

### General Description

The MP1025 is a Power IC that offers a complete solution for driving a single Cold Cathode Fluorescent Lamp (CCFL). This device converts unregulated DC voltage to a nearly pure sine wave required to ignite and operate the CCFL.

Based on proprietary power topology and control techniques (patents pending), it greatly increases the power conversion efficiency. The MP1025 supports both analog and burst mode dimming simplifying the module implementation. The MP1025 offers these distinct performance advantages:

1. More light for less power
2. Small board implementation
3. Low RF emission
4. Low cost external components

### Features

- $V_{IN}$  Operation from 3.0V to 3.6V
- Open lamp timer and regulation
- Current and Voltage feedback control
- Logic Level burst mode control
- 3.0V to 5.5V power input
- Can operate right off the LI Ion battery
- Supports Open/Short Lamp protection
- Soft Start
- Outputs are short circuit protected
- Allows Burst-Mode Operation
- Improved line transient response
- Tightened lamp current accuracy
- **Evaluation Board Available**

### Applications

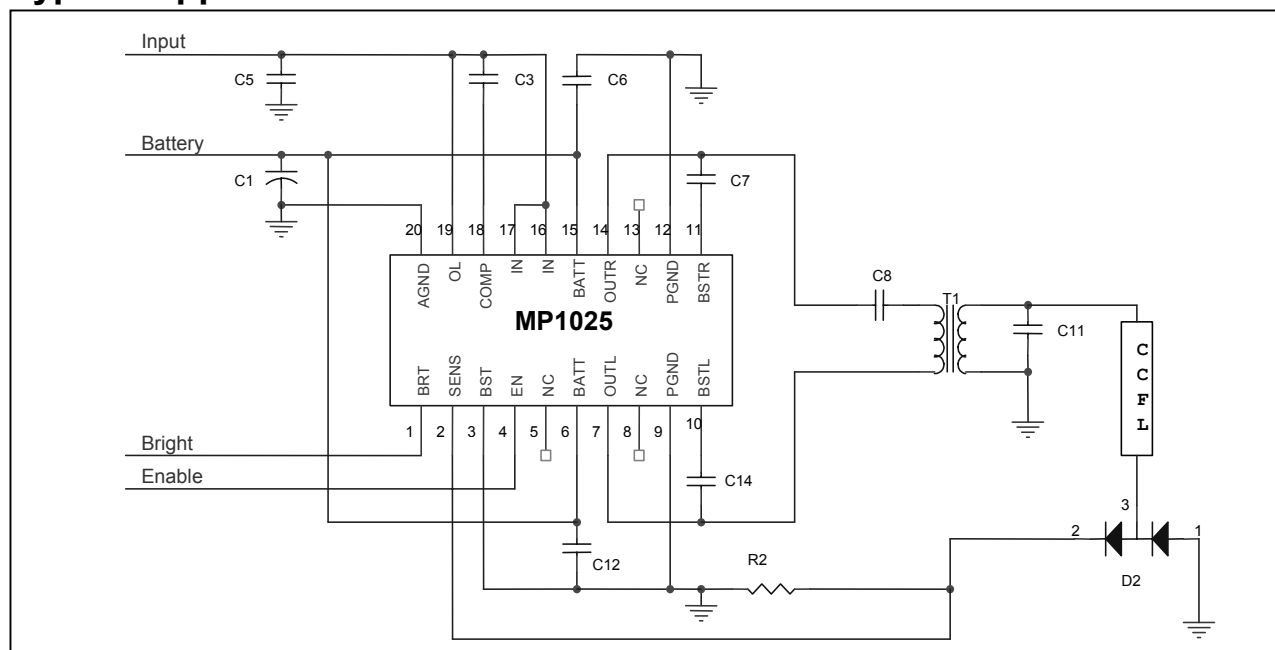
- LCD backlight inverter for handheld display applications similar to PDAs, Camcorders, Digital cameras, GPS

### Ordering Information

Part Number *	Package	Temperature
MP1025EM	TSSOP20	-20°C to + 85°C
<a href="#">EV0004</a>	Evaluation Board	

\* For Tape & Reel use suffix - Z (e.g MP1025EM-Z)

### Typical Application Circuit



### Absolute Maximum Ratings

$V_{IN}, V_{BATT}$	6 V
Power Dissipation	1.0 W
Logic Inputs	-0.3V to $V_{IN}+0.3V$
Junction Temperature	150°C
Lead Temperature (Solder)	260°C
Storage Temperature	-55°C to 150°C

### Recommended Operating Conditions

Input Voltage $V_{BATT}$	3.0V to 5.5V
Supply Voltage $V_{IN}$	3.0V to 3.6V
Enable Voltage $V_{EN}$	0V to $V_{IN}$
Brightness Voltage $V_{BRT}$	0V to 1.0V
Operating Frequency	30~120KHz
Operating Temperature	-20°C to + 85°C

