FEELING TECHNOLOGY

FMP7693

Power Bank Controller 1.5A Input/ 2A Output

Devices Included in this Data Sheet

- FMP7693 : 16-pin SOP

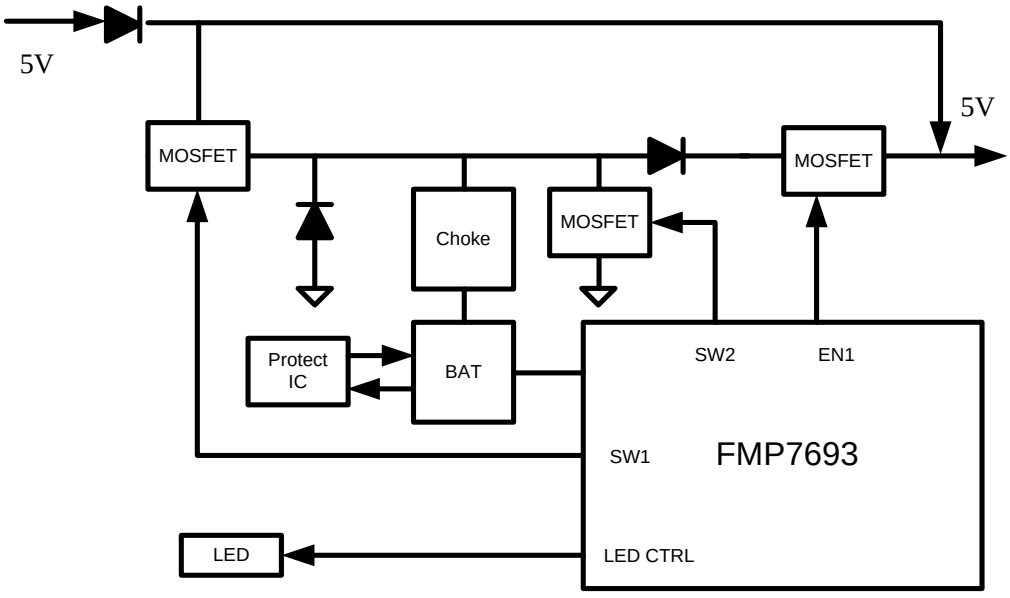
General Description

The FMP7693 is an integrated Lithium Battery power management IC. It builds in step-up PWM boost DC-DC controller, PWM charger, 4 LEDs Indicator, One push button interface, and Input Power Path Control.

Features

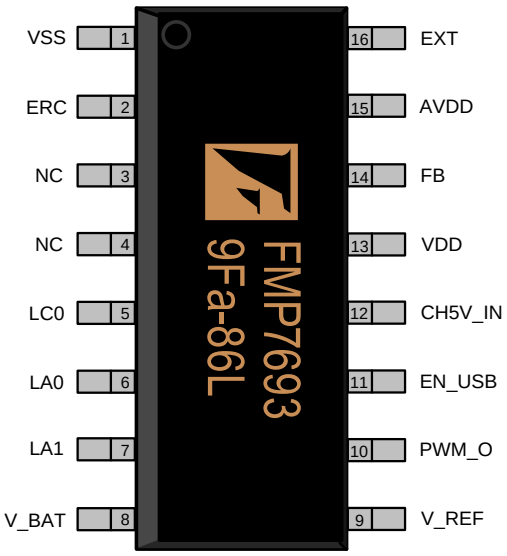
- Support 5V 1.5A Charge Input
- Support 5V 2A Boost Output
- 4 Battery Capacity Indicator LED
  - ✓ LED1: 0%~25%
  - ✓ LED2: 25%~50%
  - ✓ LED3: 50%~75%
  - ✓ LED4: 75%~100%
- 3 Low Battery Mode Indication
  - ✓ Low BAT1 (8mins to 1%): Low Bat LED flash once per second
  - ✓ Low BAT2 (4mins to 1%): Low Bat LED flash twice per second
  - ✓ Low BAT3 (1%): Low Bat LED flash once per second and Boost OFF
- Charging Adapter Voltage Verification
  - ✓ Adapter Input Range: 4.4V~5.8V

