



# Precision Low Dropout Linear Controllers

## FEATURES

- Precision 1% Reference
- Over-Current Sense Threshold Accurate to 5%
- Programmable Duty-Ratio Over-Current Protection
- 4.5V to 36V Operation
- 100mA Output Drive, Source or Sink
- Under-Voltage Lockout

Additional Features of the UC1832 series:

- Adjustable Current Limit to Current Sense Ratio
- Separate +VIN terminal
- Programmable Driver Current Limit
- Access to VREF and E/A(+)
- Logic-Level Disable Input

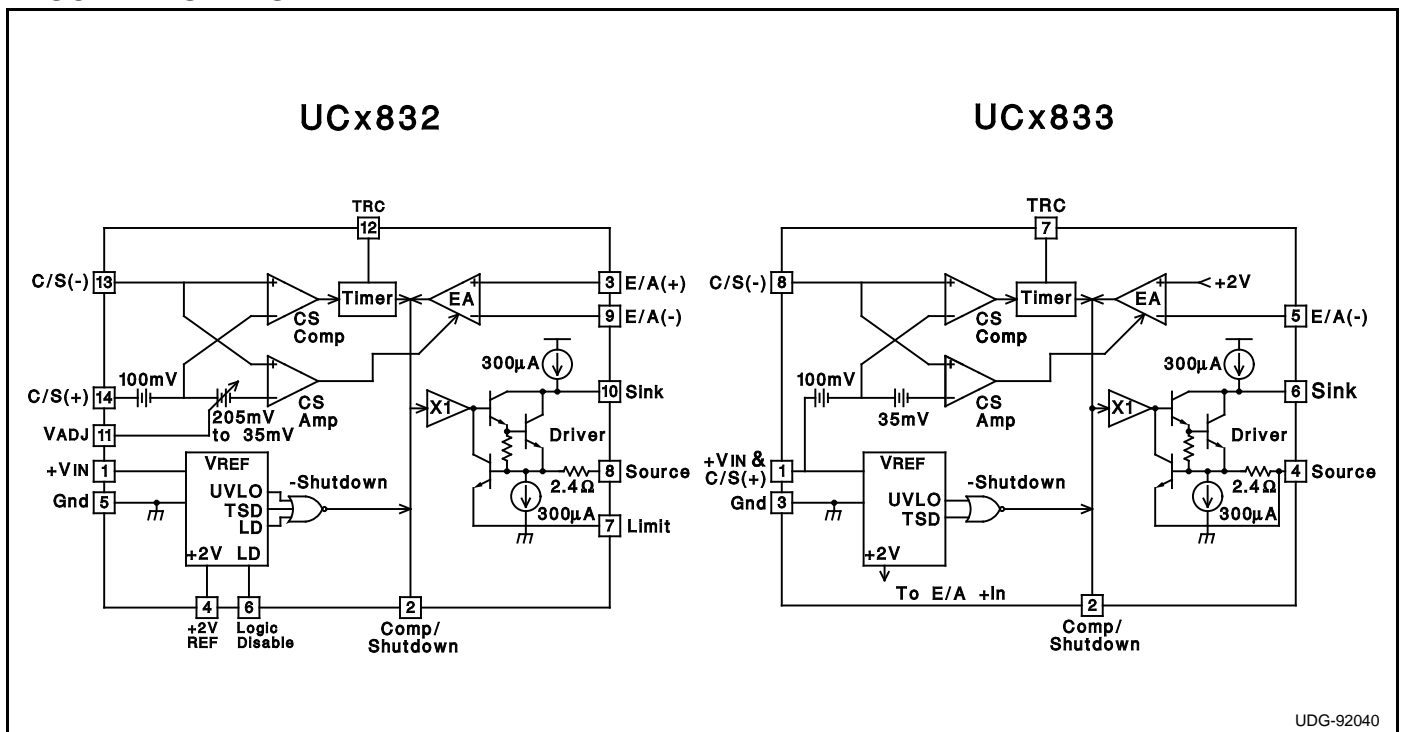
## DESCRIPTION

The UC1832 and UC1833 series of precision linear regulators include all the control functions required in the design of very low dropout linear regulators. Additionally, they feature an innovative duty-ratio current limiting technique which provides peak load capability while limiting the average power dissipation of the external pass transistor during fault conditions. When the load current reaches an accurately programmed threshold, a gated-astable timer is enabled, which switches the regulator's pass device off and on at an externally programmable duty-ratio. During the on-time of the pass element, the output current is limited to a value slightly higher than the trip threshold of the duty-ratio timer. The constant-current-limit is programmable on the UCx832 to allow higher peak current during the on-time of the pass device. With duty-ratio control, high initial load demands and short circuit protection may both be accommodated without extra heat sinking or foldback current limiting. Additionally, if the timer pin is grounded, the duty-ratio timer is disabled, and the IC operates in constant-voltage/constant-current regulating mode.

These IC's include a 2 Volt ( $\pm 1\%$ ) reference, error amplifier, UVLO, and a high current driver that has both source and sink outputs, allowing the use of either NPN or PNP external pass transistors. Safe operation is assured by the inclusion of under-voltage lockout (UVLO) and thermal shutdown.

The UC1833 family includes the basic functions of this design in a low-cost, 8-pin mini-dip package, while the UC1832 series provides added versatility with the availability of 14 pins. Packaging options include plastic (N suffix), or ceramic (J suffix). Specified operating temperature ranges are: commercial ( $0^{\circ}\text{C}$  to  $70^{\circ}\text{C}$ ), order UC3832/3 (N or J); industrial ( $-25^{\circ}\text{C}$  to  $85^{\circ}\text{C}$ ), order UC2832/3 (N or J); and military ( $-55^{\circ}\text{C}$  to  $125^{\circ}\text{C}$ ), order UC1832/3J. Surface mount packaging is also available.

## BLOCK DIAGRAMS



UDG-92040

**ABSOLUTE MAXIMUM RATINGS**

Supply Voltage +VIN	40V
Driver Output Current (Sink or Source)	450mA
Driver Sink to Source Voltage	40V
TRC Pin Voltage	-0.3V to 3.2V
Other Input Voltages	-0.3V to +VIN
Operating Junction Temperature (note 2)	-55°C to +150°C
Storage Temperature	-65°C to +150°C
Lead Temperature (Soldering, 10 Seconds)	300°C

Note 1: Unless otherwise indicated, voltages are referenced to ground and currents are positive into, negative out of, the specified terminals.

Note 2: See Unitorde Integrated Circuits databook for information regarding thermal specifications and limitations of packages.

**CONNECTION DIAGRAMS**

**UC1832**

**DIL-14 (Top View)  
J Or N Package**

**SOIC-16 (Top View)  
DW Package**

**LCC-20 & PLCC-20  
L & Q Package  
(Top View)**

PACKAGE PIN FUNCTION	
FUNCTION	PIN
N/C	1
+VIN	2
Comp/Shutdown	3
E/A(+)	4
+2V REF	5
N/C	6
Gnd	7
Logic Disable	8
Limit	9
Source	10
N/C	11
E/A(-)	12
Sink	13
VADJ	14
N/C	15-17
Timer RC	18
Current Sense(-)	19
Current Sense(+)	20

**UC1833**

**DIL-8 (Top View)  
J Or N Package**

**SOIC-16 (Top View)  
DW Package**

**LCC-20 & PLCC-20  
L & Q Package  
(Top View)**

PACKAGE PIN FUNCTION	
FUNCTION	PIN
+VIN & C/S(+)	1
Comp/Shutdown	2
N/C	3
N/C	4
Gnd	5
N/C	6
N/C	7
Source	8
E/A(-)	9
Sink	10
N/C	11
N/C	12
Timer RC	14
Current Sense(-)	15
N/C	16
N/C	17
N/C	18-20

**ELECTRICAL CHARACTERISTICS:** Unless otherwise stated, specifications hold for  $T_A = 0^\circ\text{C}$  to  $70^\circ\text{C}$  for the UC3832/3,  $-25^\circ\text{C}$  to  $85^\circ\text{C}$  for the UC2832/3, and  $-55^\circ\text{C}$  to  $125^\circ\text{C}$  for the UC1832/3,  $+V_{IN} = 15\text{V}$ , Driver sink =  $+V_{IN}$ , C/S(+) voltage =  $+V_{IN}$ .  $T_A = T_J$ .

PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNITS
<b>Input Supply</b>					
Supply Current	$+V_{IN} = 6\text{V}$		6.5	10	mA
	$+V_{IN} = 36\text{V}$		9.5	15	mA
	Logic Disable = 2V (UCx832 only)		3.3		mA
<b>Reference Section</b>					
Output Voltage (Note 3)	$T_J = 25^\circ\text{C}$ , $I_{DRIVER} = 10\text{mA}$	1.98	2.00	2.02	V
	over temperature, $I_{DRIVER} = 10\text{mA}$	1.96	2.00	2.04	V
Load Regulation (UCx832 only)	$I_{OUT} = 0$ to $10\text{mA}$	-10	-5.0		mV
Line Regulation	$+V_{IN} = 4.5$ to $36\text{V}$ , $I_{DRIVER} = 10\text{mA}$		0.033	0.5	mV/V
Under-Voltage Lockout Threshold			3.6	4.5	V
<b>Logic Disable Input (UCx832 only)</b>					
Threshold Voltage		1.3	1.4	1.5	V
Input Bias Current	Logic Disable = 0V	-5.0	-1.0		$\mu\text{A}$
<b>Current Sense Section</b>					
Comparator Offset		95	100	105	mV
	Over Temperature	93	100	107	mV
Amplifier Offset (UCx833 only)		110	135	170	mV
Amplifier Offset (UCx832 only)	$V_{ADJ} = \text{Open}$	110	135	170	mV
	$V_{ADJ} = 1\text{V}$	180	235	290	mV
	$V_{ADJ} = 0\text{V}$	250	305	360	mV
Input Bias Current	$V_{CM} = +V_{IN}$	65	100	135	$\mu\text{A}$
Input Offset Current (UCx832 only)	$V_{CM} = +V_{IN}$	-10		10	$\mu\text{A}$
Amplifier CMRR (UCx832 only)	$V_{CM} = 4.1\text{V}$ to $+V_{IN} + 0.3\text{V}$		80		dB
Transconductance	$I_{COMP} = \pm 100\mu\text{A}$		65		mS
$V_{ADJ}$ Input Current (UCx832 only)	$V_{ADJ} = 0\text{V}$	-10	-1		$\mu\text{A}$
<b>Timer</b>					
Inactive Leakage Current	C/S(+) = C/S(-) = $+V_{IN}$ ; TRC pin = 2V		0.25	1.0	$\mu\text{A}$
Active Pullup Current	C/S(+) = $+V_{IN}$ , C/S(-) = $+V_{IN} - 0.4\text{V}$ ; TRC pin = 0V	-345	-270	-175	$\mu\text{A}$
Duty Ratio (note 4)	ontime/period, $R_T = 200\text{k}$ , $C_T = 0.27\mu\text{F}$		4.8		%
Period (notes 4,5)	ontime + offtime, $R_T = 200\text{k}$ , $C_T = 0.27\mu\text{F}$		36		ms
Upper Trip Threshold ( $V_U$ )			1.8		V
Lower Trip Threshold ( $V_L$ )			0.9		V
Trip Threshold Ratio	$V_U/V_L$		2.0		V/V
<b>Error Amplifier</b>					
Input Offset Voltage (UCx832 only)	$V_{CM} = V_{COMP} = 2\text{V}$	-8.0		8.0	mV
Input Bias Current	$V_{CM} = V_{COMP} = 2\text{V}$	-4.5	-1.1		$\mu\text{A}$
Input Offset Current (UCx832 only)	$V_{CM} = V_{COMP} = 2\text{V}$	-1.5		1.5	$\mu\text{A}$
AVOL	$V_{COMP} = 1\text{V}$ to $13\text{V}$	50	70		dB
CMRR (UCx832 only)	$V_{CM} = 0\text{V}$ to $+V_{IN} - 3\text{V}$	60	80		dB
PSRR (UCx832 only)	$V_{CM} = 2\text{V}$ , $+V_{IN} = 4.5$ to $36\text{V}$		90		dB
Transconductance	$I_{COMP} = \pm 10\mu\text{A}$		4.3		mS
VOH	$I_{COMP} = 0$ , Volts below $+V_{IN}$		.95	1.3	V
VOL	$I_{COMP} = 0$		.45	0.7	V
IOH	$V_{COMP} = 2\text{V}$	-700	-500	-100	$\mu\text{A}$

**ELECTRICAL CHARACTERISTICS (cont.)**

Unless otherwise stated, specifications hold for  $T_A = 0^\circ\text{C}$  to  $70^\circ\text{C}$  for the UC3832/3,  $-25^\circ\text{C}$  to  $85^\circ\text{C}$  for the UC2832/3, and  $-55^\circ\text{C}$  to  $125^\circ\text{C}$  for the UC1832/3,  $+V_{IN} = 15\text{V}$ , Driver sink =  $+V_{IN}$ , C/S(+) voltage =  $+V_{IN}$ .  $T_A = T_J$ .

PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNITS
<b>Error Amplifier (cont.)</b>					
IOL	$V_{COMP} = 2\text{V}$ , C/S(-) = $+V_{IN}$	100	500	700	$\mu\text{A}$
	$V_{COMP} = 2\text{V}$ , C/S(-) = $+V_{IN} - 0.4\text{V}$	2	6		mA
<b>Driver</b>					
Maximum Current	Driver Limit & Source pins common; $T_J = 25^\circ\text{C}$	200	300	400	mA
	Over Temperature	100	300	450	mA
Limiting Voltage (UCx832 only)	Driver Limit to Source voltage at current limit, $I_{SOURCE} = -10\text{mA}$ ; $T_J = 25^\circ\text{C}$ (Note 6)		.72		V
Internal Current Sense Resistance	$T_J = 25^\circ\text{C}$ (Note 6)		2.4		$\Omega$
Pull-Up Current at Driver Sink	Compensation/Shutdown = $0.4\text{V}$ ; Driver Sink = $+V_{IN} - 1\text{V}$	-800	-300	-100	$\mu\text{A}$
	Compensation/Shutdown = $0.4\text{V}$ , $+V_{IN} = 36\text{V}$ ; Driver Sink = $35\text{V}$	-1000	-300	-75	$\mu\text{A}$
Pull-Down Current at Driver Source	Compensation/Shutdown = $0.4\text{V}$ ; Driver Source = $1\text{V}$	150	300	700	$\mu\text{A}$
Saturation Voltage Sink to Source	Driver Source = $0\text{V}$ ; Driver Current = $100\text{mA}$		1.5		V
Maximum Source Voltage	Driver Sink = $+V_{IN}$ , Driver Current = $100\text{mA}$ Volts below $+V_{IN}$		3.0		V
UVLO Sink Leakage	$+V_{IN} = \text{C/S}(+) = \text{C/S}(-) = 2.5\text{V}$ , Driver Sink = $15\text{V}$ , Driver Source = $0\text{V}$ , $T_A = 25^\circ\text{C}$		25		$\mu\text{A}$
Maximum Reverse Source Voltage	Compensation/Shutdown = $0\text{V}$ ; $I_{SOURCE} = 100\mu\text{A}$ , $+V_{IN} = 3\text{V}$		1.6		V
Thermal Shutdown			160		$^\circ\text{C}$

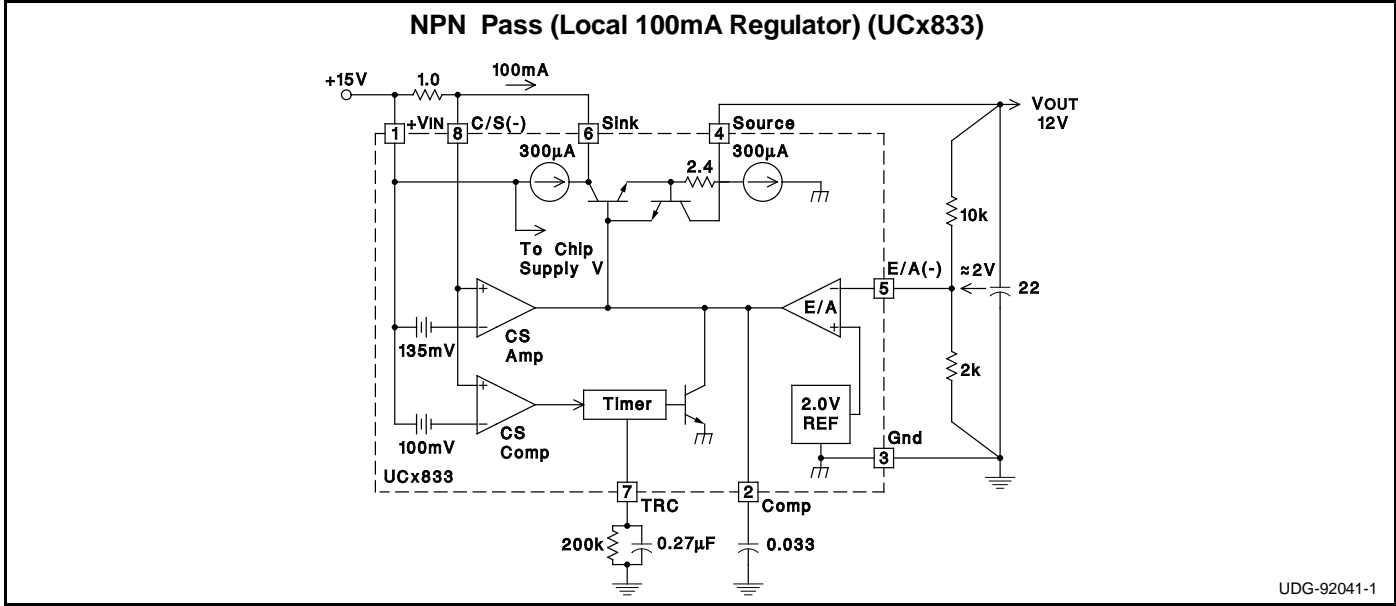
Note 3: On the UCx833 this voltage is defined as the regulating level at the error amplifier inverting input, with the error amplifier driving  $V_{SOURCE}$  to  $2\text{V}$ .

Note 4: These parameters are first-order supply-independent, however both may vary with supply for  $+V_{IN}$  less than about  $4\text{V}$ . This supply variation will cause a slight change in the timer period and duty cycle, although a high off-time/on-time ratio will be maintained.

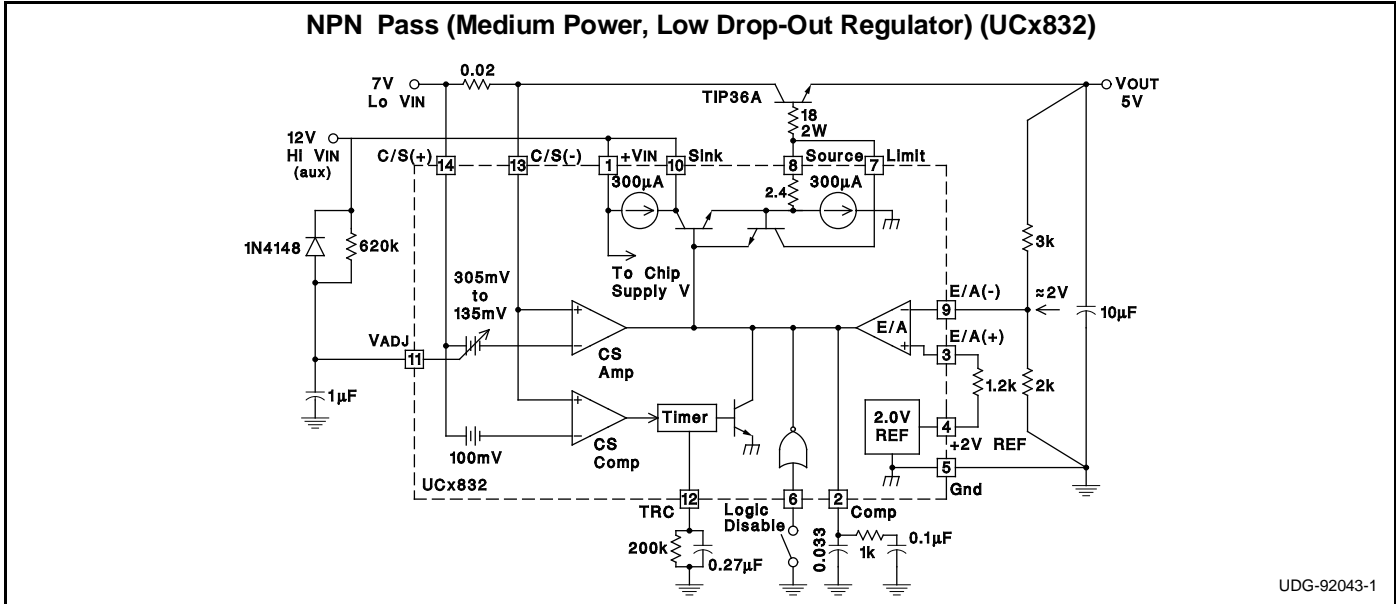
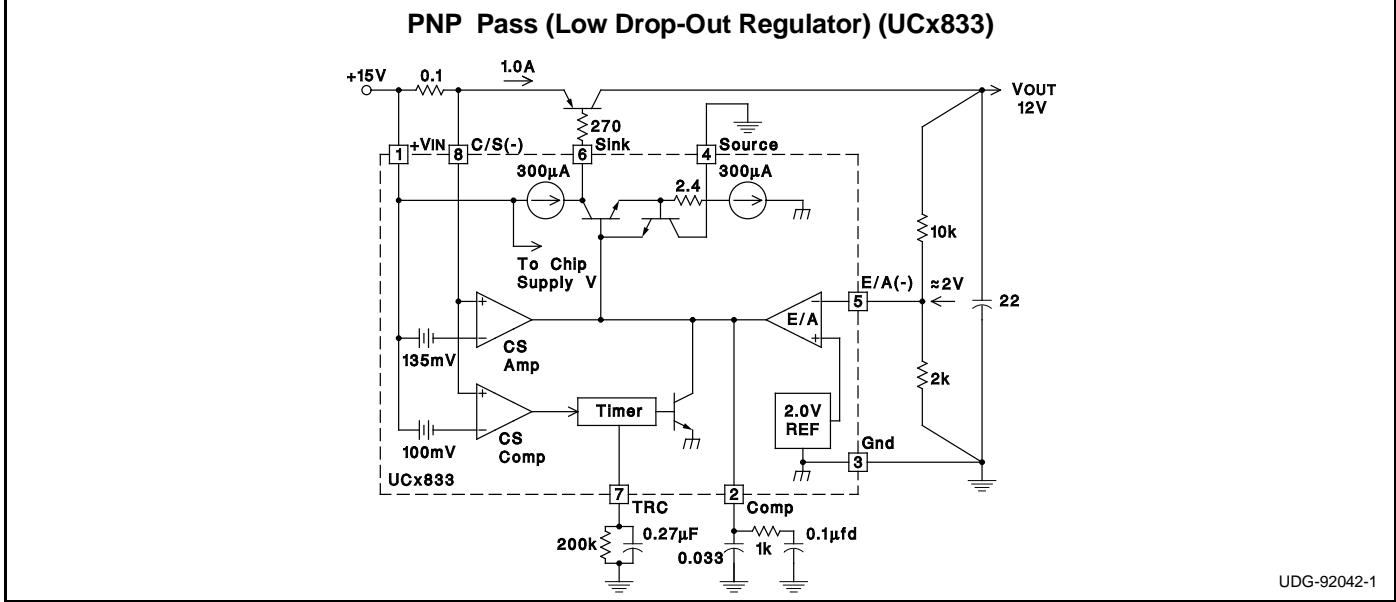
Note 5: With recommended  $R_T$  value of  $200\text{k}$ ,  $T_{OFF} \approx R_T C_T \cdot \ln(V_u/V_l) \pm 10\%$ .

Note 6: The internal current limiting voltage has a temperature dependence of approximately  $-2.0\text{mV}/^\circ\text{C}$ , or  $-2800\text{ppm}/^\circ\text{C}$ . The internal  $2.4\Omega$  sense resistor has a temperature dependence of approximately  $+1500\text{ppm}/^\circ\text{C}$ .

**APPLICATION AND OPERATION INFORMATION**



APPLICATION AND OPERATION INFORMATION (cont.)



**Estimating Maximum Load Capacitance**

For any power supply, the rate at which the total output capacitance can be charged depends on the maximum output current available and on the nature of the load. For a constant-current current-limited power supply, the output will come up if the load asks for less than the maximum available short-circuit limit current.

To guarantee recovery of a duty-ratio current-limited power supply from a short-circuited load condition, there is a maximum total output capacitance which can be charged for a given unit ON time. The design value of ON time can be adjusted by changing the timing capacitor. Nominally,  $T_{ON} = 0.693 \times 10k \times C_T$ .

Typically, the IC regulates output current to a maximum of  $I_{MAX} = K \times I_{TH}$ , where  $I_{TH}$  is the timer trip-point current,

and 
$$K = \frac{\text{Current Sense Amplifier Offset Voltage}}{100mA}$$

$\approx 1.35$  for UCx833, and is variable from 1.35 to 3.05 with VADJ for the UCx832.

For a worst-case constant-current load of value just less than  $I_{TH}$ ,  $C_{MAX}$  can be estimated from:

$$C_{MAX} = ((K-1)I_{TH}) \left( \frac{T_{ON}}{V_{OUT}} \right),$$

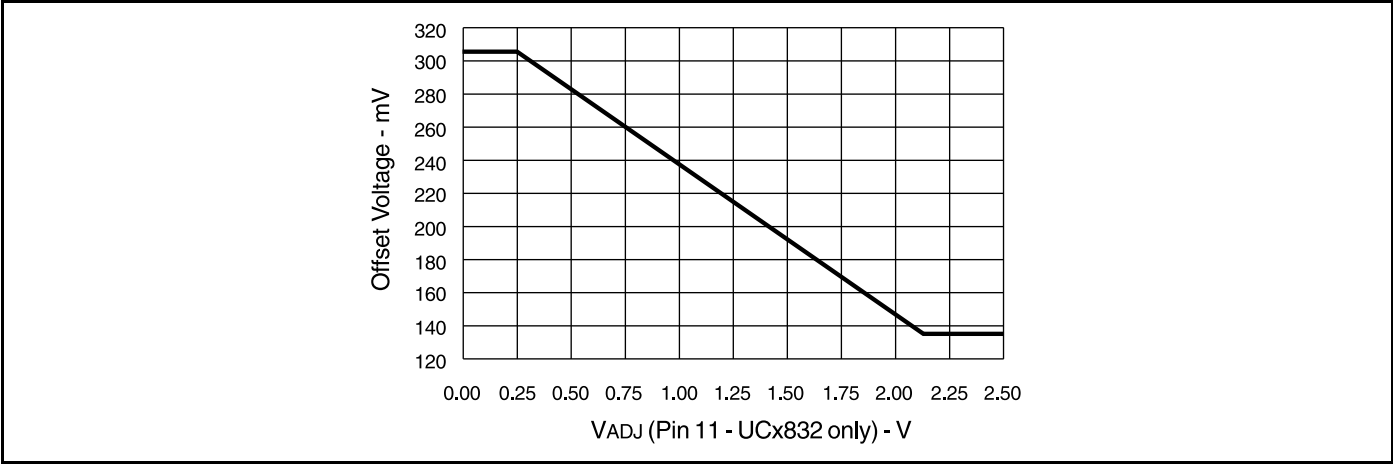
where  $V_{OUT}$  is the nominal regulator output voltage.

For a resistive load of value  $R_L$ , the value of  $C_{MAX}$  can be estimated from:

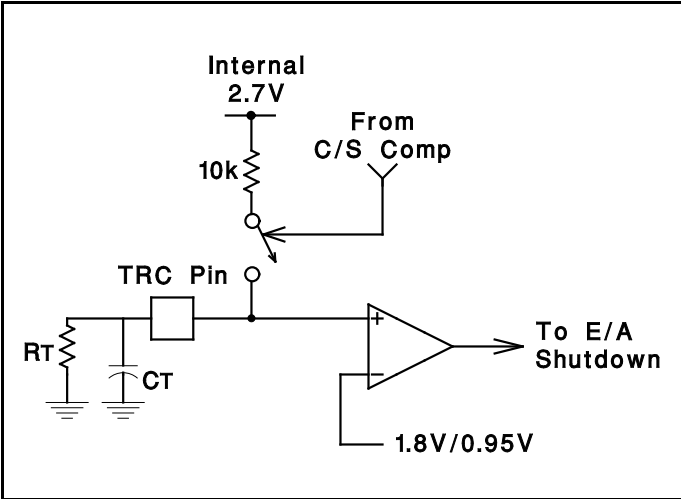
$$C_{MAX} = \frac{T_{ON}}{R_L} \cdot \frac{1}{\ln \left[ \left( 1 - \frac{V_{OUT}}{K \cdot I_{TH} \cdot R_L} \right)^{-1} \right]}$$

APPLICATION AND OPERATION INFORMATION (cont.)

