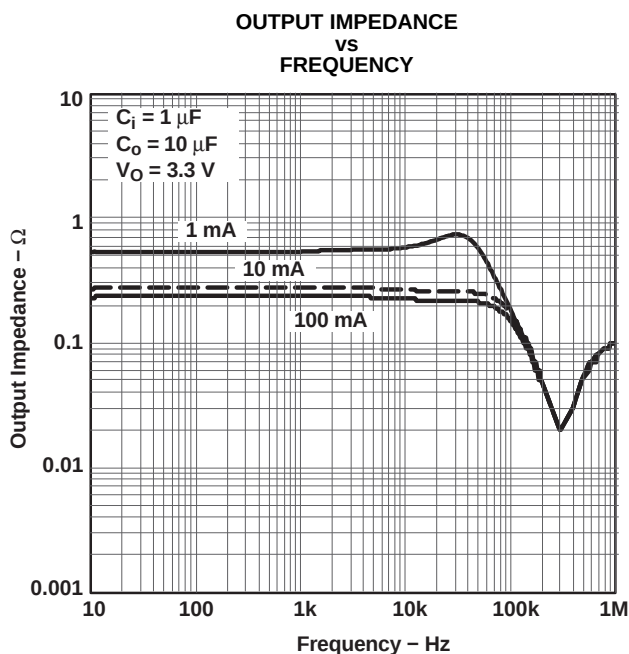


Figure 11.

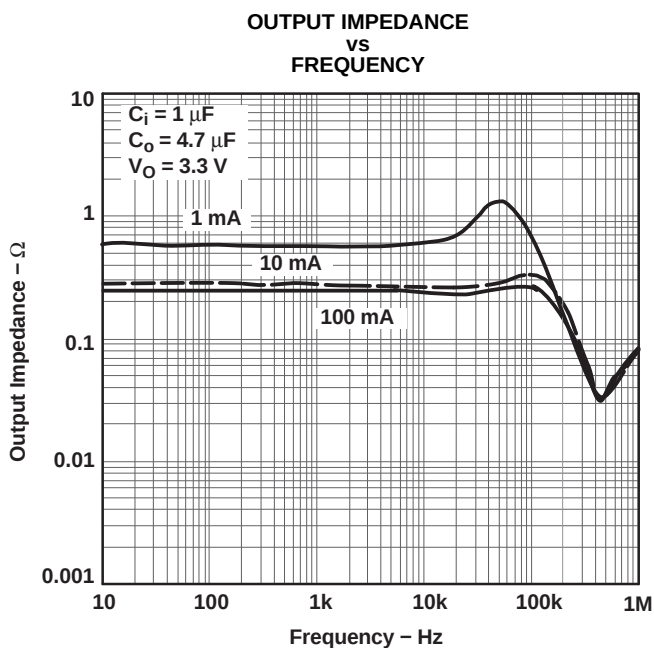


Figure 12.

# LP2985

## 150-mA LOW-NOISE LOW-DROPOUT REGULATOR WITH SHUTDOWN

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### TYPICAL PERFORMANCE CHARACTERISTICS (continued)

$C_{IN} = 1 \mu\text{F}$ ,  $C_{OUT} = 4.7 \mu\text{F}$ ,  $V_{IN} = V_{OUT(NOM)} + 1 \text{ V}$ ,  $T_A = 25^\circ\text{C}$ , ON/OFF pin tied to  $V_{IN}$  (unless otherwise specified)

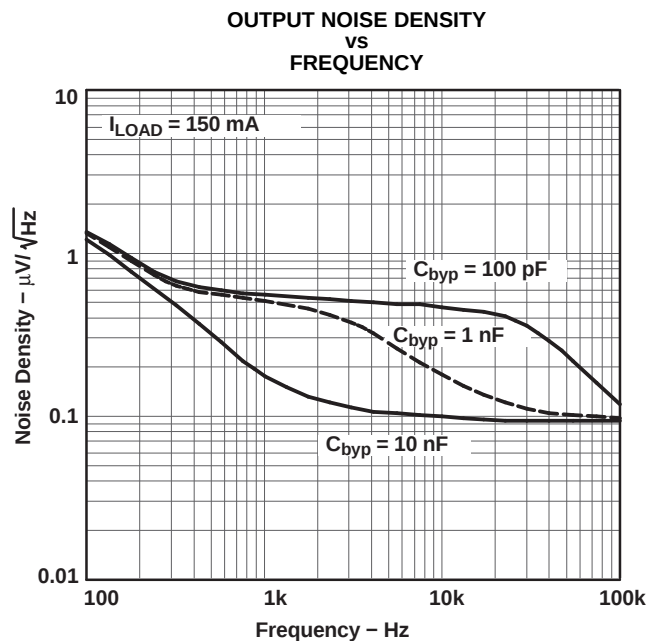


Figure 13.

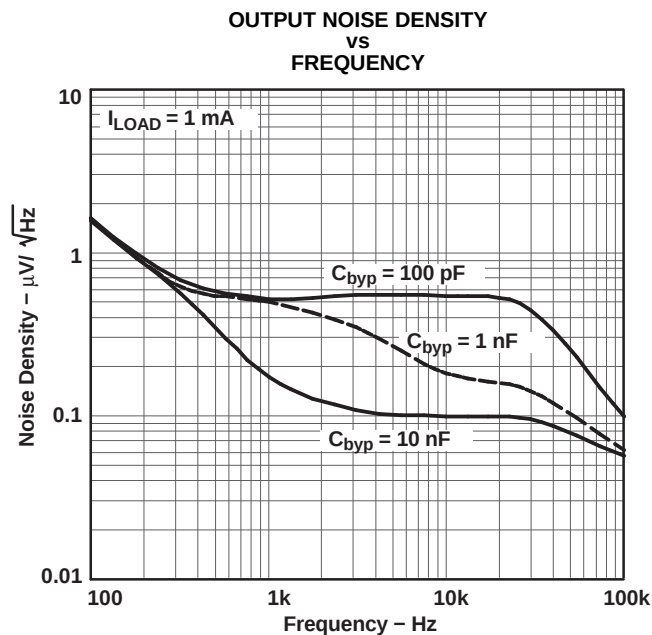


Figure 14.

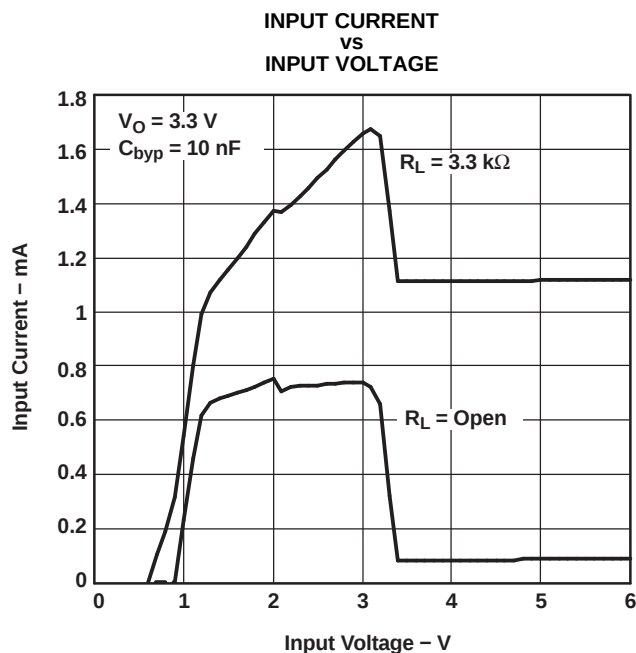


Figure 15.

