

- Fully Matches Parameters for SCSI Alternative 2 Active Termination
- Fixed 2.85-V Output
- $\pm 1\%$ Maximum Output Tolerance at $T_J = 25^\circ\text{C}$
- 0.7-V Maximum Dropout Voltage
- 620-mA Output Current
- $\pm 2\%$ 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 $\pm 1\%$ 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 $220\text{-}\Omega$ and the $330\text{-}\Omega$ resistors required for each transmission line with a passive termination scheme, reducing significantly the continuous system power drain. When placed in series with $110\text{-}\Omega$ resistors, the device matches the impedance level of the transmission cable and eliminates reflections.

The TL-SCSI285 is characterized for operation over the virtual junction temperature range of 0°C to 125°C .

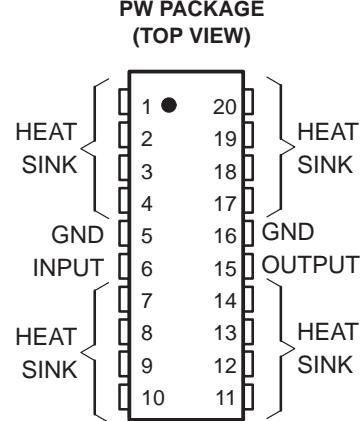
AVAILABLE OPTIONS

T_J	PACKAGED DEVICES		CHIP FORM (Y)
	PLASTIC POWER (KC)	SURFACE MOUNT (PW)	
0°C to 125°C	TL-SCSI285KC	TL-SCSI285PWR	TL-SCSI285Y

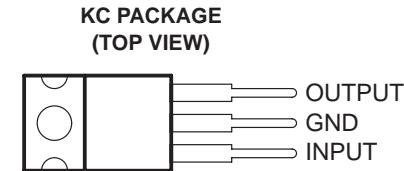
The PW package is only available taped and reeled. Chip forms are tested at 25°C .



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



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

TL-SCSI285 FIXED-VOLTAGE REGULATORS FOR SCSI ACTIVE TERMINATION

SLVS065F – NOVEMBER 1991 – REVISED JULY 1999

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

† 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.

NOTES: 1. Maximum power dissipation is a function of $T_J(\max)$, θ_{JA} , and T_A . The maximum allowable power dissipation at any allowable ambient temperature is $P_D = (T_J(\max) - T_A)/\theta_{JA}$. Operating at the absolute maximum T_J of 150°C can impact reliability. Due to variations 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.

2. The package thermal impedance is calculated in accordance with JEDEC 51, except for through-hole packages, which use a trace length of zero.

recommended operating conditions

		TL-SCSI285	UNIT	
		MIN	MAX	
Input voltage, V_I	$T_J = 25^\circ\text{C}$		V	
Input voltage, V_I	$T_J = 0^\circ\text{C}$ to 125°C	3.55	5.5	V
Output current, I_O	KC package	0	620	mA
	PW package	0	500	
Operating virtual junction temperature range, T_J		0	125	°C

electrical characteristics, $V_L = 4.5$ V, $I_O = 500$ mA, $T_J = 25^\circ\text{C}$ (unless otherwise noted)

PARAMETER	TEST CONDITIONS‡	TL-SCSI285KC			UNIT
		MIN	TYP	MAX	
Output voltage	$I_O = 20 \text{ mA to } 500 \text{ mA}$, $V_I = 3.55 \text{ V to } 5.5 \text{ V}$, $T_J = 25^\circ\text{C}$	2.82	2.85	2.88	V
	$I_O = 500 \text{ mA to } 620 \text{ mA}$, $V_I = 3.65 \text{ V to } 5.5 \text{ V}$, $T_J = 0 \text{ to } 125^\circ\text{C}$	2.79		2.91	
Input regulation	$V_I = 3.55 \text{ V to } 5.5 \text{ V}$			5	15
Ripple rejection	$f = 120 \text{ Hz}$, $V_{\text{ripple}} = 1 \text{ V}_O(\text{PP})$			-62	dB
Output regulation	$I_O = 20 \text{ mA to } 620 \text{ mA}$		5	30	mV
	$I_O = 20 \text{ mA to } 500 \text{ mA}$		5	30	
Output noise voltage	$f = 10 \text{ Hz to } 100 \text{ kHz}$			500	μV
Dropout voltage	$I_O = 500 \text{ mA}$			0.7	V
	$I_O = 620 \text{ mA}$			0.8	
Bias current	$I_O = 0$		2	5	mA
	$I_O = 27 \text{ mA, equivalent 1 line asserted}$			3	
	$I_O = 500 \text{ mA, equivalent 18 lines asserted (8-bit)}$			26	
	$I_O = 620 \text{ mA}$			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- μ F capacitor across the input and a 22.0- μ F tantalum capacitor with equivalent series resistance of 1.5 Ω on the output.

