OVERVIEW

The SM8143A is a transformer-less electroluminescent (EL) driver IC, capable of driving displays up to 80cm^2 (SM8143AV) or 70cm^2 (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_{DD} = 3.0V, Ta ≤ 70°C)
  - SM8143AD: 100mA max. (V_{DD} = 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

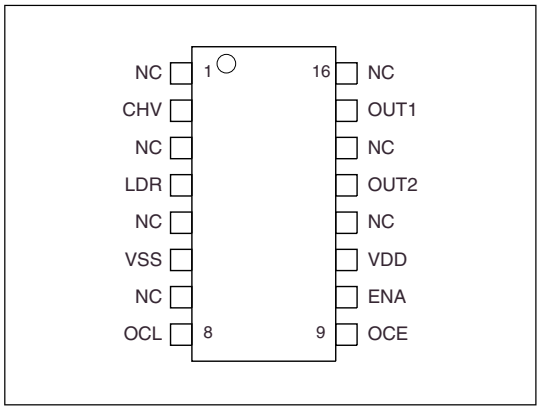
ORDERING INFORMATION

Device	Package
SM8143AV	VSOP-16
SM8143AD	SON-10

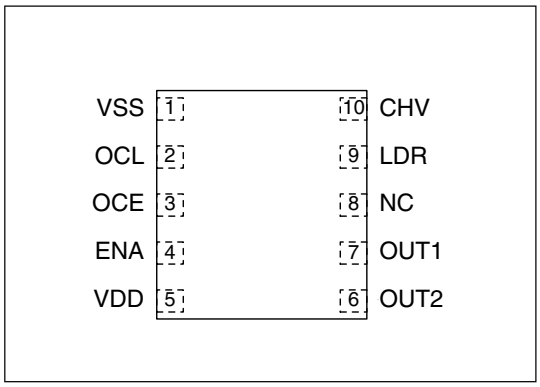
PINOUT

(Top view)

- VSOP-16



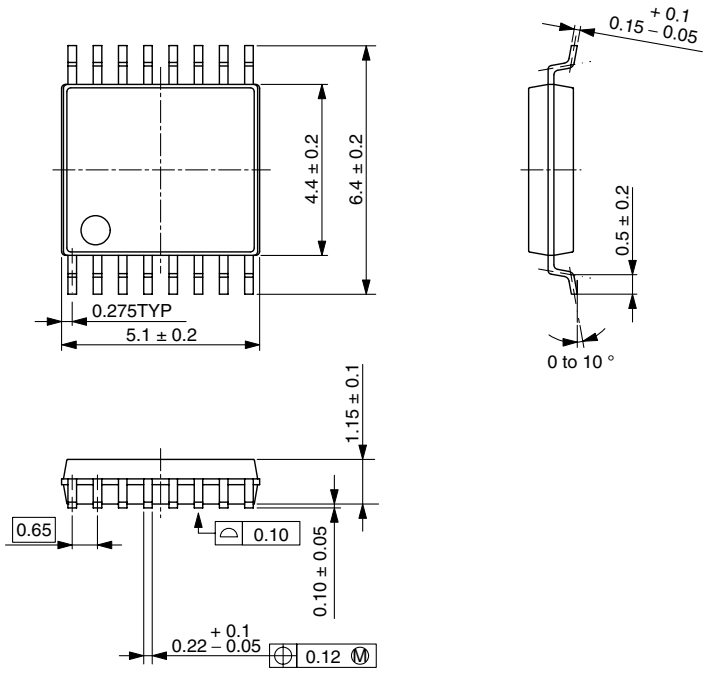
- SON-10



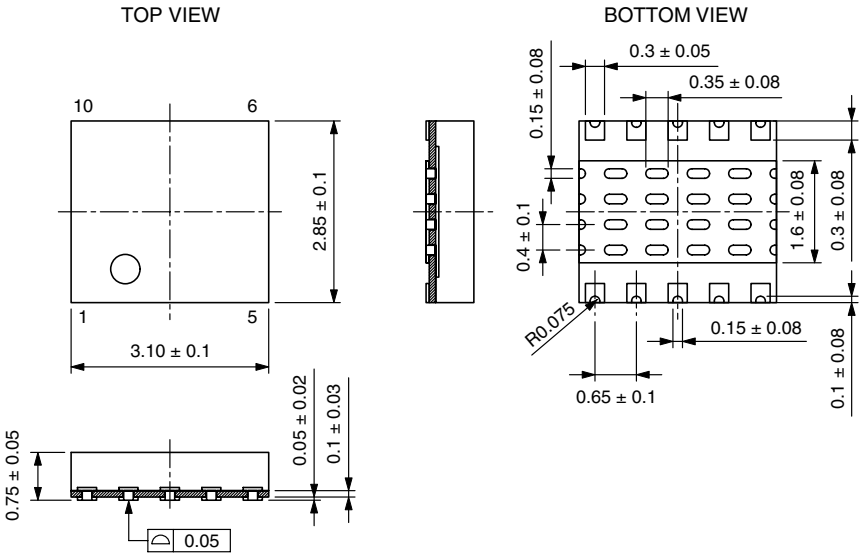
PACKAGE DIMENSIONS

(Unit: mm)

