

## Off-Line, High Voltage EL Lamp Driver

### Features

- ▶ Processed with HVCMOS® technology
- ▶ Input voltage up to 200V DC
- ▶ 400V peak-to-peak output voltage
- ▶ Output load up to 350nF (100 in<sup>2</sup> for 3.5nF/in<sup>2</sup> lamp)
- ▶ Adjustable output lamp frequency
- ▶ Adjustable on/off pulsing frequency

### Applications

- ▶ Electronic organizers
- ▶ Handheld portable computers
- ▶ Display signs
- ▶ Portable instrumentation equipment

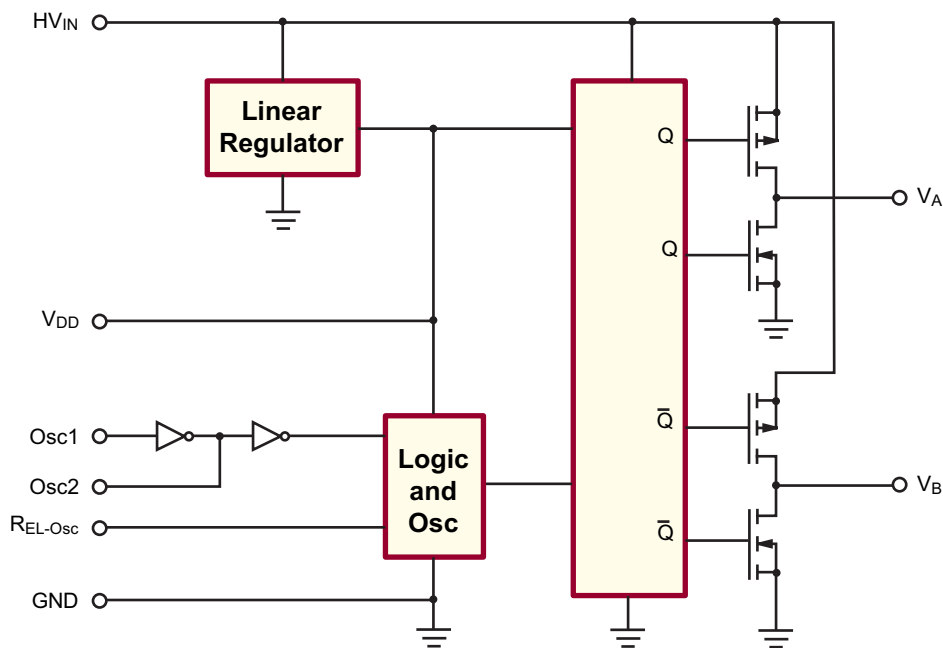
### General Description

The Supertex HV809 is an off-line, high voltage, EL lamp driver integrated circuit designed for driving EL lamps of up to 350nF at 400Hz. The input supply voltage can be a rectified nominal 120VAC source or any other DC source up to 200V. The HV809 will supply the EL lamp with an AC square wave with a peak-to-peak voltage of two times the input DC voltage.

The HV809 has two internal oscillators, a low voltage output linear regulator, and a high voltage output H-bridge. The high voltage output H-bridge frequency is set by an external resistor connected between the R<sub>EL-Osc</sub> and GND pins. The EL lamp is connected between pins V<sub>A</sub> and V<sub>B</sub>. For the HV809 in the 8-pin package, an external RC network can be connected between the oscillator's Osc1 and Osc2 pins to pulse the EL lamp on and off.

For detailed circuit and application information please refer to Application Note AN-H36.

### Block Diagram



## Ordering Information

Device	Package Options		
	8-Lead SO	8-Lead SO + Slug	7-Lead TO-220
HV809	HV809LG-G	HV809SG-G	HV809K2-G



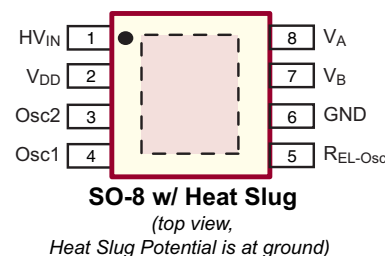
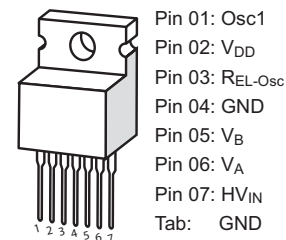
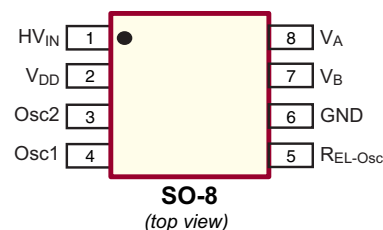
-G indicates package is RoHS compliant ('Green')

