- **Fully Matches Parameters for Alternative 2 SCSI Active Termination**
- **Fixed 2.85-V Output**
- **±1% Maximum Output Tolerance at $T_J$ = 25°C**
- **0.7-V Maximum Dropout Voltage**
- **620-mA Output Current**
- **±2% Absolute Output Variation**
- **Internal Overcurrent Limiting Circuitry**
- **Internal Thermal-Overload Protection**
- **Internal Overvoltage Protection**

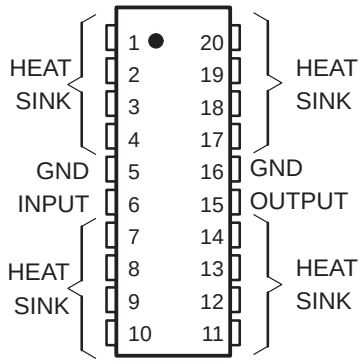
## description

The TL-SCSI285 is a low-dropout (0.7-V) fixed-voltage regulator specifically designed for small computer systems interface (SCSI) alternative 2 active signal termination. The TL-SCSI285 0.7-V maximum dropout ensures compatibility with existing SCSI systems while providing a wide TERMPWR voltage range. At the same time, the ±1% initial tolerance on its 2.85-V output voltage ensures a tighter line-driver current tolerance, thereby increasing the system noise margin.

The fixed 2.85-V output voltage of the TL-SCSI285 supports the SCSI alternative 2 termination standard, while reducing system power consumption. The 0.7-V maximum dropout voltage brings increased TERMPWR isolation, making the device ideal for battery-powered systems. The TL-SCSI285, with internal current limiting, overvoltage protection, ESD protection, and thermal protection, offers designers enhanced system protection and reliability.

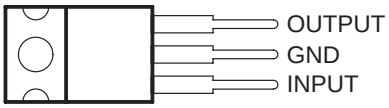
When configured as a SCSI active terminator, the TL-SCSI285 low-dropout regulator eliminates the 220-Ω and the 330-Ω resistors required for each transmission line with a passive termination scheme, reducing significantly the continuous system power drain. When placed in series with 110-Ω resistors, the device matches the impedance level of the transmission cable and eliminates reflections.

**PW PACKAGE**
**(TOP VIEW)**



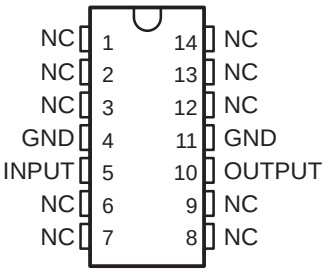

HEAT SINK – These terminals have an internal resistive connection to ground and should be grounded or electrically isolated.

**KC PACKAGE**
**(TOP VIEW)**

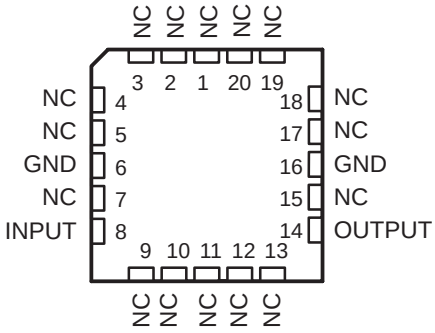



The GND terminal is in electrical contact with the mounting base.

**J PACKAGE**
**(TOP VIEW)**




**FK PACKAGE**
**(TOP VIEW)**




NC – No internal connection

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.

