Unitrode Products from Texas Instruments

application INFO available

UCC2813-0/-1/-2/-3/-4/-5
UCC3813-0/-1/-2/-3/-4/-5

Low Power Economy BiCMOS Current Mode PWM

FEATURES

- 100µA Typical Starting Supply Current
- 500µA Typical Operating Supply Current
- Operation to 1MHz
- Internal Soft Start
- Internal Fault Soft Start
- Internal Leading-Edge Blanking of the Current Sense Signal
- 1 Amp Totem-Pole Output
- 70ns Typical Response from Current-Sense to Gate Drive Output
- 1.5% Tolerance Voltage Reference
- Same Pinout as UCC3802, UC3842, and UC3842A

DESCRIPTION

The UCC3813-0/-1/-2/-3/-4/-5 family of high-speed, low-power integrated circuits contain all of the control and drive components required for off-line and DC-to-DC fixed frequency current-mode switching power supplies with minimal parts count.

These devices have the same pin configuration as the UC3842/3/4/5 family, and also offer the added features of internal full-cycle soft start and internal leading-edge blanking of the current-sense input.

The UCC3813-0/-1/-2/-3/-4/-5 family offers a variety of package options, temperature range options, choice of maximum duty cycle, and choice of critical voltage levels. Lower reference parts such as the UCC3813-3 and UCC3813-5 fit best into battery operated systems, while the higher reference and the higher UVLO hysteresis of the UCC3813-2 and UCC3813-4 make these ideal choices for use in off-line power supplies.

The UCC2813-x series is specified for operation from –40°C to +85°C and the UCC3813-x series is specified for operation from 0°C to +70°C.

ORDERING INFORMATION

Part Number	Maximum Duty Cycle	Reference Voltage	Turn-On Threshold	Turn-Off Threshold
UCCx813-0	100%	5V	7.2V	6.9V
UCCx813-1	50%	5V	9.4V	7.4V
UCCx813-2	100%	5V	12.5V	8.3V

UCC2813-0/-1/-2/-3/-4/-5
UCC3813-0/-1/-2/-3/-4/-5

ABSOLUTE MAXIMUM RATINGS (Note 1)

VCC Voltage (Note 2) 12.0V
VCC Current 30.0mA
OUT Current . . . . ±1.0A
OUT Energy (Capacitive Load) 20.0µJ
Analog Inputs (FB, CS) . . . . −0.3V to 6.3V
Power Dissipation at T_A < +25°C (N Package) 1.0W
Power Dissipation at T_A < +25°C (D Package) 0.65W
Storage Temperature . . . . −65°C to +150°C
Junction Temperature . . . . −55°C to +150°C
Lead Temperature (Soldering, 10 Seconds) . . . . +300°C

Note 1: All voltages are with respect to GND. All currents are positive into the specified terminal. Consult Unitrode Integrated Circuits databook for information regarding thermal specifications and limitations of packages.

Note 2: In normal operation VCC is powered through a current limiting resistor. Absolute maximum of 12V applies when VCC is driven from a low impedance source such that ICC does not exceed 30mA. The resistor should be sized so that the VCC voltage under operating conditions is below 12V but above the turn off threshold.
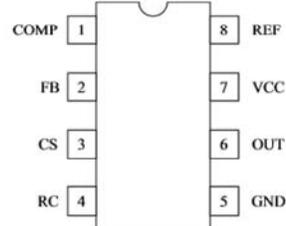
	TEMPERATURE RANGE	PACKAGES
UCC2813	−40°C TO +85°C	N, D, PW
UCC3813	0°C TO +70°C	N, D, PW