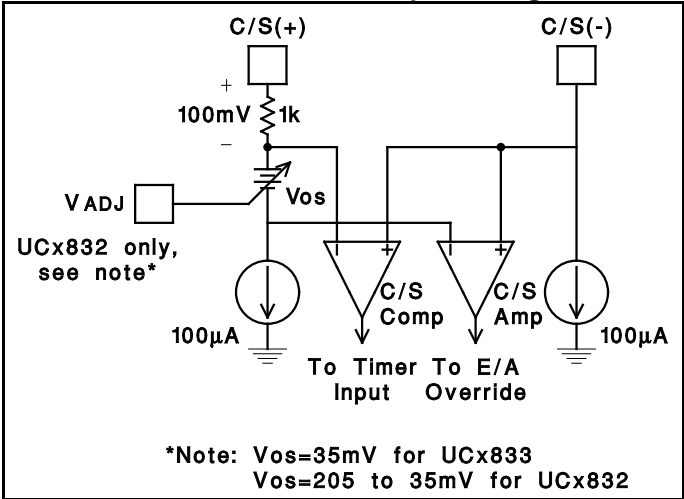
Current Sense Amplifier Offset Voltage vs VADJ



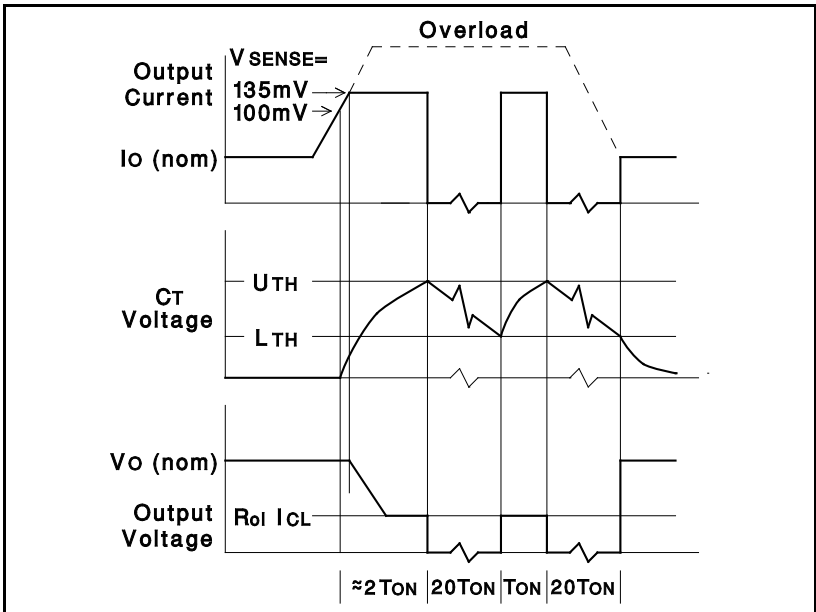
UCx832/33 Timer Function



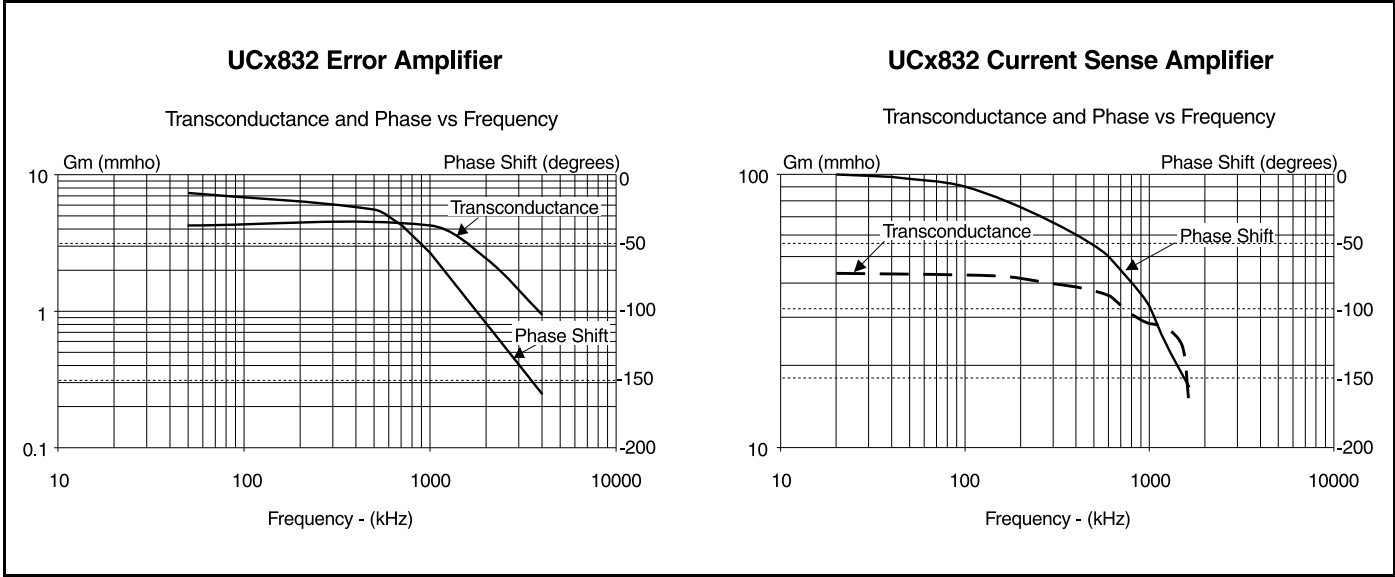
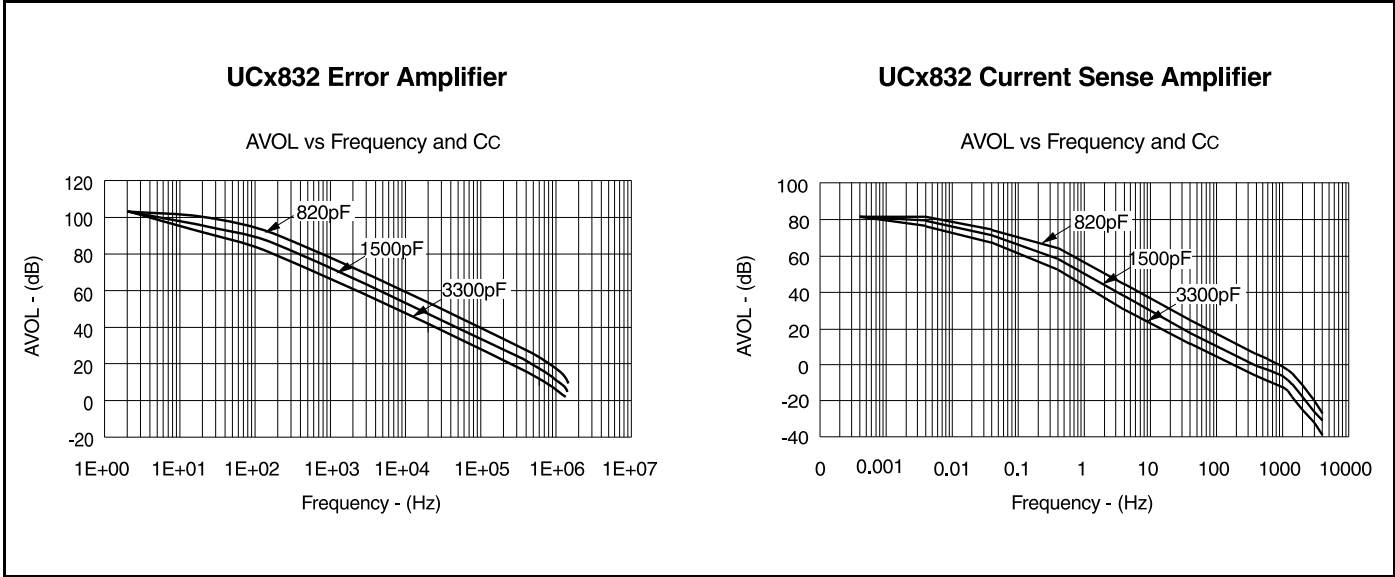
UCx832/33 Current Sense Input Configuration



Load current, timing capacitor voltage, and output voltage of the regulator under fault conditions.



APPLICATION AND OPERATION INFORMATION (cont.)



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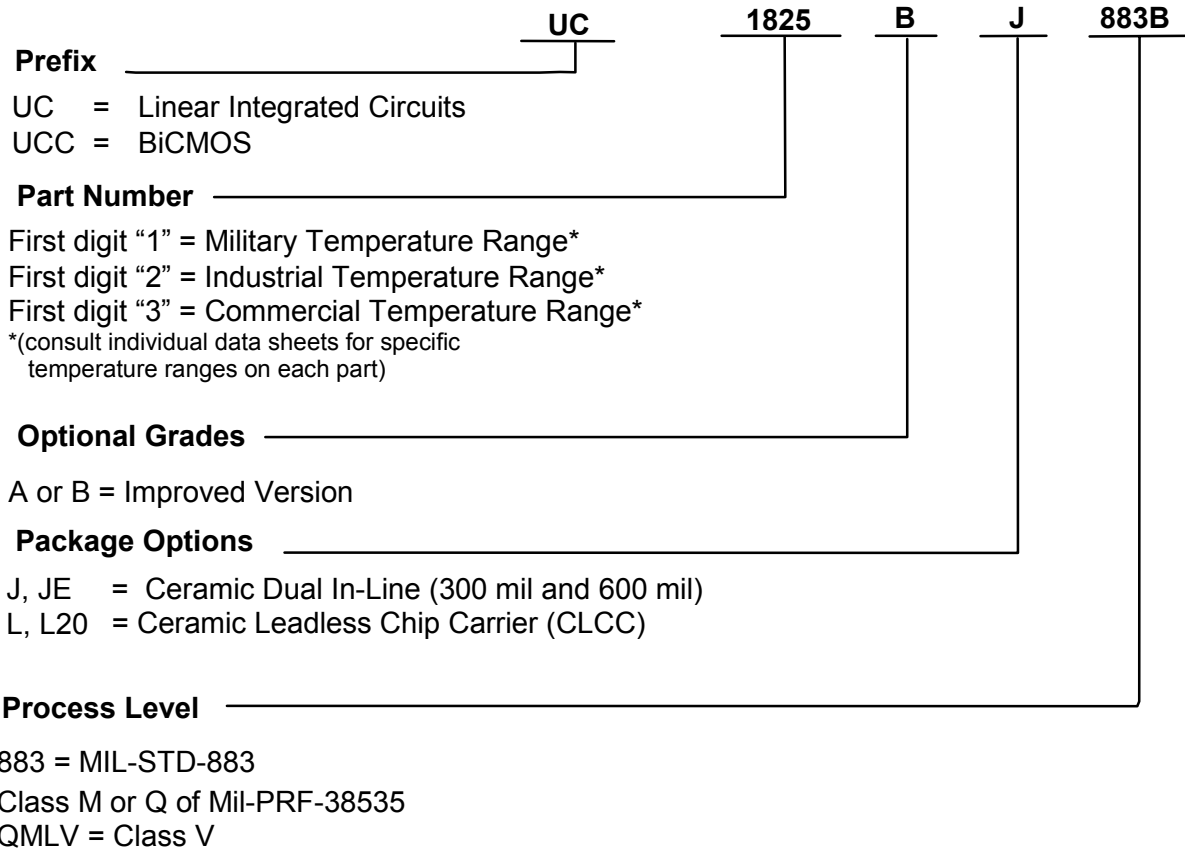
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## Analog Product Nomenclature

	TLE	2022A	M	JG	B
<b>Example:</b>					
<b>Prefix</b>					
SNJ = TI Interface, MIL-PRF-38535 (QML)					
TL = TI Linear Control Circuit					
TLC = TI LinCMOS™					
TLE = TI Excalibur					
TLV = TI Linear Low Voltage					
TPIC = TI Intelligent Power					
TSB = TI Serial Bus					
TVP = TI Video Palette					
AD = Analog Devices™ (second source)					
AM = Advanced Micro Devices™ (second source)					
LM = National Semiconductor™ (second source)					
LT = Linear Technology™ (second source)					
OP = PMI™ (second source)					
SE = Signetics™ (second source)					
μA = Fairchild™ (second source)					
THS = TI High Speed					
TPS = TI Power Supply					
<b>Unique Device Designator</b>					
A or B in last position = Upgrade					
<b>Temperature Range</b>					
M = -55°C to 125°C (applicable to all TI prefixes except SNJ)					
Q = -40°C to 125°C					
I = -40°C to 85°C					
T = -40°C to 105°C					
<b>Package Type / Pin Count</b>					
DA = Plastic Small Outline Package / 28, 30, 32 or 38					
FK = Ceramic leadless Chip Carrier / 20 or 28					
GA = Ceramic Pin Grid Array / 84					
HFG = Ceramic Flatpack / 84 or 164					
J = Ceramic DIP / 8, 14, 16, 20, or 28					
JG = Ceramic DIP / 8					
U = Ceramic Flatpack / 10					
W = Ceramic Flatpack / 14 or 16					
WD = Ceramic Flatpack / 56					
L = Ceramic Leadless Chip Carrier / 20 or 28					
PHP = Plastic Quad Flatpack PowerPad / 48					
PCE = Plastic Quad Flatpack / 144 or 160					
PWP = Plastic Power TSSOP / 14, 16, 20, 24 or 28					
DW = Plastic Widebody (30 mil) SOIC / 16, 20, 24 or 28					
TCP = Tape Carrier Package / Custom					
<b>Process Level</b>					
Blank = Standard Suffix, Commercial Processing					
B = MIL-PRF-38535 (QML)					
LinCMOS is a trademark of Texas Instruments Incorporated.					
Analog Devices is a trademark of Analog Devices, Inc.					
Advanced Micro Devices is a trademark of Advanced Micro Devices, Inc.					
National Semiconductor is a trademark of National Semiconductor Corporation.					
Linear Technology is a trademark of Linear Technology Corp.					
Motorola is a trademark of MOTOROLA INC.					
PMI is a trademark of Precision Monolithics Inc.					
Signetics is a trademark of Signetics Company a subsidiary of North American Phillips					
Fairchild is a trademark of Fairchild Camera and Instrument Corporation.					

## Unitrode Product Nomenclature

### Power Management Products Acquired from Unitrode



## Data Converters

### Future Product Releases

The following section will highlight potential data conversion products that Texas Instruments Military Semiconductor is evaluating for future release. Please the Product Information Center for release schedules and sample availability.

### Future Analog to Digital Converters

Parameter	TLC2558M	THS1408M
Number of Bits	12	14
Supply Voltage Range	4.5-5.5	3.0-3.6
Analog Input Channels	8	1
Samples per Second	400 kSPS	8 MSPS
Output Interface	Serial	Parallel
V reference	Internal	Internal
Power (typ)	4 mW	270 mW
Differential Non Linearity	1	1
Integral Non-Linearity	1	5
Package	DW	PWP (QML Plastic Power TSSOP)
SMD Number	5962-9957002NXD	5962-0051101NXD
Estimated Availability	4Q01	Now

**Just Released!**

## Data Converters

## Future Digital to Analog Converters

Parameter	TLV5639M	TLV5619M
Number of Bits	12	12
Supply Voltage Range	2.7-5.5	2.7-5.5
Input Interface	Parallel	Parallel
Settling Time	1 $\mu$ s	1 $\mu$ s
Power (typ)	2.7 mW	4.3 mW
Number of DACs per Package	1	1
Differential Non Linearity	0.5	1
Integral Non-Linearity	3	4
V reference	Internal	External
Output (Current or Voltage)	Voltage	Voltage
Package	DW (QML-Plastic)	DW (QML-Plastic)
SMD Number	5962-9958801NXD	5962-9958701NXD
Estimated Availability	Contact PIC	Contact PIC

The above data converters are designed to be used in conjunction with TI's Digital Signal Processors. These data converters also provide a "glueless" interface to most processors and will simplify your overall system design.

