ELECTRONICS, INC.
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NTE9093 & NTE9094
Integrated Circuit
Diode Transistor Logic (DTL)
Dual J–K Flip–Flop

Absolute Maximum Ratings: (Above which useful life may be impaired)

V_{CC} Pin, Potential to GND . . . . . –0.5 to +8.0V
V_{CC}, Pulsed, 1 Second 12V
Input Voltage, Applied to Input . . . . . –1.5 to 5.5V
Voltage Applied to Output when Output is High . . . . . $+V_{CC}$
Input Current, Into Inputs 1mA
Current Into Output when Output is Low 30mA
Ambient Temperature Range Under Bias . . . . . –55° to +125°C
Storage Temperature Range . . . . . –65° to +150°C
Lead Temperature (During Soldering, 60sec) . . . . . +300°C

Note 1. The **NTE9093** is a **discontinued** device and no longer available.

Electrical Characteristics: (T_A = +25°C, V_{CC} = 5V ±10% unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Output High Voltage NTE9093	V_{OH}	V_{CC} = 4.5V, I_{OH} = –180µA	2.5	3.3	–	V
NTE9094		V_{CC} = 4.5V, I_{OH} = –540µA	2.5	3.3	–	V
Output Low Voltage NTE9093	V_{OL}	V_{CC} = 4.5V, I_{OL} = 12mA	–	0.25	0.4	V
NTE9094		V_{CC} = 4.5V, I_{OH} = 13mA	–	0.25	0.4	V
Input High Voltage	V_{IH}	Guaranteed Input High Threshold for All Inputs	1.9	–	–	V
Input Low Voltage	V_{IL}	Guaranteed Input Low Threshold for All Inputs	–	–	1.1	V
Input Leakage Current, All J–K, S, C, S_D, C_D Inputs	I_R	V_{CC} = 5.5V, V_R = 4V, GND on Other Inputs	–	–	2.0	µA
Input Leakage Current, CP Inputs	I_{RCP}	V_{CC} = 5.5V, V_R = 4V, GND on Other Inputs	–	–	10	µA
Input Current, All J, K, S, C Inputs	I_F	V_{CC} = 5.5V, V_F = 0.4V, 4V on Other Inputs	–	–0.82	–0.98	mA
Input Current, S_D or C_D			–	–1.8	–2.2	mA
Input Current, CP Inputs NTE9093			–	–2.40	–2.93	mA
NTE9094			–	–1.93	–2.35	mA

Electrical Characteristics (Cont'd): (T_A = +25°C, V_{CC} = 5V ±10% unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Input Current, All J, K, S, C Inputs	I_F	V_{CC} = 4.5V, V_F = 0.4V, 4V on Other Inputs	–	–0.62	–0.76	mA
Input Current, S_D or C_D			–	–1.39	–1.70	mA
Input Current, CP Inputs NTE9093			–	–1.85	–2.26	mA
NTE9094			–	–1.50	–1.83	mA
V_{CC} Current NTE9093	I_{PD}	V_{CC} = 5V, All Inputs Open, Momentary GND on S_D	–	16.6	28.0	mA
NTE9094			–	19.8	32.4	mA
Switching Characteristics (T_A = +25°C, V_{CC} = 5V)						
Clock to Output NTE9093	t_{pd+}		35	–	75	ns
NTE9094			30	–	65	ns
Clock to Output NTE9093	t_{pd-}		30	–	75	ns
NTE9094			30	–	75	ns
Set–Up Time	t_{set-up}		35	22	–	ns
Release Time	$t_{release}$		–	14	10	ns

Truth Table: Synchronous Operation

Before Clock				Outputs After Clock	
Outputs		Inputs			
One	Zero	J	K	One	Zero
L	H	L	X	L	H
L	H	H	X	H	L
H	L	X	L	H	L
H	L	X	H	L	H

Truth Table: Asynchronous Operation

Inputs		Outputs	
S_D	C_D	One	Zero
L	L	H	H
L	H	H	L
H	L	L	H
H	H	State determined by synchronous inputs and clock input	

Pin Connection Diagram