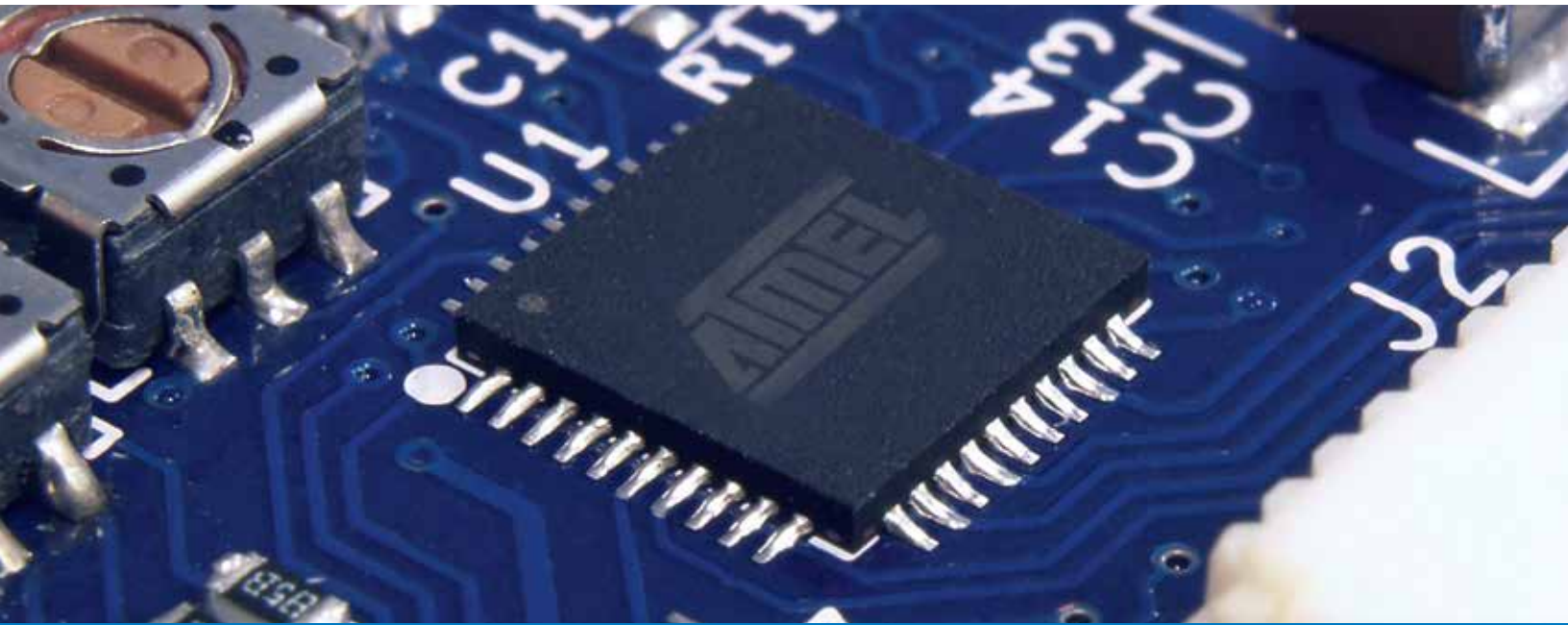


# Atmel®



## Atmel LED Driver Technology

Smart LED Power Management for  
Efficiency, Programmability and Scalability



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### Efficiency Optimizer

The Efficiency Optimizer technology consists of proprietary circuitry which controls a wide range of different architectures of external DC/DC and AC/DC converters. Multiple drivers in a system communicate with each other in real time to select an optimized operating voltage for the LEDs. This allows you to design the power supply for the worst case LED forward voltage ( $V_f$ ) without worrying about excessive power dissipation issues.

During the start-up sequence, the LED drivers automatically reduce the power supply voltage to the minimum voltage required to keep the LEDs in current regulation. The devices can be configured to periodically perform this optimization to compensate for changes in the LED forward voltage, and to assure continued optimum power savings.

### Programmability

An on-chip E<sup>2</sup>PROM holds all the default control register values. At power-up, the data in the E<sup>2</sup>PROM automatically copies directly to the control registers, setting up the device for operation.

### Scalability

A number of LED drivers feature a 20MHz SPI serial interface, or 1MHz I<sup>2</sup>C serial interface. Both interfaces support video frame-by-frame LED string intensity control for up to 16 interconnected devices to allow active area dimming. The devices include an advanced PWM engine that easily synchronizes to a video signal, and per-string phase adjustment to reduce unwanted LCD artifacts such as motion blur.

### Atmel LED Driver Parametric Table

Atmel's LED Driver ICs																
Part Number	Application	DC/DC EO	Boost	Strings						Dimming				External VSYNC	Interface	
				#	FETs	Istr	# of LEDs Per String	Matching Max	Fault Detec	String Current		String PWM				String Phasing
										Global	Per String	Global	Per String			
MSL1060	Notebooks, Industrial and Medical	-	internal 1.1MHz	6	Internal	30mA	12	1.5%	OC, SC	-	-	-	-	-	-	PWM
MSL1061										4 bits + R	-	8 bits	-	-	-	I <sup>2</sup> C
MSL1064										-	-	-	-	-	-	
MSL2041	Edgelit and Solid State Lighting	1	External	4	External	1A	DENR	1.0%	OC, SC	-	-	-	Auto	=PWM	4 PWM	
MSL2042		1		4						4 bits + R	-	8 bits	-	Auto	=PWM	PWM
MSL2100		3		8						-	-	8 bits	-	8 bits	Yes	I <sup>2</sup> C
MSL3082		1		8						-	-	8 bits	-	8 bits	Yes	I <sup>2</sup> C
MSL3085		1		8						R	-	-	-	12 bits	Yes	I <sup>2</sup> C
MSL2160		3		16						8 bits	-	12 bits	12 bits	Yes	SPI	
MSL3162		3		16						R	8 bits	6 bits	8 bits	8 bits	Yes	I <sup>2</sup> C
MSL3163	Direct Backlight	3	16	100mA	10	3%	OC, SC	8 bits + R	8 bits	8 bits	12 bits	12 bits	Yes	I <sup>2</sup> C		
MSL3164		3	16	8 bits + R				8 bits	8 bits	12 bits	12 bits	Yes	SPI			
MSL3165A	Monitor	1	External	16	Internal	30mA	10	3%	OC, SC	R	-	-	PWM	-	=PWM	PWM I <sup>2</sup> C
MSL3166A		1	16	30mA	R	-				-	PWM	Auto	=PWM	PWM I <sup>2</sup> C		
MSL3167		1	16	30mA	R	-				-	PWM	-	=PWM	PWM I <sup>2</sup> C		
MSL3168		1	16	30mA	R	-				-	PWM	Auto	=PWM	PWM I <sup>2</sup> C		
MSL4164		1	16	60mA	R	-				-	PWM	Auto	=PWM	PWM I <sup>2</sup> C		

EO=Efficiency Optimizer, DENR=Determine by External NFET Ratings, OC=Open Circuit, SC=Short Circuit, R=External Resistor

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