General Description

The EC6585D is a high perfomance charge pump converter to generate positive and negative voltage supply optimized for small to medium size thin-film transistor(TFT) liquid crystal displays (LCD's). The positive charge-pump controller provides 2x positive output voltage PAVDD and fixed -1x ratio of negative voltage NAVDD to supply the TFT LCD. To minimize the inrush current a built-in soft start circuit sets the soft start period.

The EC6585D is convinient to use and requires only 5 small and low-cost ceramic capacitors.It is availiable in the TDFN-12L package which reduces board size and make the FPC or PCB layout design easier.

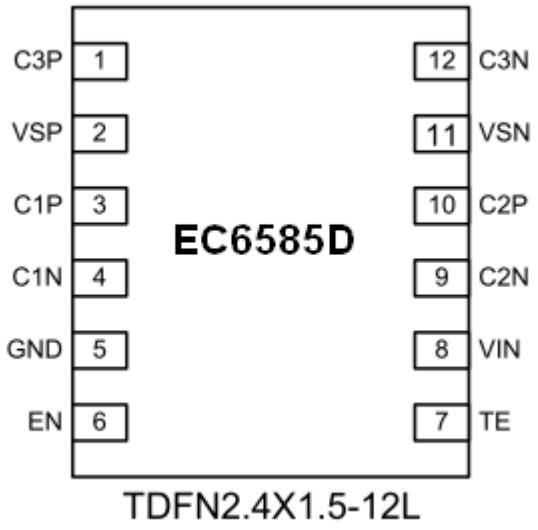
Features

- 2.5V to 4.5V Input Supply
- Positive Output Voltage Range 4.5V to 6V
- Negative Output Voltage Range -4.5V to -6V
- Support x2 Positive Voltage Charge Pump
- Negative Voltage Charge Pump Follow x(-1) Positive Output Voltage
- Up to 90% power conversion Efficiency
- Up to 100mA output current
  50mA Output Current Capability @VIN=2.8V
  80mA Output Current Capability @VIN=3.3V
  100mA Output Current Capability @VIN=3.7V
- Build-in Soft-Start to Reduce Inrush Current
- Cycle by Cycle Input Current Limit Protection
- Small 12-pin 2.4mm*1.5mm*0.45mm TDFN Package
- RoHS Compliant and Halogen Free

Applications

- Smart Phone TFT LCD Bias Power Supply
- Tablet TFT LCD Bias Power Supply
- Car Navigation Display
- Portable equipment

