



Two Modulus Prescaler

ELECTRICALLY TESTED PER: MPG 12513

The 12513 is a two-modulus prescaler which will divide by 10 and 11. A MECL-MTTL translator is provided to interface with the 12514 Counter Control Logic. In addition, there is a buffered clock input and MECL bias voltage source.

- 600 MHz (Typ) Toggle Frequency
- 12513 (+ 10/11)
- MECL to MTTL Translator on Chip
- MECL and MTTL Enable Inputs
- + 5.0 or - 5.2 V Operation *
- Buffered Clock Input Series Input RC Typ, 20 Ohms and 4.0 pF
- V_{BB} Reference Voltage
- 460 mW Max/Pkg (No Load)

PIN ASSIGNMENTS

FUNCTION	DIL	FLATS	BURN-IN (CONDITION C)
V _{CCO}	1	1	GND
Q	2	2	51 Ω to V _{TT}
\bar{Q}	3	3	51 Ω to V _{TT}
(-)	4	4	51 Ω to V _{TT}
(+)	5	5	GND
MTTL V _{CC}	6	6	GND
MTTL Output	7	7	51 Ω to V _{TT}
V _{EE}	8	8	V _{EE}
E5 MTTL	9	9	GND
E4 MTTL	10	10	GND
E3 MECL	11	11	51 Ω to V _{TT}
E2 MECL	12	12	51 Ω to V _{TT}
E1 MECL	13	13	51 Ω to V _{TT}
V _{BB}	14	14	OPEN
Clock	15	15	51 Ω to V _{TT}
V _{CC}	16	16	GND

BURN - IN CONDITIONS:

V_{TT} = - 2.0 V MAX / - 2.2 V MIN
V_{EE} = - 5.7 V MAX / - 5.2 V MIN

* When using a + 5.0 V supply, apply + 5.0 V to Pin 1 (V_{CCO}), Pin 6 (MTTL V_{CC}), Pin 16 (V_{CC}), and ground Pin 8 (V_{EE}). When using - 5.2 V supply, ground Pin 1 (V_{CCO}), Pin 6 (MTTL V_{CC}), and Pin 16 (V_{CC}) and apply 5.2 V to Pin 8 (V_{EE}). If the translator is not required, Pin 6 may be left open to conserve dc power drain.

Military 12513

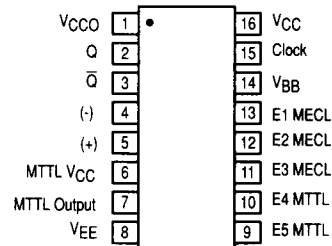


AVAILABLE AS

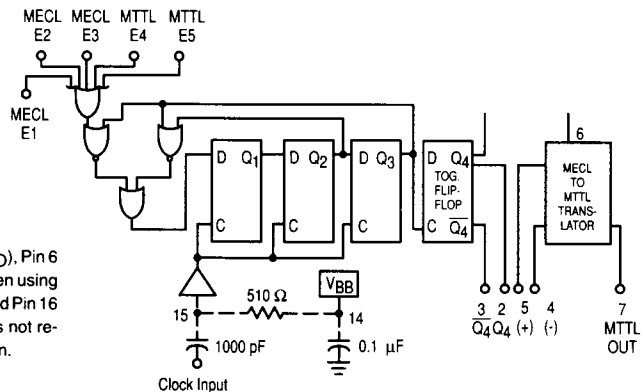
- 1) JAN: N/A
- 2) SMD: N/A
- 3) 883: 12513/BXAJC

X = CASE OUTLINE AS FOLLOWS:

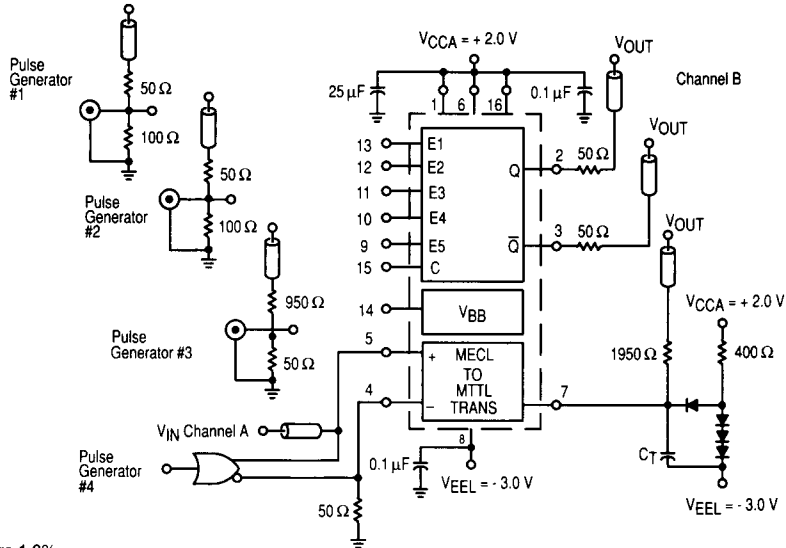
PACKAGE: CERDIP: E
CERFLAT: F



LOGIC DIAGRAM



ABSOLUTE MAXIMUM RATINGS	Symbol	Min.	Max.	Units
Supply Voltage	V_{CC}		+ 7.0	Vdc
Output Voltage	V_{OUT}		+ 5.5	Vdc
Input Voltage	V_{IN}		+ 5.5	Vdc
Operating Temperature Range	T_A	- 55	+ 125	°C
Storage Temperature Range	T_{stg}	- 65	+ 175	°C



NOTES

- All resistors are 1.0%.
- All input and output cables to the scope are equal lengths of 50 Ω coaxial cable.
- The 1950 Ω resistor at pin 7 and the scope termination impedance constitute a 40:1 attenuator probe.
- All unused outputs must be terminated with 100 Ω to ground.
- Pulse generator 1, 2, and 4 have the following characteristics:
 - PRF = 10 MHz.
 - PW = 50% duty cycle.
 - $t_r = t_f = 2.0 \text{ ns} \pm 0.2 \text{ ns}$.
- Pulse generator 3 has the following characteristics:
 - PRF = 2.0 MHz.
 - PW = 50% duty cycle.
 - $t_r = t_f = 5.0 \text{ ns} \pm 0.5 \text{ ns}$.

