

General Description

The TD1071 is an integrated power supply solution optimized for small to medium size thin-film transistor (TFT) liquid crystal displays (LCD's). Primarily intended for smart phone and tablet LCD panel's driver IC.

The positive charge pump has an internal switch and typically can support output current up to 100mA at $V_{CI}=3.3V$.

Negative charge pump has an internal switch to generate -1 ratio of VSN and typically can support output current up to 100mA at $V_{CI}=3.3V$.

The pump clock can be synchronized with external signal from driver IC or can be generated by internal circuit fixed to 600kHz.

The TD1071 is available in a thin 12-pin 2.4x1.5 mm UTDFN green package.

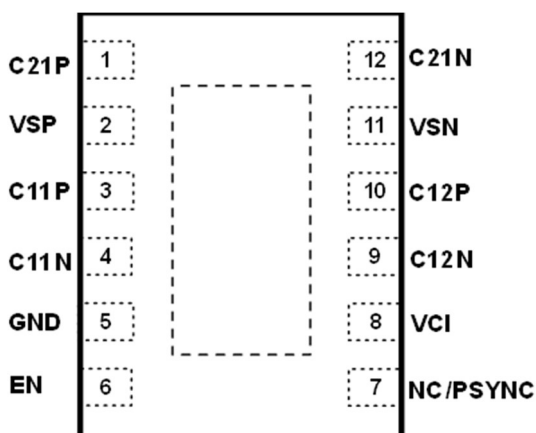
Features

- 2.5V to 4.8V Input Supply
- Generate two output voltage, positive voltage (VSP) and -1 ratio of negative voltage(VSN)
- Only 5 external capacitors
- UTDFN-12 (2.4mmx1.5mm) Exposed Pad
- Package

Applications

- TFT LCD for smart phone and tablet LCD panel's driver IC

Pin Configurations



(Top view)

Pin Description

Pin No.	Pin Name	I/O	Pin Function
1	C21P	I	Capacitor connection pin for the VSN.
2	VSP	O	Positive voltage output pin (VSP).
3	C11P	I	Capacitor connection pin for the VSP.
4	C11N	I	Capacitor connection pin for the VSP.
5	GND	P	Ground pin.
6	EN	I	Enable pin.
7	PSYNC	I	PSYNC pin connect with GND or use external clock from driver IC for TD1071
8	VCI	P	Power supply input pin.
9	C12N	I	Capacitor connection pin for the VSP.
10	C12P	I	Capacitor connection pin for the VSP.
11	VSN	O	Negative voltage output pin (VSN).
12	C21N	I	Capacitor connection pin for the VSN.