Pin Assignments

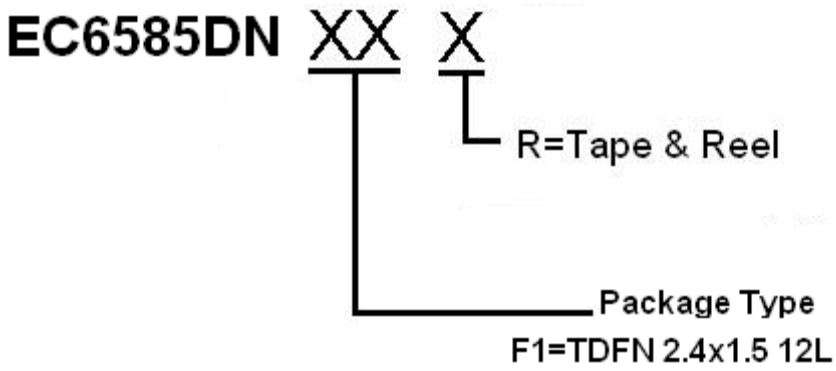


TDFN2.4X1.5-12L

PIN DESCRIPTION

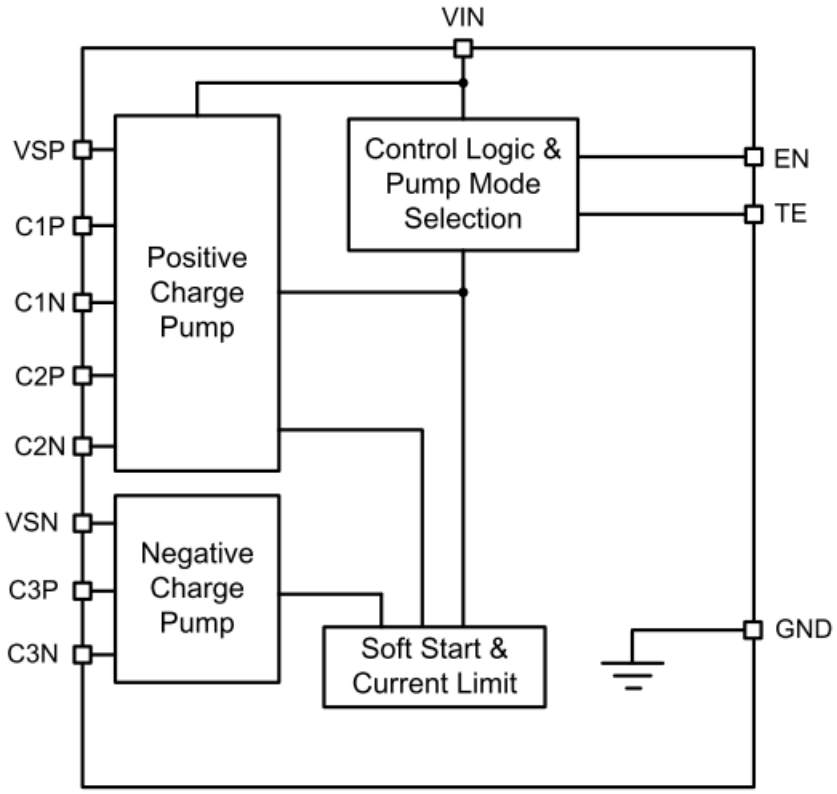
Pin Name	PIN No.	Description
C3P	1	Positive of the charge transfer capacitor 3.
VSP	2	Positive output voltage. Connect a capacitor to GND.
C1P	3	Positive of the charge transfer capacitor 1.
C1N	4	Negative of the charge transfer capacitor 1.
GND	5	Ground pin.
EN	6	Enable pin. Active high.
TE	7	Control pin. Connect to ground if not used
VIN	8	Input supply pin.
C2N	9	Negative of the charge transfer capacitor 2.
C2P	10	Positive of the charge transfer capacitor 2.
VSN	11	Negative output voltage. Connect a capacitor to GND.
C3N	12	Negative of the charge transfer capacitor 3.
Thermal Pad	-	Exposed pad. Connect to ground or left floating.

Ordering Information



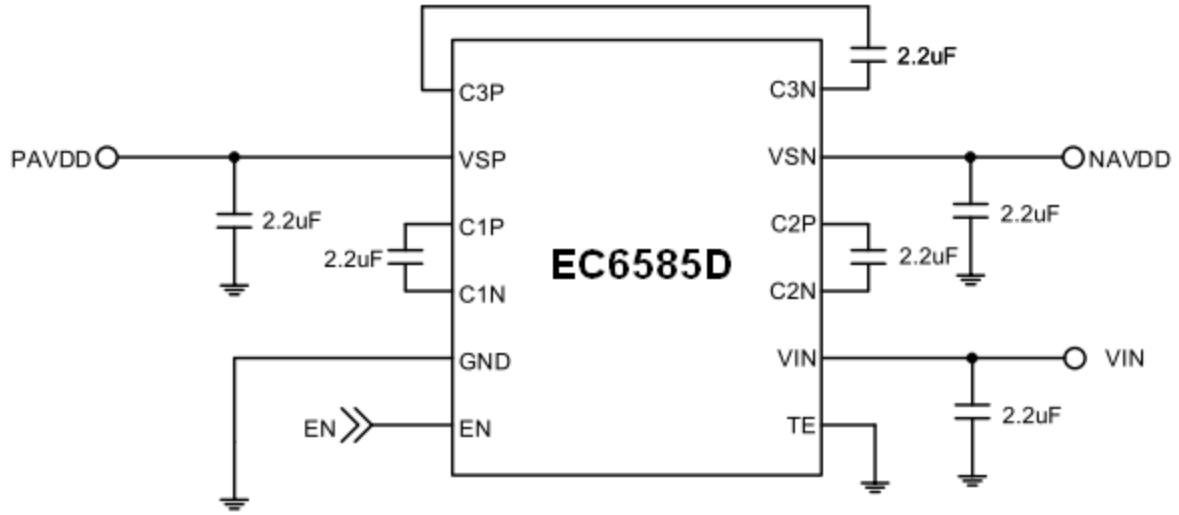
Part Number	Package	Marking	Marking Information
EC6585DNF1R	TDFN 12L	6585X LLLLL	1. X：Internal Code 2. LLLLL：Lot No

