

QUAD TRI-STATE BUS TRANSCEIVER

GENERAL DESCRIPTION

The MMC 40243 and MMC 40943 are monolithic integrated circuits available in 14-lead dual in-line plastic or ceramic package, fabricated with standard Al-gate CMOS technology. The MMC 40243 consist of a quad 3-state bus transceiver, with high output current sink and source capability. It has 2 control signals DEa/ and OEb. The MMC 40943 consist of a quad 3-state bus transceiver TTL to CMOS with high output current sink and source capability. It has 3 power supply V_{DD} , V_{SS} , V_{CC} , and 2 control signals.

FEATURES

- Wide supply voltage range 3.0 V_{DC} to 18 V_{DC}
- Bidirectional inputs-outputs.
- 1 TTL load capability.
- Non-inverting tri-state outputs.

ABSOLUTE MAXIMUM RATINGS

V_{DD}^*	Supply voltage: G and H types	-0.5 to 20	V
	E and F types	-0.5 to 18	V
V_i	Input voltage	-0.5 to $V_{DD}+0.5$	V
I_i	DC input current (any one input)	± 10	mA
P_{tot}	Total power dissipation (per package)	200	mW
	Dissipation per output transistor for T_A = full package-temperature range	100	mW
T_A	Operating temperature :		
	G and H types	-55 to 125	°C
	E and F types	-40 to 85	°C
T_{stg}	Storage temperature	-65 to 150	°C

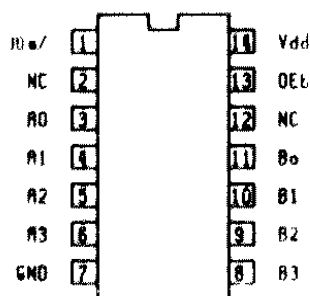
* All voltage values are referred to V_{SS} pin voltage

RECOMMENDED OPERATING CONDITIONS

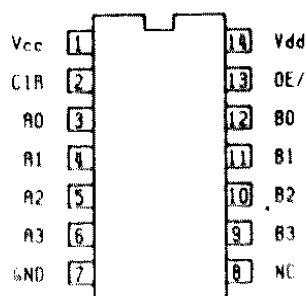
V_{DD}^*	Supply voltage: G and H types	3 to 18	V
	E and F types	3 to 15	V
V_i	Input voltage	0 to V_{DD}	V
T_A	Operating temperature :		
	G and H types	-55 to 125	°C
	E and F types	-40 to 85	°C

CONNECTIONS DIAGRAMS

MMC 40243

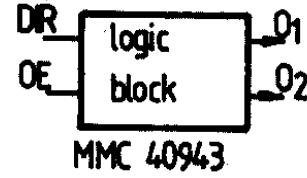
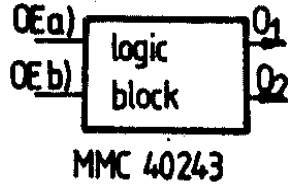
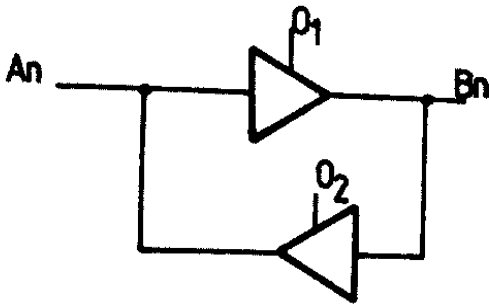


MMC 40943



MMC 40243, MMC 40943

FUNCTIONAL DIAGRAMS



TRUTH TABLES

MMC 40243

INPUTS		INPUTS/OUTPUTS	
OE _a	OE _b	A _n	B _n
L	L	inputs	B = A
H	L	Z	Z
L	H	Z	Z
H	H	A = B	inputs

