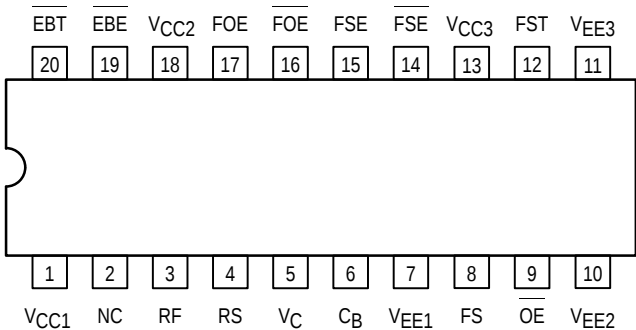


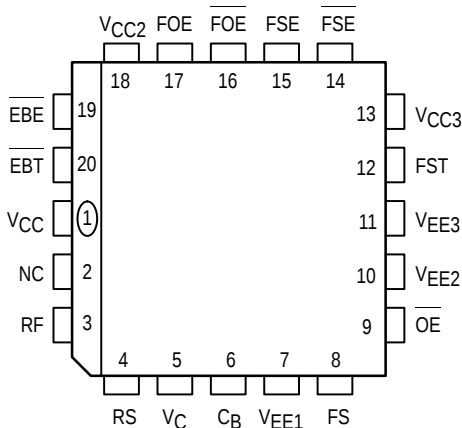
130MHz Voltage Controlled Multivibrator

- High Frequency VCM Ideal for PLL Applications
- Single External Resistor Determines Center Frequency; Additional Resistor Determines f/V Sensitivity
- Internal Ripple Counter (1/2, 1/4, 1/8) for Low Frequency Applications, TTL/ECL Outputs
- VCO Output Enable Pins (TTL/ECL Level)
- +5.0V Single Supply Voltage
- Packages: DIP, PLCC

Pinout: 20-Lead Plastic Package (Top View)

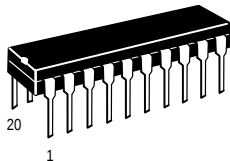


Pinout: 20-Lead PLCC Package (Top View)

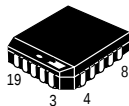


MC12101

130MHz VOLTAGE
CONTROLLED
MULTIVIBRATOR



P SUFFIX
PLASTIC DIP PACKAGE
CASE 738-03



FN SUFFIX
PLCC PACKAGE
CASE 775-02

PIN NAMES

Pin	Function
RF, RS	Center Frequency Inputs
VC	Frequency Control Input
CB	Bias Filter Input
ES	Frequency Select Input
OE	TTL Output Enable
FST	TTL +2, +4, +8 Output
FSE, FSE	Diff ECL +2, +4, +8 Outputs
FOE, FOE	Diff ECL +1 Outputs
EBE	VCO Disable, ECL Level Input
EBT	VCO Disable, TTL Level Input



