SGM37410
40V High Efficiency, Boost White LED Driver with PWM Dimming Control

GENERAL DESCRIPTION

The SGM37410 is an asynchronous Boost WLED driver with high efficiency, low EMI and high output voltage. The Boost converter integrates a 42V, 3A internal FET which operates at 1.1MHz switching frequency. Its strong driving ability can drive single or multiple parallel LED strings for 700mA maximum total LED current, which can be used as LED driver for smart phone and tablet backlight.

The default LED current can be programmed by the external current-sense resistor R_{SET}. By varying the duty cycle of the PWM signal applied to the CTRL pin, the internal reference voltage is adjusted, which ultimately adjusts the LED sink current. With full PWM duty cycle, the internal reference voltage V_{REF} is 200mV (TYP). The SGM37410 is essentially a driver that adopts analog dimming control, and it will not produce audible noise on the output capacitor. The SGM37410 provides excellent line regulation and load regulation, as well as excellent load transient response. The SGM37410 also features various protection functions such as open LED protection, OCP protection and thermal shutdown protection.

The SGM37410 is available in Green SOT-23-5 and TSOT-23-5 packages.

FEATURES

- **Input Voltage Range: 2.7V to 5.5V**
- **1:500 Stable Luminance Dimming**
- **Improved PSRR for Waveless Lighting**
- **Up to 90% Efficiency**
- **Switching Frequency: 1.1MHz**
- **Integrated 42V/3A Switch**
- **Feedback Voltage: 200mV**
- **PWM Dimming Control**
- **40V Open LED Protection for 12 LEDs in Series**
- **Automatic Soft-Start for Reduced Inrush Current**
- **Under-Voltage Lockout Protection**
- **Thermal Shutdown**
- **-40℃ to +125℃ Operating Temperature Range**
- **Available in Green SOT-23-5 and TSOT-23-5 Packages**

APPLICATIONS

Portable Devices Backlight

Small and Medium Size White LCD Display Backlight

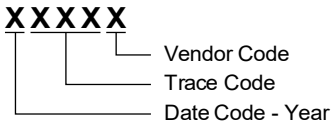
PACKAGE/ORDERING INFORMATION

MODEL	PACKAGE DESCRIPTION	SPECIFIED TEMPERATURE RANGE	ORDERING NUMBER	PACKAGE MARKING	PACKING OPTION
SGM37410	SOT-23-5	-40℃ to +125℃	SGM37410XN5G/TR	1RI XXXXX	Tape and Reel, 3000
	TSOT-23-5	-40℃ to +125℃	SGM37410XTN5G/TR	24C XXXXX	Tape and Reel, 3000

MARKING INFORMATION

NOTE: XXXXX = Date Code, Trace Code and Vendor Code.

SOT-23-5/TSOT-23-5



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

Voltage on VIN, CTRL, FB ..... -0.3V to 6V
Voltage on SW ..... -0.3V to 40V
Junction Temperature ..... +150℃
Storage Temperature Range ..... -65℃ to +150℃
Lead Temperature (Soldering, 10s) ..... +260℃
Package Thermal Resistance
SOT-23-5, θ_{JA} ..... 133.6℃/W
SOT-23-5, θ_{JB} ..... 28.2℃/W
SOT-23-5, θ_{JC} ..... 52.3℃/W
TSOT-23-5, θ_{JA} ..... 148.8℃/W
TSOT-23-5, θ_{JB} ..... 30.4℃/W
TSOT-23-5, θ_{JC} ..... 69.7℃/W
ESD Susceptibility (1) (2)
HBM ..... ±4000V
CDM ..... ±1000V

NOTES:

1. For human body model (HBM), all pins comply with ANSI/ESDA/JEDEC JS-001 specifications.

2. For charged device model (CDM), all pins comply with ANSI/ESDA/JEDEC JS-002 specifications.

RECOMMENDED OPERATING CONDITIONS

Input Voltage Range ..... 2.7V to 5.5V
Output Voltage Range ..... V_{IN} to 40V
Inductor ..... 4.7μH to 10μH
Input Capacitor ..... 1μF (MIN)
Output Capacitor ..... 1μF to 10μF
Operating Temperature Range ..... -40℃ to +125℃

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.

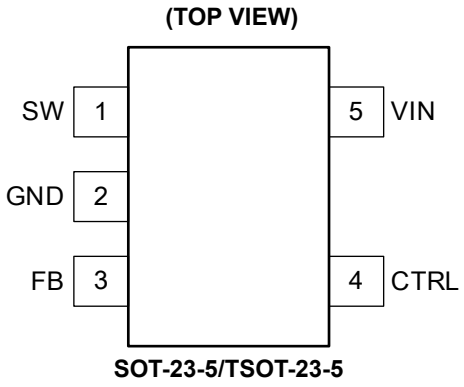
ESD SENSITIVITY CAUTION

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 CONFIGURATIONS



PIN DESCRIPTION

PIN	NAME	I/O	FUNCTION
1	SW	I	The Switch Pin of the Device. It is connected to the drain of the internal N-channel power FET.
2	GND	O	Ground.
3	FB	I	Feedback Input for Current. Connect the sense resistor between FB and GND.
4	CTRL	I	PWM Dimming Input.
5	VIN	I	Input Supply Pin.

NOTE: I: input, O: output.

TYPICAL APPLICATION

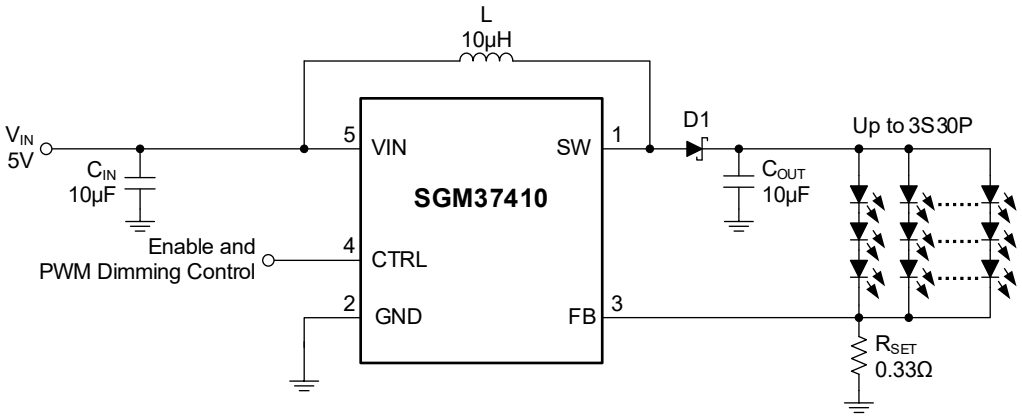


Figure 1. Typical Application

ELECTRICAL CHARACTERISTICS

(V_{IN} = 3.6V, CTRL = V_{IN}, T_A = +25℃, unless otherwise noted.)

