FEATURES

n Video Decoder

- Ÿ Supports NTSC, PAL and SECAM video input formats
- Ÿ 2D NTSC and PAL comb-filter for Y/C separation of CVBS input
- Ÿ ACC, AGC, and DCGC (Digital Chroma Gain Control)

n Analog Input

- Ÿ Supports video input 480i, 576i, On-chip clock synthesizer and PLL

n Color Engine

- Ÿ Brightness, contrast, saturation, and hue adjustment
- Ÿ 9-tap programmable multi-purpose FIR (Finite Impulse Response) filter
- Ÿ Differential 3-band peaking engine
- Ÿ Luminance Transient Improvement (LTI)
- Ÿ Chrominance Transient Improvement (CTI)
- Ÿ Black Level Extension (BLE)
- Ÿ White Level Extension (WLE)
- Ÿ Favor Color Compensation (FCC)
- Ÿ 3-channel gamma curve adjustment

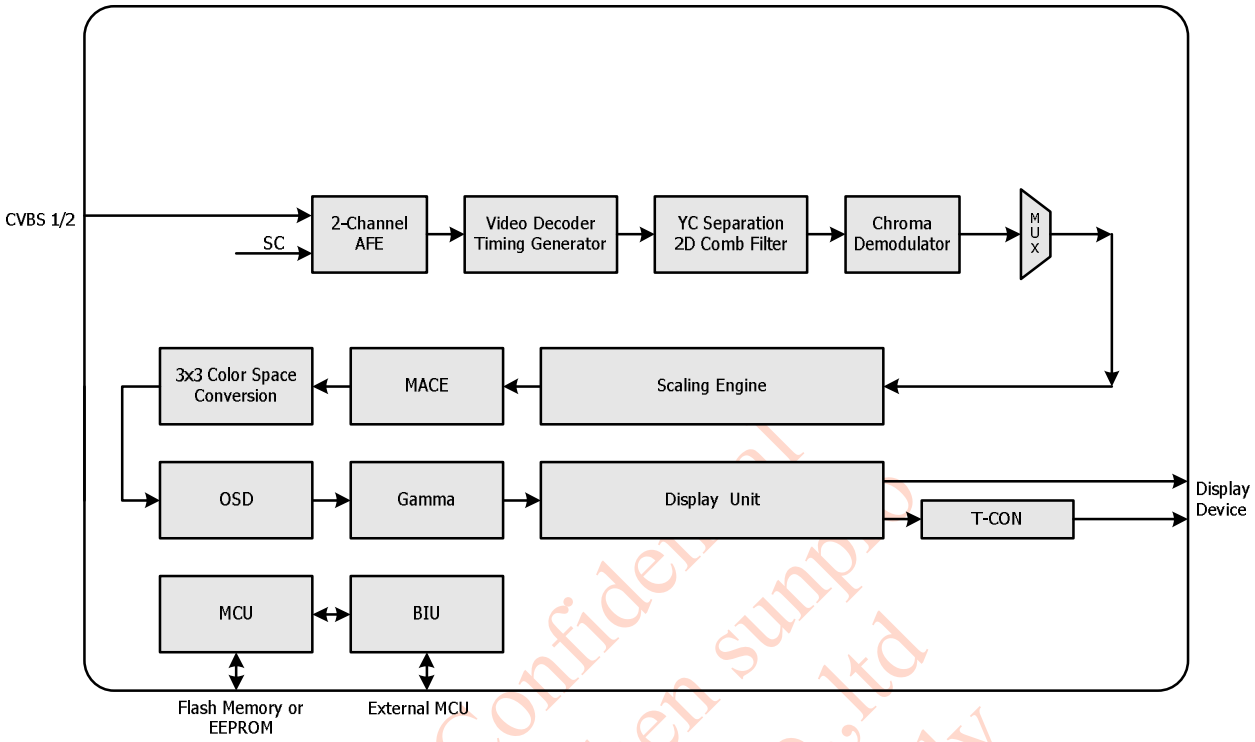
n Scaling Engine/Panel Interface

- Ÿ Supports TTL/TCON panel
- Ÿ Supports single 8-bit TTL panel output
- Ÿ Supports various displaying modes
- Ÿ Supports horizontal panorama scaling

