



Obsolescence Notice

This product is obsolete.

This information is available for your convenience only.

For more information on Zarlink's obsolete products and replacement product lists, please visit http://products.zarlink.com/obsolete_products/

TDA1085C

PHASE CONTROL INTEGRATED CIRCUIT

The TDA1085C is a silicon integrated circuit designed for use in phase control systems of AC mains with resistive and inductive loads. The circuit may form the basis of closed loop control systems utilizing tachometer frequency or analog voltage feedback.

The circuit was primarily designed for motor speed control in automatic washing machines and hence includes a programmable multiple ramp generator to control acceleration rates.

FEATURES

- Powered direct from AC mains or DC line.
- Flexible ramp generator to provide controlled acceleration and distribution period.
- Actual speed derived from tachogenerator frequency or magnitude.
- Control amplifier allowing loop gain control.
- Symmetrical positive and negative wave firing of the triac.
- Motor current limiting.
- Fail safe in case of open circuit tachogenerator.
- Repeated triac pulses provided if triac unlatches.

BLOCK DIAGRAM

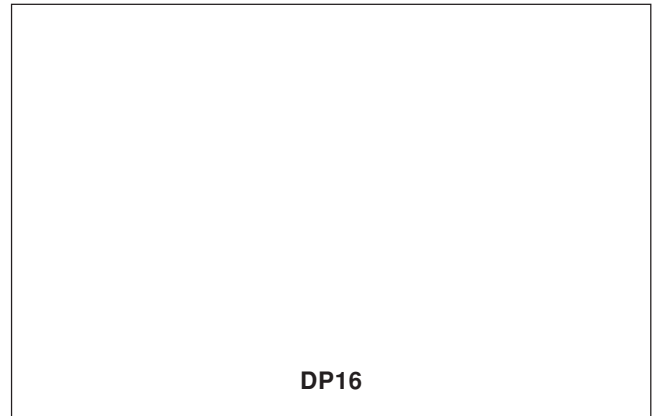


Fig.1 Pin Connections (top view)

Fig. 2 Block Diagram of TDA1085C

ELECTRICAL CHARACTERISTICS (continued)

Characteristic	Value			Units	Conditions
	Min.	Typ.	Max.		
FIRING PULSE TIMING					
Pin 2 Voltage sync trip level		±50		µA	
Pin 1 Current sync trip level		±50		µA	
Pin 16 Phase control voltage swing		11.7		V	
Pin 13 Firing pulse width Pulse repetition time		55 200		µs µs	R pin 15 = 300kΩ C pin 14 = 47nF
Pin 14 Ramp recharge current (I_R)		150		µA	
FIRING PULSE OUTPUT DRIVE					
Pin 13 High output level		$V_{CC} - 4$		V	At 150mA drive current
Leakage current			30	µA	
LOAD CURRENT LIMITER					
Pin 3 & Pin 7 Current gain		170	-		Reset of ramp generator
Pin 7 Discharge current		35		mA	

CIRCUIT DESCRIPTION

The TDA1085C incorporates a shunt type voltage regulator which enables it to be powered direct from the mains or from a DC supply. It can provide adequate current to drive external speed reference potential dividers that may be switched by contacts on mechanical timers. A supply monitor circuit resets timing functions and inhibits triac firing pulses when the circuit is being powered up at 'switch on'.

A ramp generator is provided to control the acceleration of the motor, to a speed as programmed on the speed program input, pin 5. If this pin becomes grounded a general reset and inhibit of triac pulses will take effect. A programmable period of slow acceleration may be used to give a 'distribution' period for automatic washing machines. Charging currents for the ramp generator are determined by an external resistor for the slow ramp period and internally during the fast ramp.

A frequency to analog (F-A) converter is provided on this device enabling advantage to be taken of tachogenerator frequency to be used for motor speed sensing. The conversion is carried out by transferring a pulse of charge (defined by the F-A converter capacitor) into an RC filter

when the tacho input goes positive. An internal bias current is provided to the input pin; this serves two purposes: it senses the continuity of the tacho, causing a general reset and inhibit of output pulses if it goes open circuit; secondly it enables the input to be easily biased such that tacho noise causes no additional triggering of the F-A converter.

The control amplifier has differential inputs that compare the ramp generator voltage (internal) against the actual speed voltage. The output of this amplifier is a bidirectional current of limited amplitude which is integrated to limit the maximum rate of change of triac firing pulse phase angle. The actual speed voltage may be derived directly from a tacho (for analog sensing) or via the F-A converter circuit (for digital sensing). Digital sensing has the advantage that no tacho calibration is required, plus stability against temperature variations and ageing effects.

