



# Display Drivers

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# TFT Driver Series

## Driver for Large LCD Panels

6bit RSDS™ Source Driver							
Part No.	Function	Gray Scale	Number of Outputs	Driver Output Voltage (V) Max.	Max.Clock Frequency (MHz) Max.	Logic Power Supply Voltage (V)	Package
BU95306	RSDS™ I/F R-DAC Type	6bit	600/618/630/642	13.5	85	2.7 to 3.6	COF

Note : RSDS™ is the trademark of signal interface technology proposal by National Semiconductor Corporation of the U.S.A.

## Drivers for Small to Medium LCD Panels

(LAPIS Semiconductor products)

TFT-LCD Drivers									
Part No.	Type	Logic Supply Voltage (V)	LCD Voltage (V)	Number of Driver Outputs	I/F	Operating Temperature (°C)	Package	Halogen Free Support*1	Automotive Grade*2
ML9860B	Source	2.1 to 3.6	10.0 to 14.6	480	RSDS	-40 to +95	Au bump chip	✓	YES
ML9863A	Source	2.4 to 3.6	8.0 to 14.6	960/804/792/768	CMOS/RSDS	-40 to +95	Au bump chip	✓	YES
ML9881	Source	2.7 to 3.6	8.0 to 14.6	1440/1284/1278/1260/1200/1080/1026/1020	RSDS/mini-LVDS	-40 to +95	Au bump chip	✓	YES
ML9882	Source	2.7 to 3.6	8.0 to 14.6	1440/1284/1278/1260/1200/1080/1026/1020	RSDS/mini-LVDS	-40 to +95	Au bump chip	✓	YES
ML9883	Source	2.7 to 3.6	8.0 to 14.6	1440/1284/1278/1200/1080/1062/1026/1020	RSDS/mini-LVDS	-40 to +95	Au bump chip	✓	YES
ML9872	Gate	2.4 to 3.6	Up to 40	540/480/400/384/360/300/240	CMOS	-40 to +105	Au bump chip	✓	YES
ML9873	Gate	2.4 to 3.6	Up to 40	960/800/768/720/684/682/640/600/540/512	CMOS	-40 to +105	Au bump chip	✓	YES

\*1 : A check mark of halogen free support means that we will be able to ship out the halogen free products. For details, please inquire to the sales.

\*2 : Please inquire to the sales for AEC-Q100.