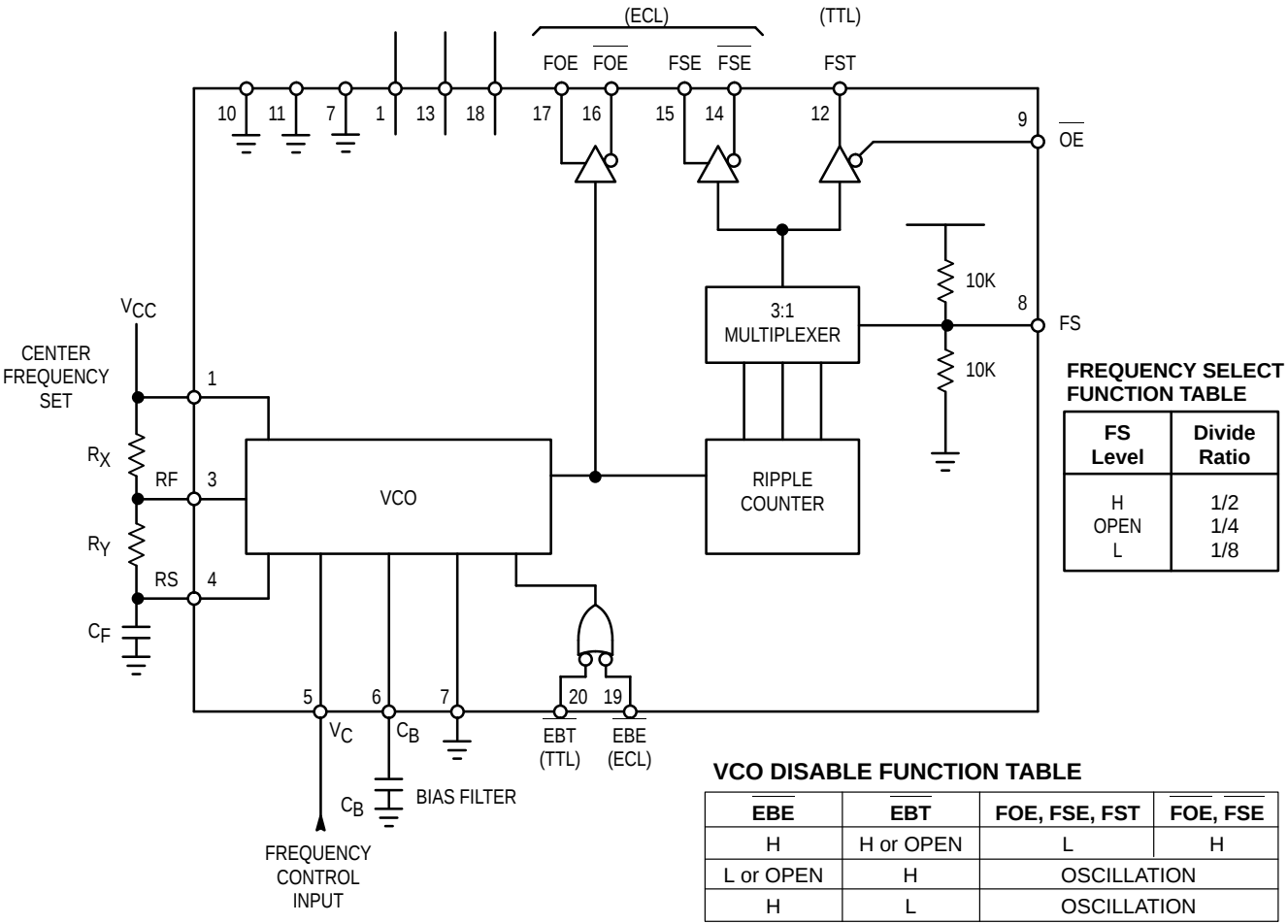


Figure 1. Block Diagram

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V _{CC1} V _{CC2} V _{CC3}	Power Supply Voltage	−0.5 to +8.0	V
V _{IN} (TTL)	Input Voltage	−0.5 to V _{CC}	V
V _{IN} (ECL)	Input Voltage	−0.5 to V _{CC}	V
I _{OUT} (ECL)	Output Source Current – Surge	100	mA
	Output Source Current – Continuous	50	mA
T _J	Junction Operating Temperature	+140	°C
T _{STG}	Storage Temperature	−55 to +150	°C

OPERATING CONDITIONS

Symbol	Parameter	Value	Unit
T _A	Ambient Temperature	0 to +75	°C
V _{CC}	Supply Voltage	+4.75 to +5.25	V
I _{OH} (TTL)	TTL High Output Current	−1.0	mA
I _{OL} (TTL)	TTL Low Output Current	20	mA

DC CHARACTERISTICS ($V_{CC} = 5.0V \pm 5\%$; $R_X = 2.4k\Omega$; $R_Y = 1.5k\Omega$; $C_B = 0.001\mu F$)

