TITC
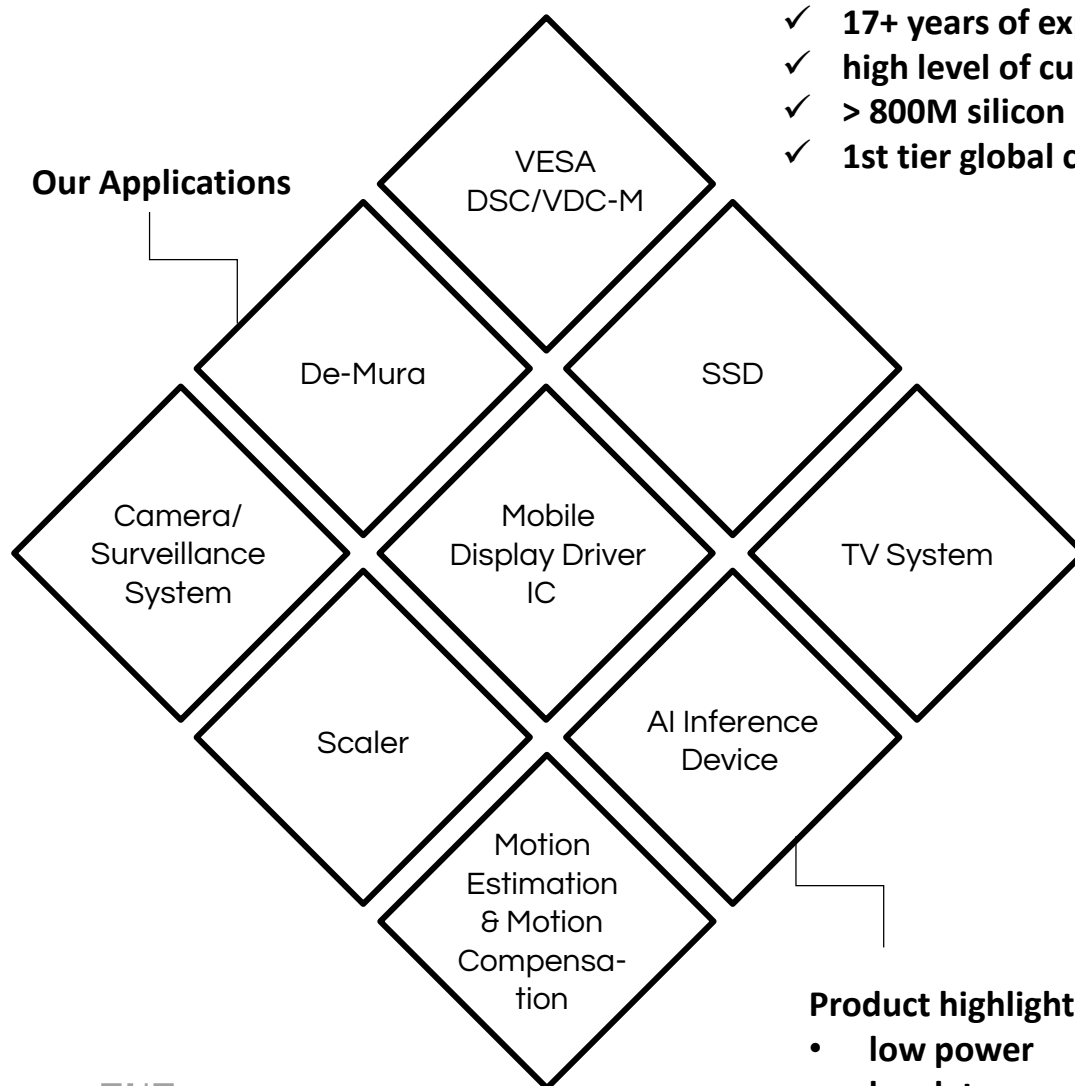
Image Compression IP specialist

✓ **17+ years of experience**
✓ **high level of customization**
✓ **> 800M silicon mass produced**
✓ **1st tier global customers**

Our Applications

- VESA DSC/VDC-M
- De-Mura
- SSD
- Camera/ Surveillance System
- Mobile Display Driver IC
- TV System
- Scaler
- AI Inference Device
- Motion Estimation & Motion Compensation

Product highlight features:

- **low power**
- **low latency**
- **small area**

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TITC Mobile Display Driver IP

TITC's Compression IPs are used in more than 800M Mobile Display Driver ICs (DDIC) . Their real-time, low latency, fixed compression ratio, low cost, low power characteristics benefit chip designs a lot. There many configurable block sizes (or compression unit) which range from 2V2H (2 vertical pixels by 2 horizontal pixels), 2V4H, 2V8H, 2V16H, to 4V4H, compression ratios which range from 1/2 to 1/4, and bit depths which range from 8 to 12, for users to choose from. TITC also has special Pentile type (RGBG) compression for AMOLED Display Driver ICs.

Each block is compressed independently without referencing any neighboring blocks. This can easily satisfy the requirement of partial update, random access. Furthermore, multiple instantiations can make higher throughput possible. TITC can provide professional recommendation and customized service to balance IP area and the performance.