## Data Converters

### Device Spotlight

#### THS1206M

The award winning THS1206 is a CMOS, low-power, 12-bit, 6 MSPS analog-to-digital converter (ADC). The speed, resolution, bandwidth and single-supply operation are suited for applications in radar, imaging, high-speed acquisition and communications. A multistage pipelined architecture with output error correction logic provides for no missing codes over the full military temperature range. Internal control registers are used to program the ADC into the desired mode. The THS1206M consists of four analog inputs, which are sampled simultaneously. These inputs can be selected individually and configured to single-ended or differential inputs. An integrated 16-word deep FIFO allows the storage of data in order to take the load off of the processor connected to the ADC. Internal reference voltages for the ADC (1.5 V and 3.5 V) are provided. An external reference can also be chosen to suit the DC accuracy and temperature drift requirements of the application. Two different conversion modes can be selected: single conversion mode or continuous conversion mode.

The THS1206M is characterized for operation from  $-55^{\circ}\text{C}$  to  $+125^{\circ}\text{C}$ .

EVM—An Evaluation Module (THS1206EVM) is available for rapid evaluation. TI offers a free Code Composer Plug-In for your DSP tools which will speed your design development. Call 1-800-477-8924 Ext. 5801 (Product Information Center) for details on how to purchase. (\$99)

#### Features

<ul style="list-style-type: none"> <li>High-Speed 6 MSPS ADC</li> </ul>	<ul style="list-style-type: none"> <li>4 Single-Ended or 2 Differential Inputs</li> </ul>
<ul style="list-style-type: none"> <li>Simultaneous Sampling of 4 Single-Ended Signals or 2 Differential Signals or Combination of Both</li> </ul>	<ul style="list-style-type: none"> <li>Differential Nonlinearity Error: <math>\pm 1</math> LSB</li> </ul>
<ul style="list-style-type: none"> <li>Integral Nonlinearity Error: <math>\pm 1.8</math> LSB</li> </ul>	<ul style="list-style-type: none"> <li>Signal-to-Noise and Distortion Ratio: 68 dB at <math>f_l = 2</math> MHz</li> </ul>
<ul style="list-style-type: none"> <li>Auto-Scan Mode for 2, 3, or 4 Inputs</li> </ul>	<ul style="list-style-type: none"> <li>Auto-Scan Mode for 2, 3, or 4 Inputs</li> </ul>
<ul style="list-style-type: none"> <li>3-V or 5-V Digital Interface Compatible</li> </ul>	<ul style="list-style-type: none"> <li>Low Power: 186 mW Max</li> </ul>
<ul style="list-style-type: none"> <li>5-V Analog Single Supply Operation</li> </ul>	<ul style="list-style-type: none"> <li>Internal Voltage References...50 PPM/<math>^{\circ}\text{C}</math> and <math>\pm 5\%</math> Accuracy</li> </ul>
<ul style="list-style-type: none"> <li>Glueless TI DSP Interface</li> </ul>	<ul style="list-style-type: none"> <li>Parallel UC/DSP Interface</li> </ul>
<ul style="list-style-type: none"> <li>Integrated FIFO</li> </ul>	<ul style="list-style-type: none"> <li>Available in DA Package over <math>-55^{\circ}\text{C}</math> to <math>+125^{\circ}\text{C}</math></li> </ul>

#### Details

Device	THS1206M
Number of Bits	12
Supply Voltage Range	3.0 – 5.5 V
Analog Input Channels	4
Samples per Second	6 MSPS
Output Interface	Parallel
V Reference	Internal
Power (typ)	186 mW
Differential Non Linearity	+/- 1 LSB
Integral Non-Linearity	+/- 1.8 LSB
Package	DA (QML plastic)
SMD Number	5962-9957701NXD
Estimated Availability	<b>NOW</b>

## Data Converters

## Devices In Production

## Analog to Digital Converters

DEVICE	Bits	Analog Input Channels	Supply Voltage Range	Sample Rate	Output Interface Type	V ref. Internal External	Power (TYP)	DNL max +/- LSB	INL max +/- LSB	Package	Release Date
TLC2558M*	12	8	4.5-5.5	400 kSPS	Serial	Int.	4 mW	1	1	DW (QML Plastic)	Contact PIC
<b>THS1408M</b> 5962-0051101NXD	<b>14</b>	<b>1</b>	<b>3 – 3.6</b>	<b>8 MSPS</b>	<b>Parallel</b>	<b>Int.</b>	<b>270 mW</b>	<b>1</b>	<b>5</b>	<b>PFB</b> <b>(QML Plastic)</b>	<b>NEW</b>
<b>THS1206M</b> 5962-9957701NXD	<b>12</b>	<b>4</b>	<b>3.0–5.5</b>	<b>6 MSPS</b>	<b>Parallel</b>	<b>Int.</b>	<b>186 mW</b>	<b>1</b>	<b>1.8</b>	<b>PWP</b> <b>(QML Plastic)</b>	<b>NEW</b>
TLV2548M	12	8	2.7-5.5	200 kSPS	Serial	Int. or Ext.	9.5 mW	1	1	J, FK	NOW
TLC876M	10	1	4.5-5.2	20 MSPS	Parallel	Ext./ special	107 mW	1	1.6	DW	NOW
TLC2543M	12	11	4.5-5.5	66 kSPS	Serial	Ext.	12 mW	1	1	J,FK	NOW
TLV1548M	10	8	2.7–5.5	85 kSPS	Serial	Ext.	4 mW	1	1	J, FK	NOW
TLV1543M	10	11	3 - 3.6	38 kSPS	Serial	Ext.	8 mW	1	1	J,FK	NOW
TLC1542M	10	11	4.5-5.5	38 kSPS	Serial	Ext.	12 mW	1	1	J,FK	NOW

\*Potential Product

## Data Converters

### Digital to Analog Converters

DEVICE	BITS	Number of DACs	Supply Voltage Range	INPUT Interface	Settling Time	Power Typ	DNL max +/- LSB	INL max +/- LSB	Vref Internal External	Output(I or V)	Package	Release Date
TLV5639M* 5962-9958801NXD	12	1	2.7-5.5 V	Parallel	1 $\mu$ s	2.7 mW	.5	3	Int.	V	DW	Contact PIC
TLV5619M* 5962-9958701NXD	12	1	2.7-5.5 V	Parallel	1 $\mu$ s	4.3 mW	1	4	Ext.	V	DW	Contact PIC
TLV5638M	12	2	2.7-5.5 V	Serial	1 $\mu$ s	7.5-22 mW	1	4	Int.	V	JG, FK	Now
TLC5618AM	12	2	4.5-5.5 V	Serial	2.5 $\mu$ s	9 mW	1	4	Ext.	V	JG, FK	Now
TLV5618AM	12	2	2.7-5.5 V	Serial	2.5 $\mu$ s	5.4 mW	1	4	Ext.	V	JG, FK	Now
AD7524M	8	1	4.8-15.5 V	Parallel	100 $\mu$ s	10 mW	.5	.5	Ext.	I	J, FK	Now

\*Potential Product

### ANALOG INTERFACE CIRCUITS

DEVICE	Resolution (bits)	Linearity (bits)	Sampling rate (kHz)	Power Diss. (mW) Typ	Bandpass filter Bandwidth (Hz)	Packages
TLC32044M	14	10	19.2	385	150 to 3800	J,FK
TLC32046M	14	10	25	385	150 to 7800	J,FK

### VIDEO INTERFACE PALETTES (RAMDACs)

DEVICE	Pixel Bus Width	Pixel Clock	Resolution	True Color	Packages
TVP3010-135M	32 + 8 bit	135 MHz	1600 x 1280 @ 60 Hz	24 bit	GA
TVP3026-175M	64 + 8 bit	175 MHz	1600 x 1280 @ 72 Hz	24 bit	HFG/PCE



# Interface (Data Transmission)

## Devices in Production

### DATA TRANSMISSION CIRCUITS

#### ANSI TIA/EIA - 644

Drivers/Receivers per Package	Propagation Delay Tpd (ns)	Icc (mA)	Device Type	Packages
0/4	2.2	10	SN55LVDS32	J,FK
4/0	1.4	9	SN55LVDS31	J,FK

#### RS485

Drivers/Receivers per Package	Propagation Delay Tpd (ns)	Icc (mA)	Device Type	Packages
0/4	35	70	SN55173	J,FK
0/4	30	20	SN55LBC173	J,FK,
0/4	30	20	SN55LBC175	J,FK,W
1/1	31/65	1.75	SN55LBC176	JG,FK,U
4/0	25 25	7 7	SN55LBC172 SN55LBC174	J,FK,W J,FK,W
9/9	14/17	60/45	SN55976AI	WD

#### EIA RS422A, CCITT v.11

Drivers/Receivers per Package	Propagation Delay Tpd (ns)	Icc (mA)	Device Type	Packages
0/4	35	70	AM26LS32AM	J,FK
0/4	35	70	AM26LS33AM	J,FK
0/4	35	70	SN55173	J,FK
0/4	27	15	AM26C32M	J,FK,W
4/0	12	3	AM26C31M	J,FK,W

#### EIA/RS 232

Drivers/Receivers per Package	Propagation Delay Tpd (ns)	Icc (mA)	Device Type	Packages
0/4	85	26	SN55189	J
0/4	85	26	SN55189A	J,FK
4/0	350	34	SN55188	J,FK

#### MISCELLANEOUS STANDARDS

Drivers/Receivers per Package	Standard	Icc (mA)	Device Type	Packages
0/4	RS423	15	AM26C32M	J,FK,W
4/0	RS423	3	AM26C31M	J,FK,W
9/9	SCSI	60/45	SN55976A1	WD

## Interface (Data Transmission)

### 1394 SERIAL BUS DEVICES\*

#### High Serial Speed Data Transmission

1394 is the IEEE designation for a high performance serial bus. This serial bus defines both a backplane (for example, VME, FB+) physical layer and a point-to-point cable-connected virtual bus. The backplane version operates at 12.5, 25 or 50 Mbits/sec, whereas the cable version supports data rates of 100, 200 and 400 Mbits/sec across the cable medium supported in the current standard. Both versions are totally compatible at the link layer and above. The interface standard defines transmission method, media and protocol. This standard supports both isochronous (Video, Audio) and asynchronous data transfer.

#### 1394 Link Layer Devices PCI Interface

Device	Name	Supply Voltage	Data Rate (Mbps)	Package	Notes
TSB12LV26*	OHCI-Lynx	3.3 (1.8-V Core)	Up to 400	PZT 100-pin PQFP	Open Host Controller Interface Compliant. 1394a-2000 link layer controller. 32-bit PCI I/F, 8-K FIFO, pin compatible with TSB12LV23
TSB43AA22*	OHCI-Lynx	3.3 (1.8-V Core)	Up to 400	PDT 128-pin TQFP	Open Host Controller Interface compliant 1394 link layer controller and 1394a-2000 compliant, 2-port PHY, 8-K FIFO
TSB12LV21B	PCILynx2	3.3	Up to 400	PGF 176-pin TQFP	High performance link for host or peripheral applications. 32-bit PCI I/F, 4-K FIFO, handles asynchronous streaming and ZV applications

\* = Planned Product

#### Audio/Video Link

Device	Name	Supply Voltage	Data Rate (Mbps)	Package	Notes
TSB42AB4*	ceLynx	3.3	Up to 400	PDT 128-pin TQFP	High-performance link for MPEG2 and DV applications. 8/16-bit host I/F, 8-K FIFO, high-speed data I/F

\* = Planned Product

#### SBP2 & General Purpose

Device	Name	Supply Voltage	Data Rate (Mbps)	Package	Notes
TSB43AA82*	iSphynxII	3.3	Up to 400	PGE 144-pin TQFP	High-performance 1394 asynchronous LLC for peripherals. Integrated 2-Port PHY with SBP2 H/W acceleration, 3.3 V, 8/16 B4 Host I/F, SCSI-like DMA, 4-K FIFO
TSB12LV32	GP2Lynx	3.3	Up to 400	PZ 100-pin QFP	1394a-2000 compliant link for camera, printer or scanner apps. 8/16-bit host S-PQFP, I/F, 2K-FIFO, high-speed data I/F
TSB12LV01B	—	3.3	Up to 400	PZ 100-pin TQFP	High performance 1394 link layer for telecom, embedded and industrial applications. 32-bit I/F, 2K-FIFO

\* = Planned Product

## Interface (Data Transmission)

### 1394 Physical Layer Devices PCI Interface

Device	Ports	Supply Voltage	Data Rate (Mbps)	Package	Notes
TSB41LV03A	3	3.3	400/200/100	PAP 64-pin TQFP	400 Mbps, 1394a, 3-Port Physical Layer
TSB41AB3*	3	3.3	400/200/100	PAP 64-pin TQFP	400 Mbps, 1394a, 3-Port Physical Layer
TSB41LV06A*	6	3.3	400/200/100	PZP 100-pin TQFP	400 Mbps, 1394a, 6-Port Physical Layer
TSB14C01A	1	5	100/50	PM 64-pin TQFP	100 Mbps, 1394-1995, 1-Port Backplane PHY
TSB14AA1*	1	3.3	100/50	TBD	100 Mbps, 1394a, 1-Port Backplane PHY

\*TI Military Semiconductors also offers selected 1394 functions in the industrial temperature range. See [www.ti.com/sc/docs/msp/1394/1394.htm](http://www.ti.com/sc/docs/msp/1394/1394.htm) for more information.

## LCD Drivers

Texas Instruments is the worldwide leader in LCD drivers and is dedicated to providing differentiated TFT LCD drivers for military, avionic, and ruggedized display applications. Texas Instruments provides industry leading expertise in design and application support.

- Digital source drivers with up to 256 gray scale and 384 output channels
- Gate drivers with up to 258 output channels at 40 V

Highlighted below are some of the key value-added services Texas Instruments offers to reduce customer time-to-market.

<b>World-Class Customer Support:</b>	<b>Quality and Reliability Excellence:</b>
• Design Support Expertise	• QML Level Processing
• Custom Tape Design	• Experienced Process and Product Engineering Teams
• Technical Documentation	• 100% Parametric Test to Datasheet
• Application Support	• Qualification Test and Verification
• Quick Production Ramp	• Failure Analysis Support
• Tape and Reel or Carrier	• Configuration Control
• Obsolescence Management	

### LCD Part Number Nomenclature:

**M P T 5 7 # # # X X X X X**

Die Name

Tape Design ID:

A, B, C, ...sequentially designated by TI.

