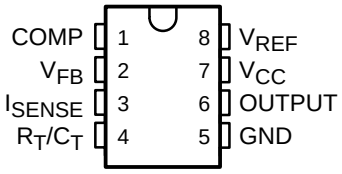
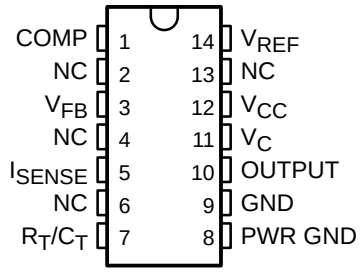
- **Extended Temperature Performance of –40°C to 125°C**
- **Optimized for Off-line and DC to DC Converters**
- **Low Start Up Current (<0.5 mA)**
- **Trimmed Oscillator Discharge Current**
- **Automatic Feed Forward Compensation**
- **Pulse-by-Pulse Current Limiting**
- **Enhanced Load Response Characteristics**
- **Under-Voltage Lockout With Hysteresis**
- **Double Pulse Suppression**
- **High Current Totem Pole Output**
- **Internally Trimmed Bandgap Reference**
- **500 kHz Operation**
- **Low R_O Error Amp**

D 8-PIN PACKAGE
(TOP VIEW)



D 14-PIN PACKAGE
(TOP VIEW)



description

The UC2842A/3A/4A/5A family of control ICs is a pin for pin compatible improved version of the UC2842/3/4/5 family. Providing the necessary features to control current mode switched mode power supplies, this family has the following improved features. Start up current is guaranteed to be less than 0.5 mA. Oscillator discharge is trimmed to 8.3 mA. During under voltage lockout, the output stage can sink at least 10 mA at less than 1.2 V for V_{CC} over 5 V.

The difference between members of this family are shown in the table below.

PART NUMBER	UVLO ON	UVLO OFF	MAXIMUM DUTY CYCLE
UC2842A	16 V	10 V	<100%
UC2843A	8.5 V	7.9 V	<100%
UC2844A	16 V	10 V	<50%
UC2845A	8.5 V	7.9 V	<50%



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.

PRODUCTION DATA information is current as of publication date. Products conform to specifications per the terms of Texas Instruments standard warranty. Production processing does not necessarily include testing of all parameters.

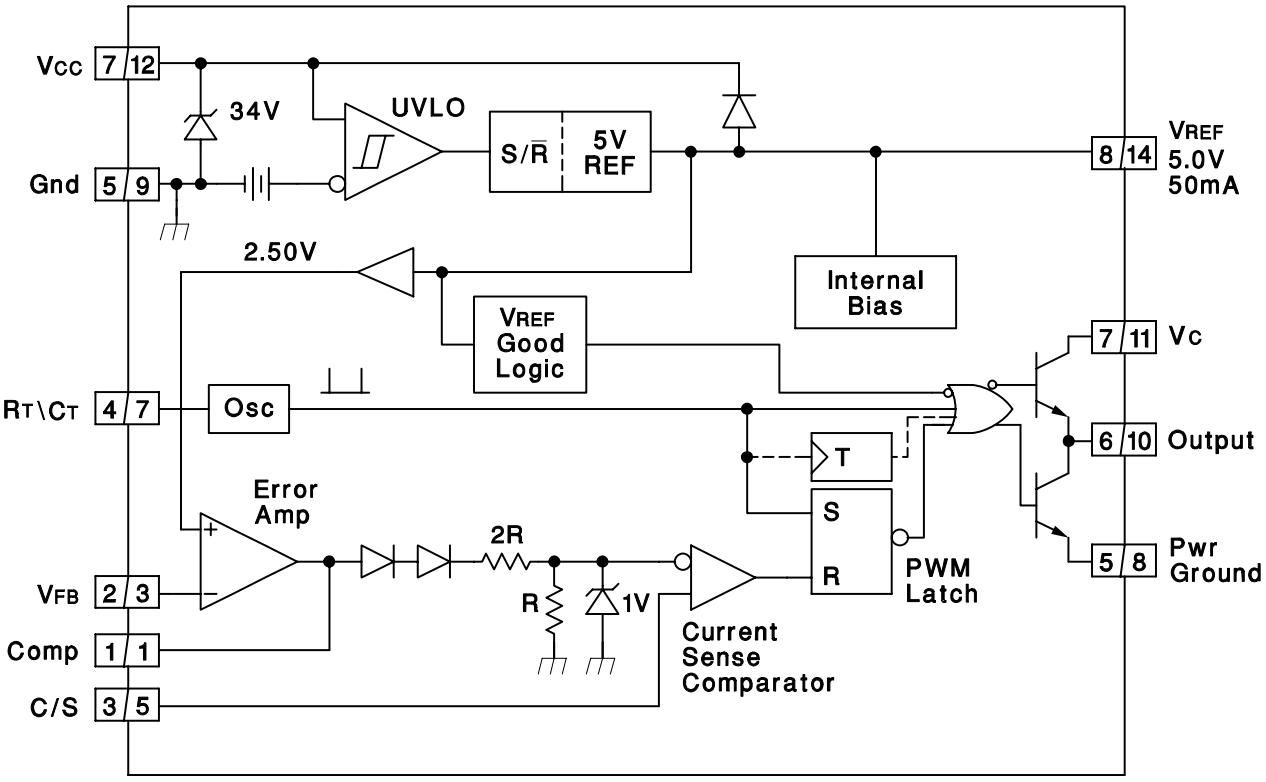
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ORDERING INFORMATION†