## description (continued)

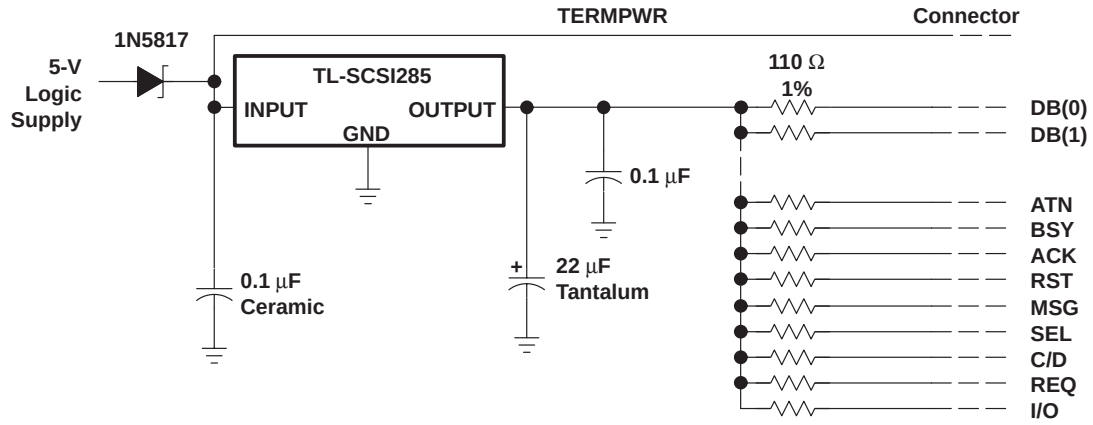
The TL-SCSI285 is characterized for operation from 0°C to 125°C virtual junction temperature. The TL-SCSI285M is characterized for operation from –55°C to 125°C virtual junction temperature.

**AVAILABLE OPTIONS**

| $T_J$ | PACKAGED DEVICES | | | | CHIP FORM (Y) |
|---|---|---|---|---|---|
| | CHIP CARRIER (FK) | CERAMIC DIP (J) | PLASTIC POWER (KC) | SURFACE MOUNT (PW)† | |
| 0°C to 125°C | — | — | TL-SCSI285KC | TL-SCSI285PWLE | TL-SCSI285Y |
| –55°C to 125°C | TL-SCSI285MFK | TL-SCSI285MJ | — | — | |

† The PW package is only available left-end taped and reeled.

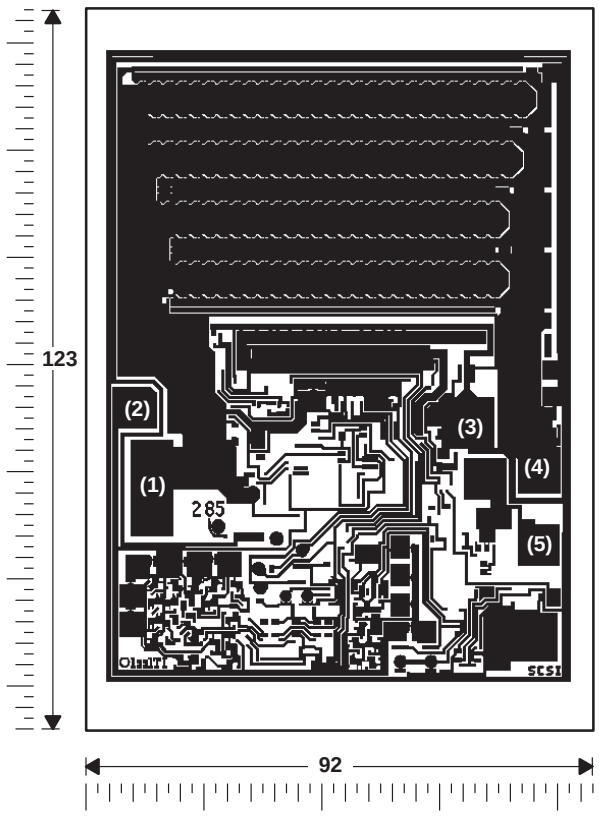
## typical application schematic

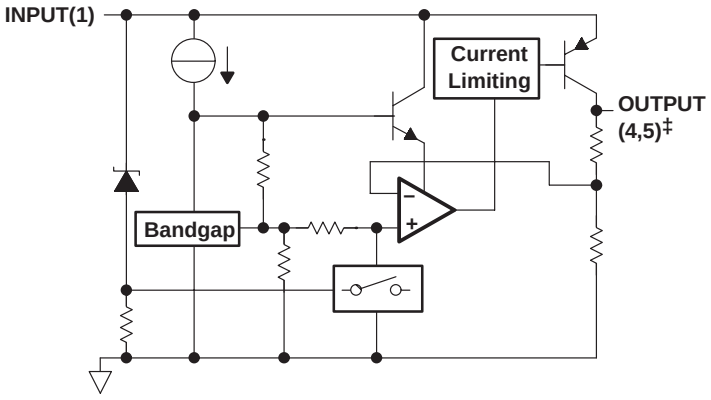


## TL-SCSI285Y chip information

This chip, when properly assembled, has characteristics similar to the TL-SCSI285. Thermal compression or ultrasonic bonding can be used on the doped-aluminum pads. The chips can be mounted with conductive epoxy or a gold-silicon preform.

