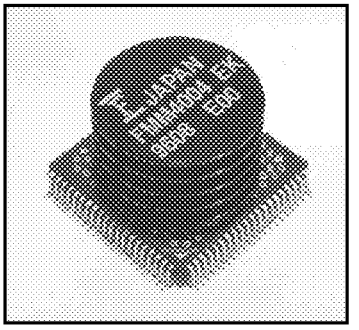
FMM4004EK

GaAs 622Mb/s Multiplexer

FEATURES

- 622Mbit/s High Speed Operation
- 16:4, 16:2, 16:1 Mode Selection
- +3.3V Single Power Supply
- Built-in Synchronous Circuit and Master/Slave Operation
- PCB(Printed Circuit Board) based 80-pin Plastic Package
- T-LVTTL Interface for 156Mb/s Data Input
- Differential LVPECL Interface for 622Mb/s Data Output



EK PACKAGE

DESCRIPTION

The FMM4004EK is a high speed/low power multiplexer. Offers 0.5µm GaAs MESFET technology, which is very useful for optical transmission systems, instrumentation, etc. The 16-bit Parallel input data can be converted into 4-bit or 2-bit serial output data up to 622Mb/s when using the selected mode. Additionally, this device can perform synchronous master/slave operation with other FMM4004EK's.

ELECTRICAL CHARACTERISTICS

LVPECL DC CHARACTERISTICS (Condition: V_{DD} = +3.3V, V_{REF} (LVPECL)*=+2.0V, V_{T1}=+1.3V, R_T=50Ω)

Parameter	Symbol	Condition	Value		Unit
			Min.	Max.	
Output HIGH Voltage	V_{OH}	$V_{IN}=V_{IH}$(max) or V_{IL}(min)	2280	2600	mV
Output LOW Voltage	V_{OL}	$V_{IN}=V_{IH}$(max) or V_{IL}(min)	1300	1680	mV
Input HIGH Voltage	V_{IH}	–	2250	2650	mV
Input LOW Voltage	V_{IL}	–	1250	1750	mV
Input HIGH Current	I_{IH}	$V_{IN}=V_{IH}$(max)	-	200	µA
Input LOW Current	I_{IL}	$V_{IN}=V_{IL}$(min)	-50	-	µA

(*) In synchronous master/slave operation, this device needs external LVPECL voltage reference VREF (LVPECL). (SYNCIN pin needs reference voltage)

T-LVTTL DC CHARACTERISTICS (Condition: $V_{REF\ (T\text{-}LVTTL)}$* = +1.65V, V_{T2} = +1.65V, R_D = 30Ω, R_T = 50Ω)

Parameter	Symbol	Conditions	Value		Unit
			Min.	Max.	
Output HIGH Voltage	V_{OH1}	Terminated	V_{T2}+400	-	mV
	V_{OH2}	Unterminated I_{OH}=-0.5mA	V_{TTL}-500	-	mV
Output LOW Voltage	V_{OL1}	Terminated	-	V_{T2}-400	mV
	V_{OL2}	Unterminated	-	500	mV
Input HIGH Voltage	V_{IH}	–	V_{REF}+200	V_{TTL}	mV
Input LOW Voltage	V_{IL}	–	0	V_{REF}-200	mV
Input HIGH Current	I_{IH}	$V_{IN} = V_{IH}$(max)	-	200	µA
Input LOW Current	I_{IL}	$V_{IN} = V_{IL}$(min)	-50	-	µA
Input Reference Voltage	V_{REF} (T-LVTTL)		1500	1800	mV

(*) This device needs external T-LVTTL reference voltage $V_{REF\ (T\text{-}LVTTL)}$.

