

MIP803, MIP804

Silicon MOS IC

■ Features

- Allowing downsizing of the sets through the reduction of a parts count resulting from the voltage step-up utilizing a coil instead of a transformer and employing the thin surface mounting package.
- Allowing low voltage drive (adaptable to a small and low-voltage battery), or $V_{CC} = 3V$ or $1.5V$ drive
- Allowing to adjust the EL light brightness responding to changes in oscillation frequency which can be changed by the external resistor.

■ Applications

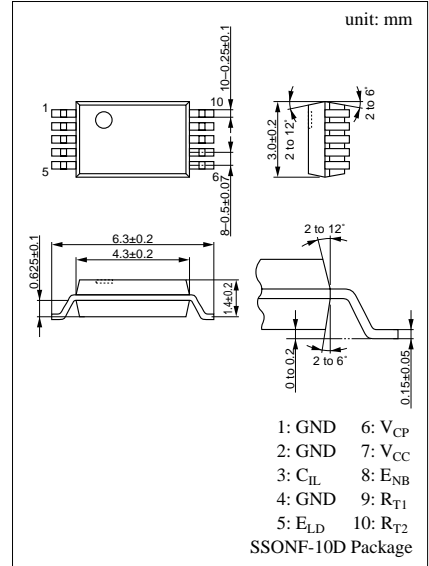
- EL drive

■ Recommended Set

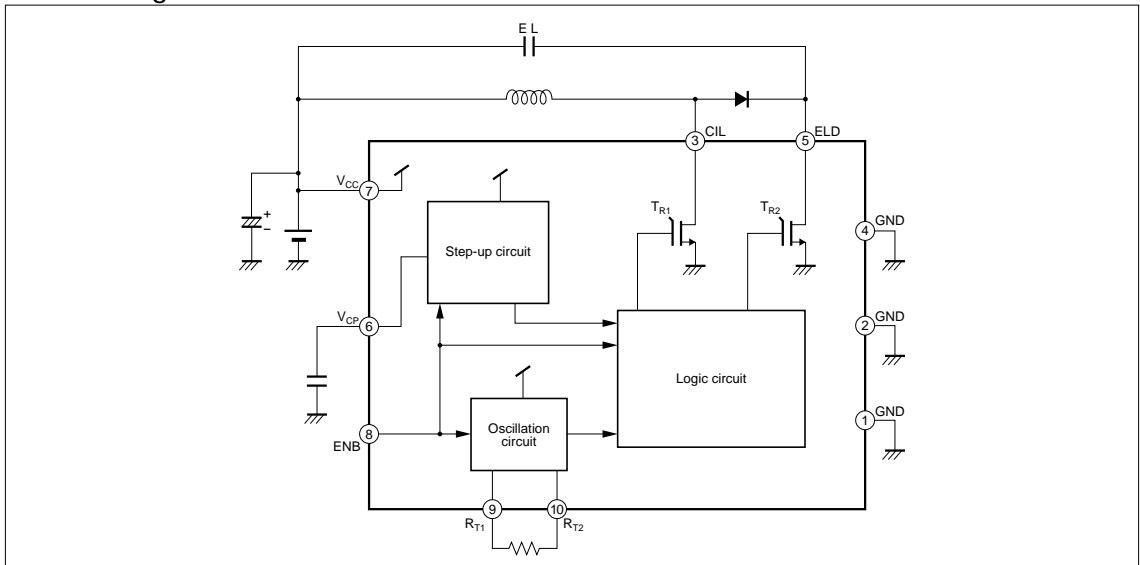
- Watches, pagers, portable CD players, cellular phones, MD players, display panels of remote controllers, and etc.

■ Absolute Maximum Ratings ($T_a = 25^\circ C$)

Parameter	Symbol	Ratings	Unit
Power supply voltage	V_{CC}	- 0.5 to 4	V
Input voltage (ENB)	V_{ENB}	- 0.5 to $V_{CC} + 0.5$	V
Output voltage (CIL)	V_{CIL}	- 0.5 to 220	V
Output voltage (ELD)	V_{ELD}	- 0.5 to 220	V
Output current (CIL)	I_{CIL}	60	mA
Output current (ELD)	I_{ELD}	120	mA
Allowable power dissipation	P_D	150	mW
Operating ambient temperature	T_{opr}	-20 to +70	$^\circ C$
Channel temperature	T_{ch}	-20 to +125	$^\circ C$
Storage temperature	T_{stg}	-55 to +125	$^\circ C$



