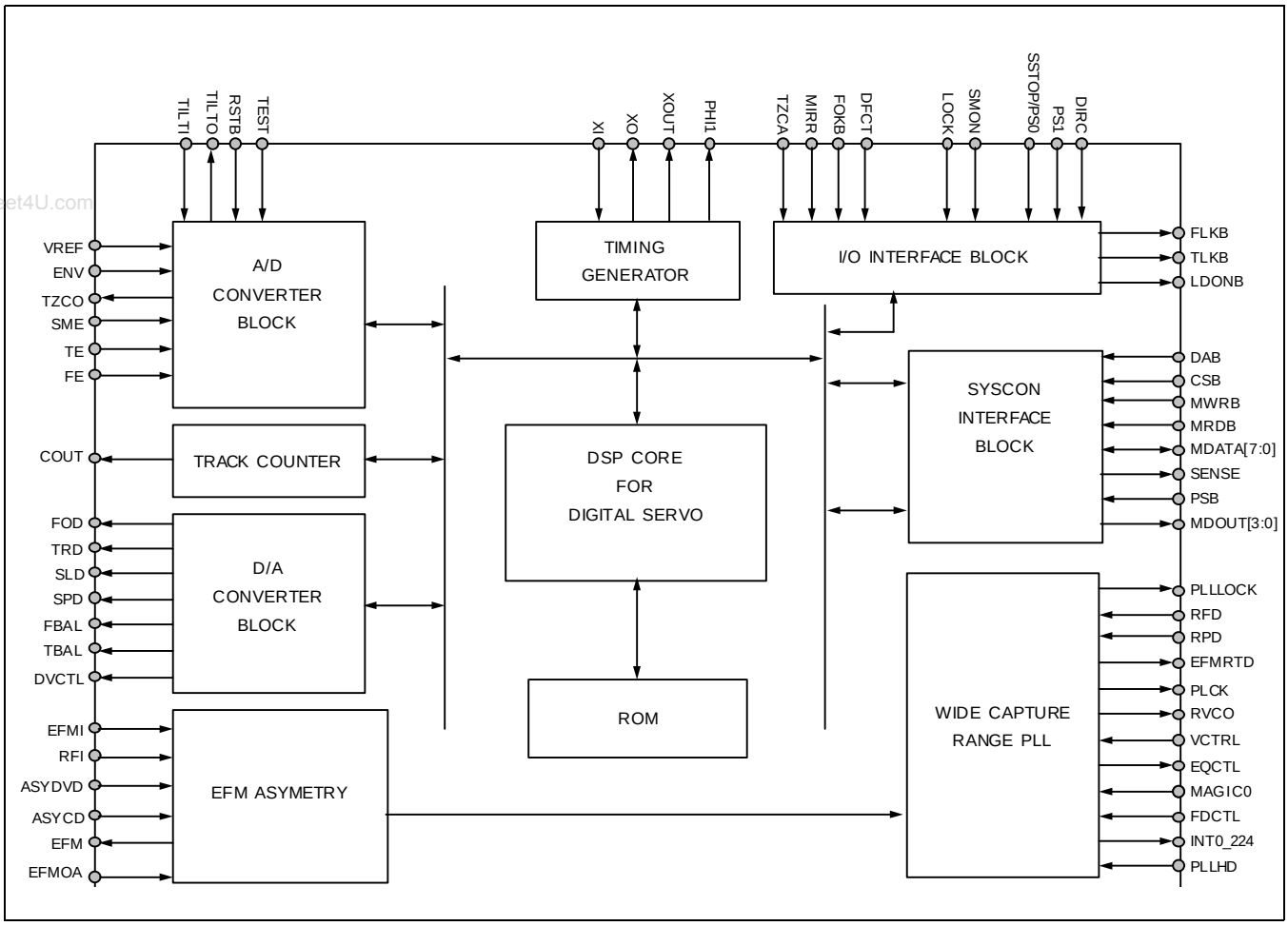
INTRODUCTION

The KS1452 is a 1-chip IC of the Digital Servo Signal Processor/Wide capture range PLL for DVDPs.

