

## OVERVIEW

The SM8143A is a transformer-less electroluminescent (EL) driver IC, capable of driving displays up to 80 cm<sup>2</sup> in size. It is a high-efficiency driver that features revised coil switching transistor ON resistance and output circuit configuration to reduce loss.

The EL drive frequency and coil drive frequency can be controlled independently, making the driver circuit optimizable to match application requirements. A microcontroller interface pin (ENA) is provided, which can be used to control the EL driver ON/OFF function. The device is available in 16-pin VSOP packages.

## FEATURES

- Dedicated EL driver
- 1.6 to 5.5 V supply voltage
- 150mA maximum operating current  
(V<sub>DD</sub> = 3.0V, Ta ≤ 70°C)
- 3.5Ω typical output resistance
- 200 Vp-p maximum EL driver voltage\*
- 31 to 1500 Hz EL drive frequency range\*
- High voltage CMOS Process
- 16-pin VSOP plastic package

\*: Adjustable with external resistance.

## APPLICATIONS

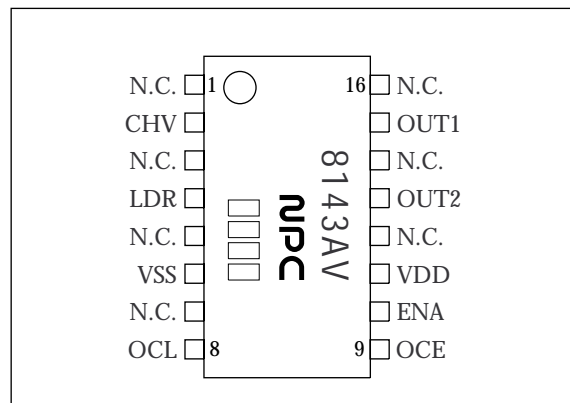
- Hand held PC, Palm size PC
- Mobile IT equipment
- White EL

## ORDERING INFORMATION

Device	Package
SM8143AV	16-pin VSOP

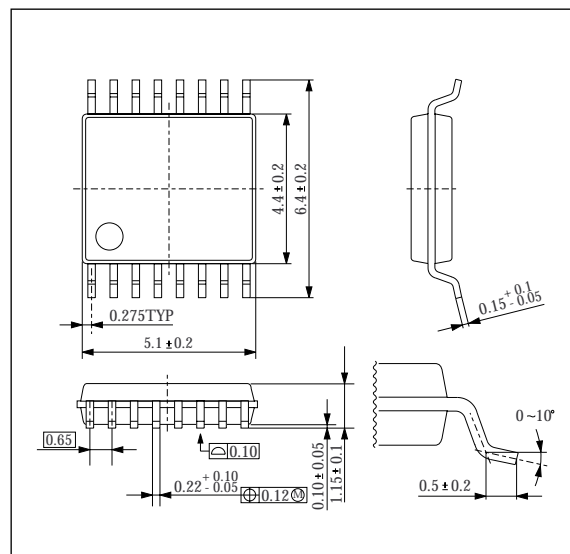
## PINOUT

(Top view)

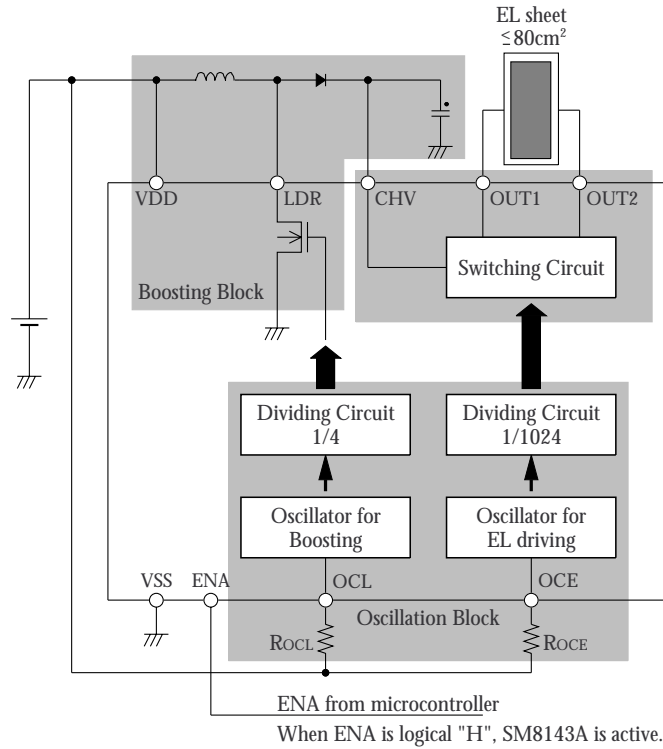


## PACKAGE DIMENSIONS

(Unit : mm)



**BLOCK DIAGRAM**



Note: Brightness and operating current are adjusted with  $R_{OCL}$ .  
 EL driving frequency is adjusted with  $R_{OCE}$ .