Function Block Diagram

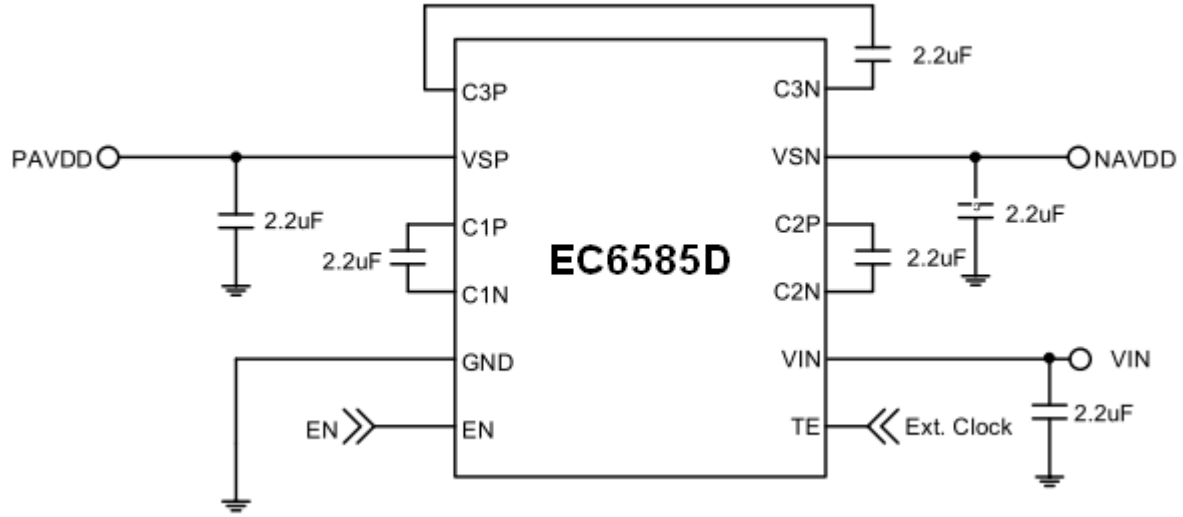


TYPICAL APPLICATION DIAGRAM

(1)Internal Clock Mode



(2)External Clock Mode



Absolute Maximum Ratings

Input Supply Voltage, VIN	-0.3V to 6.5V
Control Signals Input Voltage, EN, TE	-0.3V to 6.5V
Positive Output Voltage, VSP	+0.3V to 6.5V
Negative Output Voltage, VSN	-0.3V to -6.5V
Storage Temperature Range	-55°C to 150°C
Lead temperature (soldering, 10s maximum)	260°C
ESD, Human body mode	2kV
ESD, Machine mode	200V

Note1: All voltages are referenced to ground with GND pins grounded.

Note2: “ABSOLUTE MAXIMUM RATINGS” indicate limits beyond which permanent damage to the device may occur. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under "Recommended Operating Conditions" is not implied. For guaranteed specifications and test conditions, see the “ELECTRICAL SPECIFICATIONS”.

