

GENERAL DESCRIPTION

The PT4302 is a 2-channel 1x/1.5x auto-adjust charge pump white LED driver with LED fault detection. The auto-adjust charge pump achieves high efficiency for an Li-ion battery supply. LED fault detection feature allows the PT4302 to be self-adjusted to normal operation if an open or short occurs. The PT4302 needs few external components, which makes it an ideal choice for portable applications where a smaller board space is critical. The LED current is programmable from 3mA to 25mA in a 3mA step by applying digital codes at the EN/SET pin.

A built-in soft-start circuit prevents a high inrush current from being drawn from the supply source during power on and 1x/1.5x mode switching. The thermal shutdown and current limiter prevents the PT4302 from being damaged by short to ground or overload conditions. The ultra small shut-down current of less than 1µA significantly prolongs the battery life. The PT4302 is available in small MSOP-10 and QFN-10 packages.

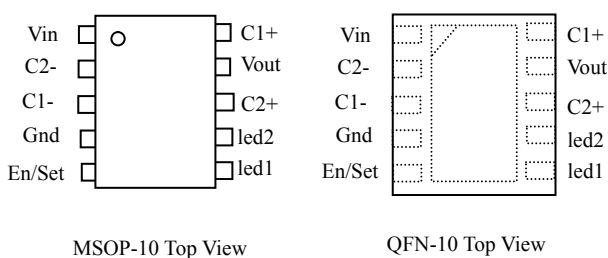
FEATURES

- 2.7V-5.5V input range
- 1x/1.5x auto-adjust charge pump
- LED fault detection
- Programmable 8 level LED currents from 3mA to 25mA
- < ±2% LED maximum current mismatch between channels
- Less than 1µA shut down current
- Built-in soft-start and mode soft-switching
- Miniature MSOP-10 and QFN-10 package

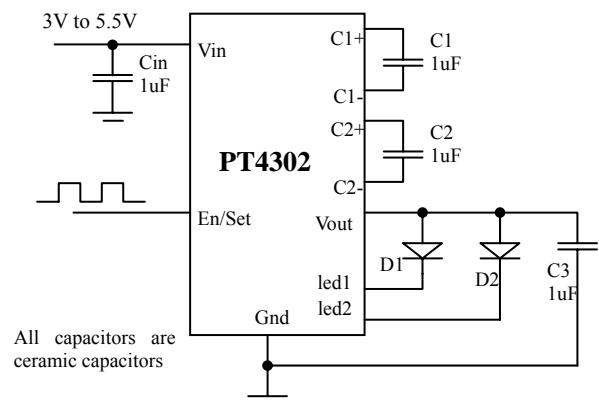
APPLICATIONS

- Cell phones
- PDAs
- Digital cameras
- Small LCD displays
- Programmable current sink

PACKAGES



TYPICAL APPLICATION



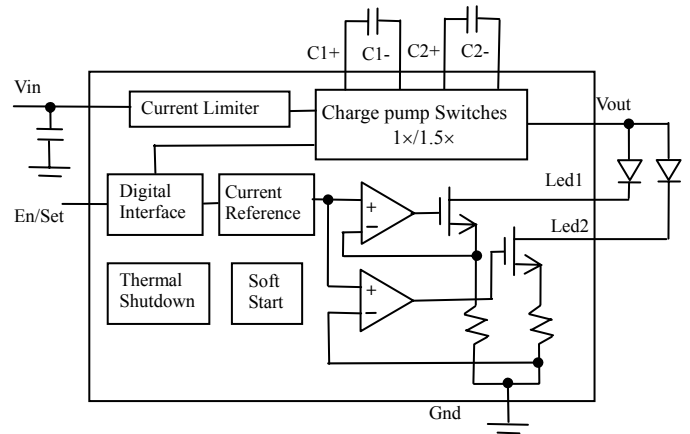
PIN DESCRIPTION

Pin No.	Symbol	Description	Pin No.	Symbol	Description
1	Vin	Power supply	6	Led1	The current sink of channel 1 to drive LED
2	C2-	Negative terminal of fly capacitor 2	7	Led2	The current sink of channel 2 to drive LED
3	C1-	Negative terminal of fly capacitor 1	8	C2+	Positive terminal of fly capacitor 2
4	Gnd	ground	9	Vout	Output voltage source connecting to a 1µF cap
5	En/set	Chip enable and Led current programming pin	10	C1+	Positive terminal of fly capacitor 1