Symbol	Characteristic	0°C		25°C			75°C		Unit	Condition
		Min	Max	Min	Typ	Max	Min	Max		
I _{CC}	Supply Current	80	135	70	100	120	85	150	mA	EBT = EBE = V_{CC} (ECL, TTL)
V _{OLT}	Output Low Voltage, TTL					0.5			V	$F_S = GND$
V _{OHT}	Output High Voltage, TTL			2.4					V	$F_S = GND$
V _{OLE}	Output Low Voltage, ECL			3.0		3.4			V	$V_{CC} = 5.0V$, $R_L = 50\Omega$, $V_T = 3.0V$
V _{OHE}	Output High Voltage, ECL			3.9		4.19			V	$V_{CC} = 5.0V$, $R_L = 50\Omega$, $V_T = 3.0V$
I _{ILT}	EBT Input Low Current					400			μA	$V_{IN} = 0.4V$
I _{IHT}	EBT Input High Current					20			μA	$V_{IN} = 2.7V$
						100			μA	$V_{IN} = 7.0V$
I _{INHE}	EBE Input High Current					250			μA	$V_{IN} = 4.19V$
I _{INLE}	EBE Input Low Current			1.0					μA	$V_{IN} = 3.05V$
V _{ILS}	FS Input, Max "L" Level					1.2			V	$V_{CC} = 5.0V$
V _{IMS}	FS Input, "Medium" Level			2.0		3.0			V	$V_{CC} = 5.0V$
V _{IHS}	FS Input, Min "H" Level			3.8					V	$V_{CC} = 5.0V$
V _{ILT}	EBT Input Low Voltage		0.8			0.8		0.8	V	
V _{IHT}	EBT Input High Voltage	2.0		2.0			2.0		V	
V _{IHE}	EBE Input High Voltage			3.87		4.19			V	$V_{CC} = 5.0V$
V _{ILE}	EBE Input Low Voltage			3.05		3.52			V	$V_{CC} = 5.0V$
V _{LM}	V_C Input Voltage, $V_C = V_{CC} \div 2$			± 1.1	± 1.3	± 1.5			V	$V_{CC} = 5.0V$
V _{CB}	C_B Output Voltage			2.35	2.50	2.65			V	$V_{CC} = 5.0V$

AC CHARACTERISTICS ($V_{CC} = 5.0V$; $R_X = 2.4k\Omega$; $R_Y = 1.5k\Omega$; $C_B = 0.001\mu F$; $V_T = 3.0V$)

Symbol	Characteristic	0°C		25°C			75°C		Unit	Condition
		Min	Max	Min	Typ	Max	Min	Max		
FO	Center Frequency ($V_{VC} - V_{CB} = 0V$)			117	130	143			MHz	$V_{CC} = +2.0V$ $V_{EE} = -3.0V$
F _{MAX} – F _{MIN}	Frequency Range ($V_C = 1/2 V_{CC} \pm 1.5V$, $V_{CC} = 5.0V$)			68	80	92			MHz	
t _{rE}	FOE/FOE/FSE/FSE Rise Time			0.5		2.4			ns	
t _{fE}	FOE/FOE/FSE/FSE Fall Time			0.5		2.4			ns	
TTT	Reset Time					40			ns	EBT ~ FST
TTO	Reset Time					25			ns	EBT ~ FOE/FOE
TTS	Reset Time					35			ns	EBT ~ FSE/FSE
TET	Reset Time					32			ns	EBE ~ FST
TEO	Reset Time					12			ns	EBE ~ FOE/FOE
TES	Reset Time					30			ns	EBE ~ FSE/FSE

