

### OVERVIEW

The SM8143A is a transformer-less electroluminescent (EL) driver IC, capable of driving displays up to 80cm<sup>2</sup> (SM8143AV) or 70cm<sup>2</sup> (SM8143AD) 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.

### FEATURES

- Dedicated EL driver
- 1.6 to 5.5V supply voltage
- Maximum operating current
  - SM8143AV: 150mA max. (V<sub>DD</sub> = 3.0V, Ta ≤ 70°C)
  - SM8143AD: 100mA max. (V<sub>DD</sub> = 3.0V, Ta ≤ 70°C)
- 3.5Ω typical output resistance
- 200Vp-p maximum EL driver voltage\*
- 31 to 1500Hz EL drive frequency range\*
- High voltage CMOS Process
- Package: VSOP-16, SON-10

\*: Adjustable with external resistance.

### APPLICATIONS

- Cellular phone
- Mobile equipment
- PDA

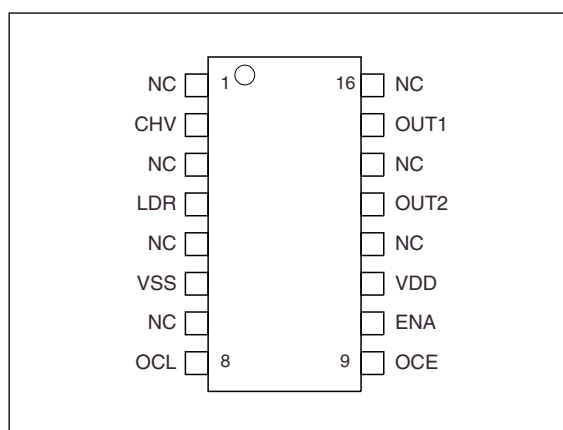
### ORDERING INFORMATION

Device	Package
SM8143AV	VSOP-16
SM8143AD	SON-10

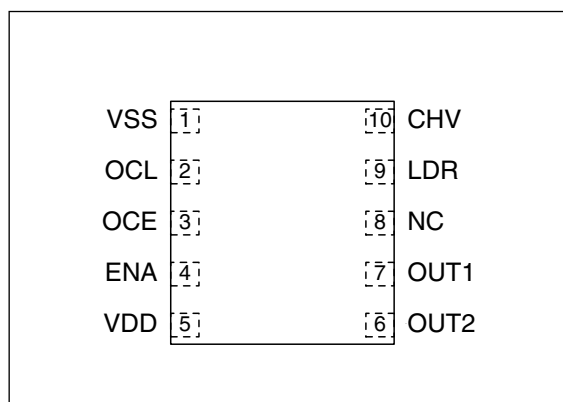
### PINOUT

(Top view)