electrical characteristics, $V_I = 4.5$ V, $I_O = 500$ mA, $T_J = 25^\circ\text{C}$ (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	$T_J = 25^\circ\text{C}$	2.82	2.85	2.88
		$T_J = 0$ to 125°C	2.79	2.91	V
Input regulation	$V_I = 3.55$ V to 5.5 V		5	15	mV
Ripple rejection	$f = 120$ Hz, $V_{\text{ripple}} = 1$ 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, $I_O = 500$ mA, $T_J = 25^\circ\text{C}$

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, $V_{\text{ripple}} = 1$ 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.

TL-SCSI285
FIXED-VOLTAGE REGULATORS
FOR SCSI ACTIVE TERMINATION

SLVS065F – NOVEMBER 1991 – REVISED JULY 1999

APPLICATION INFORMATION

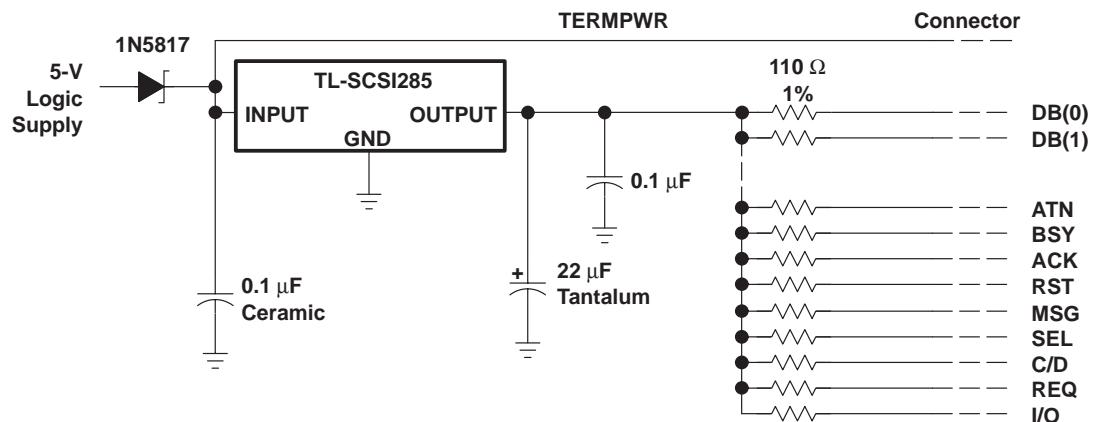


Figure 1. Typical Application Schematic

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 2 and 3 can be used to establish the capacitance value and ESR range for best regulator performance.