Loading: ECL = 50 Ω to V_T ; TTL = 500 Ω , 50pF

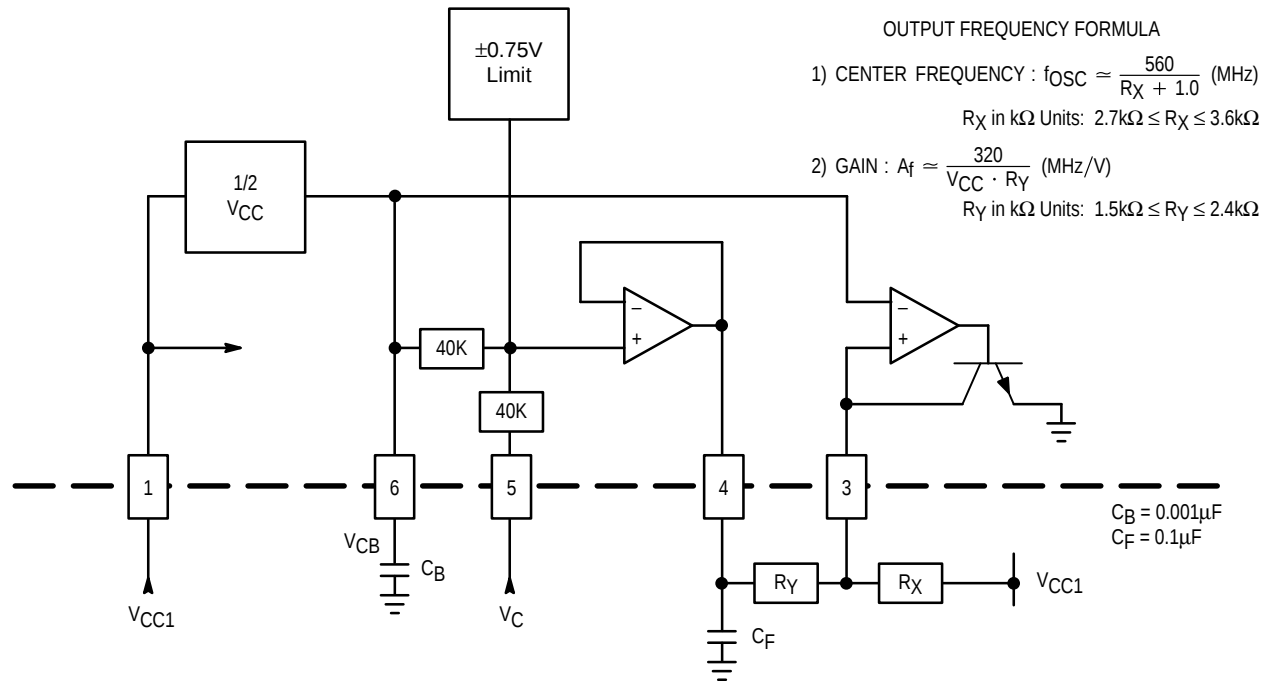


Figure 2. VCO Detail

Notes:

- For optimum VCO linearity (MHz/V), the following resistor ranges are recommended:
 $3.6k\Omega \leq R_X \leq 4.6k\Omega$ ($R_Y = 2.0k\Omega$)
 $1.5k\Omega \leq R_Y \leq 2.4k\Omega$ ($R_X = 3.3k\Omega$)
- TTL output maximum frequency = 50MHz
- Simultaneous use of both ECL and TTL outputs are not recommended due to excessive power consumption for the EIAJ Type II SO package