**PIN DESCRIPTION**

Pin number	Name	I/O	Function
1	N.C.	-	No connection (must be open)
2	CHV	I	High-voltage DC input
3	N.C.	-	No connection (must be open)
4	LDR	O	Booster coil driver output
5	N.C.	-	No connection (must be open)
6	VSS	-	Ground
7	N.C.	-	No connection (must be open)
8	OCL	I	Coil driver oscillator (oscillator frequency determined by external resistor)
9	OCE	I	EL driver oscillator (oscillator frequency determined by external resistor)
10	ENA	I	Enable input (built-in pull-down resistor)
11	VDD	-	Supply
12	N.C.	-	No connection (must be open)
13	OUT2	O	Output 2
14	N.C.	-	No connection (must be open)
15	OUT1	O	Output 1
16	N.C.	-	No connection (must be open)

## 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	$V_{CHV}$	CHV pin	0.5 to 120	V
	$V_{LDR}$	LDR pin	0.5 to 120	V
	$V_{OUT1/2}$	OUT1, OUT2 pin	0.5 to 120	V
Power dissipation	$P_D$	$T_a \leq 70\text{ }^\circ\text{C}$	200	mW
		$T_a \leq 85\text{ }^\circ\text{C}$	140	mW
Storage temperature range	$T_{STG}$		- 55 to 125	$^\circ\text{C}$

### 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 <sup>1</sup>	$I_{DD2}$	Including coil current, $V_{DD} = 3.0\text{V}$ , $T_a \leq 70\text{ }^\circ\text{C}$	-	-	150	mA
		Including coil current, $V_{DD} = 5.0\text{V}$ , $T_a \leq 70\text{ }^\circ\text{C}$	-	-	100	mA
		Including coil current, $V_{DD} = 3.0\text{V}$ , $T_a \leq 85\text{ }^\circ\text{C}$	-	-	105	mA
		Including coil current, $V_{DD} = 5.0\text{V}$ , $T_a \leq 85\text{ }^\circ\text{C}$	-	-	70	mA
Coil inductance	$L_{LDR}$	$f_{LDR} = 64\text{ kHz}$	-	0.47	-	mH

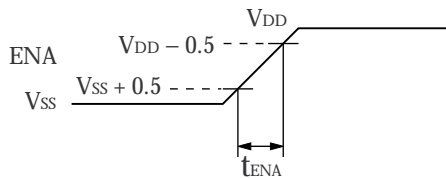
1. Max value is as same as Absolute Maximum Ratings.