ORDERING INFORMATION

UCC ☐ 813 ☐ – ☐

PRODUCT OPTION

CONNECTION DIAGRAMS

DIL-8 or SOIC-8 (TOP VIEW)
N or D PACKAGE

COMP	1		8	REF
FB	2		7	VCC
CS	3		6	OUT
RC	4		5	GND

TSSOP-8 (TOP VIEW)
PW PACKAGE

	1	COMP	REF	8	
	2	FB	VCC	7	
	3	CS	OUT	6	
	4	RC	GND	5	

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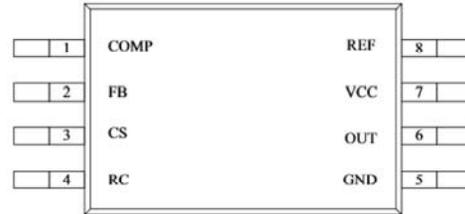
UCC2813-0/-1/-2/-3/-4/-5
UCC3813-0/-1/-2/-3/-4/-5

ELECTRICAL CHARACTERISTICS Unless otherwise stated, these specifications apply for $-40°C \leq T_A \leq +85°C$ for UCC2813-x; $0°C \leq T_A \leq +70°C$ for UCC3813-x; VCC = 10V (Note 3); RT = 100k from REF to RC; CT=330pF from RC to GND; 0.1μF capacitor from VCC to GND; 0.1μF capacitor from VREF to GND. $T_A = T_J$.

PARAMETER	TEST CONDITIONS	UCC2813-x UCC3813-x			UNITS
		MIN	TYP	MAX	
Error Amplifier Section					
Input Voltage	COMP = 2.5V; UCCx813-0/-1/-2/-4	2.42	2.50	2.56	V
	COMP = 2.0V; UCCx813-3/-5	1.92	2.0	2.05	V
Input Bias Current		−2		2	μA
Open Loop Voltage Gain		60	80		dB
COMP Sink Current	FB = 2.7V, COMP = 1.1V	0.4		2.5	mA
COMP Source Current	FB = 1.8V, COMP = REF − 1.2V	−0.2	−0.5	−0.8	mA
Gain Bandwidth Product	(Note 9)		2		MHz
PWM Section					
Maximum Duty Cycle	UCCx813-0/-2/-3	97	99	100	%
	UCCx813-1/-4/-5	48	49	50	%
Minimum Duty Cycle	COMP = 0V			0	%
Current Sense Section					
Gain	(Note 5)	1.10	1.65	1.80	V/V
Maximum Input Signal	COMP = 5V (Note 6)	0.9	1.0	1.1	V
Input Bias Current		−200		200	nA
CS Blank Time		50	100	150	ns
Over-Current Threshold		1.32	1.55	1.70	V

ELECTRICAL CHARACTERISTICS Unless otherwise stated, these specifications apply for –40°C ≤ T$_A$ ≤ +85°C for UCC2813-x; 0°C ≤ T$_A$ ≤ +70°C for UCC3813-x; VCC = 10V (Note 3); RT = 100k from REF to RC; CT=330pF from RC to GND; 0.1μF capacitor from VCC to GND; 0.1μF capacitor from VREF to GND. T$_A$ = T$_J$.

PARAMETER	TEST CONDITIONS	UCC2813-x UCC3813-x			UNITS
		MIN	TYP	MAX	
Soft Start Section					
COMP Rise Time	FB = 1.8V, Rise from 0.5V to REF–1V		4		ms
Overall Section					
Start-up Current	VCC < Start Threshold		0.1	0.23	mA
Operating Supply Current	FB = 0V, CS = 0V, RC = 0V		0.5	1.2	mA
VCC Internal Zener Voltage	ICC = 10mA (Note 8)	12	13.5	15	V
VCC Internal Zener Voltage Minus Start Threshold Voltage	UCCx813-2/-4	0.5	1.0		V

Note 3: Adjust VCC above the start threshold before setting at 10V.
Note 4: Oscillator frequency for the UCCx813-0, UCCx813-2 and UCCx813-3 is the output frequency.
Oscillator frequency for the UCCx813-1, UCCx813-4 and UCCx813-5 is twice the output frequency.
Note 5: Gain is defined by: $A = \dfrac{\Delta V_{COMP}}{\Delta V_{CS}}$ $0 \le V_{CS} \le 0.8V.$

Note 6: Parameter measured at trip point of latch with Pin 2 at 0V.
Note 7: Total Variation includes temperature stability and load regulation.
Note 8: Start Threshold, Stop Threshold and Zener Shunt Thresholds track one another.
Note 9: Ensured by design. Not 100% tested in production.