### Thermal Characteristics

Thermal Resistance $\theta_{JA}$	140°C/W
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### **Electrical Characteristics** (Unless otherwise specified $V_{BATT} = 5V, V_{IN} = 3.3V, T_A=25^\circ C$ )

Parameters	Symbol	Condition	Min	Typ	Max	Units
<b>Voltage Supply</b>						
$V_{BATT}$ Operating Range	$V_{BATT}$	(Note 1)	3.0		5.5	V
$V_{IN}$ Operating Range	$V_{IN}$		3.0		3.6	V
$V_{IN}$ Off Current	$I_{IN(OFF)}$	$V_{EN}=0V, V_{IN}=3.3V, V_{BATT}=5V$		50	80	$\mu A$
$V_{BATT}$ Off Current	$I_{BATT(OFF)}$	$V_{EN}=0V, V_{BATT}=5.5V$		3	10	$\mu A$
$V_{IN}$ Current (Operating)	$I_{IN(ON)}$	$V_{IN}=3.3V, V_{BATT}=5.0V$		1.4	2.0	mA
<b>Shutdown Logic</b>						
Open Lamp Detect	$V_{OL}$	$V_{IN}$		0.7		V
Enable Voltage Low	$V_{IL}$	(Note 3)			0.6	V
Enable Voltage High	$V_{IH}$		2.0			V
<b>Burst Logic</b>						
Burst Pin Threshold	$V_{TH}$			1.1		V
Input Bias Current	$I_{IN}$			1		$\mu A$
<b>Output Drivers</b>						
On Resistance	$R_{ON}$	$V_{IN} = 3.3V$ (Note 2)	0.11	0.14	0.17	$\Omega$
Short Circuit Current	$I_{SC}$			4		A
$T_{ON(MIN)}$ @ $V_{IN}=3V$		$V_{BATT}=5V, V_{COMP}=0V$	850	1200	1550	nS
$T_{ON(MIN)}$ @ $V_{IN}=3.6V$		$V_{BATT}=5V, V_{COMP}=0V$	750	950	1200	nS
<b>Brightness Control</b>						
Sense Full Brightness	$V_{SENS}$	$V_{BRT} = 1.0V$	210	235	260	mV
Sense Full Dim	$V_{SENS}$	$V_{BRT} = 0V$	50	60	70	mV
Lamp Current Regulation		$3.0V < V_{BATT} < 5V$		3	5	%

Note 1: Recommended Maximum Primary leakage Inductance is 25 $\mu H$ .  
(If this cannot be met, consult the factory for alternatives)

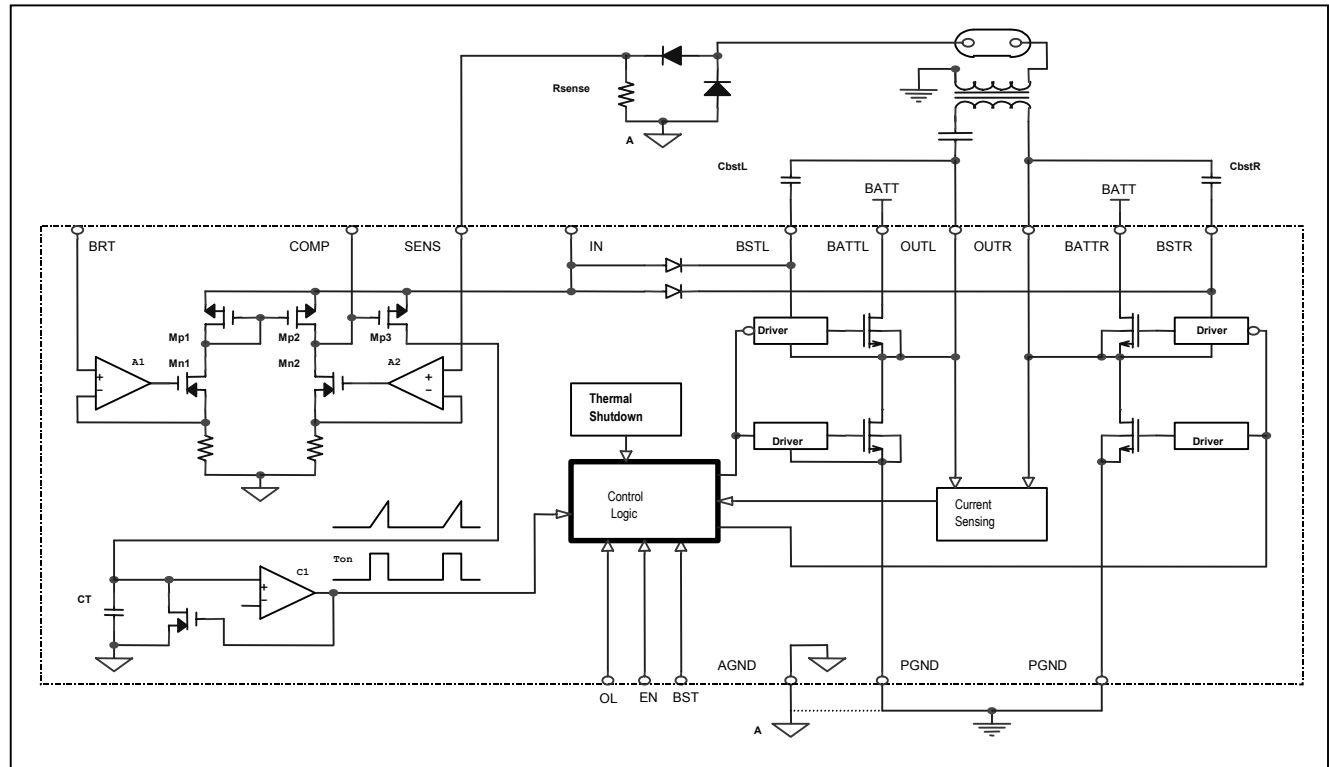
Note 2: This parameter is guaranteed by design