Synchronisation of the triac pulse is achieved by delaying the pulse with reference to the zero voltage points of the mains cycles. These points are determined by the voltage synchronisation input to the device. Inductive motors give rise to phase lag of the load current. Under high speed or heavy load conditions it is essential that the triac is fired after the load current from the previous half cycle has ceased. The current synchronisation pin (1) performs this

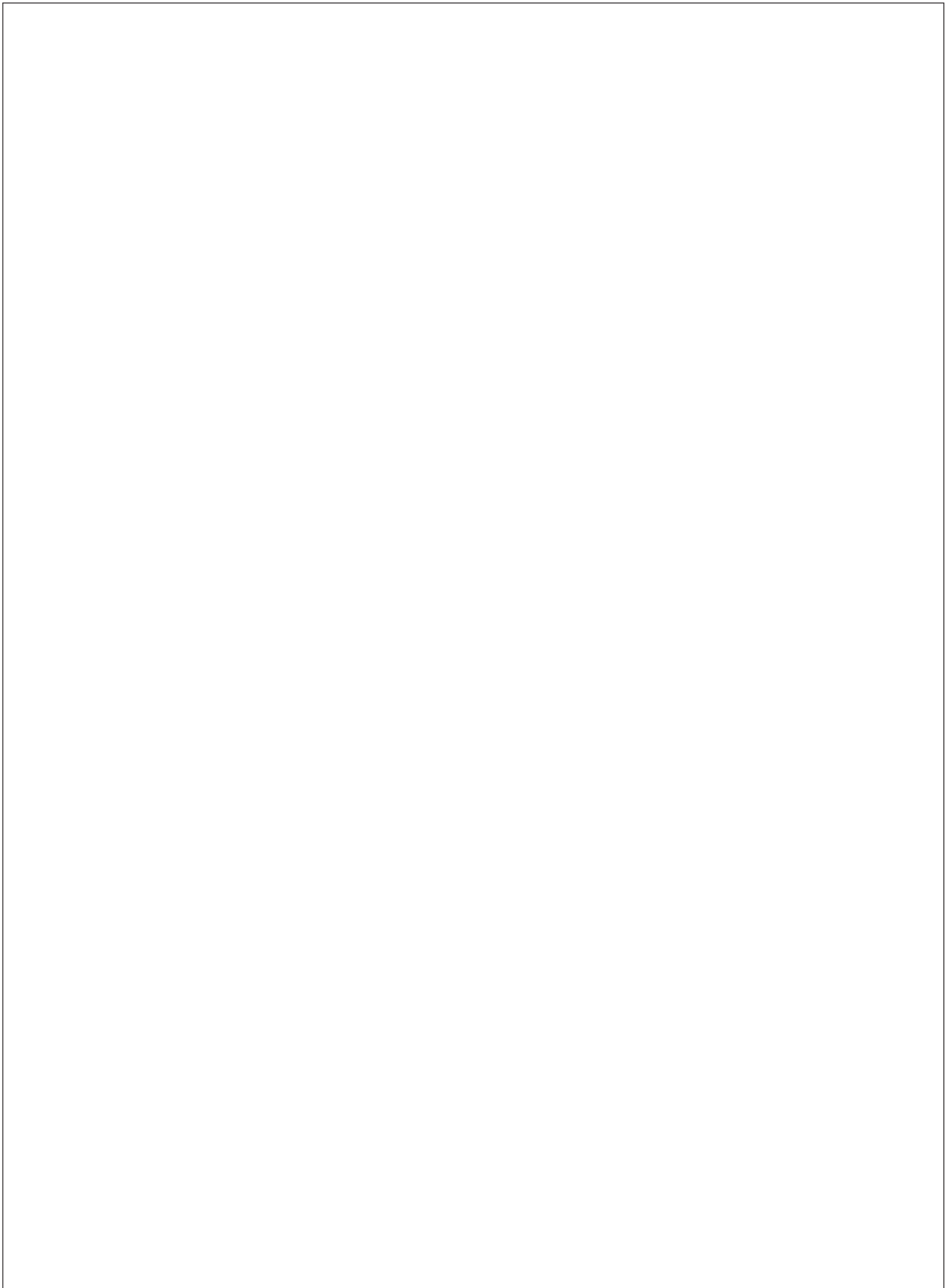


Fig. 4 TDA1085C Circuit Diagram

task by ensuring that there is a voltage across the triac before a trigger pulse is supplied (when the triac is conducting current only a small voltage drop appears across it). The triac pulse width is dependent on the capacitor which also delays the pulse from the zero voltage point. If the triac fails to latch, repeated pulses will be supplied.

The current limitation pin (3) may be used to monitor the peak negative load current. This may be necessary to protect the triac and or motor under stall conditions. The trip point is determined by external resistors which when exceeded will cause the ramp generator to discharge to a safe working voltage.

RAMP GENERATOR CHARACTERISTIC

V_{RA} and V_{RB} are determined by the voltage programmed on pin 6 (V_6). Under all conditions $V_{RB} = 2V_6$, whereas $V_{RA} = V_6$ for $V_6 \leq 1.2V$ but is clamped at $1.2V$ for $V_6 \geq 1.2V$.

The ramp generator output voltage only rises to the desired speed voltage as defined on pin 5.