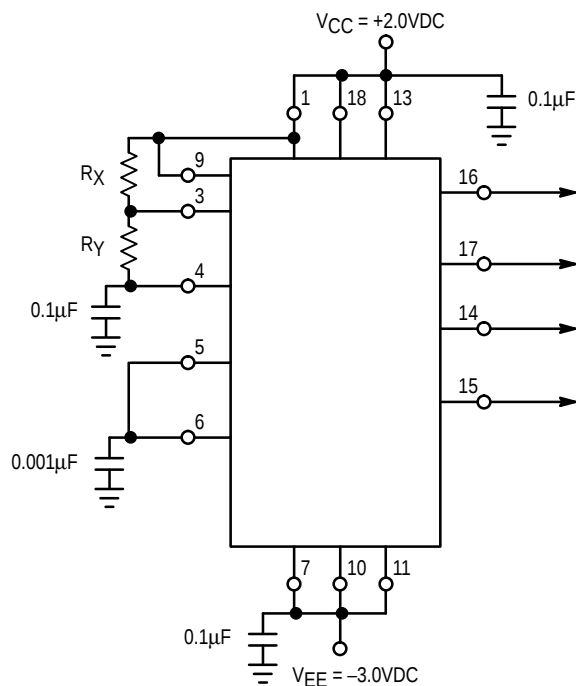
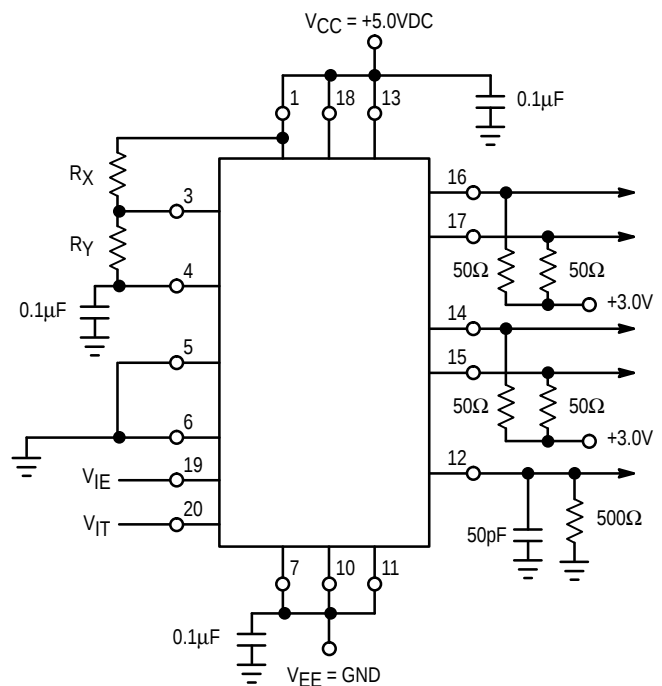
Figure 3. AC Test Circuit (FO/tr_E/t_{fE} Measurement)

Figure 4. AC Test Circuit (Other Measurements)



L

L

L

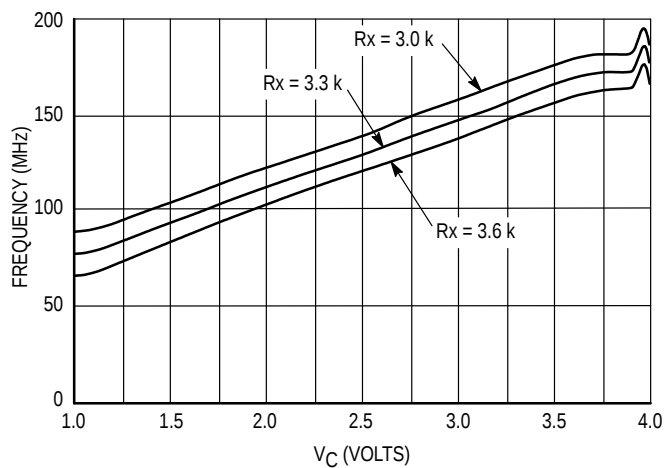


Figure 6. V_C versus Output Frequency
Varying R_x @ $V_{CC} = 5.0$ V; $T_A = 25^\circ\text{C}$; $R_y = 2.0$ k Ω

