MOTOROLA

Military 12515

Low-Power Two Modulus Prescaler

ELECTRICALLY TESTED PER:
MPG 12515

The 12515 is a two-modulus prescaler which will divide by 32 and 33. An internal regulator is provided to allow this device to be used over a wide range of power-supply voltages. This device may be operated by applying a supply voltage of 5.0 Vdc ± 10% at pin 7 or by applying an unregulated voltage from 5.5 Vdc to 9.5 Vdc to pin 8.

- 225 MHz Toggle Frequency
- Low-Power — 7.5 mA Max at 6.8 V
- Control Input and Output are Compatible with Standard CMOS
- Connecting Pins 2 and 3 Allows Driving One TTL Load
- Supply Voltage 4.5 V to 9.5 V

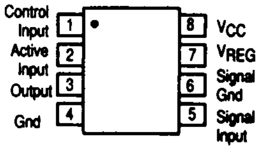
AVAILABLE AS

1) JAN: N/A
2) SMD: N/A
3) 883: 12515/BXAJC

X = CASE OUTLINE AS FOLLOWS:

PACKAGE: CERDIP: P

ABSOLUTE MAXIMUM RATINGS	Symbol	Min.	Max.	Units
Regulated Voltage, Pin 7	V_{REG}		+8.0	V_{dc}
Power Supply Voltage, Pin 8	V_{CC}		+10	V_{dc}
Input Voltage	V_{IN}		+2.0	V_{dc}
Operating Temperature Range	T_A	-55	+125	°C
Storage Temperature Range	T_{stg}	-65	+175	°C

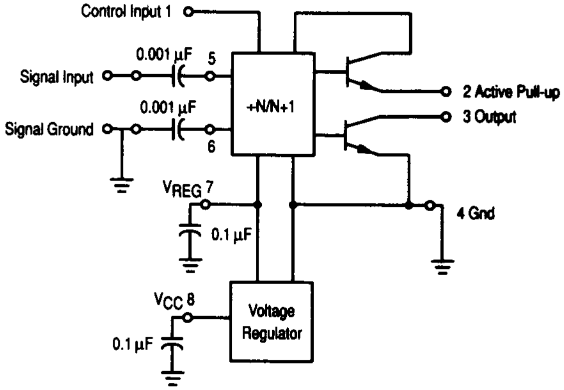


PIN ASSIGNMENTS

FUNCTION	DIL	BURN-IN (CONDITION C)
Control Input	1	V_{CC}
Active Pullup	2	3.01 kΩ to V_{CC}
Output	3	3.01 kΩ to V_{CC}
Gnd	4	GND
Signal Input	5	6.19 kΩ to V_{CC}
Signal Gnd	6	OPEN
V_{REG}	7	OPEN
V_{CC}	8	V_{CC}

BURN - IN CONDITIONS:
V_{CC} = 6.5 V MAX/ 5.5 V MIN

LOGIC DIAGRAM



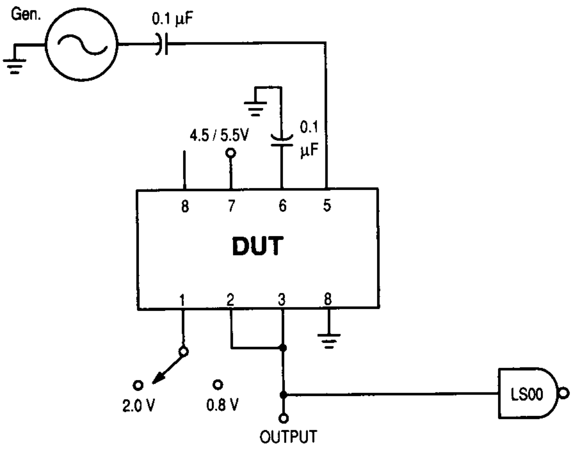


Figure 1. Minimum/Maximum Amp., Maximum/Minimum Frequency

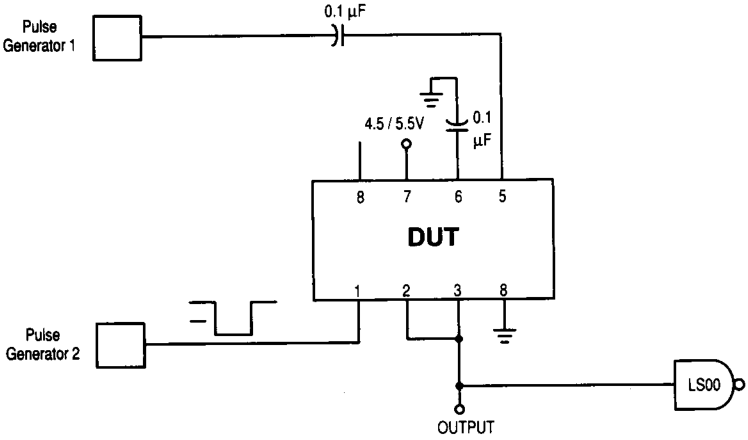


Figure 2. Setup and Hold Control Modulus, Clock to Output Delay (Information Only)