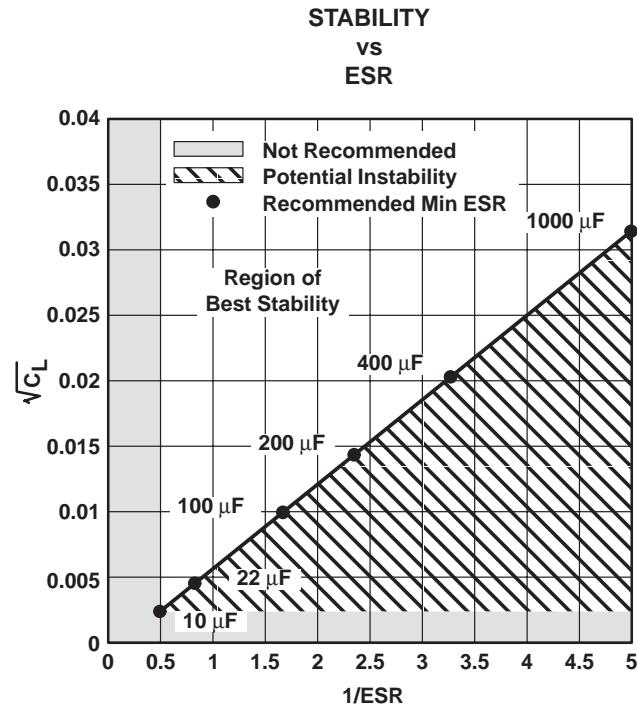
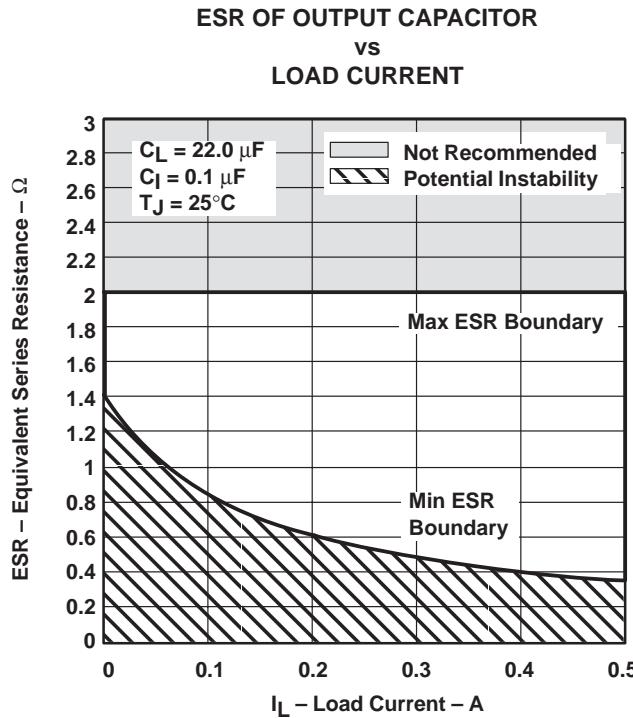


Figure 3

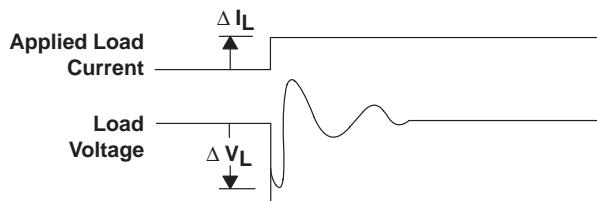


Figure 2

PACKAGING INFORMATION

Orderable Device	Status ⁽¹⁾	Package Type	Package Drawing	Pins	Package Qty	Eco Plan ⁽²⁾	Lead/Ball Finish	MSL Peak Temp ⁽³⁾	Samples (Requires Login)
TL-SCSI285KC	OBsolete	TO-220	KC	3		TBD	Call TI	Call TI	Samples Not Available
TL-SCSI285KCE3	OBsolete	TO-220	KC	3		TBD	Call TI	Call TI	Samples Not Available
TL-SCSI285KCSE3	ACTIVE	TO-220	KCS	3	50	Pb-Free (RoHS)	CU SN	N / A for Pkg Type	Request Free Samples
TL-SCSI285PWR	ACTIVE	TSSOP	PW	20	2000	Green (RoHS & no Sb/Br)	Call TI	Level-1-260C-UNLIM	Contact TI Distributor or Sales Office
TL-SCSI285PWRE4	ACTIVE	TSSOP	PW	20	2000	Green (RoHS & no Sb/Br)	Call TI	Level-1-260C-UNLIM	Contact TI Distributor or Sales Office
TL-SCSI285PWRG4	ACTIVE	TSSOP	PW	20	2000	Green (RoHS & no Sb/Br)	Call TI	Level-1-260C-UNLIM	Contact TI Distributor or Sales Office

⁽¹⁾ 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.

⁽²⁾ 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.

