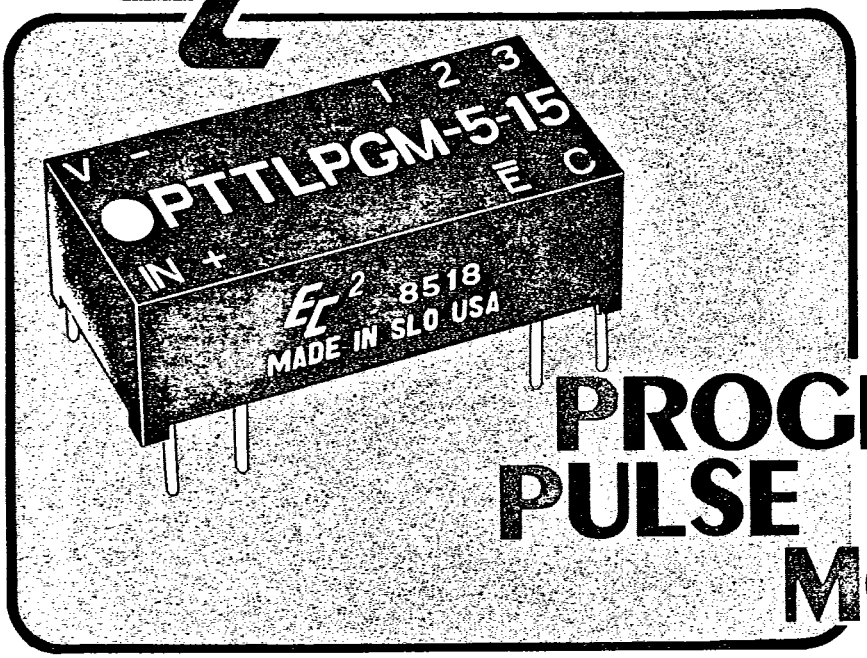
EC2



low profile

T²L COMPATIBLE PROGRAMMABLE PULSE GENERATOR MODULE

- **T²L input and outputs**
- **Pulse widths stable and precise**
- **14—pin DIP package (.240 high)**
- **Available in step resolutions from 1ns to 50ns**
- **All pulse widths digitally programmable**
- **10 T²L fanout capacity**

circuits. These Programmable Pulse Generator Modules are of hybrid construction utilizing the proven technologies of active integrated circuitry and of passive networks utilizing capacitive, inductive and resistive elements. The ICs utilized in these modules are burned in to level B of MIL-STD-883 to ensure a high MTBF. The MTBF on these modules, when calculated per MIL-HDBK-217 for a 50°C ground fixed environment, is in excess of 1.5 million hours. These modules are compatible with T²L Schottky circuits and require no external components in order to obtain the programmed output pulse.

design notes

The "DIP series" of Programmable Pulse Generator Modules developed by Engineered Components Company have been designed to provide precise output pulse widths when triggered by the rising edge of input pulse widths as small as 6ns. All required driving and output circuitry as well as timing components are contained in a 14-DIP package compatible with T²L and DTL

The Programmable Pulse Generator Modules are digitally programmed by the presence of either a "1" or a "0" at each of the programming pins. Since the input and output terminals are fixed and the programming is accomplished only by DC voltage levels, programming may be accomplished by remote switching or permanent termination of the appropriate programming pins of the module to ground; the module may also be programmed automatically by computer generated data. MUX set-up time is 4ns typical. When no need exists in the application to change pulse widths during normal use, the desired pulse width is most conveniently established by use of a ground pad around each programming pin; programming is accomplished by cutting off those

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DESIGN NOTES (continued)

pins which are to remain at state "1" before insertion of the pulse generator module into the printed circuit board.