- VSOP-16



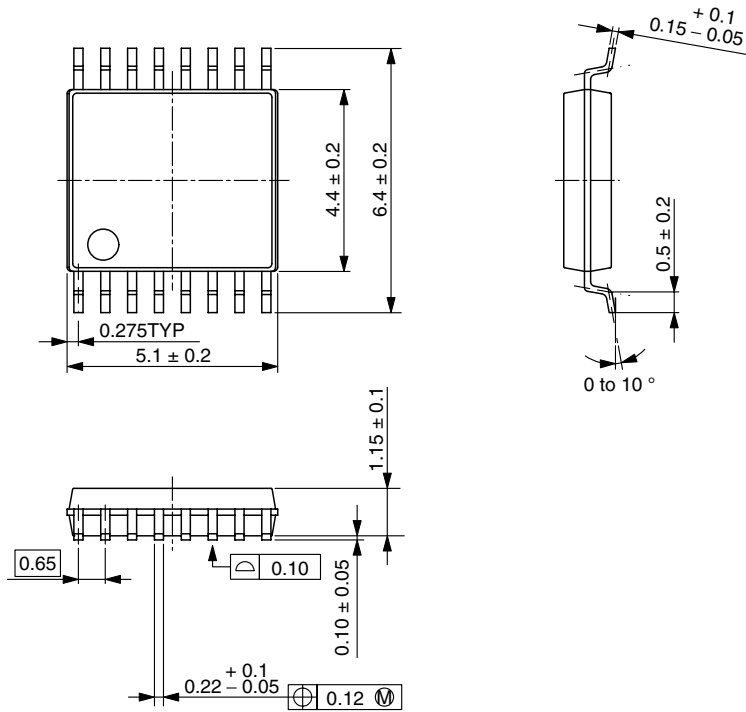
- SON-10



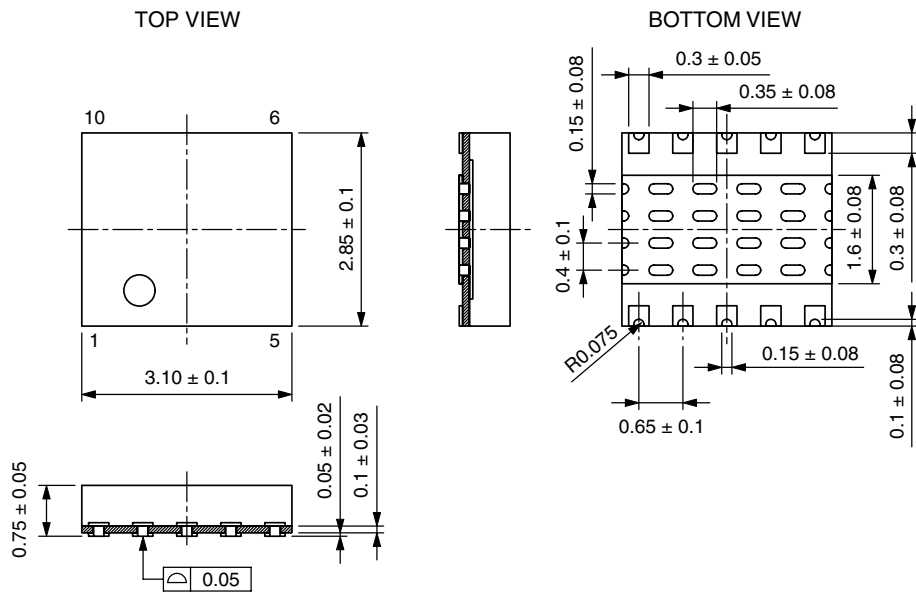
**PACKAGE DIMENSIONS**

(Unit: mm)

