Unitrode Products from Texas Instruments

application INFO available

UC1825
UC2825
UC3825

High Speed PWM Controller

FEATURES

- Compatible with Voltage or Current Mode Topologies
- Practical Operation Switching Frequencies to 1MHz
- 50ns Propagation Delay to Output
- High Current Dual Totem Pole Outputs (1.5A Peak)
- Wide Bandwidth Error Amplifier
- Fully Latched Logic with Double Pulse Suppression
- Pulse-by-Pulse Current Limiting
- Soft Start / Max. Duty Cycle Control
- Under-Voltage Lockout with Hysteresis
- Low Start Up Current (1.1mA)

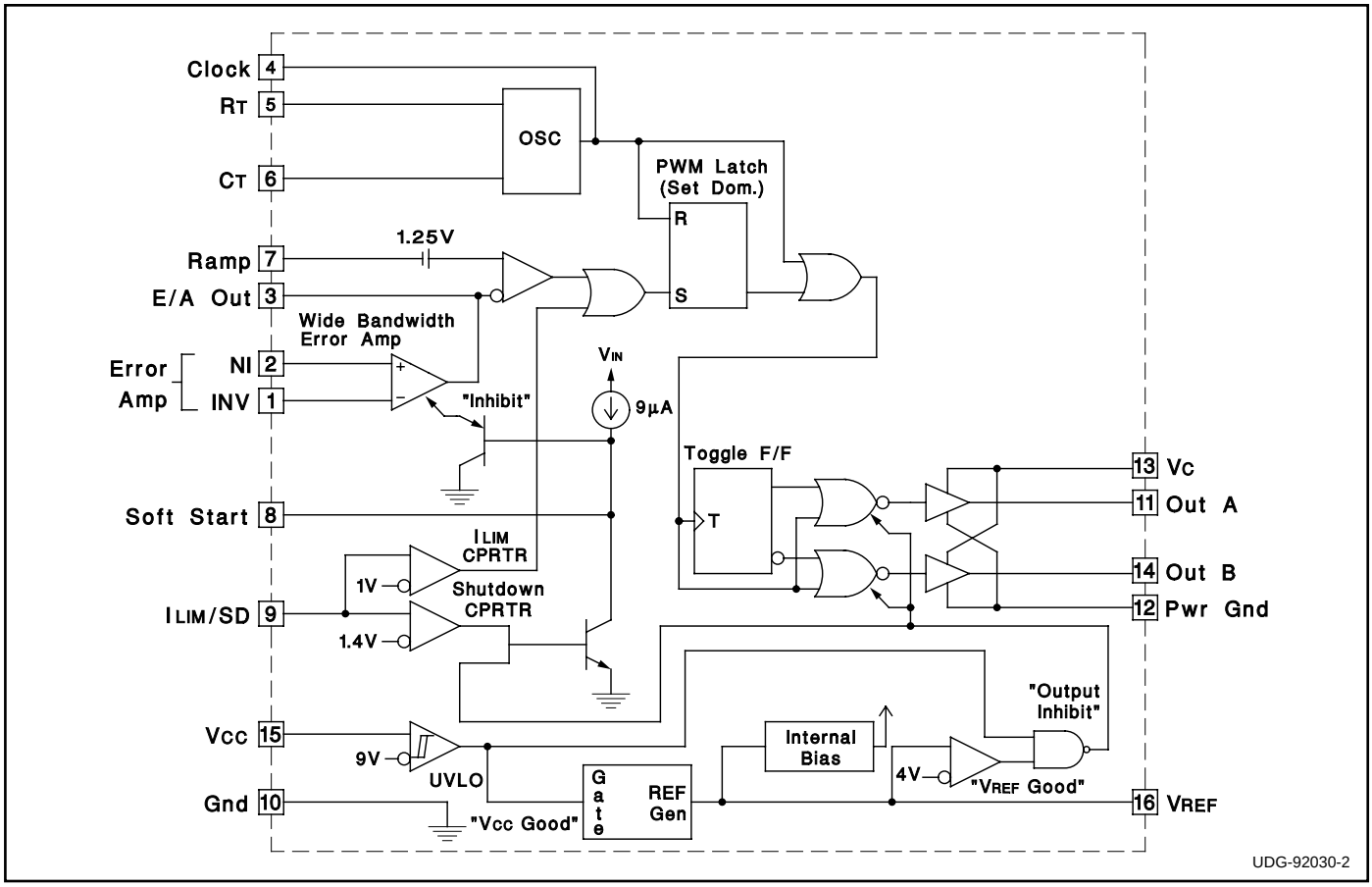
DESCRIPTION

The UC1825 family of PWM control ICs is optimized for high frequency switched mode power supply applications. Particular care was given to minimizing propagation delays through the comparators and logic circuitry while maximizing bandwidth and slew rate of the error amplifier. This controller is designed for use in either current-mode or voltage mode systems with the capability for input voltage feed-forward.

Protection circuitry includes a current limit comparator with a 1V threshold, a TTL compatible shutdown port, and a soft start pin which will double as a maximum duty cycle clamp. The logic is fully latched to provide jitter free operation and prohibit multiple pulses at an output. An under-voltage lockout section with 800mV of hysteresis assures low start up current. During under-voltage lockout, the outputs are high impedance.

These devices feature totem pole outputs designed to source and sink high peak currents from capacitive loads, such as the gate of a power MOSFET. The on state is designed as a high level.

BLOCK DIAGRAM



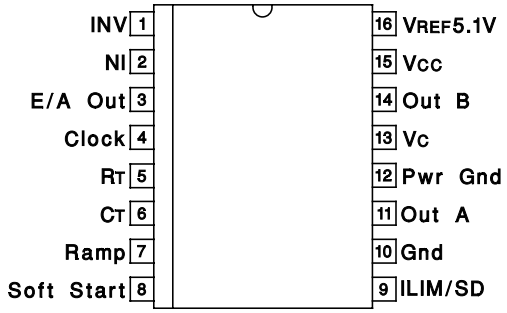
ABSOLUTE MAXIMUM RATINGS (Note 1)

Supply Voltage (Pins 13, 15) 30V
Output Current, Source or Sink (Pins 11, 14)
DC 0.5A
Pulse (0.5 s) 2.0A
Analog Inputs
(Pins 1, 2, 7) . . . . . -0.3V to 7V
(Pin 8, 9) . . . . . -0.3V to 6V
Clock Output Current (Pin 4) . . . . . -5mA
Error Amplifier Output Current (Pin 3) 5mA
Soft Start Sink Current (Pin 8) 20mA
Oscillator Charging Current (Pin 5) . . . . . -5mA
Power Dissipation 1W
Storage Temperature Range . . . . . -65°C to +150°C
Lead Temperature (Soldering, 10 seconds) . . . . . 300°C

Note 1: All voltages are with respect to GND (Pin 10); all currents are positive into, negative out of part; pin numbers refer to DIL-16 package.

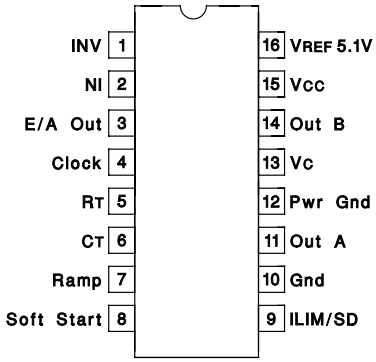
Note 3: Consult Unitrode Integrated Circuit Databook for thermal limitations and considerations of package.

SOIC-16 (Top View)
DW Package

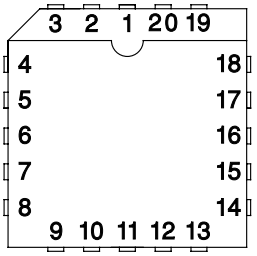


CONNECTION DIAGRAMS

DIL-16 (Top View)
J or N Package



PLCC-20 & LCC-20
(Top View)
Q & L Packages



PACKAGE PIN FUNCTION	
FUNCTION	PIN
N/C	1
INV	2
NI	3
E/A Out	4
Clock	5
N/C	6
RT	7
CT	8
Ramp	9
Soft Start	10
N/C	11
ILIM/SD	12
Gnd	13
Out A	14
Pwr Gnd	15
N/C	16
VC	17
Out B	18
VCC	19
VREF 5.1V	20

THERMAL RATINGS TABLE

Package	Θ_{JA}	Θ_{JC}
DIL-16J	80-120	28(2)
DIL-16N	90(1)	45
PLCC-20	43-75(1)	34
LCC-20	70-80	20(2)
SOIC-16	50-120(1)	35

(1) Specified Θ_{JA} (junction to ambient) is for devices mounted to 5in^2 FR4 PC board with one ounce copper where noted. When resistance range is given, lower values are for 5in^2 aluminum PC board. Test PWB was 0.062in thick and typically used 0.635mm trace widths for power packages and 1.3mm trace widths for non-power packages with 100 x 100 mil probe land area at the end of each trace.