PIN DESCRIPTIONS (cont.)

The frequency of oscillation can be estimated with the following equations:

UCCx813-0/-1/-2/-4: $F = \dfrac{1.5}{R \cdot C}$

UCCx813-3, UCCx813-5: $F = \dfrac{1.0}{R \cdot C}$

where frequency is in Hz, resistance is in Ω, and capacitance is in farads. The recommended range of timing resistors is between 10k and 200k and timing capacitor is 100pF to 1000pF. Never use a timing resistor less than 10k.

GND: GND is reference ground and power ground for all functions on this part.

OUT: OUT is the output of a high-current power driver capable of driving the gate of a power MOSFET with peak currents exceeding ±750mA. OUT is actively held low when VCC is below the UVLO threshold.

The high-current power driver consists of FET output devices, which can switch all of the way to GND and all of the way to VCC. The output stage also provides a very low impedance to overshoot and undershoot. This means that in many cases, external schottky clamp diodes are not required.

low, total supply current will be higher, depending on OUT current. Total VCC current is the sum of quiescent VCC current and the average OUT current. Knowing the operating frequency and the MOSFET gate charge (Qg), average OUT current can be calculated from:

$$I_{OUT} = Q_g \cdot F.$$

To prevent noise problems, bypass VCC to GND with a 0.1 µF ceramic capacitor in parallel as close to the VCC pin as possible. An electrolytic capacitor may also be used in addition to the ceramic capacitor.

REF: REF is the voltage reference for the error amplifier and also for many other functions on the IC. REF is also used as the logic power supply for high speed switching logic on the IC.

When VCC is greater than 1V and less than the UVLO threshold, REF is pulled to ground through a 5kΩ resistor. This means that REF can be used as a logic output indicating power system status. It is important for reference stability that REF is bypassed to GND with a ceramic capacitor as close to the pin as possible. An electrolytic capacitor may also be used in addition to the ceramic capacitor. A minimum of 0.1µF ceramic is required. Additional REF bypassing is required for external loads greater than 2.5mA on the reference.
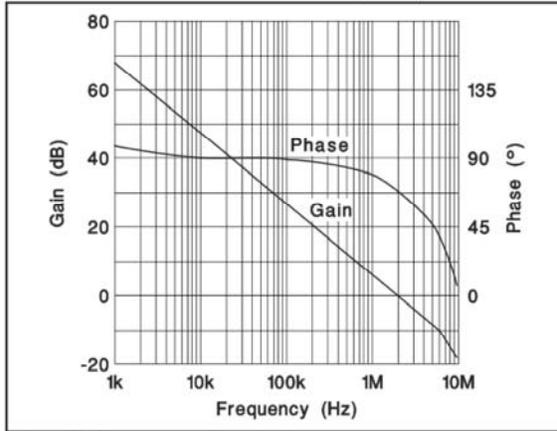
APPLICATION INFORMATION (cont.)

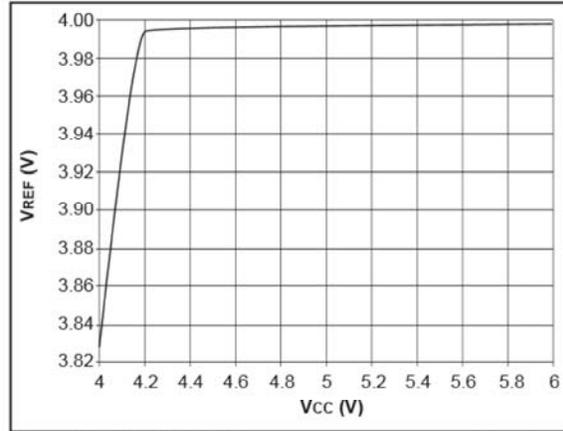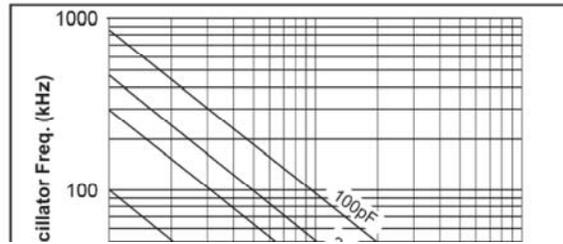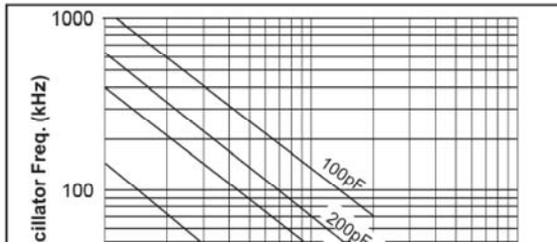Figure 2. Error amplifier gain/phase response.