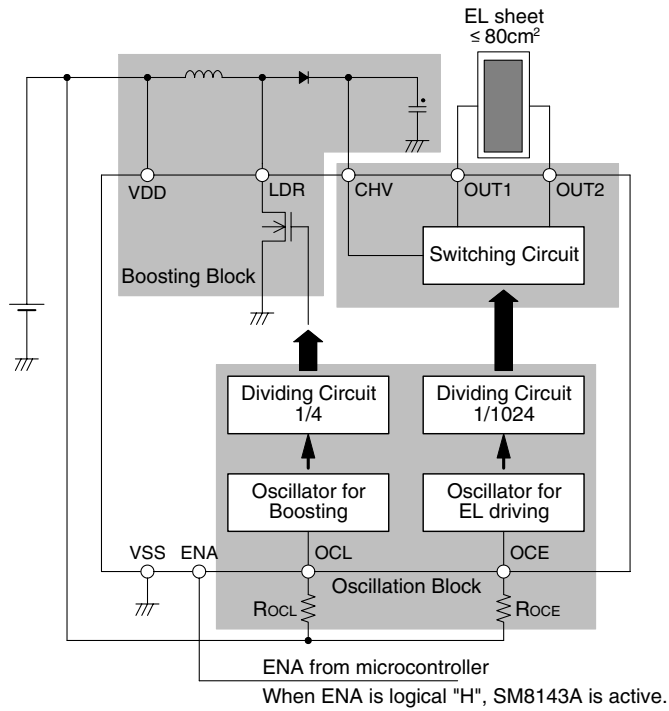
■ VSOP-16



■ SON-10



**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
VSOP-16	SON-10			
1	8	NC	–	No connection (must be open)
2	10	CHV	I	High-voltage DC input
3	–	NC	–	No connection (must be open)
4	9	LDR	O	Booster coil driver output
5	–	NC	–	No connection (must be open)
6	1	VSS	–	Ground
7	–	NC	–	No connection (must be open)
8	2	OCL	I	Coil driver oscillator (oscillator frequency determined by external resistor)
9	3	OCE	I	EL driver oscillator (oscillator frequency determined by external resistor)
10	4	ENA	I	Enable input (built-in pull-down resistor)
11	5	VDD	–	Supply
12	–	NC	–	No connection (must be open)
13	6	OUT2	O	Output 2
14	–	NC	–	No connection (must be open)
15	7	OUT1	O	Output 1
16	–	NC	–	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	$P_D$	SM8143AV (VSOP-16)	$T_a \leq 70^\circ\text{C}$	200	mW
			$T_a \leq 85^\circ\text{C}$	140	mW
		SM8143AD (SON-10)	$T_a \leq 70^\circ\text{C}$	140	mW
			$T_a \leq 85^\circ\text{C}$	100	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>	$I_{DD2}$	SM8143AV (VSOP-16) Including coil current	$V_{DD} = 3\text{V}$	$T_a \leq 70^\circ\text{C}$	-	-	150	mA
				$T_a \leq 85^\circ\text{C}$	-	-	105	mA
			$V_{DD} = 5\text{V}$	$T_a \leq 70^\circ\text{C}$	-	-	100	mA
				$T_a \leq 85^\circ\text{C}$	-	-	70	mA
		SM8143AD (SON-10) Including coil current	$V_{DD} = 3\text{V}$	$T_a \leq 70^\circ\text{C}$	-	-	100	mA
				$T_a \leq 85^\circ\text{C}$	-	-	70	mA
			$V_{DD} = 5\text{V}$	$T_a \leq 70^\circ\text{C}$	-	-	60	mA
				$T_a \leq 85^\circ\text{C}$	-	-	42	mA
Coil inductance	$L_{LDR}$	$f_{LDR} = 64\text{kHz}$		-	0.47	-	mH	

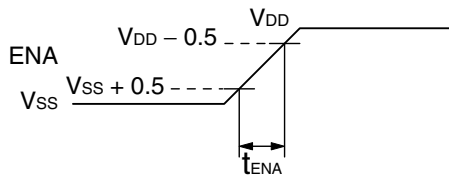
1. Max value is as same as Absolute Maximum Ratings.

## DC Characteristics

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

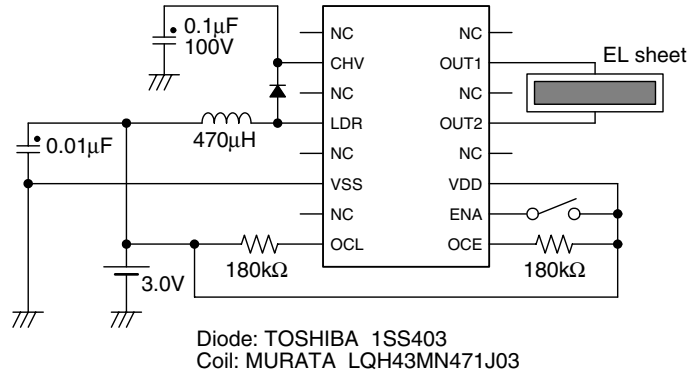
Parameter	Symbol	Condition	Rating			Unit
			min	typ	max	
Supply voltage	$V_{DD}$		1.6	3.0	5.5	V
CHV output voltage	$V_{CHV}$		0.5	–	100	V
OUT1, OUT2 HIGH-level output voltage	$V_{OUTH}$		–	–	100	V
OUT1, OUT2 LOW-level output voltage	$V_{OUTL}$		–	–	0.5	V
LDR output resistance	$R_{LDR}$	$I_{LDR} = 50mA$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

1.