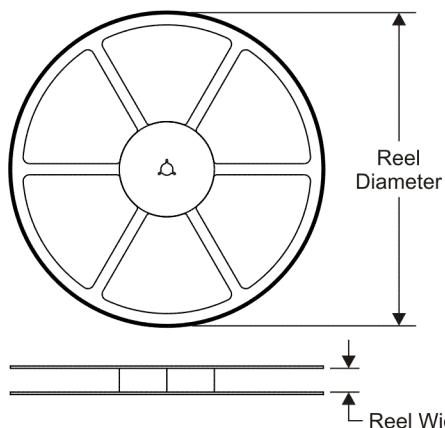
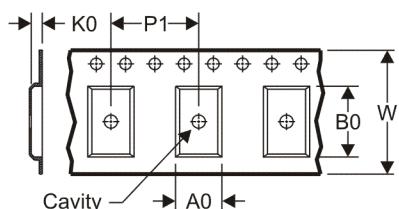
Pb-Free (RoHS Exempt): This component has a RoHS exemption for either 1) lead-based flip-chip solder bumps used between the die and package, or 2) lead-based die adhesive used between the die and leadframe. The component is otherwise considered Pb-Free (RoHS compatible) as defined above.

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)

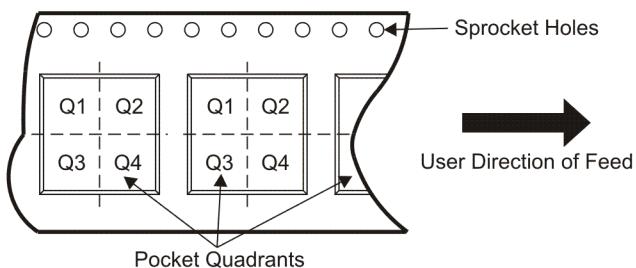
⁽³⁾ MSL, Peak Temp. -- The Moisture Sensitivity Level rating according to the JEDEC industry standard classifications, and peak solder temperature.

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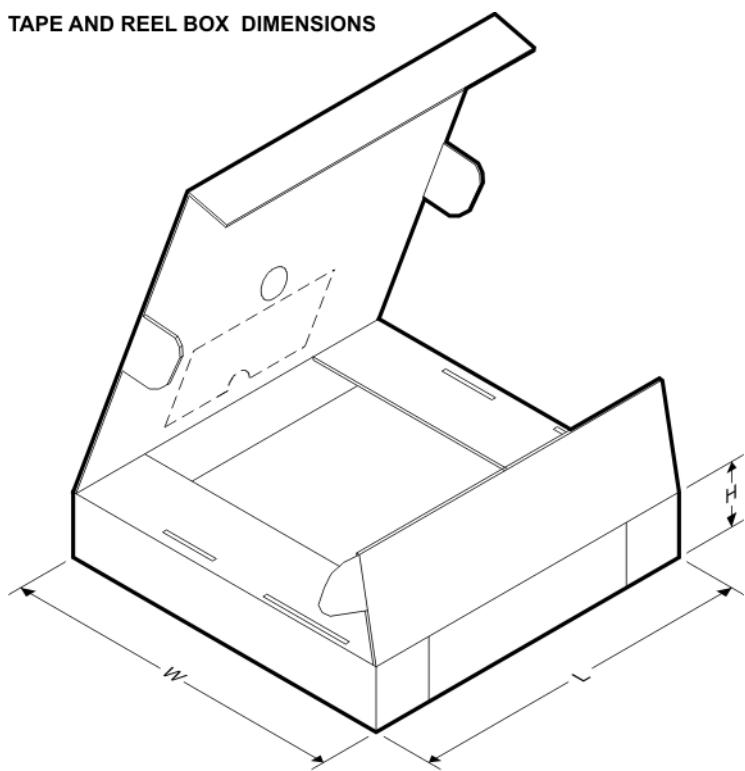
TAPE AND REEL INFORMATION
REEL DIMENSIONS

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	Package Drawing	Pins	SPQ	Reel Diameter (mm)	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P1 (mm)	W (mm)	Pin1 Quadrant
TL-SCSI285PWR	TSSOP	PW	20	2000	330.0	16.4	6.95	7.1	1.6	8.0	16.0	Q1