Figure 5. UCC3813-3/-5 V_{REF} vs. V_{CC}; $I_{LOAD} = 0.5mA$.

UCC2813-0/-1/-2/-3/-4/-5
UCC3813-0/-1/-2/-3/-4/-5

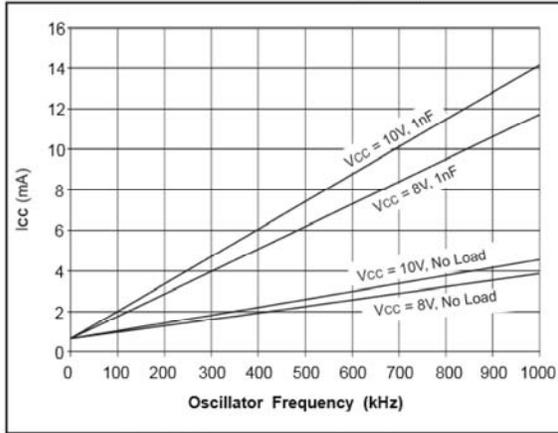## APPLICATION INFORMATION (cont.)
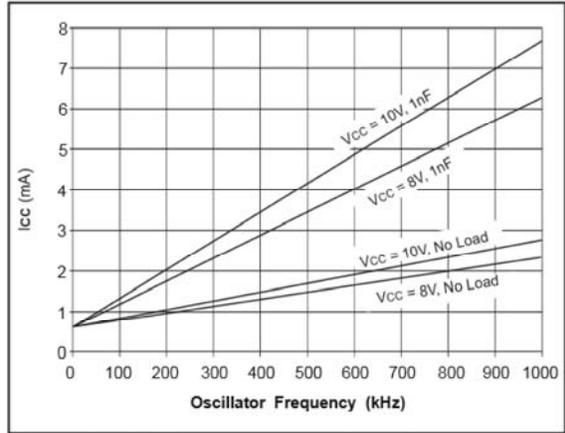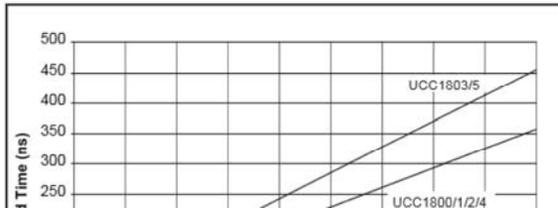

Figure 8. UCC3813-0 I_{CC} vs. oscillator frequency.

Figure 10. UCC3813-5 I_{CC} vs. oscillator frequency.