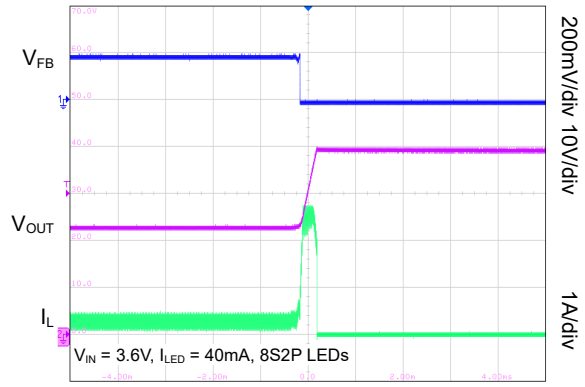
PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
Power Supply						
Input Voltage Range	V_{IN}	T_A = -40℃ to +125℃	2.7		5.5	V
Under-Voltage Lockout Threshold	UVLO	V_{IN} falling		2.23		V
		V_{IN} rising		2.38	2.55	
UVLO Hysteresis	V_{HYS}			150		mV
Operating Quiescent Current into V_{IN}	I_Q	V_{FB} = 300mV, no switching		0.24	0.35	mA
Shutdown Current	I_{SD}	CTRL = GND			1	μA
Boost Converter						
Voltage Feedback Regulation Voltage	V_{REF}	PWM duty cycle 100%	194	200	203.5	mV
		PWM duty cycle 10%	18.5	20	21.5	mV
		PWM duty cycle 1%	1.3	2	2.7	mV
		PWM duty cycle 0.2%		0.47		mV
FB Pin Bias Current	I_{FB}	V_{FB} = 100mV			1	μA
V_{REF} Filter Time Constant	t_{REF}			0.5		ms
N-Channel MOSFET On-Resistance	$R_{DS(ON)}$			0.11	0.2	Ω
Switching Frequency	f_{SW}	T_A = -40℃ to +125℃	0.85	1.1	1.3	MHz
Switching MOSFET Current Limit	I_{LIM}		2.5	3	3.5	A
Output Voltage Over-Voltage Threshold	V_{OVP_SW}	T_A = -40℃ to +125℃	38	40	42	V
Control						
CTRL Logic High Voltage	V_H	T_A = -40℃ to +125℃	1.1			V
CTRL Logic Low Voltage	V_L	T_A = -40℃ to +125℃			0.4	V
CTRL Pin Internal Pull-Down Resistor	R_{PD}			540		kΩ
CTRL Logic Low Time to Shutdown	t_{SD}	CTRL high to low	2.5			ms
PWM Dimming Frequency Range	DFR		10		100	kHz
Minimum PWM On-Time(1)			40			ns
PWM Duty Cycle Changing Time to Output	DCCTO	Duty cycle from100% to 50%		2		ms
Stable Dimming Range(1)	DR		0.2		100	%
Thermal Shutdown						
Thermal Shutdown Threshold	$T_{SHUTDOWN}$			150		℃
Thermal Shutdown Hysteresis	T_{HYS}			20		℃

NOTE:
1. Guaranteed by design.

TYPICAL PERFORMANCE CHARACTERISTICS

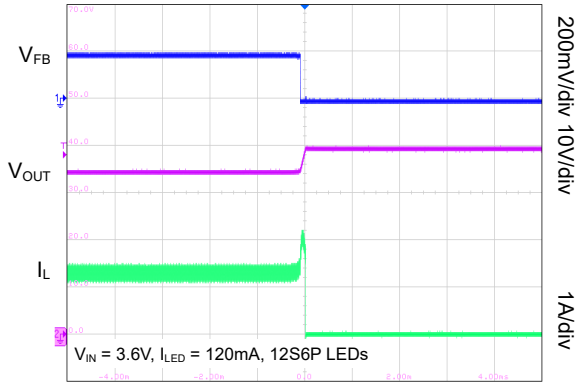
T_A = +25℃, L = 10μH, C_{IN} = 10μF, C_{OUT} = 10μF, unless otherwise noted.

Open LED Protection



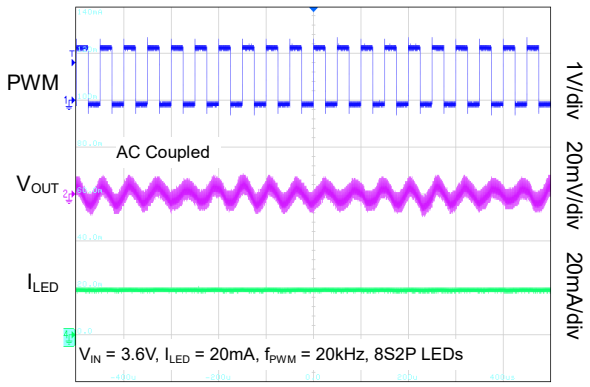
Time (1ms/div)

Open LED Protection



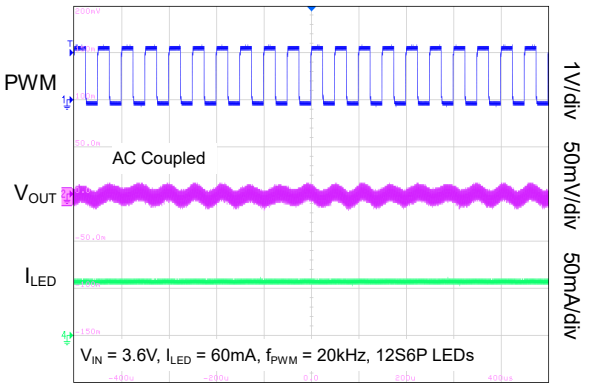
Time (1ms/div)

Output Ripple at PWM Dimming



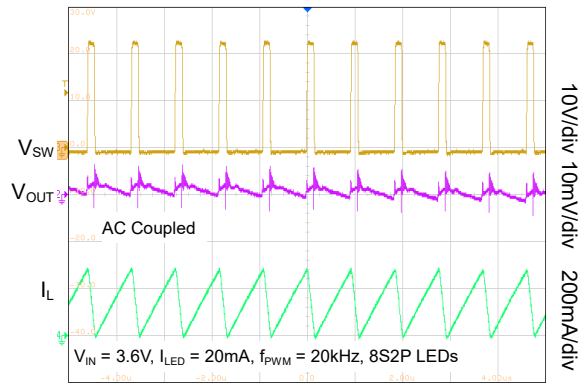
Time (100μs/div)

