Description

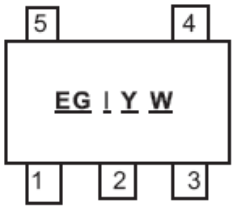
The PAM2800 is a high power white LED driver with 350mA constant rated source current. It features high efficiency and low quiescent current, making it ideal for battery powered applications.

Features

- High Efficiency 92%
- Up to 350mA Constant Source Current
- Low Quiescent Current: Typ. 65μA
- 0.5μA Shutdown Current
- Short Circuit Protection
- Open Load LED Protection
- Thermal Protection
- Space Saving Package SOT23-5
- Pb-Free Package

Pin Assignments

Top View
SOT23-5



Applications

- High Power White LED Driver

Typical Applications Circuit

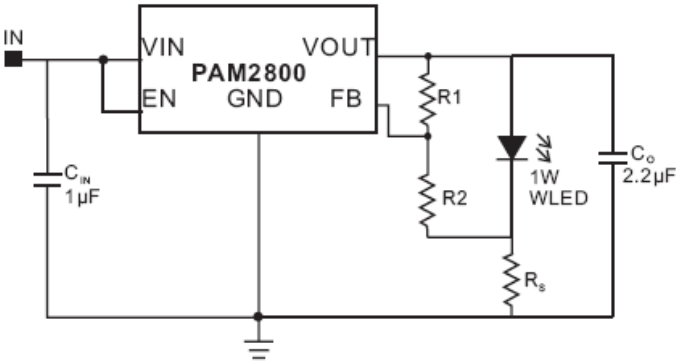
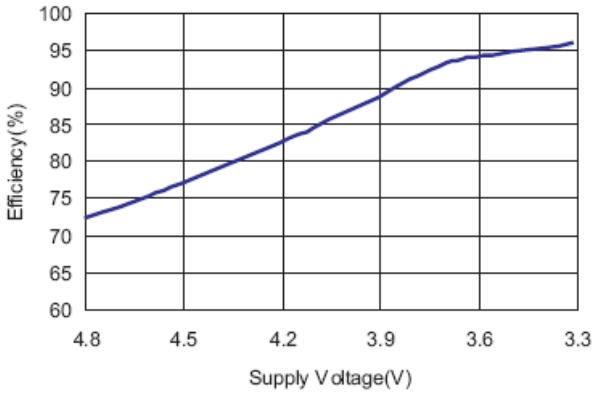


Figure 1



Pin Description

Pin Number	Pin Name	Function
1	VIN	Input
2	GND	Ground
3	EN	Chip Enable (Active High)
4	FB	Feedback
5	VOUT	Output

Absolute Maximum Ratings (@T_A = +25°C, unless otherwise specified.)

These are stress ratings only and functional operation is not implied. Exposure to absolute maximum ratings for prolonged time periods may affect device reliability. All voltages are with respect to ground.

Parameter	Rating	Unit
Input Voltage	6	V
Output Current	350	mA
Output Pin Voltage	GND -0.3 to V_{IN} +0.3	V
Lead Soldering Temperature	300, (5sec)	°C
Storage Temperature	-65 to +150	°C

Recommended Operating Conditions (@T_A = +25°C, unless otherwise specified.)

Parameter	Rating	Unit
Maximum Supply Voltage	5.5	V
Junction Temperature	-40 to +125	°C
Operation Temperature	-40 to +85	

Thermal Information

Parameter	Symbol	Package	Max	Unit
Thermal Resistance (Junction to Case)	θ_{JC}	SOT23-5	130	°C/W
Thermal Resistance (Junction to Ambient)	θ_{JA}	SOT23-5	250	
Internal Power Dissipation	P_D	SOT23-5	400	mW