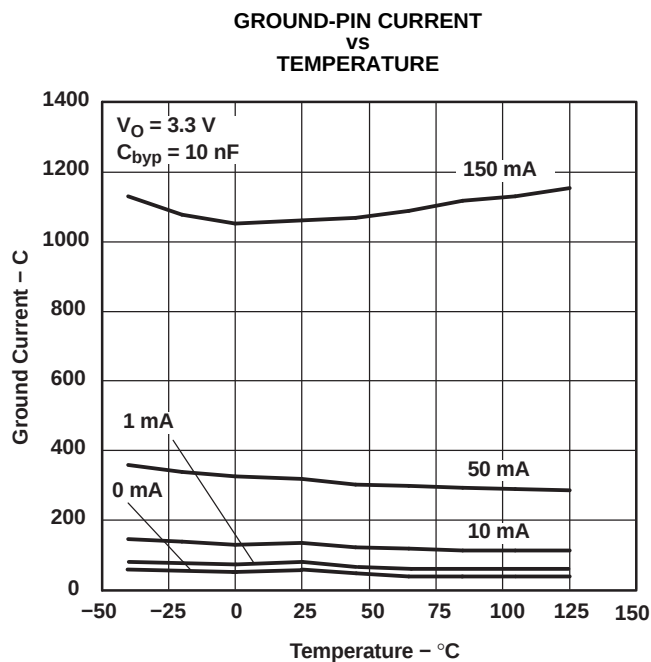


Figure 16.

# TYPICAL PERFORMANCE CHARACTERISTICS (continued)

$C_{IN} = 1 \mu F$ ,  $C_{OUT} = 4.7 \mu F$ ,  $V_{IN} = V_{OUT(NOM)} + 1 V$ ,  $T_A = 25^\circ C$ , ON/OFF pin tied to  $V_{IN}$  (unless otherwise specified)

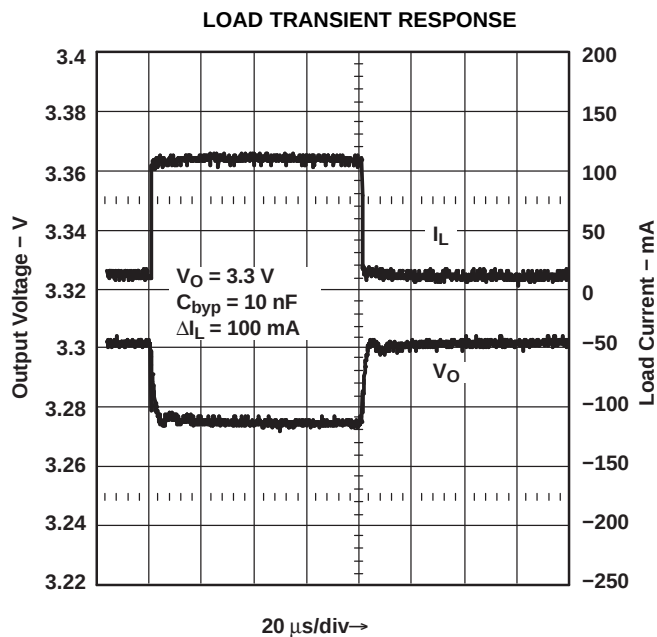


Figure 17.

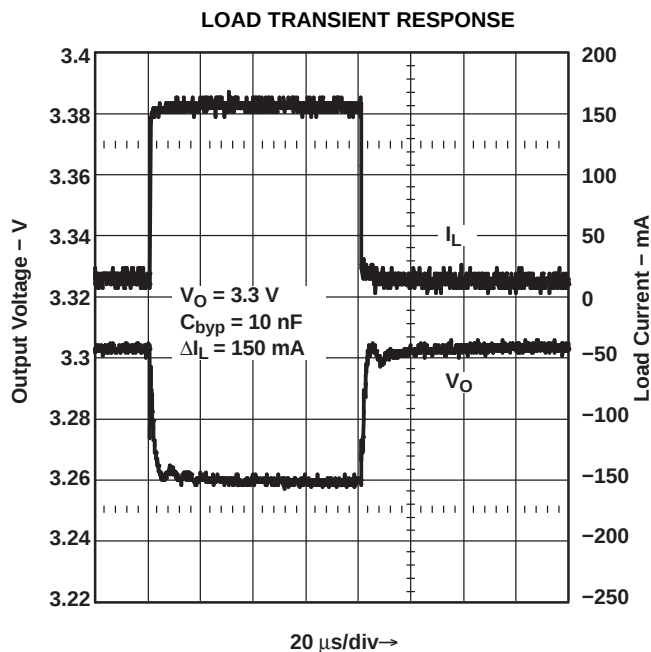


Figure 18.

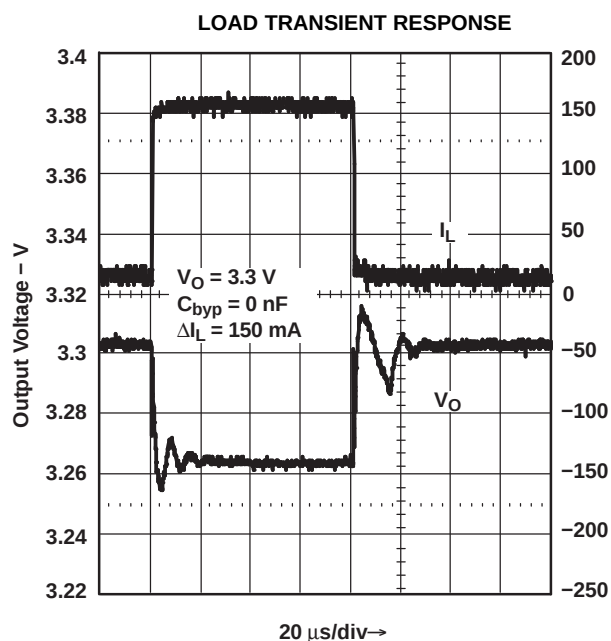


Figure 19.

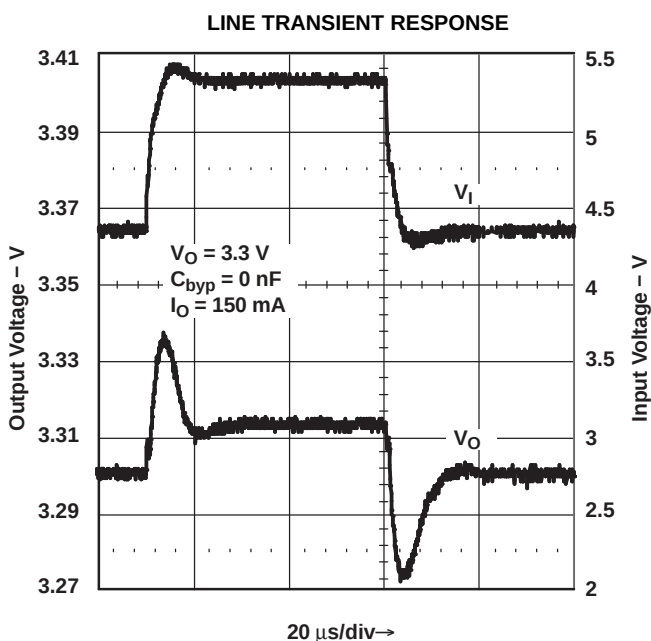


Figure 20.