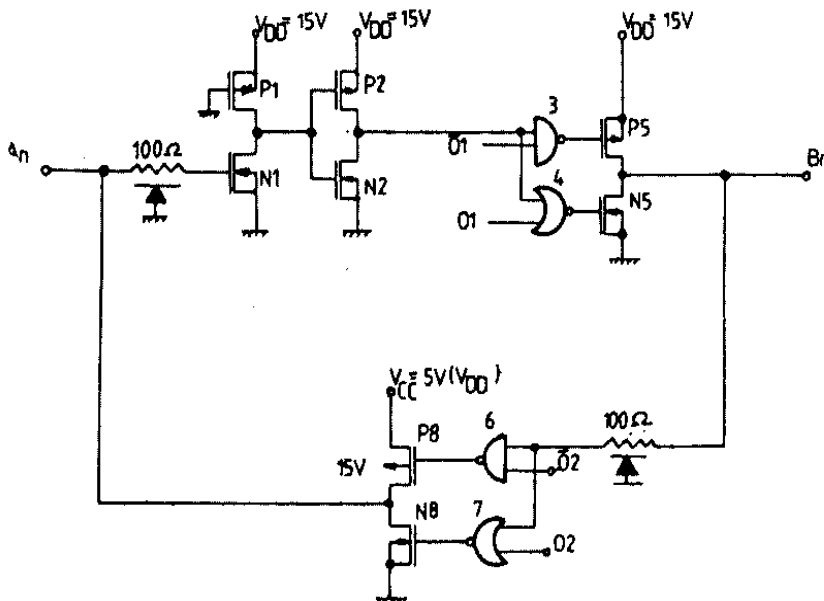
Z = high impedance

MMC 40943

INPUTS		INPUTS/OUTPUTS	
OE	DIR	A _n	B _n
L	L	A _n = B _n	inputs
L	H	inputs	A _n = B _n
H	X	Z	Z

Z = high impedance

SCHEMATIC DIAGRAMS



STATIC ELECTRICAL CHARACTERISTICS

(over recommended operating conditions)

MMC 40243

PARAMETER		TEST CONDITIONS					VALUES						UNIT
		V _I (V)	V _O (V)	I _O (μ A)	V _{DD} (V)	T _{LOW}		25°C			T _{HIGH}		
						min.	max.	min.	typ	max.	min.	max.	
I _L Quiescent current	G, H types	0/5			5		1			1		30	μ A
		0/10			10		3		3		90		
		0/15			15		8		8		240		
		0/15			20		40		40		1200		
	E, F types	0/5			5		3		3		90		
		0/10			10		9		9		270		
		0/15			15		24		24		720		
V _{OH} Output high voltage		0/5		<1	5	4.95		4.95		4.95		V	
		0/10		<1	10	9.95		9.95		9.95			
		0/15		<1	15	14.95		14.95		14.95			
V _{OL} Output low voltage		5/0		<1	5		0.05		0.05		0.05	V	
		10/0		<1	10		0.05		0.05		0.05		
		15/0		<1	15		0.05		0.05		0.05		
V _{IH} Input high voltage			0.5/4.5	<1	5	3.5		3.5		3.5		V	
			1/9	<1	10	7		7		7			
			1.5/13.5	<1	15	11		11		11			
V _{IL} Input low voltage			4.5/0.5	<1	5		1.5		1.5		1.5	V	
			9/1	<1	10		3		3		3		
			13.5/1.5	<1	15		4		4		4		
I _{OH} Output drive current outputs A0-A3	G, H types	0/5	2.5		5	-5.8		-4.8	-6.1		-3	mA	
		0/5	4.6		5	-1.2		-1.02	-1.9		-0.7		
		0/10	9.5		10	-3.1		-2.6	-3.7		-1.8		
	0/15	13.5		15	-8.2		-6.8	-14.1		-4.8			
	E, F types	0/5	2.5		5	-4.8		-4.1	-5.2		-2.9		
		0/5	4.6		5	-1		-0.8	-1.6		-0.6		
0/10		9.5		10	-2.5		-2.2	-3.1		-1.6			
		0/15	13.5		15	-6.8		-5.8	-11.9		-4.2		
I _{OL} Output sink current outputs A0-A3	G, H types	0/5	0.4		5	2.6		2.1	2.3		1.3	mA	
		0/10	0.5		10	6.5		5.5	2.6		3.8		
		0/15	1.5		15	19.2		16.1	2.3		11.2		
	E, F types	0/5	0.4		5	2.1		1.8	1.9		1.2		
		0/10	0.5		10	5.4		4.7	5.3		3.3		
		0/15	1.5		15	1.6		13.7	19.5		9.7		
I _{OH} Output drive current output B0-B3	G, H types	0/5	2.5		5	-2		-1.6	-3.2		-1.15	mA	
		0/5	4.6		5	-0.64		-0.51	-1		-0.36		
		0/10	9.5		10	-1.6		-1.3	-2.6		-0.9		
	0/15	13.5		15	-4.2		-3.4	-6.8		-2.4			
	E, F types	0/5	2.5		5	-1.53		-1.36	-3.2		-1.1		
		0/5	4.6		5	-0.52		-0.44	-1		-0.36		
0/10		9.5		10	-1.3		-1.1	-2.6		-0.9			
		0/15	13.5		15	-3.6		-3.0	-6.8		-2.4		
I _{OL} Output sink current output B0-B3	G, H types	0/5	0.4		5	0.64		0.51	1		0.36	mA	
		0/10	0.5		10	1.6		1.3	2.6		0.9		
		0/15	1.5		15	4.2		3.4	6.8		2.4		
	E, F types	0/5	0.4		5	0.52		0.44	1		0.36		
		0/10	0.5		10	1.3		1.1	2.6		0.9		
		0/15	1.5		15	3.6		3.0	5.8		2.4		