RECOMMENDED OPERATION CONDITIONS

Supply Input Voltage, VIN	2.5V to 3.7V
Control Signals Input Voltage Range	1.4V to 3.7V
Junction temperature range	-40°C to 125°C
Ambient temperature range	-40°C to 85°C

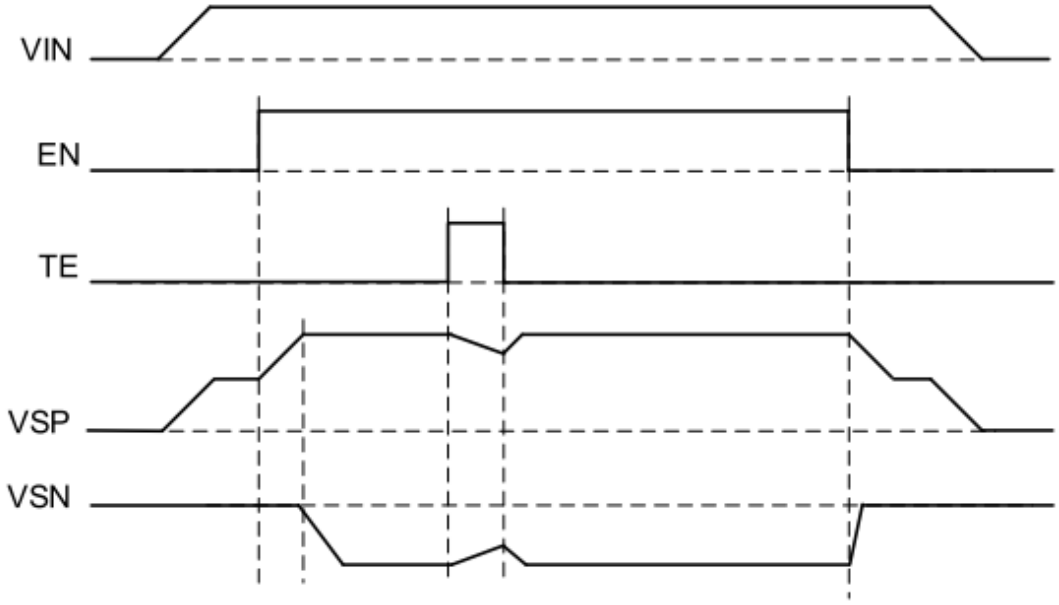
Electrical Characteristics

(VIN=2.8V, TA=25°C, unless otherwise specified)

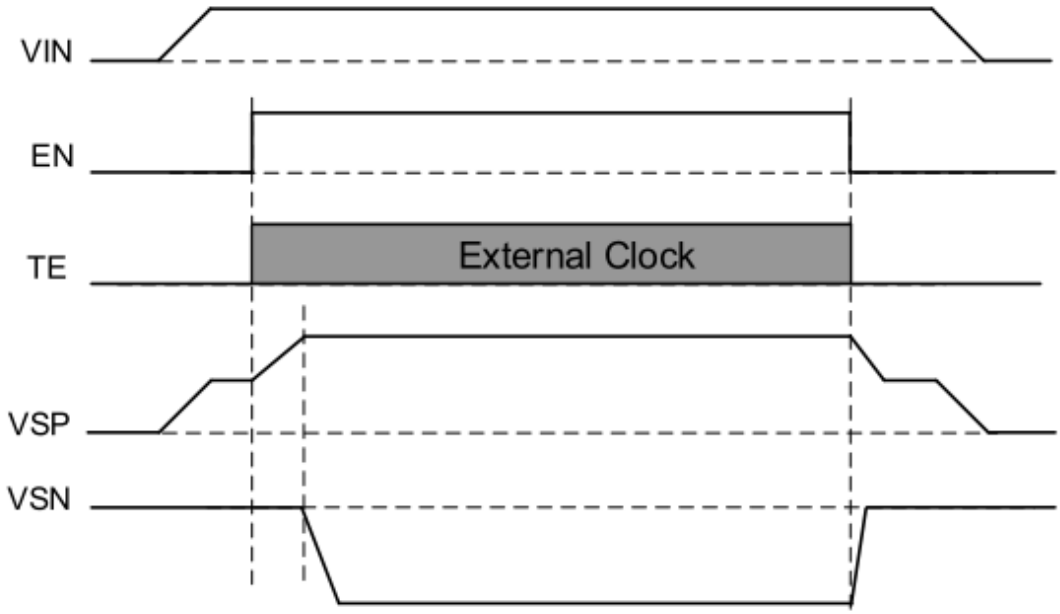
Parameter	Symbol	Test Conditions	Min	Typ	Max	Units
Input Supply						
Input Supply Voltage	V_{IN}		2.5	2.8	4.5	V
VIN Quiescent current	I_Q	EN=TE=Low		1		uA
		EN or TE = High		3		mA
Supply Current	I_{IN}				150	mA
Output Voltage						
Positive Output Voltage	VSP	VIN=2.8V,loading=0mA~50mA	4.5		6.0	V
Negative Output Voltage	VSN	VIN=2.8V,loading=0mA~50mA	-6.0		-4.5	V
Positive Output Current	I_VSP	VIN=2.8V	50			mA
		VIN=3.3V	80			
Negative Output Current	I_VSN	VIN=2.8V	50			mA
		VIN=3.3V	80			
Control Signal & Protection						
EN, TE Input Low Voltage	V_{IL}				0.2x V_{IN}	V
EN, TE Input High Voltage	V_{IH}		1.4			V
Soft-Start Period	T_{SS}			1		ms
Input Current Limit	I_{LIM}			1		A