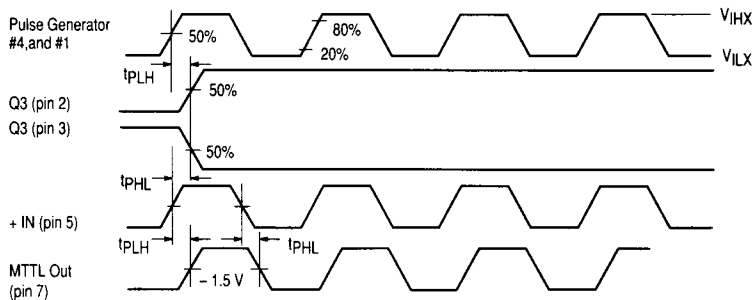


Figure 1. Switching Test Circuit and Waveforms

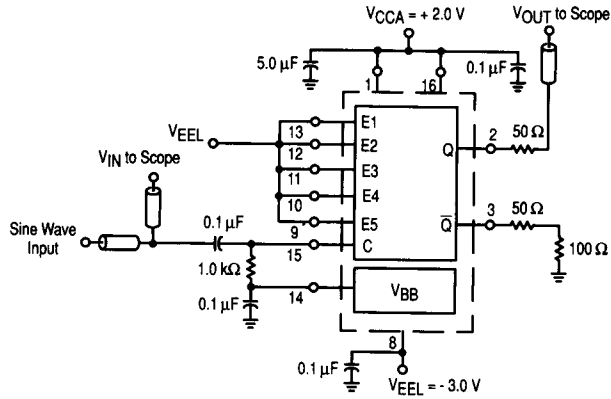


Figure 2. Switching Test Circuit and Waveforms

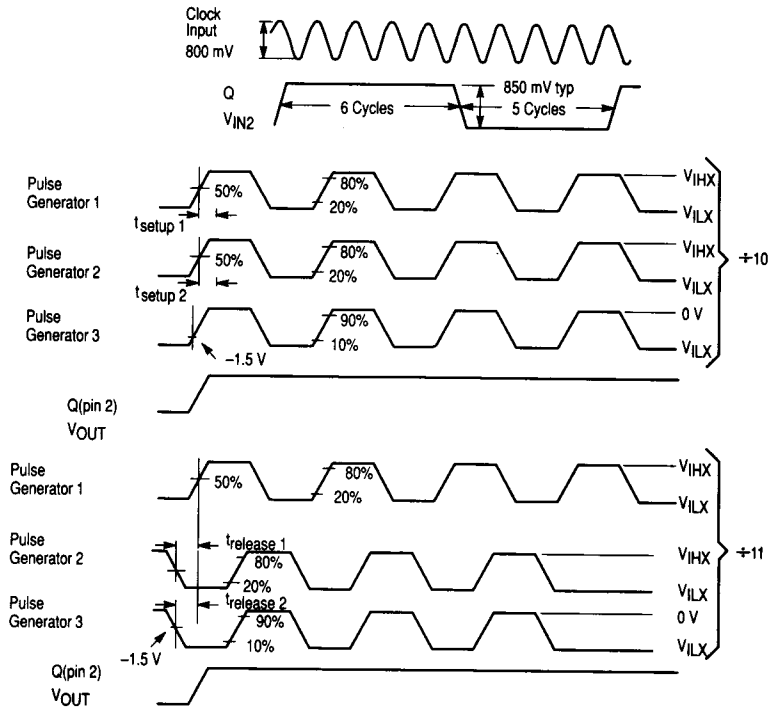


Figure 3. Maximum Frequency Test Circuit

12513 QUIESCENT LIMIT TABLE

Test Temperature	Test Voltage Values (Volts)														Test Current Values (mA)			
	V _{IH}	V _{IL}	V _{IHA}	V _{ILA}	V _{IHB}	V _{ILB}	V _{IHT}	V _{ILT}	V _{VEE}	V _{CC}	V _{IHX}	V _{ILX}	V _{ILL}	V _{EEL}	V _{CCA}	I _L	I _{OL}	I _{OH}
T _A = 25 °C	+2.4	+0.5	+3.895	+3.525	+4.22	+3.11	+2.0	+0.8	0.0	+5.0	+1.15	+0.215	-3.0	-3.0	+2.0	-0.25	+16	-0.4
T _A = 125 °C	+2.4	+0.5	+4.0	+3.6	+4.37	+3.14	+2.0	+0.8	0.0	+5.0	+1.27	+0.26	-3.0	-3.0	+2.0	-0.25	+16	-0.4
T _A = -55 °C	+2.4	+0.5	+3.745	+3.5	+4.12	+3.04	+2.0	+0.8	0.0	+5.0	+1.02	+0.165	-3.0	-3.0	+2.0	-0.25	+16	-0.4

Symbol	Parameter	Limits						Units	TEST VOLTAGE APPLIED TO PINS BELOW										
		+ 25 °C		+ 125 °C		- 55 °C			Pinouts referenced are for DIL package, check Pin Assignments Output Load = 100 Ω to + 3.0 V			Pinouts referenced are for DIL package, check Pin Assignments Output Load = 100 Ω to + 3.0 V			Pinouts referenced are for DIL package, check Pin Assignments Output Load = 100 Ω to + 3.0 V				
Functional Parameters:		Subgroup 1		Subgroup 2		Subgroup 3													
		Min	Max	Min	Max	Min	Max				V _{IH}	V _{IL}	V _{IHA/B}	V _{ILA/B}	V _{CC}	V _{EE}	P.U.T.		
I _{INH1}	Input Current High		250		400		400	μA			9, 10	11 - 13, 15		1, 16	8	11, 12, 13, 15			
I _{INH2}	Input Current High	2.0	6.0	2.0	6.4	1.7	6.0	mA				4, 5	4, 5	6	8	4, 5			
I _{INH3}	Input Current High	1.0	3.0	1.0	3.6	0.7	3.0	mA				4	5	6	8	5			
I _{INH4}	Input Current High		100		100		100	μA			9, 10			1, 16	8	9, 10			
I _{INL1}	Input Current Low	-10		-10		-10		μA						1, 16	8, 15, 11 - 13	11, 12, 13, 15			
I _{INL1}	Input Current Low	-1.6		-1.6		-1.6		mA			9, 10			1, 16	8	9, 10			