Output Ripple at PWM Dimming



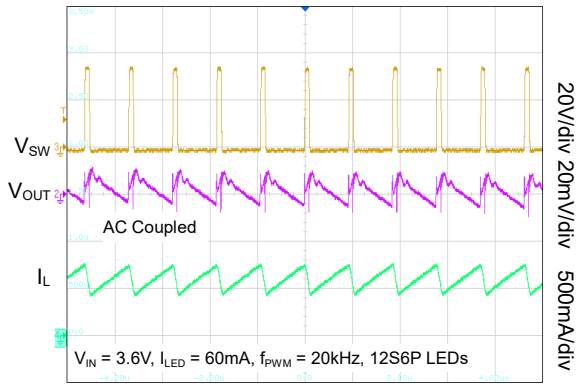
Time (100μs/div)

Switching Waveform



Time (1μs/div)

Switching Waveform

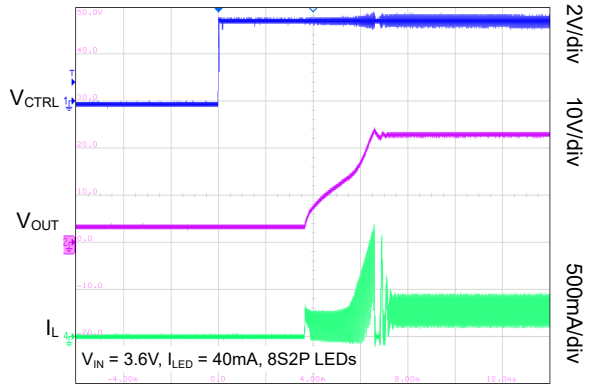


Time (1μs/div)

TYPICAL PERFORMANCE CHARACTERISTICS (continued)

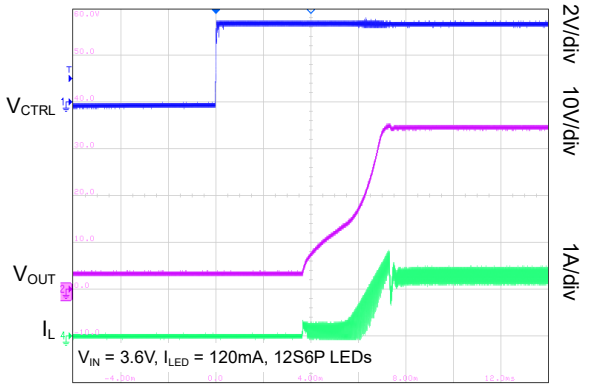
T_A = +25℃, L = 10μH, C_{IN} = 10μF, C_{OUT} = 10μF, unless otherwise noted.

Start-Up



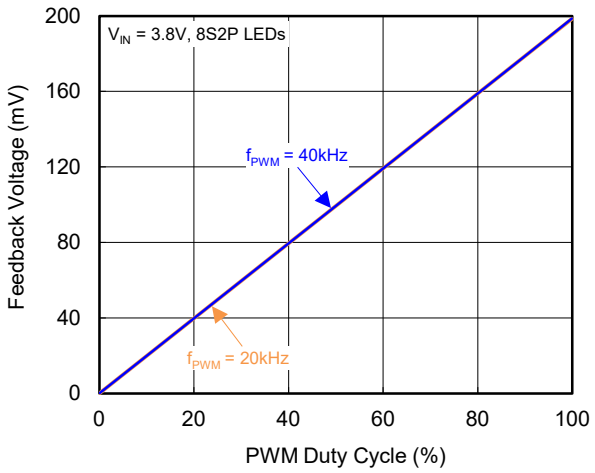
Time (2ms/div)

Start-Up

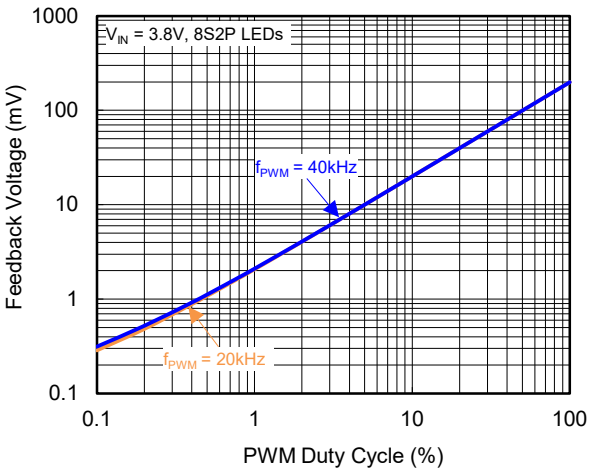


Time (2ms/div)

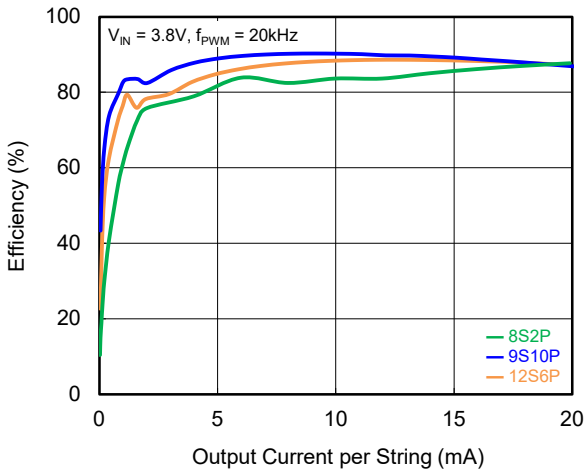
Feedback Voltage vs. PWM Duty Cycle



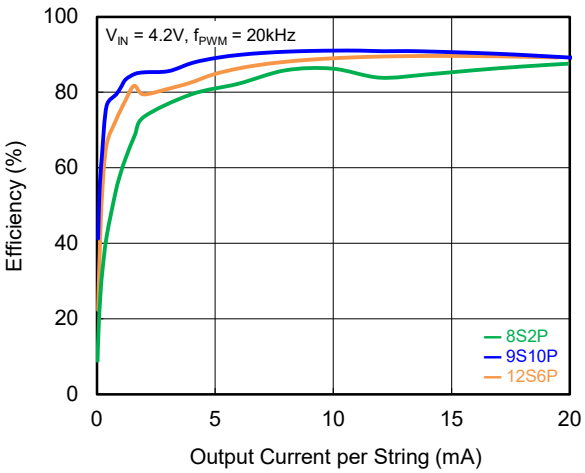
Feedback Voltage vs. PWM Duty Cycle



Efficiency vs. Output Current

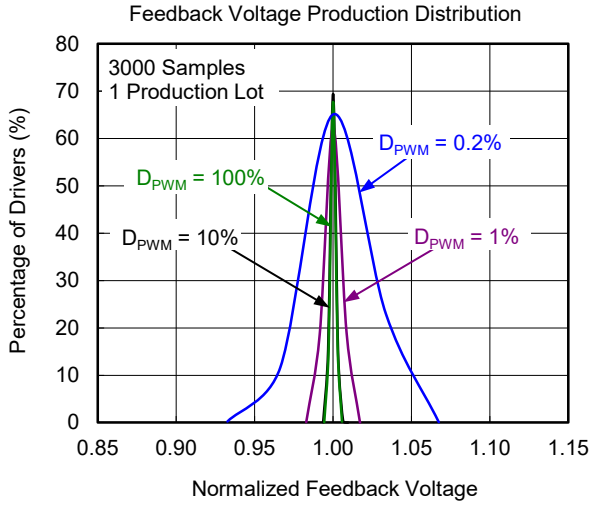


Efficiency vs. Output Current



TYPICAL PERFORMANCE CHARACTERISTICS (continued)