ABSOLUTE MAXIMUM RATINGS

PARAMETER	VALUE	UNIT
V _{IN} Range	-0.3~6.5V	V
V _{OUT} Range	-0.3~6.5V	V
V _{En/Set} Range	V _{IN} +0.3~Gnd-0.3	V
Operation Junction Temp. range	-40~150	°C
Storage Temp.	-55~150	°C
MSOP Lead Soldering Temp.	260, 10 sec.	°C
Thermal resistance, Θ_{JA}	MSOP-10	190
	QFN-10	40
		W/°C

BRIEF BLOCK DIAGRAM



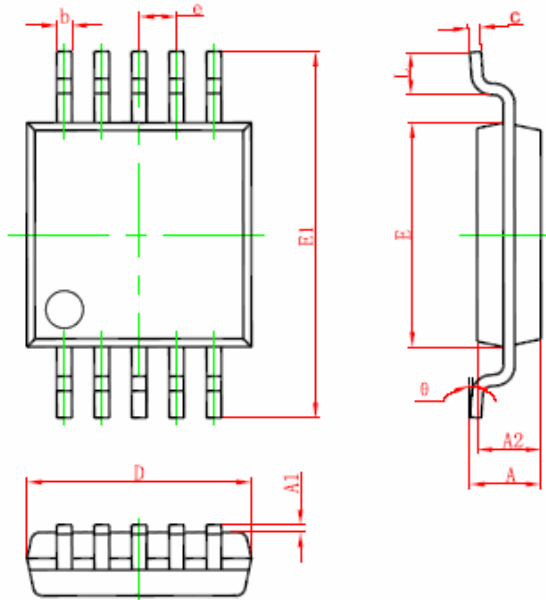
ELECTRICAL CHARACTERISTICS

V_{DD}=3.5V, C1=C2=C3=C4=1μF, T_A=25°C, unless specified otherwise.

SYMBOL	ITEMS	CONDITIONS	Min.	Typ.	Max.	UNIT
V _{IN}	Input Voltage		2.7		5.5	V
I _{OFF}	Operating Current (Shutdown)	EN/SET=0		0.1	1	μA
I _q	Operating Current (Quiescent)	No load Current		1.5	3	mA
I _{OLP}	Over Load Protection	Short Vout to Gnd		300		mA
F _{CLK}	Charge Pump Switching Frequency		0.8	1.0	1.2	MHz
T _{SS} (note.1)	Charge Pump Soft-start time			550		μs
V _{1.5-1}	The Threshold of 1.5X-> 1X	V _{LED1} =V _{LED2} =3.5V, I _{LED} =25mA		4		V
V _{1-1.5}	The Threshold of 1X-> 1.5X	V _{LED1} =V _{LED2} =3.5V, I _{LED} =25mA		3.8		V
I _{OUT}	Maximum LED output current	3.0<v _{in} <5.5, V _{LED} =3.5V, en/set set the output to maximum current	22.5	25	27.5	mA
I _{Match}	Current match between D1 and D2	3.0<v _{in} <5.5, en/set set the output to maximum current			2	%
V _{ovp}	Over output voltage protection	V _{in} =4, Open all led		5.5		V
V _{EN-L}	En/Set Maximum Low Level Threshold	V _{in} =5			1.4	V
V _{EN-H}	En/Set Minimum high level threshold	V _{in} =5	1.8			V
I _{EN/SET}	En/Set Input Current	V _{in} =5V, V _{en/set} =5	-1		1	uA
T _{setL}	En/Set low level width		0.3		75	us
T _{setH}	En/Set high level width			50		ns
T _{OFF}	En/Set shut down low level width				500	us
T _{INIT}	The period that En/Set stay at high level when system reset		100			us
T _{SD}	Thermal Shut Down Threshold	Temperature rise	150	160	170	°C
T _{HY}	Thermal Shut Down Hysteresis			10		°C