Function Block Diagram

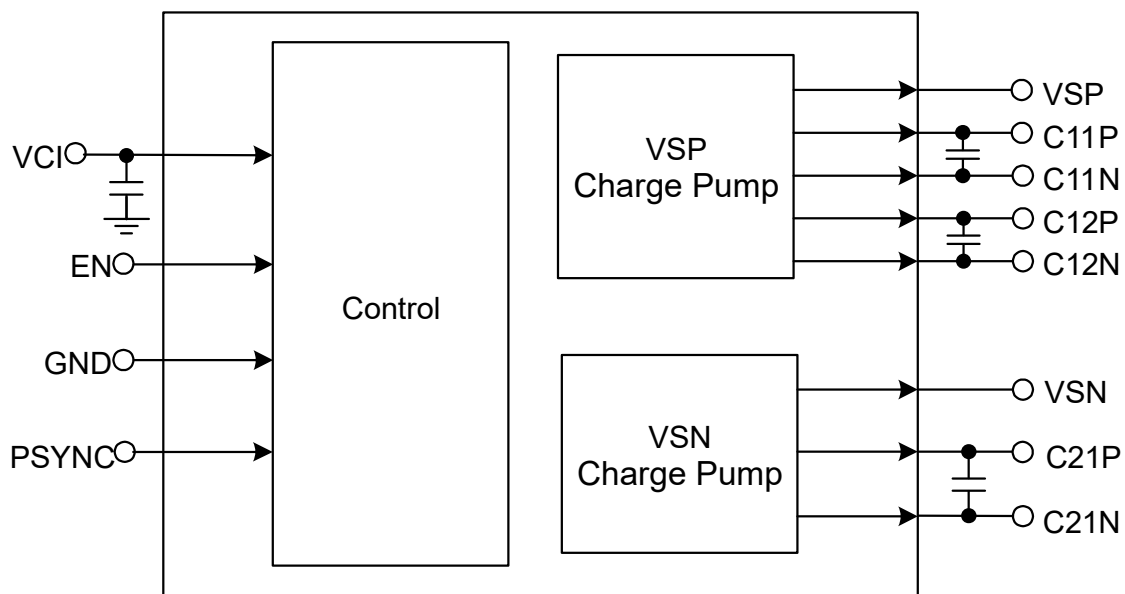


Figure 1. Block Diagram of TD1071

Typical Application Circuit

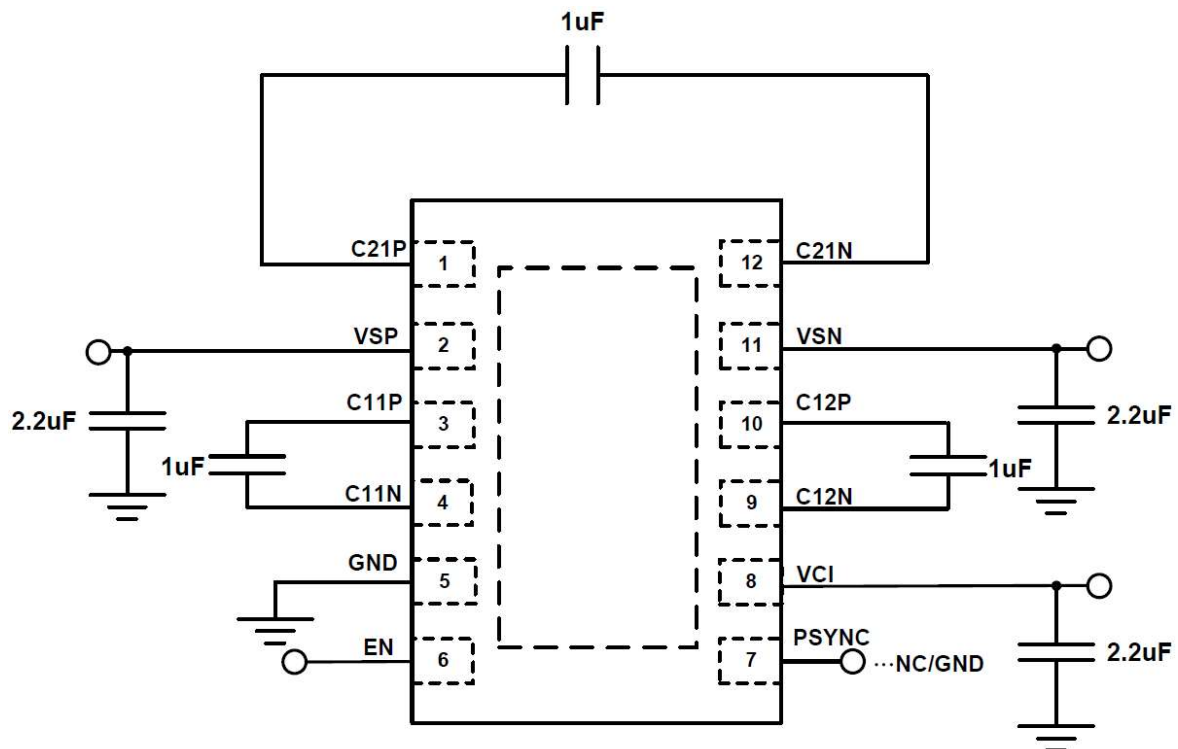


Figure 2. Pump clock fixed to 600 kHz (generated by internal circuit) for TD1071

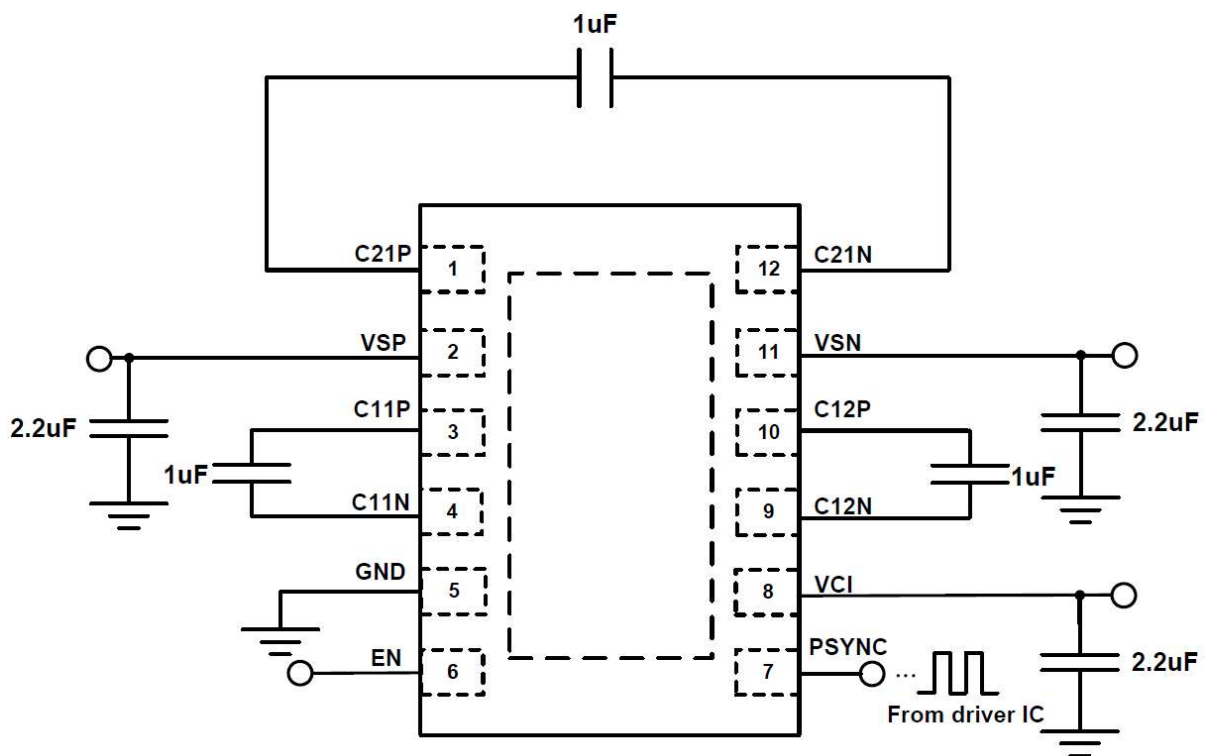


Figure 3. Pump clock synchronized with driver IC(Duty=50%) for TD1071

Integrated Switch Dual Channel Charge Pump

TD1071

ABSOLUTE MAXIMUM RATINGS_(Note 1)

- VCI ----- -0.3V to 6V
- Control signal voltage ----- -0.3V to 6V
- VSP ----- 0V to 6V
- VSN ----- 0V to -6V
- Operating Junction Temperature Range (T_J) ----- -40°C to +125°C
- Operating Temperature Range (T_{OP}) ----- -40°C to +85°C
- Storage Temperature Range ----- -55°C to +150°C
- Lead soldering Temperature Range (10 seconds) ----- 245°C

Note 1: Stresses listed as the above “Absolute Maximum Ratings” may cause permanent damage to the device. These are for stress ratings. Functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may remain possibility to affect device reliability.