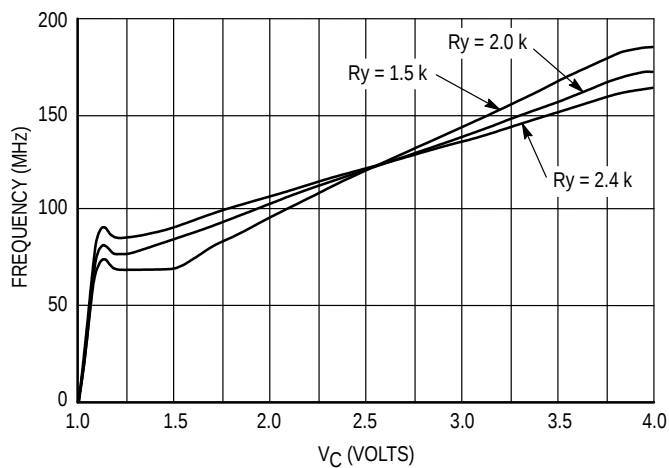


Figure 7. V_C versus Output Frequency
Varying R_y @ $V_{CC} = 5.0$ V; $T_A = 25^\circ\text{C}$; $R_x = 3.3$ k Ω

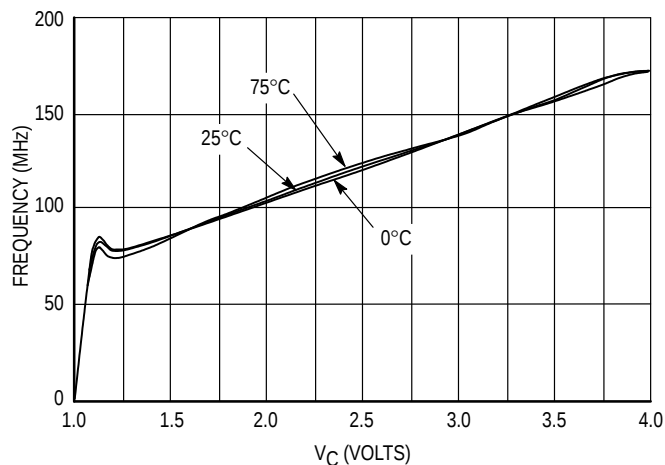


Figure 8. V_C versus Output Frequency
Varying T_A @ $V_{CC} = 5.0$ V; $R_x = 3.3$ k Ω ; $R_y = 2.0$ k Ω