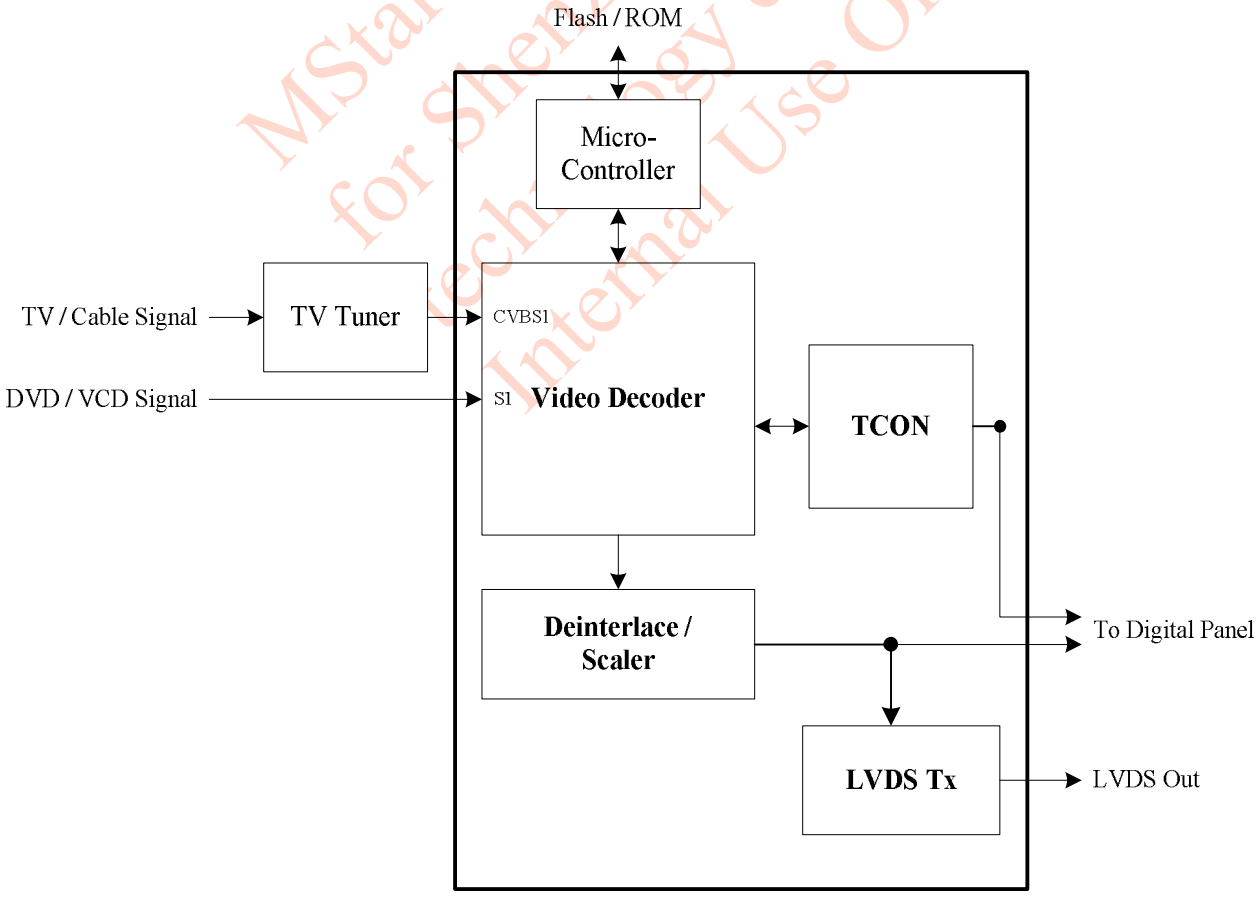
Miscellaneous

- Ÿ Built-in MCU
- Ÿ Built-in internal OSD with 256 programmable fonts, 16-color palettes, and 12-bit color resolution
- Ÿ Spread spectrum clocks
- Ÿ 3.3V output pads with programmable driving current
- Ÿ 64-pin TQFP package