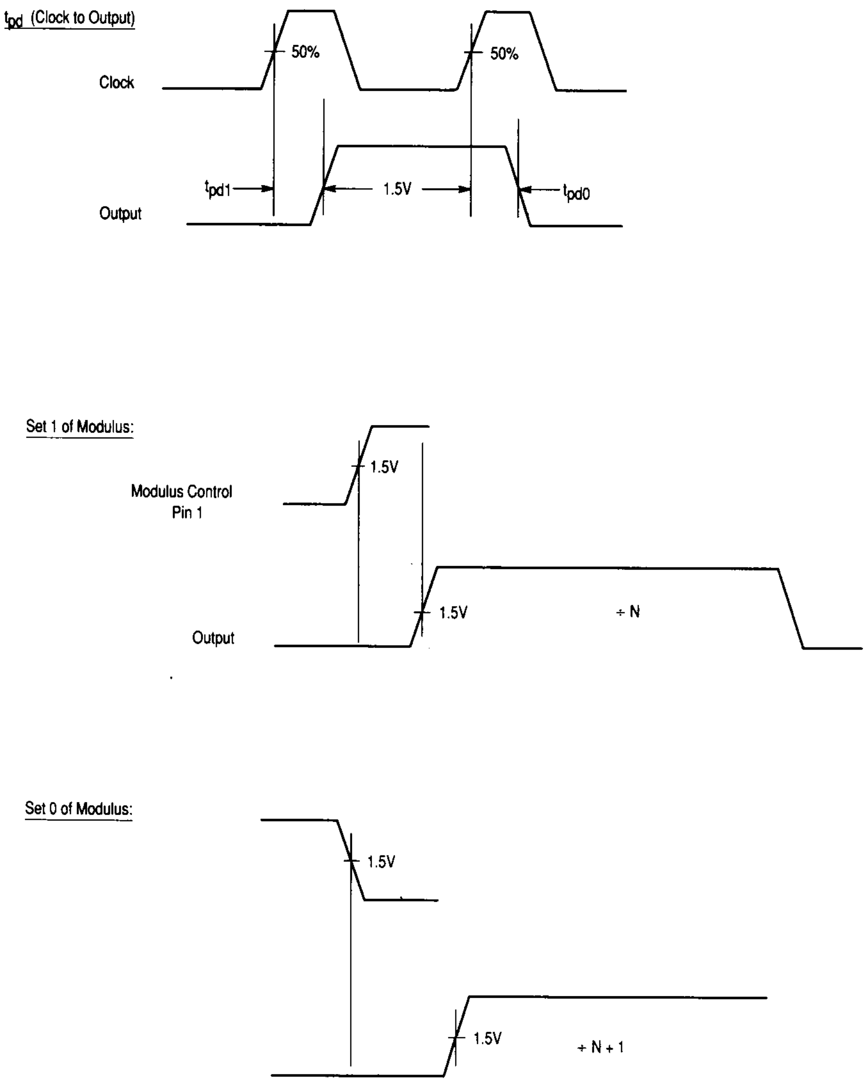
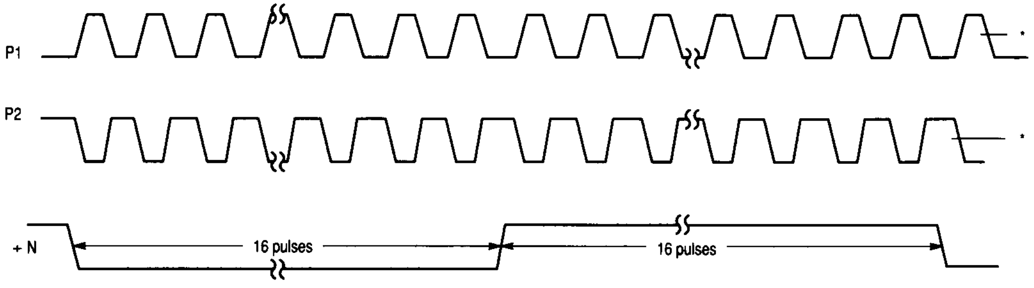
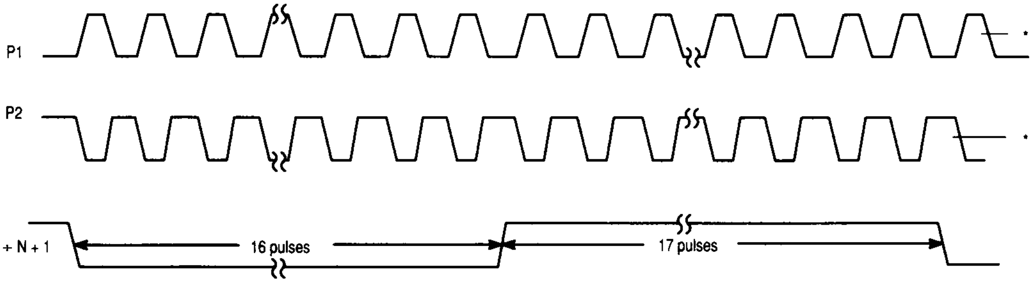