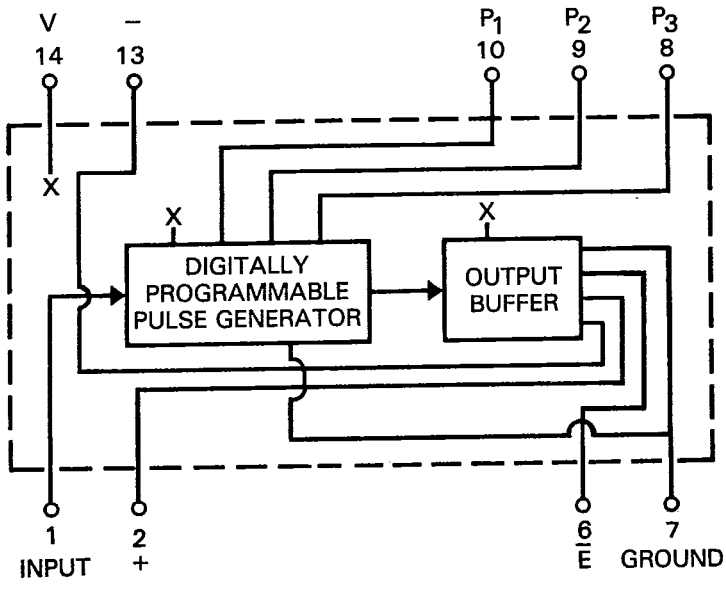
The PTTLPGM is offered in 18 modules with pulse widths to a maximum of 355ns and with pulse width resolution from 1 to 50ns, as shown in the Part Number Table. Programming of maximum pulse width is accomplished in 7 steps in accordance with the Truth Table Examples shown on Page 3. Tolerances on pulse width change per step and deviation from programmed pulse width are shown in the Part Number Table on page 3. These modules provide a stable T^2L output pulse of the programmed width for each positive input step. The generated pulse is inverted internally to provide a negative pulse one propagation delay later as an additional output. It is necessary only that the input step be held positive for at least 6ns in order to obtain the desired output pulse. The duration of the positive input pulse, after this time, has no effect on output pulse width. No output pulse will occur on the negative input pulse transition.

Pulse width tolerance is maintained as shown in the accompanying Part Number Table, when tested under the "Test Conditions" shown. Pulse width is measured at the +1.5V level on both leading and trailing edge. Rise and fall times are less than 3ns, when measured from .8V to 2.0V. These modules are capable of driving 10 Schottky T^2L loads. Temperature coefficient of pulse width is approximately +400ppm/°C over the operating temperature range of 0 to +70° C.

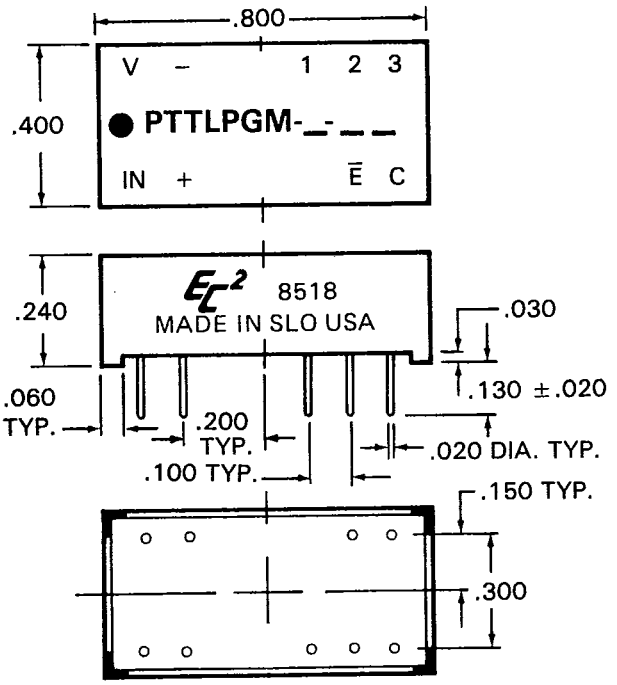
These "DIP series" modules are packaged in a 14-pin DIP housing, molded of flame-proof Diallyl Phthalate per MIL-M-14, Type SDG-F, and are fully encapsulated in epoxy resin. Leads meet the solderability requirements of MIL-STD-202, Method 208. Corner standoffs on the housing provide positive standoff from the printed circuit board to permit solder-fillet formation and flush cleaning of solder-flux residues for improved reliability.