# TN/STN LCD Driver Series

## LCD Segment Drivers

Low Duty LCD Segment Drivers																
Part No.	Display (dots)	Outputs		Operating Voltage(V)		Operating Temperature (°C)	Duty	Bias	I/F	EVR	GPO	Independent Blink	LED Driver	PWM Gen.	Keyscan	Package
		SEG	COM	I/F Power Supply (VDD)	LCD Power Supply (VLCD)											
<b>New</b> BU97550CH-3W	528	66	8	2.7 to 6.0		-40 to +85	1/8,1/7,1/5,1/4,1/3,Static	1/4,1/3,1/2	3wire+KEYOUT	✓	9port (9ch PWM)	—	—	9ch 9bit	5×6 Max. 30Key	CHIP
<b>New</b> BU9797AFUV	144	36	4	2.5 to 5.5		-40 to +85	1/4	1/3	2wire	—	—	—	—	—	—	TSSOP-C48V
BU9796AMUV	48	12	4	2.5 to 5.5		-40 to +85	1/4	1/3,1/2	2wire	—	—	—	—	—	—	VQFN024V4040
BU9796AFS	80	20	4	2.5 to 5.5		-40 to +85	1/4	1/3,1/2	2wire	—	—	—	—	—	—	SSOP-A32
BU9795AFV	108	27	4	2.5 to 5.5		-40 to +85	1/4	1/3,1/2	3wire	—	—	—	—	—	—	SSOP-B40
BU9795BGUW	124	31	4	2.5 to 5.5		-40 to +85	1/4	1/3,1/2	3wire	—	—	—	—	—	—	VBGA049W040A
BU9795AKV	140	35	4	2.5 to 5.5		-40 to +85	1/4	1/3,1/2	3wire	—	—	—	—	—	—	VQFP48C
BU9795ZKS2	140	35	4	2.5 to 5.5		-40 to +85	1/4	1/3,1/2	3wire	—	—	—	—	—	—	SQFP-T52
BU9794AKV	200	50	4	2.5 to 5.5	2.5 to 5.5	-40 to +85	1/4	1/3,1/2	3wire	—	—	—	—	—	—	VQFP64
BU9799KV	200	50	4	2.5 to 5.5	2.5 to 5.5	-40 to +85	1/4	1/3,1/2	2wire	✓	—	—	—	—	—	VQFP64
BU97950FUV	280	35	8	2.5 to 5.5	2.5 to 5.5	-40 to +85	1/8	1/4	2wire	✓	—	—	—	—	—	TSSOP-C48V
BU97941FV	104	26	4	1.8 to 3.6	2.7 to 5.5	-40 to +85	1/4,1/3,Static	1/3	3wire	—	—	—	4port	—	—	SSOP-B40
BU97930MUV	108	27	4	1.8 to 3.6	2.7 to 5.5	-40 to +85	1/4,1/3,Static	1/3	3wire	—	4port	✓	1port	1ch 8bit	—	VQFN040V6060
BU97931FV	112	28	4	1.8 to 3.6	2.7 to 5.5	-40 to +85	1/4,1/3,Static	1/3	3wire	—	5port	✓	1port	1ch 8bit	—	SSOP-B40
BU97981MUV	168	42	4	1.8 to 3.6	3.3 to 5.5	-30 to +75	1/4,1/3,Static	1/3	3wire	—	27port	✓	3port	2ch 12bit	—	VQFN56AV8080
BU97981KV	196	49	4	1.8 to 3.6	3.3 to 5.5	-30 to +75	1/4,1/3,Static	1/3	3wire	—	31port	✓	3port	2ch 12bit	—	VQFP64
BU97981GU	196	49	4	1.8 to 3.6	3.3 to 5.5	-30 to +75	1/4,1/3,Static	1/3	3wire	—	31port	✓	3port	2ch 12bit	—	VBGA064T050A
BU97501KV	204	51	4	2.7 to 6.0	4.5 to 6.0	-40 to +85	1/4,1/3	1/3,1/2	3wire+KEYOUT	—	4port	—	—	—	5×6 Max. 30Key	VQFP64
BU97530KVT	445	89	5	2.7 to 6.0		-40 to +85	1/5,1/4,1/3,Static	1/3,1/2	3wire+KEYOUT	✓	9port (9ch PWM)	—	—	9ch 8bit	5×6 Max. 30Key	TQFP100V