STATIC ELECTRICAL CHARACTERISTICS

(over recommended operating conditions)

PARAMETER		TEST CONDITIONS				VALUES						UNIT		
		V _I (V)	V _O (V)	I _O (μ A)	V _{DD} (V)	T _{LOW}		25°C			T _{HIGH}			
						min.	max.	min.	typ	max.	min.		max.	
I _{IH} , I _{IL}	Input leakage current	G, H types	0/18	Any input	18			± 0.1		$\pm 10^{-5}$	± 0.1		± 1	μ A
		E, F types	0/15											
I _{OH}	3-state output	G, H types	0/18	0/18	18			± 0.4		$\pm 10^{-4}$	± 0.4		± 12	μ A
		E, F types	0/15	0/15	15			± 1.0		$\pm 10^{-4}$	± 1.0		± 7.5	
C _I	-Input capacitance		Any input							5	7.5			pF

MMC 40943

I _L	Quiescent current	G, H types	0/ 5 0/10 0/15 0/20			5 10 15 20		1 3 8 40			1 3 8 40		30 90 240 1200	mA
		E, F types	0/ 5 0/10 0/15			5 10 15		3 9 24			3 9 24		90 270 720	
V _{OH}	Output high voltage outputs B0-B3		0/ 5 0/10 0/15	< 1 < 1 < 1	5 10 15	4.95 9.95 14.95		4.95 9.95 14.95			4.95 9.95 14.95		V	
V _{OL}	Output low voltage outputs B0-B3		5 /0 10/0 15/0	< 1 < 1 < 1	5 10 15		0.05 0.05 0.05				0.05 0.05 0.05		V	
V _{IH}	Input high voltage inputs B0-B3			0.5/4.5 1/9 1.5/13.5	< 1 < 1 < 1	5 10 15	3.5 7 11		3.5 7 11		3.5 7 11		V	
V _{IL}	Input low voltage inputs B0-B3			4.5/0.5 9/1 13.5/1.5	< 1 < 1 < 1	5 10 15	1.5 3 4			1.5 3 4		1.5 3 4	V	
V _{IH}	Input high voltage inputs A0-A3						2.8		2.8		2.8		V	
V _{IL}	Input low voltage inputs A0-A3						1.5		1.5		2.8		V	
V _{OH}	Output high voltage outputs A0-A3		0/ 5	< 1	5	4.95		4.95			4.95		V	
V _{OL}	Output low voltage outputs A0-A3		5 /0	< 1	5		0.05				0.05	0.05	V	

STATIC ELECTRICAL CHARACTERISTICS

(over recommended operating conditions)

PARAMETER	TEST CONDITIONS					VALUES						UNIT	
		V _I (V)	V _O (V)	I _{OL} (μ A)	V _{DD} (V)	T _{LOW} [*]		25°C			T _{HIGH} [*]		
						min.	max.	min.	typ.	max.	min.		max.
	G, H types	0/ 5	2.5		5	-2		-1.6	-3.2		-1.15		mA
		0/ 5	4.6		5	-0.64		-0.51	-1		-0.36		
		0/10	9.5		10	-1.6		-1.3	-2.6		-0.9		
		0/15	13.5		15	-4.2		-3.4	-6.8		-2.4		
	E, F types	0/ 5	2.5		5	-1.53		-1.36	-3.2		-1.1		mA
		0/ 5	4.6		5	-0.52		-0.44	-1		-0.36		
		0/10	9.5		10	-1.3		-1.1	-2.6		-0.9		
		0/15	13.5		15	-3.6		-3.0	-6.8		-2.4		
I _{OL}	Output sink current	G, H types	0/ 5	0.4		5	0.64		0.51	1		0.36	mA
			0/10	0.5		10	1.6		1.3	2.6		0.9	
		0/15	1.5		15	4.2		3.4	6.8		2.4		
		E, F types	0/ 5	0.4		5	0.52		0.44	1		0.36	
0/10	0.5			10	1.3		1.1	2.6		0.9			
0/15	1.5		15	3.6		3.0	6.8		2.4				
I _{IH} I _{IL}	Input leakage current	G, H types	0/1/3	Any input	18		± 0.1		$\pm 10^{-5}$	± 0.1		± 1	μ A
		E, F types	0/15										
I _{OH}	3—state output	G, H types	0/18	0/18	18		± 0.4		$\pm 10^{-4}$	± 0.4		± 12	μ A
		E, F types	0/15	0/15									
C _i	Input capacitance			Any input						40			pF

* T_{LOW} = -55°C for G, H devices; -40°C for E, F devices.

* T_{HIGH} = +125°C for G, H devices; +85°C for E, F devices.

The Noise Margin for both "1" and "0" level is:

- 1 V min. with V_{DD} = 5 V
- 2 V min. with V_{DD} = 10 V
- 2.5 V min. with V_{DD} = 15 V