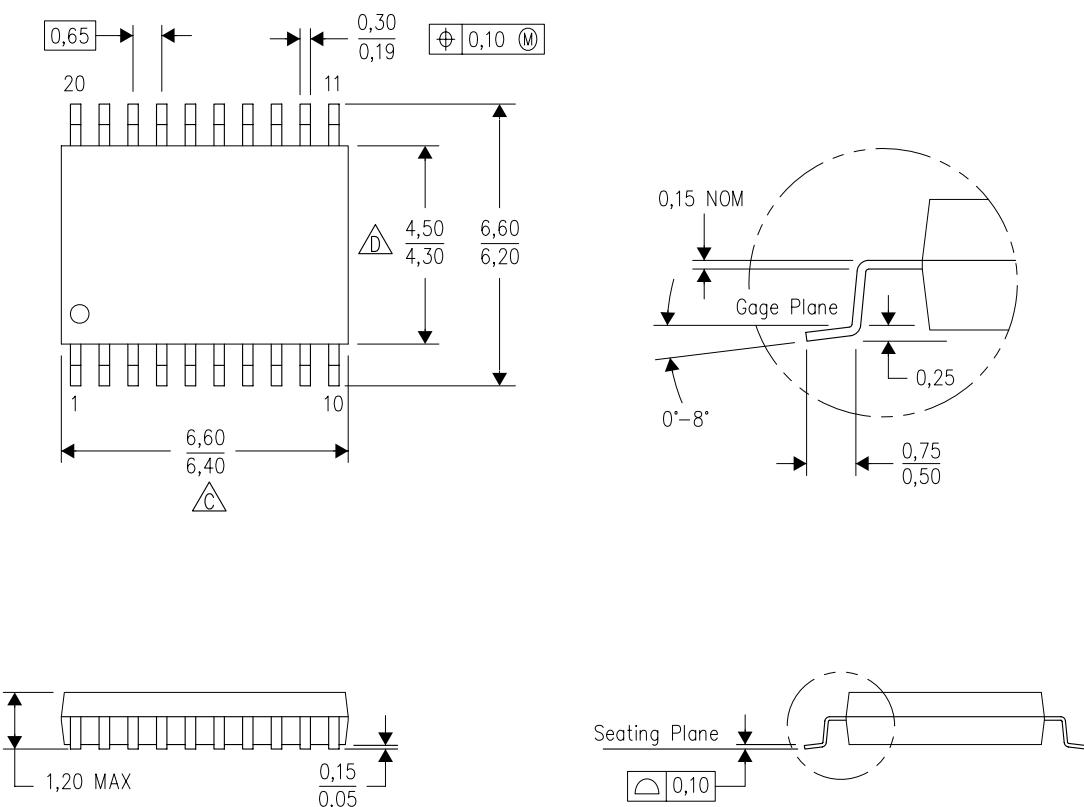
TAPE AND REEL BOX DIMENSIONS

*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Length (mm)	Width (mm)	Height (mm)
TL-SCSI285PWR	TSSOP	PW	20	2000	346.0	346.0	33.0

PW (R-PDSO-G20)

PLASTIC SMALL OUTLINE



NOTES: A. All linear dimensions are in millimeters. Dimensioning and tolerancing per ASME Y14.5M-1994.