(2) Θ_{JC} data values stated were derived from MIL-STD-1835B. MIL-STD-1835B states that the baseline values shown are worst case (mean +2s) for a 60 x 60mil microcircuit device silicon die and applicable for devices with die sizes up to 14400 square mils. For device die sizes greater than 14400 square mils use the following values; dual-in-line, 11°C/W; flat pack 10°C/W; pin grid array, 10°C/W.

ELECTRICAL CHARACTERISTICS: Unless otherwise stated, these specifications apply for , R_T = 3.65k, C_T = 1nF, V_{CC} = 15V, -55°C<T_A<125°C for the UC1825, –40°C<T_A<85°C for the UC2825, and 0°C<T_A<70°C for the UC3825, T_A=T_O.

PARAMETERS	TEST CONDITIONS	UC1825 UC2825			UC3825			
		MIN	TOP	MAX	MIN	TOP	MAX	UNITS
Reference Section								
Output Voltage	T_O = 25°C, I_O = 1mA	5.05	5.10	5.15	5.00	5.10	5.20	V
Line Regulation	10V < V_{CC} < 30V		2	20		2	20	mV
Load Regulation	1mA < I_O < 10mA		5	20		5	20	mV
Temperature Stability*	T_{MIN} < T_A < T_{MAX}		0.2	0.4		0.2	0.4	mV/°C
Total Output Variation*	Line, Load, Temperature	5.00		5.20	4.95		5.25	V
Output Noise Voltage*	10Hz < f < 10kHz		50			50		µV
Long Term Stability*	T_J = 125°C, 1000hrs.		5	25		5	25	mV
Short Circuit Current	V_{REF} = 0V	-15	-50	-100	-15	-50	-100	mA
Oscillator Section								
Initial Accuracy*	T_J = 2°C	360	400	440	360	400	440	kHz
Voltage Stability*	10V < V_{CC} < 30V		0.2	2		0.2	2	%
Temperature Stability*	T_{MIN} < T_A < T_{MAX}		5			5		%
Total Variation*	Line, Temperature	340		460	340		460	kHz
Oscillator Section (cont.)								
Clock Out High		3.9	4.5		3.9	4.5		V
Clock Out Low			2.3	2.9		2.3	2.9	V
Ramp Peak*		2.6	2.8	3.0	2.6	2.8	3.0	V
Ramp Valley*		0.7	1.0	1.25	0.7	1.0	1.25	V
Ramp Valley to Peak*		1.6	1.8	2.0	1.6	1.8	2.0	V
Error Amplifier Section								
Input Offset Voltage				10			15	mV
Input Bias Current			0.6	3		0.6	3	µA
Input Offset Current			0.1	1		0.1	1	µA
Open Loop Gain	1V < V_O < 4V	60	95		60	95		dB
CMRR	1.5V < V_{CM} < 5.5V	75	95		75	95		dB
PSRR	10V < V_{CC} < 30V	85	110		85	110		dB
Output Sink Current	$V_{PIN\ 3}$ = 1V	1	2.5		1	2.5		mA
Output Source Current	$V_{PIN\ 3}$ = 4V	-0.5	-1.3		-0.5	-1.3		mA
Output High Voltage	$I_{PIN\ 3}$ = -0.5mA	4.0	4.7	5.0	4.0	4.7	5.0	V
Output Low Voltage	$I_{PIN\ 3}$ = 1mA	0	0 .5	1.0	0	0.5	1.0	V
Unity Gain Bandwidth*		3	5.5		3	5.5		MHz
Slew Rate*		6	12		6	12		V/µs

ELECTRICAL CHARACTERISTICS: Unless otherwise stated, these specifications apply for , R_T = 3.65k, C_T = 1nF, V_{CC} = 15V, -55°C<T_A<125°C for the UC1825, –40°C<T_A<85°C for the UC2825, and 0°C<T_A<70°C for the UC3825, T_A=T_J.

PARAMETERS	TEST CONDITIONS	UC1825 UC2825			UC3825			UNITS
		MIN	TOP	MAX	MIN	TOP	MAX	
PWM Comparator Section								
Pin 7 Bias Current	$V_{PIN\ 7}$ = 0V		-1	-5		-1	-5	µA
Duty Cycle Range		0		80	0		85	%
Pin 3 Zero DC Threshold	$V_{PIN\ 7}$ = 0V	1.1	1.25		1.1	1.25		V
Delay to Output*			50	80		50	80	ns
Soft-Start Section								
Charge Current	$V_{PIN\ 8}$ = 0.5V	3	9	20	3	9	20	µA
Discharge Current	$V_{PIN\ 8}$ = 1V	1			1			mA
Current Limit / Shutdown Section								
Pin 9 Bias Current	0 < $V_{PIN\ 9}$ < 4V			15			10	µA
Current Limit Threshold		0.9	1.0	1.1	0.9	1.0	1.1	V
Shutdown Threshold		1.25	1.40	1.55	1.25	1.40	1.55	V
Delay to Output			50	80		50	80	ns
Output Section								
Output Low Level	I_{OUT} = 20mA		0.25	0.40		0.25	0.40	V
	I_{OUT} = 200mA		1.2	2.2		1.2	2.2	V
Output High Level	I_{OUT} = -20mA	13.0	13.5		13.0	13.5		V
	I_{OUT} = -200mA	12.0	13.0		12.0	13.0		V
Collector Leakage	V_C = 30V		100	500		10	500	µA
Rise/Fall Time*	CL = 1nF		30	60		30	60	ns
Under-Voltage Lockout Section								
Start Threshold		8.8	9.2	9.6	8.8	9.2	9.6	V
UVLO Hysteresis		0.4	0.8	1.2	0.4	0.8	1.2	V
Supply Current Section								
Start Up Current	V_{CC} = 8V		1.1	2.5		1.1	2.5	mA
ICC	$V_{PIN\ 1}$, $V_{PIN\ 7}$, $V_{PIN\ 9}$ = 0V; $V_{PIN\ 2}$ = 1V		22	33		22	33	mA

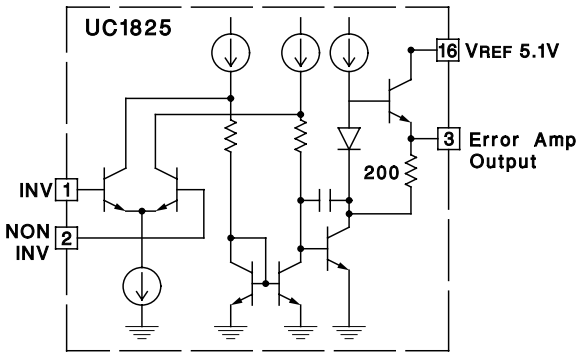
* This parameter not 100% tested in production but guaranteed by design.

Printed Circuit Board Layout Considerations

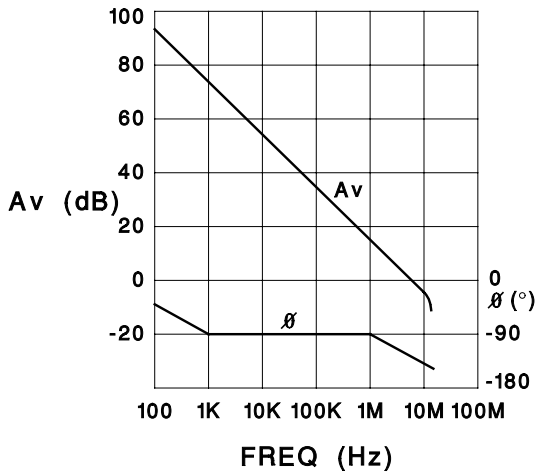
High speed circuits demand careful attention to layout and component placement. To assure proper performance of the UC1825 follow these rules: 1) Use a ground plane. 2) Damp or clamp parasitic inductive kick energy from the gate of driven MOSFETs. Do not allow the output pins to ring below ground. A series gate resistor or a shunt 1 Amp Schottky diode at the output pin will serve this purpose. 3) Bypass V_{CC}, V_C, and V_{REF}. Use 0.1µF monolithic ceramic capacitors with low equivalent series inductance. Allow less than 1 cm of total lead length for each capacitor between the bypassed pin and the ground plane. 4) Treat the timing capacitor, CT, like a bypass capacitor.