Edition 1.4
April 1998

ABSOLUTE MAXIMUM RATINGS (Ambient Temperature Ta = 25°C)

Parameter	Symbol	Values	Unit
Supply Voltage	V_{TTL}	-0.5 ~ +4.0	V
Output Current	I_{OUT}	-50 ~ +50	mA
Input Voltage	V_{IN}	-0.5 ~ V_{TTL}	V
Storage Temperature	T_{STG}	-65 ~ +150	°C
Case Temperature	T_C	-55 ~ +125	°C

RECOMMENDED OPERATING CONDITION

Parameter	Symbol	Values	Unit
Power Supply Voltage	V_{TTL}	+3.3 ± 5%	V
LVPECL Termination Voltage	V_{T1}	+1.3	V
T-LVTTL Termination Voltage	V_{T2}	+1.65	V
Termination Resistance	R_T	50	Ω
T-LVTTL Damping Resistance	R_D	30	Ω
Ambient Temperature	T_A	(Air Flow) 0 ~ +58 0 m/s 0 ~ +70 1 m/s~	°C

POWER DISSIPATION (DC)

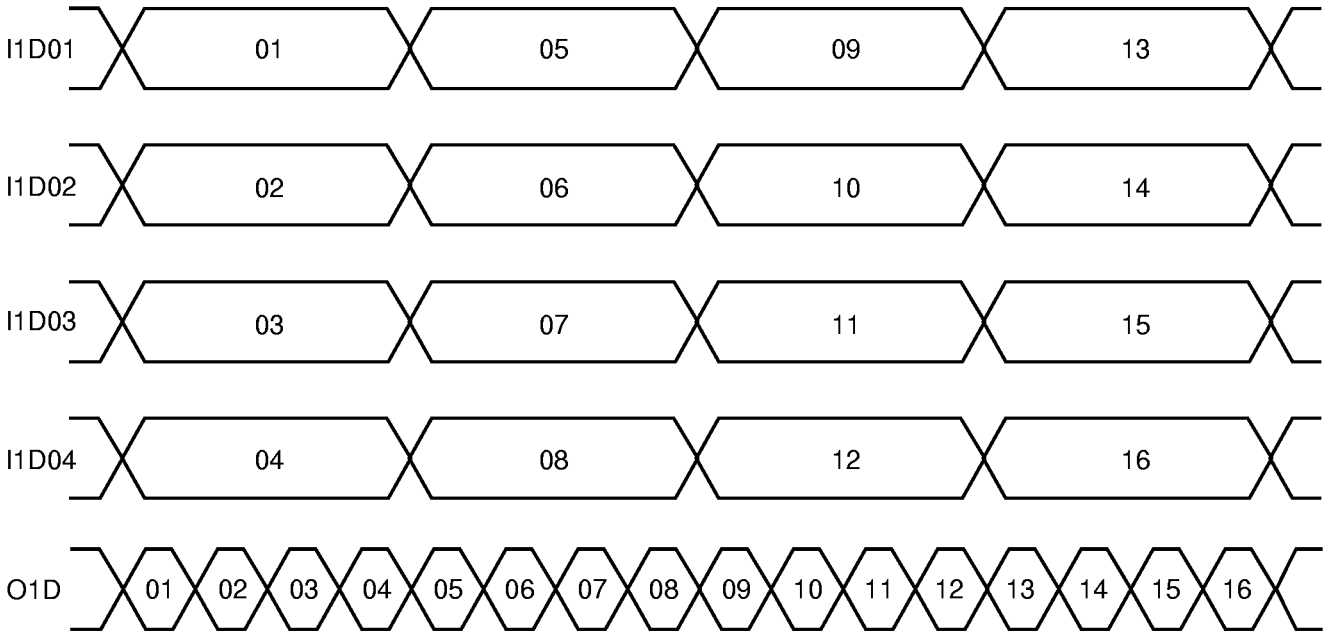
Parameter	Symbol	Conditions	Value			Unit
			Min.	Typ.	Max.	
Power	P_{dis}	Recommended Condition	-	1.10	1.60	W

