QW2889C

Emergency Lighting Driver

General Description

QW2889C is a LED driver designed for Emergency Lighting. The QW2889C employs patent protected main line detecting methodology to control and drive the emergency lighting system, without any peripheral components. The QW2889C can drive an LED load directly or to enable a boost circuitry, while the AC input main line could be 85-265Vac.

With Patented AC main line detection, the N or L line is compatible in QW2889C system. QW2889C integrates a precise single lithium-ion /polymer battery management functional blocks to protect the lithium-ion/polymer battery, including Over Charge Protection, Over Discharge Protection.

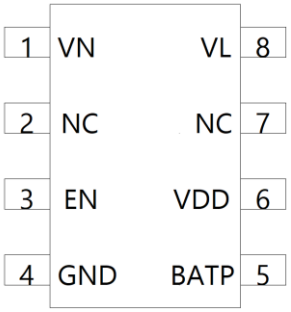
QW2889C output current in emergency state could be dimmable according the switch ON/OFF delay time.

QW2889C can deliver directly output current. QW2889C is available in SOP-8 package.

Features

- Simplified application circuitry
- AC main line detecting directly
- 85-265Vac Input
- EN PIN drive LED load directly
- Integrated single lithium-ion/polymer battery management and protection
- Dimmable in DC mode
- L/N Mixing

Package Reference



Applications

- Emergency lighting
- Stand-by Lighting

Typical application schematic

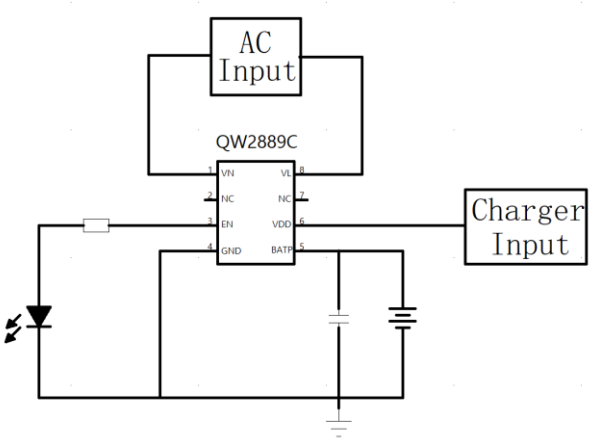
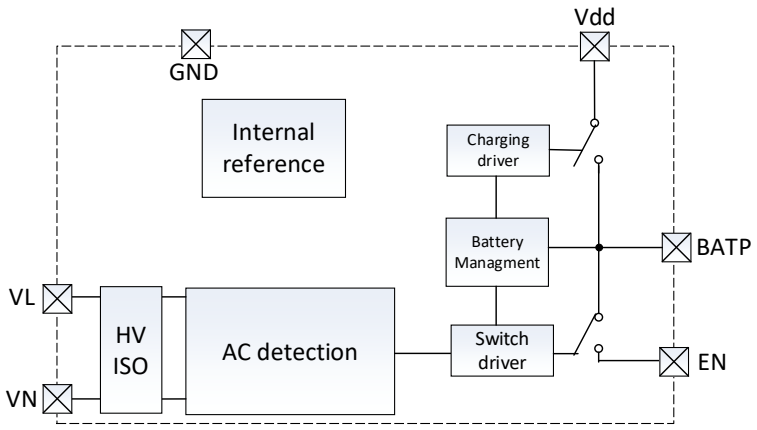


Fig1 QW2889C typical application schematic

PIN FUNCTIONS

PIN #	PIN NAME	FUNCTION
1	VN	AC main input
2	NC	
3	EN	Output
4	GND	Ground / Battery Negative
5	BATP	Battery Positive
6	VDD	Charger input
7	NC	
8	VL	AC main input

Functional Blocks



ABSOLUTE MAXIMUM RATINGS (@T_A= +25°C, unless otherwise specified.)