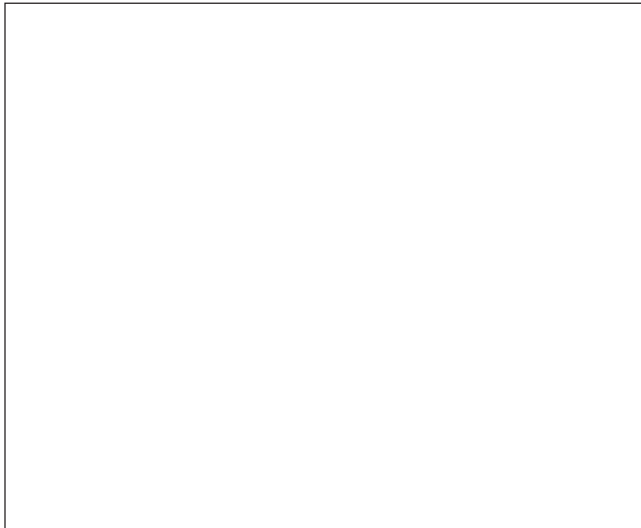


Fig. 3 Ramp Generator Characteristic

ABSOLUTE MAXIMUM RATINGS

Electrical

Peak input current (I sync), pin 1:	±2mA
Peak input current (V sync), pin 2:	±2mA
Current drain, pin 3:	5mA
Positive input voltage, pin 3:	6V
Analog voltage drive, pin 4:	V_{CC}
Speed reference voltage, pin 5:	V_{CC}
Distribute level, pin 6:	V_{CC}
IC Circuit current (pin 10 disconnected), pin 9:	10mA
Supply shunt regulating current, pin 10:	30mA
Tachogenerator(digital)drive input, pin 12: -3, +0.1 mA	
Triac gate current, pin 13:	200mA
Phase timing current, pin 15:	1 mA

Thermal

Operating ambient temperature:	0°C to +70°C
Storage temperature:	-55°C to +125°C

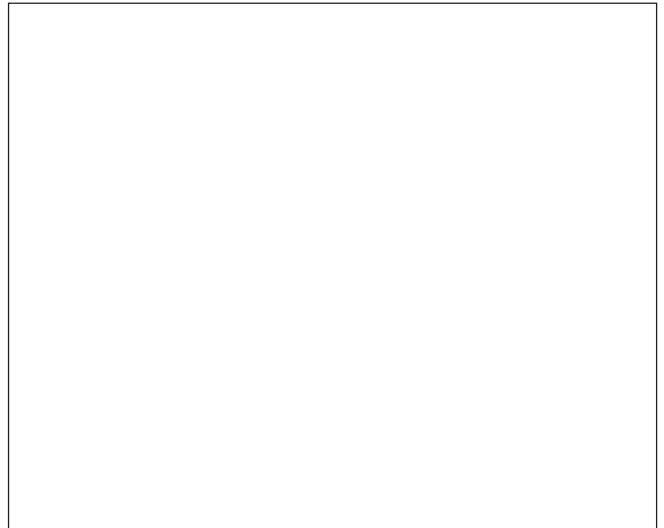


Fig. 5 Power Dissipation



**For more information about all Zarlink products
visit our Web Site at
www.zarlink.com**

Information relating to products and services furnished herein by Zarlink Semiconductor Inc. trading as Zarlink Semiconductor or its subsidiaries (collectively "Zarlink") is believed to be reliable. However, Zarlink assumes no liability for errors that may appear in this publication, or for liability otherwise arising from the application or use of any such information, product or service or for any infringement of patents or other intellectual property rights owned by third parties which may result from such application or use. Neither the supply of such information or purchase of product or service conveys any license, either express or implied, under patents or other intellectual property rights owned by Zarlink or licensed from third parties by Zarlink, whatsoever. Purchasers of products are also hereby notified that the use of product in certain ways or in combination with Zarlink, or non-Zarlink furnished goods or services may infringe patents or other intellectual property rights owned by Zarlink.

This publication is issued to provide information only and (unless agreed by Zarlink in writing) may not be used, applied or reproduced for any purpose nor form part of any order or contract nor to be regarded as a representation relating to the products or services concerned. The products, their specifications, services and other information appearing in this publication are subject to change by Zarlink without notice. No warranty or guarantee express or implied is made regarding the capability, performance or suitability of any product or service. Information concerning possible methods of use is provided as a guide only and does not constitute any guarantee that such methods of use will be satisfactory in a specific piece of equipment. It is the user's responsibility to fully determine the performance and suitability of any equipment using such information and to ensure that any publication or data used is up to date and has not been superseded. Manufacturing does not necessarily include testing of all functions or parameters. These products are not suitable for use in any medical products whose failure to perform may result in significant injury or death to the user. All products and materials are sold and services provided subject to Zarlink's conditions of sale which are available on request.

Purchase of Zarlink's I²C components conveys a licence under the Philips I²C Patent rights to use these components in an I²C System, provided that the system conforms to the I²C Standard Specification as defined by Philips.

Zarlink and the Zarlink Semiconductor logo are trademarks of Zarlink Semiconductor Inc.

Copyright 2001, Zarlink Semiconductor Inc. All Rights Reserved.

TECHNICAL DOCUMENTATION - NOT FOR RESALE