**Low Duty LCD Segment Drivers for Automotive Application**

Part No.	Display (dots)	Outputs		Operating Voltage(V)		Operating Temperature (°C)	Duty	Bias	I/F	EVR	GPO	Independent Blink	LED Driver	PWM Gen.	Keyscan	Package	Automotive Grade AEC-Q100
		SEG	COM	I/F Power Supply(VDD)	LCD Power Supply(VLCD)												
<b>New</b> BU97601FV-M	116	29	4	2.7 to 6.0		-40 to +85	1/4,1/3,1/2, Static	1/3,1/2	3wire + KEYOUT	✓	16port (16ch PWM)	—	—	6ch 9bit	4x5 Max. 20Key	SSOP-B40	YES
BU9797FUV-M	144	36	4	2.5 to 5.5		-40 to +85	1/4	1/3,1/2	2wire	—	—	—	—	—	—	TSSOP-C48V	YES
BU97510CKV-M	216	54	4	2.7 to 6.0		-40 to +85	1/4,1/3	1/3,1/2	3wire	—	6port (6ch PWM)	—	—	6ch 6bit	—	VQFP64	YES
BU97520AKV-M	276	69	4	2.7 to 6.0		-40 to +85	1/4,1/3	1/3,1/2	3wire + KEYOUT	—	6port (6ch PWM)	—	—	6ch 8bit	5x6 Max. 30Key	VQFP80	YES
BU97530KVT-M	445	89	5	2.7 to 6.0		-40 to +85	1/5,1/4,1/3, Static	1/3,1/2	3wire + KEYOUT	✓	9port (9ch PWM)	—	—	9ch 8bit	5x6 Max. 30Key	TQFP100V	YES
BU97540KV-M	335	67	5	2.7 to 6.0		-40 to +85	1/5,1/4,1/3, Static	1/3,1/2	3wire + KEYOUT	✓	9port (9ch PWM)	—	—	9ch 9bit	5x6 Max. 30Key	VQFP80	YES
BU97550KV-M	528	66	8	2.7 to 6.0		-40 to +85	1/8,1/7,1/5,1/4, 1/3,Static	1/4,1/3,1/2	3wire + KEYOUT	✓	9port (9ch PWM)	—	—	9ch 9bit	5x6 Max. 30Key	VQFP80	YES
BU91600FV-M	116	29	4	2.7 to 6.0		-40 to +105	1/4,1/3,1/2, Static	1/3,1/2	3wire + KEYOUT	✓	16port (16ch PWM)	—	—	6ch 9bit	4x5 Max. 20Key	SSOP-B40	YES
BU91600FUV-M	148	37	4	2.7 to 6.0		-40 to +105	1/4,1/3,1/2, Static	1/3,1/2	3wire + KEYOUT	✓	16port (16ch PWM)	—	—	6ch 9bit	4x5 Max. 20Key	TSSOP-C48V	YES
BU91501KV-M	204	51	4	2.7 to 6.0	4.5 to 6.0	-40 to +105	1/4,1/3	1/3,1/2	3wire + KEYOUT	—	4port	—	—	5x6 Max. 30Key	VQFP64	YES	
BU91510KV-M	216	54	4	2.7 to 6.0		-40 to +105	1/4,1/3	1/3,1/2	3wire	—	6port (6ch PWM)	—	—	6ch 6bit	—	VQFP64	YES
BU91520KV-M	276	69	4	2.7 to 6.0		-40 to +105	1/4,1/3	1/3,1/2	3wire + KEYOUT	—	6port (6ch PWM)	—	—	6ch 8bit	5x6 Max. 30Key	VQFP80	YES
BU91530KVT-M	445	89	5	2.7 to 6.0		-40 to +105	1/5,1/4,1/3, Static	1/3,1/2	3wire + KEYOUT	✓	9port (9ch PWM)	—	—	9ch 8bit	5x6 Max. 30Key	TQFP100V	YES
<b>New</b> BU91795MUF-M	48	12	4	2.5 to 6.0		-40 to +105	1/4	1/3	2wire	—	—	—	—	—	—	VQFN24FV4040	YES
<b>New</b> BU91796FS-M	80	20	4	2.5 to 6.0		-40 to +105	1/4	1/3	2wire	—	—	—	—	—	—	SSOP-A32	YES
BU91796MUF-M	80	20	4	2.5 to 6.0		-40 to +105	1/4	1/3	2wire	—	—	—	—	—	—	VQFN32FV5050	YES
BU91797MUF-M	144	36	4	2.5 to 6.0		-40 to +105	1/4	1/3	2wire	—	—	—	—	—	—	VQFN48FV7070	YES
BU91799KV-M	200	50	4	2.5 to 6.0	2.5 to 6.0	-40 to +105	1/4	1/3	2wire	✓	—	—	—	—	—	VQFP64	YES
BU91R63CH-M3BW	176	44	4	2.7 to 6.0	2.7 to 6.0	-40 to +105	1/4,1/3,1/2, Static	1/3,1/2	2wire	✓	—	—	—	—	—	Au Bump Chip	YES
<b>New</b> BU91797FUV-M	144	36	4	2.5 to 6.0		-40 to +105	1/4	1/3	2wire	—	—	—	—	—	—	TSSOP-C48V	YES