Benefits: reduce memory
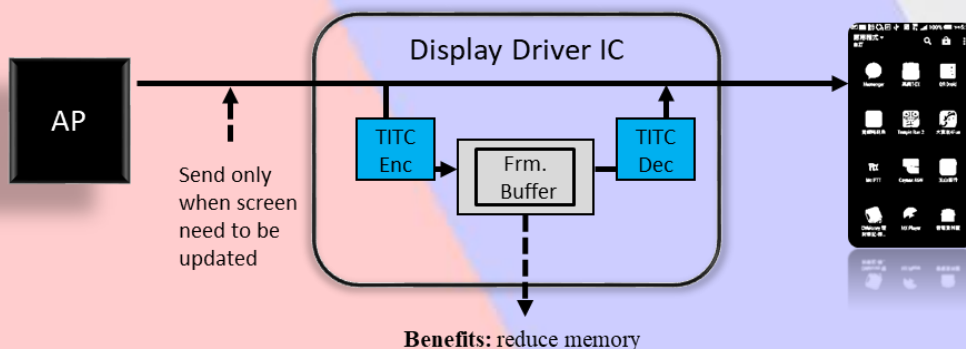
➢ TITC Display Driver IP

IP Name	DDI-RGB2V2H-2X DDI-RGB1V4H-2X	DDI-RGB2V8H-3X DDI-RGB1V8H-3X	DDI-Ptype1V8H-2X	DDI-RGB4V4H-4X
Status	MP>300M	MP>300M	MP>60M	Ready
Throughput	4 pixel/clk	8 pixel/clk	8 component/clk	8 pixel/clk
Function Support	partial update	partial update	partial update	partial update
	random access	random access	random access	random access
Compression Unit	2V2H or 1V4H	2V8H or 1V8H	1V8H	4V4H
Source Format	RGB	RGB	Pentile (RG$_1$BG$_2$)	RGB
Bit Depth	8 bit	8 bit	8 bit	8 bit
Compression Ratio	2X	3X	2X *	4X
Latency	ENC: 2 clk DEC: 1 clk	ENC : 10 clk DEC : 5 clk	ENC : 7 clk DEC : 7 clk	ENC : 30 clk DEC : 5 clk
Gate Count	<50K	<400K	<400K	<550K
Power	<5mW	<10mW	<8mW	<25mW

*Compressed data size is the same as RGB 3x

TITC VESA-DSC/VDCM Decoder IP

VESA DSC (Display Stream Compression) and VDC-M (VESA Display Stream Compression-M) are standard which is used for compressing and decompressing image display streams. It is designed for real-time systems, with real-time compression, transmission, decompression, and display. These standard IP could be used in many applications and save the transmission cost, such as between a mobile application processor and display panel, between a computer graphics and display monitor, and so on.

TITC provides a DSC decoder IP which is compatible to VESA DSC V1.1 and V1.2a, and VDC-M DEC IP is ready soon. Specially, TITC provides 6P/T versions DSC DEC, which could be used for 1 slice setting. These IP are configurable in display resolution (Up to 4K, UHD+, and 8K), bits per video component (8 and 10 bits), video output formats(RGB, YCbCr444, YUV422, and YUV420), and multiple slice per line setting (1, 2, or 4). TITC also provides customized service to shrink the IP area when no need to support the whole configuration.
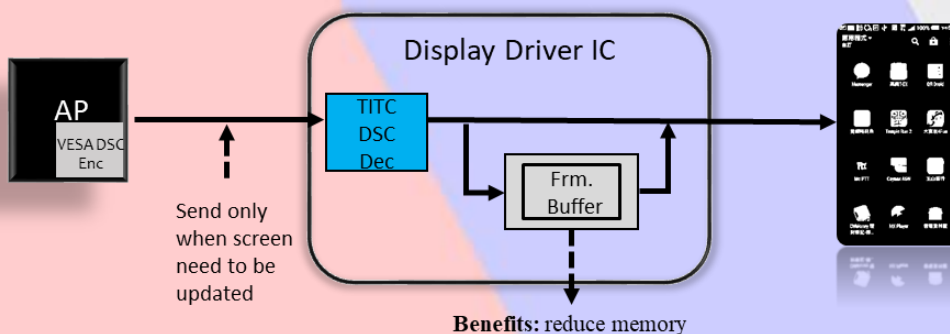
➤ TITC VESA IP

Decoder IP	DSC v1.1 6P	DSC v1.2a 3P	DSC v1.2a 6P	VDCM v1.1.0 VDCM v1.2.2
Status	MP>1M	Ready	MP	Available soon
Throughput	6 pixel/clk	3 pixel/clk	6 pixel/clk @ RGB 3 pixel/clk @ YUV422	4 pixel/clk
Function Support	MMAP, BP, MPP, ICH	MMAP, BP, MPP, ICH	MMAP, BP, MPP, ICH	TX, BP, MPP, Fallbacks
	Color space Conversion	Color space Conversion	Color space Conversion	Color space Conversion
	Constant Bit Rate	Constant Bit Rate	Constant Bit Rate	Constant Bit Rate
	Multi-slice: 2 slice	Multi-slice: 2 slice/4 slice	Multi-slice: 2 slice/4 slice	Multi-slice: 2 slice/4 slice
Performance with 120MHz Clock	FHD@344+ FPS QHD@195+ FPS 4K@86+ FPS	FHD@172+ FPS QHD@97+ FPS 4K@43+ FPS	FHD@344+ FPS QHD@195+ FPS 4K@86+ FPS	FHD@228+ FPS QHD@130+ FPS 4K@57+ FPS
Source Format	RGB	RGB/YUV422/YUV420	RGB/YUV422	RGB/YUV422/YUV420
Bit Depth	8, 10 bit	8, 10 bit	8, 10 bit	8, 10 bit
Compression Ratio	8 bit: 1X~4X 10bit:1X~5X	8 bit: 1X~4X 10bit:1X~5X	8 bit: 1X~4X 10bit:1X~5X	8 bit: 1X~5X 10bit:1X~6X
Latency	5 clk	5 clk	5 clk	13 clk