

GENERAL DESCRIPTION

The SGM3735 is a high efficiency constant current LED driver with a 1MHz PWM boost converter. An internal low-side N-channel MOSFET and a high switching frequency make the SGM3735 easy to use small components and optimized for compact solutions.

The SGM3735 is capable of driving either up to 10 LEDs in series for 38V output or total 260mA current with 3 LEDs in series per string while achieving high conversion efficiency.

32-step FB reference voltage can be programmed by one-wire dimming interface. Compared to normal PWM dimming control, it can avoid audible noise and reduce inrush current.

The SGM3735 provides very low shutdown current. It also includes a comprehensive set of protection features such as over-voltage protection, cycle-by-cycle input current limit and thermal shutdown.

The SGM3735 is available in a Green TDFN-2x2-8L package. It operates over an ambient temperature range of -40°C to +85°C.

FEATURES

- **Input Voltage Range: 2.7V to 5.5V**
- **Support up to 10 LEDs in Series**
- **Integrated 40V/1.35A Switch**
- **High Efficiency PWM Boost Converter**
- **Low Feedback Voltage: 200mV**
- **500kΩ Pull-Down Resistor on EN/SET Pin**
- **One-Wire Dimming Interface**
- **Switching Frequency: 1MHz**
- **38V LED Open Protection**
- **Automatic Soft-Start for Reducing Inrush Current**
- **Less than 1μA Shutdown Current**
- **-40°C to +85°C Operating Temperature Range**
- **Available in a Green TSOT-23-6 Package**

APPLICATIONS

LED Backlighting
Mobile Phones and Digital Photo Frames
Portable Devices
Automotive Navigation

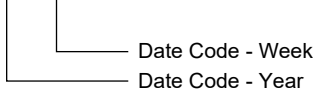
PACKAGE/ORDERING INFORMATION

MODEL	PACKAGE DESCRIPTION	SPECIFIED TEMPERATURE RANGE	ORDERING NUMBER	PACKAGE MARKING	PACKING OPTION
SGM3735	TDFN-2x2-8L	-40°C to +85°C	SGM3735YTDE8G/TR	3735 XXXX	Tape and Reel, 3000

MARKING INFORMATION

NOTE: XXXX = Date Code.

XXXX



Green (RoHS & HSF): SG Micro Corp defines "Green" to mean Pb-Free (RoHS compatible) and free of halogen substances. If you have additional comments or questions, please contact your SGMICRO representative directly.

ABSOLUTE MAXIMUM RATINGS

- Input Voltage, V_{IN}..... -0.3V to 6V
- High Voltage Nodes, SW, V_{OUT} -0.3V to 40V
- Other Pins, FB, EN/SET-0.3V to V_{IN} + 0.3V
- Package Thermal Resistance
- TDFN-2x2-8L, θ_{JA}..... 75°C/W
- Junction Temperature.....+150°C
- Storage Temperature Range -65°C to +150°C
- Lead Temperature (Soldering, 10s).....+260°C
- ESD Susceptibility
- HBM..... 3000V
- MM..... 200V

RECOMMENDED OPERATING CONDITIONS

- Operating Temperature Range -40°C to +85°C

OVERSTRESS CAUTION

Stresses beyond those listed in Absolute Maximum Ratings may cause permanent damage to the device. Exposure to absolute maximum rating conditions for extended periods may affect reliability. Functional operation of the device at any conditions beyond those indicated in the Recommended Operating Conditions section is not implied.

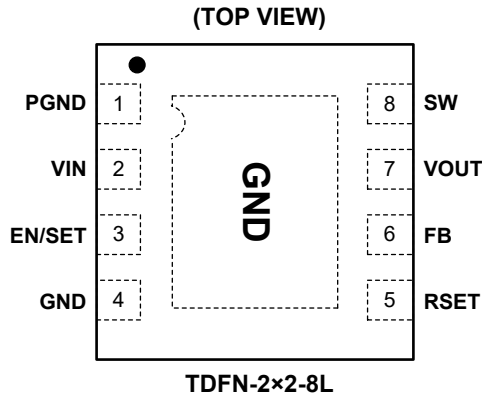
ESD SENSITIVITY CAUTION

This integrated circuit can be damaged if ESD protections are not considered carefully. SGMICRO recommends that all integrated circuits be handled with appropriate precautions. Failure to observe proper handling and installation procedures can cause damage. ESD damage can range from subtle performance degradation to complete device failure. Precision integrated circuits may be more susceptible to damage because even small parametric changes could cause the device not to meet the published specifications.