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



FUNCTIONAL BLOCK DIAGRAM

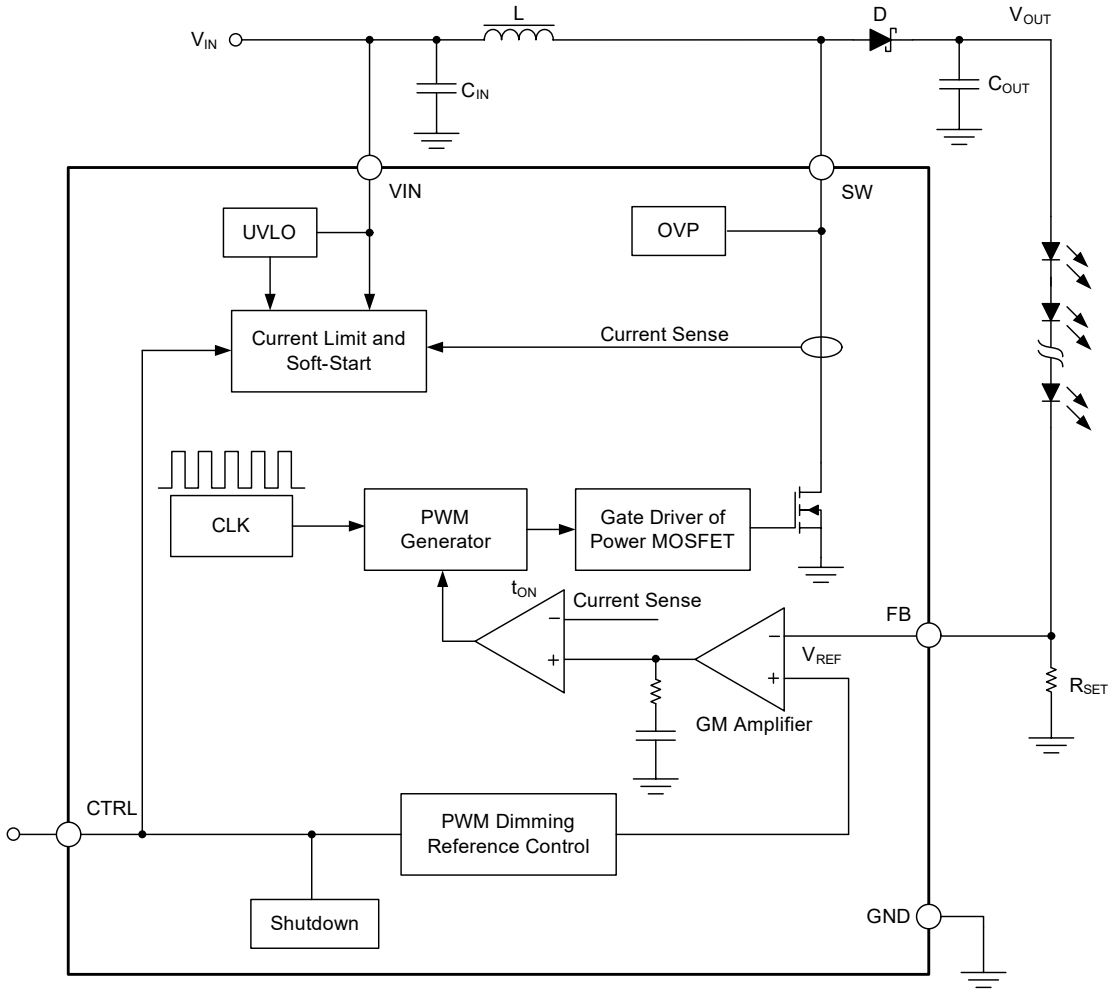


Figure 2. Functional Block Diagram

DETAILED DESCRIPTION

The SGM37410 is an asynchronous Boost converter that operates at 1.1MHz switching frequency and integrates a power FET with peak current limit of 3A. The maximum output voltage can reach 40V. The device is capable of driving LEDs from 1 series to 12 series and the input voltage range is 2.7V to 5.5V. The strong driving capability of the device can drive single or multiple parallel LED strings, which can be used as LED driver for smart phone and tablet backlight.

The SGM37410 operates with peak current control, and the internal compensation circuit greatly reduces the complexity of the design. The loop design can be completed with only one external sampling resistor R_{SET}. Peak current mode controls the on time of the switching FET by comparing the error signal of the internal GM amplifier with the inductance current signal.

Through the duty cycle of the PWM signal added to the CTRL pin, the SGM37410 can set the reference voltage V_{REF}. When the duty cycle is 100%/10%/1%, the typical values of V_{REF} are 200mV/20mV/2mV respectively, and the supported PWM signal has a wide frequency range from 10kHz to 100kHz. It can realize linear dimming in the range of PWM duty cycle 0.2% to 100%.

The SGM37410 also has excellent line regulation and load regulation, as well as excellent load transient response performance. It also has complete protection functions, including open LED protection, OCP protection and thermal shutdown protection. At the same time, the output current can be programmed through the resistor R_{SET} connected to the FB pin.

Soft Start-Up

SGM37410 integrates the soft start-up function to ensure that the output voltage of Boost converter rises slowly by limiting the output voltage of GM amplifier during start-up. This method effectively avoids the surge current. After the start-up is completed, the device switches to the internal reference voltage for closed-loop control.

Open LED Protection

Open LED protection feature shuts off the IC in case of LED or R_{SET} disconnection, which prevents damage to the device. The SGM37410 monitors the voltage of SW pin in each switching cycle. When V_{SW} exceeds V_{OVP} threshold for 8 consecutive cycles, the device turns the switch FET off, and shuts down the IC. The device remains in shutdown until the CTRL pin is toggled to logic high. This function can effectively prevent the device from being damaged when the output voltage exceeds V_{OVP} threshold.