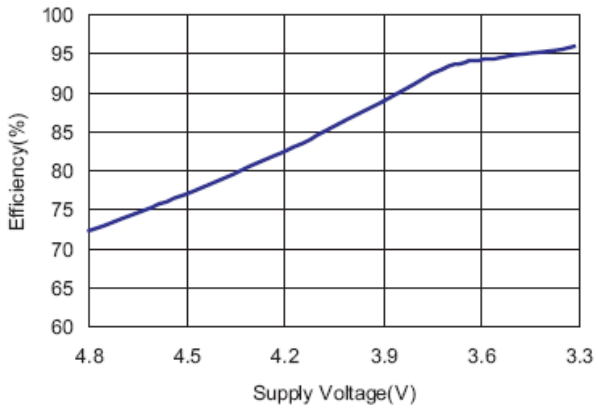
Electrical Characteristics (@T_A = +25°C, V_{IN} = 3.7V, C_{IN} = 1μF, C_O = 2.2μF, unless otherwise specified.)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Input Voltage	V_{IN}				5.5	V
Output Current	I_O		300			mA
Quiescent Current	I_Q	No Load		65	90	μA
Efficiency			90	92		%
Over Temperature Shutdown	OTS	I_O = 1mA		150		°C
Over Temperature Hysteresis	OTH	I_O = 1mA		30		°C

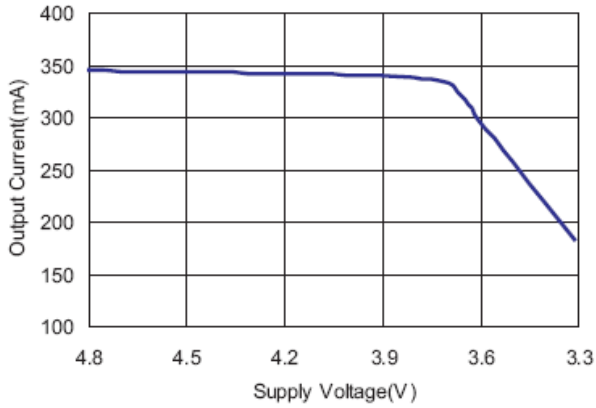
Typical Performance Characteristics

(@T_A = +25°C, C_{IN} =1μF, C_O = 2.2μF, R1 = 62kΩ, R2 = 33kΩ, RS = 0.22Ω, unless otherwise specified.)

Efficiency vs Supply Voltage



Output Current vs Supply Voltage



Application Information

In the typical application (see Figure 1), the LED current will come to constant current level little by little after the device is powered. A 62KΩ resistor is recommended for R1, the value for R2 should be adjusted around 33KΩ due to LED forward voltage from lot-to-lot or brand-to-brand.

Power Dissipation and Thermal Consideration

Thermal protection limits power dissipation in the PAM2800. When the operation junction temperature exceeds +150°C, the OTP (Over Temperature Protection) starts the thermal shutdown and turns the pass transistor off. The pass transistor resumes operation after the junction temperature drops below +120°C.

For continuous operation, the junction temperature should be maintained below +125°C. The power dissipation is defined as:

$$P_D = (V_{IN} - V_{OUT}) * I_O + V_{IN} * I_{GND}$$

The maximum power dissipation depends on the thermal resistance of IC package, PCB layout, the rate of surrounding airflow and temperature difference between junction and ambient. The maximum power dissipation can be calculated by the following formula:

$$P_{D(MAX)} = (T_{J(MAX)} - T_A) / \theta_{JA}$$

Where $T_{J(MAX)}$ is the maximum operation junction temperature +125°C. T_A is the ambient temperature, and is the thermal resistance from the junction to the ambient.

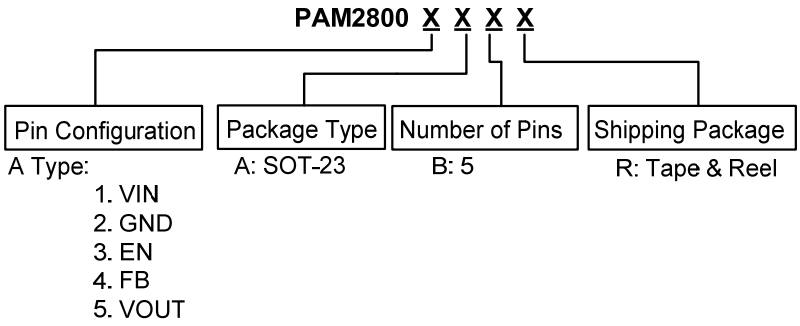
For example, as θ_{JA} is +250°C/W for SOT-23, based on the standard JEDEC 51-3 for a single layer thermal test board, the maximum power dissipation for SOT-23 package at T_A = +25°C can be calculated by following formula:

$$P_{D(MAX)} = (125°C - 25°C) / 250 = 0.4W$$

To calculate the junction temperature of the PAM2800 SOT-23 package, if we use input voltage V_{IN} = 4V at an output current I_O = 300mA and the case temperature T_A = 40°C measured by the thermal couple while operating, the power dissipation is defined as:

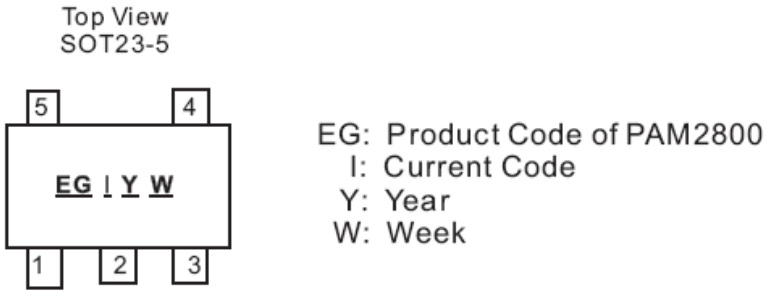
$$P_D = (4V - 2.8V) * 300mA + 4V * 70\mu A \approx 360mW$$

Ordering Information



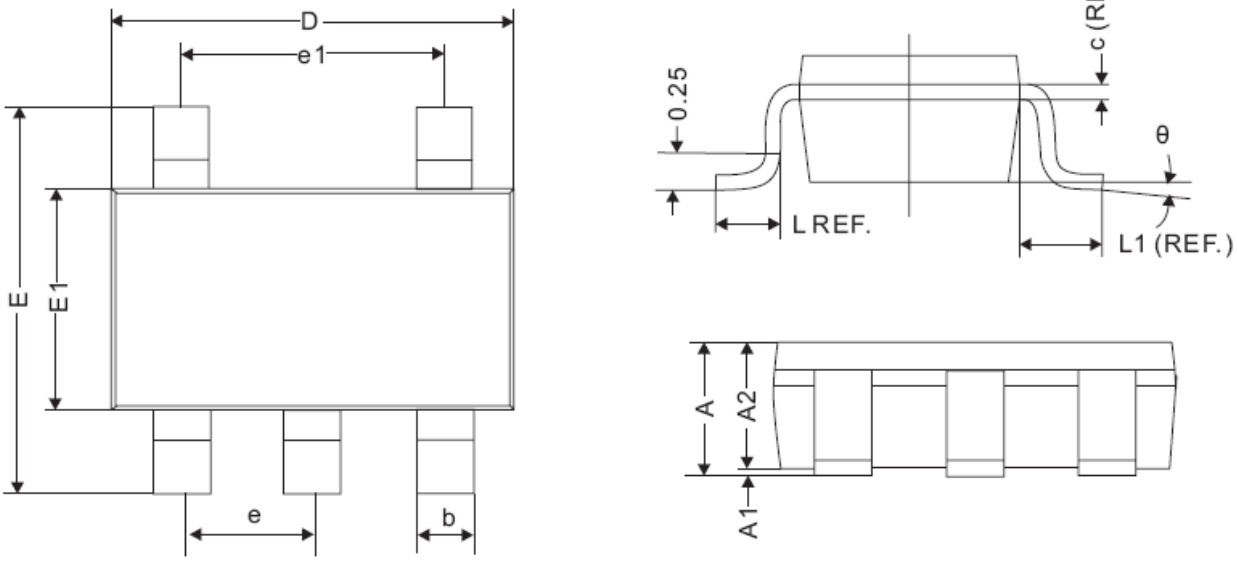
Part Number	Output Current	Marking	Package Type	Standard Package
PAM2800AABR	350mA	EGAYW	SOT23-5	3000 Units/Tape&Reel

Marking Information



Package Outline Dimensions (All dimensions in mm.)

SOT23-5



REF.	Millimeter	
	Min	Max
A	1.10MAX	
A1	0	0.10
A2	0.70	1
c	0.12REF.	
D	2.70	3.10
E	2.60	3.00
E1	1.40	1.80
L	0.45REF.	
L1	0.60REF.	
θ	0°	10°
b	0.30	0.50
e	0.95REF.	
e1	1.90REF.	

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