Error Amplifier Circuit

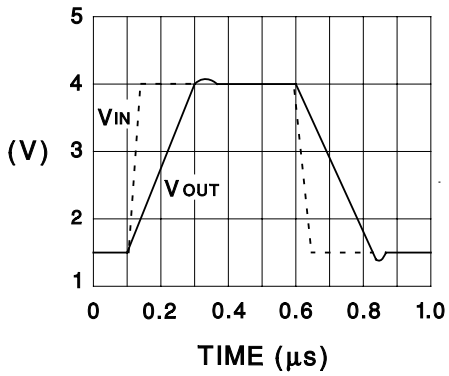
Simplified Schematic



Open Loop Frequency Response

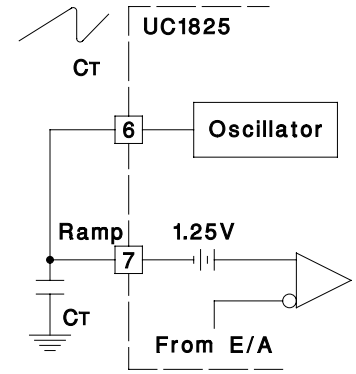


Unity Gain Slew Rate

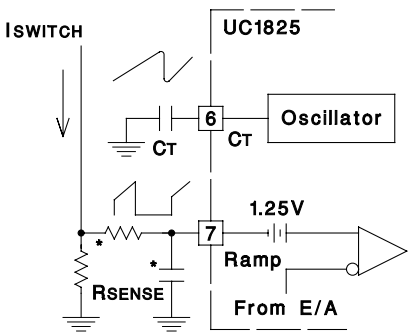


PWM Applications

Conventional (Voltage Mode)

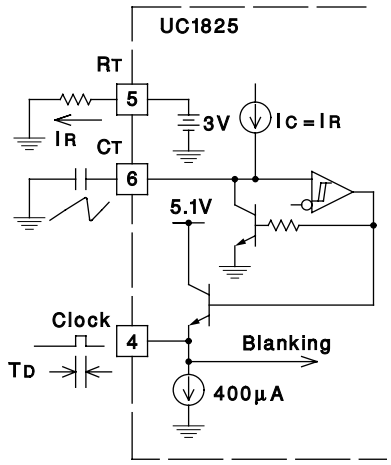


Current-Mode

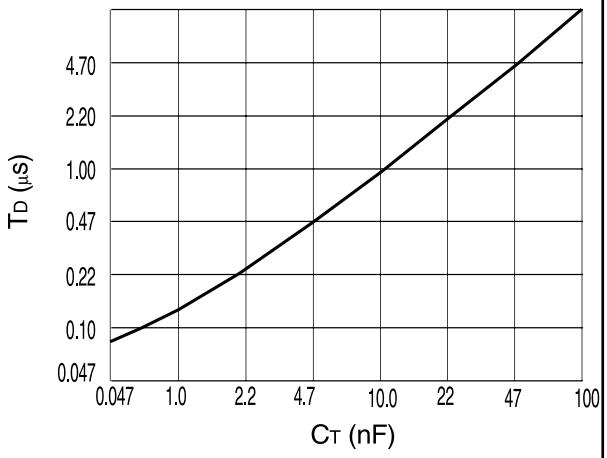


* A small filter may be required to suppress switch noise.

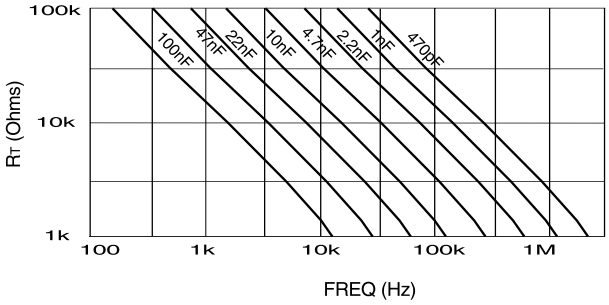
Oscillator Circuit



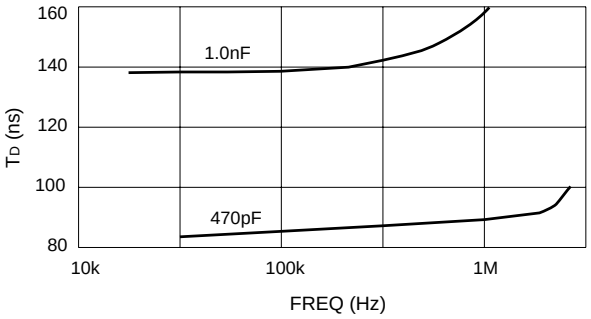
Deadtime vs C_T (3k R_T 100k)



Timing Resistance vs Frequency

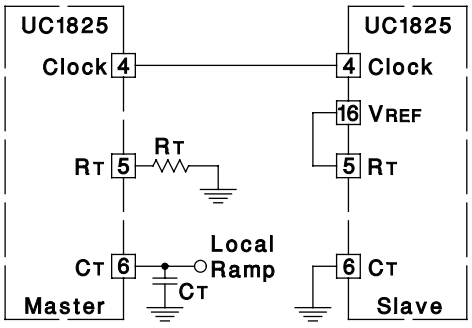


Deadtime vs Frequency

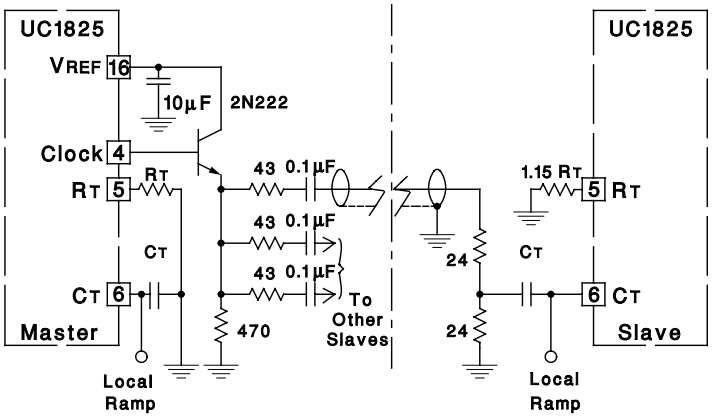


Synchronized Operation

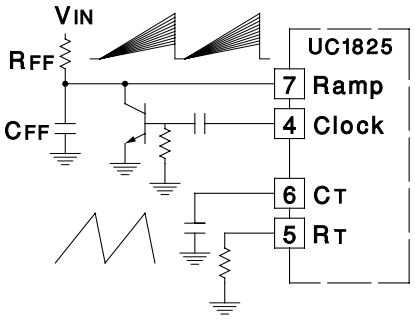
Two Units in Close Proximity



Generalized Synchronization

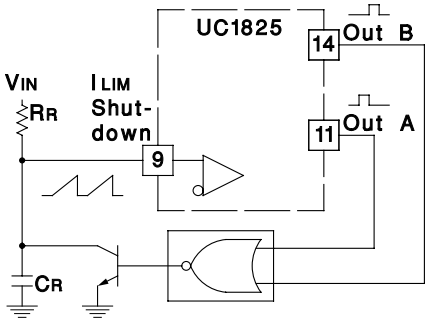


Forward Technique for Off-Line Voltage Mode Application



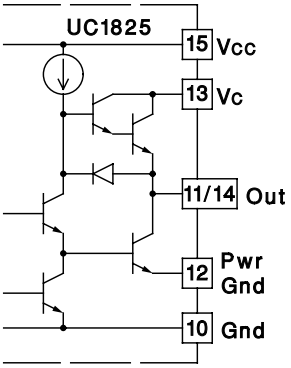
Constant Volt-Second Clamp Circuit

The circuit shown here will achieve a constant volt-second product clamp over varying input voltages. The ramp generator components, RT and CR are chosen so that the ramp at Pin 9 crosses the 1V threshold at the same time the desired maximum volt-second product is reached. The delay through the functional nor block must be such that the ramp capacitor can be completely discharged during the minimum deadtime.

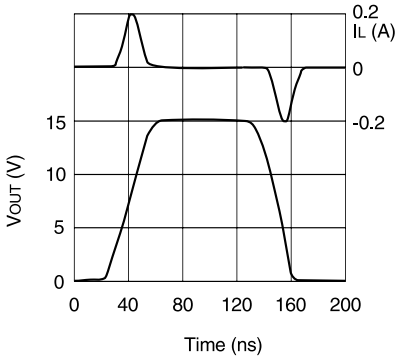


Output Section

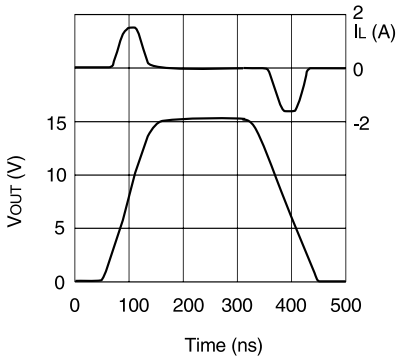
Simplified Schematic



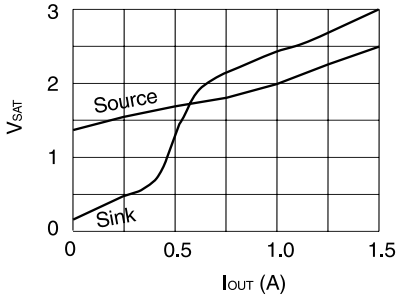
Rise/Fall Time (CL=1nF)