T_A	PACKAGE‡		ORDERABLE PART NUMBER	TOP-SIDE MARKING
–40°C to 125°C	SOIC-8 – D8	Tape and reel	UC2842AQD8R	2842AQ
	SOIC-8 – D8	Tube	UC2842AQD8	2842AQ
	SOIC-14 – D	Tape and reel	UC2842AQDR	2842AQ
	SOIC-14 – D	Tube	UC2842AQD	2842AQ
	SOIC-8 – D8	Tape and reel	UC2843AQD8R	2843AQ
	SOIC-8 – D8	Tube	UC2843AQD8	2843AQ
	SOIC-14 – D	Tape and reel	UC2843AQDR	2843AQ
	SOIC-14 – D	Tube	UC2843AQD	2843AQ
	SOIC-8 – D8	Tape and reel	UC2844AQD8R	2844AQ
	SOIC-8 – D8	Tube	UC2844AQD8	2844AQ
	SOIC-14 – D	Tape and reel	UC2844AQDR	2844AQ
	SOIC-14 – D	Tube	UC2844AQD	2844AQ
	SOIC-8 – D8	Tape and reel	UC2845AQD8R	2845AQ
	SOIC-8 – D8	Tube	UC2845AQD8	2845AQ
	SOIC-14 – D	Tape and reel	UC2845AQDR	2845AQ
	SOIC-14 – D	Tube	UC2845AQD	2845AQ

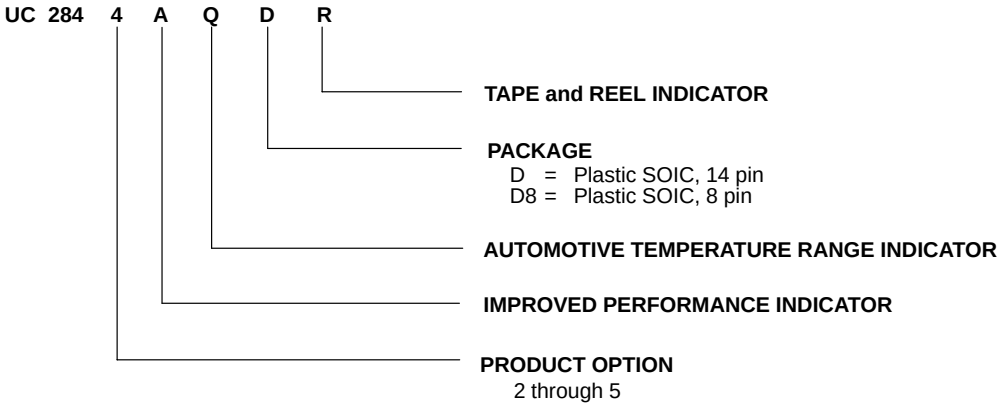
† Package drawings, standard packing quantities, thermal data, symbolization, and PCB design guidelines are available at www.ti.com/sc/package.

block diagram



NOTES: 1. A = DIL-8 Pin Number. B = SO-14 Pin Number.
2. Toggle flip flop used only in 2844A and 2845A.

Ordering Information



absolute maximum ratings over operating free-air temperature range (unless otherwise noted)†‡

V_{CC} voltage (low impedance source) . . . . . 30 V
V_{CC} voltage (I_{CC} mA) . . . . . self limiting
Output current, I_O . . . . . ±1 A
Output energy (capacitive load) . . . . . 5 μJ
Analog Inputs (pins 3, 5) . . . . . –0.3 V to 6.3 V
Error Amp Output Sink current . . . . . 10 mA
Power Dissipation at T_A < +25°C (D package) . . . . . 1 W
Package thermal impedance, θ_{JA} (see Note 1): D (8-pin) package . . . . . 97°C/W
Storage temperature range, T_{stg} . . . . . –65°C to 150°C
Lead temperature soldering 1,6 mm (1/16 inch) from case for 10 seconds . . . . . 260°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.

‡ Unless otherwise indicated, voltages are reference to ground and currents are positive into and negative out of the specified terminals.

NOTE 1: Long term high–temperature storage and/or extended use at maximum recommended operating conditions may result in a reduction of overall device life. See http://www.ti.com/ep_quality for additional information on enhanced plastic packaging.

electrical characteristics, T_A = –40°C to 125°C, V_{CC} = 15 V (see Note 1), R_T = 10 kΩ, C_T = 3.3 nF, and $T_A = T_J$ (unless otherwise stated)

PARAMETER	TEST CONDITIONS		MIN	TYP	MAX	UNITS
Reference Section						
Output voltage	T_J = 25°C, I_O = 1 mA		4.95	5.0	5.05	V
Line regulation voltage	V_{IN} = 12 V to 25 V			6	20	mV
Load regulation voltage	I_O = 1 mA to 20 mA			6	25	mV
Temperature stability	See Notes 2 and 3			0.2	0.4	mV/°C
Total output variation voltage	Line, Load, Temp.		4.9		5.1	V
Output noise voltage	f = 10 Hz to 10 kHz, See Note 2	T_J = 25°C		50		μV
Long term stability	1000 hours, See Note 2	T_A = 125°C		5	25	mV
Output short-circuit current			–30	–100	–180	mA
Oscillator Section						
Initial accuracy	See Note 4	T_J = 25°C	47	52	57	kHz
Voltage stability	V_{CC} = 12 V to 25 V			0.2	1	%
Temperature stability	T_A = MIN to MAX, See Note 2			5		%
Amplitude peak-to-peak	V pin 7, See Note 2			1.7		V
Discharge current	V pin 7 = 2 V, See Note 5	T_J = 25°C	7.8	8.3	8.8	mA
		T_J = Full range	7.5		8.8	

electrical characteristics, T_A = –40°C to 125°C, V_{CC} = 15 V (see Note 1), R_T = 10 kΩ, C_T = 3.3 nF, and $T_A = T_J$ (unless otherwise stated)