# **TYPICAL PERFORMANCE CHARACTERISTICS (continued)**

$C_{IN} = 1\ \mu\text{F}$ ,  $C_{OUT} = 4.7\ \mu\text{F}$ ,  $V_{IN} = V_{OUT(NOM)} + 1\ \text{V}$ ,  $T_A = 25^\circ\text{C}$ , ON/OFF pin tied to  $V_{IN}$  (unless otherwise specified)

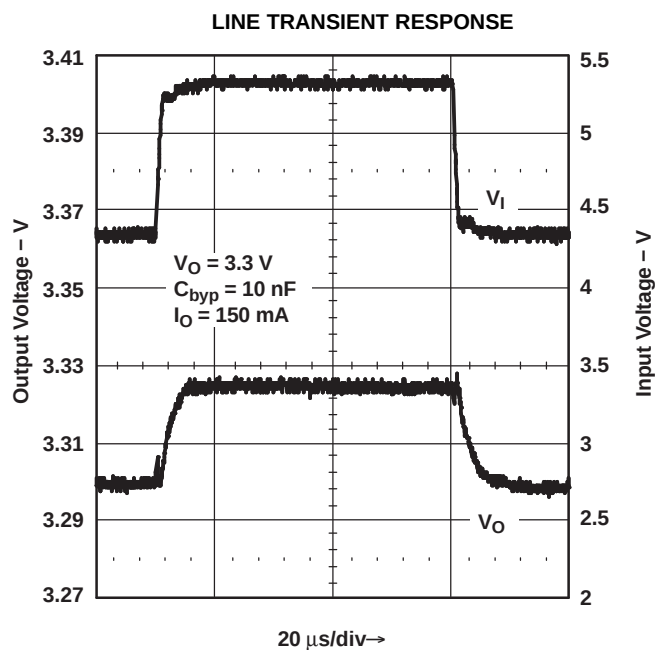


Figure 21.

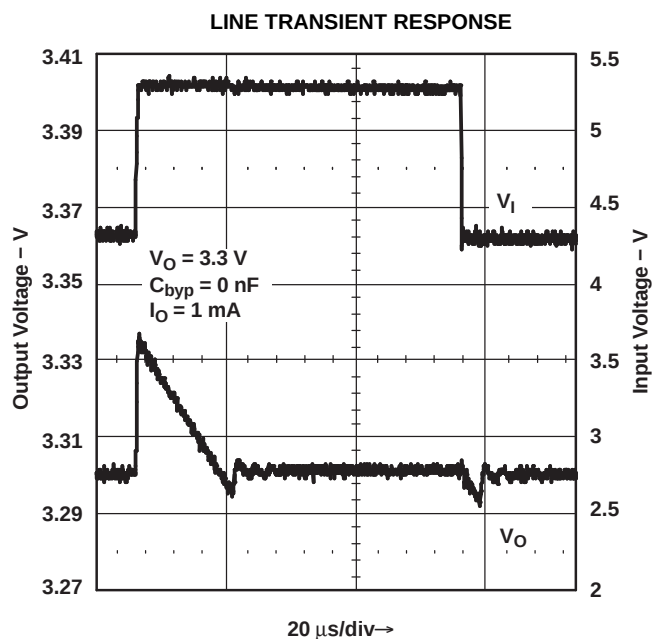


Figure 22.

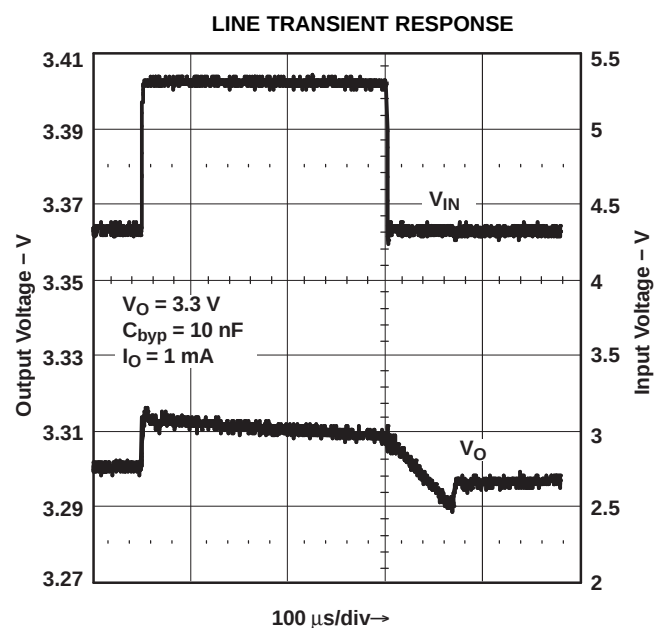


Figure 23.

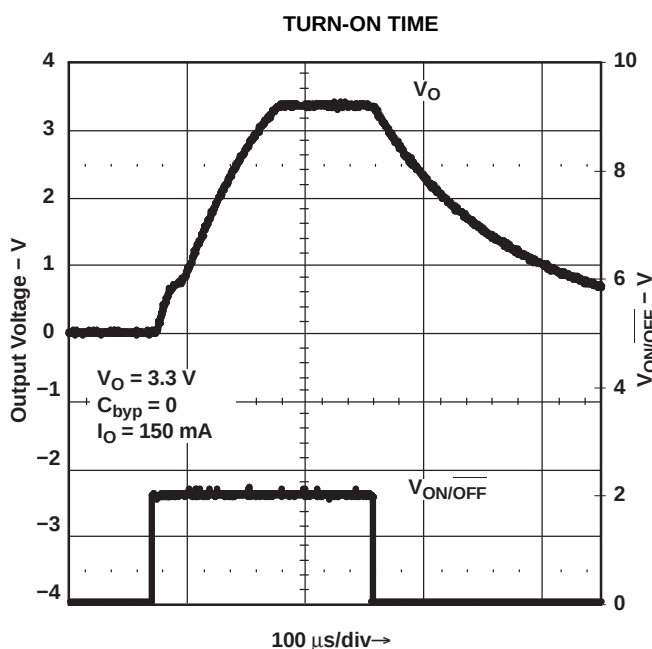


Figure 24.

# TYPICAL PERFORMANCE CHARACTERISTICS (continued)

$C_{IN} = 1 \mu F$ ,  $C_{OUT} = 4.7 \mu F$ ,  $V_{IN} = V_{OUT(NOM)} + 1 V$ ,  $T_A = 25^\circ C$ , ON/OFF pin tied to  $V_{IN}$  (unless otherwise specified)

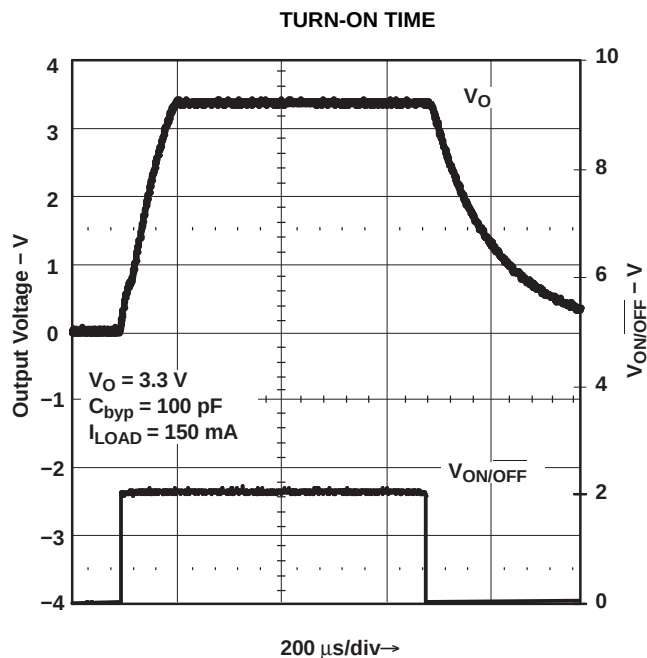


Figure 25.