Shutdown

When the CTRL pin remains low voltage for more than 2.5ms, the SGM37410 enters shutdown mode. In shutdown mode, the internal switch FET stops switching, and the device maintains in a low loss condition. At the same time, the minimum forward voltage of the LED array should be kept higher than the maximum input voltage. Otherwise a DC current path is resulted from the inductor and Schottky diode to the LED array.

Current Program

The FB pin voltage V_{FB} depends on the internal reference voltage V_{REF}. At full PWM duty cycle, the typical value of V_{REF} is 200mV. The external programming of LED current can be realized by using the current-sense resistor connected in series with the LED. The R_{SET} resistor value is given by Equation 1:

$$I_{LED} = \frac{V_{FB}}{R_{SET}} \quad (1)$$

where

I_{LED} = sum of LED string(s) current

V_{FB} = FB pin regulation voltage

R_{SET} = current sense resistor.

The FB voltage accuracy and current sense resistor accuracy determines the output current accuracy.

LED Brightness Dimming

The PWM signal applied to the CTRL pin controls the LED current. For PWM dimming signal, the device required PWM frequency range is 10kHz to 100kHz, which can obtain accurate reference voltage and small LED current ripple. The LED brightness dimming can be realized by changing PWM duty cycle. The relationship between duty cycle and FB regulation voltage is calculated by Equation 2:

$$V_{FB} = Duty \times 200mV \quad (2)$$

where

Duty = duty cycle of the PWM signal

200mV = internal reference voltage

DETAILED DESCRIPTION (continued)

The LED brightness is easily adjusted by controlling the duty cycle of the PWM signal applied to CTRL pin. The recommended minimum PWM duty cycle is 0.2% for reliable dimming.

As shown in Figure 3, the SGM37410 adjusts the 200mV reference voltage based on PWM duty cycle of the CTRL pin. The PWM reference voltage is then filtered by the internal RC filter. The RC filter output is then fed to the non-inverting input of the error amplifier. The advantage is that the value of the reference voltage V_{REF} only depends the duty cycle of the PWM signal and does not depend on the amplitude. Under this working principle, although the PWM signal is used for dimming, its essence is an analog dimming. The PWM signal is only used to modulate the reference voltage V_{REF}, which can avoid the occurrence of audible noise.

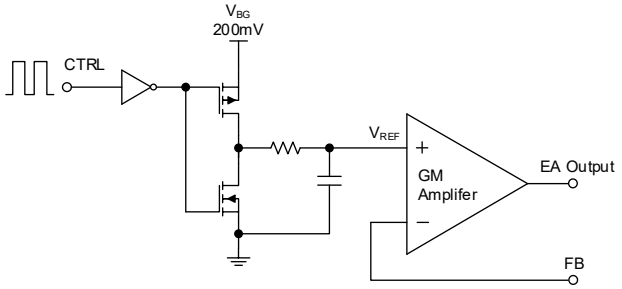


Figure 3. FB Voltage Adjustment via PWM Signal

However, it should be noted that since the reference voltage V_{REF} is obtained by the charge and discharge of the RC low-pass filter, the V_{REF} has a ripple voltage with the same frequency as the PWM signal, which will significantly increase the LED ripple current. With the increase of PWM signal frequency, the ripple voltage of V_{REF} decreases, and the LED ripple current decreases. In the actual design, a 10μF MLCC capacitor can be used as the output capacitor to reduce the LED ripple current.

Under-Voltage Lockout

Under-voltage lockout prevents the device from operating at input voltage below 2.23V (TYP). When V_{IN} falls below 2.23V, the device enters shutdown mode and the internal switch FET is turned off. If V_{IN} reaches 2.38V (TYP), the IC will resume operation.

Thermal Shutdown

When the junction temperature of the IC exceeds +150℃ (TYP), the internal thermal shutdown is triggered and the device enters the shutdown state. When the junction temperature is dropped by 20℃ (TYP), the device will restart and resume operation.

Operation with CTRL

The CTRL pin is an enable control pin with logic high voltage of 1.1V and logic low voltage of 0.4V. When the control voltage of CTRL pin is higher than 1.1V and the input voltage is higher than the UVLO threshold, the device starts up. When the control voltage of CTRL pin is lower than 0.4V, the device enters shutdown mode and the switch FET is turned off.

ADDITIONAL TYPICAL APPLICATIONS

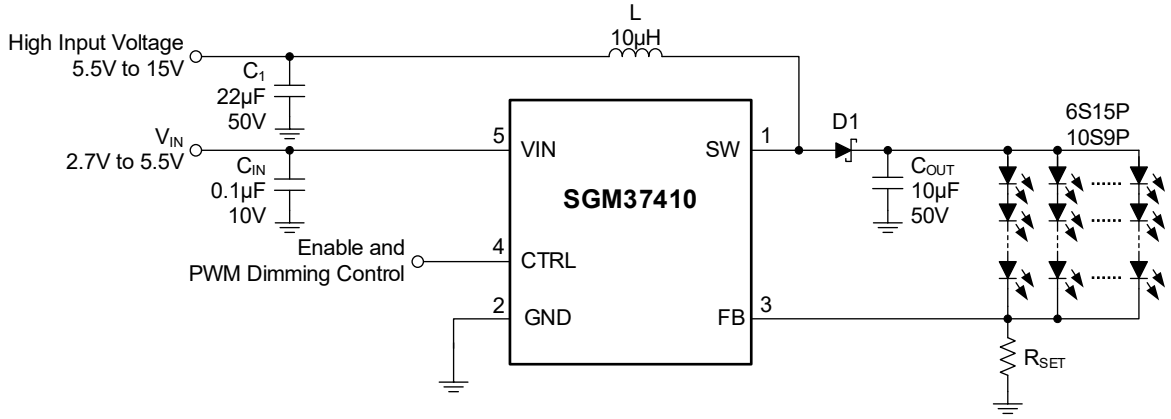


Figure 4. Driving Up to 90 LEDs (6S15P or 10S9P) with High and Low Voltage Power Supplies

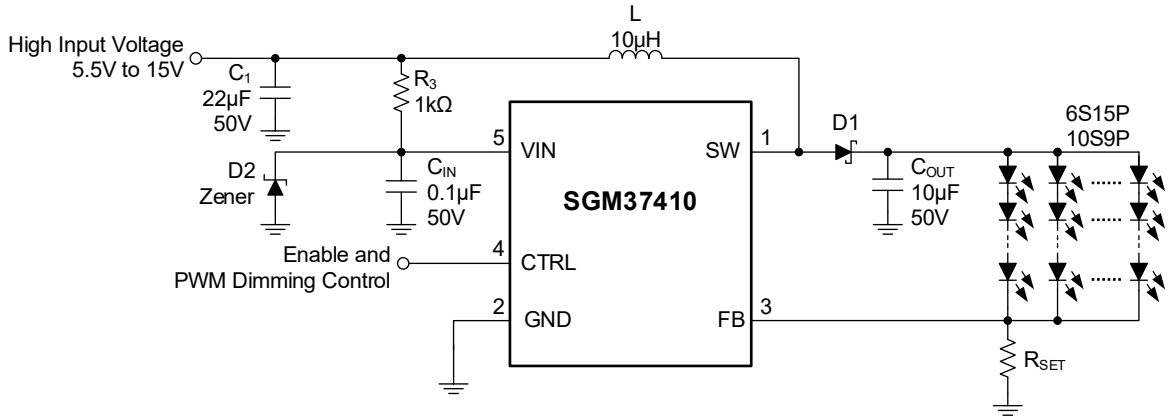


Figure 5. Driving Up to 90 LEDs (6S15P or 10S9P) with a High Voltage Power Supply