DISCLAIMER

SG Micro Corp reserves the right to make any change in circuit design, or specifications without prior notice.

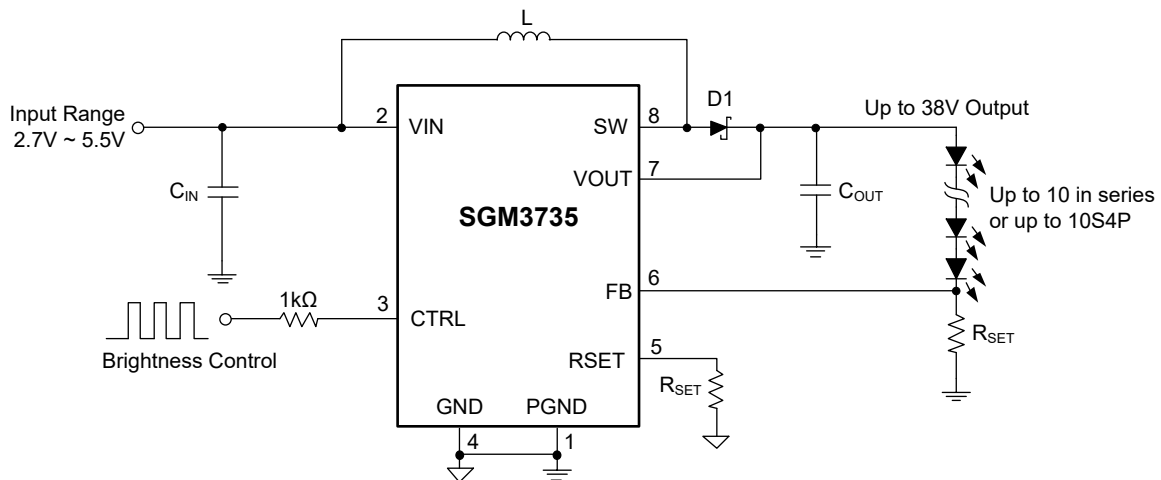
PIN CONFIGURATION



PIN DESCRIPTION

PIN	NAME	FUNCTION
1	PGND	Power Ground Pin.
2	VIN	Input Supply Pin.
3	EN/SET	Enable Control and One-Wire Dimming Interface. Pull it high to enable the device and pull it low for 3ms to shut down the device. Apply an input pulse signal to this pin for LED brightness control. The 32-step LED current control can be programmed by EN/SET pin.
4	GND	Ground Pin.
5	RSET	Current Setting Pin. Connect an external resistor from RSET pin to ground to program the maximum white LED current.
6	FB	Feedback Input for Current. It is regulated at 200mV.
7	VOUT	Output Voltage Pin.
8	SW	Boost Converter Switching Node.
Exposed Pad	GND	Exposed Pad. It should be soldered to PCB board and connected to GND.

TYPICAL APPLICATION



ELECTRICAL CHARACTERISTICS(V_{IN} = 3.6V, L = 10μH, C_{IN} = 10μF, C_{OUT} = 0.47μF, Full = -40°C to +85°C, typical values are at T_A = +25°C, unless otherwise noted.)