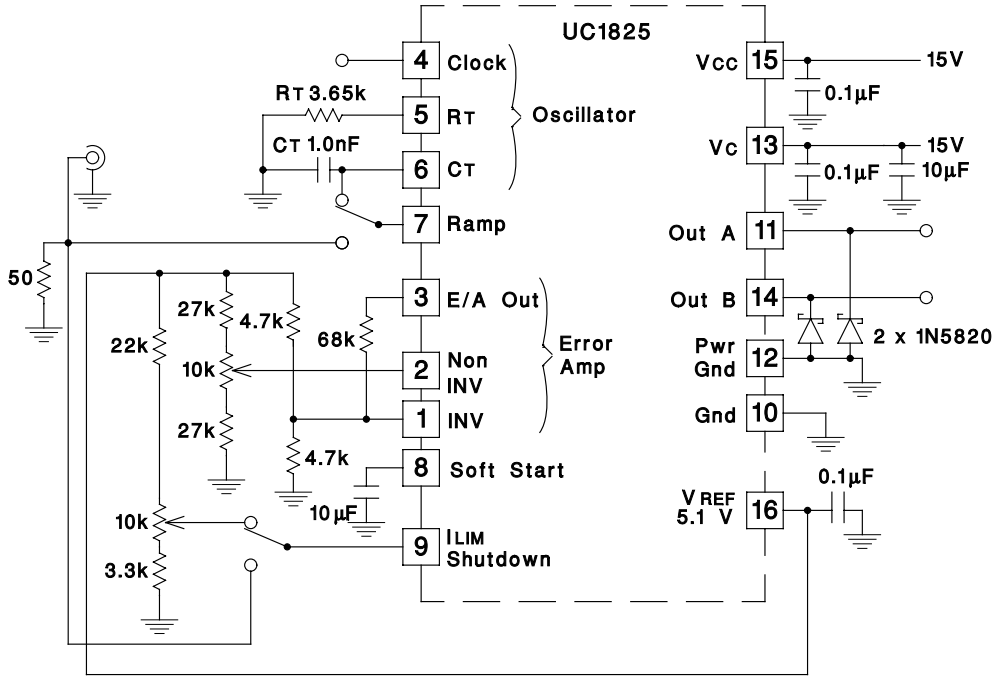
Rise/Fall Time (CL=10nF)



Saturation Curves



Open Loop Laboratory Test Fixture

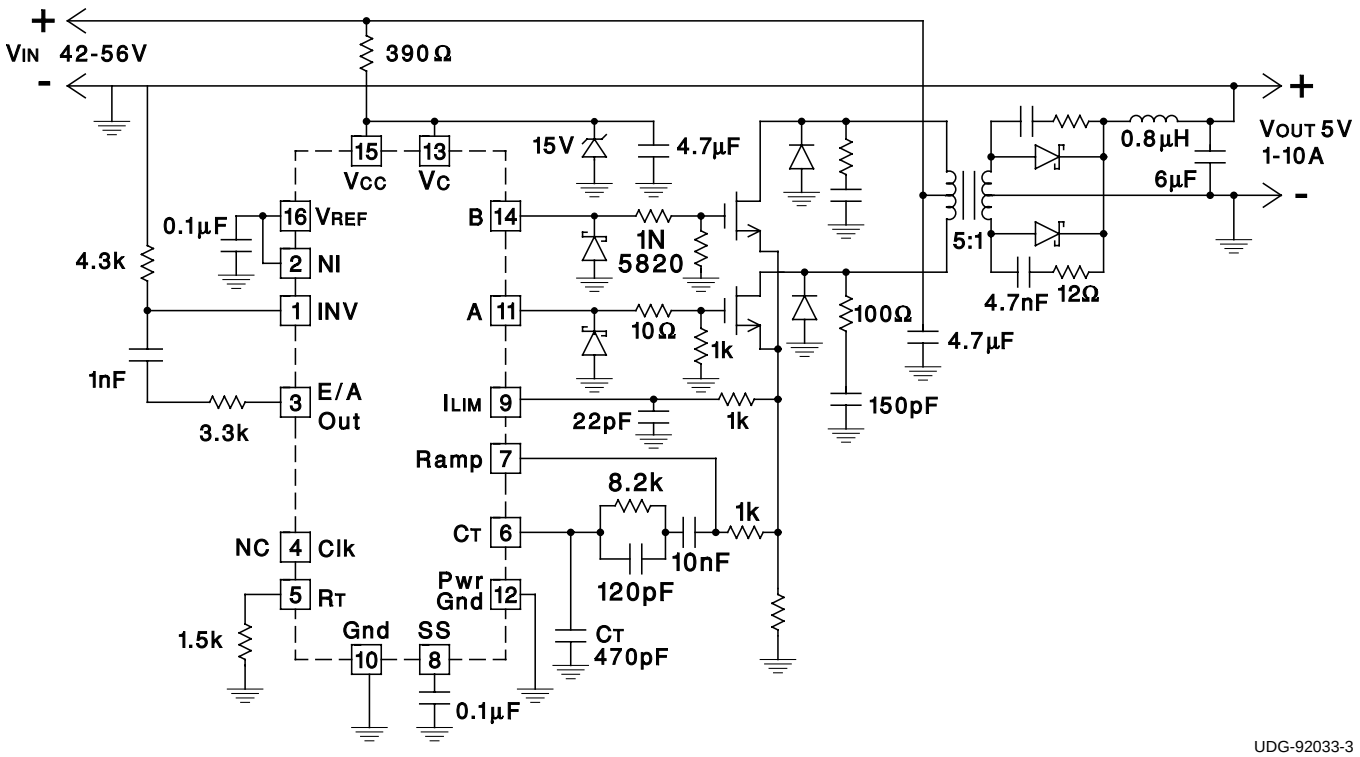


UDG-92032-2

This test fixture is useful for exercising many of the UC1825's functions and measuring their specifications.

As with any wideband circuit, careful grounding and bypass procedures should be followed. The use of a ground plane is highly recommended.

Design Example: 50W, 48V to 5V DC to DC Converter - 1.5MHz Clock Frequency



UDG-92033-3

PACKAGING INFORMATION

Orderable Device	Status (1)	Package Type	Package Drawing	Pins	Package Qty	Eco Plan (2)	Lead/Ball Finish	MSL Peak Temp (3)
5962-87681012A	ACTIVE	LCCC	FK	20	1	TBD	POST-PLATE	Level-NC-NC-NC
5962-8768101EA	ACTIVE	CDIP	J	16	1	TBD	A42 SNPB	Level-NC-NC-NC
5962-8768101QFA	ACTIVE	CFP	W	16	1	TBD	A42 SNPB	Level-NC-NC-NC
5962-8768101V2A	ACTIVE	LCCC	FK	20	1	TBD	Call TI	Level-NC-NC-NC
5962-8768101VEA	ACTIVE	CDIP	J	16	1	TBD	Call TI	Level-NC-NC-NC
UC1825J	ACTIVE	CDIP	J	16	1	TBD	A42 SNPB	Level-NC-NC-NC
UC1825J883B	ACTIVE	CDIP	J	16	1	TBD	A42 SNPB	Level-NC-NC-NC
UC1825JQMLV	ACTIVE	CDIP	J	16		TBD	Call TI	Call TI
UC1825L	ACTIVE	LCCC	FK	20	1	TBD	POST-PLATE	Level-NC-NC-NC
UC1825L883B	ACTIVE	LCCC	FK	20	1	TBD	POST-PLATE	Level-NC-NC-NC
UC1825LQMLV	ACTIVE	LCCC	FK	20		TBD	Call TI	Call TI
UC1825W883B	ACTIVE	CFP	W	16	1	TBD	A42 SNPB	Level-NC-NC-NC
UC2825DW	ACTIVE	SOIC	DW	16	40	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-2-260C-1 YEAR
UC2825DW/1	PREVIEW	SOIC	DW	16		Green (RoHS & no Sb/Br)	CU NIPDAU	Level-2-260C-1 YEAR
UC2825DWTR	ACTIVE	SOIC	DW	16	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-2-260C-1 YEAR
UC2825DWTRG4	ACTIVE	SOIC	DW	16	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-2-260C-1 YEAR
UC2825J	ACTIVE	CDIP	J	16	1	TBD	A42 SNPB	Level-NC-NC-NC
UC2825N	ACTIVE	PDIP	N	16	25	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-NC-NC-NC
UC2825NG4	ACTIVE	PDIP	N	16	25	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-NA-NA-NA
UC2825Q	ACTIVE	PLCC	FN	20	46	Green (RoHS & no Sb/Br)	Call TI	Level-2-260C-1 YEAR
UC2825QTR	ACTIVE	PLCC	FN	20	1000	Green (RoHS & no Sb/Br)	Call TI	Level-2-260C-1 YEAR
UC3825DW	ACTIVE	SOIC	DW	16	40	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-2-260C-1 YEAR
UC3825DWG4	ACTIVE	SOIC	DW	16	40	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-2-260C-1 YEAR
UC3825DWTR	ACTIVE	SOIC	DW	16	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-2-260C-1 YEAR
UC3825DWTRG4	ACTIVE	SOIC	DW	16	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-2-260C-1 YEAR
UC3825J	ACTIVE	CDIP	J	16	1	TBD	A42 SNPB	Level-NC-NC-NC
UC3825N	ACTIVE	PDIP	N	16	25	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-NC-NC-NC
UC3825NG4	ACTIVE	PDIP	N	16	25	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-NC-NC-NC
UC3825Q	ACTIVE	PLCC	FN	20	46	Green (RoHS & no Sb/Br)	CU SN	Level-2-260C-1 YEAR
UC3825QTR	ACTIVE	PLCC	FN	20	1000	Green (RoHS & no Sb/Br)	CU SN	Level-2-260C-1 YEAR

(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.