**Low Duty LCD Segment Drivers for Industrial Application**

Part No.	Display (dots)	Outputs		Operating Voltage(V)		Operating Temperature (°C)	Duty	Bias	Interface	EVR	GPO	Independent Blink	LED Driver	PWM Gen.	Keyscan	Package
		SEG	COM	I/F Power Supply(VDD)	LCD Power Supply(VLCD)											
BU97941FV-LB	104	26	4	1.8 to 3.6	2.7 to 5.5	-40 to +85	1/4,1/3,Static	1/3	3wire	—	—	—	—	4port	—	SSOP-B40
BU9795AFV-LB	108	27	4	2.5 to 5.5		-40 to +85	1/4	1/3,1/2	3wire	—	—	—	—	—	—	SSOP-B40
BU97931FV-LB	112	28	4	1.8 to 3.6	2.7 to 5.5	-40 to +85	1/4,1/3,Static	1/3	3wire	—	5port	✓	1port	1ch 8bit	—	SSOP-B40

**Common/Segment Drivers for Dot Matrix LCD**

(LAPIS Semiconductor products)

LCD Drivers								
Part No.	No. of Driver Output	Max. Driving Display Size	Logic Supply Voltage(V)	Driver Supply Voltage (V)	Operating Temperature (°C)	Feature	Package	Halogen Free Support*1
ML9460	240	320x240 (QVGA)	2.5 to 5.5	up to 43	-30 to +75	Output change 240/200/160/120	Au bump chip	✓
ML9461B	320		2.5 to 5.5	2.6 to 5.5	-30 to +75	Output change 320/240/200	Au bump chip	✓

\*1 : A check mark of halogen free support means that we will be able to ship out the halogen free products. For details, please inquire to the sales.

**Controller Drivers for Graphic LCD**

(LAPIS Semiconductor products)

LCD Controller Drivers									
Part No.	Max. No. of Segment Outputs	Max. Driving Display Size	Logic Supply Voltage (V)	Driver Supply Voltage (V)	Operating Temperature (°C)	Feature	Package	Halogen Free Support*1	Automotive Grade*2
ML9058E	132	132x65 dots	3.7 to 5.5	6 to 18	-40 to +85	Integrated RAM/ Boost circuit	Au bump chip	✓	YES
ML9059E	132	132x49 dots	3.7 to 5.5	6 to 18	-40 to +85	Integrated RAM/ Boost circuit	Au bump chip	✓	YES
ML9445	180	180x65 dots	2.7 to 5.5	6 to 18.5	-40 to +105	Integrated RAM/ Boost circuit	Au bump chip	✓	YES
ML9092-01	56	56x10 dots	4.5 to 5.5	4.5 to 16.5	-40 to +85	Integrated RAM/ Boost circuit/PWM	TQFP100	✓	YES
ML9092-02	60	60x10 dots	4.5 to 5.5	4.5 to 16.5	-40 to +85	Integrated RAM/ Boost circuit	TQFP100	✓	YES
ML9092-03						Integrated RAM			
ML9092-04						Integrated RAM/PWM			

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 \*2 : Please inquire to the sales for AEC-Q100.

**Controller Drivers for Character LCD**

(LAPIS Semiconductor products)

LCD Controller Drivers								
Part No.	Max. No. of Segment Outputs	Digits/Lines	Logic Supply Voltage (V)	Driver Supply Voltage (V)	Operating Temperature (°C)	Feature	Package	Halogen Free Support*1
ML9042-0x	100	5x8 dots, 20 charactersx2 lines	2.7 to 5.5	2.7 to 5.5	-40 to +85	Built-in bias register 2kΩ/ Supports custom fonts	Au bump chip	✓
ML9042-1x	100	5x8 dots, 20 charactersx2 lines	2.7 to 5.5	2.7 to 5.5	-40 to +85	Built-in bias register 4kΩ/ Supports custom fonts	Au bump chip	✓
ML9042-2x	100	5x8 dots, 20 charactersx2 lines	2.7 to 5.5	2.7 to 5.5	-40 to +85	Built-in bias register 10kΩ/ Supports custom fonts	Au bump chip	✓