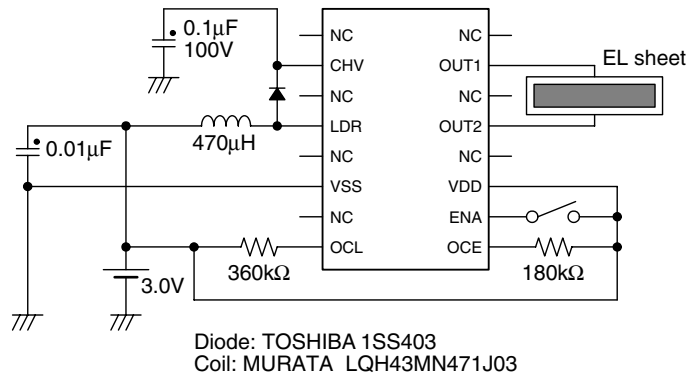


**TYPICAL APPLICATIONS**

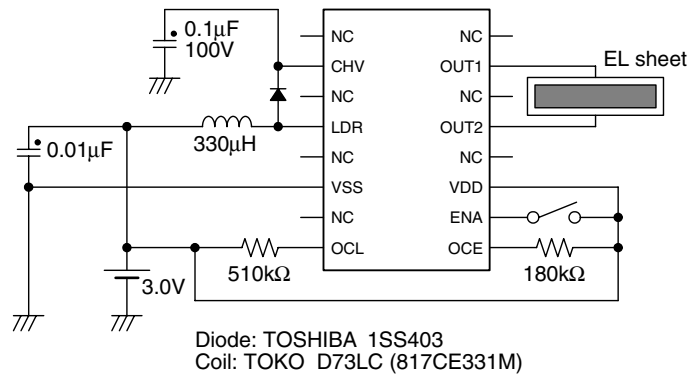
- EL sheet size: 20 to 30cm<sup>2</sup>, Current consumption: 20mA



- 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.

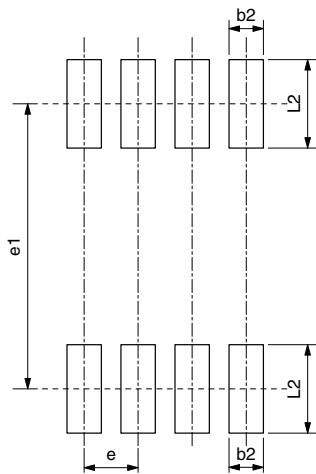
## FOOTPRINT

The optimum footprint varies depending on the board material, soldering paste, soldering method, and equipment accuracy, all of which need to be considered to meet design specifications.

(Unit: mm)

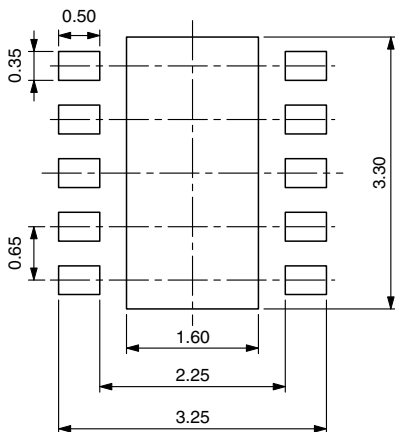
### ■ VSOP-16

Package	b2	L2	e	e1
VSOP-16	0.55	0.95	0.65	5.90

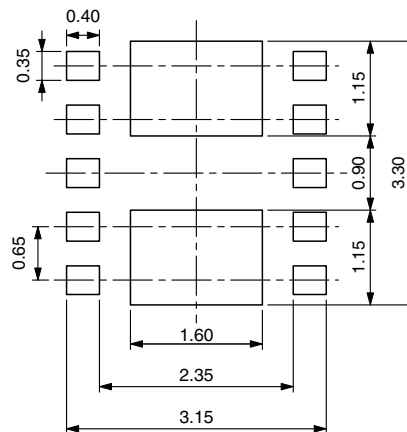


### ■ SON-10

#### • Footprint pattern



#### • Metalmask pattern



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NC9923CE 2006.06