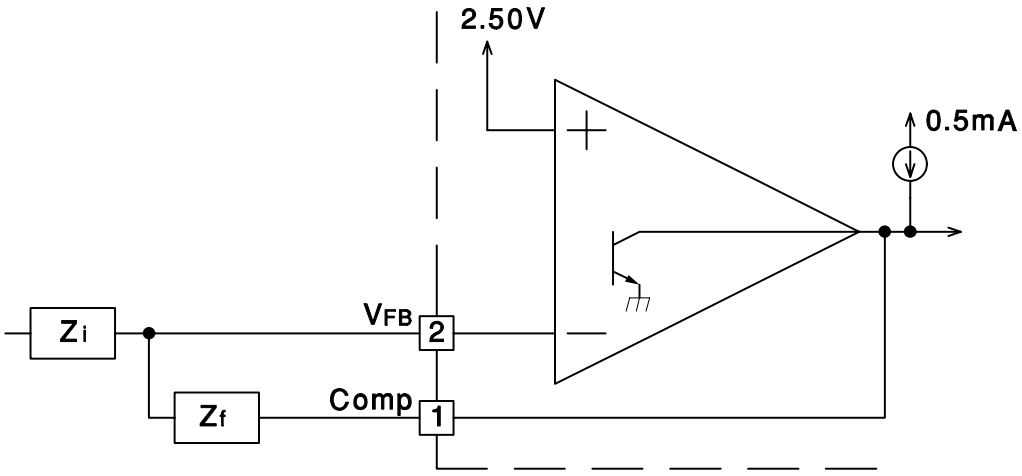
PARAMETER	TEST CONDITIONS		MIN	TYP	MAX	UNITS
Error Amplifier Section						
Input voltage	COMP = 2.5 V		2.45	2.5	2.55	V
Input bias current				–0.3	–1	μA
Open loop voltage gain (A_{VOL})	V_O = 2 V to 4 V		65	90		dB
Unity gain bandwidth	See Note 2	T_J = 25°C	0.7	1		MHz
PSRR	V_{CC} = 12 V to 25 V		60	70		dB
Output sink current	FB = 2.7 V, COMP = 1.1 V		2	6		mA
Output source current	FB = 2.3 V, COMP = 5 V		–0.5	–0.8		mA
V_{OUT} high	FB = 2.3 V, R_L = 15 kΩ to GND		5	6		V
V_{OUT} low	FB = 2.7 V, R_L = 15 kΩ to V_{REF}			0.7	1.1	V
Current Sense Section						
Gain	See Notes 6 and 7		2.85	3	3.15	V/V
Maximum input signal	COMP = 5 V, See Note 6		0.9	1	1.1	V
PSRR	V_{CC} = 12 V to 25 V, See Note 6			70		dB
Input bias current				–2	–10	μA
Delay to output	I_{SENSE} = 0 V to 2 V, See Note 2			150	300	ns
Output Section (OUT)						
Low-level output voltage	I_{OUT} = 20 mA			0.1	0.4	V
	I_{OUT} = 200 mA			15	2.2	
High-level output voltage	I_{OUT} = –20 mA		13	13.5		V
	I_{OUT} = –200 mA		12	13.5		
Rise time	C_L = 1 nF, See Note 2	T_J = 25°C		50	150	ns
Fall time	C_L = 1 nF, See Note 2	T_J = 25°C		50	150	ns
UVLO saturation	V_{CC} = 5 V, I_{OUT} = 10 mA			0.7	1.2	V
Undervoltage Lockout Section						
Start threshold		UC2842A, UC2844A	15	16	17	V
		UC2843A, UC2845A	7.8	8.4	9	
Minimum operation voltage after turn on		UC2842A, UC2844A	9	10	11	V
		UC2843A, UC2845A	7	7.6	8.2	

electrical characteristics, T_A = –40°C to 125°C, V_{CC} = 15 V (see Note 1), R_T = 10 kΩ, C_T = 3.3 nF, and $T_A = T_J$ (unless otherwise stated)

PARAMETER	TEST CONDITIONS		MIN	TYP	MAX	UNITS
PWM Section						
Maximum duty cycle		UC2842A, UC2843A	94	96	100	%
		UC2844A, UC2845A	47	48	50	
Minimum duty cycle					0	%
Total Standby Current						
Start-up current				0.3	0.5	mA
Operating supply current	FB = 0 V, SENSE = 0 V			11	17	mA
V_{CC} internal zener voltage	I_{CC} = 25 mA		30	34		V

NOTES: 1. Adjust V_{CC} above the start threshold before setting at 15 V.
2. Not production tested.
3. Temperature stability, sometimes referred to as average temperature coefficient, is described by the equation:
$$\text{Temp Stability} = \frac{V_{REF}\,(\max) - V_{REF}\,(\min)}{T_J\,(\max) - T_J\,(\min)}$$
V_{REF} (max) and V_{REF} (min) are the maximum and minimum reference voltage measured over the appropriate temperature range. Note that the extremes in voltage do not necessarily occur at the extremes in temperature.
4. Output frequency equals oscillator frequency for the UC2842A and UC2843A. Output frequency is one half oscillator frequency for the UC2844A and UC2845A.
5. This parameter is measured with R_T = 10 kΩ to V_{REF}. This contributes approximately 300 μA of current to the measurement. The total current flowing into the $R_{T/C}$ pin will be approximately 300 μA higher than the measured value.
6. Parameter measured at trip point of latch with V_{FB} at 0 V.
7. Gain is defined by: $$A = \frac{\Delta V_{COMP}}{\Delta V_{SENSE}};\ 0 \le V_{SENSE} \le 0.8\ V.$$

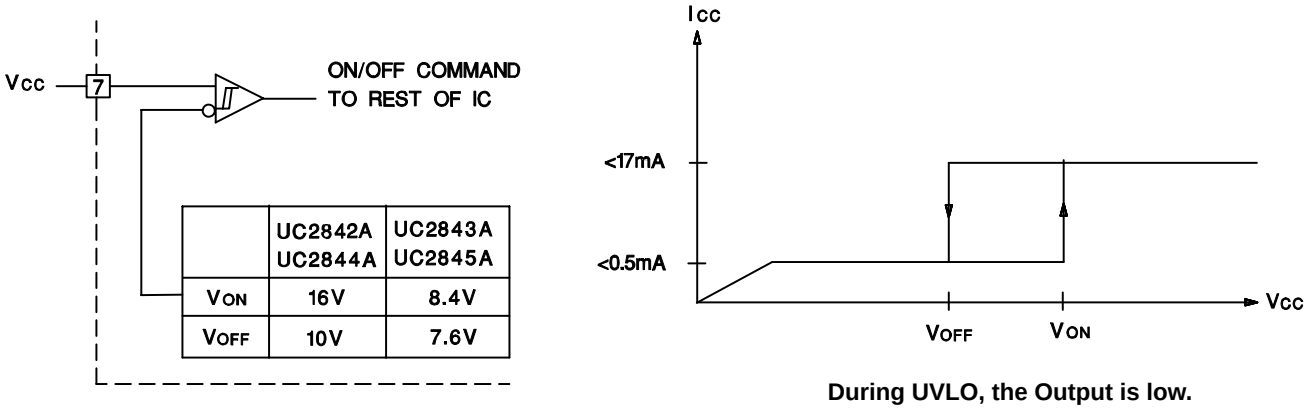
PARAMETER MEASUREMENT INFORMATION



Error Amp can source and sink up to 0.5 mA, and sink up to 2 mA.