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## Controller Drivers for Low Duty LCD

(LAPIS Semiconductor products)

LCD Controller Drivers(Package Product)														
Part No.	Max. No. of Segment Outputs	Max. No. of Driving Segments					Internal Oscillation Frame Frequency (Hz)	Logic Supply Voltage (V)	Driver Supply Voltage (V)	Operating Temperature (°C)	Feature	Package	Halogen Free Support <sup>*1</sup>	Automotive Grade <sup>*2</sup>
		static	1/2	1/3	1/4	1/5								
ML9470-12	80	80	160	—	—	—	—	3.0 to 5.5 (single)	-40 to +105	Supports external clock input	QFP100-1420-0.65	✓	YES	
ML9471	80	—	—	240	320	400	—	3.0 to 5.5 (single)	-40 to +105	Supports external clock input	TQFP100	✓	YES	
ML9472	60	60	120	—	—	—	—	3.0 to 5.5 (single)	-40 to +105	Supports external clock input	P-TQFP80-1212-0.50	✓	YES	
ML9473	60	—	—	180	240	300	—	3.0 to 5.5 (single)	-40 to +105	Supports external clock input	P-TQFP80-1212-0.50	✓	YES	
ML9475	40	—	—	120	160	—	—	3V ± 10%/ 5V ± 10%	3.5 to 5.5	-40 to +105	Supports external clock input/ Bias generator built in/ EMS countermeasure built in	QFP56	✓	YES
ML9476	16	—	—	48	64	—	—	3V ± 10%/ 5V ± 10%	3.5 to 5.5	-40 to +105	Supports external clock input/ Bias generator built in/ EMS countermeasure built in	TQFP48	✓	YES
ML9477	32	—	—	96	128	—	—	3V ± 10%/ 5V ± 10%	3.5 to 5.5	-40 to +105	Supports external clock input/ Bias generator built in/ EMS countermeasure built in	TQFP48	✓	YES
ML9484	50	50	100	150	200	—	—	2.7 to 5.5	4.5 to 5.5	-40 to +105	Supports external clock input/ Bias generator built in	TQFP64	✓	YES
LCD Controller Drivers(Gold Bump Product)														
ML9480	40	40	80	120	160	—	65/75/85/95/ 130/150/170/190 command switching	2.7 to 5.5	4.5 to 5.5	-40 to +105	Supports external clock input/ Bias generator built in/ EMS countermeasure built in/ No external parts	Au bump chip	✓	YES
ML9478C	80	80	160	240	320	—	65/75/85/95 command switching	2.7 to 5.5	4.5 to 5.5	-40 to +105	Supports external clock input/ Bias generator built in/ EMS countermeasure built in/ No external parts	Au bump chip	✓	YES
ML9479E	160	160	320	480	640	—	65/75/85/95 command switching	2.7 to 5.5	4.5 to 5.5	-40 to +105	Supports external clock input/ Bias generator built in/ EMS countermeasure built in/ No external parts	Au bump chip	✓	YES
ML9488	80	80	160	240	320	—	130/150/170/190 command switching	2.7 to 5.5	4.5 to 5.5	-40 to +105	Supports external clock input/ Bias generator built in	Au bump chip	✓	YES
ML9489	160	160	320	480	640	—	130/150/170/190 command switching	2.7 to 5.5	4.5 to 5.5	-40 to +105	Supports external clock input/ Bias generator built in	Au bump chip	✓	YES

\*1: A check mark of halogen free support means that we will be able to ship out the halogen free products. For details, please inquire to the sales.  
 \*2: Please inquire to the sales for AEC-Q100.