■ Block Diagram



■ Electrical Characteristics ($V_{CC} = 2.5V/1.2V$, $V_{ENB} = 2.5V/1.2V$, $GND = 0$, $T_C = 25 \pm 2^\circ C$)

Parameter		Symbol	Conditions	min	typ	max	Unit	
Supply voltage	MIP803	V_{CC}		1.5	2.5	3.5	V	
	MIP804			0.9		3.5		
Output frequency	MIP803	f_{OSC}	$R_T = 390k\Omega$	119	140	161	kHz	
	MIP804		$R_T = 240k\Omega$	195	230	265		
Change of output frequency	MIP803	Δf_v (Note)	$R_T = 390k\Omega$	-7		7	%	
	MIP804		$R_T = 240k\Omega$	-15		15		
High level input voltage (ENB)	MIP803	V_{IH}	$V_{CC} = 1.5$ to $3.5V$	1			V	
	MIP804		$V_{CC} = 0.9$ to $3.3V$	0.8				
Low level input voltage (ENB)	MIP803	V_{IL}	$V_{CC} = 1.5$ to $3.5V$			0.3	V	
	MIP804		$V_{CC} = 0.9$ to $3.3V$			0.1		
Output (T_{R1})	Breakdown voltage		V_{DSS}	$I_{OFF(TR1)} = 0.1mA$	200		V	
	Saturation current	MIP803	I_{DS}	$V_{DS(TR1)} = 20V$	70		mA	
		MIP804			60			
	ON-state resistance	MIP803	R_{ON}	$I_{DS(TR1)} = 10mA$		6.5	10	Ω
		MIP804					15	
Off-leakage current		I_{OFF}	$V_{DS(TR1)} = 160V$			2	μA	
Output (T_{R2})	Breakdown voltage		V_{DSS}	$I_{OFF(TR2)} = 0.1mA$	200		V	
	Saturation current	MIP803	I_{DS}	$V_{DS(TR2)} = 20V$	15		mA	
		MIP804			10			
	ON-state resistance	MIP803	R_{ON}	$I_{DS(TR2)} = 10mA$	0.5	0.75	1	k Ω
		MIP804			0.7	1	1.4	
Off-leakage current		I_{OFF}	$V_{DS(TR2)} = 160V$			2	μA	
Clime power the inside voltage	MIP803	V_{CP}	$V_{CC} = V_{ENB} = 1.5V$, $C_{CP} = 1000pF$, $R_T = 390k\Omega$	2			V	
	MIP804		$V_{CC} = V_{ENB} = 0.9V$, $C_{CP} = 1000pF$, $R_T = 240k\Omega$	2				
Statically consumption current	MIP803	I_C	$V_{CC} = 3.5V$, $V_{ENB} = 0$			0.1	μA	
	MIP804		$V_{CC} = 3.3V$, $V_{ENB} = 0$			0.1		
Consumption current	MIP803	I_{CC}	$V_{CC} = V_{ENB} = 3.5V$, $R_T = 390k\Omega$		1	1.5	mA	
	MIP804		$V_{CC} = V_{ENB} = 3.3V$, $R_T = 240k\Omega$		1	1.5		

Note: Δf_v : Calculation is made as follows:

$$\Delta f_v = (f_{osc} / \frac{f_1 + f_2}{2} - 1) \times 100$$

MIP803 f_1 : f_{osc} at $V_{CC} = 1.5V$, f_2 : f_{osc} at $V_{CC} = 3.5V$

MIP804 f_1 : f_{osc} at $V_{CC} = 0.9V$, f_2 : f_{osc} at $V_{CC} = 3.5V$

■ Pin Descriptions

Pin No.	Symbol	Pin Name	Description
1	GND	GND pin	GND pin
2	GND	GND pin	GND pin
3	C_{IL}	Output for voltage step-up	Drain pin of the voltage step-up MOS FET
4	GND	GND pin	GND pin
5	E_{LD}	Output for EL driving	Drain pin of the EL drive MOS FET
6	V_{CP}	Internal voltage step-up pin	Capacitor connection pin for internal voltage step-up power supply
7	V_{CC}	Power input pin	Power input pin
8	E_{NB}	ENABLE pin	ENABLE signal input pin for controlling the EL driver (if ENB = H, the EL driver becomes ON and if ENB = L/OPEN, it becomes OFF)
9	R_{T1}	Internal oscillation output	Internal oscillation circuit output pin
10	R_{T2}	OSC resistor connecting pin	OSC resistor connection pin for connecting the OSC resistor between R_{T1} and R_{T2}