Electrical Characteristics

(V_{IN}=3V, T_A=-40°C to 85°C, unless otherwise specified. Typical values are tested at 25°C ambient temperature).

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Power Supply						
Input Voltage	V _{CI}		2.5	-	4.8	V
VCI Under Voltage Lockout (UVLO)	V _{UVLO}	VCI Rising	2	2.2	2.4	V
		Hysteresis	-	200	-	mV
Standby Current	I _{STANDBY}		-	-	2	uA
Output Voltage VSP						
Output Voltage Range	V _{SP}	VCI=3V. Io=0mA	5.6	-	6	V
Output Current Capability		VCI=2.8V	-	35	-	mA
		VCI=3V	-	60	-	mA
		VCI=3.3V	-	100	-	mA
Output Voltage VSN						
Output Voltage Range	V _{SN}	VCI=3V. Io=0mA	-5.6		-6	V
Output Current Capability		VCI=2.8V	-	35	-	mA
		VCI=3V	-	60	-	mA
		VCI=3.3V	-	100	-	mA
LOGIC EN/PSYNC						
Threshold Voltage	VIH		1.5	-	-	V
	VIL		-	-	0.5	V
PSYNC Frequency			50	-	-	kHz
Internal Pump Clock Frequency			-	600	-	kHz
Enable Pull down Resistor			-	300	-	kΩ