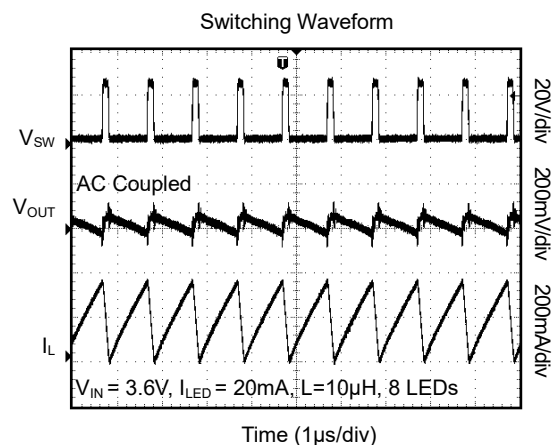
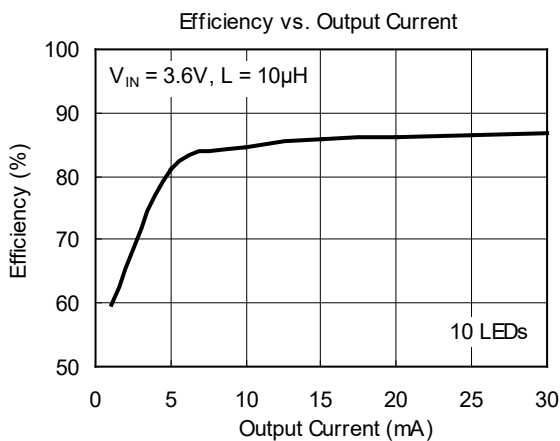
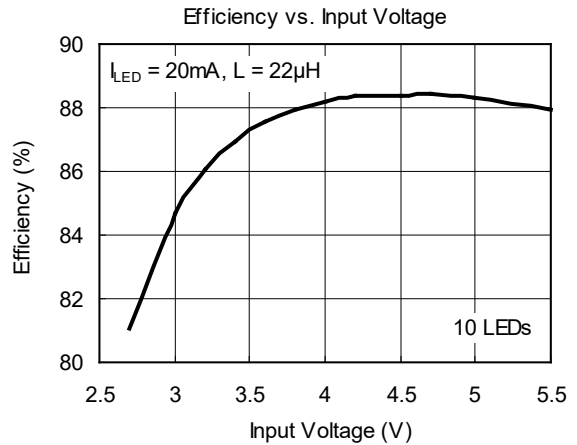
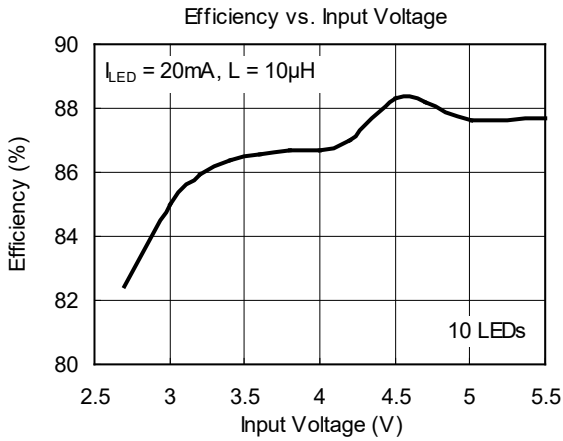
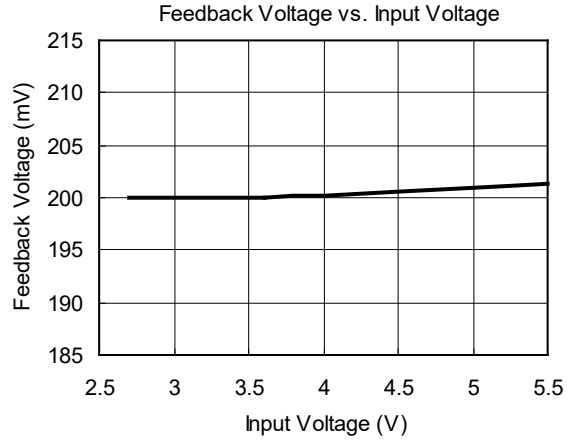
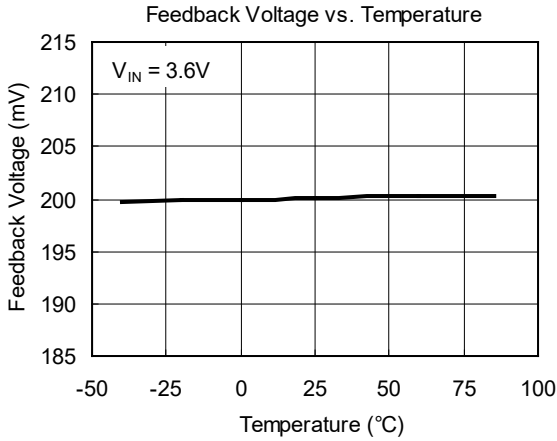
PARAMETER	SYMBOL	CONDITIONS	TEMP	MIN	TYP	MAX	UNITS
IC Supply							
Input Voltage Range	V _{IN}		Full	2.7		5.5	V
Input Under-Voltage Lockout	UVLO	Rising edge	+25°C		2.5	2.6	V
UVLO Hysteresis	V _{HYS}		+25°C		0.15		V
Quiescent Current (Non Switching)	I _Q	V _{FB} = 0.4V	+25°C		0.20	0.35	mA
Operating Current (Switching)		V _{FB} = 0V	+25°C		0.72	1.20	mA
VIN Pin Shutdown Current	I _{SHDN}	V _{EN} = 0V	+25°C		0.1	1	μA
Step-Up Converter							
Voltage Feedback Regulation Voltage	V _{REF}		Full	192	200	212.5	mV
NMOS On-Resistance	R _{DS(ON)}		+25°C		0.36	0.55	Ω
SW Pin Leakage Current	I _{SW}		+25°C		0.01	1	μA
Peak NMOS Current Limit	I _{LIM}		+25°C	1.0	1.35	1.7	A
Oscillator Frequency	f _s		Full	0.8	1.0	1.22	MHz
Maximum Duty Cycle	D _{MAX}		+25°C	92	95		%
Over-Voltage Threshold	V _{OVP}	Measured at VOUT pin	Full	35.5	38	40.5	V
Start-Up Time	t _s		+25°C		800		μs
Control							
Logic Low Threshold	V _{IL}		Full			0.35	V
Logic High Threshold	V _{IH}		Full	1.5			V
Minimum Logic High Pulse Width Timing	t _{HIGH_MIN}		+25°C	0.4			μs
Logic Low Pulse Width Timing	t _{LOW}		+25°C	0.4		750	μs
Minimum Shutdown Pulse Width Timing	t _{OFF}		+25°C	3			ms
Junction Thermal Shutdown Threshold					150		°C
Junction Thermal Shutdown Hysteresis					15		°C