Figure 3. Test Circuit Waveforms (Information Only)



P1 = 400 mV above and below * point (for static testing only). Rise and Fall times of test waveforms must be less than 20 ns.
* Device internal bias point.



P1 = 400 mV above and below * point (for static testing only). Rise and Fall times of test waveforms must be less than 20 ns.
* Device internal bias point.

Figure 4. Test Waveforms

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QUIESCENT LIMIT TABLE

Test Temperature	Test Voltage Values (Volts)									Test Current Values		Divide by Function	
	V_{IH}	V_{IL}	V_{IR}	V_{LL}	$V_{CH/CM1}$	$V_{IM/CM2}$	V_{CL}	V_{CC}	GND	I_{OL}	I_{CH}	÷N	÷N + 1
T_A = 25 °C	+2.0	+0.8	+2.7	+0.4	+5.5	+9.5	+4.5	+5.0	0	+2.0 mA	-100 μA	+32	+33
T_A = 125 °C	+2.0	+0.8	+2.7	+0.4	+5.5	+9.5	+4.5	+5.0	0	+2.0 mA	-100 μA	+32	+33
T_A = -55 °C	+2.0	+0.8	+2.7	+0.4	+5.5	+9.5	+4.5	+5.0	0	+2.0 mA	-100 μA	+32	+33

Symbol	Parameter	Limits						Units	TEST VOLTAGE APPLIED TO PINS BELOW								
	Functional Parameters:	+ 25 °C		+ 125 °C		- 55 °C			Pinouts referenced are for DIL package, check Pin Assignments P1 per figure 4, Output Load = 0.1 μF to Gnd								
		Subgroup 1		Subgroup 2		Subgroup 3											
		Min	Max	Min	Max	Min	Max		V_{IH}	V_{CH}	$V_{IM/CM2}$	V_{CL}	C1	P1	I_{OH}/I_{OL}	GND	P.U.T.
** V_{OH}	High Voltage Output	2.5		2.5		2.5		V	1			7	6	5	2, 3 (I_{OH})	4	2, 3
* V_{OL}	Low Voltage Output		0.5		0.5		0.5	V	1			7	6	5	2, 3 (I_{OL})	4	2, 3
** I_{SC}	Short Circuit Current	-5.0	-16.5	-5.0	-16.5	-5.0	-16.5	mA	1	7			6	5		2, 3, 4	2, 3
* I_{IM}	Input Current High		0.1		0.1		0.1	mA			1	7, 8	6	5		4	1
* I_{CH}	Power Supply Current		7.2		7.2		7.2	mA	1	7			6	5		4	7
* I_{CM}	Power Supply Current		7.8		7.8		7.8	mA	1		8 (V_{CM2})		6	5		4	8

* Precondition Low, Pins 2 and 3 wired together.