**BONDING-PAD ASSIGNMENTS**




† Connect pads 2 and 3 together.
‡ Connect pads 4 and 5 together.

**CHIP THICKNESS: 11 MILS TYPICAL**

**BONDING PADS: 7 X 7 MILS MINIMUM**

**$T_J$ (max) = 150°C**

**TOLERANCES ARE ±10%.**

**ALL DIMENSIONS ARE IN MILS.**

### absolute maximum ratings over operating virtual junction temperature range (unless otherwise noted)†

Continuous input voltage, $V_I$ . . . . . 7.5 V
Continuous total dissipation (see Note 1) . . . . . See Dissipation Rating Table
Operating virtual junction temperature range, $T_A$ . . . . . –55°C to 150°C
Storage temperature range, $T_{stg}$ . . . . . –65°C to 150°C
Lead temperature 1,6 mm (1/16 inch) from case for 60 seconds: KC, N, or PW Package . . . . . 260°C
Lead temperature 1,6 mm (1/16 inch) from case for 60 seconds: J Package . . . . . 300°C

† 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.

NOTE 1: Refer to Figures 1 and 2 to avoid exceeding the design maximum virtual junction temperature; these ratings should not be exceeded. Due to variation in individual device electrical characteristics and thermal resistance, the built-in thermal overload protection may be activated at power levels slightly above or below the rated dissipation.

**DISSIPATION RATING TABLE**

| PACKAGE | POWER RATING AT | T ≤ 25°C POWER RATING | DERATING FACTOR ABOVE T = 25°C | T= 70°C POWER RATING | T = 85°C POWER RATING | T = 125°C POWER RATING |
|---|---|---|---|---|---|---|
| FK | $T_A$ | 1375 mW | 11.0 mW/°C | 880 mW | 715 mW | 275 mW |
| J | $T_A$ | 1375 mW | 11.0 mW/°C | 880 mW | 715 mW | 275 mW |
| KC | $T_A$ | 2000 mW | 16.0 mW/°C | 1280 mW | 1040 mW | 400 mW |
| | $T_C$ | 20000 mW | 182.0 mW/°C‡ | 11810 mW | 9080 mW | 1800 mW |
| PW | $T_A$ | 950 mW | 7.6 mW/°C | 608 mW | 494 mW | 190 mW |
| | $T_C$ | 4625 mW | 37.0 mW/°C | 2960 mW | 2405 mW | 925 mW |

