

## 5-Bit Differential Register

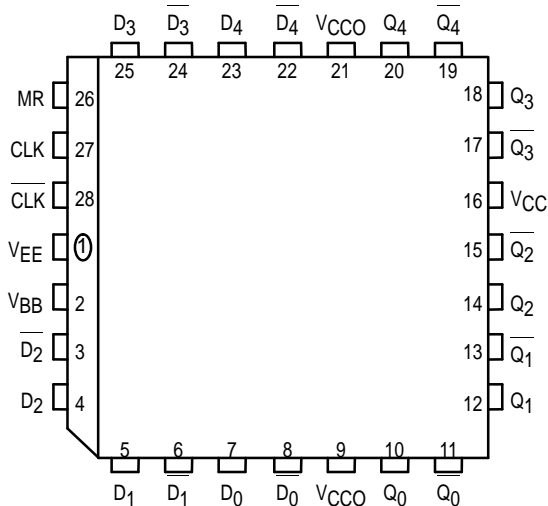
The MC10E/100E452 is a 5-bit differential register with differential data (inputs and outputs) and clock. The registers are triggered by a positive transition of the positive clock (CLK) input. A high on the Master Reset (MR) asynchronously resets all registers so that the Q outputs go LOW.

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<sub>CC</sub>.

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<sub>BB</sub> Reference Available
- 1100MHz Min. Toggle Frequency
- Asynchronous Master Reset
- Extended 100E V<sub>EE</sub> Range of - 4.2V to - 5.46V

**Pinout: 28-Lead PLCC (Top View)**



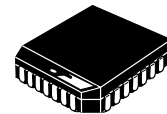
\* All V<sub>CC</sub> and V<sub>CCO</sub> pins are tied together on the die.

### PIN NAMES

Pin	Function
D[0:4], D[0:4]	Differential Data Inputs
MR	Master Reset Input
CLK, CLK	Differential Clock Input
V <sub>BB</sub>	V <sub>BB</sub> Reference Output
Q[0:4], Q[0:4]	Differential Data Outputs

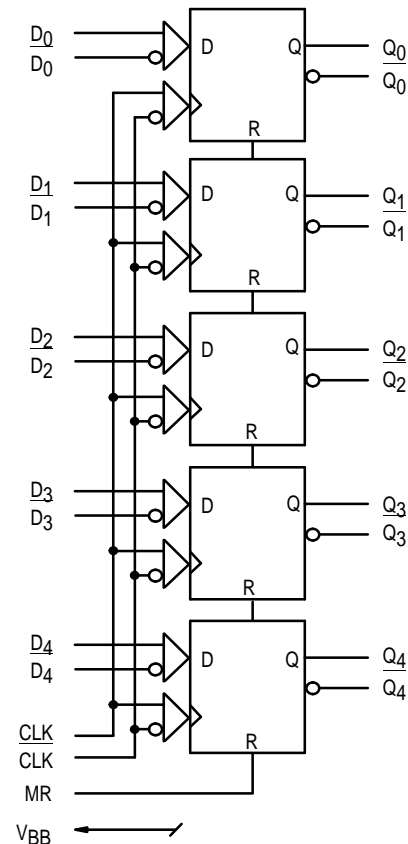
**MC10E452**  
**MC100E452**

**5-BIT DIFFERENTIAL REGISTER**



**FN SUFFIX**  
PLASTIC PACKAGE  
CASE 776-02

### LOGIC DIAGRAM



# MC10E452 MC100E452

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

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	$\mu\text{A}$					
$I_{EE}$	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  $V_{PP}$ .

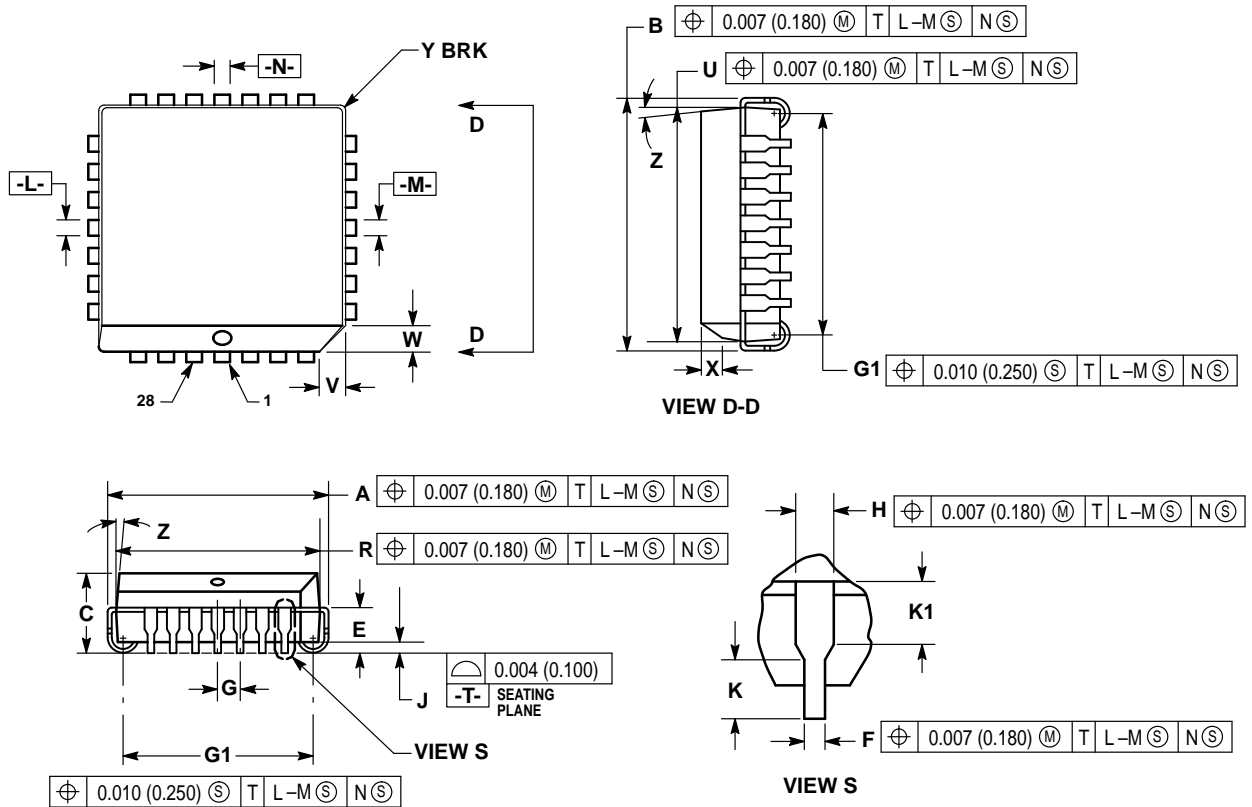
## AC CHARACTERISTICS ( $V_{EE} = V_{EE(\min)}$ to $V_{EE(\max)}$ ; $V_{CC} = V_{CCO} = \text{GND}$ )

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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