Marking consists of manufacturer's name, logo (EC^2), part number, terminal identification and date code of manufacture. All marking is applied by silk screen process using white epoxy paint in accordance with MIL-STD-130, to meet the permanency of identification required by MIL-STD-202, Method 215.

BLOCK DIAGRAM IS SHOWN BELOW



MECHANICAL DETAIL IS SHOWN BELOW



TEST CONDITIONS

1. All measurements are made at 25°C.
2. V_{CC} supply voltage is maintained at 5.0V DC.
3. All units are tested using a Schottky toggle-type positive input pulse and one Schottky T^2L load at the output.
4. Input pulse width used is 10ns for all modules; repetition rate is in accordance with the data specified in the part number table.

OPERATING SPECIFICATIONS

* V_{CC} supply voltage:	4.75 to 5.25V DC
V_{CC} supply current:	85ma typical
Logic 1 input:	
Voltage	2V min.; 5.5V max.
Current	2.4V = 50ua max.
	5.5V = 1ma max.
Logic 0 input:	
Voltage	.8V max.
Current	−2ma max.
Logic 1 Voltage out:	2.4V min.
Logic 0 Voltage out:	.4V max.
Operating temperature range:	0 to 70°C.
Storage temperature:	−55 to +125°C.

* Pulse width increases or decreases approximately 2% for a respective increase or decrease of 5% in supply voltage.

PART NUMBER TABLE

PULSE WIDTHS AND TOLERANCES (in ns)				
Part Number	*Step Zero Pulse Width	Pulse Width Change Per Step	Maximum Pulse Width	Maximum Deviation From Programmed Pulse Width**
PTTLPGM-5-1	5 ±1	1 ±.3	12	±.4
PTTLPGM-5-2	5 ±1	2 ±.4	19	±.6
PTTLPGM-5-3	5 ±1	3 ±.5	26	±.8
PTTLPGM-5-4	5 ±1	4 ±.5	33	±.9
PTTLPGM-5-5	5 ±1	5 ±.5	40	±1
PTTLPGM-5-6	5 ±1	6 ±.6	47	±1.2
PTTLPGM-5-7	5 ±1	7 ±.7	54	±1.4
PTTLPGM-5-8	5 ±1	8 ±.8	61	±1.6
PTTLPGM-5-9	5 ±1	9 ±.9	68	±1.8
PTTLPGM-5-10	5 ±1	10 ±1	75	±2
PTTLPGM-5-15	5 ±1	15 ±1.5	110	±6
PTTLPGM-5-20	5 ±1	20 ±2	145	±8
PTTLPGM-5-25	5 ±1	25 ±2	180	±10
PTTLPGM-5-30	5 ±1	30 ±2.5	215	±12
PTTLPGM-5-35	5 ±1	35 ±2.5	250	±14
PTTLPGM-5-40	5 ±1	40 ±3	285	±16
PTTLPGM-5-45	5 ±1	45 ±3	320	±18
PTTLPGM-5-50	5 ±1	50 ±3	355	±20

*Pulse width at step zero is referenced to the input pin.

** All pulse width times after step 0 are referenced to step 0.

TRUTH TABLE EXAMPLES

Programming Pins / Part Number	3	0	0	0	0	1	1	1	1
	2	0	0	1	1	0	0	1	1
	1	0	1	0	1	0	1	0	1
PTTLPGM-5-1		5	1	2	3	4	5	6	7
PTTLPGM-5-2		5	2	4	6	8	10	12	14
PTTLPGM-5-3		5	3	6	9	12	15	18	21
ETC.									

Special modules can be readily manufactured to improve accuracies and/or provide customer specified random pulse widths for specific applications.