1. Power Supply Voltage = 5.0 V. Power Supply Voltage = - 5.2 V is guaranteed but not tested.

• **ELECTRICAL CHARACTERISTICS:** This device is designed to meet the dc specifications shown in the test table after thermal equilibrium has been established. Outputs are terminated through a 100 Ω resistor to + 3.0 V.

12513 QUIESCENT LIMIT TABLE

Test Temperature	Test Voltage Values (Volts)												Test Current Values (mA)					
	V _{IH}	V _{IL}	V _{IHA}	V _{ILA}	V _{IHB}	V _{ILB}	V _{IHT}	V _{ILT}	V _{VEE}	V _{CC}	V _{IHX}	V _{ILX}	V _{ILL}	VEEL	V _{CCA}	IL	IOH	IOH
T _A = 25 °C	+2.4	+0.5	+3.895	+3.525	+4.22	+3.11	+2.0	+0.8	0.0	+5.0	+1.15	+0.215	-3.0	-3.0	+2.0	-0.25	+16	-0.4
T _A = 125 °C	+2.4	+0.5	+4.0	+3.6	+4.37	+3.14	+2.0	+0.8	0.0	+5.0	+1.27	+0.26	-3.0	-3.0	+2.0	-0.25	+16	-0.4
T _A = -55 °C	+2.4	+0.5	+3.745	+3.5	+4.12	+3.04	+2.0	+0.8	0.0	+5.0	+1.02	+0.165	-3.0	-3.0	+2.0	-0.25	+16	-0.4

Symbol	Parameter	Limits						Units	TEST VOLTAGE APPLIED TO PINS BELOW									
		+25 °C		+125 °C		-55 °C			Pinouts referenced are for DIL package, check Pin Assignments Output Load = 100 Ω to +3.0 V									
		Subgroup 9	Subgroup 10	Subgroup 9	Subgroup 10	Subgroup 11	V _{ILL}		V _{ILX}	V _{IN}	V _{OUT}	V _{CCA}	VEEL	P.U.T.				
t _{pHH}	Propagation Delay (15+2+)	Min	Max	Min	Max	Min	Max	ns	9, 10	11 - 13	15	2, 3	1, 6, 16	8	2, 3			
t _{pHH}	Propagation Delay (5+ 7+)	Min	Max	Min	Max	Min	Max	ns	9, 10	11 - 13	15	2, 3	1, 6, 16	8	2, 3			
t _{pLL}	Propagation Delay (15+ 2+)	Min	Max	Min	Max	Min	Max	ns	9, 10	11 - 13	15	2, 3	1, 6, 16	8	7			
t _{pLL}	Propagation Delay (5- 7-)	Min	Max	Min	Max	Min	Max	ns	9, 10	11 - 13	15	2, 3	1, 6, 16	8	7			
t _{Setup 1}	Setup Time MECL	5.0	5.0	5.0	5.0	5.0	5.0	ns	9, 10	11 - 13	9 - 13	V _{OUT}	V _{CCA}	VEEL	P.U.T.			
t _{Setup 2}	Setup Time MTTL	5.0	5.0	5.0	5.0	5.0	5.0	ns	9, 10	11 - 13	9 - 13	V _{OUT}	V _{CCA}	VEEL	P.U.T.			
t _{Rel 1}	Release Time MECL	5.0	5.0	5.0	5.0	5.0	5.0	ns	9, 10	11 - 13	9 - 13	V _{OUT}	V _{CCA}	VEEL	P.U.T.			
t _{Rel 2}	Release Time MTTL	5.0	5.0	5.0	5.0	5.0	5.0	ns	9, 10	11 - 13	9 - 13	V _{OUT}	V _{CCA}	VEEL	P.U.T.			
f _{max} +11	Toggle Frequency	550	600	500	540	500	600	MHZ			15	2	1, 6, 16	8 - 13	2			