Power On/Off Sequence

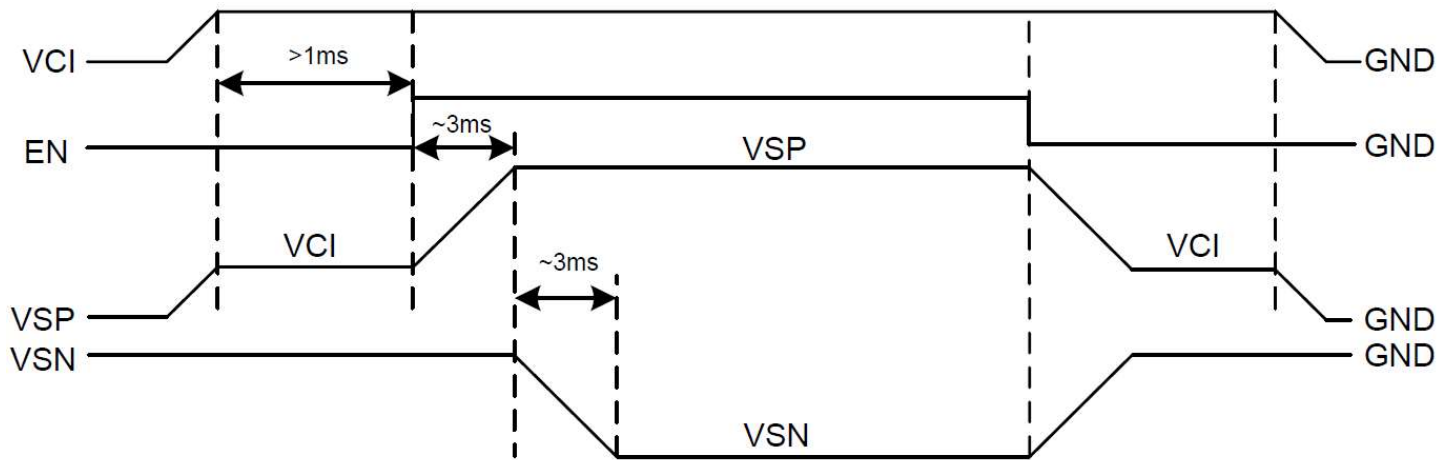


Figure 4. Power sequence of pump clock used internal circuit for TD1071

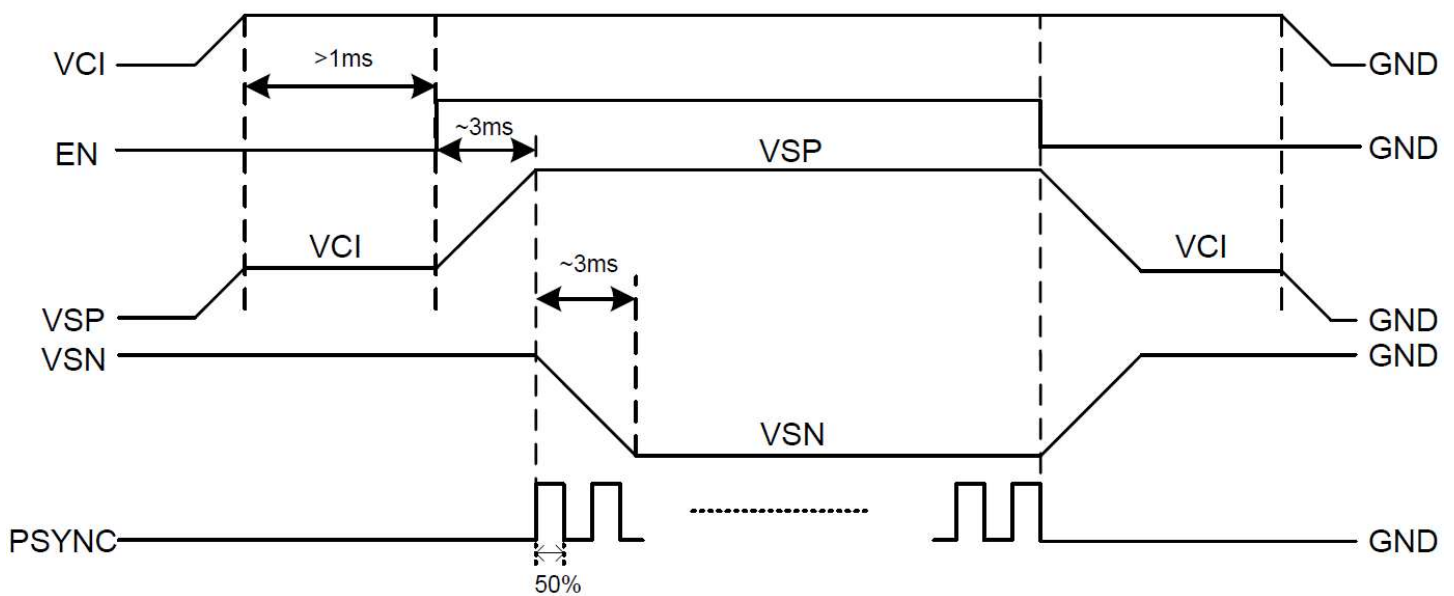


Figure 5. Power sequence of pump clock used synchronized signal from driver IC for TD1071

Typical Performance Curves

$V_{IN}=3V/3.3V$, $T_A=+25^{\circ}C$, internal clock, unless otherwise noted.