ADDITIONAL TYPICAL APPLICATIONS (continued)

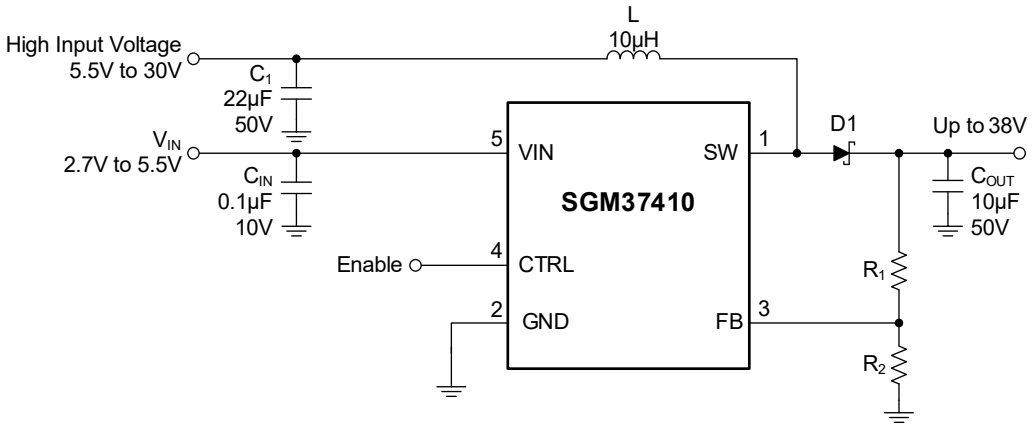


Figure 6. Used as a Constant Output Voltage Boost Converter with High and Low Voltage Power Supplies

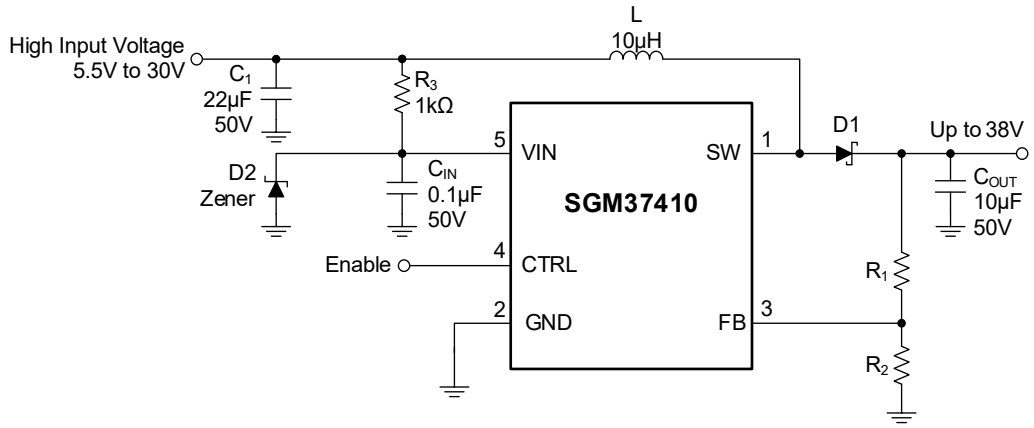


Figure 7. Used as a Constant Output Voltage Boost Converter with a High Voltage Power Supply

APPLICATION INFORMATION

The SGM37410 is a 40V high-efficiency and low EMI Boost DC/DC converter, which supports dimming by changing the duty cycle of the PWM signal applied to CTRL pin. The stable dimming range is 0.2% to 100%. The device has excellent line regulation, load regulation and transient response performance. It can be widely used in various panel backlight lighting.

Design Requirements

In this design example, Table 1 lists the operating conditions. The LED array adopts 3S30P, and the output current of each string of LED is 20mA.

Table 1. Design Parameters

DESIGN PARAMETER	EXAMPLE VALUE
Input Voltage Range	5V
Output, LED Number per String	3
Output, LED String Number	30
Output, LED Current per String	20mA

Inductor Selection

Inductance is an important power device for Boost converter design. Selecting appropriate inductor parameters can ensure that the system has high efficiency and stable steady-state performance. At the same time, it will also affect the system transient response and loop stability. Inductor's DC resistance, saturation current and inductance are important specs for DC/DC design. Large inductance results in small ripple current, which is beneficial to smaller output ripple voltage and higher transmission efficiency. Use Equation 3 to calculate the average inductor current $I_{L(DC)}$:

$$I_{L(DC)} = \frac{V_{OUT} \times I_{OUT}}{V_{IN} \times \eta} \quad (3)$$

where

V_{OUT} = Boost output voltage

I_{OUT} = Boost output current

V_{IN} = Boost input voltage

η = power conversion efficiency.

Use the minimum input voltage, maximum output voltage, and maximum load current to calculate the worst-case average current. The selected inductor should provide a peak to peak ripple current $\Delta I_{L(P-P)}$ to be 30% to 40% of inductor average DC current $I_{L\ (DC)}$ calculated in Equation 3. Use Equation 4 to calculate the peak-to-peak inductor current.

$$\Delta I_{L(P-P)} = \frac{1}{L \times \left(\frac{1}{V_{OUT} - V_{IN}} + \frac{1}{V_{IN}} \right) \times f_S} \quad (4)$$

where

$\Delta I_{L(P-P)}$ = Inductor peak-to-peak ripple

L = Inductor value

f_S = Boost switching frequency

V_{OUT} = Boost output voltage

V_{IN} = Boost input voltage

Use Equation 5 to calculate the peak inductor current.

$$I_{L(P)} = I_{L(DC)} + \frac{\Delta I_{L(P-P)}}{2} \quad (5)$$

The saturation current value of inductor will affect the operation of Boost converter. When the inductor current is close to or higher than the saturation current, the inductance will drop rapidly, which causes the peak inductor current to rise and reach the peak current limit of the IC. The selected inductor's saturation current should maintain a 20% margin, and a 4.7μH to 10μH inductor is recommended for SGM37410.