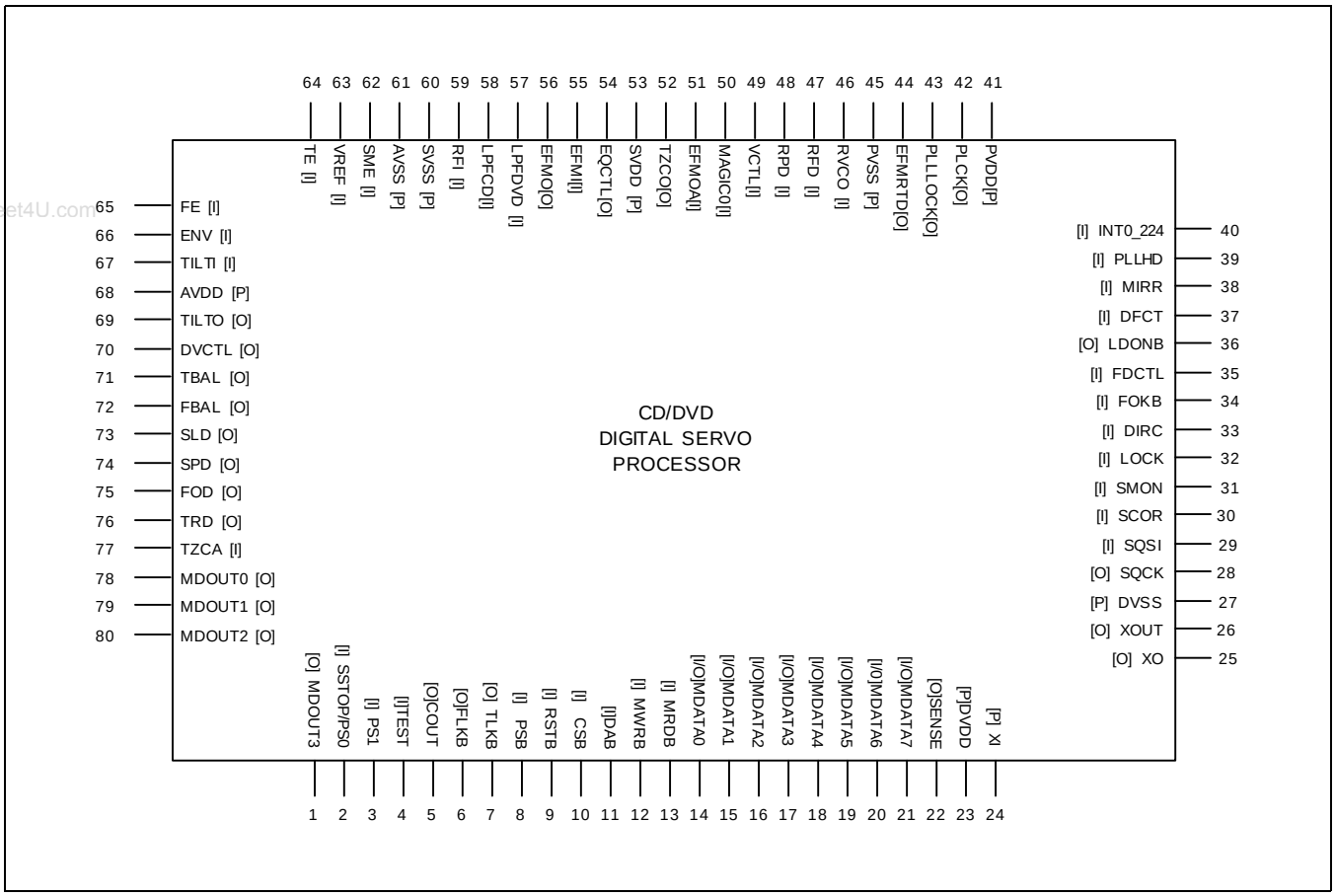
FEATURES

- Digital Servo IC for CD/CDROM (x1, x2, x4, x8), and DVD (x1)
- Complete Automatic Adjustment Function (Focus/Tracking Loops input gain, offset, balance, loop gain)
- Materialization of a Digital Filter for each Servo Loop, reducing the number of external parts
- Built-in AGC function to respond ideally to different disc types
- High Speed migration control (built-in Sled FG Encoder) and built-in Search Algorithm for speed control
- Built-in 8-bit A/D Converter and 9-bit D/A Converter
- Able to select various filter characteristics and internal constants from Syscon
- Interface with Syscon is 1-bit serial and 8-bit parallel compatible
- Built-in circuits for compensation in cases of Drop Out and Shock
- Built-in 16-bit Track Counter
- Able to select the best method from multiple Search Algorithms
- Widening the range by high speed sampling (151.2Khz), thus improving the Servo function
- Built-in Wide Capture Range (+/– 50%) PLL
- Built-in EFM slice
- Built-in DAC type F/V for RF EQ adjustment
- FD/PD gain adjustment possible
- Built-in Wide range VCO (20–280Mhz)
- 5V single power supply
- 80 QFP