‡ Derate above 40°C

**MAXIMUM CONTINUOUS DISSIPATION vs FREE-AIR TEMPERATURE**

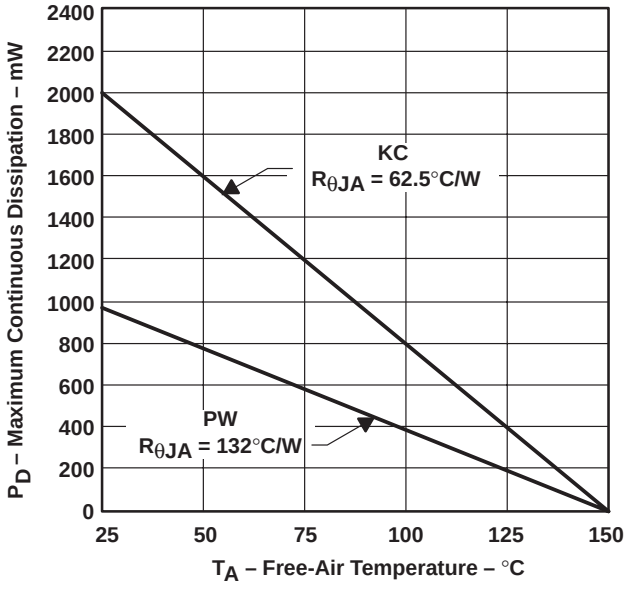



**Figure 1**

**MAXIMUM CONTINUOUS DISSIPATION vs CASE TEMPERATURE**

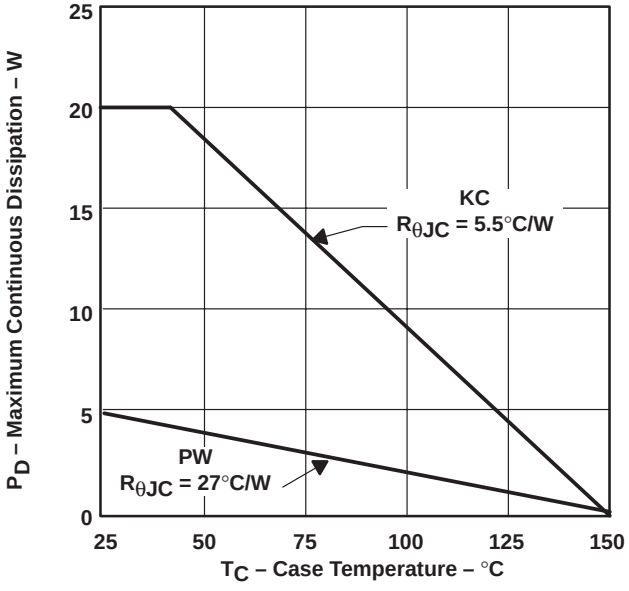



**Figure 2**

## recommended operating conditions

| | | TL-SCSI285 | | TL-SCSI285M | | UNIT |
|---|---|---|---|---|---|---|
| | | MIN | MAX | MIN | MAX | |
| Input voltage, $V_I$ | $T_J$ = 25°C | | | 3.45 | 5.5 | V |
| Input voltage, $V_I$ | $T_J$ = full range† | 3.55 | 5.5 | 3.7 | 5.5 | V |
| Output current, $I_O$ | KC package | 0 | 620 | | | mA |
| | PW package | 0 | 500 | | | |
| | FK and J packages | | | | 480 | |
| Operating virtual junction temperature range, $T_J$ | | 0 | 125 | –55 | 125 | °C |

† Full range for the TL-SCSI285 is 0°C to 125°C. Full range for the TL-SCSI285M is –55°C to 125°C.

## electrical characteristics, $V_I$ = 4.5 V, $I_O$ = 500 mA, $T_J$ = 25°C (unless otherwise noted)

| PARAMETER | TEST CONDITIONS‡ | | | TL-SCSI285KC TL-SCSI285N | | | UNIT |
|---|---|---|---|---|---|---|---|
| | | | | MIN | TYP | MAX | |
| Output voltage | $I_O$ = 20 mA to 500 mA, | $V_I$ = 3.55 V to 5.5 V, | $T_J$ = 25°C | 2.82 | 2.85 | 2.88 | V |
| | $I_O$ = 500 mA to 620 mA, | $V_I$ = 3.65 V to 5.5 V, | $T_J$ = 0 to 125°C | 2.79 | | 2.91 | |
| Input regulation | $V_I$ = 3.55 V to 5.5 V | | | | 5 | 15 | mV |
| Ripple rejection | f = 120 Hz, | $V_{ripple}$ = 1 $V_{O(PP)}$ | | | –62 | | dB |
| Output regulation | $I_O$ = 20 mA to 620 mA | | | | 5 | 30 | mV |
| | $I_O$ = 20 mA to 500 mA | | | | 5 | 30 | |
| Output noise voltage | f = 10 Hz to 100 kHz | | | | 500 | | μV |
| Dropout voltage | $I_O$ = 500 mA | | | | | 0.7 | V |
| | $I_O$ = 620 mA | | | | | 0.8 | |
| Bias current | $I_O$ = 0 | | | | 2 | 5 | mA |
| | $I_O$ = 27 mA, equivalent 1 line asserted | | | | 3 | 6 | |
| | $I_O$ = 500 mA, equivalent 18 lines asserted (8-bit) | | | | 26 | 49 | |
| | $I_O$ = 620 mA | | | | 37 | 62 | |

‡ Pulse-testing techniques are used to maintain the virtual junction temperature as close to the ambient temperature as possible. Thermal effects must be taken into account separately. All characteristics are measured with a 0.1-μF capacitor across the input and a 22.0-μF tantalum capacitor with equivalent series resistance of 1.5 Ω on the output.