(*) Average for Output HIGH/LOW

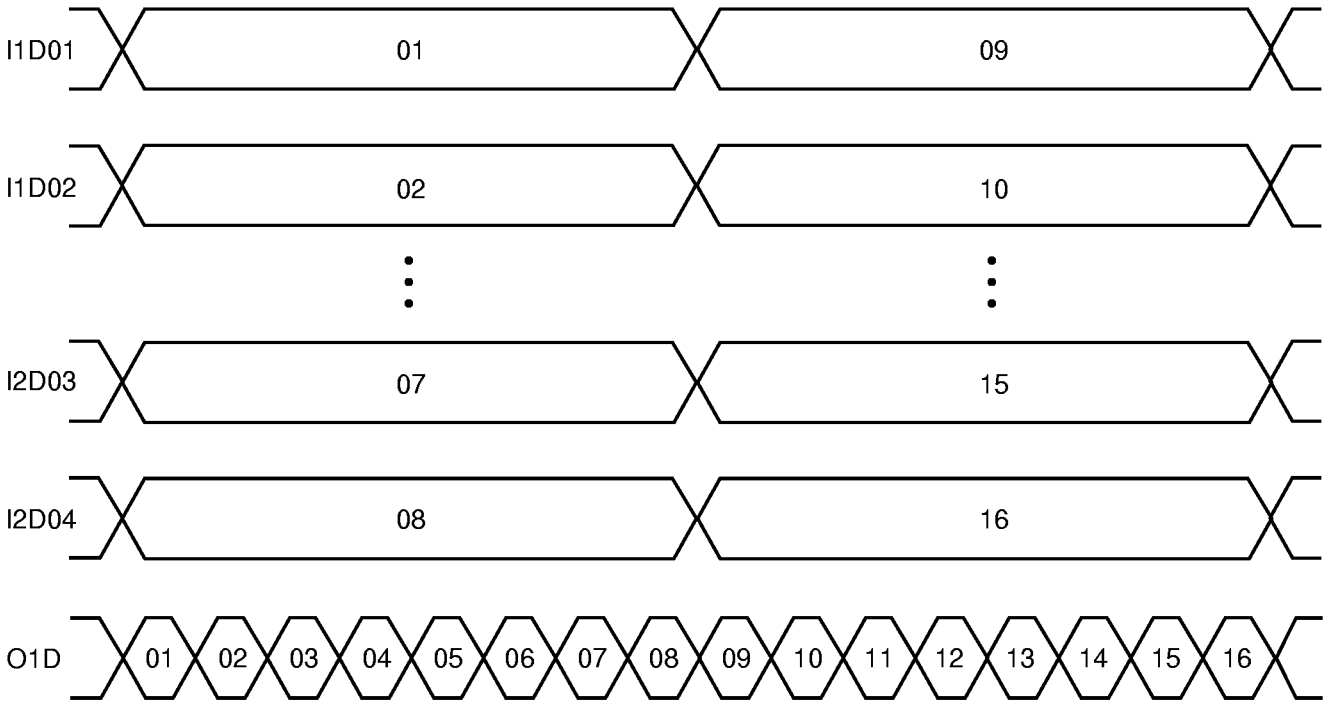
AC CHARACTERISTICS

Parameter	Symbol	Condition	Value			Unit
			Min.	Typ.	Max.	
Maximum Clock Frequency	f_{clk}	Recommended Condition	622	-	-	MHz

16:4 Parallel-Serial Conversion (Condition: MODE1=1, MODE2=0)
for I1Dxx Parallel Data and O1D Serial Data (identical to I2Dxx ~ I4Dxx & O2D ~ O4D)



16:2 Parallel-Serial Conversion (Condition: MODE1=0, MODE2=1)
for I1Dxx ~ I2Dxx & O1D (identical to I3Dxx ~ I4Dxx & O3D)



16:1 Parallel-Serial Conversion (Condition: MODE1=1, MODE2=1) for I1Dxx ~ I4Dxx & O1D