Application Block Diagram



Pin Descriptions

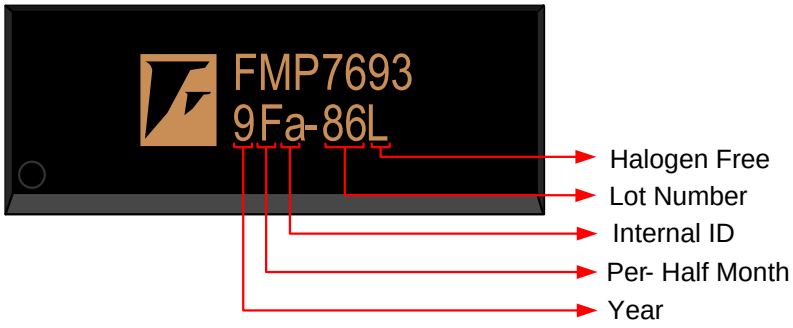
SOP16



Name	NO.	Description
VSS	1	IC Ground
ADP_CTL	2	Power Path Control
CTL_LIGHT	3	LED Light Control
CH5V_CHK	4	CH5V Check
LC0	5	LED Control
LA0	6	LED Control
LA1	7	LED Control
V_BAT	8	Battery Voltage Input
V_REF	9	Reference Voltage Input
PWM_O	10	Charger PWM Output
EN_USB	11	USB 2A Output Control
CH5V_IN	12	Adapter 5V Input
VDD	13	Digital VDD
FB	14	Boost FB Input
AVDD	15	Analog VDD
EXT	16	Boost External MOS Control

Marking Information

SOP-16L



Halogen Free: Halogen free product indicator

Lot Number: Wafer lot number's last two digits

For Example: 132386TB → 86

Internal ID: Internal Identification Code

Per-Half Month: Production period indicated in half month time unit

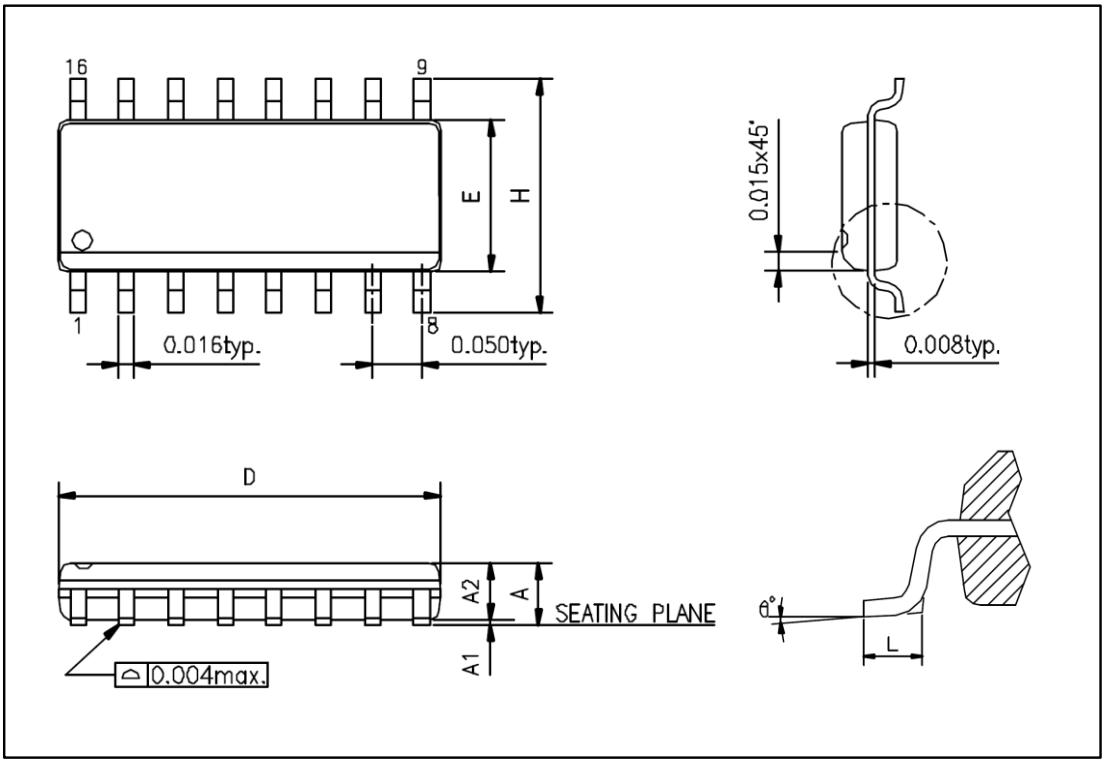
For Example: January → A (Front Half Month), B (Last Half Month)