PACKAGE OPTION ADDENDUM

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PACKAGING INFORMATION

Orderable Device	Status [1]	Package Type	Package Drawing	Pins	Package Qty	Eco Plan [2]	Lead/Ball Finish	MSL Peak Temp [3]
UCC2813D-0	ACTIVE	SOIC	D	8	75	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
UCC2813D-0G4	ACTIVE	SOIC	D	8	75	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
UCC2813D-1	ACTIVE	SOIC	D	8	75	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
UCC2813D-1G4	ACTIVE	SOIC	D	8	75	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
UCC2813D-2	ACTIVE	SOIC	D	8	75	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
UCC2813D-2G4	ACTIVE	SOIC	D	8	75	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
UCC2813D-3	ACTIVE	SOIC	D	8	75	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
UCC2813D-3G4	ACTIVE	SOIC	D	8	75	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
UCC2813D-4	ACTIVE	SOIC	D	8	75	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
UCC2813D-4G4	ACTIVE	SOIC	D	8	75	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
UCC2813D-5	ACTIVE	SOIC	D	8	75	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
UCC2813D-5G4	ACTIVE	SOIC	D	8	75	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
UCC2813DTR-0	ACTIVE	SOIC	D	8	2500	Green (RoHS &	CU NIPDAU	Level-1-260C-UNLIM

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Orderable Device	Status [1]	Package Type	Package Drawing	Pins	Package Qty	Eco Plan [2]	Lead/Ball Finish	MSL Peak Temp [3]
UCC2813N-0G4	ACTIVE	PDIP	P	8	50	Green (RoHS & no Sb/Br)	CU NIPDAU	N / A for Pkg Type
UCC2813N-1	ACTIVE	PDIP	P	8	50	Green (RoHS & no Sb/Br)	CU NIPDAU	N / A for Pkg Type
UCC2813N-1G4	ACTIVE	PDIP	P	8	50	Green (RoHS & no Sb/Br)	CU NIPDAU	N / A for Pkg Type
UCC2813N-2	ACTIVE	PDIP	P	8	50	Green (RoHS & no Sb/Br)	CU NIPDAU	N / A for Pkg Type
UCC2813N-2G4	ACTIVE	PDIP	P	8	50	Green (RoHS & no Sb/Br)	CU NIPDAU	N / A for Pkg Type
UCC2813N-3	ACTIVE		UTR			TBD	Call TI	Call TI
UCC2813N-4	ACTIVE	PDIP	P	8	50	Green (RoHS & no Sb/Br)	CU NIPDAU	N / A for Pkg Type
UCC2813N-4G4	ACTIVE	PDIP	P	8	50	Green (RoHS & no Sb/Br)	CU NIPDAU	N / A for Pkg Type
UCC2813N-5	ACTIVE	PDIP	P	8	50	Green (RoHS & no Sb/Br)	CU NIPDAU	N / A for Pkg Type
UCC2813N-5G4	ACTIVE	PDIP	P	8	50	Green (RoHS & no Sb/Br)	CU NIPDAU	N / A for Pkg Type
UCC2813PW-0	ACTIVE	TSSOP	PW	8	150	Green (RoHS & no Sb/Br)	Call TI	Level-2-260C-1 YEAR
UCC2813PW-0G4	ACTIVE	TSSOP	PW	8	150	Green (RoHS & no Sb/Br)	Call TI	Level-2-260C-1 YEAR
UCC2813PW-1	ACTIVE	TSSOP	PW	8	150	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-2-260C-1 YEAR
UCC2813PW-1G4	ACTIVE	TSSOP	PW	8	150	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-2-260C-1 YEAR

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Orderable Device	Status [1]	Package Type	Package Drawing	Pins	Package Qty	Eco Plan [2]	Lead/Ball Finish	MSL Peak Temp [3]
UCC2813PWTR-2	ACTIVE	TSSOP	PW	8	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-2-260C-1 YEAR
UCC2813PWTR-2G4	ACTIVE	TSSOP	PW	8	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-2-260C-1 YEAR
UCC2813PWTR-3	ACTIVE	TSSOP	PW	8	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-2-260C-1 YEAR
UCC2813PWTR-3G4	ACTIVE	TSSOP	PW	8	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-2-260C-1 YEAR
UCC2813PWTR-4	ACTIVE	TSSOP	PW	8	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-2-260C-1 YEAR
UCC2813PWTR-4G4	ACTIVE	TSSOP	PW	8	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-2-260C-1 YEAR
UCC2813PWTR-5	ACTIVE	TSSOP	PW	8	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-2-260C-1 YEAR
UCC2813PWTR-5G4	ACTIVE	TSSOP	PW	8	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-2-260C-1 YEAR
UCC3813D-0	ACTIVE	SOIC	D	8	75	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
UCC3813D-0G4	ACTIVE	SOIC	D	8	75	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
UCC3813D-1	ACTIVE	SOIC	D	8	75	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
UCC3813D-1G4	ACTIVE	SOIC	D	8	75	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
UCC3813D-2	ACTIVE	SOIC	D	8	75	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
UCC3813D-2G4	ACTIVE	SOIC	D	8	75	Green (RoHS &	CU NIPDAU	Level-1-260C-UNLIM