BLOCK DIAGRAM



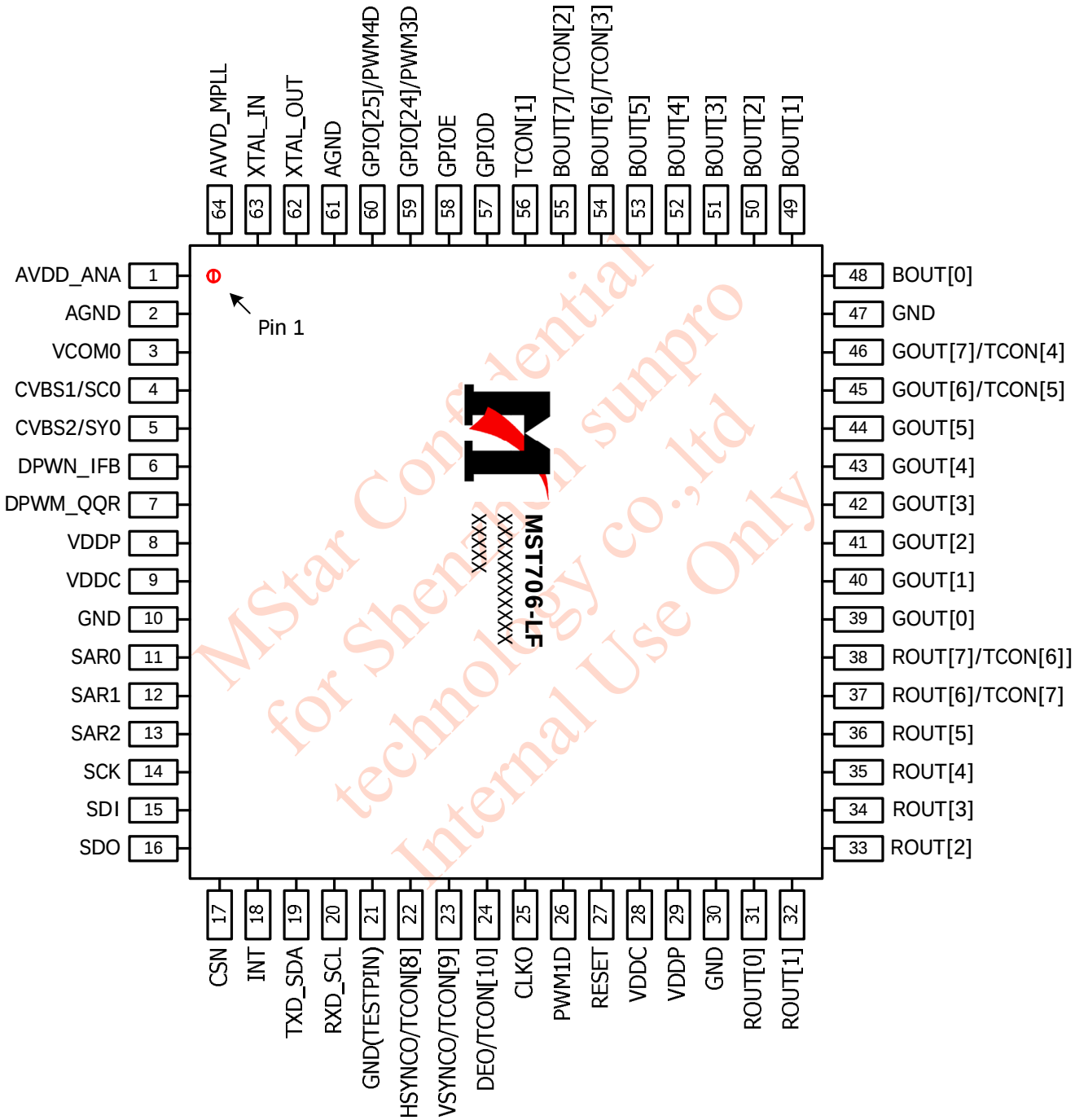
SYSTEM APPLICATION DIAGRAM



GENERAL DESCRIPTION

The MST706 is a high quality ASIC for NTSC/PAL/SECAM car TV application. It receives analog NTSC/PAL/SECAM CVBS and S-Video inputs from TV tuners, DVD or VCR sources, including weak and distorted signals, as well as analog YCbCr input from HDTV/SDTV systems. Automatic gain control (AGC) and 10-bit A/D converters provide high resolution video quantization. With automatic video source and mode detection, users can easily switch and adjust variety of signal sources. Multiple internal adaptive PLLs precisely extract pixel clock from video source and perform sharp color demodulation. Built-in line-buffer supports adaptive 2-D comb-filter, 2-D sharpening, and synchronization stabler in a condense manner. The output format of MST706 supports 6-bit TTL/TCON digital TFT-LCD modules.

PIN DIAGRAM (MST706)



PIN DESCRIPTION

Analog Interface

Pin Name	Pin Type	Function	Pin
VCOM0	Analog Input	Common Analog Input Reference Ground 0	3
CVBS1/SC0	Analog Input	CVBS0 or S-Video (Y/C) Input Channel 0	4
CVBS2/SY0	Analog Input	CVBS1 or S-Video (Y/C) Input Channel 0	5

