

OVERVIEW

The SM8142B is a transformer-less electroluminescent (EL) driver IC, capable of driving sheets up to 30cm² in size. It employs a high-efficiency driver output circuit configuration to control power dissipation. It is available in ultra-small 8-pin SON (Small Outline Non-leaded) packages*, making possible the construction of small, thin, low-power driver units.

* : SM8142BD

FEATURES

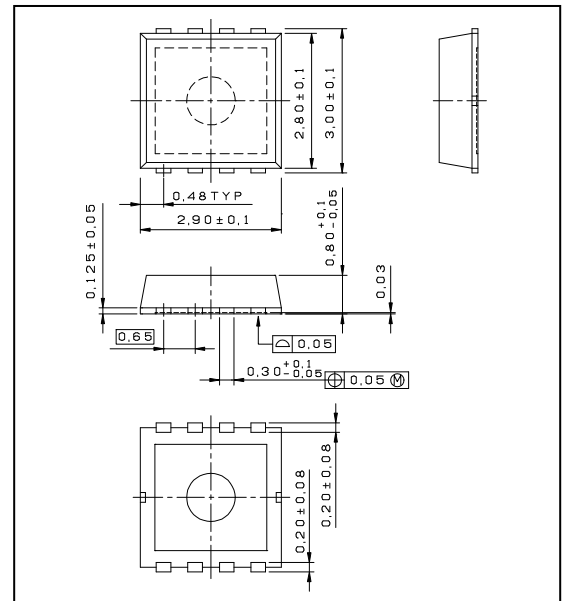
- Dedicated EL driver
- Noise-less smooth drive waveform
- High-efficiency output circuit
- Stand-by function
- Stable temperature characteristics
- Ultra-small package
- 1.6 to 5.5V supply voltage
- 0.3mA typ. ($V_{DD}=3.0V$) current consumption (excluding coil current)
- 200V_{p-p} maximum EL driver voltage
- 31 to 1000Hz EL driver frequency range
- 220μH minimum coil inductance

ORDERING INFORMATION

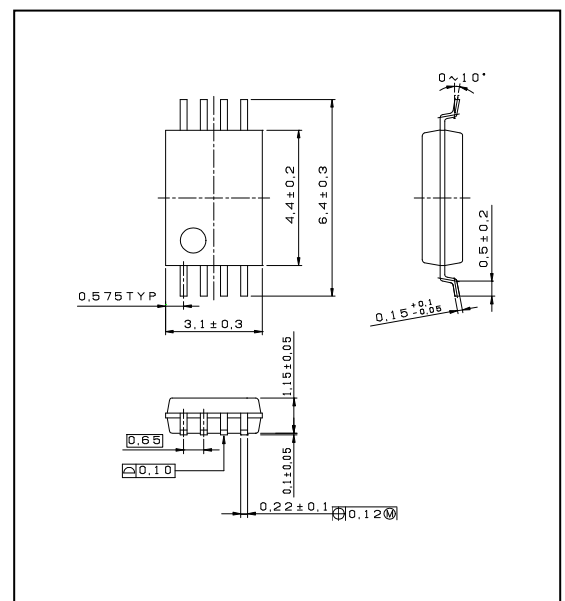
Device	Package
SM8142BD	8 pin SON
SM8142BV	8 pin VSOP

PACKAGE DIMENSIONS (Unit : mm)

▪ 8-pin SON

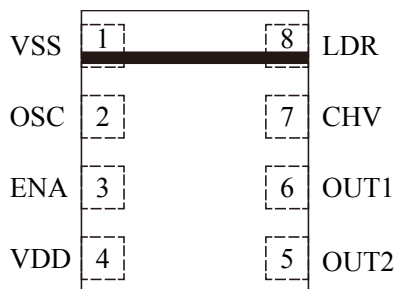


▪ 8-pin VSOP

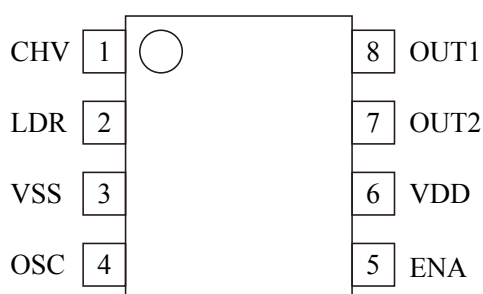


PINOUT (Top view)