Schottky Diode Selection

In order to ensure the best efficiency of SGM37410, the selected Schottky diode should have low forward voltage, fast reverse recovery speed, and low junction capacitance. At the same time, the average and peak current ratings of the selected diode should exceed the average output current and peak inductor current. It is recommended to have a 20% current margin. Additionally, the Schottky diode reverse breakdown voltage should be higher than the open LED protection voltage threshold to avoid damage. It is recommended to use ROHM RB160M-60TR for the SGM37410.

APPLICATION INFORMATION (continued)

Output Capacitor Selection

The output capacitance of SGM37410 is used to meet the loop stability and output ripple requirement. At the same time, it affects the loop bandwidth and the transient response performance. MLCC capacitor with low ESR is recommended as the output capacitor. For a given output voltage ripple requirement, the minimum output capacitance value can be calculated according to Equation 6:

$$C_{OUT} = \frac{(V_{OUT} - V_{IN}) \times I_{OUT}}{V_{OUT} \times f_S \times V_{RIPPLE}} \quad (6)$$

where

V_{RIPPLE} = peak-to-peak output ripple.

A 1μF to 10μF MLCC capacitor is recommended for typical application. Since the reference voltage V_{REF} is obtained by filtering the pulse signal, the actual output ripple contains the pulsed ripple, which carries the same frequency as the PWM signal. The interference ripple can be effectively reduced by using 10μF MLCC capacitor. For higher total output current applications, it is recommended to use larger MLCC output capacitor to minimize output ripple.

LED Current Set Resistor

Use Equation 1 to calculate the R_{SET} resistance. Multiple resistors can also be connected in parallel to obtain the required resistance value.

Thermal Considerations

Thermal dissipation of the IC should be considered to design the SGM37410. High IC junction temperature will trigger thermal shutdown. The heat loss is related to the system input and output. Lower input voltage and higher output current leads to more heat loss. The thermal dissipation can be reduced by reasonable layout. The allowable heat loss of device can be determined by Equation 7:

$$P_D = \frac{150℃ - T_A}{\theta_{JA}} \quad (7)$$

where

T_A = the ambient temperature for the application.

θ_{JA} = the thermal resistance junction-to-ambient given under absolute maximum ratings section.

Power Supply Recommendations

The SGM37410 operates with an input voltage range of 2.7V to 5.5V. It is recommended to use 10μF MLCC capacitor as the input capacitor. If the SGM37410 is located far away from the input power supply, an additional high-capacity capacitor is recommended to damp the wiring inductance.

Layout Considerations

Layout design is an important step in all switching power supplies design. Good layout plays a positive role in loop stability, signal integrity and low EMI. Since the switch FET of SGM37410 works at a typical switching frequency of 1.1MHz, its power circuit layout needs to be designed more carefully. The SW node contains high dV/dt and di/dt switching. The area of SW node should be as small as possible, and the input and output loop needs to maintain the minimum loop path, which can effectively suppress the generation of ringing. For the high current path, it should be as wide and short as possible. The input capacitance C_{IN} should be close to VIN pin and GND pin to reduce the influence of parasitic parameters on the line. The inductor and the Schottky diode should be placed close to the SW pin to reduce the area of the SW node, which reduces EMI. The output capacitance C_{OUT} should be as close to V_{OUT} as possible, and the ground of C_{OUT} should be close to GND pin to reduce grounding return. FB resistors should be placed close to FB pin. For signal grounding, it is recommended to route the ground signal away from the power ground plane with small and short traces, and connect the signal ground with power ground via a single point close to the GND pin.

REVISION HISTORY

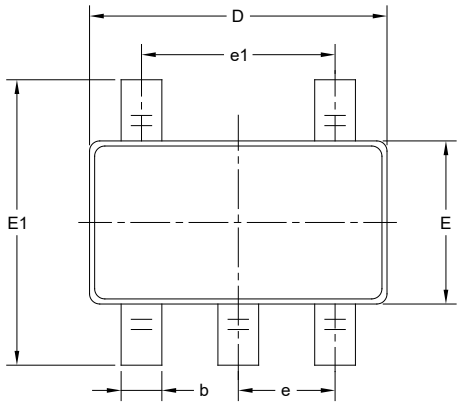
NOTE: Page numbers for previous revisions may differ from page numbers in the current version.

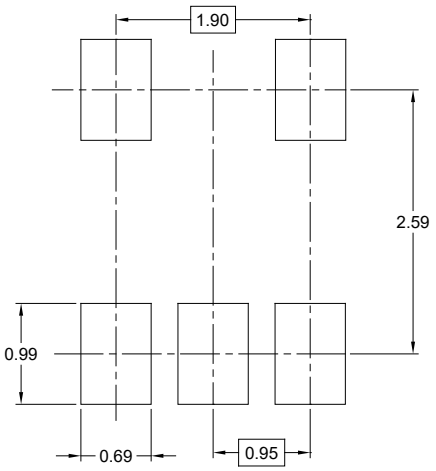
JULY 2026 – REV.A to REV.A.1	Page
Added TSOT-23-5 package	1 ~ 3

Changes from Original to REV.A (SEPTEMBER 2025)	Page
Changed from product preview to production data	All

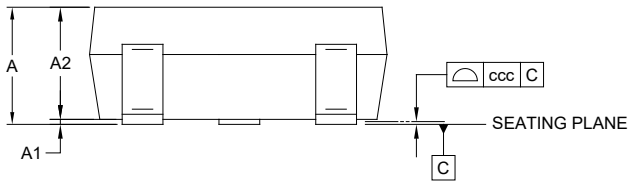
PACKAGE OUTLINE DIMENSIONS

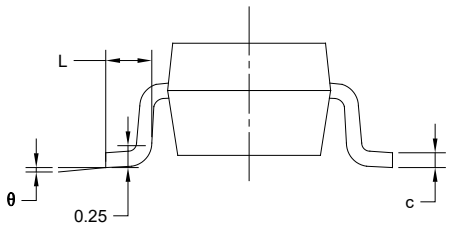
SOT-23-5





RECOMMENDED LAND PATTERN (Unit: mm)