Internal MCU Interface with Serial Flash Memory

Pin Name	Pin Type	Function	Pin
SAR2	Analog Input	SAR Low Speed ADC Input 2	13
SAR1	Analog Input	SAR Low Speed ADC Input 1	12
SAR0	Analog Input	SAR Low Speed ADC Input 0	11
SCK	Output	SPI Interface Sampling Clock	14
SDI	Output	SPI Interface Data-In	15
SDO	Input w/ 5V-tolerant	SPI Interface Data-Out	16
CSN	Output	SPI Interface Chip Select	17
INT	Input	Interrupt Input for IR Receiver	18
TXD_SDA	I/O w/ 5V-tolerant, w/ pull-up resistor	Serial Bus Data	19
RXD_SCL	Input w/ 5V-tolerant	Serial Bus Clock	20
PWM1D	Output	Pulse Width Modulation Output; 4mA driving strength	26
GPIO[25]/PWM4D	I/O w/ 5V-tolerant	General Purpose Input/Output / Pulse Width Modulation Output; 4mA driving strength	60
GPIO[24]/PWM3D	I/O w/ 5V-tolerant	General Purpose Input/Output / Pulse Width Modulation Output; 4mA driving strength	59

Digital Panel Output Interface

Pin Name	Pin Type	Function	Pin
CLKO	Output	Display Clock Output	25
DEO/TCON[10]	Output	Display Enable Output	24
VSYNCO/TCON[9]	Output	Vertical Sync Output / TCON Output[9]	23
HSYNCO/TCON[8]	Output	Horizontal Sync Output / TCON Output[8]	22
ROUT[7]/TCON[6]	Output	Red channel Output [7] / TCON Output[6]	38
ROUT[6]/TCON[7]	Output	Red channel Output [6] / TCON Output[7]	37
ROUT[5:0]	Output	Red channel Output [5:0]	36, 35, 34, 33, 32, 31

Pin Name	Pin Type	Function	Pin
GOUT[7]/TCON[4]	Output	Green channel Output [7] / TCON Output[4]	46
GOUT[6]/TCON[5]	Output	Green channel Output [6] / TCON Output[5]	45
GOUT[5:0]	Output	Green channel Output [5:0]	44, 43, 42, 41, 40, 39
BOUT[7]/TCON[2]	Output	Blue channel Output [7] / TCON Output[2]	55
BOUT[6]/TCON[3]	Output	Blue channel Output [6] / TCON Output[3]	54
BOUT[5:0]	Output	Blue channel Output [5:0]	53, 52, 51, 50, 49, 48
TCON[1]	Output	TCON Output[1]	56

GPIO Interface

Pin Name	Pin Type	Function	Pin
GPIOD	I/O w/ 5V-tolerant	General Purpose Input Output; 4mA driving strength	57
GPIOE	I/O w/ 5V-tolerant	General Purpose Input Output; 4mA driving strength	58

Digital PWM Interface

Pin Name	Pin Type	Function	Pin
DPWM_IFB	Analog Input	Input for DPWM Feedback Loop	6
DPWM_QOR	Output	DPWM Output	7

Misc. Interface

Pin Name	Pin Type	Function	Pin
RESET	Schmitt Trigger Input w/ 5V-tolerant	Hardware Reset; active high	27
XTAL_IN	Analog Input	Crystal Oscillator Input	63
XTAL_OUT	Analog Output	Crystal Oscillator Output	62

Power Pins

Pin Name	Pin Type	Function	Pin
AVDD_ANA	3.3V Power	Analog ADC Power	1
AVDD_MPLL	3.3V Power	MPLL Power	64
VDDC	1.2V Power	Digital Core Power	9, 28
VDDP	3.3V Power	Digital Input/Output Power	8, 29
AGND	Ground	Analog Ground	2, 61
GND	Ground	Ground	10, 21, 30, 47

ELECTRICAL SPECIFICATIONS

Absolute Maximum Ratings

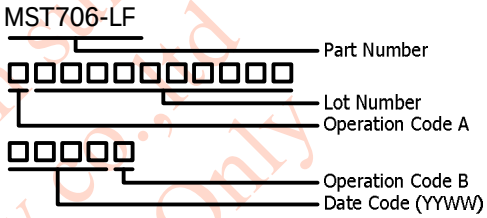
Parameter	Symbol	Min	Max	Units
3.3V Supply Voltages	V_{VDD_33}		3.63	V
1.2V Supply Voltages	V_{VDD_12}		1.32	V
Input Voltage (5V tolerant inputs)	$V_{IN5Vtol}$		5.0	V
Input Voltage (non 5V tolerant inputs)	V_{IN}		V_{VDD_33}	V
Ambient Operating Temperature	T_A	0	70	°C
Storage Temperature	T_{STG}	-40	125	°C
Junction Temperature	T_J		125	°C

Note: Stresses above those listed in Absolute Maximum Ratings may cause permanent damage to the device. This is a stress rating only and does not imply functional operation of the device. Exposure to absolute maximum ratings for extended periods may affect device reliability.