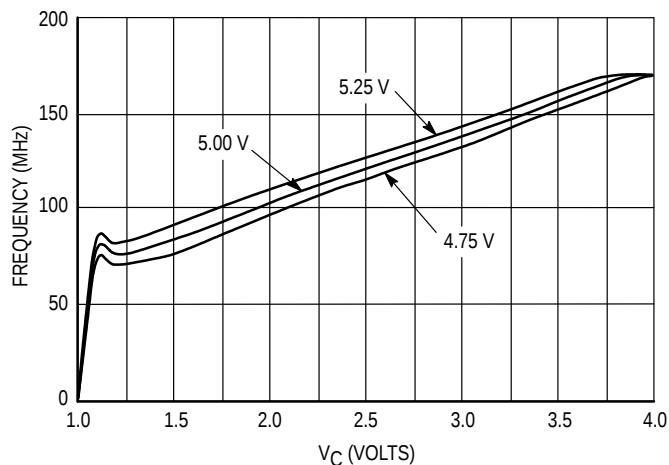
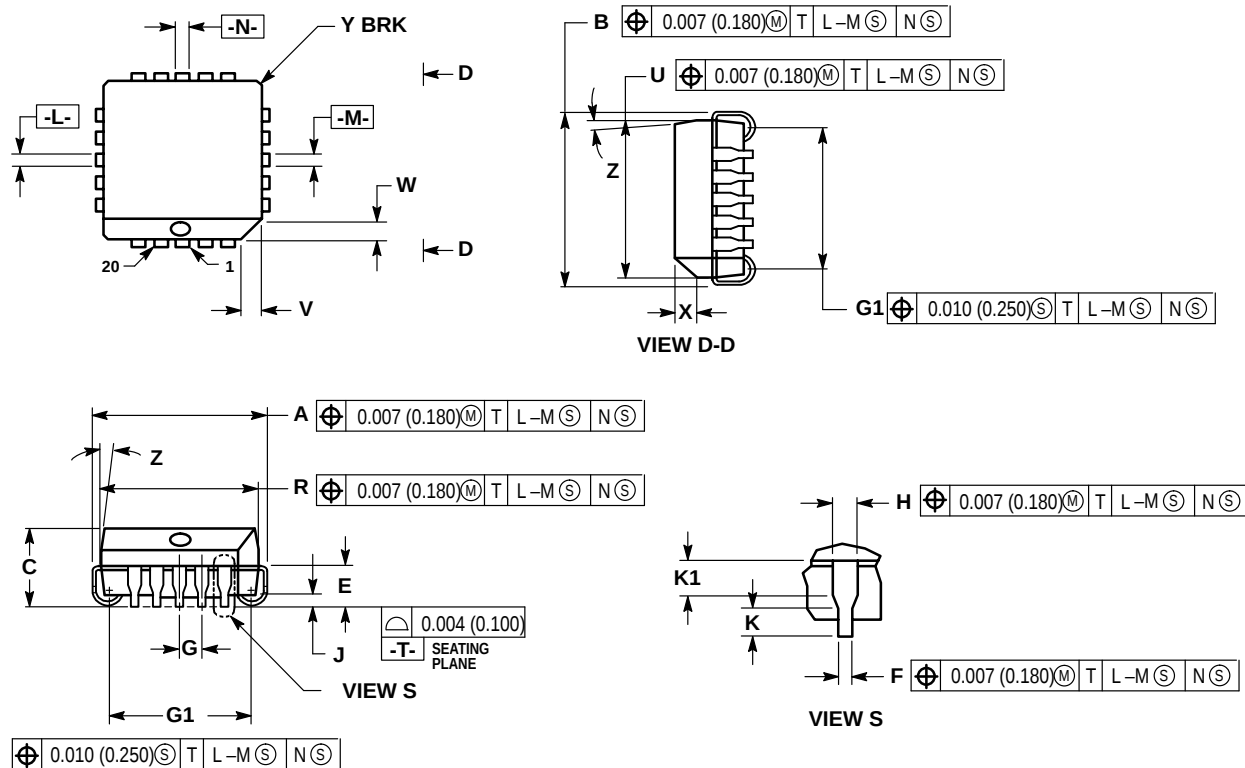


Figure 9. V_C versus Output Frequency
Varying V_{CC} @ $R_x = 3.3$ k Ω ; $R_y = 2.0$ k Ω ; $T_A = 25^\circ\text{C}$

