

5-Bit Differential Register

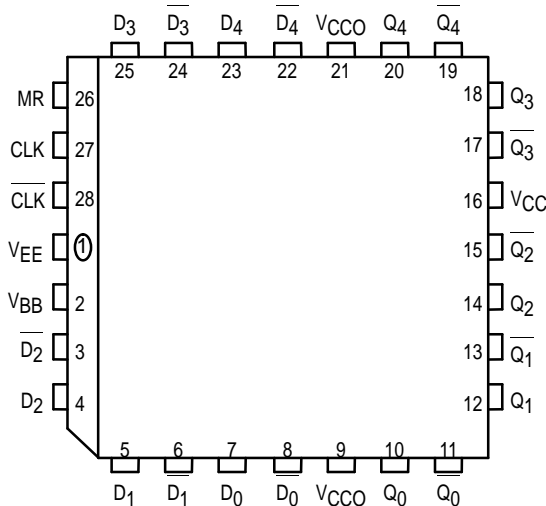
The MC10E/100E452 is a 5-bit differential register with differential data (inputs and outputs) and clock. The registers are triggered by a positive transition of the positive clock (CLK) input. A high on the Master Reset (MR) asynchronously resets all registers so that the Q outputs go LOW.

The differential input structures are clamped so that the inputs of unused registers can be left open without upsetting the bias network of the device. The clamping action will assert the D and the CLK sides of the inputs. Because of the edge triggered flip-flop nature of the device simultaneously opening both the clock and data inputs will result in an output which reaches an unidentified but valid state. Note that the input clamps only operate when both inputs fall to 2.5V below V_{CC}.

The fully differential design of the device makes it ideal for very high frequency applications where a registered data path is necessary.

- Differential D, CLK and Q; V_{BB} Reference Available
- 1100MHz Min. Toggle Frequency
- Asynchronous Master Reset
- Extended 100E V_{EE} Range of - 4.2V to - 5.46V

Pinout: 28-Lead PLCC (Top View)



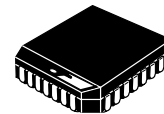
* All V_{CC} and V_{CCO} pins are tied together on the die.

PIN NAMES

Pin	Function
D[0:4], D[0:4]	Differential Data Inputs
MR	Master Reset Input
CLK, CLK	Differential Clock Input
V _{BB}	V _{BB} Reference Output
Q[0:4], Q[0:4]	Differential Data Outputs

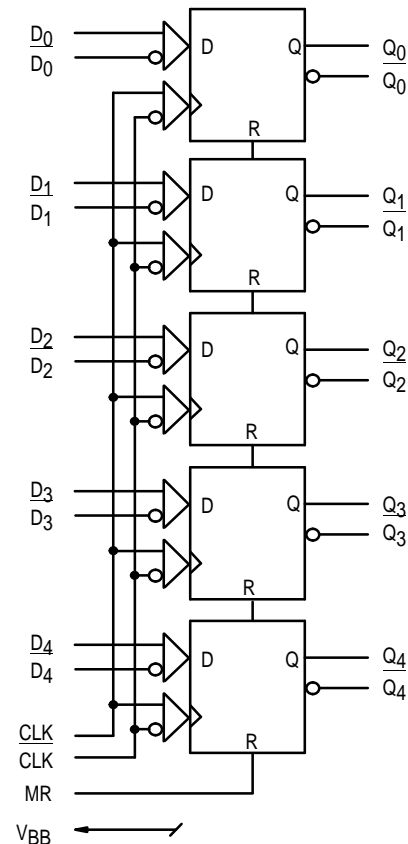
MC10E452
MC100E452

5-BIT DIFFERENTIAL REGISTER



FN SUFFIX
PLASTIC PACKAGE
CASE 776-02

LOGIC DIAGRAM



MC10E452 MC100E452

DC CHARACTERISTICS ($V_{EE} = V_{EE}(\text{min})$ to $V_{EE}(\text{max})$; $V_{CC} = V_{CCO} = \text{GND}$)

Symbol	Characteristic	-40°C			0°C			25°C			85°C			Unit	Cond
		Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	Min	Typ	Max		
V_{BB}	Output Reference Voltage	10E	-1.43	-1.30	-1.38	-1.27	-1.35	-1.25	-1.31	-1.19	V				
		100E	-1.38	-1.26	-1.38	-1.26	-1.38	-1.26	-1.38	-1.26					
I_{IH}	Input HIGH Current		150		150		150		150	μA					
I_{EE}	Power Supply Current	10E	74	89	74	89	74	89	74	89	mA				
		100E	74	89	74	89	74	89	85	102					
V_{CMR}	Common Mode Range	-2.0	-0.4	-2.0	-0.4	-2.0	-0.4	-2.0	-0.4	V	1				

- V_{CMR} is referenced to the most positive side of the differential input signal. Normal specified operation is obtained when the input signals are within the V_{CMR} range and the input swing is greater than V_{PP} .