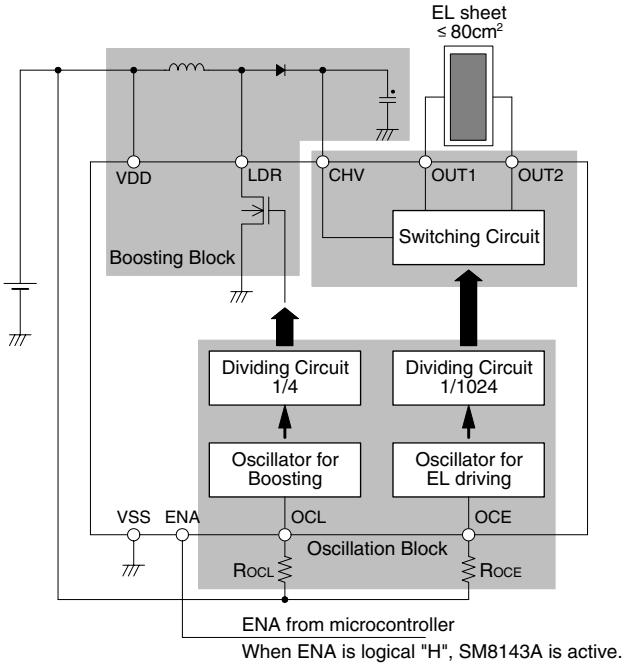
■ VSOP-16



■ 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)	Ta ≤ 70°C	200	mW
			Ta ≤ 85°C	140	mW
		SM8143AD (SON-10)	Ta ≤ 70°C	140	mW
			Ta ≤ 85°C	100	mW
Storage temperature range	T_{STG}			– 55 to 125	°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	°C
Operating current[1]	I_{DD2}	SM8143AV (VSOP-16) Including coil current	V_{DD} = 3V	Ta ≤ 70°C	–	–	150	mA
				Ta ≤ 85°C	–	–	105	mA
			V_{DD} = 5V	Ta ≤ 70°C	–	–	100	mA
				Ta ≤ 85°C	–	–	70	mA
		SM8143AD (SON-10) Including coil current	V_{DD} = 3V	Ta ≤ 70°C	–	–	100	mA
				Ta ≤ 85°C	–	–	70	mA
			V_{DD} = 5V	Ta ≤ 70°C	–	–	60	mA
				Ta ≤ 85°C	–	–	42	mA
Coil inductance	L_{LDR}	f_{LDR} = 64kHz			–	0.47	–	mH

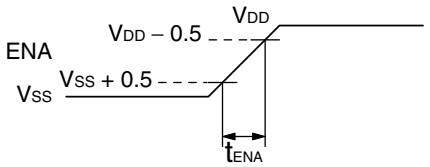
1. Max value is as same as Absolute Maximum Ratings.

DC Characteristics

V_{DD} = 3.0V, Ta = 25°C unless otherwise noted.

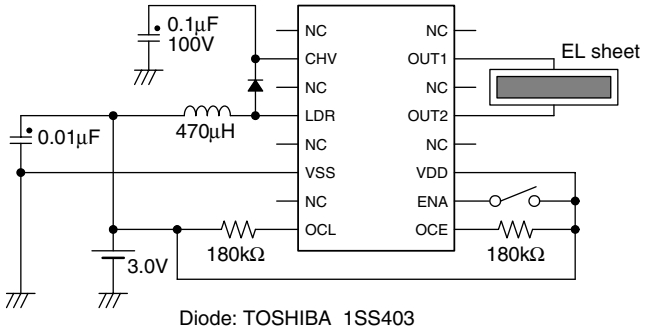
Parameter	Symbol	Condition	Rating			Unit
			min	typ	max	
Supply voltage	V_{DD}		1.6	3.0	5.5	V
CHV output voltage	V_{CHV}		0.5	–	100	V
OUT1, OUT2 HIGH-level output voltage	V_{OUTH}		–	–	100	V
OUT1, OUT2 LOW-level output voltage	V_{OUTL}		–	–	0.5	V
LDR output resistance	R_{LDR}	I_{LDR} = 50mA	–	3.5	5.25	Ω
OCE oscillator frequency	f_{OCE1}	R_{OCE} = 180kΩ	205	256	307	kHz
OCE oscillator frequency range	f_{OCE2}		32	–	1536	
OCL oscillator frequency	f_{OCL1}	R_{OCL} = 180kΩ	205	256	307	kHz
OCL oscillator frequency range	f_{OCL2}		32	–	1536	
OUT1, OUT2 output frequency	f_{OUT1}	R_{OCE} = 180kΩ	200	250	300	Hz
OUT1, OUT2 output frequency range	f_{OUT2}		31	–	1500	
LDR inductance driver frequency	f_{LDR1}	R_{OCL} = 180kΩ	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	µA
ENA rise time[1]	t_{ENA}		–	–	100	µs
Operating current	I_{DD1}	Excluding coil current	–	–	1.0	mA
Stand-by current	I_{STB}	ENA = LOW	–	–	1.0	µA