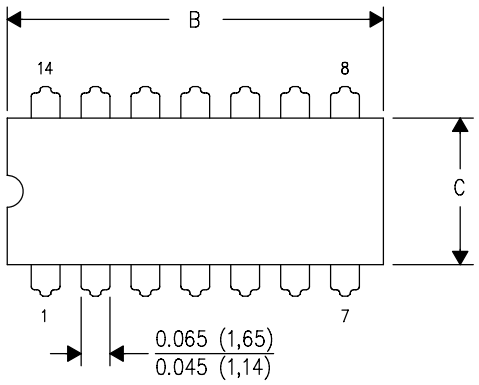
(2) Eco Plan - The planned eco-friendly classification: Pb-Free (RoHS) or Green (RoHS & no Sb/Br) - please check http://www.ti.com/productcontent for the latest availability information and additional product content details.
TBD: The Pb-Free/Green conversion plan has not been defined.
Pb-Free (RoHS):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

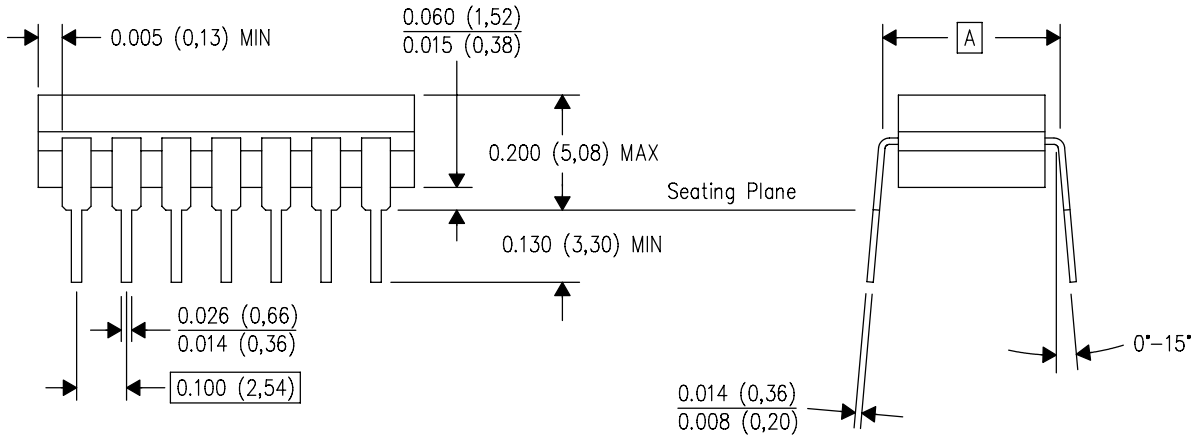
J (R–GDIP–T**)

14 LEADS SHOWN

CERAMIC DUAL IN–LINE PACKAGE



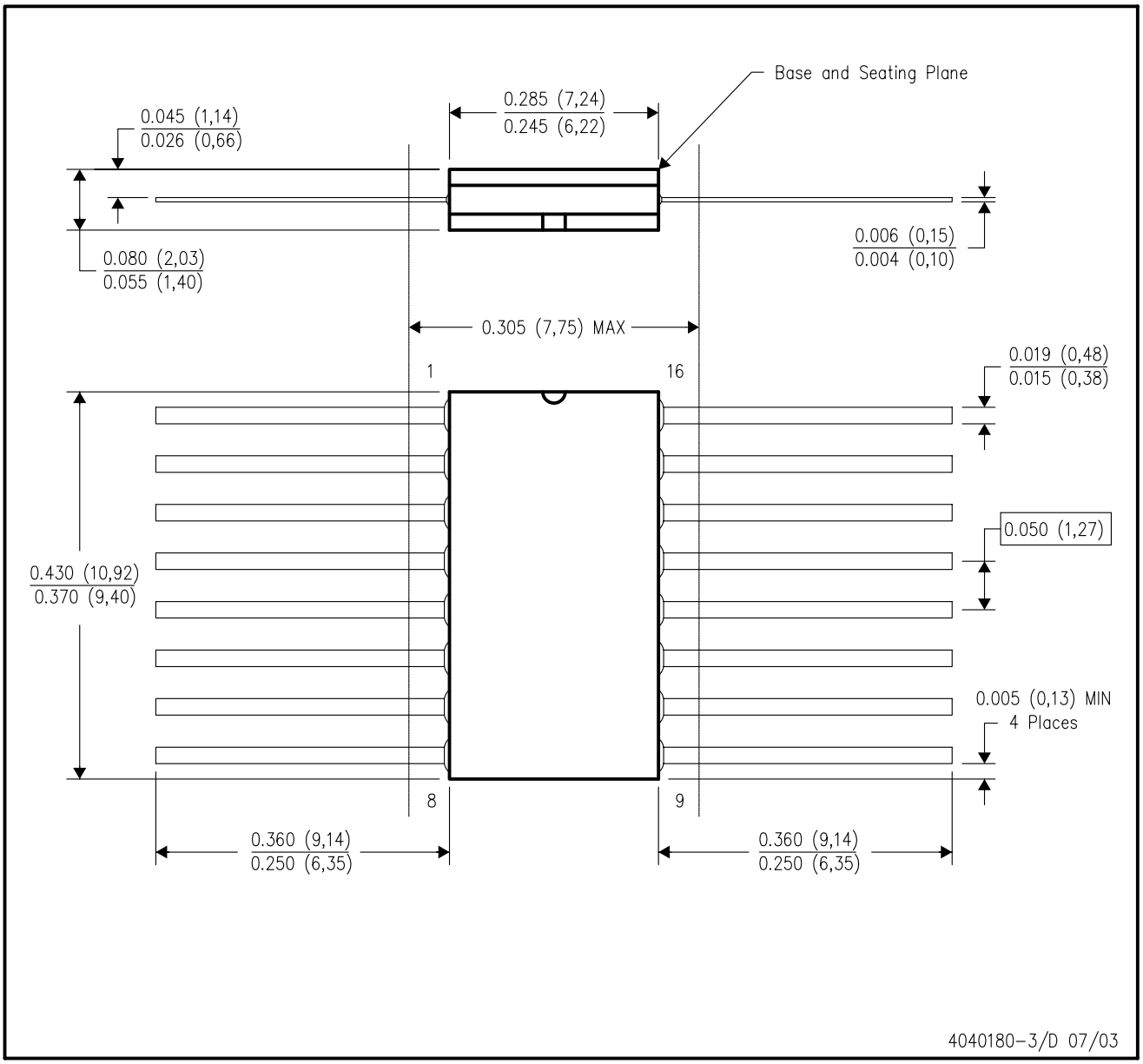
DIM \ PINS **	14	16	18	20
A	0.300 (7,62) BSC	0.300 (7,62) BSC	0.300 (7,62) BSC	0.300 (7,62) BSC
B MAX	0.785 (19,94)	.840 (21,34)	0.960 (24,38)	1.060 (26,92)
B MIN	—	—	—	—
C MAX	0.300 (7,62)	0.300 (7,62)	0.310 (7,87)	0.300 (7,62)
C MIN	0.245 (6,22)	0.245 (6,22)	0.220 (5,59)	0.245 (6,22)



4040083/F 03/03

NOTES:
A. All linear dimensions are in inches (millimeters).
B. This drawing is subject to change without notice.
C. This package is hermetically sealed with a ceramic lid using glass frit.
D. Index point is provided on cap for terminal identification only on press ceramic glass frit seal only.
E. Falls within MIL STD 1835 GDIP1–T14, GDIP1–T16, GDIP1–T18 and GDIP1–T20.