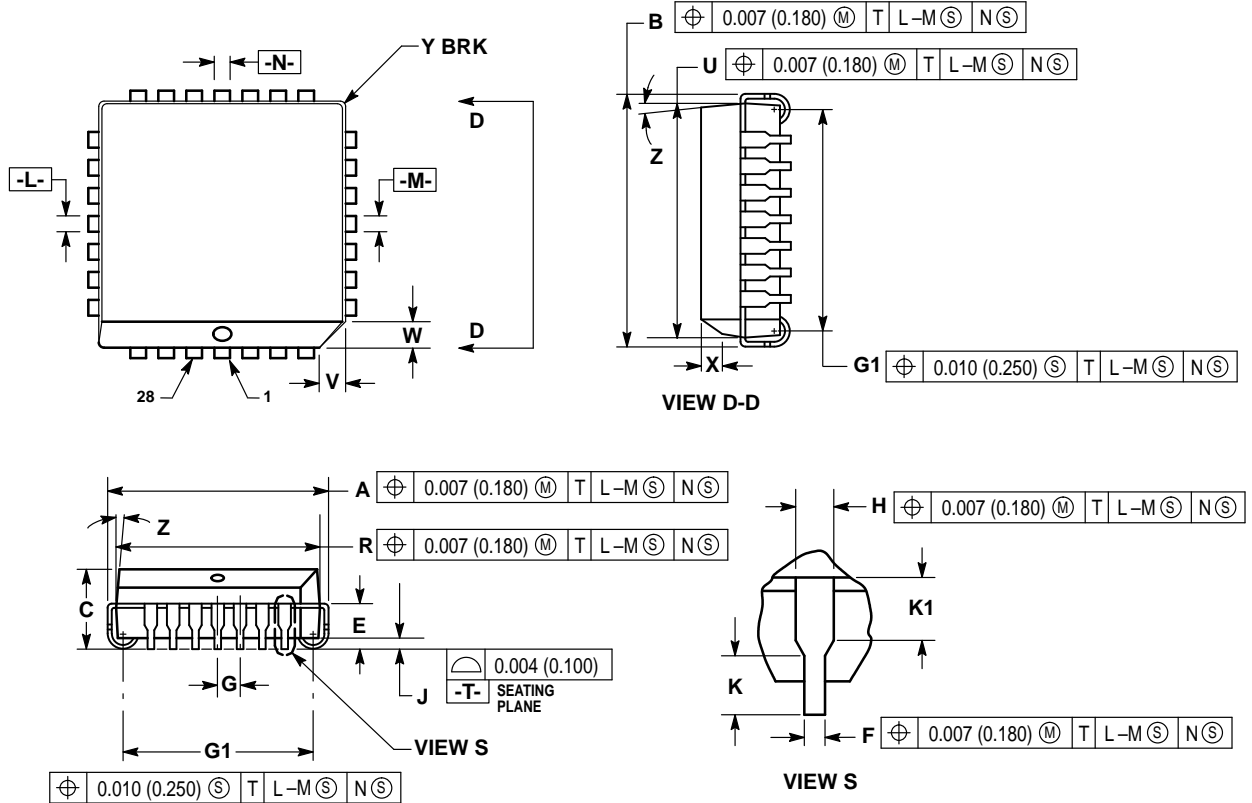
AC CHARACTERISTICS ($V_{EE} = V_{EE}(\text{min})$ to $V_{EE}(\text{max})$; $V_{CC} = V_{CCO} = \text{GND}$)

Symbol	Characteristic	-40°C			0°C to 85°C			Unit	Condition		
		Min	Typ	Max	Min	Typ	Max				
f_{MAX}	Maximum Toggle Frequency	1000	1400		1100	1400		MHz			
t_{PLH} t_{PHL}	Propagation Delay to Output							ps			
	CLK (Diff)	425	600	850	475	600	800				
	CLK (SE)	375	600	900	425	600	850				
	MR	375	625	900	425	625	850				
t_S	Setup Time		D	175	-50		150	-50	ps		
t_H	Hold Time		D	225	50		200	50	ps		
t_{RR}	Reset Recovery Time			750	450		700	450			
t_{PW}	Minimum Pulse Width		CLK	400			400		ps		
			MR	400			400				
t_{skew}	Within-Device Skew			50			50		ps	1	
V_{PP}	Minimum Input Swing			150			150		mV	2	
t_r/t_f	Rise/Fall Times			250	475	725	275	475	675	ps	20-80%

- Within-device skew is defined as identical transitions on similar paths through a device.
- Minimum input swing for which AC parameters are guaranteed.

OUTLINE DIMENSIONS


FN SUFFIX
 PLASTIC PLCC PACKAGE
 CASE 776-02
 ISSUE D



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	0.485	0.495	12.32	12.57
B	0.485	0.495	12.32	12.57
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	0.450	0.456	11.43	11.58
U	0.450	0.456	11.43	11.58
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°	
G1	0.410	0.430	10.42	10.92
K1	0.040	—	1.02	—

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