BLOCK DIAGRAM



PIN DIAGRAM



PIN DESCRIPTION

No	Name	I/0	Description
1	MDOUT3	O	Mode data3 out controlled by micom
2	SSTOP/PS0PS1	I	Limit switch/sled position sensor input pin0
3	PS1	I	Sled motor position sensor input pin1
4	TEST	I	Test pin (L: normal H: test)
5	COUT	O	Counter clock
6	FLKB	O	Focus servo lock signal output pin
7	TLKB	O	Tracking servo lock signal output pin
8	PSB	I	0: 1BIT 1: 8BIT
9	RSTB	I	System reset signal input pin
10	CSB	I	Micom chip select pin
11	DAB	I	Micom data/addrs select pin
12	MWRB	I	Micom write clock signal input pin
13	MRDB	I	Micom read clock signal input pin
14	MDATA0	I/O	Micom data pin0
15	MDATA1	I/O	Micom data pin1
16	MDATA2	I/O	Micom data pin2
17	MDATA3	I/O	Micom data pin3
18	MDATA4	I/O	Micom data pin4
19	MDATA5	I/O	Micom data pin5
20	MDATA6	I/O	Micom data pin6
21	MDATA7	I/O	Micom data pin7
22	SENSE	O	Internal status monitor pin
23	DVDD	P	Servo logic & ROM VDD power supply pin
24	XI	I	System clock signal input pin
25	XO	O	System clock signal output pin
26	XOUT	O	Clock out (33.9688Mhz) to DSP
27	DVSS	P	Servo logic & ROM VSS power supply pin
28	SQCK	O	Clock output pin for subcode data read
29	SQSI	I	Subcode data input pin

PIN DESCRIPTION (CONT.)

No	Name	I/0	Description
30	SCOR	I	Timing detection input pin for subcode data read
31	SMON	I	Motor ON signal input pin
32	LOCK	I	Lock signal input pin
33	DIRC	I	Direct jump control (for 1 track jump)
34	FOKB	I	Focus OK signal input pin
35	FDCTL	I	PLL frequency detect control input pin
36	LDONB	O	Laser diode ON signal output pin
37	DFCT	I	Defect detection signal input pin
38	MIRR	I	Mirror signal input pin
39	PLLHD	I	PLL hold signal from micom
40	INT0_224	O	Servo interrupt monitor pin
41	PVDD	P	PLL logic block VDD power supply pin
42	PLCK	O	PLCK
43	PLLLOCK	O	Frequency lock detect output (H: lock L: unlock)
44	EFMRTD	O	Latched EFM output signal
45	PVSS	P	PLL logic block VSS power supply pin
46	RVCO	I	Resistor pin for VCO gain
47	RFD	I	Gain adjust resister for frequence detector
48	RPD	I	Gain adjust resister for phase detector
49	VCTL	I	control voltage for VCO
50	MAGIC0	I	Input for controlling hysterisis of the FD output (for testing)
51	EFMOA	I	EFM offset adjustment pin
52	TZCO	O	Tracking zero cross output pin
53	SVDD	P	Servo CPU VDD power supply pin
54	EQCTL	O	EQ control signal
55	EFMI	I	EFM signal for test
56	EFMO	O	EFM signal
57	LPFDVD	I	Asymmetric input signal for DVD
58	LPFCD	I	Asymmetric input signal for CD

PIN DESCRIPTION (CONT.)

No	Name	I/0	Description
59	RFI	I	Rf input signal
60	SVSS	P	Servo CPU VSS power supply pin
61	AVSS	P	Analog block VSS power supply pin
62	SME	I	Spindle error input pin
63	VREF	I	Reference voltage input pin
64	TE	I	Tracking error signal input pin
65	FE	I	Focus error signal input pin
66	ENV	I	RF envelope input pin
67	TILTI	I	TILT in (reserved)
68	AVDD	P	Analog block VDD power supply pin
69	TILTO	O	TILT out (reserved)
70	DVCTL	O	Depth variation control signal output pin
71	TBAL	O	Tracking balance signal output pin
72	FBAL	O	Focus balance signal output pin
73	SLD	O	Sled motor drive signal output pin
74	SPD	O	Spindle motor drive signal output pin
75	FOD	O	Focus actuator drive signal output pin
76	TRD	O	Tracking actuator drive signal output pin
77	TZCA	I	TE signal for tracking zero cross input pin
78	MDOUT0	O	Mode data0 out controlled by micom
79	MDOUT1	O	Mode data1 out controlled by micom
80	MDOUT2	O	Mode data2 out controlled by micom