February → C (Front Half Month), D (Last Half Month)

Year: Production year's last digit

Package Outline

SOP-16L



UNIT: mm

Symbols	Min. (mm)	Max. (mm)
A	1.346	1.752
A1	0.101	0.254
A2	1.244	1.651
D	9.804	10.007
E	3.810	3.987
H	5.791	6.197
L	0.406	1.270
θ°	0°	8°

Note:

1. Package dimensions are in compliance with JEDEC outline: MS-012 AC.
2. Dimension “D” does not include molding flash, protrusions or gate burrs.
3. Dimension “E” does not include inter-lead flash or protrusions.

Absolute Maximum Ratings

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Supply Voltage	V_{DD}		0		6	V
LX Voltage	V_{LX}		0		16	V
EN,FB Voltage			0		6	V
Power Dissipation	P_D	TSSOP-20 @T_A=25°C			455	mW
Thermal Resistance (Note1)	θ_{JA}	TSSOP-20				°C / W
Junction Temperature	T_J				+150	°C
Operating Temperature	T_{OP}		-40		+85	°C
Storage Temperature	T_{ST}		-65		+150	°C
Lead Temperature		(soldering, 10 sec)			+260	°C

Recommended Operating Conditions

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Supply Voltage	V_{IN}		2.6		5.5	V
Operating Temperature Range	T_A	Ambient Temperature	-40		+85	°C

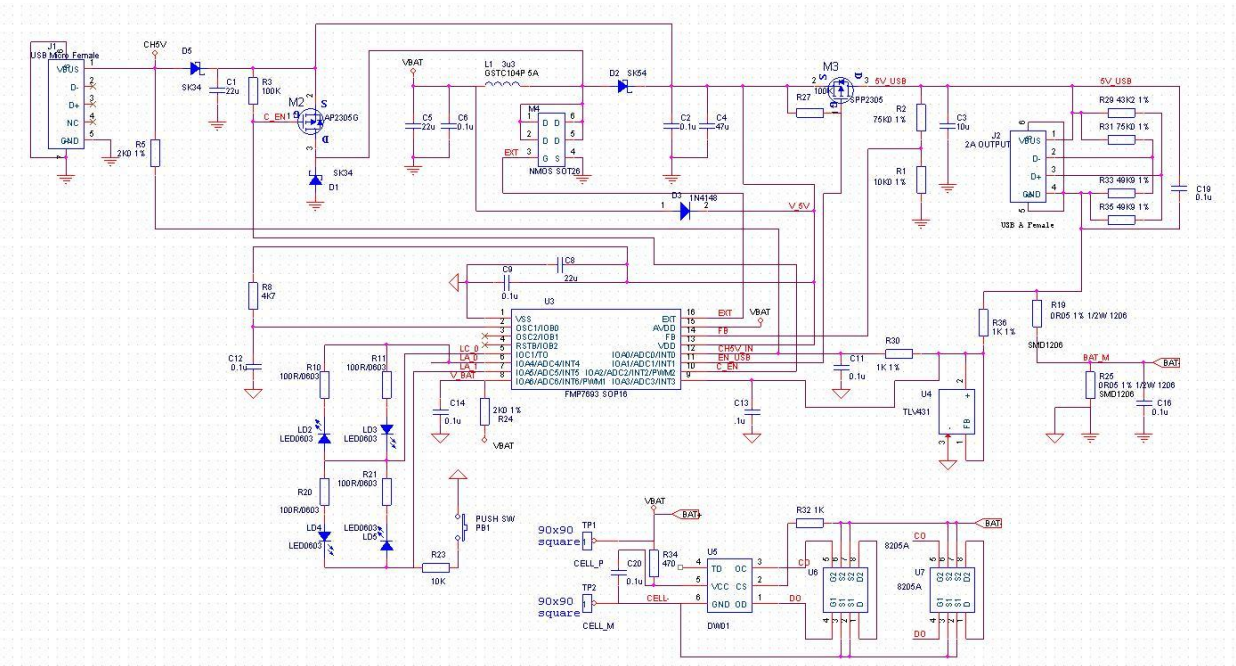
DC Electrical Characteristics

Under Operating Conditions, at four clock instruction cycles and WDT & LVDT are disabled

Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Input high voltage	V_{IH}	With schmitter				V
		I/O ports	0.7vdd		vdd	
		RSTB pin	0.8vdd		vdd	
Input low voltage	V_{IL}	With schmitter				V
		I/O ports	vss		0.2vdd	
		RSTB pinENEN	vss		0.2vdd	
Input Leakage Current	I_{IL}	Vin = 5V, Vdd=5V			1	uA
		Vin = 0V, Vdd=5V			1	
IO Drive Current	I_{OH}	VOH =4.5V, Vdd = 5V		9		mA
		VOH =4V, Vdd = 5V		17		
IO Sink Current	I_{OL}	VOL =0.5V, Vdd = 5V		19		mA
		VOL =0.75V, Vdd = 5V		26		
WDT current	I_{WDT}	Vdd=5V		8		uA
		Vdd=3V		2		
LVDT current	I_{LVDT}	LVDT = 2.6V		3		uA
		LVDT = 2.6V		0.5		
LVDT voltage	V_{LVDT}	LVDT = 3.7V	3.5	3.7	3.9	V
		LVDT = 2.6V	2.4	2.6	2.8	
Power down current	I_{SB}	Sleep mode, Vdd=3V		9		uA
Operating current	I_{DD}	IRC mode, vdd=3V		3		mA