## electrical characteristics, $V_I$ = 4.5 V, $I_O$ = 500 mA, $T_J$ = 25°C (unless otherwise noted)

| PARAMETER | TEST CONDITIONS† | | TL-SCSI285PW | | | UNIT |
|---|---|---|---|---|---|---|
| | | | MIN | TYP | MAX | |
| Output voltage | $I_O$ = 20 mA to 500 mA, $V_I$ = 3.55 V to 5.5 V | $T_J$ = 25°C | 2.82 | 2.85 | 2.88 | V |
| | | $T_J$ = 0 to 125°C | 2.79 | | 2.91 | |
| Input regulation | $V_I$ = 3.55 V to 5.5 V | | | 5 | 15 | mV |
| Ripple rejection | f = 120 Hz, $V_{ripple}$ = 1 $V_{O(PP)}$ | | | –62 | | dB |
| Output regulation | $I_O$ = 20 mA to 500 mA | | | 5 | 30 | mV |
| Output noise voltage | f = 10 Hz to 100 kHz | | | 500 | | μV |
| Dropout voltage | $I_O$ = 500 mA | | | | 0.7 | V |
| Bias current | $I_O$ = 0 | | | 2 | 5 | mA |
| | $I_O$ = 27 mA, equivalent 1 line asserted | | | 3 | 6 | |
| | $I_O$ = 500 mA, equivalent 18 lines asserted (8-bit) | | | 26 | 49 | |

† Pulse-testing techniques are used to maintain the virtual junction temperature as close to the ambient temperature as possible. Thermal effects must be taken into account separately. All characteristics are measured with a 0.1-μF capacitor across the input and a 22.0-μF tantalum capacitor with equivalent series resistance of 1.5 Ω on the output.

## electrical characteristics, $V_I$ = 4.5 V, $I_O$ = 480 mA, $T_J$ = full range (unless otherwise noted)

| PARAMETER | TEST CONDITIONS† | | | TL-SCSI285M | | | UNIT |
|---|---|---|---|---|---|---|---|
| | | | | MIN | TYP | MAX | |
| Output voltage | $I_O$ = 20 mA to 480 mA, | $V_I$ = 3.55 V to 5.5 V, | $T_J$ = 25°C | 2.82 | 2.85 | 2.88 | V |
| | $I_O$ = 20 mA to 480 mA, | $V_I$ = 3.7 V to 5.5 V, | | 2.79 | | 2.91 | |
| Input regulation | $V_I$ = 3.55 V to 5.5 V, | $T_J$ = 25°C | | | | 15 | mV |
| Ripple rejection | f = 120 Hz, | $V_{ripple}$ = 1 $V_{O(PP)}$ | | | –62 | | dB |
| Output regulation | $I_O$ = 20 mA to 480 mA, | $T_J$ = 25°C | | | | 30 | mV |
| Output noise voltage | f = 10 Hz to 100 kHz | | | | 500 | | μV |
| Dropout voltage | $T_J$ = 25°C | | | | | 0.7 | V |
| | | | | | | 0.85 | |
| Bias current | $I_O$ = 0 | | | | | 5 | mA |
| | $I_O$ = 24 mA, equivalent 1 line asserted | | | | | 6 | |
| | $I_O$ = 480 mA, equivalent 18 lines asserted (8-bit) | | | | | 49 | |

† Pulse-testing techniques are used to maintain the virtual junction temperature as close to the ambient temperature as possible. Thermal effects must be taken into account separately. All characteristics are measured with a 0.1-μF capacitor across the input and a 22.0-μF tantalum capacitor with equivalent series resistance of 1.5 Ω on the output.