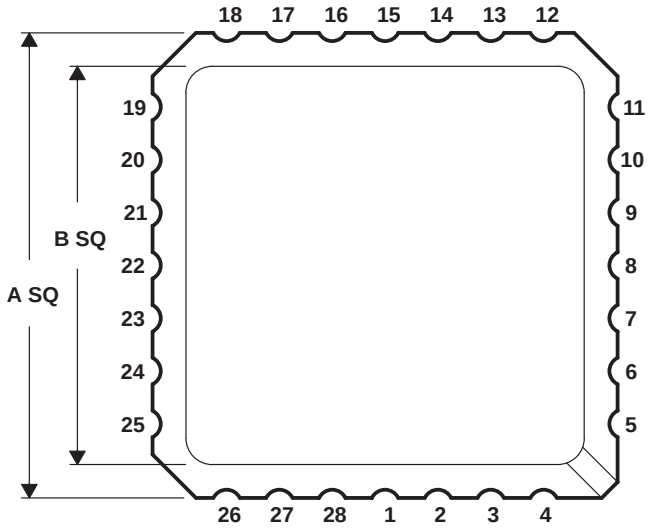
W (R–GDFP–F16) CERAMIC DUAL FLATPACK



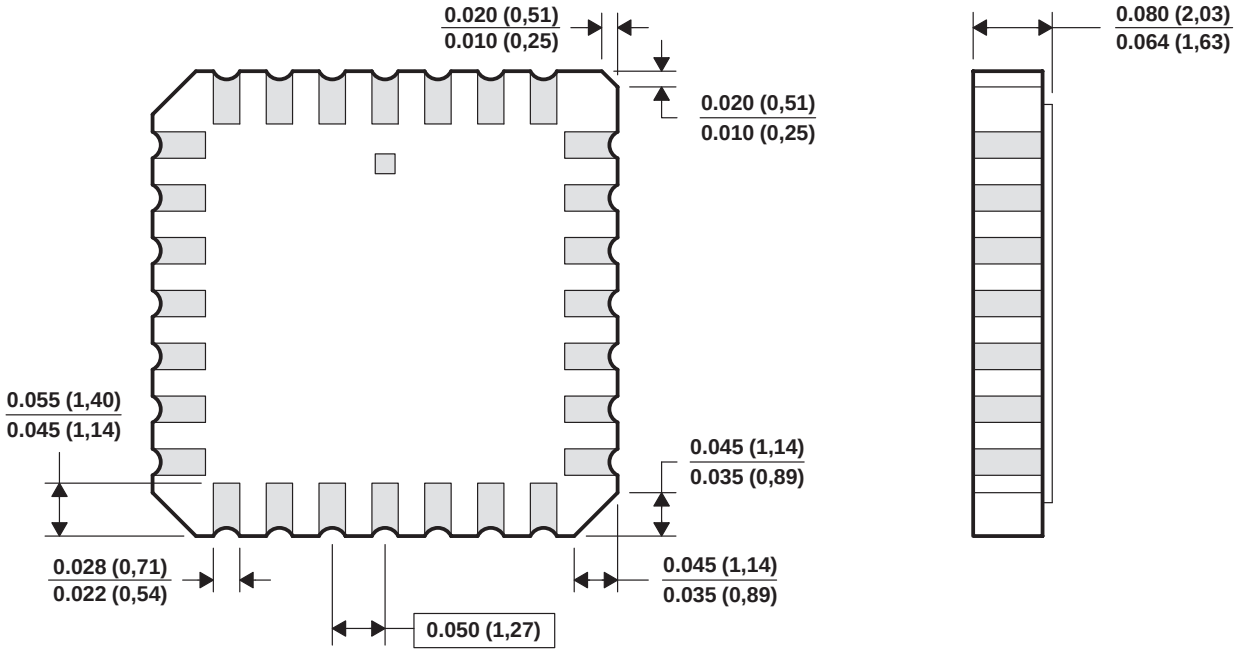
NOTES:
A. All linear dimensions are in inches (millimeters).
B. This drawing is subject to change without notice.
C. This package can be hermetically sealed with a ceramic lid using glass frit.
D. Index point is provided on cap for terminal identification only.
E. Falls within MIL STD 1835 GDFP1–F16 and JEDEC MO–092AC

FK (S-CQCC-N)** **LEADLESS CERAMIC CHIP CARRIER**

28 TERMINAL SHOWN



NO. OF TERMINALS **	A		B	
	MIN	MAX	MIN	MAX
20	0.342 (8,69)	0.358 (9,09)	0.307 (7,80)	0.358 (9,09)
28	0.442 (11,23)	0.458 (11,63)	0.406 (10,31)	0.458 (11,63)
44	0.640 (16,26)	0.660 (16,76)	0.495 (12,58)	0.560 (14,22)
52	0.739 (18,78)	0.761 (19,32)	0.495 (12,58)	0.560 (14,22)
68	0.938 (23,83)	0.962 (24,43)	0.850 (21,6)	0.858 (21,8)
84	1.141 (28,99)	1.165 (29,59)	1.047 (26,6)	1.063 (27,0)



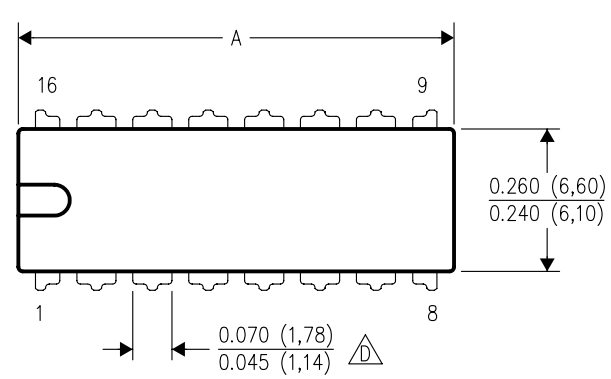
4040140/D 10/96

NOTES: A. All linear dimensions are in inches (millimeters).
B. This drawing is subject to change without notice.
C. This package can be hermetically sealed with a metal lid.
D. The terminals are gold plated.
E. Falls within JEDEC MS-004

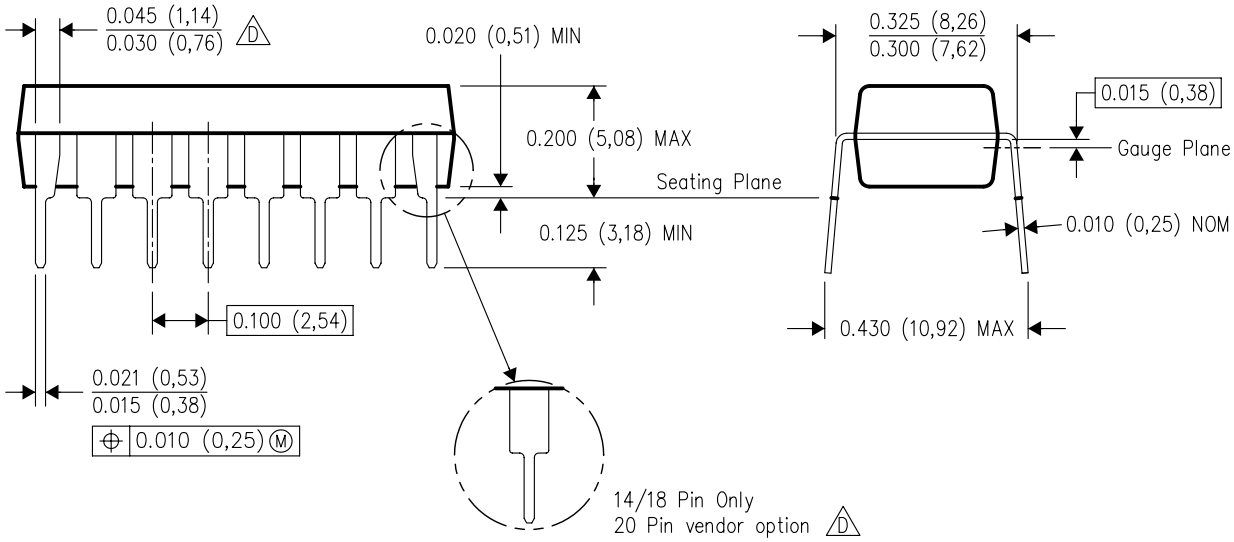
N (R–PDIP–T**)

PLASTIC DUAL–IN–LINE PACKAGE

16 PINS SHOWN



DIM \ PINS **	14	16	18	20
A MAX	0.775 (19,69)	0.775 (19,69)	0.920 (23,37)	1.060 (26,92)
A MIN	0.745 (18,92)	0.745 (18,92)	0.850 (21,59)	0.940 (23,88)
MS–001 VARIATION (C)	AA	BB	AC	AD