B. This drawing is subject to change without notice.

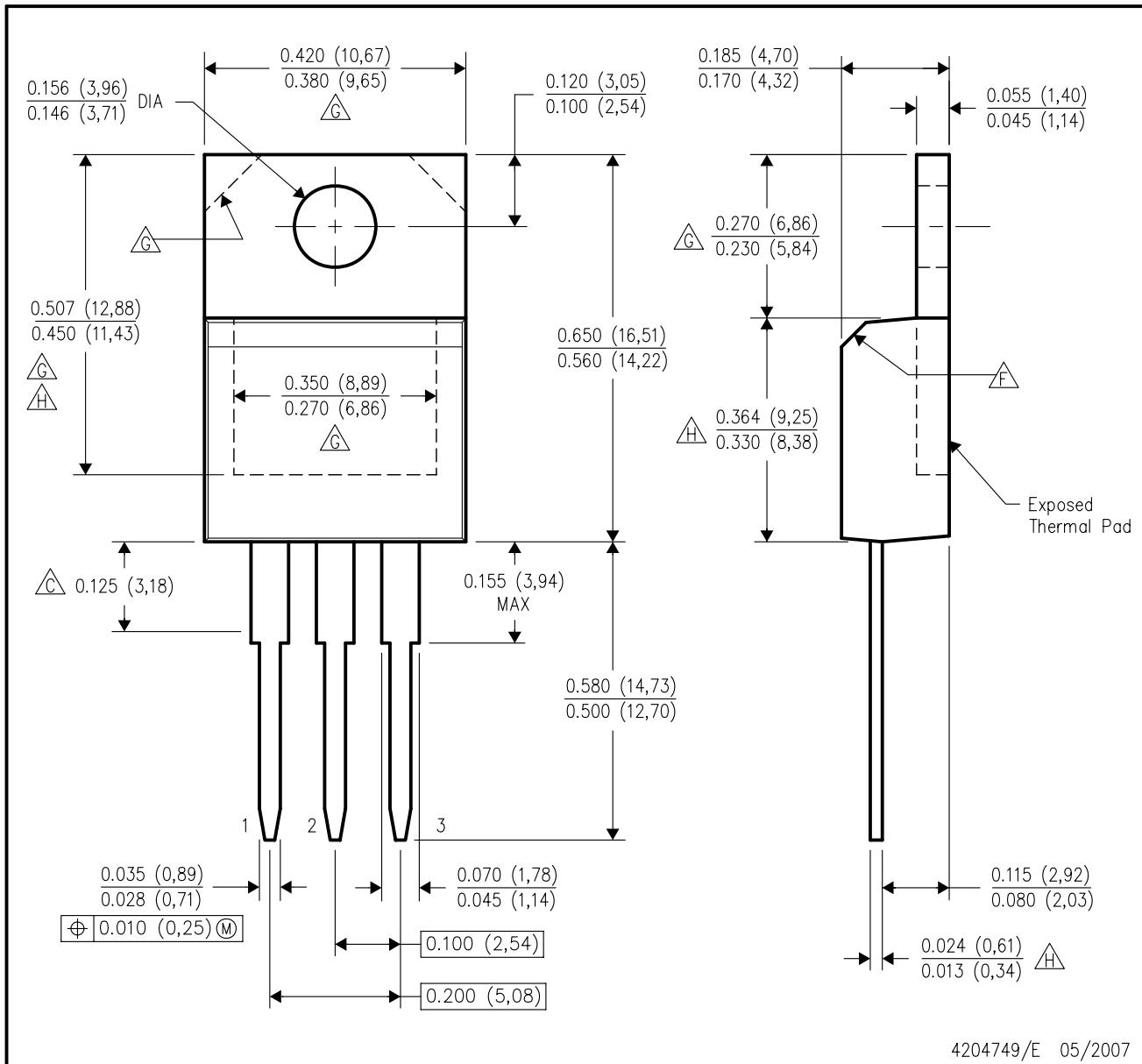
 Body length does not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or gate burrs shall not exceed 0.15 each side.

 Body width does not include interlead flash. Interlead flash shall not exceed 0,25 each side.

E. Falls within JEDDEC MO-153

KCS (R-PSFM-T3)

PLASTIC FLANGE-MOUNT PACKAGE



NOTES: A. All linear dimensions are in inches (millimeters).
B. This drawing is subject to change without notice.

 Lead dimensions are not controlled within this area.