OUTLINE DIMENSIONS

FN SUFFIX
PLASTIC PLCC PACKAGE
CASE 775-02
ISSUE C

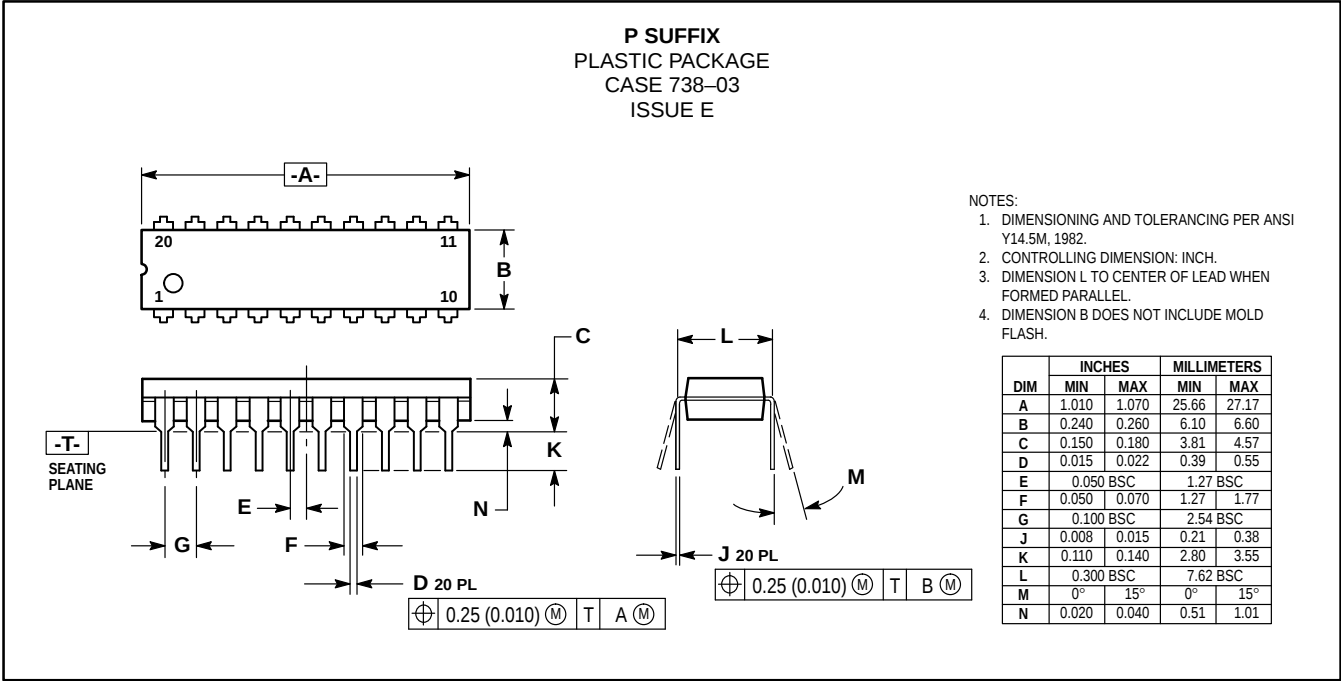


NOTES:

- DATUMS -L-, -M-, AND -N- DETERMINED WHERE TOP OF LEAD SHOULDER EXITS PLASTIC BODY AT MOLD PARTING LINE.
- DIM G1, TRUE POSITION TO BE MEASURED AT DATUM -T-, SEATING PLANE.
- DIM R AND U DO NOT INCLUDE MOLD FLASH. ALLOWABLE MOLD FLASH IS 0.010 (0.250) PER SIDE.
- DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
- CONTROLLING DIMENSION: INCH.
- THE PACKAGE TOP MAY BE SMALLER THAN THE PACKAGE BOTTOM BY UP TO 0.012 (0.300). DIMENSIONS R AND U ARE DETERMINED AT THE OUTERMOST EXTREMES OF THE PLASTIC BODY EXCLUSIVE OF MOLD FLASH, TIE BAR BURRS, GATE BURRS AND INTERLEAD FLASH, BUT INCLUDING ANY MISMATCH BETWEEN THE TOP AND BOTTOM OF THE PLASTIC BODY.
- DIMENSION H DOES NOT INCLUDE DAMBAR PROTRUSION OR INTRUSION. THE DAMBAR PROTRUSION(S) SHALL NOT CAUSE THE H DIMENSION TO BE GREATER THAN 0.037 (0.940). THE DAMBAR INTRUSION(S) SHALL NOT CAUSE THE H DIMENSION TO BE SMALLER THAN 0.025 (0.635).

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.385	0.395	9.78	10.03
B	0.385	0.395	9.78	10.03
C	0.165	0.180	4.20	4.57
E	0.090	0.110	2.29	2.79
F	0.013	0.019	0.33	0.48
G	0.050 BSC		1.27 BSC	
H	0.026	0.032	0.66	0.81
J	0.020	—	0.51	—
K	0.025	—	0.64	—
R	0.350	0.356	8.89	9.04
U	0.350	0.356	8.89	9.04
V	0.042	0.048	1.07	1.21
W	0.042	0.048	1.07	1.21
X	0.042	0.056	1.07	1.42
Y	—	0.020	—	0.50
Z	2°	10°	2°	10°
G1	0.310	0.330	7.88	8.38
K1	0.040	—	1.02	—

OUTLINE DIMENSIONS



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