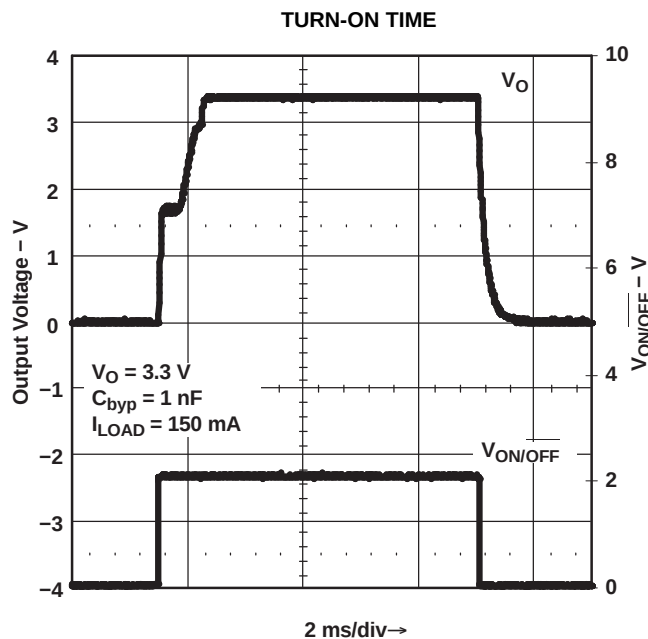


Figure 26.

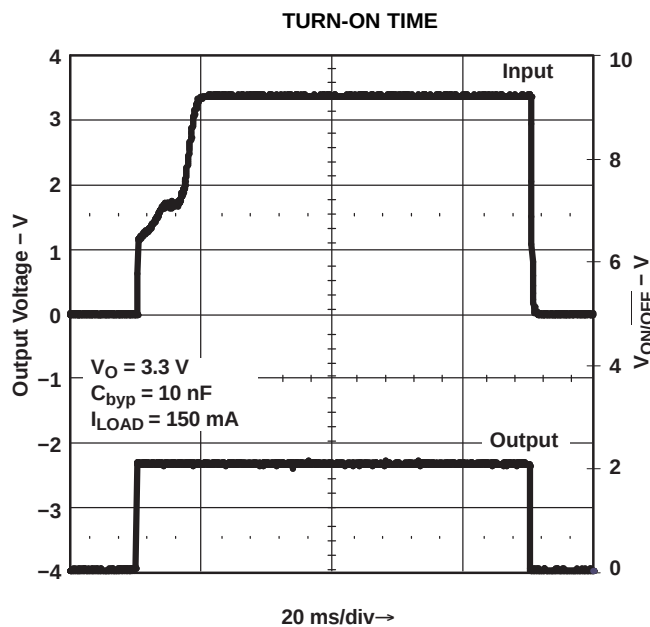


Figure 27.

## APPLICATION INFORMATION

### Capacitors

#### Input Capacitor ( $C_{IN}$ )

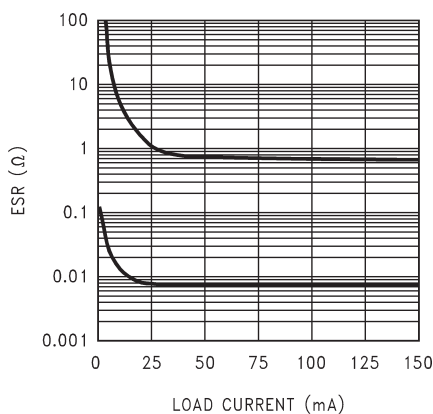
A minimum value of 1  $\mu\text{F}$  (over the entire operating temperature range) is required at the input of the LP2985. In addition, this input capacitor should be located within 1 cm of the input pin and connected to a clean analog ground. There are no equivalent series resistance (ESR) requirements for this capacitor, and the capacitance can be increased without limit.

#### Output Capacitor ( $C_{OUT}$ )

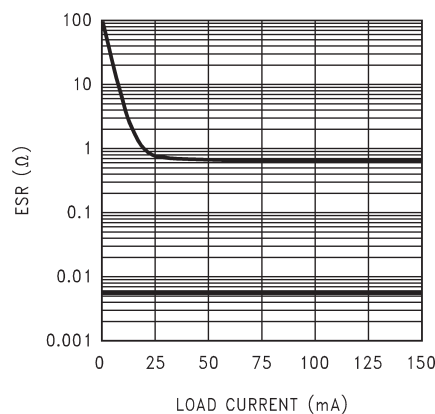
As an advantage over other regulators, the LP2985 permits the use of low-ESR capacitors at the output, including ceramic capacitors that can have an ESR as low as 5 m $\Omega$ . Tantalum and film capacitors also can be used if size and cost are not issues. The output capacitor also should be located within 1 cm of the output pin and be returned to a clean analog ground.

As with other PNP LDOs, stability conditions require the output capacitor to have a minimum capacitance and an ESR that falls within a certain range.

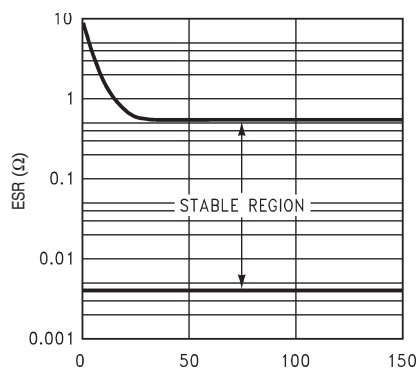
- Minimum  $C_{OUT}$ : 2.2  $\mu\text{F}$  (can be increased without limit to improve transient response stability margin)
- ESR range: see [Figure 28](#) through [Figure 30](#)



**Figure 28. 2.2- $\mu\text{F}$  Stable ESR Range for Output Voltage  $\leq 2.3$  V**



**Figure 29. 4.7- $\mu\text{F}$  Stable ESR Range for Output Voltage  $\leq 2.3$  V**



**Figure 30. 2.2- $\mu\text{F}$ /3.3- $\mu\text{F}$  Stable ESR Range for Output Voltage  $\geq 2.5$  V**

It is critical that both the minimum capacitance and ESR requirement be met *over the entire operating temperature range*. Depending on the type of capacitors used, both these parameters can vary significantly with temperature (see *capacitor characteristics*).

## APPLICATION INFORMATION (continued)

### Noise Bypass Capacitor ( $C_{\text{BYPASS}}$ )

The LP2985 allows for low-noise performance with the use of a bypass capacitor that is connected to the internal bandgap reference via the BYPASS pin. This high-impedance bandgap circuitry is biased in the microampere range and, thus, cannot be loaded significantly, otherwise, its output – and, correspondingly, the output of the regulator – changes. Thus, for best output accuracy, dc leakage current through  $C_{\text{BYPASS}}$  should be minimized as much as possible and never should exceed 100 nA.

A 10-nF capacitor is recommended for  $C_{\text{BYPASS}}$ . Ceramic and film capacitors are well suited for this purpose.

### Capacitor Characteristics

#### Ceramics

Ceramic capacitors are ideal choices for use on the output of the LP2985 for several reasons. For capacitances in the range of 2.2  $\mu\text{F}$  to 4.7  $\mu\text{F}$ , ceramic capacitors have the lowest cost and the lowest ESR, making them choice candidates for filtering high-frequency noise. For instance, a typical 2.2- $\mu\text{F}$  ceramic capacitor has an ESR in the range of 10 m $\Omega$  to 20 m $\Omega$  and, thus, satisfies minimum ESR requirements of the regulator.

Ceramic capacitors have one major disadvantage that must be taken into account – a poor temperature coefficient, where the capacitance can vary significantly with temperature. For instance, a large-value ceramic capacitor ( $\geq 2.2 \mu\text{F}$ ) can lose more than half of its capacitance as the temperature rises from 25°C to 85°C. Thus, a 2.2- $\mu\text{F}$  capacitor at 25°C drops well below the minimum  $C_{\text{OUT}}$  required for stability, as ambient temperature rises. For this reason, select an output capacitor that maintains the minimum 2.2  $\mu\text{F}$  required for stability over the entire operating temperature range. Note that there are some ceramic capacitors that can maintain a  $\pm 15\%$  capacitance tolerance over temperature.