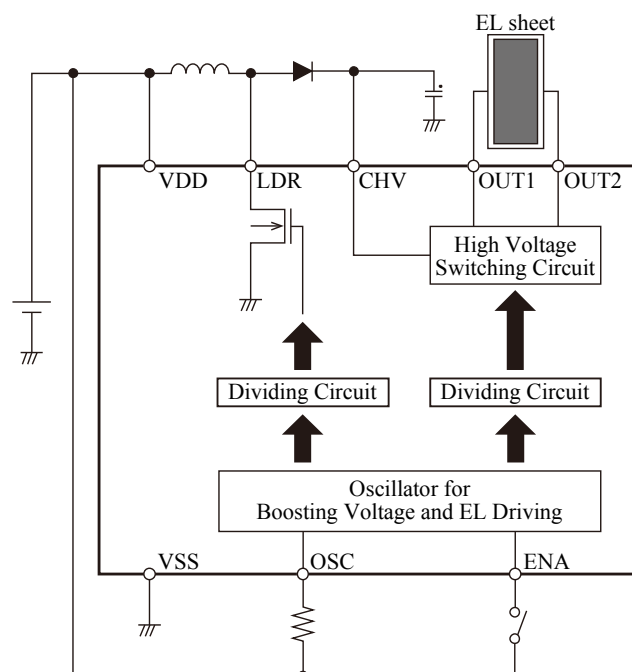
▪ 8-pin SON



▪ 8-pin VSOP



BLOCK DIAGRAM



PIN DESCRIPTION

Pin number		Name	I/O	Function
VSOP-8	SON-8			
1	7	CHV	I	High-voltage DC input
2	8	LDR	O	Booster coil driver output
3	1	VSS	-	Ground
4	2	OSC	I	Coil and EL driver oscillator (oscillator frequency determined by external resistor)
5	3	ENA ^{*1}	I	Enable input (High : enable, Low : disable)
6	4	VDD	-	Supply
7	5	OUT2	O	Output 2
8	6	OUT1	O	Output 1

*1. Built-in pull-down resistor

SPECIFICATIONS

Absolute Maximum Ratings

Parameter	Symbol	Condition	Rating	Unit
Supply voltage range	V_{DD}		-0.3 to 7.0	V
Input voltage range	V_{IN}	All input pins	$V_{SS}-0.3$ to $V_{DD}+0.3$	V
Output voltage(CHV)	V_{CHV}	CHV pin	0.5 to 120	V
Output voltage(LDR)	V_{LDR}	LDR pin	0.5 to 120	V
Output voltage(OUT1/2)	$V_{OUT1/2}$	OUT1,OUT2 pin	0.5 to 120	V
Power dissipation	P_D	$T_a \leq 85^\circ\text{C}$	100	mW
Storage temperature range	T_{STG}		-55 to +125	$^\circ\text{C}$

Note. The device may be damaged or deteriorated if any of the above parameter ratings is exceeded.

Recommended Operating Conditions

Parameter	Symbol	Condition	Rating			Unit	
			MIN	TYP	MAX		
Supply voltage range	V_{DD2}		1.6	3.0	5.5	V	
Operating temperature	T_{OPR}		-40	-	85	$^\circ\text{C}$	
Operating current	I_{DD2}	Including coil current, $V_{DD}=3.0\text{V}$	-	-	60^{*1}	mA	
		Including coil current, $V_{DD}=5.0\text{V}$	-	-	36^{*1}		
Current limit resistance	R_{CHV}	$V_{DD} \leq 4.0\text{V}$	0	-	-	k Ω	
		$V_{DD} > 4.0\text{V}$	20	-	-		
	R_{OUT}	$V_{DD} \leq 4.0\text{V}$	EL Size $\leq 30\text{cm}^2$	0	-	-	k Ω
			EL Size $> 30\text{cm}^2$	1.0	-	-	
$V_{DD} > 4.0\text{V}$	EL Size $\leq 30\text{cm}^2$	0	-	1.0			
	EL Size $> 30\text{cm}^2$	1.0^{*2}	-	1.0^{*2}			
Coil inductance	L_{LDR}	$f_{LDR}=64\text{kHz}$	-	470	-	μH	

*1. When it is designed, these ratings should not be exceeded, including device variations.