POWER SEQUENCE

(1)Internal Clock Mode

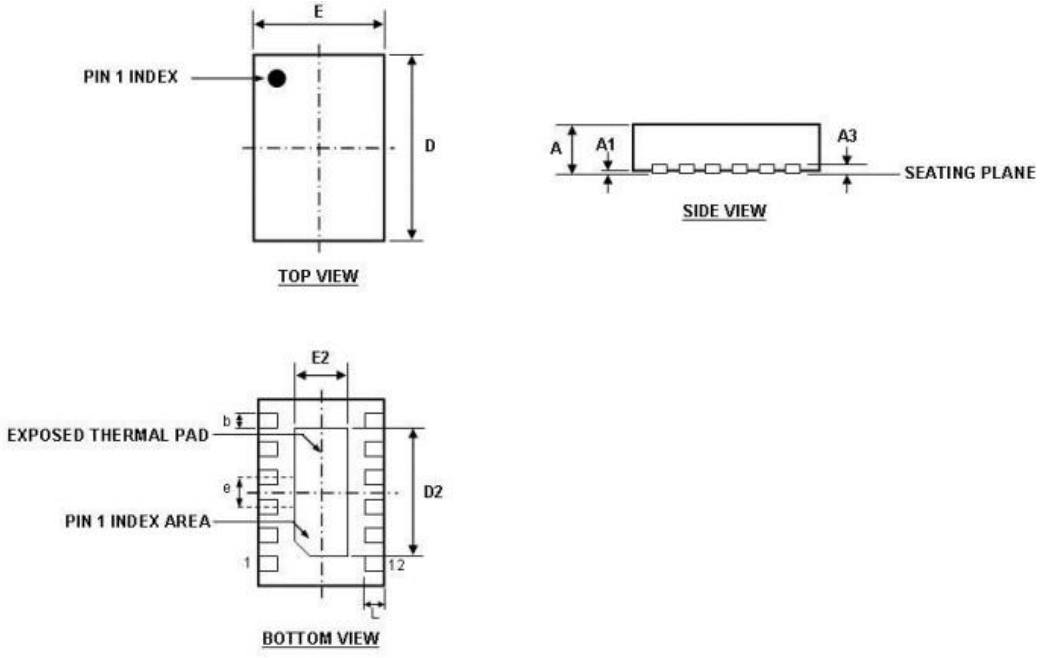


(2)External Clock Mode



Package Information

TDFN 12L



DIMENSION	MIN (mm)	TYP(mm)	MAX (mm)
A	0.40	0.45	0.50
A1	0.00	0.025	0.05
A3		0.152 REF	
b	0.15	0.20	0.25
D		2.40 BSC	
D2	1.70	1.80	1.90
E		1.50 BSC	
E2	0.40	0.50	0.60
e		0.40 BSC	
L	0.20	0.25	0.30

Notes:
1) All dimensions are in millimeters.