Figure 1. Error Amp Configuration

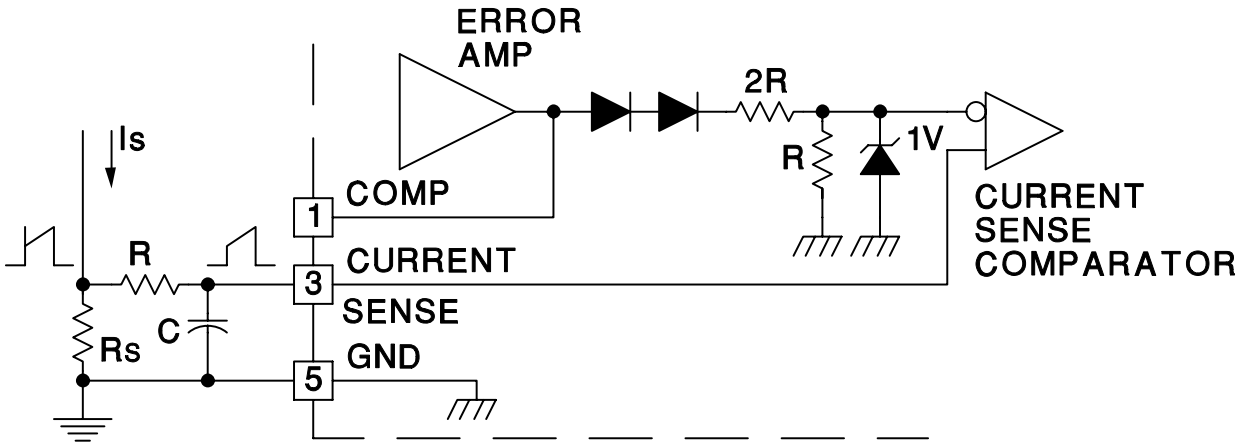
PARAMETER MEASUREMENT INFORMATION



	UC2842A UC2844A	UC2843A UC2845A
VON	16V	8.4V
VOFF	10V	7.6V

During UVLO, the Output is low.

Figure 2. Under Voltage Lockout



Peak Current (Is) is Determined By The Formula:

$$Ismax' \frac{1.0V}{RS}$$

A small RC filter may be required to supress switch transients.

Figure 3. Current Sense Circuit

PARAMETER MEASUREMENT INFORMATION

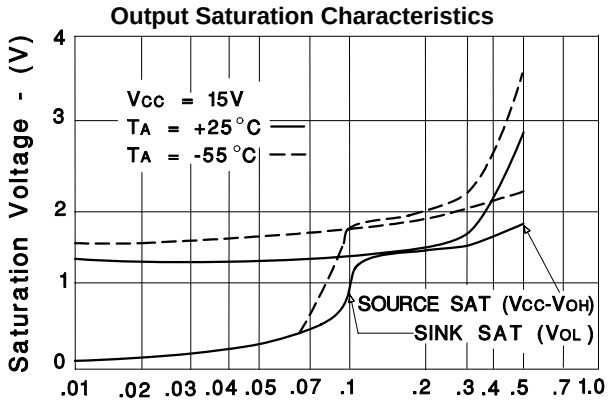


Figure 4

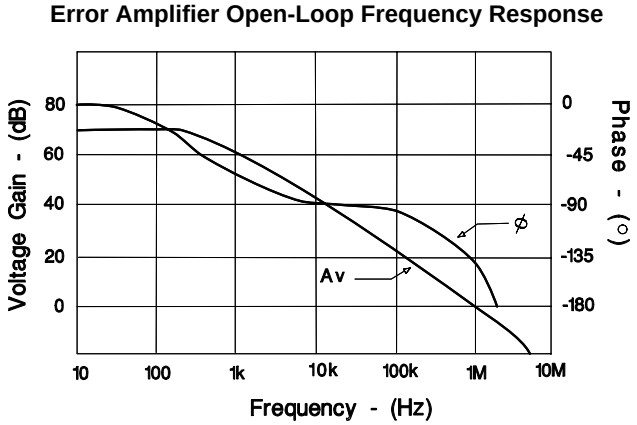
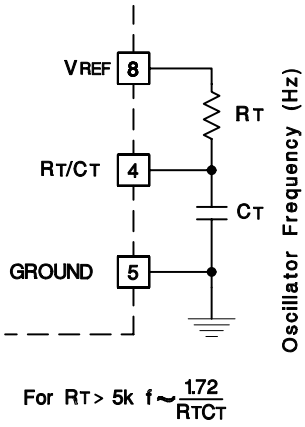
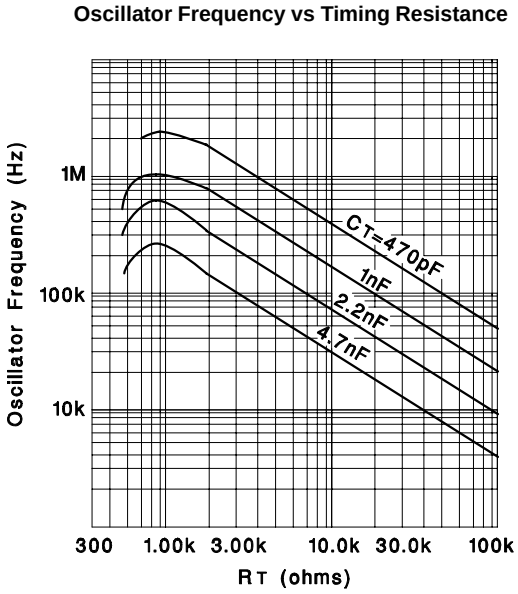