** Precondition High, Pins 2 and 3 wired together.

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QUIESCENT LIMIT TABLE

Test Temperature	Test Voltage Values (Volts)									Test Current Values		Divide by Function	
	V_{IH}	V_{IL}	V_{IR}	V_{LL}	$V_{CH/CM1}$	$V_{IM/CM2}$	V_{CL}	V_{CC}	GND	I_{OL}	I_{CH}	÷N	÷N + 1
T_A = 25 °C	+2.0	+0.8	+2.7	+0.4	+5.5	+9.5	+4.5	+5.0	0	+2.0 mA	-100 µA	+32	+33
T_A = 125 °C	+2.0	+0.8	+2.7	+0.4	+5.5	+9.5	+4.5	+5.0	0	+2.0 mA	-100 µA	+32	+33
T_A = -55 °C	+2.0	+0.8	+2.7	+0.4	+5.5	+9.5	+4.5	+5.0	0	+2.0 mA	-100 µA	+32	+33

Symbol	Parameter	Limits						Units	TEST VOLTAGE APPLIED TO PINS BELOW								
	Functional Parameters:	+ 25 °C		+ 125 °C		- 55 °C			Pinouts referenced are for DIL package, check Pin Assignments P1 per figure 4, Output Load = 0.1 µF to Gnd								
		Subgroup 1		Subgroup 2		Subgroup 3											
		Min	Max	Min	Max	Min	Max		V_R	V_{R2}	V_{CH}	V_{IR}	V_{ILL}	C1	P1	GND	P.U.T.
V_R	High Voltage Output	3.5	4.5	3.5	4.5	4.0	5.0	V	7		8 (V_{CH1})						7
V_{R2}	Low Voltage Output	4.0	4.5	3.3	4.5	4.0	5.0	V		7	8 (V_{CH2})						7
* I_{IR}	Short Circuit Current	-5.0	-16.5	-5.0	-16.5	-5.0	-16.5	mA			7. 8	1		6	5	4	1
* I_{IL}	Input Current High		0.1		0.1		0.1	mA			7, 8		1	6	5	4	1

* Precondition Low, Pins 2 and 3 wired together.

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QUIESCENT LIMIT TABLE

Test Temperature	Test Voltage Values (Volts)									Test Current Values		Divide by Function	
	V_{IH}	V_{IL}	V_{IR}	V_{LL}	$V_{CH/CM1}$	$V_{IM/CM2}$	V_{CL}	V_{CC}	GND	I_{OL}	I_{CH}	+N	+N + 1
T_A = 25 °C	+2.0	+0.8	+2.7	+0.4	+5.5	+9.5	+4.5	+5.0	0	+2.0 mA	-100 µA	+32	+33
T_A = 125 °C	+2.0	+0.8	+2.7	+0.4	+5.5	+9.5	+4.5	+5.0	0	+2.0 mA	-100 µA	+32	+33
T_A = -55 °C	+2.0	+0.8	+2.7	+0.4	+5.5	+9.5	+4.5	+5.0	0	+2.0 mA	-100 µA	+32	+33

Symbol	Parameter	Limits						Units	TEST VOLTAGE APPLIED TO PINS BELOW				
	Functional Parameters:	+ 25 °C		+ 125 °C		- 55 °C			Pinouts referenced are for DIL package, check Pin Assignments				
		Subgroup 9		Subgroup 10		Subgroup 11							
		Min	Max	Min	Max	Min	Max		V_{OUT}	V_{IN}	V_{CC}	V_{EEL}	P.U.T.
t_{pd}	Propagation Delay (Note 1)		50		50		50	ns	(See Figure 1 - 4)				
* Clk1 (min)	Clock Input 1 (Note 2)	400	800	400	800	400	800	mVp-p	(See Figure 1 - 4)				
* Clk2 (min)	Clock Input 2 (Note 2)	200	800	200	800	200	800	mVp-p	(See Figure 1 - 4)				
* Clk (max)	Clock Maximum (Note 2)	200	800	200	800	200	800	mVp-p	(See Figure 1 - 4)				
t_{SET0}	Setup Time (Note 1)		6.0		6.0		6.0	ns	(See Figure 1 - 4)				
t_{SET1}	Setup Time (Note 1)		6.0		6.0		6.0	ns	(See Figure 1 - 4)				
f_{max}	Toggle Frequency (Note 3)	225		225		225		MHz	(See Figure 1 - 4)				
f_{min}	Toggle Frequency		35		35		35	MHz	(See Figure 1 - 4)				

1. These parameters guaranteed by those marked with a single asterisk *, therefore are not tested.
2. Measure Clock 1 (min) at 35 MHz, Clock 2 (min) at 50 MHz, and Clock (max) at f_{MAX}.
3. 275 MHz for 12515A.