NOTE:

1. The SGM3735 is guaranteed to meet performance specifications over the -40°C to +85°C operating temperature range by design, characterization and correlation with statistical process controls.

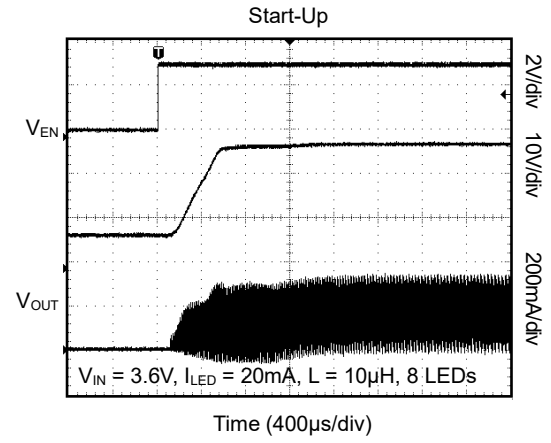
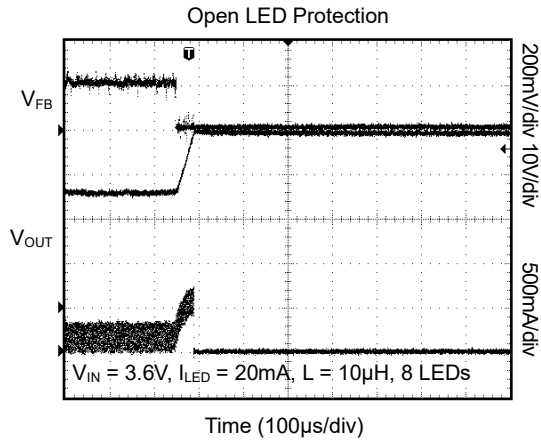
TYPICAL PERFORMANCE CHARACTERISTICS

T_A = +25°C, L = 10µH, C_{IN} = 10µF, C_{OUT} = 0.47µF, unless otherwise noted.



TYPICAL PERFORMANCE CHARACTERISTICS (continued)

$T_A = +25^\circ\text{C}$, $L = 10\mu\text{H}$, $C_{IN} = 10\mu\text{F}$, $C_{OUT} = 0.47\mu\text{F}$, unless otherwise noted.