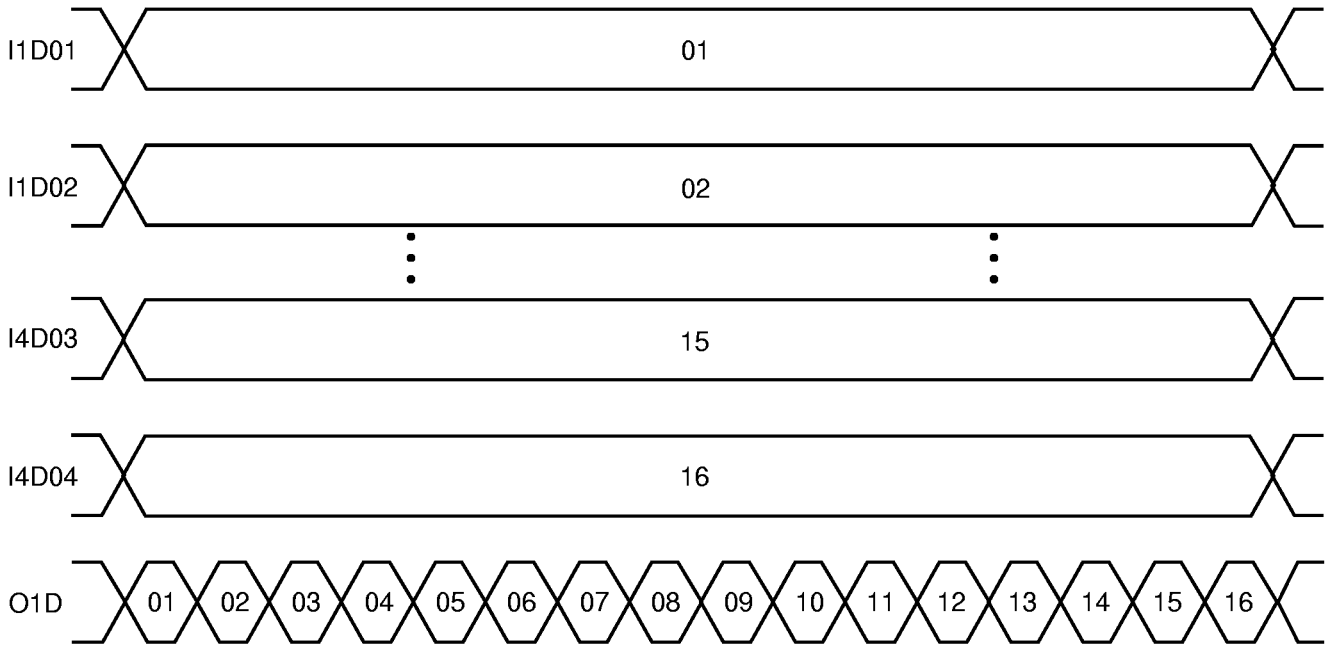
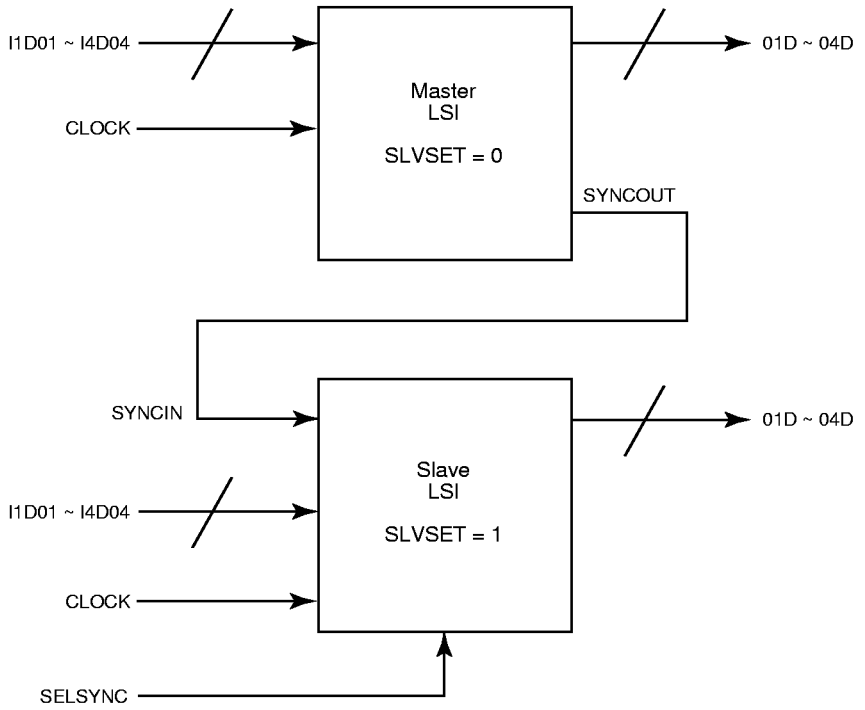
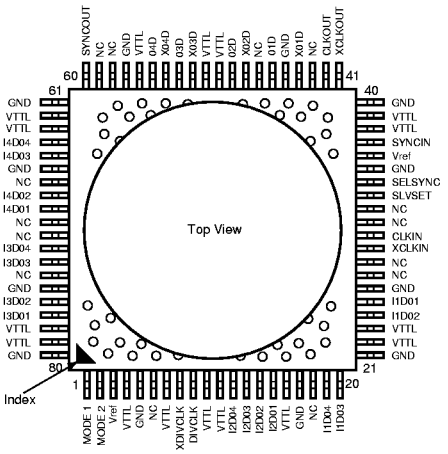