Figure 5

APPLICATION INFORMATION





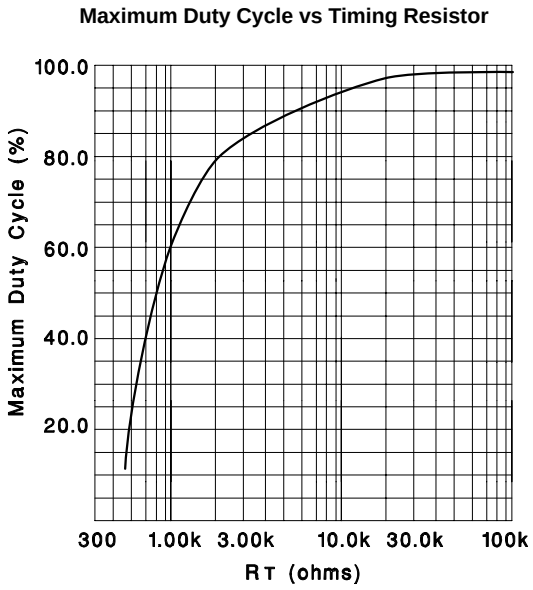
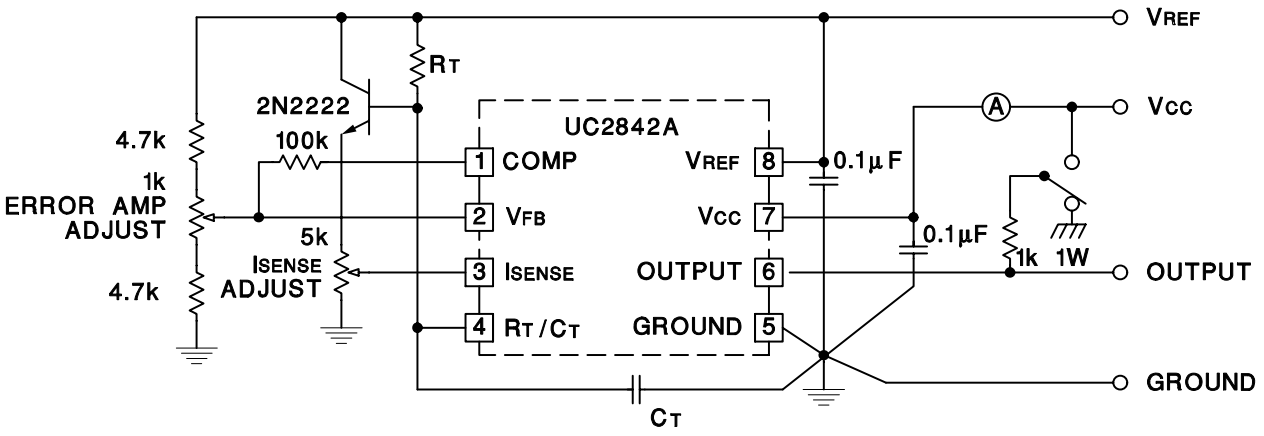


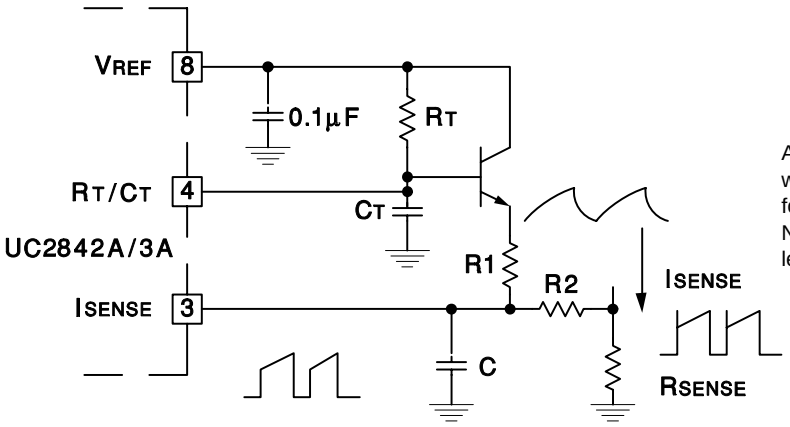
Figure 6. Oscillator

APPLICATION INFORMATION



High peak currents associated with capacitive loads necessitate careful grounding techniques. Timing and bypass capacitors should be connected close to pin 5 in a single point ground. The transistor and 5k potentiometer are used to sample the oscillator waveform and apply an adjustable ramp to pin 3.

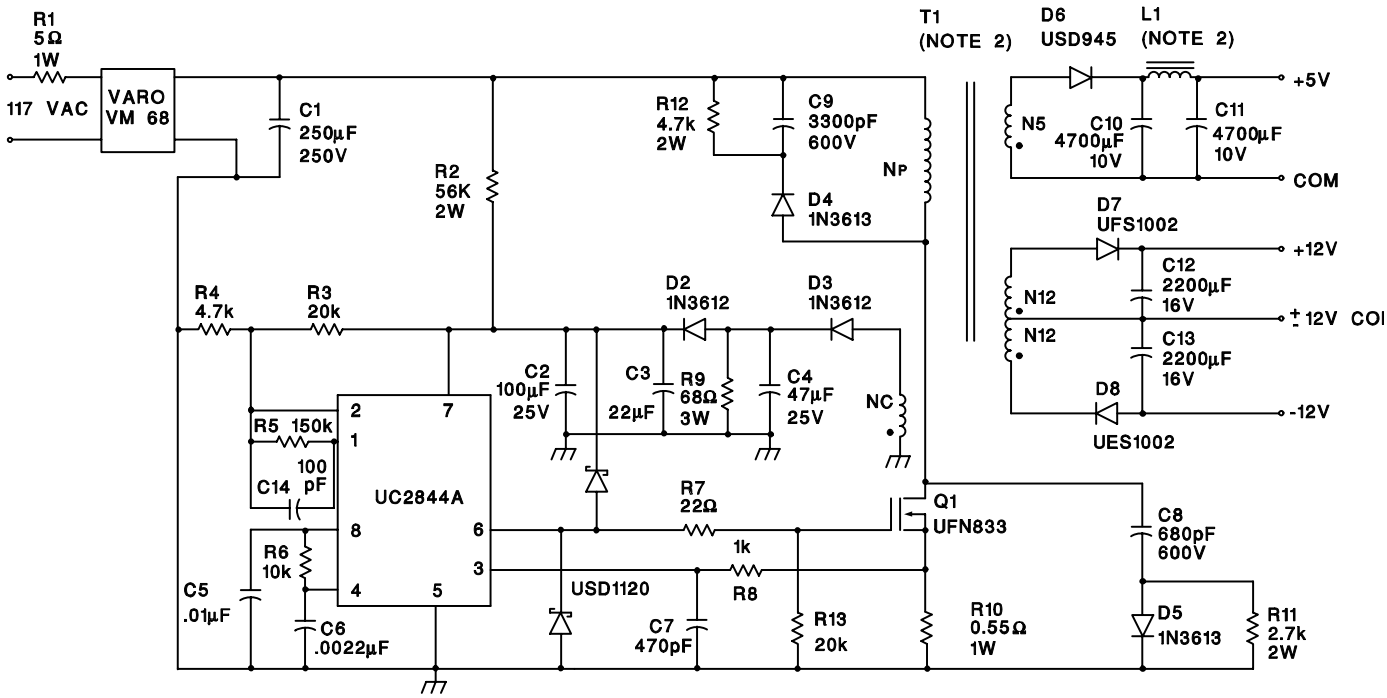
Figure 7. Open-Loop Laboratory Text Fixture