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Orderable Device	Status [1]	Package Type	Package Drawing	Pins	Package Qty	Eco Plan [2]	Lead/Ball Finish	MSL Peak Temp [3]
UCC3813DTR-3	ACTIVE	SOIC	D	8	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
UCC3813DTR-3G4	ACTIVE	SOIC	D	8	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
UCC3813DTR-4	ACTIVE	SOIC	D	8	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
UCC3813DTR-4G4	ACTIVE	SOIC	D	8	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
UCC3813DTR-5	ACTIVE	SOIC	D	8	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
UCC3813DTR-5G4	ACTIVE	SOIC	D	8	2500	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
UCC3813N-0	ACTIVE	PDIP	P	8	50	Green (RoHS & no Sb/Br)	CU NIPDAU	N / A for Pkg Type
UCC3813N-0G4	ACTIVE	PDIP	P	8	50	Green (RoHS & no Sb/Br)	CU NIPDAU	N / A for Pkg Type
UCC3813N-1	ACTIVE	PDIP	P	8	50	Green (RoHS & no Sb/Br)	CU NIPDAU	N / A for Pkg Type
UCC3813N-1G4	ACTIVE	PDIP	P	8	50	Green (RoHS & no Sb/Br)	CU NIPDAU	N / A for Pkg Type
UCC3813N-2	ACTIVE	PDIP	P	8	50	Green (RoHS & no Sb/Br)	CU NIPDAU	N / A for Pkg Type
UCC3813N-2G4	ACTIVE	PDIP	P	8	50	Green (RoHS & no Sb/Br)	CU NIPDAU	N / A for Pkg Type
UCC3813N-3	ACTIVE	PDIP	P	8	50	Green (RoHS & no Sb/Br)	CU NIPDAU	N / A for Pkg Type
UCC3813N-3G4	ACTIVE	PDIP	P	8	50	Green (RoHS &	CU NIPDAU	N / A for Pkg Type

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Orderable Device	Status (1)	Package Type	Package Drawing	Pins	Package Qty	Eco Plan (2)	Lead/Ball Finish	MSL Peak Temp (3)
UCC3813PW-4	ACTIVE	TSSOP	PW	8	150	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-2-260C-1 YEAR
UCC3813PW-4G4	ACTIVE	TSSOP	PW	8	150	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-2-260C-1 YEAR
UCC3813PW-5	ACTIVE	TSSOP	PW	8	150	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-2-260C-1 YEAR
UCC3813PW-5G4	ACTIVE	TSSOP	PW	8	150	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-2-260C-1 YEAR
UCC3813PWTR-0	ACTIVE	TSSOP	PW	8	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-2-260C-1 YEAR
UCC3813PWTR-0G4	ACTIVE	TSSOP	PW	8	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-2-260C-1 YEAR
UCC3813PWTR-1	ACTIVE	TSSOP	PW	8	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-2-260C-1 YEAR
UCC3813PWTR-1G4	ACTIVE	TSSOP	PW	8	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-2-260C-1 YEAR
UCC3813PWTR-2G4	ACTIVE	TSSOP	PW	8		TBD	Call TI	Call TI
UCC3813PWTR-3	ACTIVE	TSSOP	PW	8	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-2-260C-1 YEAR
UCC3813PWTR-3G4	ACTIVE	TSSOP	PW	8	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-2-260C-1 YEAR
UCC3813PWTR-4G4	ACTIVE	TSSOP	PW	8		TBD	Call TI	Call TI
UCC3813PWTR-5	ACTIVE	TSSOP	PW	8	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-2-260C-1 YEAR
UCC3813PWTR-5G4	ACTIVE	TSSOP	PW	8	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-2-260C-1 YEAR

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PACKAGE OPTION ADDENDUM

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information may not be available for release.