4040049/E 12/2002

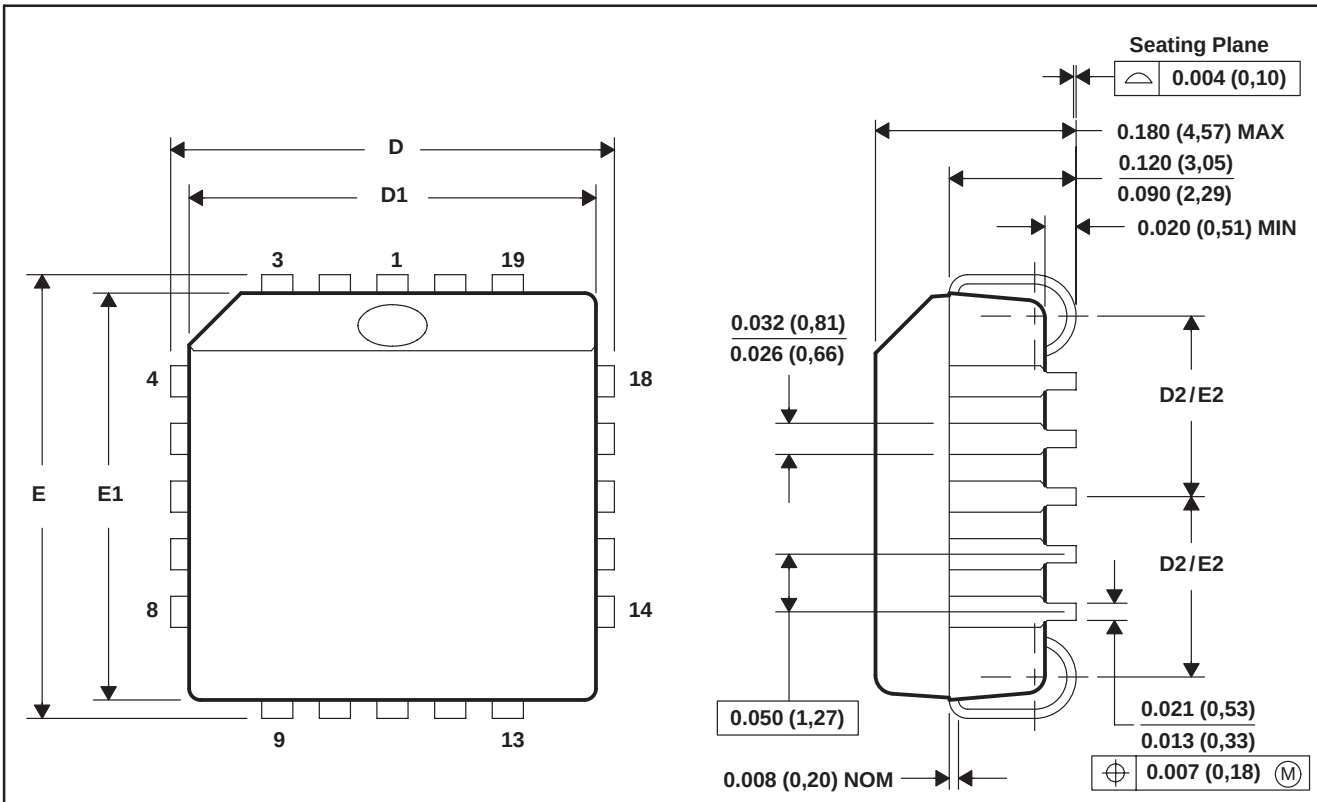
NOTES:
A. All linear dimensions are in inches (millimeters).
B. This drawing is subject to change without notice.
C. Falls within JEDEC MS–001, except 18 and 20 pin minimum body length (Dim A).
D. The 20 pin end lead shoulder width is a vendor option, either half or full width.

MPLC004A – OCTOBER 1994

FN (S-PQCC-J**)

PLASTIC J-LEADED CHIP CARRIER

20 PIN SHOWN

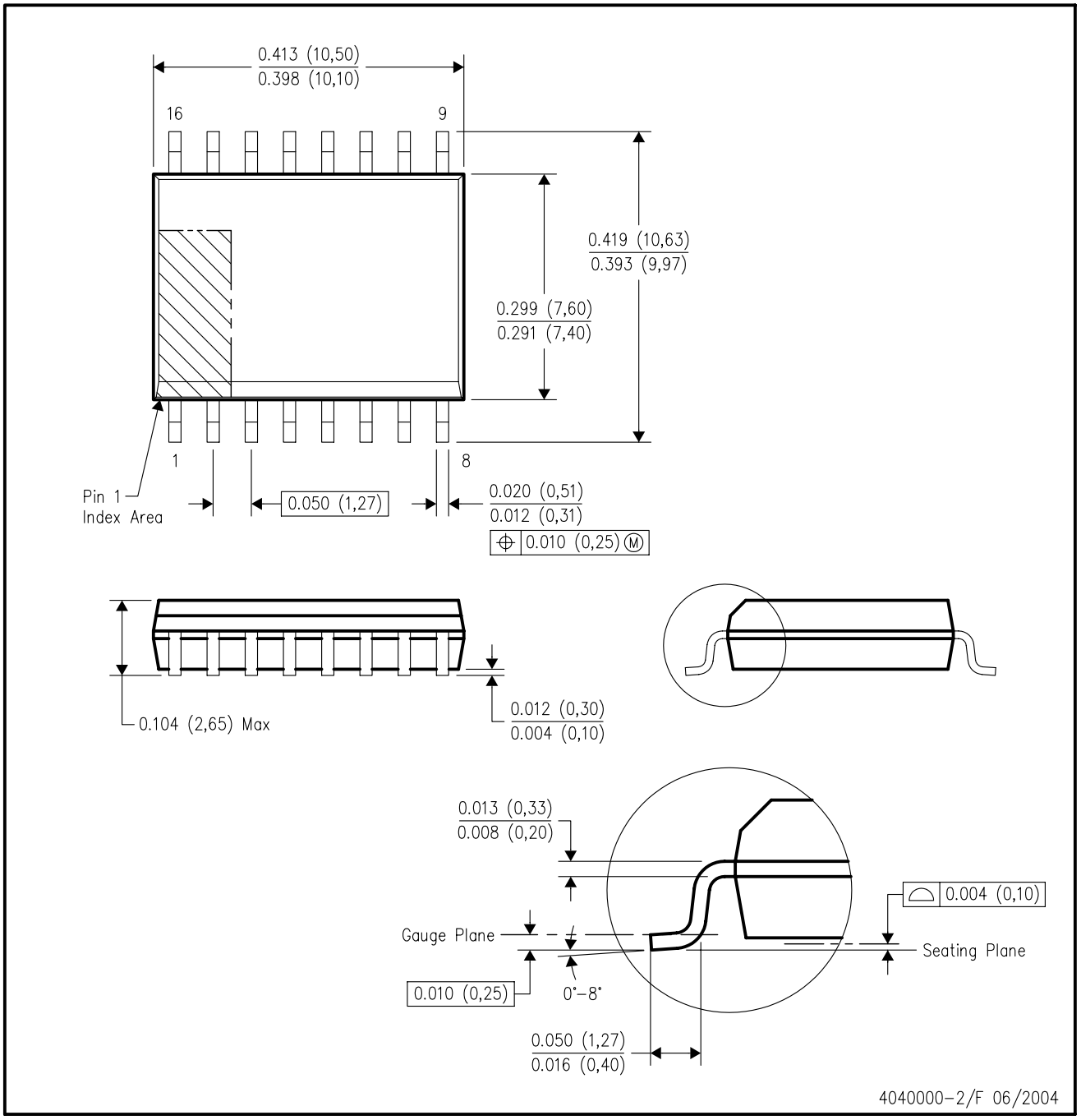


NO. OF PINS **	D/E		D1/E1		D2/E2	
	MIN	MAX	MIN	MAX	MIN	MAX
20	0.385 (9,78)	0.395 (10,03)	0.350 (8,89)	0.356 (9,04)	0.141 (3,58)	0.169 (4,29)
28	0.485 (12,32)	0.495 (12,57)	0.450 (11,43)	0.456 (11,58)	0.191 (4,85)	0.219 (5,56)
44	0.685 (17,40)	0.695 (17,65)	0.650 (16,51)	0.656 (16,66)	0.291 (7,39)	0.319 (8,10)
52	0.785 (19,94)	0.795 (20,19)	0.750 (19,05)	0.756 (19,20)	0.341 (8,66)	0.369 (9,37)
68	0.985 (25,02)	0.995 (25,27)	0.950 (24,13)	0.958 (24,33)	0.441 (11,20)	0.469 (11,91)
84	1.185 (30,10)	1.195 (30,35)	1.150 (29,21)	1.158 (29,41)	0.541 (13,74)	0.569 (14,45)

4040005/B 03/95

NOTES: A. All linear dimensions are in inches (millimeters).
B. This drawing is subject to change without notice.
C. Falls within JEDEC MS-018

DW (R–PDSO–G16) PLASTIC SMALL–OUTLINE PACKAGE



NOTES:
A. All linear dimensions are in inches (millimeters).
B. This drawing is subject to change without notice.
C. Body dimensions do not include mold flash or protrusion not to exceed 0.006 (0,15).
D. Falls within JEDEC MS–013 variation AA.

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Logic	logic.ti.com	Military	www.ti.com/military
Power Mgmt	power.ti.com	Optical Networking	www.ti.com/opticalnetwork
Microcontrollers	microcontroller.ti.com	Security	www.ti.com/security
		Telephony	www.ti.com/telephony
		Video & Imaging	www.ti.com/video
		Wireless	www.ti.com/wireless

Mailing Address: Texas Instruments
Post Office Box 655303 Dallas, Texas 75265

View ROHS Compliant Devices
View RoHS Compliant Devices

UC2825, Status: ACTIVE
High Speed PWM Controller

Features | Samples | Technical Documents
Quality & Pb-Free Data | Pricing/Packaging | Applications Notes
Related Products | Inventory | Simulation Models
Tools & Software | Symbols/Footprints | Reference Designs

Refine Your Se
- Selection Gui
- Analog & Mix Power Supply

Support
- KnowledgeBa
- Contact Tech
- TI Cross Ref
- Training
- Part Marking

Datasheet

Download Datasheet **High Speed PWM Controller (Rev. A)** (uc2825.pdf, 914 KB)
24 Feb 2004 Download