Tape Size:

A = 70 mm ♦  
 B = 48 mm ♦  
 C = 35 mm ♦  
 D = 70 mm\*  
 E = 48 mm\*  
 F = 35 mm\*

♦ = Reel format  
 \* = Carrier format

Part Revision:

Blank or character assigned by TI

Lead Finish:

A = Solder Dip  
 B = Tin Plate  
 C = Gold Plate

Temperature Range:

C = 0°C to 70°C  
 I = -40°C to 85°C  
 M = -55°C to 125°C  
 S = Special per Datasheet

Texas Instruments reserves the right to make changes at any time in order to improve design and supply the best product possible.

## LCD Drivers

## Devices in Production

## LCD Drivers

## SOURCE/COLUMN DRIVERS – LINE INVERSION

Part No.	# Output Channels	Graphics Standard	# Gray Scales	Voltage (V <sub>OUT</sub> )	Frequency (MHz)
MPT57592	192/240	SVGA/XGA	64	5	45
MPT57492	384	SVGA	64	3 to 5.5	55

## SOURCE/COLUMN DRIVERS – DOT INVERSION

Part No.	# Output Channels	Graphics Standard	# Gray Scales	Voltage (V <sub>OUT</sub> )	Frequency (MHz)
MPT57491	300/309	SVGA/XGA	256	3.3	55
MPT57565	384	XGA/SXGA	64	7.5 to 9.5	45
MPT57561	384	XGA/SXGA	64	6 to 9.5	45
MPT57570A	384	XGA/SXGA	256	8 to 10.5	45
MPT57571	384	XGA/SXGA	256	8 to 13.5	55

## GATE DRIVERS

Part No.	# Output Channels	Graphics Standard	Voltage (V <sub>OUT</sub> )	Frequency (kHz)
MPT57603	240	AV/VGA	-15 to 20	100
MPT57600	120/128	VGA/SVGA/XGA	-15 to 25	100
MPT57601	150/200	SVGA/XGA	-15 to 25	100
MPT57604	192/200	SVGA/XGA	-15 to 25	100
MPT57605	256	XGA/SXGA	-15 to 25	100
MPT57606	258	XGA/SXGA	-15 to 25 3 LEVEL	100
MPT57651	152/156	XGA/SXGA	-15 to 25 3 LEVEL	200

# Power Management

## Current-Mode Pulse Width Modulator (PWM) Controllers

Device Name	UC1823	UC1823A	UC1823B	UC1825	UC1825A	UC1825B
Application	DC-DC	DC-DC	Off-line	DC-DC	DC-DC	Off-line
Topology	Buck, Boost	Buck, Boost	Buck, Boost	Push-Pull, Full Bridge, Half Bridge	Push-Pull, Full Bridge, Half Bridge	Push-Pull, Full Bridge, Half Bridge
Vref tol (%)	1	1	1	1	1	1
Peak Output Current (mA)	1500	2000	2000	1500	2000	2000
Undervoltage Lockout	9.2 V / 8.4 V	9.2 V / 8.4 V	16 V / 8.4 V	9.2 V / 8.4 V	9.2 V / 8.4 V	16 V / 10 V
Maximum Practical Frequency (kHz)	1000	1000	1000	1000	1000	1000
Output Type	Single, Totem Pole	Single, Totem Pole	Single, Totem Pole	Dual Alternating, Totem Pole	Dual Alternating, Totem Pole	Dual Alternating, Totem Pole
Startup Current (mA) Max	1.1	0.1	0.1	1.1	0.1	0.1
Leading Edge Blanking	—	Yes	Yes	—	Yes	Yes
Soft Start	Yes	Yes	Yes	Yes	Yes	Yes
Duty Cycle (max) (%)	100	Programmable	Programmable	50/50	Programmable	Programmable, <50
Separate Oscillator / Synch Terminal	Yes	Yes	Yes	Yes	Yes	Yes
VIN Range (VDC)	10 - 30	12 - 20	12 - 20	10 - 30	12 - 20	12 - 20
Output Mode Fixed Push - Pull	No	No	No	Yes	Yes	Yes
Pulse - by - Pulse Isense	Yes	Yes	Yes	Yes	Yes	Yes
Shutdown Mode	Yes	Yes	Yes	Yes	Yes	Yes
Operating / Start-Up Current (mA)	22/61	20/0.1	28/0.1	22/1.1	28/0.1	28/0.1
Reference Voltage (V)	5.1	5.1	5.1	5.1	5.1	5.1
On-board Amplifiers	1	1	1	1	1	1
Output Mode Single - Ended	Yes	Yes	Yes	No	No	No
Current - Sense	No	No	No	No	No	No
SMD Number	5962-8990501EA 5962-89905012A	5962-8990502EA 5962-89905022A	5962-8990503EA 5962-89905032A	5962-8768101EA 5962-87681012A	5962-8768102EA 5962-87681022A 5962-8768102XA	5962-8768103EA 5962-87681032A 5962-8768103XA
Pincount / Package	16-J, 20-L	16-J, 20-L	16-J, 20-L	16-J, 20-L	16-J, 20-L/28-LP	16-J, 20-L, 28-LP
Space Level-Class V	—	5962-8990502VEA 5962-8990502V2A*	—	5962-8768101VEA 5962-8768101V2A	5962-8768102VEA 5962-8768102V2A	—
Catalog Orderable Part Number	UC1823J UC1823J883B UC1823L UC1823L883B	UC1823AJ UC1823AJ883B UC1823AL UC1823AL883B	UC1823BJ UC1823BJ883B UC1823BL UC1823BL883B	UC1825J UC1825J883B UC1825L UC1825L883B	UC1825AJ UC1825AJ883B UC1825AL UC1825AL883B	UC1825BJ UC1825BJ883B UC1825BL* UC1825BL883B

\* Contact the PIC for availability

## Power Management

## Current-Mode Pulse Width Modulator (PWM) Controllers

Device Name	UC1841	UC1842	UC1842A	UC1843	UC1843A
Application	Off-line, DC-DC	Off-line, DC-DC	Off-line, DC-DC	Off-line, DC-DC	Off-line, DC-DC
Topology	Forward, Flyback, Buck, Boost	Forward, Flyback, Buck, Boost	Forward, Flyback, Buck, Boost	Forward, Flyback, Buck, Boost	Forward, Flyback, Buck, Boost
Vref tol (%)	1	1	1	1	1
Peak Output Current (mA)	1000	±1000	±1000	±1000	±1000
Undervoltage Lockout	8.0/7.8	16 V / 10 V	16 V / 10 V	7.6 V / 8.4 V	7.6 V / 8.4 V
Maximum Practical Frequency (kHz)	500	500	500	500	500
Output Type	Single, Totem Pole	Single, Totem Pole	Single, Totem Pole	Single, Totem Pole	Single, Totem Pole
Startup Current (mA) Max	6	1.0	0.5	1.0	0.5
Leading Edge Blanking	—	—	—	—	—
Soft Start	Yes	—	—	—	—
Duty Cycle (max) (%)	Programmable	100	100	100	100
Separate Oscillator / Synchronization Terminal	—	—	—	—	—
VIN Range (VDC)	8 - 30	10 - 30	10 - 30	7.6 - 30	7.6 - 30
Output Mode Fixed Push - Pull	No	No	No	No	No
Pulse - by - Pulse Isense	Yes	Yes	Yes	Yes	Yes
Shutdown Mode	Yes	No	No	No	No
Operating / Start-Up Current (mA)	10/4.5	11/0.5	11/0.3	11/0.3	11/0.3
Reference Voltage (V)	5	5	5	5	5
On-board Amplifiers	3	1	1	1	1
Output Mode Single - Ended	Yes	Yes	Yes	Yes	Yes
Current - Senses	Yes	No	No	No	No
SMD Number	5962-8992002VA 5962-89920022A	5962-8670401PA 5962-8670401XA	5962-8670405PA 5962-8670405XA	5962-8670402PA 5962-8670402XA	5962-8670406PA 5962-8670406XA
Pincount / Package	18-J, 20-L	8-J, 20-L	8-J, 20-L	8-J, 20-L	8-J, 20-L
Space Level-Class V	—	5962-8670401VEA 5962-8670401V2A	5962-8670405VPA 5962-8670405V2A	5962-8670402VPA 5962-8670402V2A	5962-8670406VPA 5962-8670406V2A
Catalog Orderable Part Number	UC1841J UC1841J883B UC1841L UC1841L883B	UC1842J UC1842J883B UC1842L UC1842L883B	UC1842AJ UC1842AJ883B UC1842AL* UC1842AL883B	UC1843J UC1843J883B UC1843L UC1843L883B	UC1843AJ UC1843AJ883B UC1843AL* UC1843AL883B

\* Contact the PIC for availability

# Power Management

## Current-Mode Pulse Width Modulator (PWM) Controllers (Continued)

Device Name	UC1844	UC1844A	UC1845	UC1845A	UC1846	UC1847
Application	Off-line, DC-DC	Off-line, DC-DC	Off-line, DC-DC	Off-line, DC-DC	Off-line, DC-DC	Off-line, DC-DC
Topology	Forward, Flyback, Buck, Boost	Forward, Flyback, Buck, Boost	Forward, Flyback, Buck, Boost	Forward, Flyback, Buck, Boost	Push-Pull, Full Bridge, Half Bridge	Push-Pull, Full Bridge, Half Bridge
Vref tol (%)	1	1	1	1	1	1
Peak Output Current (mA)	1000	1000	1000	1000	500	500
Undervoltage Lockout	16 V / 10 V	16 V / 10 V	8.4 V / 7.6 V	8.5 V / 7.6 V	7.7 V / 6.95 V	7.7 V / 6.95 V
Maximum Practical Frequency (kHz)	500	500	500	500	500	500
Output Type	Single, Totem Pole	Single, Totem Pole	Single, Totem Pole	Single, Totem Pole	Dual Alternating, Totem Pole	Dual Alternating, Totem Pole
Startup Current (mA) Max	1.0	0.5	1.0	0.5	—	—
Leading Edge Blanking	—	—	—	—	—	—
Soft Start	—	—	—	—	Yes	Yes
Duty Cycle (max) (%)	<50	50	<50	50	50/50	50/50
Separate Oscillator / Synchronization Terminal	—	—	—	—	Yes	Yes
VIN Range (VDC)	10-30	10-30	7.6 - 30	7.6 - 30	8 - 40	8 - 40
Output Mode Fixed Push - Pull	No	No	No	No	Yes	Yes
Pulse - by - Pulse Isense	Yes	Yes	Yes	Yes	Yes	Yes
Shutdown Mode	No	No	No	No	Yes	Yes
Operating / Startup Current (mA)	11/0.3	11/0.3	11/0.3	11/0.3	NA/17	NA/17
Reference Voltage (V)	5	5	5	5	5.1	5.1
On-board Amplifiers	1	1	1	1	2	2
Output Mode Single - Ended	Yes	Yes	Yes	Yes	No	No
Current - Sense	No	No	No	No	Yes	Yes
SMD Number	5962-8670403PA 5962-8670403XA	5962-8670407PA 5962-8670407XA	5962-8670404PA 5962-8670404XA	5962-8670408PA 5962-8670408XA	5962-8680601EA 5962-86806012A	5962-8680602EA 5962-86806022A
Pincount / Package	8-J, 20-L	8-J, 20-L	8-J, 20-L	8-J, 20-L	16-J, 20-L	16-J, 20-L
Space Level-Class V	5962-8670403VPA 5962-8670403V2A	5962-8670407VPA 5962-8670407V2A	5962-8670404VPA 5962-8670404V2A	5962-8670408VPA 5962-8670408V2A	5962-8680601VEA 5962-8680601V2A	—
Catalog Orderable Part Number	UC1844J UV1844J883B UV1844L UV1844L883B	UC1844AJ UV1844AJ883B UV1844AL UV1844AL883B	UC1845J UC1845J883B UC1845L* UC1845L883B	UC1845AJ UC1845AJ883B UC1845AL* UC1845AL883B	UC1846J UC1846J883B UC1846L* UC1846L883B	UC1847J UC1847J883B UC1847L UC1847L883B

\* Contact the PIC for availability



## Power Management

## Current-Mode Pulse Width Modulator (PWM) Controllers (Continued)

Device Name	UC1851	UC1856	UC1800	UCC1801	UCC1802	UCC1803
Application	Off-line, Prog., Primary side Controller	Isolated Output, Push-Pull Controller	DC-DC and Battery	DC-DC and Battery	Off-line	DC-DC and Battery
Topology	Forward, Flyback, Buck, Boost	Push-Pull, Full Bridge, Half Bridge	Buck, Boost	Buck, Boost	Forward, Flyback	Buck, Boost
Vref tol (%)	1	1	1.5	1.5	1.5	1.5
Peak Output Current (mA)	200	1500	1000	1000	1000	1000
Undervoltage Lockout	7.7 V / 7 V	7.7 V / 7.0 V	7.2 V / 6.9 V	9.4 V / 7.4 V	12.5 V / 8.3 V	4.1 V / 3.6 V
Maximum Practical Frequency (kHz)	500	1000	1000	1000	1000	1000
Output Type	Single, Totem Pole	Dual Alternating, Totem Pole	Single, Totem Pole	Single, Totem Pole	Single, Totem Pole	Single, Totem Pole
Startup Current (mA) Max	4.5	—	0.1	0.1	0.1	0.1
Leading Edge Blanking	Yes	—	Yes	Yes	Yes	Yes
Soft Start	Yes	Yes	Yes	Yes	Yes	Yes
Duty Cycle (max) (%)	50	50/50	100	50	100	100
Separate Oscillator / Synchronization Terminal	—	Yes	—	—	—	—
VIN Range (VDC)	8 - 30	8 - 40	6.9-12	7.4 - 12	8.3 - 12	3.6 - 12
Output Mode Fixed Push - Pull	No	Yes	—	—	—	—
Pulse - by - Pulse Isense	Yes	No	—	—	—	—
Shutdown Mode	Yes	Yes	—	—	—	—
Operating / Startup Current (mA)	15/4.5	NA/18	0.5/0.1	0.5/0.1	0.5/0.1	0.5/0.1
Reference Voltage (V)	5	5.1	5	5	5	4
On-board Amplifiers	1	2	-	-	-	-
Output Mode Single - Ended	Yes	No	Yes	Yes	Yes	Yes
Current - Sense	No	Yes	—	Yes	Yes	Yes
SMD Number	5962-9558601MVA 5962-9558601M2A*	5962-9453001MEA 5962-9453001M2A	5962-9451300MPA	5962-9451301MPA	5962-9451302MPA	5962-9451303MPA
Pincount / Package	18-J	16-J, 20-L20	8-J, 20-L*	8-J, 20-L*	8-J, 20-L*	8-J, 20-L*
Space Level-Class V	—	—	—	—	—	—
Catalog Orderable Part Number	UC1851J UC1851J883B UC1851L* UC1851L883B*	UC1856J UC1856J883B UC1856L20 UC1856L20883B	UC1800J UC1800J883B UC1800L* UC1800L883B*	UCC1801J UCC1801J883B UCC1801L* UCC1801L883B*	UCC1802J UCC1802J883B UCC1802L* UCC1802L883B	UCC1803J UCC1803J883B UCC1803L* UCC1803L883B*