In no event shall TI's liability arising out of such information exceed the total purchase price of the TI part(s) at issue in this document sold by TI to Customer on an annual basis.

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PACKAGE MATERIALS INFORMATION

19-Mar-2008

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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
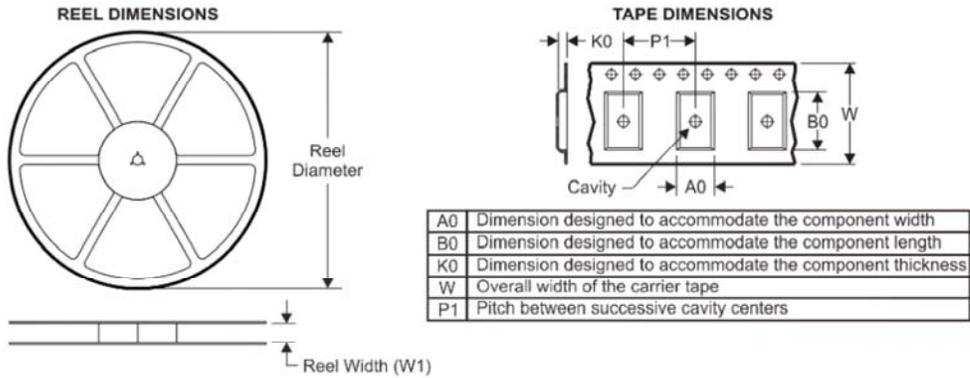
QUADRANT ASSIGNMENTS FOR PIN 1 ORIENTATION IN TAPE

*All dimensions are nominal

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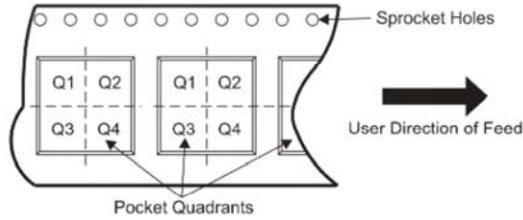
PACKAGE MATERIALS INFORMATION

19-Mar-2008

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
UCC3813PWTR-0	TSSOP	PW	8	2000	330.0	12.4	7.0	3.6	1.6	8.0	12.0	Q1
UCC3813PWTR-1	TSSOP	PW	8	2000	330.0	12.4	7.0	3.6	1.6	8.0	12.0	Q1
UCC3813PWTR-3	TSSOP	PW	8	2000	330.0	12.4	7.0	3.6	1.6	8.0	12.0	Q1
UCC3813PWTR-5	TSSOP	PW	8	2000	330.0	12.4	7.0	3.6	1.6	8.0	12.0	Q1

TAPE AND REEL BOX DIMENSIONS

TEXAS INSTRUMENTS
www.ti.com
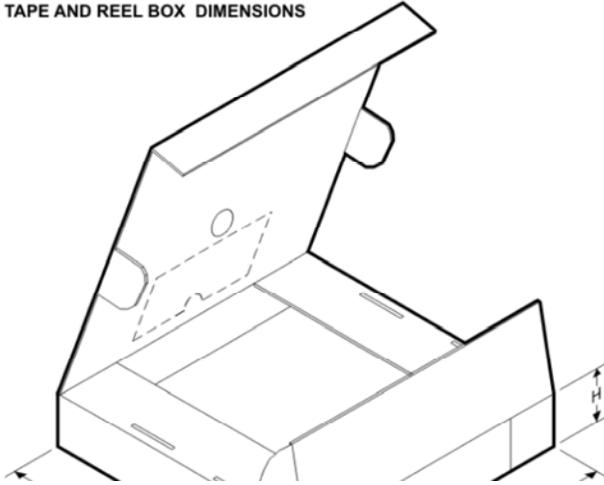
PACKAGE MATERIALS INFORMATION