*2. These values should be fixed at 1.0k Ω .

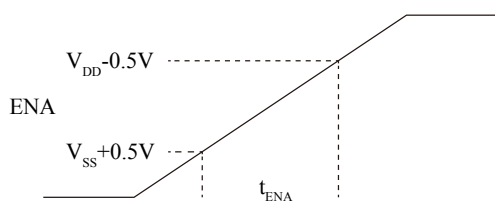
DC Characteristics

$V_{DD}=3.0V$, $T_a=25^{\circ}C$ unless otherwise noted.

Parameter	Pin	Symbol	Condition	Rating			Unit
				MIN	TYP	MAX	
Supply voltage	VDD	V_{DD}		1.6	3.0	5.5	V
Output voltage	CHV	V_{CHV}		0.5	-	100	V
	OUT1/2	V_{OUTH}		-	-	100	V
	OUT1/2	V_{OUTL}		-	-	0.5	V
Output resistance	LDR	R_{LDR}	$I_{LDR}=50mA$	-	8.0	12.0	Ω
Oscillator frequency	OSC	f_{OSC1}	$R_{OSC}=180k\Omega$	205	256	307	kHz
Oscillator frequency range		f_{OSC2}		32	-	1024	kHz
Output frequency ^{*1}	OUT1/2	f_{OUT1}	$R_{OSC}=180k\Omega$	200	250	300	Hz
Output frequency range		f_{OUT2}		31	-	1000	Hz
Inductance driver frequency ^{*1}	LDR	f_{LDR1}	$R_{OSC}=180k\Omega$	51	64	77	kHz
Inductance driver frequency range		f_{LDR2}		8	-	256	kHz
HIGH-level input voltage	ENA	V_{ENAH}	ENA="H" $V_{DD}=1.6$ to $5.5V$	$V_{DD}-0.5$	-	$V_{DD}+0.3$	V
LOW-level input voltage		V_{ENAL}	ENA="L" $V_{DD}=1.6$ to $5.5V$	$V_{SS}-0.3$	-	$V_{SS}+0.5$	V
Input current	ENA	I_{ENAH}	$V_{ENAH}=V_{DD}=3.0V$	2.0	4.0	6.0	μA
Rise time ^{*2}	ENA	t_{ENA}	$V_{ENAL} \rightarrow V_{ENAH}$	-	-	100	ms
Operating current	VDD	I_{DD1}	Excluding coil current	-	-	0.5	mA
Stand-by current	VDD	I_{STB}	ENA="L"	-	-	1.0	μA