\* Contact the PIC for availability

## Power Management

### Current-Mode Pulse Width Modulator (PWM) Controllers (Continued)

Device Name	UCC1804	UCC1805	UCC1806
Application	Off-line	DC-DC and Battery	Isolated Output, Push-Pull Controller
Topology	Forward, Flyback	Forward, Flyback	Push-Pull, Full Bridge, Half Bridge
Vref tol (%)	1.5	1.5	1
Peak Output Current (mA)	1000	1000	500
Undervoltage Lockout	12.5 V / 8.3 V	4.1 V / 3.6 V	7.5 V / 6.7 V
Maximum Practical Frequency (kHz)	1000	1000	1000
Output Type	Single, Totem Pole	Single, Totem Pole	Dual Alternating, Totem Pole
Startup Current (mA) Max	0.1	0.1	0.05
Leading Edge Blanking	Yes	Yes	—
Soft Start	Yes	Yes	Yes
Duty Cycle (max) (%)	50	50	50/50
Separate Oscillator / Synchronization Terminal	—	—	Yes
VIN Range (VDC)	8.3 - 12	3.6 - 12	6.7 - 15
Output Mode Fixed Push - Pull	—	—	Yes
Pulse - by - Pulse Isense	Yes	Yes	Yes
Shutdown Mode	—	—	Yes
Operating / Standby Current (mA)	0.5/0.1	0.5/0.1	1.4/0.1
Reference Voltage (V)	5	4	5.1
On-board Amplifiers	—	—	2
Output Mode Single - Ended	Yes	Yes	No
SMD Number	5962-9451304MPA	5962-9451305MPA	5962-9457501MEA
Pincount / Package	8-J, 20-L*	8-J, 20-L*	16-J, 20-L
Space Level-Class V	—	—	5962-9457501VEA 5962-9457501V2A*
Catalog Orderable Part Number	UCC1804J UCC1804J883B UCC1804L* UCC1804L883B*	UCC1805J UCC1805J883B UCC1805L* UCC1805L883B*	UCC1806J UCC1806J883B UCC1806L UCC1806L883B

\* Contact the Product Information Center for availability

## Power Management

## Voltage-Mode Pulse Width Modulator (PWM) Controllers

Device Name	TL5001	TL5001A	TL1451A	UC1524	UC1524A
Application	DC-DC	DC-DC	DC-DC, Off-line	Fixed Frequency PWM, Off-line, DC-DC	Fixed Frequency PWM, Off-line, DC-DC
Topology	Forward, Flyback, Buck, Boost	Forward, Flyback, Buck, Boost	Forward, Flyback, Buck, Boost	Forward, Flyback, Buck, Boost	Forward, Flyback, Buck, Boost
Shutdown	No	No	No	Yes	Yes
VIN Range (VDC)	3.6-40	3.6-40	3.6-50	8 - 40	8 - 40
Output Type	Single Switch	Single Switch	Single Switch	Dual Alternating, Uncommitted	Dual Alternating, Uncommitted
Output Current (mA)	20	20	20	100	200
Frequency (max) (kHz)	400	400	500	300	500
Operating / Startup Current (mA)	1.1/1	1.1/1	1.7/1.3	- / 8	- / 8
Reference Voltage (V)	1	1	2.5	5	5
Vref tol (%)	5	3	4	4	1
Duty Cycle (max) (%)	100	100	100	50/50	50/50
Undervoltage Lockout	Yes	Yes	Yes	No	Yes
Output Mode Fixed Push - Pull	No	No	No	Yes	Yes
Output Mode Single - Ended	Yes	Yes	Yes	Yes	Yes
Current - Senses	1	1	2	1	1
Dead Time Control	Yes	Yes	Yes	No	No
SMD Number	5962-9958301QPA 5962-9958301Q2A	5962-9958302QPA 5962-9958302Q2A	5962-9958401QEA 5962-9958401Q2A	7802801EA 78028012A*	5962-8764502EA
Pincount-/ Package	8-JG, 20-FK	8-JG, 20-FK	16-J, 20-FK	16-J, 20-L	16-J, 20-L
Catalog Orderable Part Number	TL5001MJG TL5001MJGB TL5001MFK* TL5001MFKB	TL5001AMJG TL5001AMJGB TL5001AMFK* TL5001AMFKB	TL1451AMJ TL1451AMJB TL1451AMFK* TL1451AMFKB	UC1524J UC1524J883B UC1524L* UC1524L883B*	UC1524AJ UC1524AJ883B UC1524AL UC1524AL883B

\* Contact the PIC for availability

# Power Management

## Voltage-Mode Pulse Width Modulator (PWM) Controllers (Continued)

Device Name	UC1525A	UC1525B	UC1526	UC1526A	UC1527A	UCC15701
Application	Fixed Frequency PWM, Off-line, DC-DC	Fixed Frequency PWM, Off-line, DC-DC	Fixed Frequency PWM, Off-line, DC-DC	Fixed Frequency PWM, Off-line, DC-DC	Fixed Frequency PWM, Off-line, DC-DC	Wide range DC – DC, Off-line
Topology	Full Bridge, Half Bridge	Full Bridge, Half Bridge	Full Bridge, Half Bridge	Full Bridge, Half Bridge	Full Bridge, Half Bridge	Forward, Flyback, Buck, Boost
Shutdown	Yes	Yes	Yes	Yes	Yes	Yes
VIN Range (VDC)	8 - 35	8 - 35	8 - 35	7 - 35	8 - 35	9 - 15
Output Type	Dual Alternating, Totem Pole	Dual Alternating, Totem Pole	Dual Alternating, Totem Pole	Dual Alternating, Totem Pole	Dual Alternating, Totem Pole	Single, Totem Pole
Output Current (mA)	± 200	±400	± 100	± 200	± 200	1200
Frequency (max) (kHz)	500	500	400	600	500	700
Operating / Startup Current (mA)	- / 14	- / 14	- / 26	- / 14	- / 14	0.75 / 0.13
Reference Voltage (V)	5.1	5.1	5	5	5.1	5
Vref tol (%)	1	0.75	1	1	1	1
Duty Cycle (max) (%)	50/50	50/50	50/50	50/50	50/50	100
Undervoltage Lockout	7 V	7 V	Yes	Yes	7V	13V / 9V
Output Mode Fixed Push - Pull	Yes	Yes	Yes	Yes	Yes	No
Output Mode Single - Ended	No	No	No	No	No	Yes
Dead Time Control	Yes	Yes	Yes	Yes	Yes	Yes
SMD Number	5962-8951103EA 5962-89511032A	5962-8951105EA 5962-89511052A	8551501VA 85515012A	8551502VA 85515022A	5962-8951104EA 5962-89511042A	*
Pincount-/ Package	16-J, 20-L	16-J	16-J, 20-L	16-J, 20-L	16-J	14-J, L-20
Space Level-Class V	—	5962-895110V2A	—	—	—	—
Catalog Orderable Part Number	UC1525AJ UC1525AJ883B UC1525AL UC1525AL883B	UC1525BJ UC1525BJ883B UC1525BL* UC1525BL883B*	UC1526J UC1526J883B UC1526L UC1526L883B	UC1526AJ UC1526AJ883B UC1526AL UC1526AL883B	UC1527AJ UC1527AJ883B UC1527AL* UC1527AL883B	UCC15701J UCC15701J883B* UCC15701L UC15701L883B*

\* Contact the PIC for availability

## Power Management

## Soft Switching Pulse Width Modulator (PWM) Controllers—Resonant Mode

Part No.	UC1879	UCC1895	UC1867	UC1875	UC1863	UC1864
Application	Zero Voltage Transition, Phase Shifted Bridge	Zero Voltage Transition, Phase Shifted Bridge	DC-DC and Battery, Zero Current Switching	Zero Voltage Transition, Phase Shifted Bridge	DC-DC and Battery, Zero Voltage Switching	DC-DC and Battery, Zero Voltage Switching
Topology	Full Bridge	Full Bridge	Half Bridge, Full Bridge	Full Bridge	Half Bridge, Full Bridge	Forward, Flyback
Voltage Reference Tolerance	1%	1%	1%	1%	1%	1%
Peak Output Current	0.1 A	0.1 A	1 A	2 A	1 A	1 A
Undervoltage Lockout	Selectable 10.75 V / 9.5 V, 15.25 V / 9.25 V	11 V / 9 V	8 V / 7 V	10.75 V / 9.5 V	8 V / 7 V	8 V / 7 V
Maximum Practical Operating Frequency	300 kHz	1 MHz	1 MHz	1 MHz	1 MHz	1 MHz
Outputs	Quad, Phase Shifted, Totem Pole	Quad, Phase Shifted, Totem Pole	Dual Alternating, Totem Pole	Quad Phase Shifted, Totem Pole	Dual Alternating, Totem Pole	Single, Totem Pole
Startup Current	150 $\mu$ A	150 $\mu$ A	150 $\mu$ A	150 $\mu$ A	150 $\mu$ A	150 $\mu$ A
Soft Start	Y	Y	—	Y	—	—
Maximum Duty Cycle	100%	100%	50% / 50%	100%	50% / 50%	100%
Separate Oscillator/ Synchronization Terminal	Y	Y	—	Y	—	—
SMD Numbers	—	—	—	5962-9455501MRA 5962-9455501M3A	5962-9203103QEA 5962-9203103Q2A	5962-9203101MEA 5962-9203101M2A
Space Level Class V	—	—	—	5962-9455501VRA	5962-9203103VEA 5962-9203103V2A	—
Catalog Orderable Part Number	UC1879J UC1879J883B	UCC1895J UCC1895J883B	UC1867J UC1867J883B** UC1867L UC1867L883B**	UC1875J UC1875J883B UC1875L UC1875L883B	UC1863J UC1863J883B UC1863L UC1863L883B	UC1864J UC1864J883B UC1864L UC1864L883B

\*\*Zero Voltage Transition technique

## Power Management

### Power Factor Correction Products

Part No.	UC1854	UC1854A	UC1854B
Maximum Practical Operating Frequency	200 kHz	200 kHz	200 kHz
Current Error Amplifier Bandwidth	800 kHz	5 MHz	5 MHz
Average Current Mode	Y	Y	Y
Worldwide AC Input Voltage Operation	Y	Y	Y
Output Drive	1 A	1 A	1 A
Startup Current	1.5 mA	0.3 mA	0.3 mA
Undervoltage Lockout	16 V / 10 V	16 V / 10 V	10.5 V / 10 V
Enable Input	Y	Y	Y
Multiplier / Divider Feedforward	Y	Y	Y
Special Features	—	—	—
Pincount-/ Package	16-J	16-J	16-J
SMD Numbers	5962-9326101MEA	5962-9326103MEA	5962-9326102MEA
Catalog Orderable Part Number	UC1854J UC1854J883B	UC1854AJ UC1854AJ883B	UC1854BJ UC1854BJ883B

\*Zero Voltage Transition technique

## Power Management

### Motor/Motion Control Products

#### Brushless DC Motor Controllers

Part No.	UC1625
Hall Logic	Yes
Tachometer	Yes
Output Current per OutPut	0.1 A
Operating Voltage	10 V-18 V
Differential Current Sense Amplifier	Yes
Current Limit	Yes
Pincount/Package (Through-Hole Package)	28-J
Pincount/Package (Surface-Mount Package)	28-L
SMD Number	5962-9168901MXA
Catalog Orderable Part Number	UC1625J UC1625J883B UC1625L UC1625L883B

#### DC Motor Controllers

Part No.	UC1637
Output Clamp Diodes Hall Logic	—
Output Current per Output	0.1 A
Operating Voltage	5 V-36 V
Differential Current Sense Amplifier	—
Current Limit	Yes
Pincount/Package (Through- Hole Package)	18-J
Pincount/Package (Surface- Mount Package)	20-L
SMD Number	5962-8995701VA 5962-89957012A
Catalog Orderable Part Number	UC1637J UC1637J883B UC1637L UC1637L883B

## Power Management

### Motion Control Products Stepper Motor Drivers/Controllers

Part No.	UC1717
Output Clamp Diodes	Yes
Output Current per Output	0.9 A
Operating Voltage	10 V-45 V
Thermal Shutdown	Yes
Current Limit	Yes
Pincount/Package	16-J, 20-L
SMD Number	5962-9474601MEA 5962-9474601M2A
Catalog Orderable Part Number	UC1717J UC1717J883B UC1717L* UC1717L883B

\* Contact the PIC for availability



# Power Management

## PWM Support Products

### Power Drivers

Part No.	UC1705	UC1706	UC1707	UC1708
Power Driver	Single	Dual	Dual	Dual
Output Configuration	Complementary	Complementary	Complementary	Non-Inverting
Enable	—	—	—	Yes
Inhibit	—	Yes	Yes	—
Analog Stop	—	Yes	Yes	—
Output Rise Time	60 ns	60 ns	50 ns	75 ns
Maximum Voltage	40 V	40 V	40 V	35 V
Peak Output Current	1.5 A	1.5 A	1.5 A	3.0 A
Pincount/Package	8-J, 20-L	16-J, 20-L	16-J, 20-L	8-J, 16-JE, 20-L
SMD Number	5962-9579801MPA 5962-9579801M2A	5962-8961101EA 5962-89611012A	5962-8761901EA 5962-87619012A	5962-0051401QPA 5962-0051401Q2A
Space Level-Class V	5962-9579801VPA 5962-9579801V2A	—	5962-8761901VEA 5962-8761901V2A	5962-0051401VEA 5962-0051401V2A
Catalog Orderable Part Numbers	UC1705J UC1705J883B, UC1705L UC1705L883B	UC1706J UC1706J883B UC1706L UC1706L883B	UC1707J UC1707J883B UC1707L UC1707L883B	UC1708J / UC1708J883B UC1708JE / UC1708JE883B UC1708L* / UC1708L883B

### Power FET Drivers

Part No.	UC1709	UC1710
FET Driver	Single	Single
Isolated Driver Pairs	—	—
Output Configuration	Non-Inverting	Complementary
Output Rise Time	40 ns	40 ns
Maximum Voltage	40 V	20 V
Peak Output Current	1.5 A	6.0 A
Pincount/Package	8-J, 20-L	8-J
SMD Number	Contact Factory	Contact Factory
Space Level-Class V	5962-015120*VPA	—
Catalog Orderable Part Number	UC1709J / UC1709J883B UC1709L / UC1709L883B	UC1710J / UC1710J883B