1.



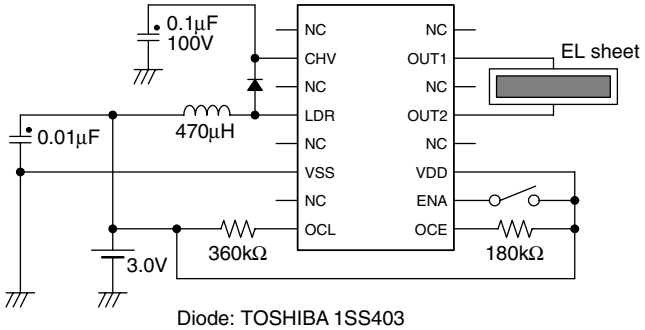
TYPICAL APPLICATIONS

■ EL sheet size: 20 to 30cm^2, Current consumption: 20mA



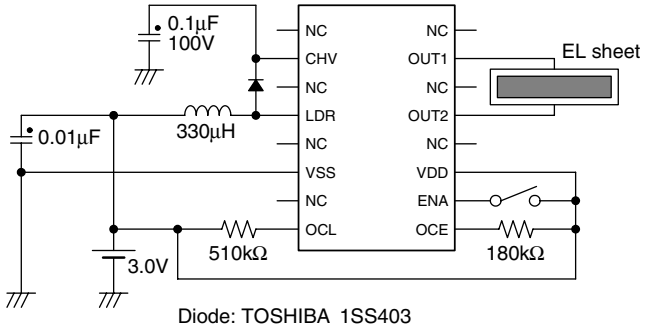
Diode: TOSHIBA 1SS403
Coil: MURATA LQH43MN471J03

■ EL sheet size: 30 to 50cm^2, Current consumption: 40mA



Diode: TOSHIBA 1SS403
Coil: MURATA LQH43MN471J03

■ EL sheet size: 50 to 100cm^2, Current consumption: 80mA



Diode: TOSHIBA 1SS403
Coil: TOKO D73LC (817CE331M)

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

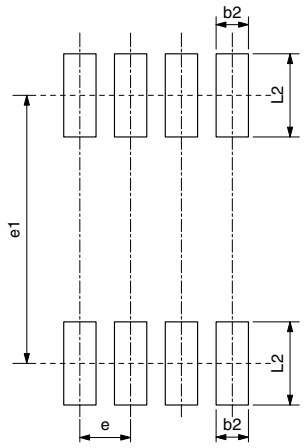
FOOTPRINT

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)

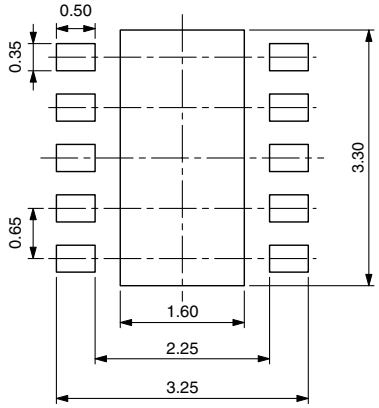
■ VSOP-16

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

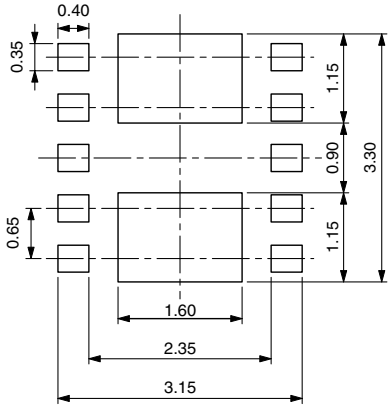


■ SON-10

• Footprint pattern



• Metalmask pattern



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