	UC1825	UC2825	UC3825
Topology	Boost, Flyback, Forward, Full-Bridge, Half-Bridge, Push-Pull	Boost, Flyback, Forward, Full-Bridge, Half-Bridge, Push-Pull	Boost, Buck, Flyback, Forward, Full-Bridge, Half-Bridge, Push-Pull
Control Method	Current Mode	Current Mode	Current Mode, Voltage
Duty Cycle(Max)(%)	50	50	50
PWM Outputs(#)	2	2	2
Frequency(Max)(kHz)	1000	1000	1000
UVLO Thresholds On/Off(V)	9.2/8.4	9.2/8.4	9.2/8.4
Pin/Package	16CDIP,16CFP,20LCCC	16CDIP,16PDIP,16SOIC,20PLCC	16CDIP,16PDIP,16SOIC,20PLCC
Approx. 1KU Price (US$)	6.03	1.7	1.6
	Samples	Samples	Samples
	Inventory	Inventory	Inventory

Product Information

Features

Save this to your personal library

Compatible with Voltage or Current Mode Topologies
Practical Operation Switching Frequencies to 1MHz
50ns Propagation Delay to Output
High Current Dual Totem Pole Outputs (1.5A Peak)
Wide Bandwidth Error Amplifier
Fully Latched Logic with Double Pulse Suppression
Pulse-by-Pulse Current Limiting
Soft Start / Max. Duty Cycle Control
Under-Voltage Lockout with Hysteresis
Low Start Up Current (1.1mA)

Description

The UC1825 family of PWM control ICs is optimized for high frequency switched mode power supply applications. Particular care was given to minimizing propagation delays through the comparators and logic circuitry while maximizing bandwidth and slew rate of the error amplifier. This controller is designed for use in either current-mode or voltage mode systems with the capability for input voltage feed-forward.

Protection circuitry includes a current limit comparator with a 1V threshold, a TTL compatible shutdown port, and a soft start pin which will double as a maximum duty cycle clamp. The logic is fully latched to provide jitter free operation and prohibit multiple pulses at an output. An under-voltage lockout section with 800mV of hysteresis assures low start up current. During under-voltage lockout, the outputs are high impedance.

These devices feature totem pole outputs designed to source and sink high peak currents from capacitive loads, such as the gate of a power MOSFET. The on state is designed as a high level.

Pricing/Packaging/CAD Design Tools/Samples

			Price	Packaging			CAD Design Tools		Samples
Device	Status	Temp (°C)	Budget Price ($US) | QTY	Industry Standard (TI Pkg) | Pins	Top Side Marking	Standard Pack Quantity	Symbols	Footprints	Samples
UC2825DW	ACTIVE	-40 to 85	1.70 | 1KU	SOIC (DW) | 16	View	40	☐	☐	Request Free Samples
UC2825DW/1	PREVIEW	-40 to 85		SOIC (DW) | 16	View				Not Available
UC2825DWTR	ACTIVE	-40 to 85	1.80 | 1KU	SOIC (DW) | 16	View	2000	☐	☐	Purchase Samples
UC2825DWTRG4	ACTIVE	-40 to 85	1.80 | 1KU	SOIC (DW) | 16	View	2000	☐	☐	Purchase Samples
UC2825J	ACTIVE	-40 to 85	4.08 | 1KU	CDIP (J) | 16		1	☐	☐	Request Military Samples
UC2825N	ACTIVE	-40 to 85	1.70 | 1KU	PDIP (N) | 16	View	25	☐	☐	Request Free Samples
UC2825NG4	ACTIVE	-40 to 85	1.70 | 1KU	PDIP (N) | 16	View	25	☐	☐	Purchase Samples
UC2825Q	ACTIVE	-40 to 85	1.70 | 1KU	PLCC (FN) | 20	View	46	☐	☐	Purchase Samples
UC2825QTR	ACTIVE	-40 to 85	1.80 | 1KU	PLCC (FN) | 20	View	1000	☐	☐	Purchase Samples

Inventory

View all Distributors

Choose a Region

	TI Inventory Status			Reported Distributor Inventory			
UC2825DW	As of 8:26 AM GMT, 25 Nov 2005			As of 8:26 AM GMT, 25 Nov 2005			
	In Stock	In Progress QTY | Date	Lead Time	Region	Company	In Stock	Purchase
	3700*	>10k | 30 Dec	6 Weeks	Americas	Avnet	128	
					DigiKey	190	
					Newark InOne	83	
				Europe	Arrow Southern Europe	307	
					Avnet-SILICA	457	
					EBV Elektronik	>1k	
					Rutronik	30	
					Spoerle	294	
UC2825DW/1	As of 8:26 AM GMT, 25 Nov 2005			As of 8:26 AM GMT, 25 Nov 2005			
	In Stock	In Progress QTY | Date	Lead Time	Region	Company	In Stock	Purchase
	0*	>10k | 30 Dec	6 Weeks	None Reported View Distributors			
UC2825DWTR	As of 8:26 AM GMT, 25 Nov 2005			As of 8:26 AM GMT, 25 Nov 2005			
	In Stock	In Progress QTY | Date	Lead Time	Region	Company	In Stock	Purchase
	6000*	>10k | 3 Jan	6 Weeks	Europe	Avnet-SILICA	>1k	
UC2825DWTRG4	As of 8:26 AM GMT, 25 Nov 2005			As of 8:26 AM GMT, 25 Nov 2005			
	In Stock	In Progress QTY | Date	Lead Time	Region	Company	In Stock	Purchase
	6000*	>10k | 3 Jan	6 Weeks	None Reported View Distributors			
UC2825J	As of 8:26 AM GMT, 25 Nov 2005			As of 8:26 AM GMT, 25 Nov 2005			
	In Stock	In Progress QTY | Date	Lead Time	Region	Company	In Stock	Purchase
	295*	>10k | 19 Dec	8 Weeks	None Reported View Distributors			
UC2825N	As of 8:26 AM GMT, 25 Nov 2005			As of 8:26 AM GMT, 25 Nov 2005			
	In Stock	In Progress QTY | Date	Lead Time	Region	Company	In Stock	Purchase

	2825*	>10k | 30 Dec	6 Weeks	Americas	Avnet	237	
					DigiKey	399	
					Newark InOne	990	
				Europe	Arrow Southern Europe	173	
					Avnet-SILICA	475	
					EBV Elektronik	>1k	
					Spoerle	206	

UC2825NG4	As of 8:26 AM GMT, 25 Nov 2005			As of 8:26 AM GMT, 25 Nov 2005			
	In Stock	**In Progress QTY | Date**	**Lead Time**	**Region**	**Company**	**In Stock**	**Purchase**
	2825*	>10k | 30 Dec	6 Weeks	None Reported View Distributors			

UC2825Q	As of 8:26 AM GMT, 25 Nov 2005			As of 8:26 AM GMT, 25 Nov 2005			
	In Stock	**In Progress QTY | Date**	**Lead Time**	**Region**	**Company**	**In Stock**	**Purchase**
	1472*	>10k | 25 Jan	6 Weeks	None Reported View Distributors			

UC2825QTR	As of 8:26 AM GMT, 25 Nov 2005			As of 8:26 AM GMT, 25 Nov 2005			
	In Stock	**In Progress QTY | Date**	**Lead Time**	**Region**	**Company**	**In Stock**	**Purchase**
	1000*	734 | 25 Nov	6 Weeks	Europe	EBV Elektronik	500	
		>10k | 25 Jan					

* Our information is updated daily, so please check back with us soon if this does not meet your needs. You may also contact your TI Authorized Distributor, including those listed above, for real time stock information.

** Lead time information is not available at this time. However, our information is updated daily so please check back with us soon. Please contact your preferred TI Authorized Distributor for additional information.

Quality & Lead (Pb)-Free Data

	Product Content				MTBF/FIT Rate
Device	**Eco Plan***	**Lead/Ball Finish**	**MSL Rating/Peak Reflow**	**Details**	**Details**
UC2825DW	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-2-260C-1 YEAR	View	View
UC2825DW/1	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-2-260C-1 YEAR	View	View
UC2825DWTR	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-2-260C-1 YEAR	View	View
UC2825DWTRG4	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-2-260C-1 YEAR	View	View
UC2825J	TBD	A42 SNPB	Level-NC-NC-NC	View	View
UC2825N	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-NC-NC-NC	View	View
UC2825NG4	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-NA-NA-NA	View	View
UC2825Q	Green (RoHS & no Sb/Br)	CU SN	Level-2-260C-1 YEAR	View	View
UC2825QTR	Green (RoHS & no Sb/Br)	CU SN	Level-2-260C-1 YEAR	View	View

* The planned eco-friendly classification: Pb-Free (RoHS) or Green (RoHS & no Sb/Br) - please click on the Product Content Details "View" link in the table above for the latest availability information and additional product content details.

If the information you are requesting is not available online at this time, contact one of our Product Information Centers regarding the availability of this information.

Technical Documents

Datasheets — **Keep track of what's new**

High Speed PWM Controller (Rev. A) (uc2825.pdf, 914 KB)

24 Feb 2004 Download

Application Notes

U-110 1.5 Mhz Current Mode IC Controlled 50-Watt Power Supply (slua053.htm, 9 KB)

05 Sep 1999 Abstract

View Application Notes for PWM Power Supply Controllers

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