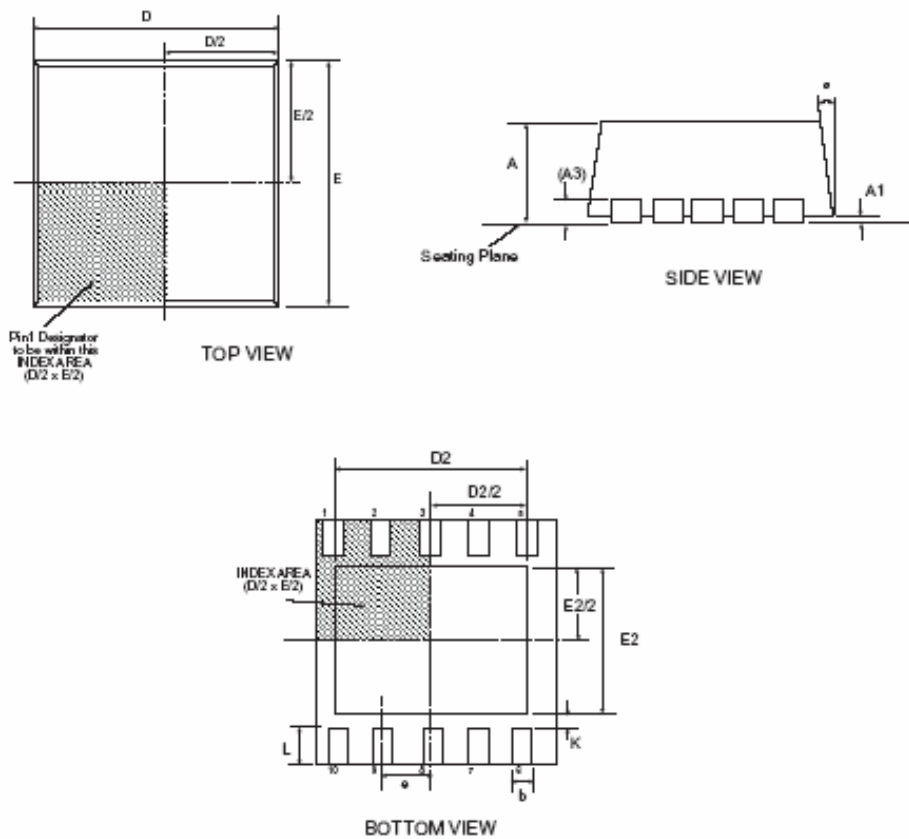
PACKAGE INFORMATION

MSOP-10



Symbol	Dimensions in Millimeters		Dimensions in Inches	
	Min	Max	Min	Max
A	0.820	1.100	0.032	0.043
A1	0.020	0.150	0.001	0.006
A2	0.750	0.950	0.030	0.037
b	0.180	0.280	0.007	0.011
c	0.090	0.230	0.004	0.009
D	2.900	3.100	0.114	0.122
e	0.50(BSC)		0.020(BSC)	
E	2.900	3.100	0.114	0.122
E1	4.750	5.050	0.187	0.199
L	0.400	0.800	0.016	0.031
θ	0°	6°	0°	6°

■ QFN-10



3x3 10 Pin DFN		JEDEC MO-229		VARIATION VEED-5		
SYMBOL	Dimensions in Millimeters: Controlling Dimension			Dimensions in Inches Conversion Factor: 1 Inch = 25.40 mm		
	MIN	NOM	MAX	MIN	NOM	MAX
A	0.90	0.90	1.00	0.032	0.036	0.039
A1	0.00	0.02	0.05	0.000	0.001	0.002
A3	0.20 REF			0.008 REF		
K	0.20	-	-	0.008	-	-
θ	0°	-	14°	0°	-	14°
b	0.18	0.25	0.30	0.008	0.010	0.012
D	3.00 BSC			0.119 BSC		
D2	2.20	-	2.70	0.087	-	0.106
E	3.00 BSC			0.119 BSC		
E2	1.40	-	1.75	0.056	-	0.069
e	0.50 BSC			0.020 BSC		
L	0.30	0.40	0.50	0.012	0.016	0.020