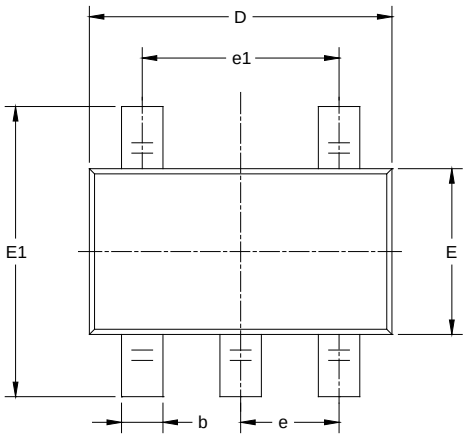


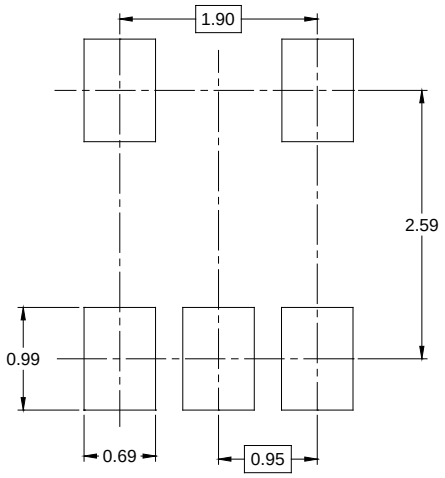
Symbol	Dimensions In Millimeters		
	MIN	NOM	MAX
A	-	-	1.450
A1	0.000	-	0.150
A2	0.900	-	1.300
b	0.300	-	0.500
c	0.080	-	0.220
D	2.750	-	3.050
E	1.450	-	1.750
E1	2.600	-	3.000
e	0.950 BSC		
e1	1.900 BSC		
L	0.300	-	0.600
θ	0°	-	8°
ccc	0.100		

NOTES:
1. This drawing is subject to change without notice.
2. The dimensions do not include mold flashes, protrusions or gate burrs.
3. Reference JEDEC MO-178.

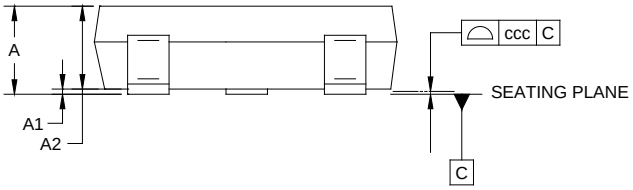
PACKAGE OUTLINE DIMENSIONS

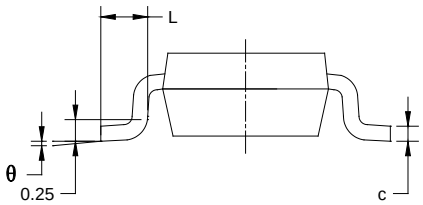
TSOT-23-5





RECOMMENDED LAND PATTERN (Unit: mm)



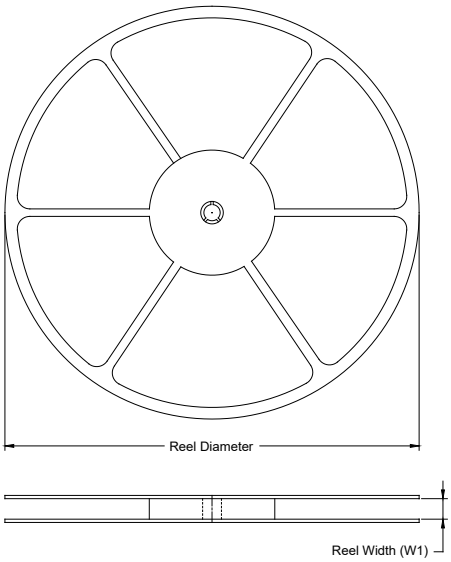


Symbol	Dimensions In Millimeters		
	MIN	NOM	MAX
A	-	-	0.950
A1	0.000	-	0.100
A2	0.700		1.000
b	0.300	-	0.500
c	0.080		0.200
D	2.750	-	3.050
E	1.450	-	1.750
E1	2.600	-	3.000
e	0.950 BSC		
e1	1.900 BSC		
L	0.300	-	0.600
θ	0°	-	8°
ccc	0.100		

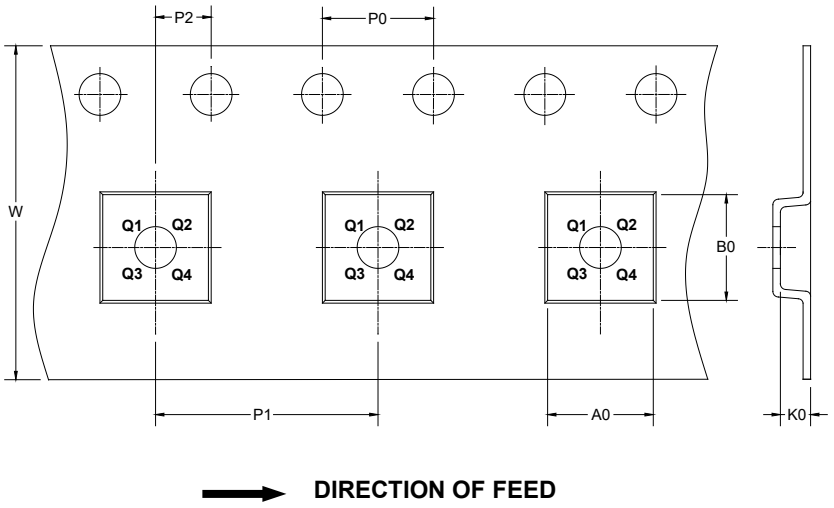
NOTES:
1. This drawing is subject to change without notice.
2. The dimensions do not include mold flashes, protrusions or gate burrs.
3. Reference JEDEC MO-193.

TAPE AND REEL INFORMATION

REEL DIMENSIONS



TAPE DIMENSIONS



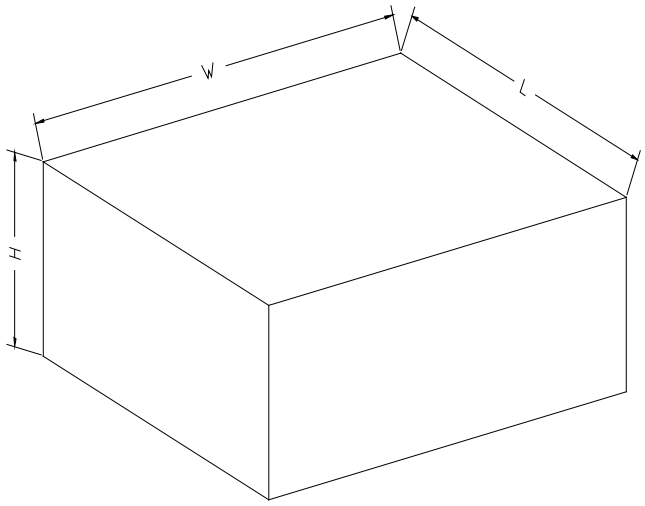
NOTE: The picture is only for reference. Please make the object as the standard.

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
SOT-23-5	7"	9.5	3.20	3.20	1.40	4.0	4.0	2.0	8.0	Q3
TSOT-23-5	7"	9.5	3.17	3.10	1.10	4.0	4.0	2.0	8.0	Q3

DD0001

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

DD0002