Parameter	Symbol	Value	Units
V_BATP	Vbatp	-0.3 to +10V	V
V_EN	Ven	-0.3 to +7V	V
VL, VN	VL, Vn	-0.3 to +600V	V
Junction Temperature	TJ	-65 to +150	ºC
Storage Temperature	TSTG	-65 to +150	ºC
Thermal Resistance(Note 5)	θJA	120	°C/W
Lead Temperature (Soldering, 10sec)	TLEAD	+300	ºC
ESD (Machine Model)	–	200	V
ESD (Human Body Model))	–	2000	V

Recommended Operating Conditions

Symbol	Parameter	Min	Max	Unit
T_A		-40	+105	°C

Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

Parameter	Symbol	Condition	Min	Typical	Max	Unit
Standby current Section						
Standby current	I_{CC}	V_{CC} =3.7V		50	–	uA
MOSFET Switch Section						
EN switch resistance	R_{DSEN}	–	–	0.2	–	Ω
Charging switch resistance	R_{DSCHRG}			0.35		Ω
AC detect Section						
Enable threshold resistance			500	1000		KΩ
Battery management Section						
Floating charging voltage		–	4.2	4.25	4.3	V
Over Charge Release Voltage			3.8	3.85	3.9	
Over Discharge Voltage			2.65	2.75	2.85	
Over Discharge Release Voltage			3.05	3.15	3.25	V
Over Charge Delay				60	200	mS
Over Discharge Delay				20	60	mS

Application

- **AC main line detection**

QW2889C is an ASIC for LED emergency lighting. The output PIN EN switch is turned on if the resistance between VL and VN is less than the threshold resistance, while there is no AC power signal. If the AC power is detected or the resistance between VL and VN is larger than the threshold, the EN PIN is high impedance state.

AC input	EN	NOTE
AC power	High impedance	
AC open	High impedance	
AC short	High level (battery voltage)	Resistance is less than threshold

- **Battery Management**

The QW2889C is internally integrated with a complete single lithium battery protection module to support the recharge of 0V batteries. When the battery voltage is between 0 and 2V, the charging current is charged to the battery by an internal resistance equivalent of 100 ohms. When the battery voltage is greater than 2V, the charging current is determined by the external charging source.

- **Output current**

In order to set the LED current, a ballast resister could be added between EN PIN and LED load. The internal MOSFET resistance is 200mohm.

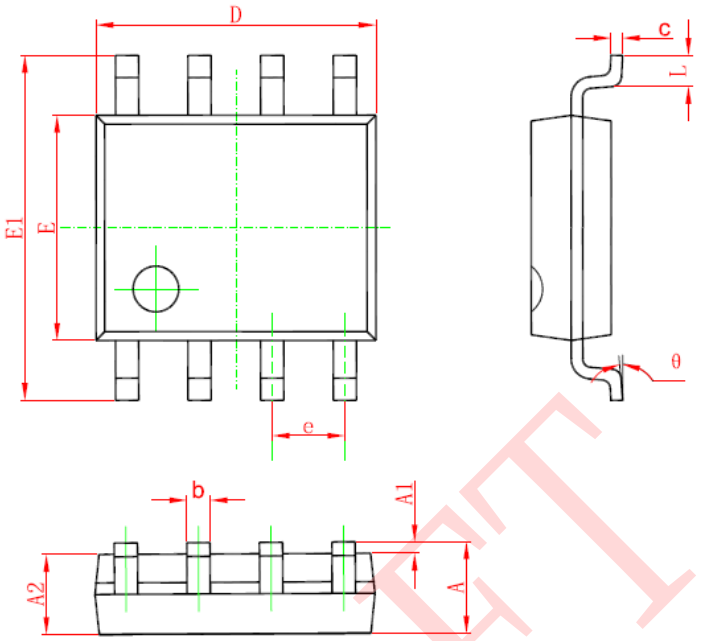
- **LN Mixing**

QW2889C has Neutral-Live line mixing automatic identification function. In the parallel use of multiple emergency lamps, the neutral line or the live line is functionally same, that makes all the parallel lamps work normally. To synchronize all the parallel lamps, the AC switch would be switched off and on within 1 second.

- **Dimming in DC mode**

QW2889C internal integrated emergency dimming module, in emergency mode 5S internal switch, will make the chip into dimming mode, brightness is 100%-50%-25%, in turn cycle. If the switch switching time is greater than 5S, the brightness is 100% each time it is turned on. At the same time at any brightness after a switch on AC, again into the emergency state brightness also default to 100%.

Package Type



symbol	UNIT (mm)		UNIT (mm)	
	Min	Max	Min	Max
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.006	0.010
D	4.700	5.100	0.185	0.200
E	3.800	4.000	0.150	0.157
E1	5.800	6.200	0.228	0.244
e	1.270 (BSC)		0.050 (BSC)	
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°