## VFD Driver Series

## Anode/Grid Drivers for VFD

(LAPIS Semiconductor products)

VFD Drivers									
Part No.	No. of Driver Output	Driving Target	VFD Driving Voltage (V)	Power Supply Type	Operating Temperature (°C)	Feature	Package	Halogen Free Support <sup>*1</sup>	Automotive Grade <sup>*2</sup>
ML9271	48	Anode/Grid	18	Positive supply	-40 to +105	Cascade connection	QFP64-P-1414-0.80	—	YES
ML9272	40	Anode/Grid	65	Positive supply	-40 to +105	Cascade connection	SSOP60	✓	YES

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 \*2: Please inquire to the sales for AEC-Q100.

## Controller Drivers for Character VFD

(LAPIS Semiconductor products)

VFD Controller Drivers								
Part No.	Display Pixels	VFD Driving Voltage (V)	Power Supply Type	Operating Temperature (°C)	Feature	Package	Halogen Free Support <sup>*1</sup>	Automotive Grade <sup>*2</sup>
ML9208-xxGA	5 × 7 dots	V <sub>DD</sub> -42	Negative supply	-40 to +85	3-bit gradation	QFP64-1414-0.80	✓	—
ML9208-xxMB	5 × 7 dots	V <sub>DD</sub> -42	Negative supply	-40 to +85	3-bit gradation	SSOP64	—	—
ML9208A-xxGA	5 × 7 dots	V <sub>DD</sub> -42	Negative supply	-40 to +85	4-bit gradation	QFP64	✓	—
ML9208A-xxTB	5 × 7 dots	V <sub>DD</sub> -42	Negative supply	-40 to +85	4-bit gradation	TQFP64	✓	—
ML9209-xxGA	16 segs	V <sub>DD</sub> -42	Negative supply	-40 to +85	4-bit gradation	QFP44	—	—
ML9289-xxGA	16 segs	42	Positive supply	-40 to +85	4-bit gradation	QFP44	✓	—
ML9289-xxTB	16 segs	42	Positive supply	-40 to +85	4-bit gradation	TQFP48	—	—
ML9286-xxGA	5 × 7 dots	80	Positive supply	-40 to +105	Multigrad function/ 8-bit gradation/ Cascade connection	QFP80-1414-0.65	✓	YES
ML9286-xxTB	5 × 7 dots	80	Positive supply	-40 to +105	Multigrad function/ 8-bit gradation/ Cascade connection	TQFP80-1212-0.50	✓	YES

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 \*2: Please inquire to the sales for AEC-Q100.

## Controller Drivers for Low Duty VFD

(LAPIS Semiconductor products)

VFD Controller Drivers								
Part No.	Max. No. of Driving Segments	VFD Driving Voltage(V)	Power Supply Type	Operating Temperature (°C)	Feature	Package	Halogen Free Support <sup>*1</sup>	Automotive Grade <sup>*2</sup>
ML9212GA	64 (1/2Duty) 96 (1/3Duty)	18	Positive supply	-40 to +85	10-bit gradation/ Cascade connection	QFP56	✓	YES
ML9213GP	112 (1/2Duty) 168 (1/3Duty)	18	Positive supply	-40 to +85	10-bit gradation/ Cascade connection	P-QFP80-1414-0.65	✓	YES

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 \*2: Please inquire to the sales for AEC-Q100.

## Car Clock Drivers

(LAPIS Semiconductor products)

Car Clock									
Part No.	Display Duty	VFD Driving Voltage (V)	Logic Supply Voltage (V)	Operating Temperature (°C)	Supply Current (Max.)(mA)	No. of Digit	Package	Halogen Free Support <sup>*1</sup>	Automotive Grade <sup>*2</sup>
ML9298	1/2	4.0 to 18	No need	-40 to +85	0.6	4digits×1line and col.	SSOP32	✓	YES
ML9098B	Static, 1/2	3.0 to 5.5	3.0 to 5.5	-40 to +105	0.6	4digits×1line and col., AM, PM	TQFP48	—	YES

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 \*2: Please inquire to the sales for AEC-Q100.