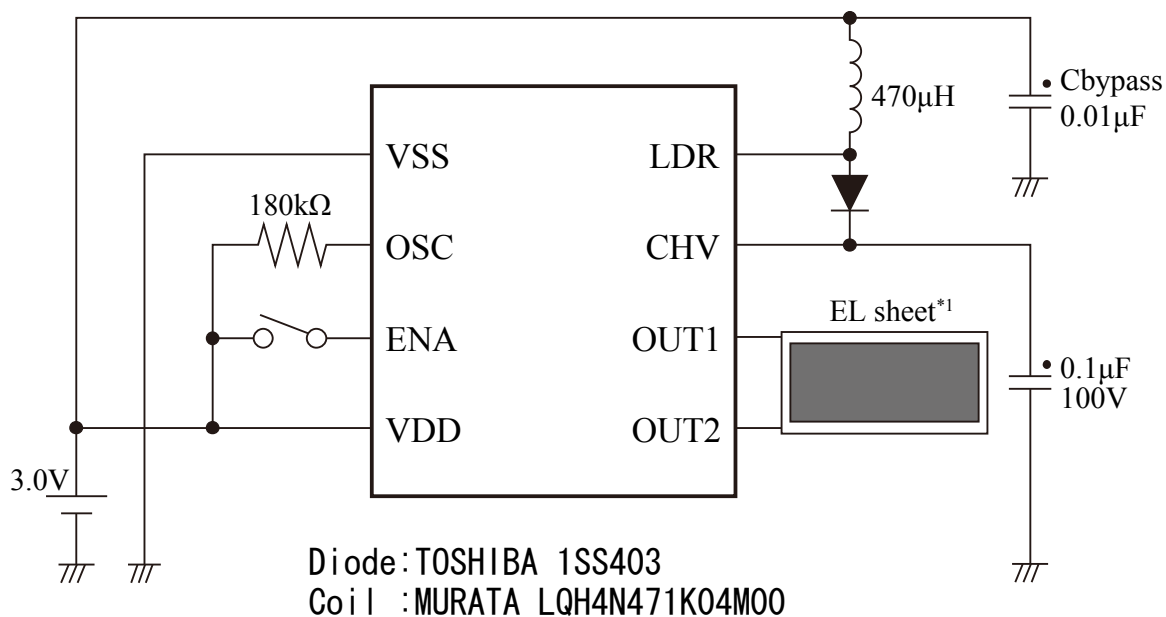
*1. Output frequency=(1/256)×Inductance driver frequency