Note 3: During startup,  $V_{IN}$  must be  $\geq 3V$  before Enable reaches 1.1V.

## Pin Description

Pin Name	Pin Name	Pin Function
1	BRT	Dimming Control: 0 volts is full Dim and 1V is full brightness
2	SENS	Lamp current feedback sense input, 0.235V DC is full current
3	BST	For burst mode, the pin is switched between 0V and $V_{IN}$ . When not using burst mode, then pin must be tied to ground.
4	EN	The enable will turn the chip on/off. Do not float this pin.
5	NC	No Connect
6	BATT	Battery Voltage Input
7	OUTL	Output to Load (tank circuit)
8	NC	No Connect
9	PGND	Power Ground
10	BSTL	Regulated output voltage for boost cap on phase L
11	BSTR	Regulated output voltage for boost cap on phase R
12	PGND	Power Ground
13	NC	No Connect
14	OUTR	Output to Load (tank circuit)
15	BATT	Battery Voltage Input
16	IN	Supply Voltage
17	IN	Supply Voltage
18	COMP	Loop compensation cap
19	OL	Latching shutdown for open lamp or low battery
20	AGND	Small signal ground

### Functional Block Diagram

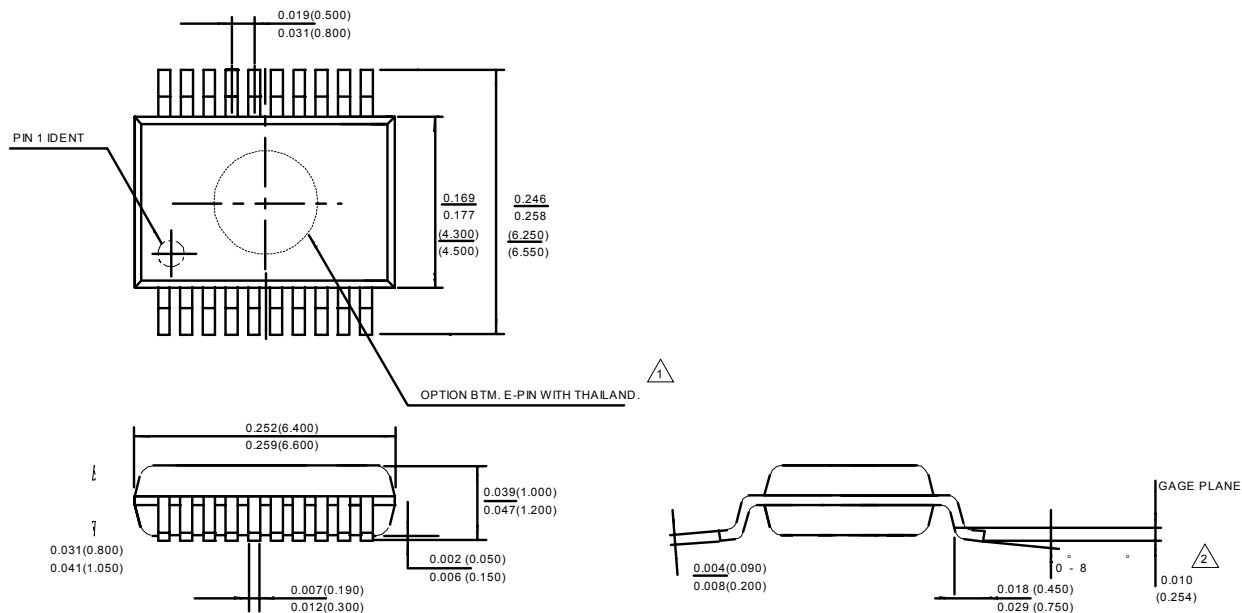


### Truth Table

Enable	Burst	Output L / R
L	X	High Z
H	H	0V (Standby)
L	X	High Z
H	L	Normal Operation

### Packaging Information

#### TSSOP20



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