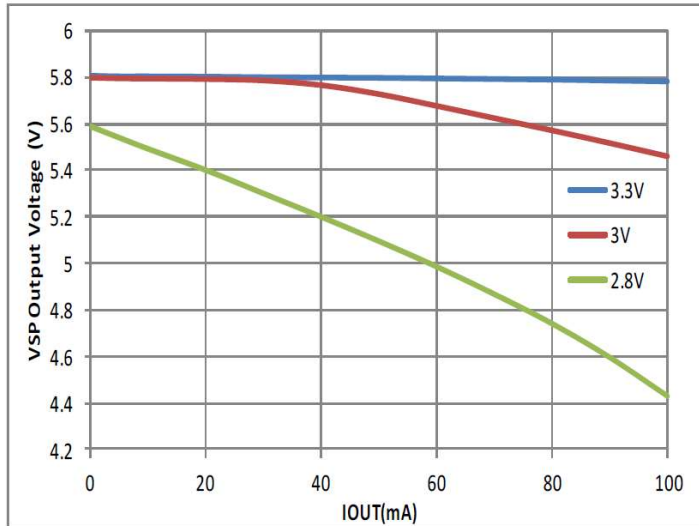


Figure 6. VSP's Output Voltage vs. Output Current

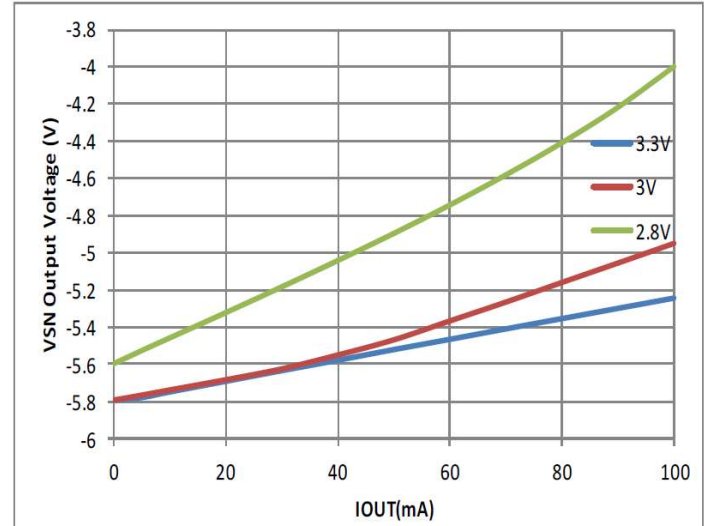


Figure 7. VSN's Output Voltage vs. Output Current

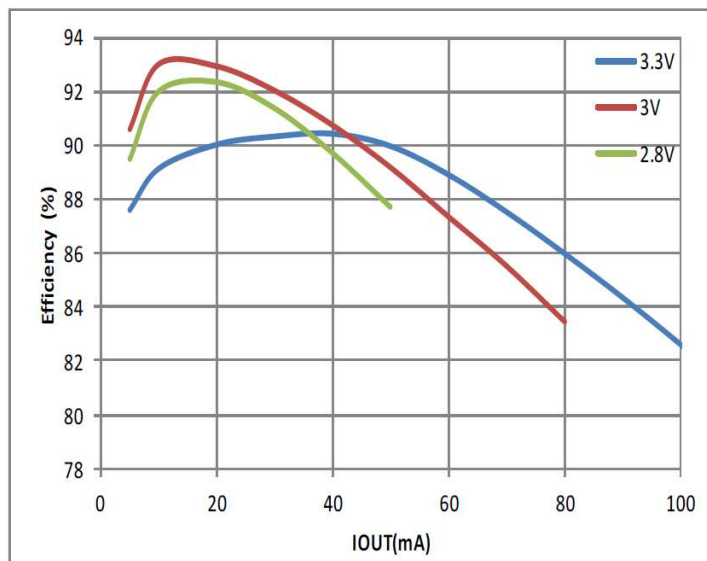
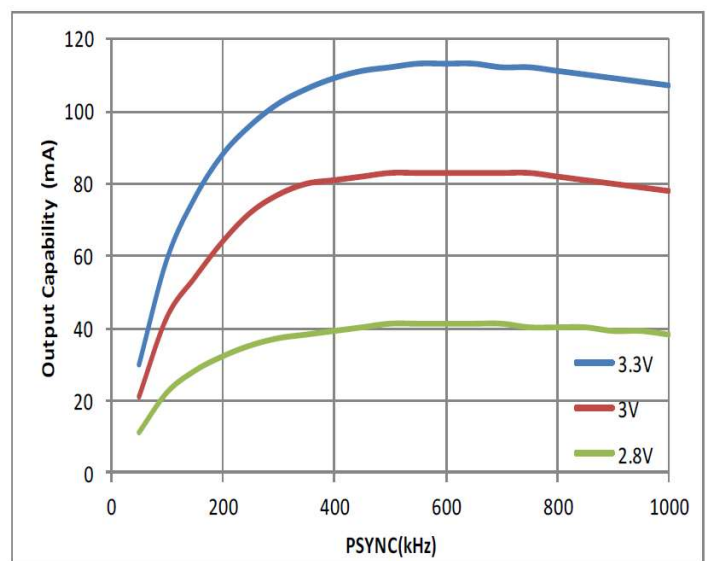