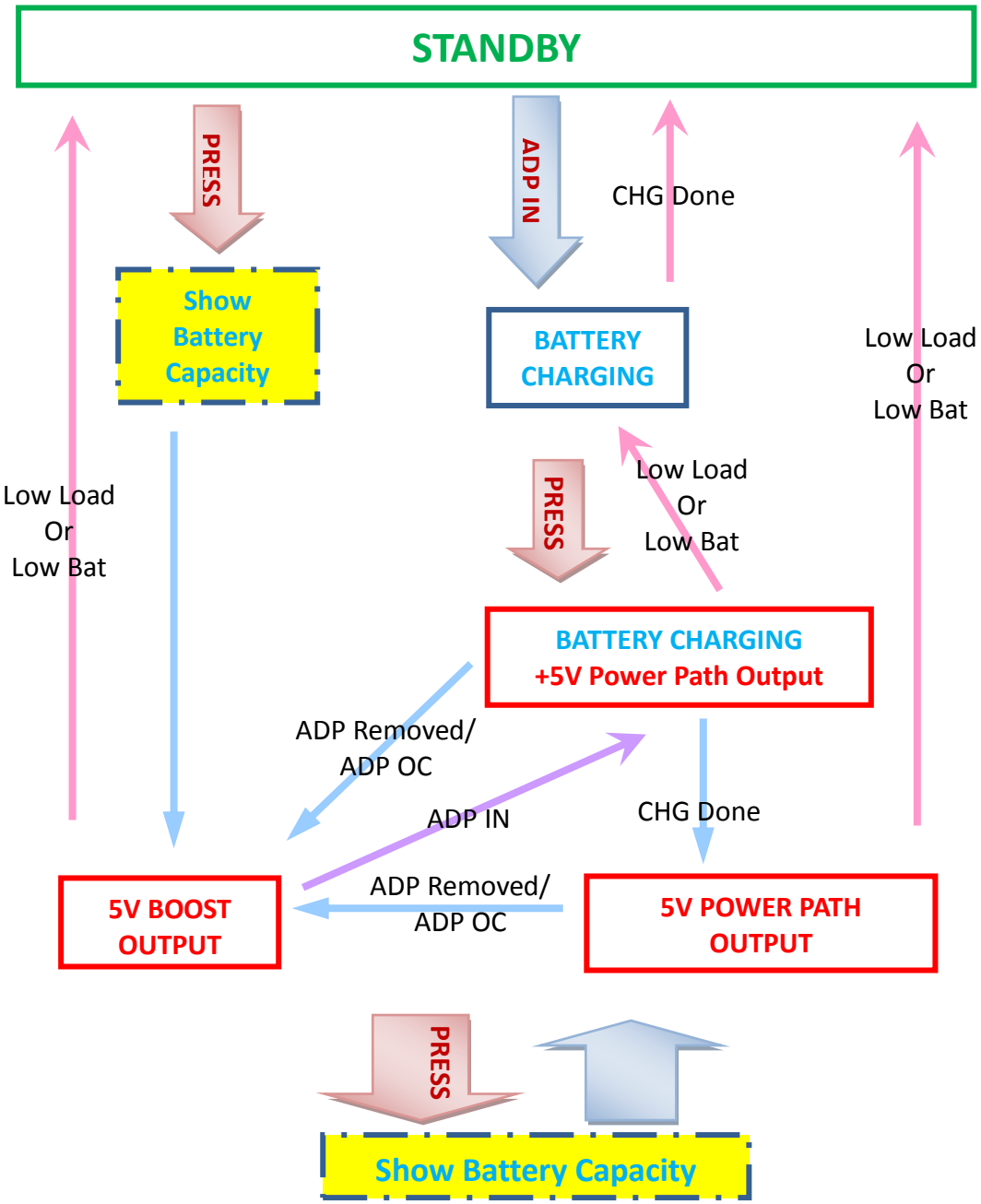
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Under Voltage Lockout	V_{UVLO}			2.1		V
UVLO Hysteresis				0.1		V
Quiescent Current	I_{CC}	FB=1.0V, No switch		70		μA
Shutdown Current	I_{CC}	V_{EN}=GND		0.1		μA
Oscillator						
Operation Frequency	f_{OSC}	V_{FB}=0.6V		500		kH_Z
PFM Switching Duty Ratio	%			15		%
Maximum Duty Ratio	%			90		%
Soft-Start Time	t_{SS}	V_{CC}=5V		7		ms
Reference Voltage						
Feedback Voltage	V_{REF}	V_{CC}=5V	0.588	0.6	0.612	V
Enable Control						
Enable Voltage	V_{EN}		0.96			V
Shutdown Voltage	V_{EN}				0.6	V
External Transistor Connection current						
EXT Pin Output Current	I_{EXTH}			-105		mA
EXT Pin Output Current	I_{EXTL}			130		mA
CV Output (Float) Voltage	V_{FLOAT}	0°C<T_A<85°C	4.158	4.2	4.242	V
Operation Frequency			100	500		KHz
Frequency Change with Voltage				10		%
Maximum Duty Cycle					97	%
Trickle Charge Current	I_{TRIKL}			100		mA
Trickle Charge Threshold Voltage	V_{TRIKL}			2.9		V
Trickle Charge Hysteresis Voltage	V_{TRKHYS}			200		mV
V_{in} Under Voltage Lockout Threshold	V_{UV}	V_{in} Rising		4.4		V
V_{in} Under Voltage Lockout Threshold Hysteresis	V_{UVHYS}			100		mV

Application Circuit



Function Description

Flow Chart of PWM Charger and Power Path:



LED Indication:

CHG MODE	LED1	LED2	LED3	LED4
0~25%	Flash1	-	-	-
25%~50%	ON	Flash1	-	-
50%~75%	ON	ON	Flash1	-
75%~100%	ON	ON	ON	Flash1
CHG DONE	ON	ON	ON	ON
Show BAT	LED1	LED2	LED3	LED4
0~25%*	ON	-	-	-
25%~50%	ON	ON	-	-
50%~75%	ON	ON	ON	-
75%~100%	ON	ON	ON	ON
Low BAT	LED1	LED2	LED3	LED4
<1%	Flash2	-	-	-
3mins to <1%	Flash2	-	-	-
6mins to <1%	Flash1	-	-	-

Flash1: LED flash once per second
Flash2: LED flash twice per second
* Not Include Low Battery Mode