D. All lead dimensions apply before solder dip.

E. The center lead is in electrical contact with

E. The center lead is in electrical contact with the mounting tab.
F. The lead is insulated.

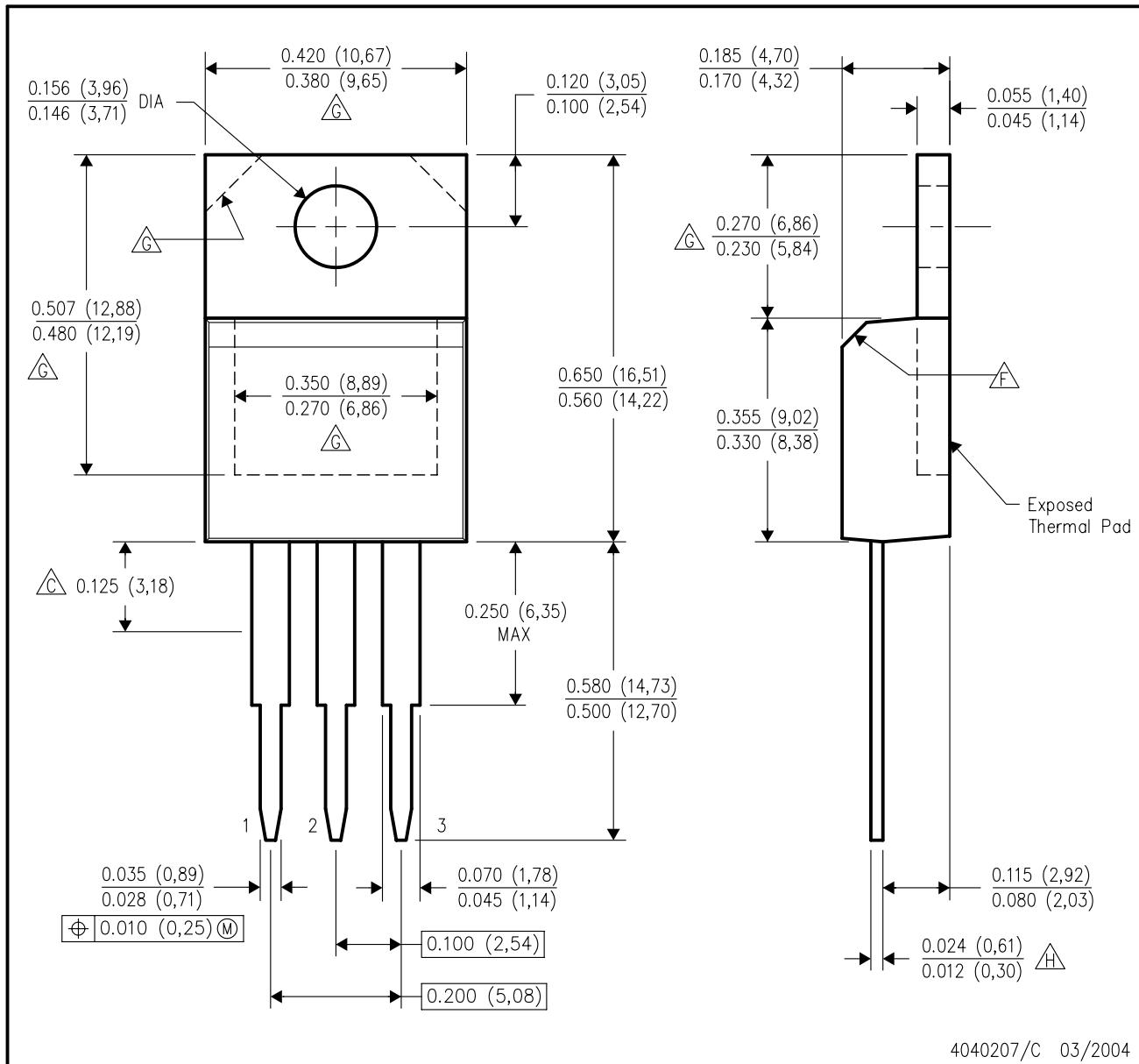
 The chamfer is optional.


 Thermal pad contour optional within these dimensions.

 Falls within JEDEC TO-220 variation AB, except minimum lead thickness, minimum exposed pad length, and maximum body length.

KC (R-PSFM-T3)

PLASTIC FLANGE-MOUNT PACKAGE



NOTES:

- A. All linear dimensions are in inches (millimeters).
- B. This drawing is subject to change without notice.
- C. Lead dimensions are not controlled within this area.
- D. All lead dimensions apply before solder dip.
- E. The center lead is in electrical contact with the mounting tab.
- F. The chamfer is optional.
- G. Thermal pad contour optional within these dimensions.
- H. Falls within JEDEC TO-220 variation AB, except minimum lead thickness.

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