#### Tantalum

Tantalum capacitors can be used at the output of the LP2985, but there are significant disadvantages that could prohibit their use:

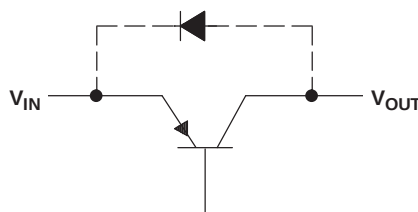
- In the 1- $\mu\text{F}$  to 4.7- $\mu\text{F}$  range, tantalum capacitors are more expensive than ceramics of the equivalent capacitance and voltage ratings.
- Tantalum capacitors have higher ESRs than their equivalent-sized ceramic counterparts. Thus, to meet the ESR requirements, a higher-capacitance tantalum may be required, at the expense of larger size and higher cost.
- The ESR of a tantalum capacitor increases as temperature drops, as much as double from 25°C to –40°C. Thus, ESR margins must be maintained over the temperature range to prevent regulator instability.

### ON/OFF Operation

The LP2985 allows for a shutdown mode via the ON/OFF pin. Driving the pin LOW ( $\leq 0.3 \text{ V}$ ) turns the device OFF; conversely, a HIGH ( $\geq 1.6 \text{ V}$ ) turns the device ON. If the shutdown feature is not used, ON/OFF should be connected to the input to ensure that the regulator is on at all times. For proper operation, do not leave ON/OFF unconnected, and apply a signal with a slew rate of  $\geq 40 \text{ mV}/\mu\text{s}$ .

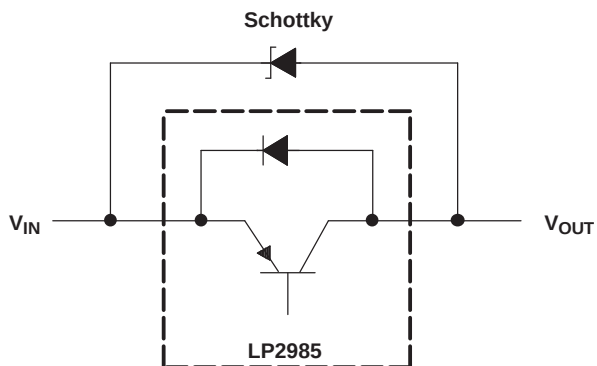
### Reverse Input-Output Voltage

There is an inherent diode present across the PNP pass element of the LP2985.



### APPLICATION INFORMATION (continued)

With the anode connected to the output, this diode is reverse biased during normal operation, since the input voltage is higher than the output. However, if the output is pulled higher than the input for any reason, this diode is forward biased and can cause a parasitic silicon-controlled rectifier (SCR) to latch, resulting in high current flowing from the output to the input. Thus, to prevent possible damage to the regulator in any application where the output may be pulled above the input, an external Schottky diode should be connected between the output and input. With the anode on output, this Schottky limits the reverse voltage across the output and input pins to  $\sim 0.3$  V, preventing the regulator's internal diode from forward biasing.



**PACKAGING INFORMATION**

| Orderable Device | Status <sup>(1)</sup> | Package Type | Package Drawing | Pins | Package Qty | Eco Plan <sup>(2)</sup> | Lead/Ball Finish | MSL Peak Temp <sup>(3)</sup> |
|------------------|-----------------------|--------------|-----------------|------|-------------|-------------------------|------------------|------------------------------|
| LP2985-18DBVR    | ACTIVE                | SOT-23       | DBV             | 5    | 3000        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| LP2985-18DBVRE4  | ACTIVE                | SOT-23       | DBV             | 5    | 3000        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| LP2985-18DBVT    | ACTIVE                | SOT-23       | DBV             | 5    | 250         | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| LP2985-18DBVTE4  | ACTIVE                | SOT-23       | DBV             | 5    | 250         | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| LP2985-25DBVR    | ACTIVE                | SOT-23       | DBV             | 5    | 3000        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| LP2985-25DBVRG4  | ACTIVE                | SOT-23       | DBV             | 5    | 3000        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| LP2985-25DBVT    | ACTIVE                | SOT-23       | DBV             | 5    | 250         | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| LP2985-25DBVTG4  | ACTIVE                | SOT-23       | DBV             | 5    | 250         | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| LP2985-28DBVR    | ACTIVE                | SOT-23       | DBV             | 5    | 3000        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| LP2985-28DBVRE4  | ACTIVE                | SOT-23       | DBV             | 5    | 3000        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| LP2985-28DBVT    | ACTIVE                | SOT-23       | DBV             | 5    | 250         | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| LP2985-28DBVTE4  | ACTIVE                | SOT-23       | DBV             | 5    | 250         | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| LP2985-29DBVR    | ACTIVE                | SOT-23       | DBV             | 5    | 3000        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| LP2985-29DBVRG4  | ACTIVE                | SOT-23       | DBV             | 5    | 3000        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| LP2985-29DBVT    | ACTIVE                | SOT-23       | DBV             | 5    | 250         | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| LP2985-29DBVTG4  | ACTIVE                | SOT-23       | DBV             | 5    | 250         | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| LP2985-30DBVR    | ACTIVE                | SOT-23       | DBV             | 5    | 3000        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| LP2985-30DBVRG4  | ACTIVE                | SOT-23       | DBV             | 5    | 3000        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| LP2985-30DBVT    | ACTIVE                | SOT-23       | DBV             | 5    | 250         | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| LP2985-30DBVTG4  | ACTIVE                | SOT-23       | DBV             | 5    | 250         | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| LP2985-33DBVR    | ACTIVE                | SOT-23       | DBV             | 5    | 3000        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| LP2985-33DBVRE4  | ACTIVE                | SOT-23       | DBV             | 5    | 3000        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| LP2985-33DBVT    | ACTIVE                | SOT-23       | DBV             | 5    | 250         | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| LP2985-33DBVTE4  | ACTIVE                | SOT-23       | DBV             | 5    | 250         | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| LP2985-50DBVR    | ACTIVE                | SOT-23       | DBV             | 5    | 3000        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |

| Orderable Device | Status <sup>(1)</sup> | Package Type | Package Drawing | Pins | Package Qty | Eco Plan <sup>(2)</sup> | Lead/Ball Finish | MSL Peak Temp <sup>(3)</sup> |
|------------------|-----------------------|--------------|-----------------|------|-------------|-------------------------|------------------|------------------------------|
| LP2985-50DBVRG4  | ACTIVE                | SOT-23       | DBV             | 5    | 3000        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| LP2985-50DBVT    | ACTIVE                | SOT-23       | DBV             | 5    | 250         | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| LP2985-50DBVTG4  | ACTIVE                | SOT-23       | DBV             | 5    | 250         | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| LP2985A-18DBVR   | ACTIVE                | SOT-23       | DBV             | 5    | 3000        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| LP2985A-18DBVRE4 | ACTIVE                | SOT-23       | DBV             | 5    | 3000        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| LP2985A-18DBVT   | ACTIVE                | SOT-23       | DBV             | 5    | 250         | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| LP2985A-18DBVTE4 | ACTIVE                | SOT-23       | DBV             | 5    | 250         | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| LP2985A-25DBVR   | ACTIVE                | SOT-23       | DBV             | 5    | 3000        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| LP2985A-25DBVRG4 | ACTIVE                | SOT-23       | DBV             | 5    | 3000        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| LP2985A-25DBVT   | ACTIVE                | SOT-23       | DBV             | 5    | 250         | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| LP2985A-25DBVTG4 | ACTIVE                | SOT-23       | DBV             | 5    | 250         | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| LP2985A-28DBVR   | ACTIVE                | SOT-23       | DBV             | 5    | 3000        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| LP2985A-28DBVRE4 | ACTIVE                | SOT-23       | DBV             | 5    | 3000        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| LP2985A-28DBVT   | ACTIVE                | SOT-23       | DBV             | 5    | 250         | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| LP2985A-28DBVTE4 | ACTIVE                | SOT-23       | DBV             | 5    | 250         | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| LP2985A-29DBVR   | ACTIVE                | SOT-23       | DBV             | 5    | 3000        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| LP2985A-29DBVRG4 | ACTIVE                | SOT-23       | DBV             | 5    | 3000        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| LP2985A-29DBVT   | ACTIVE                | SOT-23       | DBV             | 5    | 250         | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| LP2985A-29DBVTG4 | ACTIVE                | SOT-23       | DBV             | 5    | 250         | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| LP2985A-30DBVR   | ACTIVE                | SOT-23       | DBV             | 5    | 3000        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| LP2985A-30DBVRG4 | ACTIVE                | SOT-23       | DBV             | 5    | 3000        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| LP2985A-30DBVT   | ACTIVE                | SOT-23       | DBV             | 5    | 250         | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| LP2985A-30DBVTG4 | ACTIVE                | SOT-23       | DBV             | 5    | 250         | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| LP2985A-33DBVR   | ACTIVE                | SOT-23       | DBV             | 5    | 3000        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| LP2985A-33DBVRE4 | ACTIVE                | SOT-23       | DBV             | 5    | 3000        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| LP2985A-33DBVT   | ACTIVE                | SOT-23       | DBV             | 5    | 250         | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |

| Orderable Device | Status <sup>(1)</sup> | Package Type | Package Drawing | Pins | Package Qty | Eco Plan <sup>(2)</sup> | Lead/Ball Finish | MSL Peak Temp <sup>(3)</sup> |
|------------------|-----------------------|--------------|-----------------|------|-------------|-------------------------|------------------|------------------------------|
| LP2985A-33DBVTE4 | ACTIVE                | SOT-23       | DBV             | 5    | 250         | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| LP2985A-50DBVR   | ACTIVE                | SOT-23       | DBV             | 5    | 3000        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| LP2985A-50DBVRG4 | ACTIVE                | SOT-23       | DBV             | 5    | 3000        | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| LP2985A-50DBVT   | ACTIVE                | SOT-23       | DBV             | 5    | 250         | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |
| LP2985A-50DBVTG4 | ACTIVE                | SOT-23       | DBV             | 5    | 250         | Green (RoHS & no Sb/Br) | CU NIPDAU        | Level-1-260C-UNLIM           |

<sup>(1)</sup> The marketing status values are defined as follows:

**ACTIVE:** Product device recommended for new designs.

**LIFEBUY:** TI has announced that the device will be discontinued, and a lifetime-buy period is in effect.

**NRND:** Not recommended for new designs. Device is in production to support existing customers, but TI does not recommend using this part in a new design.

**PREVIEW:** Device has been announced but is not in production. Samples may or may not be available.

**OBsolete:** TI has discontinued the production of the device.

<sup>(2)</sup> Eco Plan - The planned eco-friendly classification: Pb-Free (RoHS), Pb-Free (RoHS Exempt), or Green (RoHS & no Sb/Br) - please check <http://www.ti.com/productcontent> for the latest availability information and additional product content details.

**TBD:** The Pb-Free/Green conversion plan has not been defined.

**Pb-Free (RoHS):** TI's terms "Lead-Free" or "Pb-Free" mean semiconductor products that are compatible with the current RoHS requirements for all 6 substances, including the requirement that lead not exceed 0.1% by weight in homogeneous materials. Where designed to be soldered at high temperatures, TI Pb-Free products are suitable for use in specified lead-free processes.

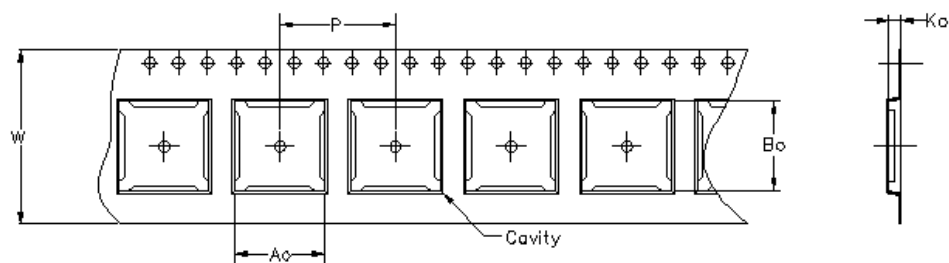
**Pb-Free (RoHS Exempt):** This component has a RoHS exemption for either 1) lead-based flip-chip solder bumps used between the die and package, or 2) lead-based die adhesive used between the die and leadframe. The component is otherwise considered Pb-Free (RoHS compatible) as defined above.

**Green (RoHS & no Sb/Br):** TI defines "Green" to mean Pb-Free (RoHS compatible), and free of Bromine (Br) and Antimony (Sb) based flame retardants (Br or Sb do not exceed 0.1% by weight in homogeneous material)

<sup>(3)</sup> MSL, Peak Temp. -- The Moisture Sensitivity Level rating according to the JEDEC industry standard classifications, and peak solder temperature.

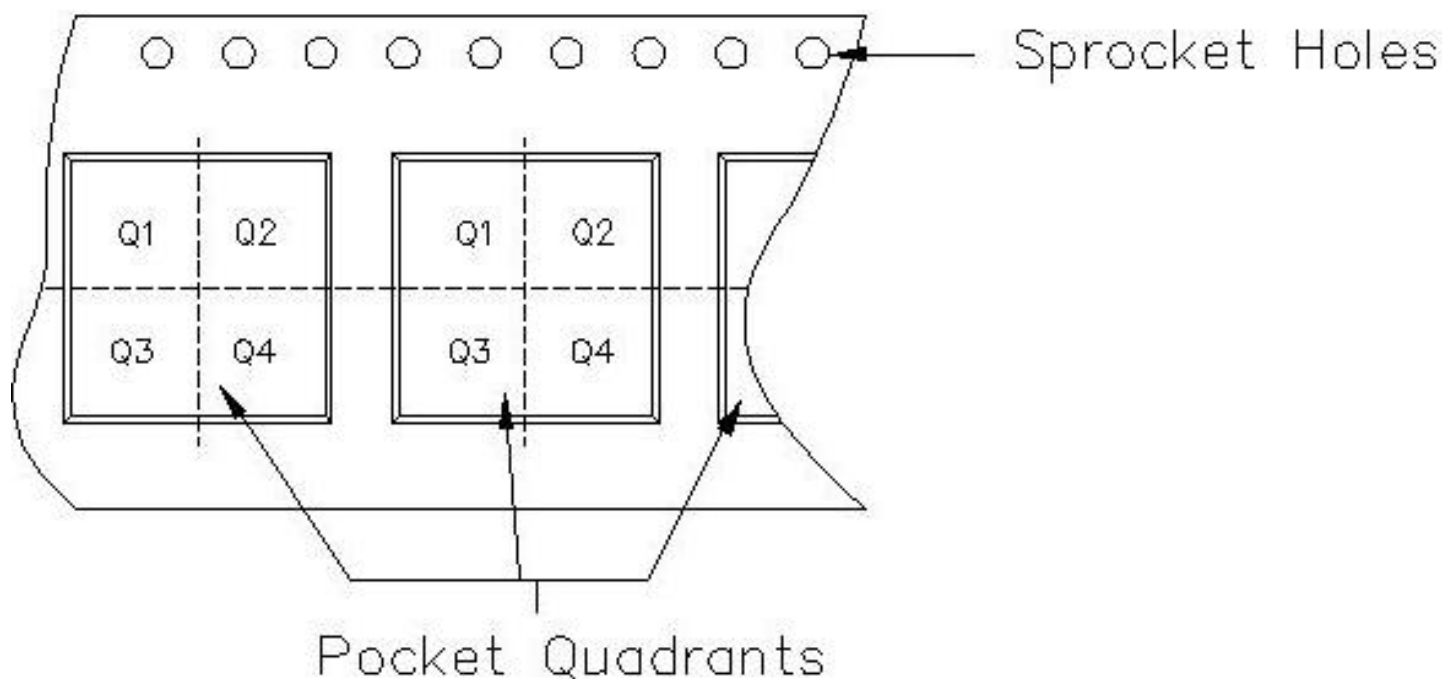
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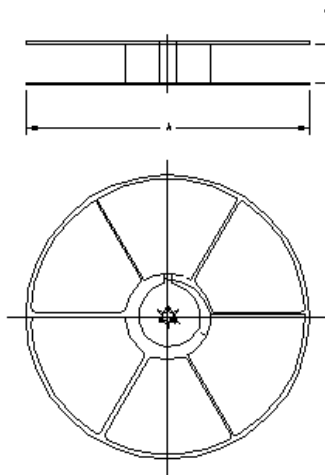
Carrier tape design is defined largely by the component length, width, and thickness.