DETAILED DESCRIPTION

Table 1. Current Setting

DATA	LED Current Ratio	DATA	LED Current Ratio	DATA	LED Current Ratio	DATA	LED Current Ratio
1	32/32	9	24/32	17	16/32	25	8/32
2	31/32	10	23/32	18	15/32	26	7/32
3	30/32	11	22/32	19	14/32	27	6/32
4	29/32	12	21/32	20	13/32	28	5/32
5	28/32	13	20/32	21	12/32	29	4/32
6	27/32	14	19/32	22	11/32	30	3/32
7	26/32	15	18/32	23	10/32	31	2/32
8	25/32	16	17/32	24	9/32	32	1/32

REVISION HISTORY

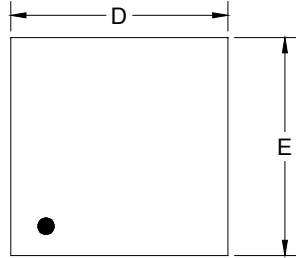
NOTE: Page numbers for previous revisions may differ from page numbers in the current version.

JULY 2014 – REV.A to REV.A.1	Page
Changed GENERAL DESCRIPTION section.....	1
Changed Figure 1.....	9

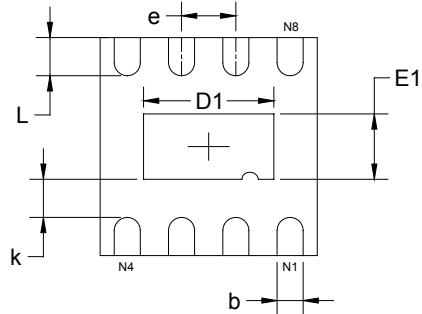
Changes from Original (MARCH 2014) to REV.A	Page
Changed from product preview to production data.....	All

PACKAGE OUTLINE DIMENSIONS

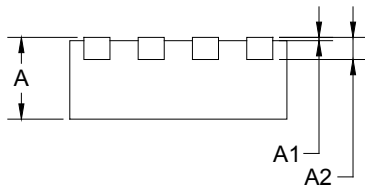
TDFN-2x2-8L



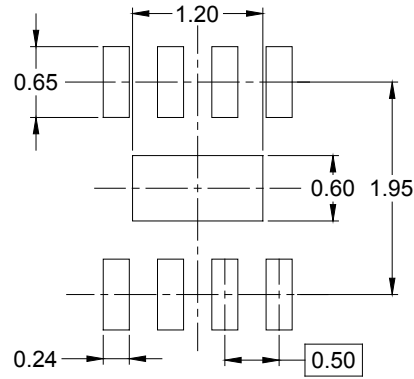
TOP VIEW



BOTTOM VIEW



SIDE VIEW



RECOMMENDED LAND PATTERN (Unit: mm)

Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MIN	MAX	MIN	MAX
A	0.700	0.800	0.028	0.031
A1	0.000	0.050	0.000	0.002
A2	0.203 REF		0.008 REF	
D	1.900	2.100	0.075	0.083
D1	1.100	1.300	0.043	0.051
E	1.900	2.100	0.075	0.083
E1	0.500	0.700	0.020	0.028
k	0.200 MIN		0.008 MIN	
b	0.180	0.300	0.007	0.012
e	0.500 TYP		0.020 TYP	
L	0.250	0.450	0.010	0.018

PACKAGE INFORMATION

TAPE AND REEL INFORMATION

REEL DIMENSIONS



TAPE DIMENSIONS



NOTE: The picture is only for reference. Please make the object as the standard.

KEY PARAMETER LIST OF TAPE AND REEL

Package Type	Reel Diameter	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P0 (mm)	P1 (mm)	P2 (mm)	W (mm)	Pin1 Quadrant
TDFN-2×2-8L	7"	9.5	2.30	2.30	1.10	4.0	4.0	2.0	8.0	Q1

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PACKAGE INFORMATION

CARTON BOX DIMENSIONS



NOTE: The picture is only for reference. Please make the object as the standard.

KEY PARAMETER LIST OF CARTON BOX

Reel Type	Length (mm)	Width (mm)	Height (mm)	Pizza/Carton
7" (Option)	368	227	224	8
7"	442	410	224	18

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