A fraction of the oscillator ramp can be resistively summed with the current sense signal to provide slope compensation for converters requiring duty cycles over 50%.
Note that capacitor, C, forms a filter with R2 to suppress the leading edge switch spikes.

Figure 8. Slope ComplressIon

APPLICATION INFORMATION



Power Supply Specifications

1. Input Voltage 95VAC to 130VAC (50Hz/60Hz)
2. Line Isolation 3750V
3. Switching Frequency 40 kHz
4. Efficiency, Full Load 70%
5. Output Voltage:
   A. +5V, ±5%; 1A to 4A Load
   B. +12V, ±3%; 0.1A to 0.3A Load Ripple voltage: 100 mV P-P Max
   C. –12V, ±3%; 0.1A to 0.3A Load Ripple voltage: 100 mV P-P Max

Figure 9. Off-Line Flyback Regulator

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)
UC2842AQD	ACTIVE	SOIC	D	14		TBD	Call TI	Call TI	
UC2842AQD8	ACTIVE	SOIC	D	8	75	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	
UC2842AQD8R	ACTIVE	SOIC	D	8	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	
UC2842AQDR	ACTIVE	SOIC	D	14	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	
UC2843AQD	ACTIVE	SOIC	D	14	50	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	
UC2843AQD8	ACTIVE	SOIC	D	8	75	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	
UC2843AQD8G4	ACTIVE	SOIC	D	8	75	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	
UC2843AQD8R	ACTIVE	SOIC	D	8	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	
UC2843AQD8RG4	ACTIVE	SOIC	D	8	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	
UC2843AQDR	ACTIVE	SOIC	D	14	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	
UC2845AQD	ACTIVE	SOIC	D	14	50	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	
UC2845AQD8	ACTIVE	SOIC	D	8	75	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	
UC2845AQD8R	ACTIVE	SOIC	D	8	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	
UC2845AQDR	ACTIVE	SOIC	D	14	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	

(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.

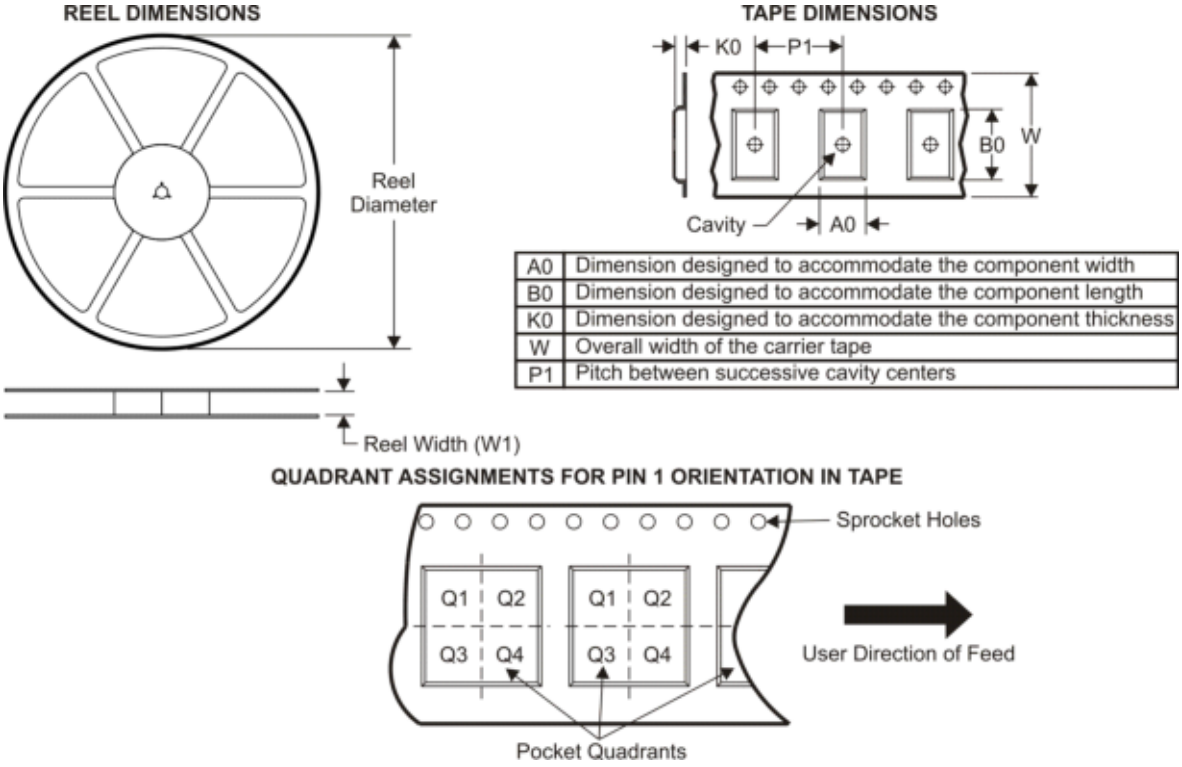
(2) Eco Plan - The planned eco-friendly classification: Pb-Free (RoHS), Pb-Free (RoHS Exempt), or Green (RoHS & no Sb/Br) - please check http://www.ti.com/productcontent for the latest availability information and additional product content details.
TBD: The Pb-Free/Green conversion plan has not been 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