Figure 1 SYNCHRONOUS MASTER/SLAVE OPERATION
(Condition: SLVSET=0 for Master, SLVSET=1 for Slave)

Synchronous master-slave operation is available through the following usage. Signal phase of SYNCIN can be changed by selecting SELSYNC HIGH/LOW. This function enables to expand the bit width twice or more by appending slave LSI's.



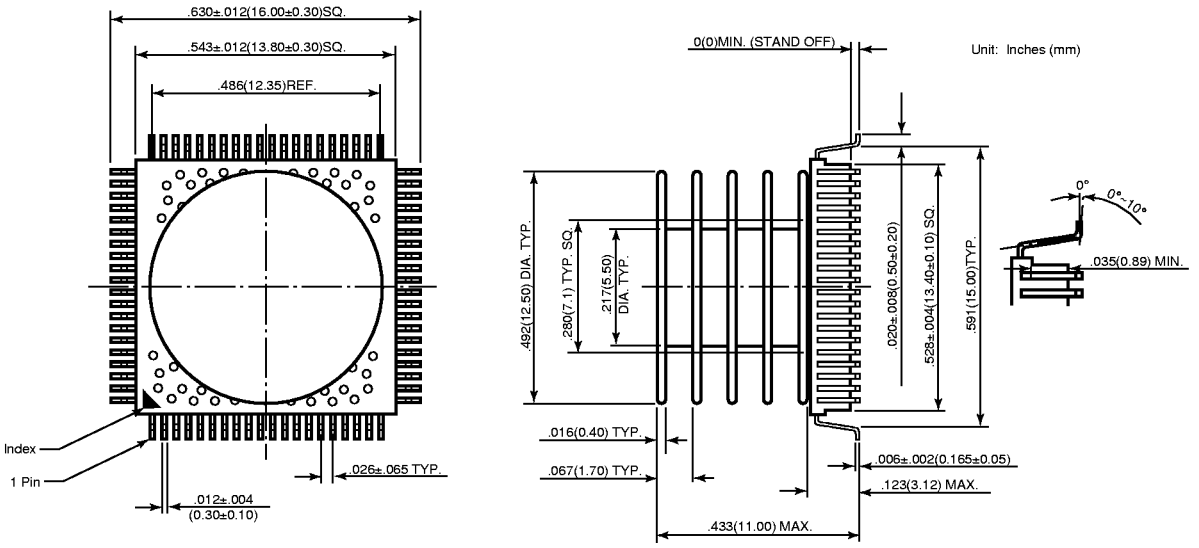
FMM4004EK Pin Assignment



PIN DESCRIPTION

Pin Name	Pin No.	I/O	Description	Pin Name	Pin No.	I/O	Description
MODE1	1	TLV-I	MODE Select 1	XCLKOUT	41	PECL-0	CLOCK Output(Invert)
MODE2	2	TLV-I	MODE Select 2	CLKOUT	42	PECL-0	CLOCK Output(True)
Vref	3	TLV-I	Vref(T-LVTTL)+1.65V	NC	43	-	Connected to GND
VTTL	4	-	—	X01D	44	PECL-0	I1Dxx MUX Output(I)
GND	5	-	—	GND	45	-	—
NC	6	-	Connected to GND	01D	46	PECL-0	I1Dxx MUX Output(T)
VTTL	7	-	—	NC	47	-	Connected to GND
XDIVCLK	8	PECL-0	Divided Clock Out(I)	X02D	48	PECL-0	I2Dxx MUX Output(I)
DIVCLK	9	PECL-0	Divided Clock Out(T)	02D	49	PECL-0	I2Dxx MUX Output(T)
VTTL	10	-	—	VTTL	50	-	—
VTTL	11	-	—	VTTL	51	-	—
I2D04	12	TLV-I	Parallel data Input	X03D	52	PECL-0	I3Dxx MUX Output(I)
I2D03	13	TLV-I	Parallel data Input	03D	53	PECL-0	I3Dxx MUX Output(T)
I2D02	14	TLV-I	Parallel data Input	X04D	54	PECL-0	I4Dxx MUX Output(I)
I2D01	15	TLV-I	Parallel data Input	04D	55	PECL-0	I4Dxx MUX Output(T)
VTTL	16	-	—	VTTL	56	-	—