*2. Rise time

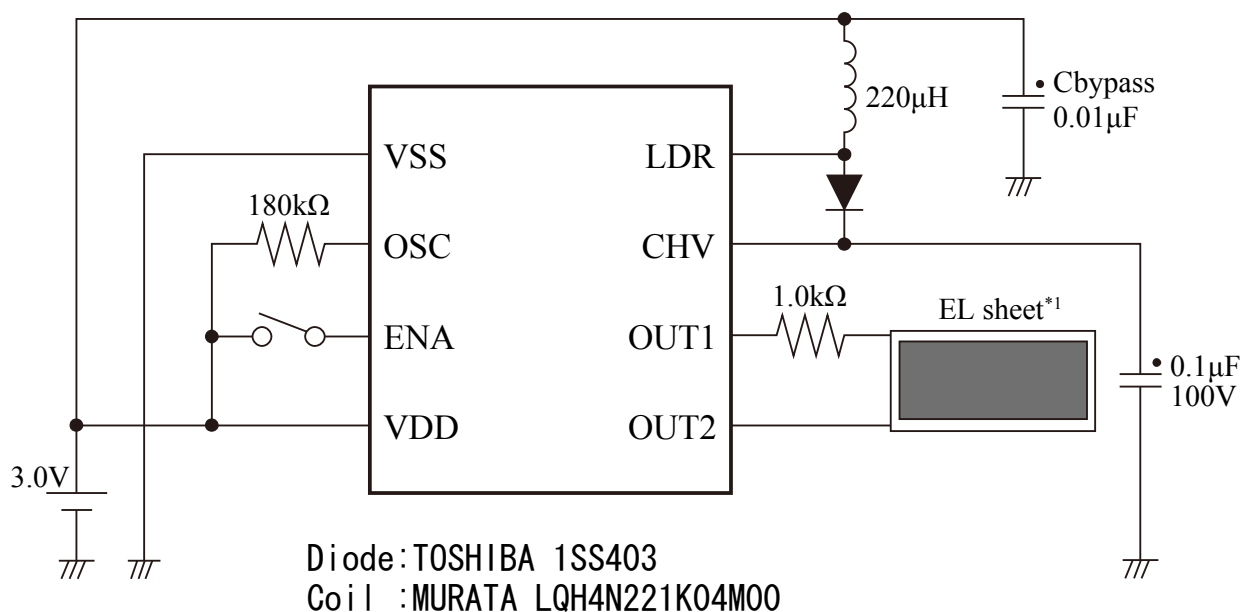


TYPICAL APPLICATIONS

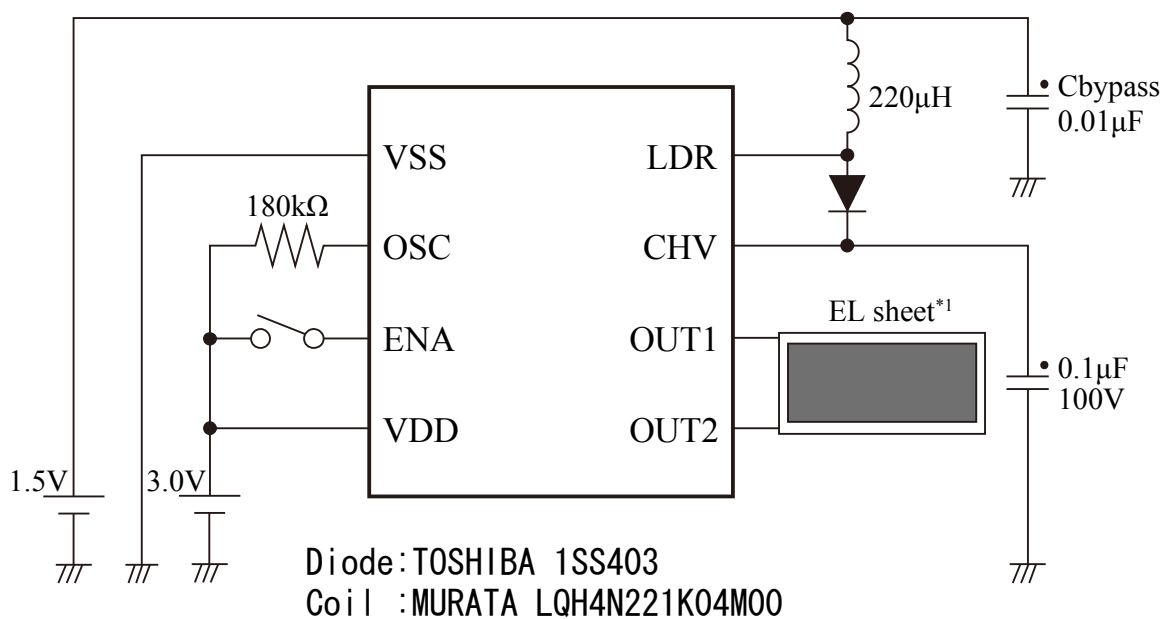
- (1) EL sheet size : 20 to 30cm²
 Current consumption : 20mA



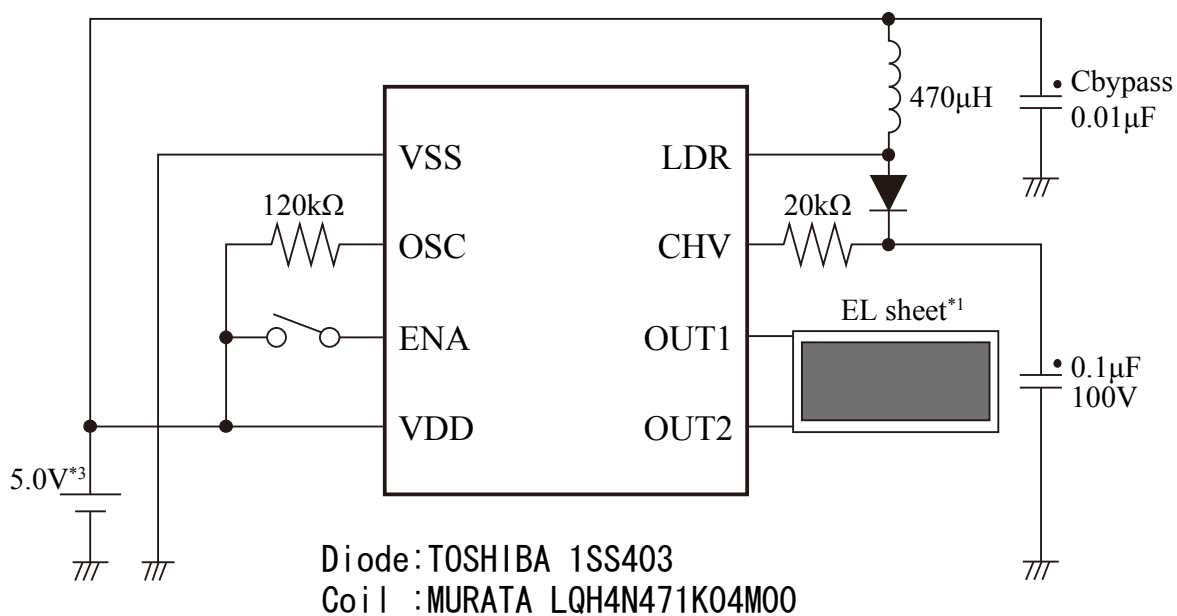
- (2) EL sheet size : 30 to 50cm² *2
 Current consumption : 40mA