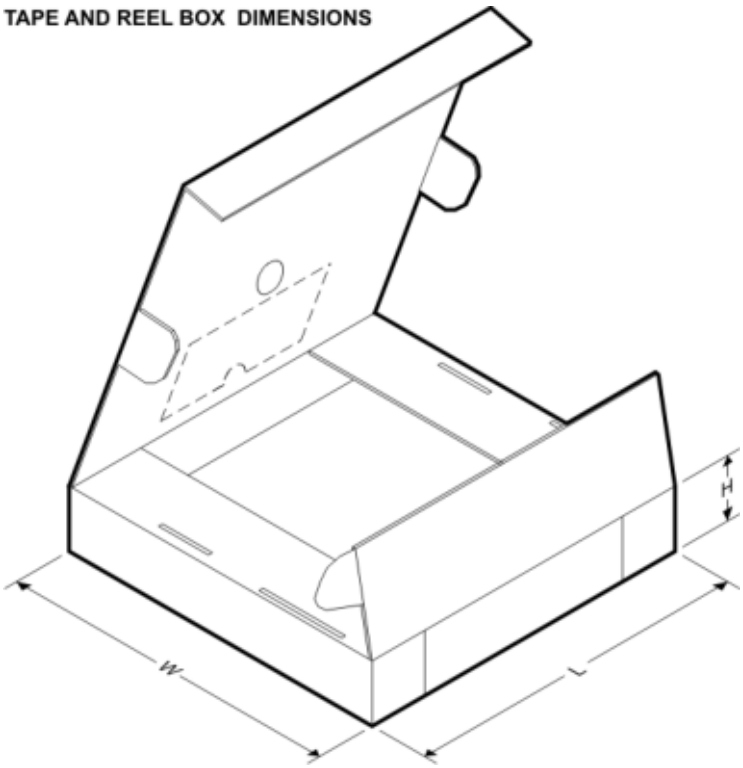


A0	Dimension designed to accommodate the component width
B0	Dimension designed to accommodate the component length
K0	Dimension designed to accommodate the component thickness
W	Overall width of the carrier tape
P1	Pitch between successive cavity centers

*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
UC2842AQD8R	SOIC	D	8	2500	330.0	12.4	6.4	5.2	2.1	4.0	12.0	Q1
UC2843AQD8R	SOIC	D	8	2500	330.0	12.4	6.4	5.2	2.1	4.0	12.0	Q1
UC2845AQD8R	SOIC	D	8	2500	330.0	12.4	6.4	5.2	2.1	4.0	12.0	Q1