GND	17	-	—	GND	57	-	—
NC	18	-	Connected to GND	NC	58	-	Connected to GND
I1D04	19	TLV-I	Parallel data Input	NC	59	-	Connected to GND
I1D03	20	TLV-I	Parallel data Input	SYNCOUT	60	PECL-0	Sync. Output
GND	21	-	—	GND	61	-	—
VTTL	22	-	—	VTTL	62	-	—
VTTL	23	-	—	VTTL	63	-	—
I1D02	24	TLV-I	Parallel data Input	I4D04	64	TLV-I	Parallel data Input
I1D01	25	TLV-I	Parallel data Input	I4D03	65	TLV-I	Parallel data Input
GND	26	-	—	GND	66	-	—
NC	27	-	Connected to GND	NC	67	-	Connected to GND
NC	28	-	Connected to GND	I4D02	68	TLV-I	Parallel data Input
XCLKIN	29	PECL-I	CLOCK Input(Invert)	I4D01	69	TLV-I	Parallel data Input
CLKIN	30	PECL-I	CLOCK Input(True)	NC	70	-	Connected to GND
NC	31	-	Connected to GND	NC	71	-	Connected to GND
NC	32	-	Connected to GND	I3D04	72	TLV-I	Parallel data Input
SLVSET	33	TLV-I	Set Master/Slave	I3D03	73	TLV-I	Parallel data Input
SELSYNC	34	TLV-I	Select Sync. Phase	NC	74	-	Connected to GND
GND	35	-	—	GND	75	-	—
Vref	36	PECL-I	Vref(LVPECL)+2.0V	I3D02	76	TLV-I	Parallel data Input
SYNCIN	37	PECL-I	Sync. Input	I3D01	77	TLV-I	Parallel data Input
VTTL	38	-	—	VTTL	78	-	—
VTTL	39	-	—	VTTL	79	-	—
GND	40	-	—	GND	80	-	—

Case Style "EK"
Plastic 80-Pin QFP Package



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Printed in U.S.A. FCSI0698M200

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