|                                                                    |
|--------------------------------------------------------------------|
| $A_0$ = Dimension designed to accommodate the component width.     |
| $B_0$ = Dimension designed to accommodate the component length.    |
| $K_0$ = Dimension designed to accommodate the component thickness. |
| $W$ = Overall width of the carrier tape.                           |
| $P$ = Pitch between successive cavity centers.                     |



## TAPE AND REEL INFORMATION

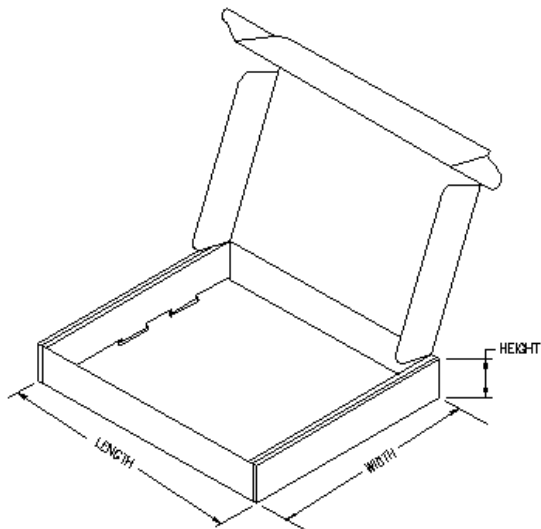
| Device         | Package | Pins | Site | Reel<br>Diameter<br>(mm) | Reel<br>Width<br>(mm) | A0 (mm) | B0 (mm) | K0 (mm) | P1<br>(mm) | W<br>(mm) | Pin1<br>Quadrant |
|----------------|---------|------|------|--------------------------|-----------------------|---------|---------|---------|------------|-----------|------------------|
| LP2985-18DBVR  | DBV     | 5    | LEN  | 180                      | 9                     | 3.15    | 3.2     | 1.4     | 4          | 8         | Q3               |
| LP2985-18DBVT  | DBV     | 5    | LEN  | 180                      | 9                     | 3.15    | 3.2     | 1.4     | 4          | 8         | Q3               |
| LP2985-25DBVR  | DBV     | 5    | LEN  | 180                      | 9                     | 3.15    | 3.2     | 1.4     | 4          | 8         | Q3               |
| LP2985-25DBVT  | DBV     | 5    | LEN  | 180                      | 9                     | 3.15    | 3.2     | 1.4     | 4          | 8         | Q3               |
| LP2985-28DBVR  | DBV     | 5    | LEN  | 180                      | 9                     | 3.15    | 3.2     | 1.4     | 4          | 8         | Q3               |
| LP2985-28DBVT  | DBV     | 5    | LEN  | 180                      | 9                     | 3.15    | 3.2     | 1.4     | 4          | 8         | Q3               |
| LP2985-29DBVR  | DBV     | 5    | LEN  | 180                      | 9                     | 3.15    | 3.2     | 1.4     | 4          | 8         | Q3               |
| LP2985-29DBVT  | DBV     | 5    | LEN  | 180                      | 9                     | 3.15    | 3.2     | 1.4     | 4          | 8         | Q3               |
| LP2985-30DBVR  | DBV     | 5    | LEN  | 180                      | 9                     | 3.15    | 3.2     | 1.4     | 4          | 8         | Q3               |
| LP2985-30DBVT  | DBV     | 5    | LEN  | 180                      | 9                     | 3.15    | 3.2     | 1.4     | 4          | 8         | Q3               |
| LP2985-33DBVR  | DBV     | 5    | HNC  | 180                      | 9                     | 3.23    | 3.17    | 1.37    | 4          | 8         | Q3               |
| LP2985-33DBVR  | DBV     | 5    | NFME | 0                        | 0                     | 3.23    | 3.17    | 1.37    | 4          | 8         | Q3               |
| LP2985-33DBVT  | DBV     | 5    | HNC  | 180                      | 9                     | 3.23    | 3.17    | 1.37    | 4          | 8         | Q3               |
| LP2985-33DBVT  | DBV     | 5    | NFME | 330                      | 16                    | 10.6    | 15.8    | 4.9     | 16         | 24        | Q3               |
| LP2985-50DBVR  | DBV     | 5    | LEN  | 180                      | 9                     | 3.15    | 3.2     | 1.4     | 4          | 8         | Q3               |
| LP2985-50DBVT  | DBV     | 5    | LEN  | 180                      | 9                     | 3.15    | 3.2     | 1.4     | 4          | 8         | Q3               |
| LP2985A-18DBVR | DBV     | 5    | LEN  | 180                      | 9                     | 3.15    | 3.2     | 1.4     | 4          | 8         | Q3               |
| LP2985A-18DBVT | DBV     | 5    | LEN  | 180                      | 9                     | 3.15    | 3.2     | 1.4     | 4          | 8         | Q3               |
| LP2985A-25DBVR | DBV     | 5    | LEN  | 180                      | 9                     | 3.15    | 3.2     | 1.4     | 4          | 8         | Q3               |
| LP2985A-25DBVT | DBV     | 5    | LEN  | 180                      | 9                     | 3.15    | 3.2     | 1.4     | 4          | 8         | Q3               |
| LP2985A-28DBVR | DBV     | 5    | LEN  | 180                      | 9                     | 3.15    | 3.2     | 1.4     | 4          | 8         | Q3               |
| LP2985A-28DBVT | DBV     | 5    | LEN  | 180                      | 9                     | 3.15    | 3.2     | 1.4     | 4          | 8         | Q3               |
| LP2985A-29DBVR | DBV     | 5    | LEN  | 180                      | 9                     | 3.15    | 3.2     | 1.4     | 4          | 8         | Q3               |
| LP2985A-29DBVT | DBV     | 5    | LEN  | 180                      | 9                     | 3.15    | 3.2     | 1.4     | 4          | 8         | Q3               |
| LP2985A-30DBVR | DBV     | 5    | LEN  | 180                      | 9                     | 3.15    | 3.2     | 1.4     | 4          | 8         | Q3               |
| LP2985A-30DBVT | DBV     | 5    | LEN  | 180                      | 9                     | 3.15    | 3.2     | 1.4     | 4          | 8         | Q3               |
| LP2985A-33DBVR | DBV     | 5    | HNC  | 180                      | 9                     | 3.23    | 3.17    | 1.37    | 4          | 8         | Q3               |
| LP2985A-33DBVR | DBV     | 5    | NFME | 0                        | 0                     | 3.23    | 3.17    | 1.37    | 4          | 8         | Q3               |
| LP2985A-33DBVT | DBV     | 5    | HNC  | 180                      | 9                     | 3.23    | 3.17    | 1.37    | 4          | 8         | Q3               |
| LP2985A-33DBVT | DBV     | 5    | NFME | 330                      | 16                    | 10.6    | 15.8    | 4.9     | 16         | 24        | Q3               |
| LP2985A-50DBVR | DBV     | 5    | LEN  | 180                      | 9                     | 3.15    | 3.2     | 1.4     | 4          | 8         | Q3               |
| LP2985A-50DBVT | DBV     | 5    | LEN  | 180                      | 9                     | 3.15    | 3.2     | 1.4     | 4          | 8         | Q3               |