\* Contact the PIC for availability

## Power Management

### Power Supply Support Products

Part No.	UC1907	UC1610	UC1611
Description	Load Share Controller	Dual Schottky Diode Bridge	Quad Schottky Diode Array
Application	Allows Multiple Independent Power Supplies to be Paralleled so that Each Unit Supplies Only its Proportional share of Total Load Current	Eight-diode Array for High Current, Low Duty Cycle Flyback Voltage Clamping for Inductive Loads	Four-diode Array for High-Current Bridges and Voltage Clamps
Key Features	Fully Differential High Impedance Voltage Sensing Accurate Current Amplifier for Precise Load Sharing Optocoupler Driving Capability 4.5-V to 35-V Operation	Monolithic Eight-Diode Array High Peak Current Low Forward Voltage Fast Recovery Time	Matched, Four-Diode Monolithic Array High Peak Current Low Forward Voltage Parallelable for Higher Current or Lower Voltage Drop
Pincount/Package	16-J, 20-L	8-J, 20-L	8-J, 20-L
SMD Number	5962-9320601MEA 5962-9320601M2A	Contact Factory	5962-9053801PA 5962-90538012A
Catalog Orderable Part Numbers	UC1907J UC1907J883B UC1907L UC1907L883B	UC1610J UC1610J883B UC1610L* UC1610L883B*	UC1611J UC1611J883B UC1611L UC1611L883B

\* Contact the PIC for availability

## Power Management

### Power Supply Support Products

Part No.	UC1901	UC19431	UC19432
Description	Isolated Feedback Generator	Precision Adjustable Shunt Regulator	Precision Analog Controller
Application	Amplitude Modulation System Used to couple a control signal across a Voltage Isolation Barrier	Adjustable 100 mA Shunt Regulator, Voltage Reference Optocoupler Driver, Voltage-to-Current Converter	Adjustable 100-mA Shunt Regulator, Optocoupler Driver, Programmable Transconductance Voltage-to-Current Converter
Key Features	Transformer Couples Isolated Feedback Error Signal  Low Cost Alternative to Optocouplers  5-Mhz Carrier Provides Fast Response Capability  Modulator Synchronizable to an External Clock	Multiple On-Chip Programmable Reference Voltages  2.2-V to 36-V Operating Supply Voltage and User Programmable Reference  Linear Transconductance for Optocoupler Feedback Applications	Programmable Linear Transconductance for Optimum Optocoupler Current Drive  Precision Reference and Error Amplifier Inputs Externally Available  2.2-V to 36-V Operating Supply Voltage and User Programmable Reference
Pincount/Package (Through Hole Package)	14-J	8-J	8-J
Pincount/Package (Surface Mount Package)	20-L	-	-
SMD Number	5962-8944101CA 5962-89441012A	Contact Factory	Contact Factory
Catalog Orderable Part Numbers	UC1901J UC1901J883B UC1901L UC1901L883B	UC19431J UC19431J883B UC19431L* UC19431L883B*	UC19432J UC19432J883B

\* Contact the PIC for availability

## Power Management

### Linear Regulation Products

#### Military Precision Programmable Voltage References

Device Name	Attributes	Vref (V)	VO (max) (V)	VO (min) (V)	Tolerance (%)	IZ* (min) (uA)	IZ (max) (mA)	Temp Coeff (typ) (ppm/degree C)	VI (max) (V)	Package
TL1431M†	Adjustable Shunt	2.5V	36	Vref	0.4	1000	100	30	36	JG, FK

† Also see UC19431

#### Linear Controllers

Part No.	UC1832	UC1833	UC1834	UC1835	UC1836
Type of Output	Positive Adjustable	Positive Adjustable	Positive or Negative Adjustable	5-V Fixed	Positive Adjustable
Maximum Input Voltage	36 V	36 V	40 V	40 V	40 V
Minimum Output Voltage	2.0 V	2.0 V	+1.5 V/-2.0 V	-	2.5 V
Output Drive	300 mA	300 mA	350 mA	500 mA	500 mA
Type of Short Circuit Limit	Duty Cycle	Duty Cycle	Foldback	Foldback	Foldback
Reference Voltage Accuracy	2%	2%	3% / 4%	2%	2%
Special Features	Multiple Pins Accessible	8-pin Package	-	Built in Rsense	Built in Rsense
Pincount/Package	14-J, 20-L	8-J, 20-L	16-J, 20-L	8-J, 20-L	8-J
SMD Number	5962-9326501MCA 5962-9326501M2A	5962-9326502MPA 5962-9326502M2A	5962-8774201EA 5962-87742012A	5962-9065001PA 5962-90650012A	Contact Factory
Space Level-Class V	5962-9326501VCA 5962-9326501V2A	—	5962-8774201VEA 5962-8774201V2A	—	—
Catalog Orderable Part Numbers	UC1832J UC1832J883B UC1832L* UC1832L883B	UC1832J UC1832J883B UC1833L UC1833L883B	UC1834J UC1834J883B UC1834L UC1834L883B	UC1835J UC1835J883B UC1835L* UC1835L883B	UC1836J UC1836J883B

\* Contact PIC for availability

## Power Management

### Power Supply Support Products Supervisory and Monitor Circuits (SVS)

Device Name	Attributes	VCC (nom) (V)	Vt (V)	Tolerance (%)	VIN (min) (V)	Number of SVS	Complementary Outputs	ICC (max) (mA)	Over Voltage Sense	WDI	Package
UC1946*	Single, with WatchDog	2 - 5.5	1.235	2	1.1	1	No	0.018	No	Yes	TBD
TLC7733M	Single, MicroPower, Programmable Delay	3.3	2.93	2.4	1	1	Yes	0.016	No	No	JG, FK
TLC7705M	Single, MicroPower, Programmable Delay	5	4.55	1.5	1	1	Yes	0.016	No	No	JG, FK, U
TL7705BM	Single, Programmable Delay	5	4.55	2	1	1	Yes	3	No	No	JG, FK
UC1544	Single	4.5 - 40	Adj	1	4.5	1	No	15	Yes	No	J, L
UC1543	Single	4.5 - 40	Adj	1	4.5	1	No	15	Yes	No	J, L

\* Potential Military Product

### Military Quad Line Monitors

Device Name	Attributes	VIN Range (V)	Window Adjust	Programmable Fault Threshold	Programmable Time Delay	Current Limit	Power Supply Monitor	Package
UC1903	Quad	8 - 40	Yes	Yes	Yes	No	Quad	J, L

### Smart Power Switches

Part No.	UC17131	UC17132	UC17133
Part Name	Low-Side Switch	High and Low Side Switch	High Side Switch
Operating Voltage (V)	8 – 65	8 – 65	8 – 65
Max Output Voltage (V)	65	78	65
Output Current (Continuous/Peak) (mA)	300 / 900	300 / 900	300 / 900
Overload and Short Circuit Protection	Yes	Yes	Yes
Power Interruption Protection	Yes	Yes	Yes
Programmable Hysteresis	No	Yes	No
Orderable Part Numbers	UC17131J	UC17132J UC17132J883B* UC17132L* UC17132L883B	UC17133J

# Power Management

## Space Products Class V

Orderable SMD #	Unitrode Part #	Description
5962-8951103V2A	UC1525ALQMLV	PWM Controller, Regulating, Voltage Mode
5962-895110*V2A	UC1525BLQMLV	PWM Controller, Regulating, Voltage Mode
5962-9579801VPA	UC1705JQMLV	Power Driver, High Speed
5962-8761901VEA	UC1707JQMLV	Power Driver, Dual channel
5962-8761901V2A	UC1707LQMLV	Power Driver, Dual channel
5962-0051401VPA	UC1708JQMLV	Power Driver, Dual, Non-Inverting
5962-015120*VPA	UC1709JQMLV	FET Driver, Dual, High Speed
5962-8990502VEA	UC1823AJQMLV	PWM Controller, High Speed, Current-Mode
5962-8768101VEA	UC1825JQMLV	PWM Controller, High Speed, Current-Mode
5962-8768101V2A	UC1825LQMLV	PWM Controller, High Speed, Current-Mode
5962-8768102VEA	UC1825AJQMLV	PWM Controller, High Speed, Current-Mode
5962-8768102V2A	UC1825ALQMLV	PWM Controller, High Speed, Current-Mode
5962-9326501VCA	UC1832JQMLV	LDO Linear Regulator Controller, Precision
5962-9326501V2A	UC1832LQMLV	LDO Linear Regulator Controller, Precision
5962-8774201VEA	UC1834JQMLV	LDO Linear Regulator Controller, High Efficiency
5962-8774201V2A	UC1834LQMLV	LDO Linear Regulator Controller, High Efficiency
5962-8670401VPA	UC1842JQMLV	PWM Controller, Current-Mode
5962-8670401V2A	UC1842LQMLV	PWM Controller, Current-Mode
5962-8670405V2A	UC1842ALQMLV	PWM Controller, Current-Mode
5962-8670402VPA	UC1843JQMLV	PWM Controller, Current-Mode
5962-8670402V2A	UC1843LQMLV	PWM Controller, Current-Mode
5962-8670406VPA	UC1843AJQMLV	PWM Controller, Current-Mode
5962-8670406V2A	UC1843ALQMLV	PWM Controller, Current-Mode
5962-8670403VPA	UC1844JQMLV	PWM Controller, Current-Mode
5962-8670403V2A	UC1844LQMLV	PWM Controller, Current-Mode
5962-8670407VPA	UC1844AJQMLV	PWM Controller, Current-Mode
5962-8670407V2A	UC1844ALQMLV	PWM Controller, Current-Mode
5962-8670404VPA	UC1845JQMLV	PWM Controller, Current-Mode
5962-8670404V2A	UC1845LQMLV	PWM Controller, Current-Mode
5962-8670408VPA	UC1845AJQMLV	PWM Controller, Current-Mode
5962-8670408V2A	UC1845ALQMLV	PWM Controller, Current-Mode
5962-8680601VEA	UC1846JQMLV	PWM Controller, Current-Mode
5962-8680601V2A	UC1846LQMLV	PWM Controller, Current-Mode
5962-9203103VEA	UC1863JQMLV	PWM Controller, Soft-Switching, Resonant Mode
5962-9203103V2A	UC1863LQMLV	PWM Controller, Soft-Switching, Resonant Mode
5962-9455501VRA	UC1875JQMLV	PWM Controller, Phase Shift, Resonant Mode
5962-9457501VEA	UCC1806JQMLV	PWM Controller, Low Power, Dual Output, Current Mode

Please contact the Product Information Center for Class V device availability.

## Signal Conditioning (Comparators)

### Devices in Production

#### COMPARATORS

Device	Supply Voltage (V)	V <sub>io</sub> (mV) Max	I <sub>ib</sub> (nA) Max	I <sub>ol</sub> (mA)	Response Time (ns) Typ	Packages
LM111	4 to 30	4	150	8	165	JG, FK
LM139	4 to 30	9	-300	6	300	J,FK,W
LM139A	4 to 30	4	-300	6	300	J,FK,W
LM193	4 to 30	9	- 300	6	300	JG,FK
TLC139M	4 to 16	10	30	6	1100	J,FK,W*
TLC193M	4 to 16	10	30	6	1100	JG,FK*
TLC372M	4 to 16	10	20	6	200	JG,FK,U
TLC374M	4 to 16	10	20	6	200	J,FK,W*
TLC3702M	4 to 16	10	30	20	1100	JG,FK,U*
TLC3704M	4 to 16	10	30	20	1100	J,FK,W*
TLV2352M	2 to 8	10	20	6	1400	JG,FK,U
TLV2354M	2 to 8	10	20	6	1400	J,FK,W

\* Package available on special request

## Signal Conditioning (Op Amps)

## Devices in Production

## Operational Amplifiers (High Speed)

Device	Supply Voltage (V)		Vio (mV Max)	Iib (nA)	Avd (V/mV)	B1 (MHz)	SR (V/μs)	Package
	Min	Max						
THS4011M	± 5	± 15	6	6	25	290	310	JG,FK
THS4031M	± 5	± 15	2	6	75	100	100	JG,FK
THS4051M	± 5	± 15	8	6	9	70	240	JG,FK
THS4061M	± 5	± 15	9	3	9	180	400	JG,FK

## Operational Amplifiers (Single)

Device	Supply Voltage (V)		Vio (mV Max)	Iib (nA)	Avd (V/mV)	B1 (MHz)	SR (V/μs)	Package
	Min	Max						
LM118	± 5	± 20	10	150	25	15	70	JG,FK
OP27A	± 4	± 22	0.06	60	600	8	2.8	JG,FK
OP27C	± 4	± 22	0.3	150	300	8	2.8	JG
SE5534	± 3	± 20	4	500	25	10	13	JG,FK
TLC2201M	+4.6	+16	0.1	0.5	45	1.8	2.5	JG,FK,U
TLC2201AM	+4.6	+16	0.1	0.5	45	1.8	2.5	JG,FK
TLC2652M	+4.4	+16	0.01	0.5	1000	1.9	2.8	J,JG,FK,U
TLC2652AM	+4.4	+16	0.008	0.5	1000	1.9	2.8	J,JG,FK
TLC2654M	+4.4	+16	0.05	0.5	1000	1.9	2	J,JG,FK,U
TLC2654AM	+4.4	+16	0.04	0.5	1000	1.9	2	J,JG,FK
TLE2021M	± 2	± 20	1	70	500	2	0.65	JG,FK
TLE2021AM	± 2	± 20	0.5	65	500	2	0.65	JG,FK
TLE2021BM	± 2	± 20	0.2	60	500	2	0.65	JG,FK
TLE2027M	± 4	± 22	0.2	150	2500	13	2.8	JG,FK
TLE2027AM	± 4	± 22	0.1	150	3500	13	2.8	JG,FK
TLE2061M	± 3.5	± 18	6	40	20	2	3.4	JG,FK
TLE2061AM	± 3.5	± 18	3.6	40	20	2	3.4	JG,FK
TLE2061BM	± 3.5	± 18	1.7	40	20	2	3.4	JG,FK
TLE2071M	± 2.3	± 19	9.2	65	88	10	40	JG,FK
TLE2071AM	± 2.3	± 19	7.2	65	88	10	40	JG,FK
TLE2161M	± 3.5	± 20	6	40	20	6.4	10	JG,FK
TLE2161AM	± 3.5	± 20	3.6	40	20	6.4	10	JG,FK
TLE2161BM	± 3.5	20	1.7	40	20	6.4	10	JG,FK
TLE2141M	± 2	± 22	1.7	-1800	20	6	45	JG,FK
TLE2141AM	± 2	± 22	1.2	-1800	20	6	45	JG,FK
TL061M	± 5	± 15	9	50	4	1	3.5	JG,FK
TL071M	± 5	± 15	9	50	15	3	13	JG,FK
TL081M	± 5	± 15	9	50	15	3	13	JG,FK
TLV2460M	± 2.7	± 6	2.2	14	32	5.2	1.6	JG, FK, U
TLV2460AM	± 2.7	± 6	1.7	14	32	5.2	1.6	JG, FK, U
TLV2461M	± 2.7	± 6	2.2	14	32	5.2	1.6	JG, FK, U
TLV2461AM	± 2.7	± 6	1.7	14	32	5.2	1.6	JG, FK, U
UA741M	± 2	± 20	6	150	25	1	0.5	J,JG,FK