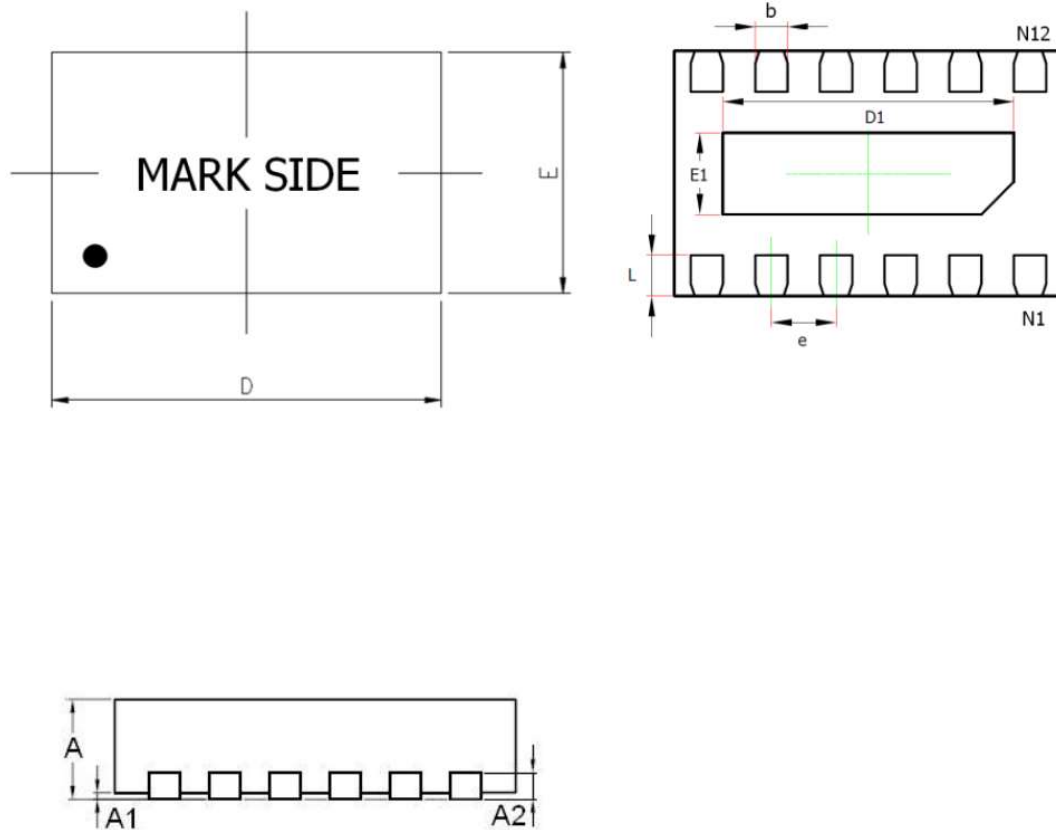
Figure 8. Efficiency vs. Output Current



9. PSYNC Frequency vs. Output Capability

Package Information

Outline Dimensions



SYMBOLS UNIT	DIMENSION IN MILLIMETER	
	MIN	MAX
A	0.40	0.55
A1	0.00	0.05
A2	0.10	0.20
D	2.30	2.50
E	1.40	1.60
L	0.20	0.30
b	0.15	0.25
e	0.35	0.45
D1	1.70	1.90
E1	0.40	0.60

Design Notes