**TAPE AND REEL BOX INFORMATION**

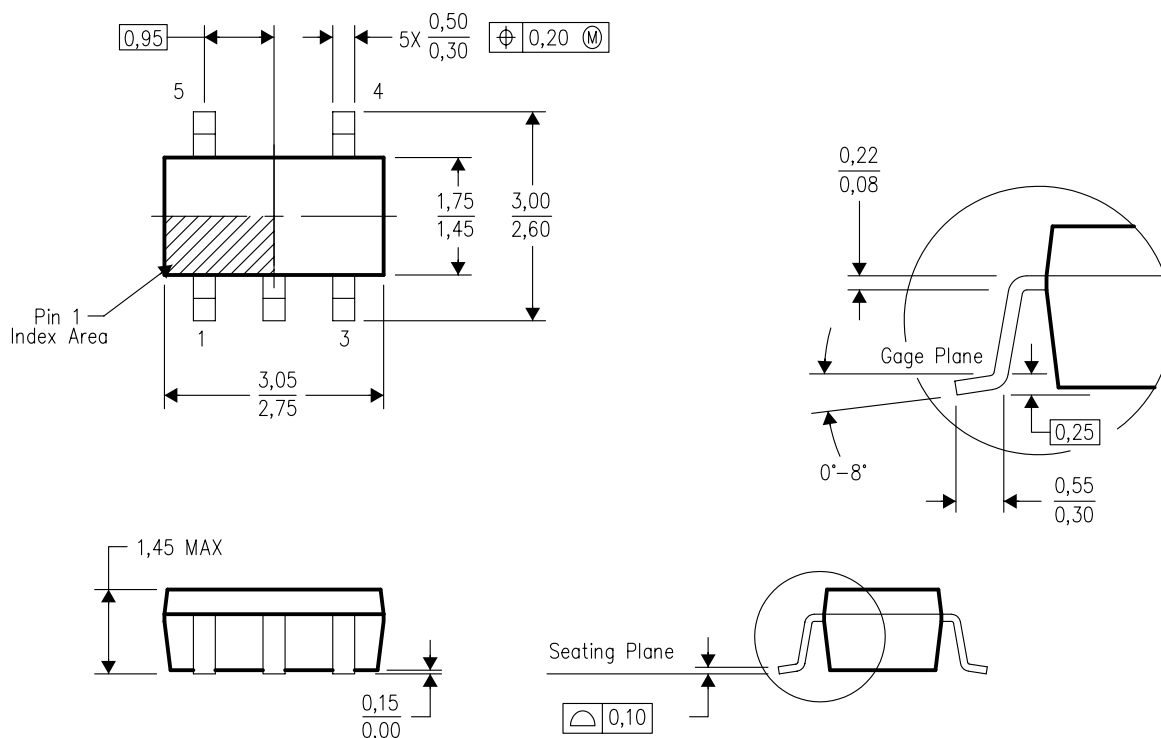
| Device         | Package | Pins | Site | Length (mm) | Width (mm) | Height (mm) |
|----------------|---------|------|------|-------------|------------|-------------|
| LP2985-18DBVR  | DBV     | 5    | LEN  | 182.0       | 182.0      | 20.0        |
| LP2985-18DBVT  | DBV     | 5    | LEN  | 182.0       | 182.0      | 20.0        |
| LP2985-25DBVR  | DBV     | 5    | LEN  | 182.0       | 182.0      | 20.0        |
| LP2985-25DBVT  | DBV     | 5    | LEN  | 182.0       | 182.0      | 20.0        |
| LP2985-28DBVR  | DBV     | 5    | LEN  | 182.0       | 182.0      | 20.0        |
| LP2985-28DBVT  | DBV     | 5    | LEN  | 182.0       | 182.0      | 20.0        |
| LP2985-29DBVR  | DBV     | 5    | LEN  | 182.0       | 182.0      | 20.0        |
| LP2985-29DBVT  | DBV     | 5    | LEN  | 182.0       | 182.0      | 20.0        |
| LP2985-30DBVR  | DBV     | 5    | LEN  | 182.0       | 182.0      | 20.0        |
| LP2985-30DBVT  | DBV     | 5    | LEN  | 182.0       | 182.0      | 20.0        |
| LP2985-33DBVR  | DBV     | 5    | HNC  | 205.0       | 200.0      | 33.0        |
| LP2985-33DBVR  | DBV     | 5    | NFME | 185.0       | 185.0      | 220.0       |
| LP2985-33DBVT  | DBV     | 5    | HNC  | 201.0       | 192.0      | 26.0        |
| LP2985-33DBVT  | DBV     | 5    | NFME | 0.0         | 0.0        | 0.0         |
| LP2985-50DBVR  | DBV     | 5    | LEN  | 182.0       | 182.0      | 20.0        |
| LP2985-50DBVT  | DBV     | 5    | LEN  | 182.0       | 182.0      | 20.0        |
| LP2985A-18DBVR | DBV     | 5    | LEN  | 182.0       | 182.0      | 20.0        |
| LP2985A-18DBVT | DBV     | 5    | LEN  | 182.0       | 182.0      | 20.0        |
| LP2985A-25DBVR | DBV     | 5    | LEN  | 182.0       | 182.0      | 20.0        |
| LP2985A-25DBVT | DBV     | 5    | LEN  | 182.0       | 182.0      | 20.0        |
| LP2985A-28DBVR | DBV     | 5    | LEN  | 182.0       | 182.0      | 20.0        |
| LP2985A-28DBVT | DBV     | 5    | LEN  | 182.0       | 182.0      | 20.0        |
| LP2985A-29DBVR | DBV     | 5    | LEN  | 182.0       | 182.0      | 20.0        |
| LP2985A-29DBVT | DBV     | 5    | LEN  | 182.0       | 182.0      | 20.0        |
| LP2985A-30DBVR | DBV     | 5    | LEN  | 182.0       | 182.0      | 20.0        |

| Device         | Package | Pins | Site | Length (mm) | Width (mm) | Height (mm) |
|----------------|---------|------|------|-------------|------------|-------------|
| LP2985A-30DBVT | DBV     | 5    | LEN  | 182.0       | 182.0      | 20.0        |
| LP2985A-33DBVR | DBV     | 5    | HNC  | 205.0       | 200.0      | 33.0        |
| LP2985A-33DBVR | DBV     | 5    | NFME | 185.0       | 185.0      | 220.0       |
| LP2985A-33DBVT | DBV     | 5    | HNC  | 201.0       | 192.0      | 26.0        |
| LP2985A-33DBVT | DBV     | 5    | NFME | 0.0         | 0.0        | 0.0         |
| LP2985A-50DBVR | DBV     | 5    | LEN  | 182.0       | 182.0      | 20.0        |
| LP2985A-50DBVT | DBV     | 5    | LEN  | 182.0       | 182.0      | 20.0        |



## DBV (R-PDSO-G5)

## PLASTIC SMALL-OUTLINE PACKAGE



4073253-4/K 03/2006

- NOTES:
- A. All linear dimensions are in millimeters.
  - B. This drawing is subject to change without notice.
  - C. Body dimensions do not include mold flash or protrusion. Mold flash and protrusion shall not exceed 0.15 per side.
  - D. Falls within JEDEC MO-178 Variation AA.

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| Logic                 | <a href="http://logic.ti.com">logic.ti.com</a>                     | Military           | <a href="http://www.ti.com/military">www.ti.com/military</a>             |
| Power Mgmt            | <a href="http://power.ti.com">power.ti.com</a>                     | Optical Networking | <a href="http://www.ti.com/opticalnetwork">www.ti.com/opticalnetwork</a> |
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| RFID                  | <a href="http://www.ti-rfid.com">www.ti-rfid.com</a>               | Telephony          | <a href="http://www.ti.com/telephony">www.ti.com/telephony</a>           |
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