19-Mar-2008

Device	Package Type	Package Drawing	Pins	SPQ	Length (mm)	Width (mm)	Height (mm)
UCC3813DTR-1	SOIC	D	8	2500	340.5	338.1	20.6
UCC3813DTR-2	SOIC	D	8	2500	340.5	338.1	20.6
UCC3813DTR-3	SOIC	D	8	2500	340.5	338.1	20.6
UCC3813DTR-4	SOIC	D	8	2500	340.5	338.1	20.6
UCC3813DTR-5	SOIC	D	8	2500	340.5	338.1	20.6
UCC3813PWTR-0	TSSOP	PW	8	2000	346.0	346.0	29.0
UCC3813PWTR-1	TSSOP	PW	8	2000	346.0	346.0	29.0
UCC3813PWTR-3	TSSOP	PW	8	2000	346.0	346.0	29.0
UCC3813PWTR-5	TSSOP	PW	8	2000	346.0	346.0	29.0

MECHANICAL DATA

PW (R-PDSO-G)**

PLASTIC SMALL-OUTLINE PACKAGE

14 PINS SHOWN

MECHANICAL DATA

D (R−PDSO−G8)   PLASTIC SMALL−OUTLINE PACKAGE
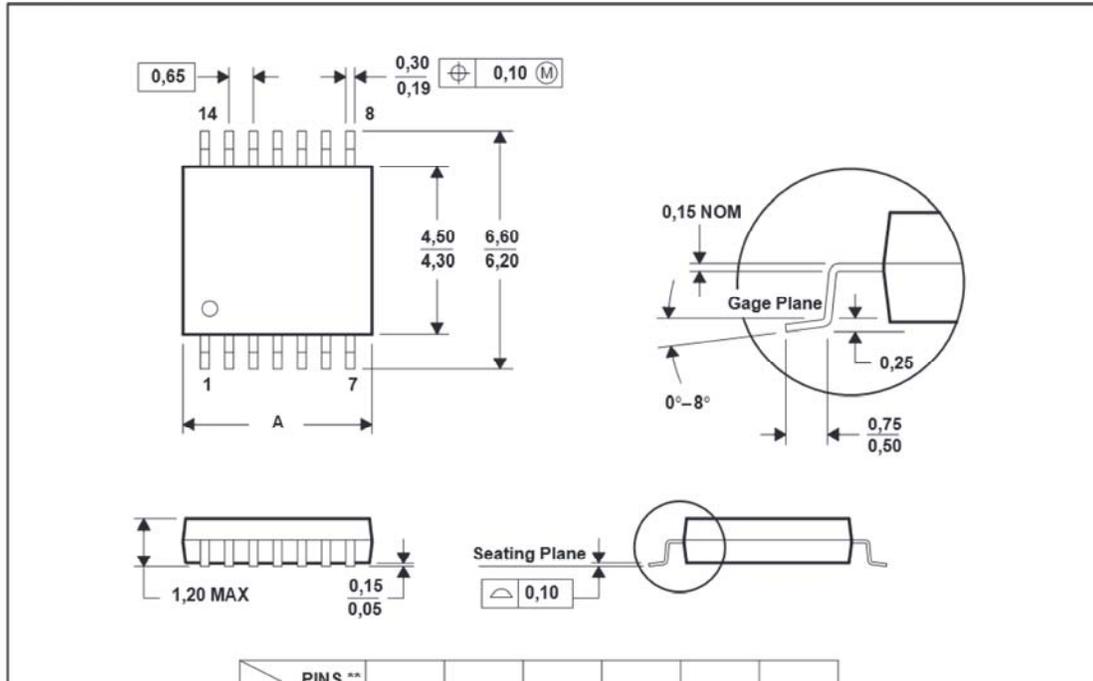
MECHANICAL DATA

P (R-PDIP-T8)   PLASTIC DUAL-IN-LINE