ORDERING GUIDE

Part Number	Temperature Range	Package Description	Package Option
MST706-LF	0°C to +70°C	TQFP	64

MARKING INFORMATION



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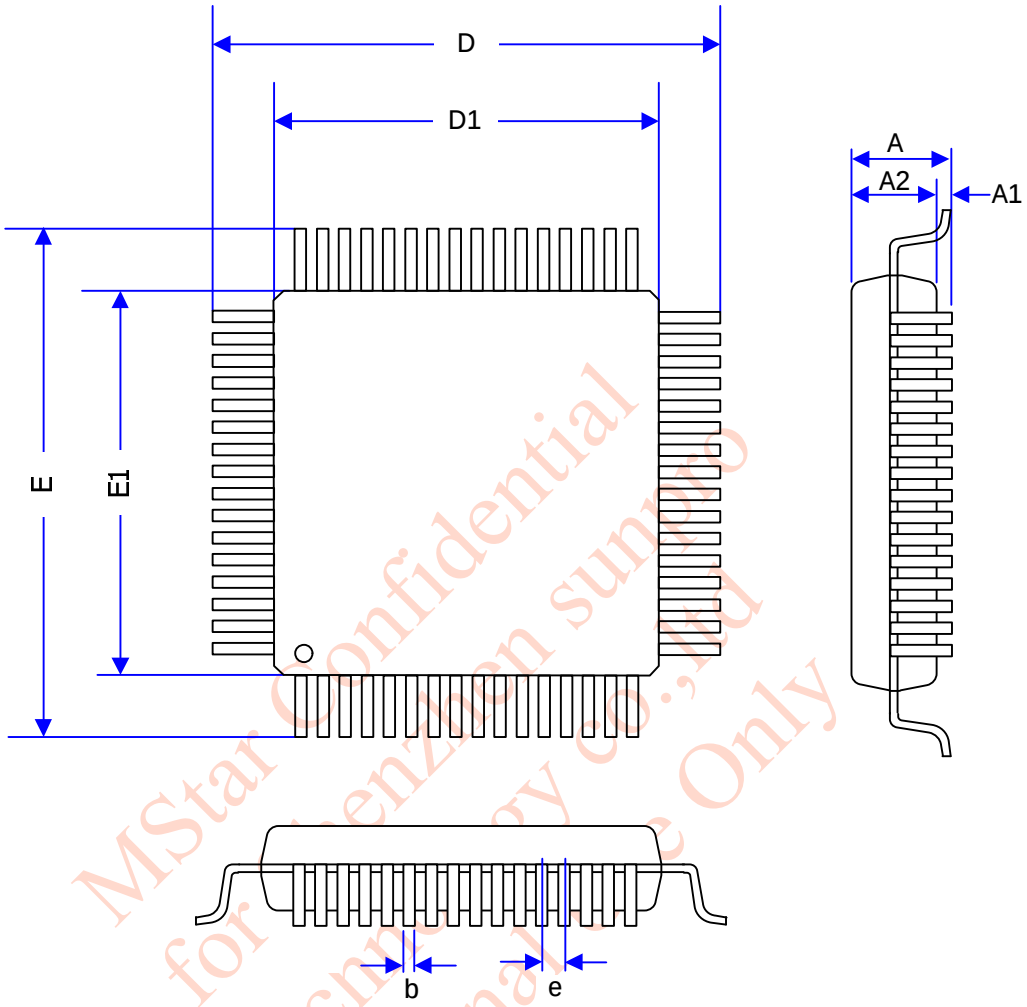
Electrostatic charges accumulate on both test equipment and human body and can discharge without detection. MST706 comes with ESD protection circuitry; however, the device may be permanently damaged when subjected to high energy discharges. The device should be handled with proper ESD precautions to prevent malfunction and performance degradation.

REVISION HISTORY

Document	Description	Date
MST706_pb_v01	Ÿ Initial release	03/20/2014

MECHANICAL DIMENSIONS



Symbol	Millimeter			Inch		
	Min.	Nom.	Max.	Min.	Nom.	Max.
A	-	-	1.2	-	-	0.047
A1	0.05	-	0.15	0.002	-	0.006
A2	0.95	1	1.05	0.037	0.039	0.041
D	8.8	9	9.2	0.346	0.354	0.362
D1	6.8	7	7.2	0.268	0.276	0.283
E	8.8	9	9.2	0.346	0.354	0.362
E1	6.8	7	7.2	0.268	0.276	0.283
b	0.13	0.18	0.23	0.005	0.007	0.009
e	0.32	0.4	0.48	0.013	0.016	0.019