Min/Max are over the full military temperature of -55 to 125°C

Typ values are at 25°C



## Signal Conditioning (Op Amps)

## Operational Amplifiers (Dual)

DEVICE	Supply Voltage (V)		Vio (mV Max)	Iib (nA)	A <sub>vd</sub> (V/mV)	B1 (MHz)	SR (V/μs)	Package
	Min	Max						
LM158	± 1.5	± 15	7	300	25	0.6	0.2	JG,FK
LM158A	± 1.5	± 15	7	300	25	0.6	0.2	JG,FK
LT1013M	± 5	± 22	.6	45	250	0.7	0.4	JG,FK
LT1013AM	± 5	± 22	0.3	30	500	0.7	0.4	JG
MC1558	± 5	± 15	6	1500	25	1	0.5	JG,FK
TLC2202M	+ 4.6	+ 16	1	0.5	100	1.9	2.7	JG,FK
TLC2202AM	+ 4.6	+ 16	0.75	0.5	100	1.9	2.7	JG,FK
TLC2252M	± 4.4	± 16	1.75	.5	10	0.21	.12	JG,FK,U
TLC2252AM	± 4.4	± 16	1.0	.5	10	0.21	.12	JG,FK,U
TLC2262M	+ 4.4	+ 16	3	0.5	50	0.73	0.55	JG
TLC2262AM	+ 4.4	+ 16	1.5	0.5	50	0.73	0.55	JG
TLC2272M	+ 4.4	+ 16	3.0	0.1	15	2.18	3.6	JG,FK
TLC2272AM	+ 4.4	+ 16	1.5	0.1	15	2.18	3.6	JG,FK
TLC4502M	+ 4	+ 6	100	10	200	4.7	2.5	JG,FK,U
TLC4502AM	+ 4	+ 6	50	10	200	4.7	2.5	JG,FK,U
TLE2022M	± 2	± 20	0.7	90	800	2.8	0.65	JG,FK
TLE2022AM	± 2	± 20	0.45	90	1000	2.8	0.65	JG,FK
TLE2022BM	± 2	± 20	0.3	90	1500	2.8	0.65	JG,FK
TLE2062M	± 3.5	± 18	6	40	20	2	3.4	JG,FK
TLE2062AM	± 3.5	± 18	4	40	20	2	3.4	JG,FK
TLE2062BM	± 3.5	± 18	3	40	20	2	3.4	JG,FK
TLE2072M	± 2.3	± 19	10.5	60	93	10	40	JG,FK
TLE2072AM	± 2.3	± 19	8	60	93	10	40	JG,FK
TLE2082M	± 2.3	± 20	9.5	65	93	10	40	JG,FK
TLE2082AM	± 2.3	± 20	6.5	65	93	10	40	JG,FK
TLE2142M	± 2	± 22	1.6	1.8	20	6	45	JG,FK
TLE2142AM	± 2	± 22	2	1.8	20	6	45	JG,FK
TLV2262M	+ 2.7	+ 8	3	0.5	50	0.71	0.55	JG
TLV2262AM	+ 2.7	+ 8	1.5	0.5	50	0.71	0.55	JG
TLV2252M	+ 2.7	+ 8	1.75	.5	10	0.2	.12	JG,FK,U
TLV2252AM	+ 2.7	+ 8	1.0	.5	10	0.2	.12	JG,FK,U
TLV2422M	+ 2.7	+ 10	.95	0.3	700	.052	.02	JG,FK,U
TLV2422AM	+ 2.7	+ 10	2.0	0.3	700	.052	.02	JG,FK,U
TLV2442M	+ 2.7	+ 10	2.5	0.3	750 (Typ)	1.75	1.3	JG,FK,U
TLV2442AM	+ 2.7	+ 10	1.6	0.3	750 (Typ)	1.75	1.3	JG,FK,U
TLV2432M	+ 2.7	+ 10	2.5	0.3	950 (Typ)	0.55	0.25	JG,FK,U
TLV2432AM	+ 2.7	+ 10	2.0	0.3	950 (Typ)	0.55	0.25	JG,FK,U
TLV2462M	+ 2.7	± 6	2.2	14	32	5.2	1.6	JG,FK,U
TLV2462AM	+ 2.7	± 6	1.7	14	32	5.2	1.6	JG,FK,U
TLV2463M	+ 2.7	± 6	2.2	14	32	5.2	1.6	JG,FK,U
TLV2463AM	+ 2.7	± 6	1.7	14	32	5.2	1.6	JG,FK,U
TLV2772M	+ 2.5	+ 5.5	2.5	.006	20	4.8	9	JG,FK
TLV2772AM	+ 2.5	+ 5.5	1.6	.006	20	4.8	9	JG,FK
TL062M	± 5	± 15	9	50	4	1	3.5	JG,FK
TL072M	± 5	± 15	9	50	15	3	13	JG,FK
TL082M	± 5	± 15	9	50	15	3	13	JG,FK

Min/Max are over the full military temperature of -55° to 125°C

Typ values are at 25°C

## Signal Conditioning (Op Amps)

## Operational Amplifiers (Quad)

DEVICE	Supply Voltage (V)		Vio (mV Max)	Iib (nA)	A <sub>vd</sub> (V/mV)	B1 (MHz)	SR (V/μs)	Package
	Min	Max						
LM124	± 1.5	± 15	7	300	25	0.6	0.13	J,FK
LM148	± 4	± 18	6	325	25	1	0.5	J,FK
LT1014M	± 5	± 22	0.55	45	250	0.7	0.4	J,FK
LT1014AM	± 5	± 22	0.35	30	400	0.7	0.4	J,FK
TLC2264M	+ 4.4	+ 16	3	0.5	50	0.73	0.55	J
TLC2264AM	+ 4.4	+ 16	1.5	0.5	50	0.73	0.55	J
TLC2274M	+ 4.4	+ 16	3.0	0.5	20	2.3	3.6	J,FK
TLC2274AM	+ 4.4	+ 16	1.5	0.5	20	2.3	3.6	J,FK
TLC2254M	+ 4.4	+ 16	1.75	.5	10	0.21	.12	J,FK
TLC2254AM	+ 4.4	+ 16	1.0	.5	10	0.21	.12	J,FK
TLE2024M	± 2	± 20	1.2	90	400	2.8	0.7	J,FK
TLE2024AM	± 2	± 20	0.95	90	800	2.8	0.7	J,FK
TLE2024BM	± 2	± 20	0.7	90	1000	2.8	0.7	J,FK
TLE2064M	± 3.5	± 18	8	40	20	2	3.4	J,FK
TLE2064AM	± 3.5	± 18	6	40	20	2	3.4	J,FK
TLE2064BM	± 3.5	± 18	4	40	20	2	3.4	J,FK
TLE2074M	± 2.3	± 19	10.5	60	93	10	40	J,FK
TLE2074AM	± 2.3	± 19	8.5	60	93	10	40	J,FK
TLE2144M	± 2	± 22	4	1800	20	6	45	J,FK
TLE2144AM	± 2	± 22	3.2	1800	20	6	45	J,FK
TLV2254M	+ 2.7	+ 8	1.75	.5	10	0.2	.12	J,FK
TLV2254AM	+ 2.7	+ 8	1.0	.5	10	0.2	.12	J,FK
TLV2264M	+ 2.7	+ 8	3	.5	50	0.71	.55	J,FK
TLV2264AM	+ 2.7	+ 8	1.5	.5	50	0.71	.55	J,FK
TLO64M	± 5	± 15	15	50	4	1	3.5	J,FK
TLO74M	± 5	± 15	15	50	15	3	13	J,FK
TLO84M	± 5	± 15	15	50	15	3	13	J,FK
TLV2464M*	+ 2.7	± 6	2.2	14	32	5.2	1.6	JG,FK,U
TLV2464AM*	+ 2.7	± 6	1.7	14	32	5.2	1.6	JG,FK,U
TLV2465M*	+ 2.7	± 6	2.2	14	32	5.2	1.6	JG,FK,U
TLV2465AM*	+ 2.7	± 6	1.7	14	32	5.2	1.6	JG,FK,U

Min/Max are over the full military temperature of -55° to 125°C

Typ values are at 25°C

\* Potential product

## Special Functions

### Devices in Production

#### SPECIAL FUNCTIONS

##### Logarithmic Amplifiers

Device	Supply Voltage Nom	Supply Current (mA)	Bandwidth (MHz) Typ	Differential Output Offset (mV)	Log Linearity (30 dB sections)	Packages
TL441AM	± 6	33.5	40	± 100	1	J

##### Precision Timers

Device	Supply Voltage Nom	Supply Current (mA)	Output Current (mA)	Type	Timing	Packages
					From - To	
SE555	4.5 to 18	5	±200	single	10 $\mu$ s - hours	JG,FK
SE556	4.5 to 18	8	±200	dual	10 $\mu$ s - hours	J,FK
TLC555M	2 to 15	0.7	+100/-10	single	1 $\mu$ s - hours	JG,FK
TLC556M	2 to 15	1.4	+100/-10	dual	1 $\mu$ s - hours	J,FK

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## UC1832, Precision Low Dropout Linear Controllers

DEVICE STATUS: ACTIVE

PARAMETER NAME	UC1832	UC2832	UC3832
I <sub>q</sub> (typ) (mA)	3.3	3.3	3.3
V <sub>in</sub> (max) (V)	40	40	40
Tolerance (%)	2	2	2
Shutdown	Yes	Yes	Yes
V <sub>O</sub> (min) (V)	2	2	2
I <sub>drive</sub> (max) (mA)	100	100	100
Type of Short Circuit Limit	Duty Cycle	Duty Cycle	Duty Cycle

### FEATURES

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- Precision 1% Reference
- Over-Current Sense Threshold Accurate to 5%
- Programmable Duty-Ratio Over-Current Protection
- 4.5V to 36V Operation
- 100mA Output Drive, Source or Sink
- Under-Voltage Lockout
- Additional Features of the UC1832 series:
  - Adjustable Current Limit to Current Sense Ratio
  - Separate +V<sub>IN</sub> terminal
  - Programmable Driver Current Limit
  - Access to V<sub>REF</sub> and E/A(+)
  - Logic-Level Disable Input

### DESCRIPTION

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The UC1832 and UC1833 series of precision linear regulators include all the control functions required in the design of very low dropout linear regulators. Additionally, they feature an innovative duty-ratio current limiting technique which provides peak load capability while limiting the average power dissipation of the external pass transistor during fault conditions. When the load current reaches an accurately programmed threshold, a gated-astable timer is enabled, which switches the regulator's pass device off and on at an externally programmable duty-ratio. During the on-time of the pass element, the output current is limited to a value slightly higher than the trip threshold of the duty-ratio timer. The constant-current-limit is programmable on the UCx832 to allow higher peak current during the on-time of the pass device. With duty-ratio control, high initial load demands and short circuit protection may both be accommodated without extra heat sinking or foldback current limiting. Additionally, if the timer pin is grounded, the duty-ratio timer is disabled, and the IC operates in constant-voltage/constant-current regulating mode.

These IC's include a 2 Volt ( $\pm 1\%$ ) reference, error amplifier, UVLO, and a high current driver that has both source and sink outputs, allowing the use of either NPN or PNP external pass transistors. Safe operation is assured by the inclusion of under-voltage lockout (UVLO) and thermal shutdown.

The UC1833 family includes the basic functions of this design in a low-cost, 8-pin mini-dip package, while the UC1832 series provides added versatility with the availability of 14 pins. Packaging options include plastic (N suffix), or ceramic (J suffix). Specified operating temperature ranges are: commercial (0°C to 70°C), order UC3832/3 (N or J); industrial (-25°C to 85°C), order UC2832/3 (N or J); and military (-55°C to 125°C), order UC1832/3J. Surface mount packaging is also available.

### TECHNICAL DOCUMENTS

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To view the following documents, [Acrobat Reader 4.0](#) is required.

To download a document to your hard drive, right-click on the link and choose 'Save'.

## DATASHEET

[▲Back to Top](#)Full datasheet in Acrobat PDF: [slus387.pdf](#) (733 KB) (Updated: 09/05/1999)

## APPLICATION NOTES

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- [DN-32 Optocoupler Feedback Drive Techniques](#) (SLUA167 - Updated: 09/05/1999)
- [PowerFLEX \(TM\) -- Surface-Mount Alternative For Through-Hole Power Packages](#) (SZZA015 - Updated: 04/08/1999)
- [Supply Voltage Drop On Fast Current Demand](#) (SLVA076 - Updated: 09/03/1999)
- [U-152 A High-Performance Linear Regulator for Low Dropout Applications](#) (SLUA072 - Updated: 09/05/1999)

## PRICING/ AVAILABILITY

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ORDERABLE DEVICE	PACKAGE	PINS	TEMP (°C)	STATUS	BUDGETARY PRICE US\$/UNIT QTY= 1000+	PACK QTY	DSCC NUMBER	PRICING/AVAILABILITY
5962-9326501M2A	<a href="#">FK</a>	20	-55 TO 125	ACTIVE	39.05	1		<a href="#">Check stock or order</a>
5962-9326501MCA	<a href="#">J</a>	14	-55 TO 125	ACTIVE	17.82	1		<a href="#">Check stock or order</a>
5962-9326501V2A	<a href="#">FK</a>	20	-55 TO 125	ACTIVE	201.24	1		<a href="#">Check stock or order</a>
UC1832J	<a href="#">J</a>	14	-55 TO 125	ACTIVE	10.91	1		<a href="#">Check stock or order</a>
UC1832J883B	<a href="#">J</a>	14	-55 TO 125	ACTIVE	17.82	1	5962-9326501MCA	<a href="#">Check stock or order</a>
UC1832JQMLV	<a href="#">J</a>	14	-55 TO 125	ACTIVE	118.29	1		<a href="#">Check stock or order</a>
UC1832L883B	<a href="#">FK</a>	20	-55 TO 125	ACTIVE	39.05	1	5962-9326501M2A	<a href="#">Check stock or order</a>
UC1832LQMLV	<a href="#">FK</a>	20	-55 TO 125	ACTIVE	201.24	1	5962-9326501V2A	<a href="#">Check stock or order</a>

View Pricing/Availability for: [UC2832](#) [UC3832](#)

Table Data Updated on: 5/ 6/ 2001