## DC Characteristics

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

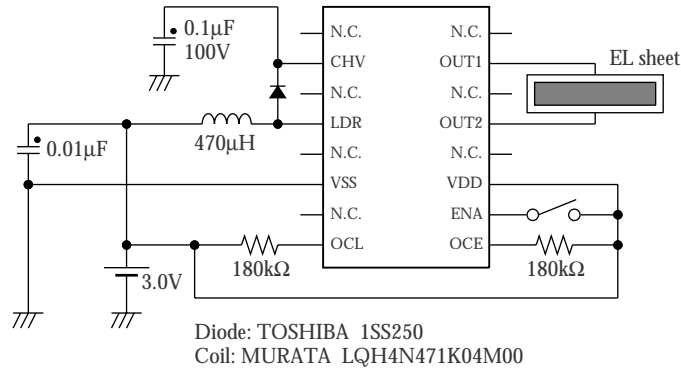
Parameter	Symbol	Condition	Rating			Unit
			min	typ	max	
Supply voltage	$V_{DD}$		1.6	3.0	5.5	V
CHV output voltage	$V_{CHV}$		0.5	-	100	V
OUT1, OUT2 HIGH-level output voltage	$V_{OUTH}$		-	-	100	V
OUT1, OUT2 LOW-level output voltage	$V_{OUTL}$		-	-	0.5	V
LDR output resistance	$R_{LDR}$	$I_{LDR} = 50\text{ mA}$	-	3.5	5.25	$\Omega$
OCE oscillator frequency	$f_{OCE1}$	$R_{OCE} = 180\text{ k}\Omega$	205	256	307	kHz
OCE oscillator frequency range	$f_{OCE2}$		32	-	1536	
OCL oscillator frequency	$f_{OCL1}$	$R_{OCL} = 180\text{ k}\Omega$	205	256	307	kHz
OCL oscillator frequency range	$f_{OCL2}$		32	-	1536	
OUT1, OUT2 output frequency	$f_{OUT1}$	$R_{OCE} = 180\text{ k}\Omega$	200	250	300	Hz
OUT1, OUT2 output frequency range	$f_{OUT2}$		31	-	1500	
LDR inductance driver frequency	$f_{LDR1}$	$R_{OCL} = 180\text{ k}\Omega$	51	64	77	kHz
LDR inductance driver frequency range	$f_{LDR2}$		8	-	384	
ENA HIGH-level input voltage	$V_{ENAH}$	ENA = HIGH, $V_{DD} = 1.6\text{ to }5.5\text{ V}$	$V_{DD} - 0.5$	-	$V_{DD} + 0.3$	V
ENA LOW-level input voltage	$V_{ENAL}$	ENA = LOW, $V_{DD} = 1.6\text{ to }5.5\text{ V}$	$V_{SS} - 0.3$	-	$V_{SS} + 0.5$	
ENA input current	$I_{ENAH}$	$V_{ENAH} = V_{DD} = 3.0\text{ V}$	2.0	4.0	6.0	$\mu\text{A}$
ENA rise time <sup>1</sup>	$t_{ENA}$		-	-	100	$\mu\text{s}$
Operating current	$I_{DD1}$	Excluding coil current	-	-	1.0	mA
Stand-by current	$I_{STB}$	ENA = LOW	-	-	1.0	$\mu\text{A}$

1.

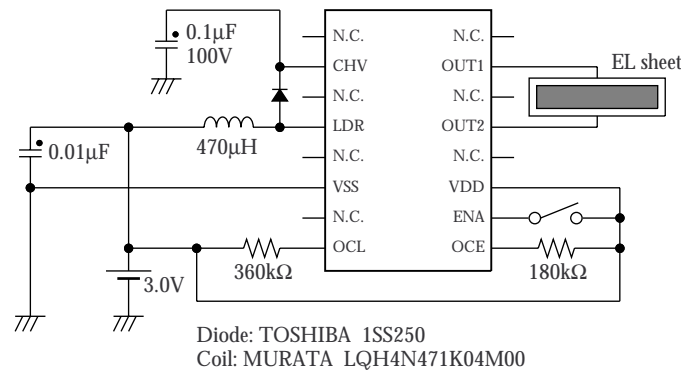


**TYPICAL APPLICATIONS**

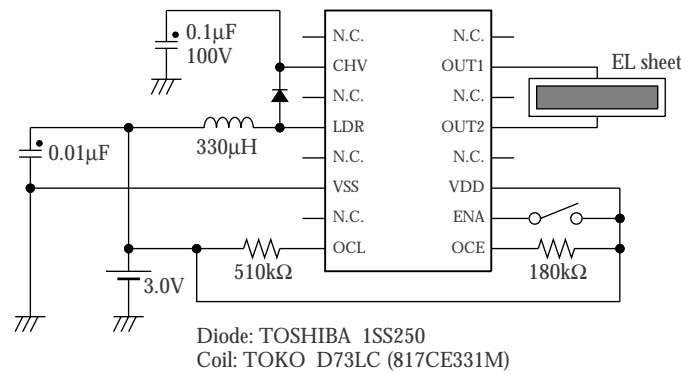
- EL sheet size: 20 to 30cm<sup>2</sup>, Current consumption: 20mA



- EL sheet size: 30 to 50cm<sup>2</sup>, Current consumption: 40mA



- EL sheet size: 50 to 100cm<sup>2</sup>, Current consumption: 80mA



Note: Do not operate the SM8143A with the EL sheet NOT connected (no load to OUT1/OUT2) since the IC will be damaged.

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