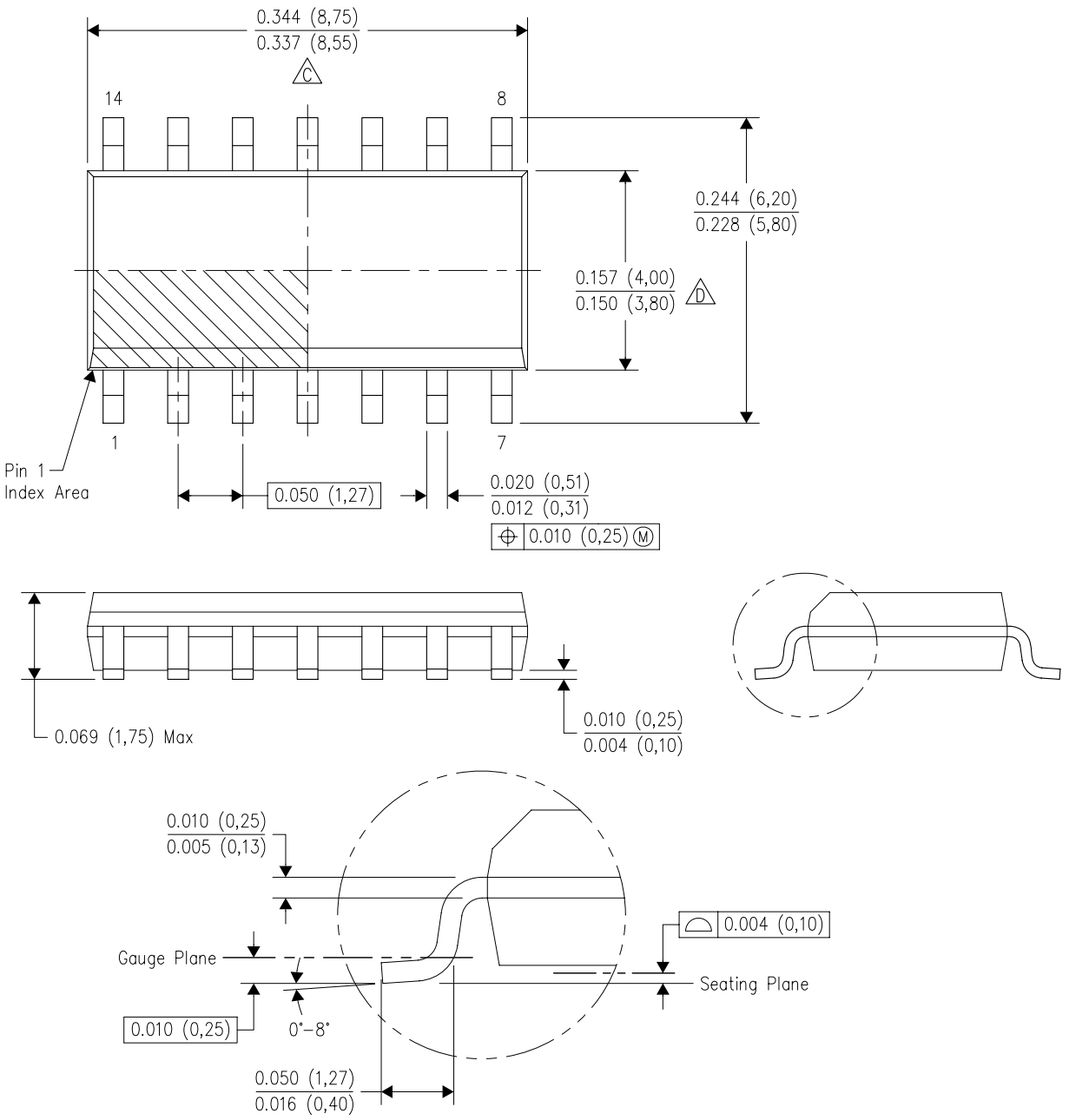
TAPE AND REEL BOX DIMENSIONS



*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Length (mm)	Width (mm)	Height (mm)
UC2842AQD8R	SOIC	D	8	2500	367.0	367.0	35.0
UC2843AQD8R	SOIC	D	8	2500	367.0	367.0	35.0
UC2845AQD8R	SOIC	D	8	2500	367.0	367.0	35.0

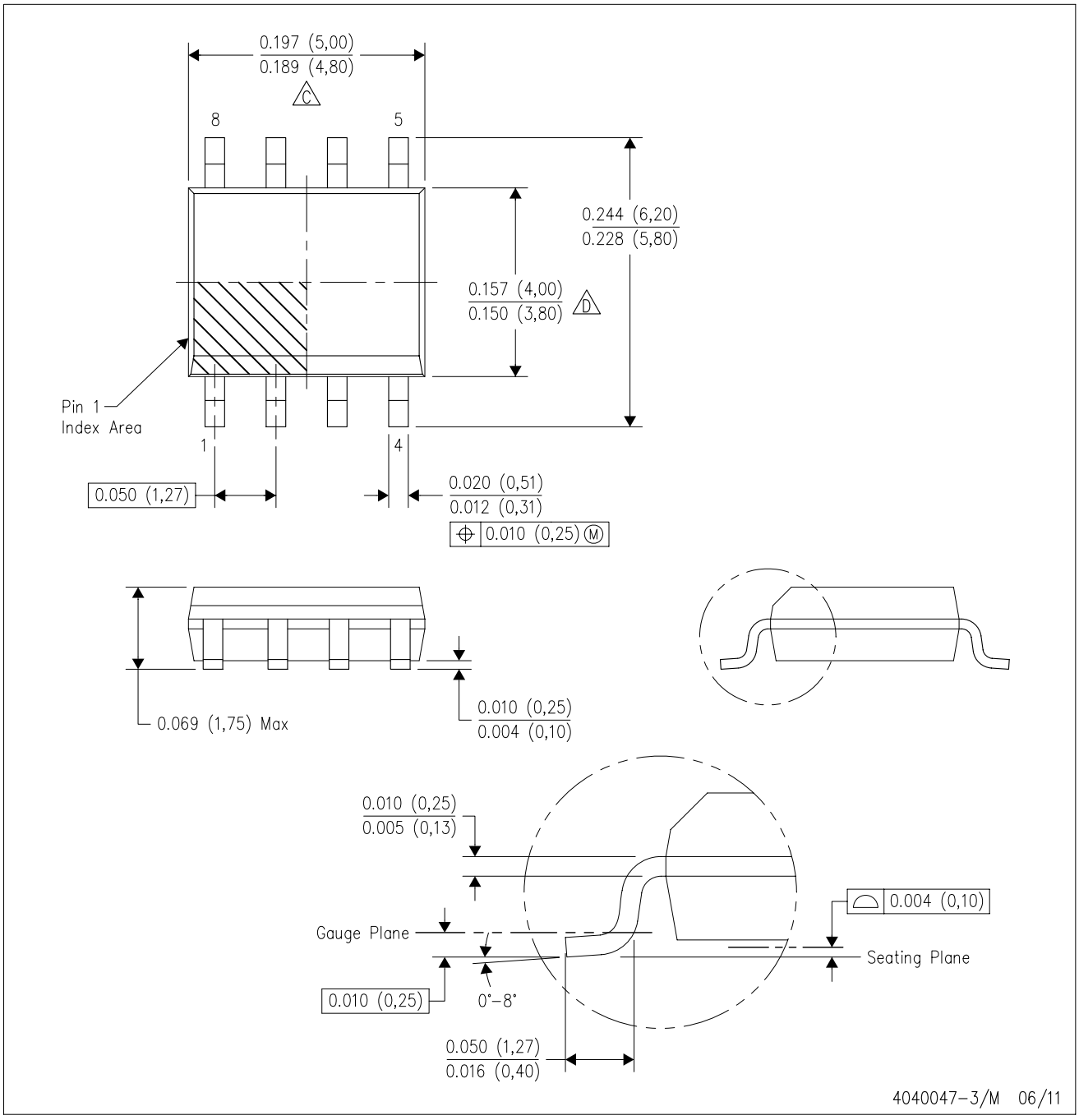
D (R–PDSO–G14) PLASTIC SMALL OUTLINE



4040047–5/M 06/11

NOTES:
A. All linear dimensions are in inches (millimeters).
B. This drawing is subject to change without notice.
C. Body length does not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or gate burrs shall not exceed 0.006 (0,15) each side.
D. Body width does not include interlead flash. Interlead flash shall not exceed 0.017 (0,43) each side.
E. Reference JEDEC MS–012 variation AB.

D (R–PDSO–G8) PLASTIC SMALL OUTLINE



NOTES:
A. All linear dimensions are in inches (millimeters).
B. This drawing is subject to change without notice.
C. Body length does not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or gate burrs shall not exceed 0.006 (0,15) each side.
D. Body width does not include interlead flash. Interlead flash shall not exceed 0.017 (0,43) each side.
E. Reference JEDEC MS–012 variation AA.

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