## electrical characteristics, $V_I$ = 4.5 V, $I_O$ = 500 mA, $T_J$ = 25°C

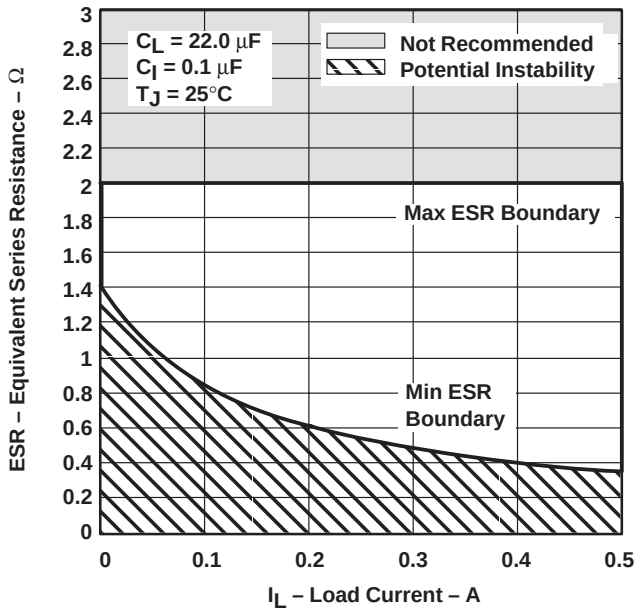
| PARAMETER | TEST CONDITIONS† | TL-SCSI285Y | | | UNIT |
|---|---|---|---|---|---|
| | | MIN | TYP | MAX | |
| Output voltage | $I_O$ = 20 mA to 500 mA, $V_I$ = 3.55 V to 5.5 V | | 2.85 | | V |
| Input regulation | $V_I$ = 3.55 V to 5.5 V | | 5 | | mV |
| Ripple rejection | f = 120 Hz, $V_{ripple}$ = 1 $V_{O(PP)}$ | | –62 | | dB |
| Output regulation | $I_O$ = 20 mA to 620 mA | | 5 | | mV |
| | $I_O$ = 20 mA to 500 mA | | 5 | | |
| Output noise voltage | f = 10 Hz to 100 kHz | | 500 | | μV |
| Bias current | $I_O$ = 0 | | 2 | | mA |
| | $I_O$ = 27 mA, equivalent 1 line asserted | | 3 | | |
| | $I_O$ = 500 mA, equivalent 18 lines asserted (8-bit) | | 26 | | |
| | $I_O$ = 620 mA | | 37 | | |

† Pulse-testing techniques are used to maintain the virtual junction temperature as close to the ambient temperature as possible. Thermal effects must be taken into account separately. All characteristics are measured with a 0.1-μF capacitor across the input and a 22.0-μF tantalum capacitor with equivalent series resistance of 1.5 Ω on the output.

## COMPENSATION CAPACITOR SELECTION INFORMATION

The TL-SCSI285 is a low-dropout regulator. This means that the capacitance loading is important to the performance of the regulator because it is a vital part of the control loop. The capacitor value and the equivalent series resistance (ESR) both affect the control loop and must be defined for the load range and the temperature range. Figures 3 and 4 can be used to establish the capacitance value and ESR range for best regulator performance.

**ESR OF OUTPUT CAPACITOR vs LOAD CURRENT**



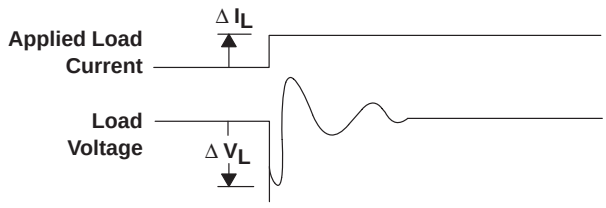




**Figure 3**

**STABILITY vs ESR**

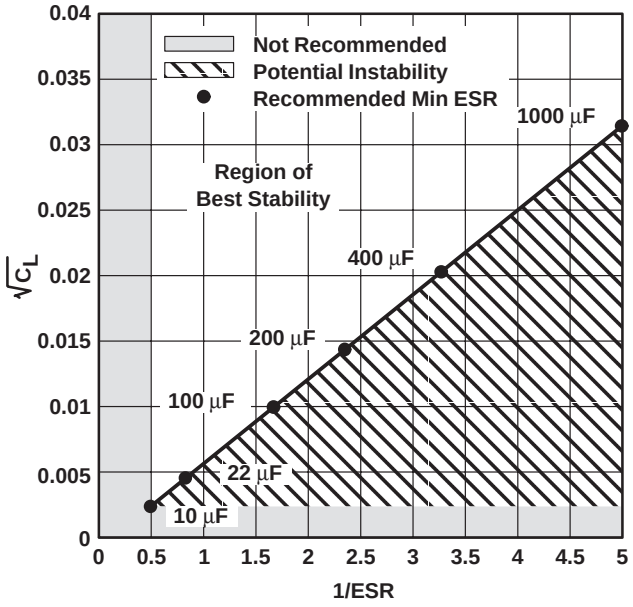



**Figure 4**

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