ELECTRICAL CHARACTERISTICS

DC CHARACTERISTICS

Vdd = 0.5 ± 5%, Vss = 0 V, Ta = –20 to +70 ℃

Table 1-1. DC Characteristics

No	Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Input Pin (1): Digital Input Pin							
1	Input Voltage High Level 1	Vih1		0.7 Vdd	–	–	V
2	Input Voltage High Level 1	Vil1		–	–	0.3 Vdd	V
3	Input Leakage Current 1	Ilkg1		–	–	±10	µA
4	Input Leakage Current 2 (MDATA 7~0)	Ilkg2		–	–	±20	µA
Input Pin (2): Analog Input Pin (FE, TE)							
5	Input Voltage High Level 2	Vih1		–	–	Vdd	V
6	Input Voltage High Level 2	Vil1		0	–	–	V
7	Consumption Current	Idd		–	–	150	µA
Ouput Pin (1): Analog Ouput Pin (FOD, TRD, SLD, SPD, FBAL, TBAL)							
1	Ouput Voltage High Level 1	Voh1	Ioh1 = –1 mA	Vdd–0.5V	–	–	V
2	Ouput Voltage High Level 1	Vol1	Ioh1 = 1 mA	–	–	Vss+0.5V	V
Ouput Pin (2): General Digital Ouput Pin							
3	Ouput Voltage High Level 2	Voh2	Ioh2 = –1 mA	Vdd–0.5V	–	–	V
4	Ouput Voltage High Level 2	Vol2	Ioh2 = 1 mA	–	–	Vss+0.5V	V
Ouput Pin (3): Sense Pin							
5	Ouput Voltage High Level 3	Voh3	Ioh3 = –1 mA	Vdd–0.5V	–	–	V
6	Ouput Voltage High Level 3	Vol3	Ioh3 = 1 mA	–	–	Vss+0.5V	V

AC CHARACTERISTICS

Vdd = 0.5 ± 5%, Vss + 0 V, Ta = –20 to +70 ℃

Table 1-2. DC Characteristics

No	Item	Symbol	Condition	Min.	Typ.	Max.	Unit
D/A Conveter (FOD,TRD)							
1	Resolution	RES		–	–	9	BIT
2	Linearity	Lin		–	–	±2	LSB
D/A Conveter(SPD,SLD,FBAL,TBAL,Tiltd,DVCTL)							
3	Resolution	RES		–	–	7	BIT
4	Linearity	Lin		–	–	±2	LSB
A/D Conveter							
5	Resolution	RES		–	–	8	BIT
6	Linearity	Lin		–	–	±2	LSB
PLL							
1	VCO Max Frequency	F_{VCO}, H	V_{ctl} = 3.8 V	208	260	312	MHz
2	VCO Max Frequency	F_{VCO}, L	V_{ctl} = 1.0 V	45	56	67	MHz
3	VCO Gain	G_{VCO}		58.2	72.9	87.5	MHz/V
4	PD UP/DN Current Matching	$R_{Iup/dn}$	R_{pp} = 10.7 V_L, H = 3.8 V_L, L = 1.0	-3	0	3	%
5	Bandgap Voltage	V_{bg}		1.30	1.32	1.34	V

ABSOLUTE MAXIMUM RATINGS

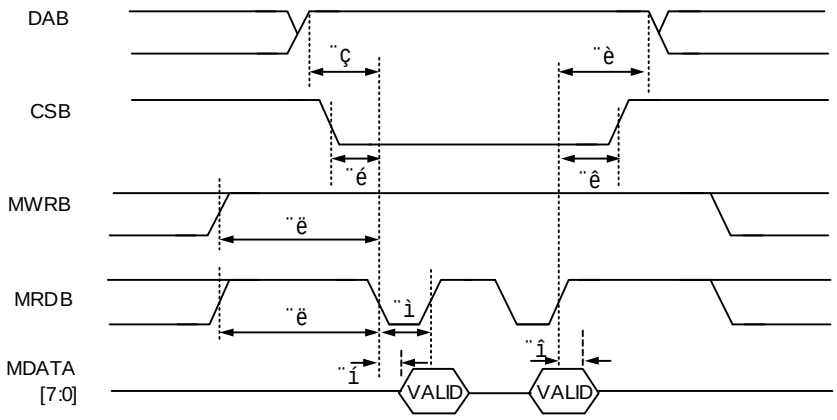
No.	Item	Symbol	Spec.	Unit
1	Power supply voltage	V_{DD}	-03 to +7.0	V
2	Input voltage	Vi	V_{SS}-0.3 to V_{DD} + 0.3	V
3	Operating Temperature	Topr	–20 to +70	℃
4	Storage Temperature	Tstg	–55 to +125	℃

MICOM INTERFACE

No.	Item	Min.	Typ.	Max.	Unit
1	DAB Setup	40	-	-	ns
2	DAB hold	10	-	-	ns
3	CSB Setup	30	-	-	ns
4	CSB hold	5	-	-	ns
5	MWRB or MRDB Inactive	50	-	-	ns
6	MWRB or MRDB Active Pulse Width	50	-	-	ns
7	MRDB Active to MDATA[7:0] Low-Impedence	5	-	-	ns
8	Read Data Hold after MRDB Inactive	10	-	-	ns
9	Write Data Setup	30	-	-	ns
10	Write Data Hold	20	-	-	ns

Micom Interface Timing Diagram

*Read Cycle



*Write Cycle