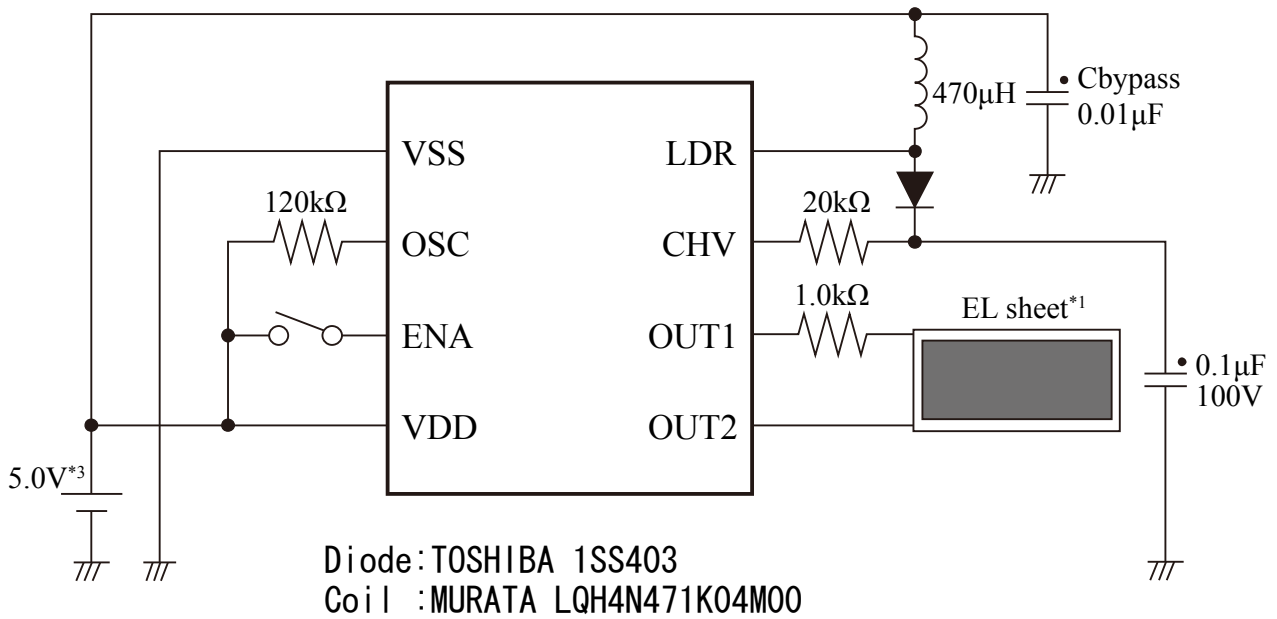
(3) EL sheet size : 10 to 15cm²
 Current consumption : 20mA



(4) EL sheet size : 10 to 20cm²
 Current consumption : 26mA



(5) EL sheet size : 30 to 50 cm²*2
 Current consumption : 34mA



- *1. Do not operate the IC with the EL sheet NOT connected (no load to OUT1/OUT2) since the IC will be damaged.
- *2. If the EL sheet size is exceeded 30cm², connect a 1.0kΩ resistor between the EL sheet and the OUT1 pin.
- *3. When the supply voltage is exceeded 4.0V, connect a 20kΩ resistor to CHV for current limit, and the OUT1 pin resistor is set 1.0kΩ (EL sheet size>30cm²) or 1.0kΩ or less (EL sheet size≤30cm²).

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ND11013-E-00 2011.10