## Absolute Maximum Ratings

Parameter	Value
HV <sub>IN</sub> , Input voltage	+210V
V <sub>DD</sub> , Internal logic voltage	+15V
Operating temperature Range	-25°C to +85°C
Storage temperature Range	-55°C to +150°C
Power dissipation:	
SO-8	500mW
SO-8 + Slug	1.5 Watts
7-Lead TO-220	15Watts

Absolute Maximum Ratings are those values beyond which damage to the device may occur. Functional operation under these conditions is not implied. Continuous operation of the device at the absolute rating level may affect device reliability. All voltages are referenced to device ground.

## Pin Configurations



## Electrical Characteristics

DC Characteristics (Over recommended operating conditions unless otherwise specified - T<sub>A</sub> = 25°C)

Symbol	Parameter	Min	Typ	Max	Units	Conditions
I <sub>IN</sub>	High voltage supply current	-	-	70	mA	HV <sub>IN</sub> = 170V, R <sub>EL</sub> = 1.0MΩ, C <sub>L</sub> = 350nF
		-	-	9.0	mA	HV <sub>IN</sub> = 170V, R <sub>EL</sub> = 1.0MΩ, C <sub>L</sub> = 50nF
I <sub>INQ</sub>	Quiescent supply current	-	-	400	μA	HV <sub>IN</sub> = 170V, R <sub>EL-Osc</sub> = 1.0MΩ, Osc1 = GND, No Load
		-	-	100	μA	HV <sub>IN</sub> = 170V, R <sub>EL-osc</sub> = 1.0MΩ, Osc1 = V <sub>DD</sub> , No Load
I <sub>SINK</sub>	Osc2 sink current	-	300	-	μA	V <sub>Osc2</sub> = 1.0V
I <sub>SOURCE</sub>	Osc2 source current	-	100	-	μA	V <sub>Osc2</sub> = V <sub>DD</sub> - 1.0V
I <sub>Osc1</sub>	Osc1 logic input leakage current	-	±10	-	μA	V <sub>Osc1</sub> = 0V and V <sub>DD</sub>
V <sub>H</sub>	Osc1 hysteresis voltage	-	2.5	-	V	---
V <sub>A-B</sub>	Min differential output voltage across lamp	-	-	400	V	HV <sub>IN</sub> = 200V
V <sub>DD</sub>	Internal supply voltage	8.0	10	12	V	No load on V <sub>DD</sub>
I <sub>DD (OUT)</sub>	Minimum output V <sub>DD</sub> current	-	-	4.0	mA	For HV809K2, ΔV <sub>DD</sub> = 1.0V

## Electrical Characteristics

**AC Characteristics** (Over recommended operating conditions unless otherwise specified -  $T_A = 25^\circ\text{C}$ )

Symbol	Parameter	Min	Typ	Max	Units	Conditions
$f_{EL}$	$V_{A-B}$ output drive frequency	320	400	480	Hz	$R_{EL-Osc} = 1.0\text{M}\Omega$ , Osc1 = GND, $C_L = 350\text{nF}$
		0.8	1.0	1.2	kHz	$R_{EL-Osc} = 390\text{K}\Omega$ , Osc1 = GND, $C_L = 150\text{nF}$
$t_r$	Output rise time	-	180	250	$\mu\text{s}$	$C_L = 150\text{nF}$ , $HV_{IN} = 170\text{V}$
$t_f$	Output fall time	-	50	100	$\mu\text{s}$	$C_L = 150\text{nF}$ , $HV_{IN} = 170\text{V}$

## Recommended Operating Conditions

Symbol	Parameter	Min	Typ	Max	Units	Conditions
$HV_{IN}$	High voltage input	50	-	200	V	---
$C_L$	Load capacitance	-	-	350	nF	$R_{EL-Osc} = 1.0\text{M}\Omega$ , $HV_{IN} = 170\text{V}$
		-	-	150	nF	$R_{EL-Osc} = 390\text{K}\Omega$ , $HV_{IN} = 170\text{V}$
$T_A$	Operating temperature	-25	-	85	$^\circ\text{C}$	---

## Function Table

Input	Outputs	
Osc1	$V_A$	$V_B$
GND	Enabled	Enabled
$V_{DD}$	Disabled	Disabled

Figure 1. AC Off-Line EL Lamp

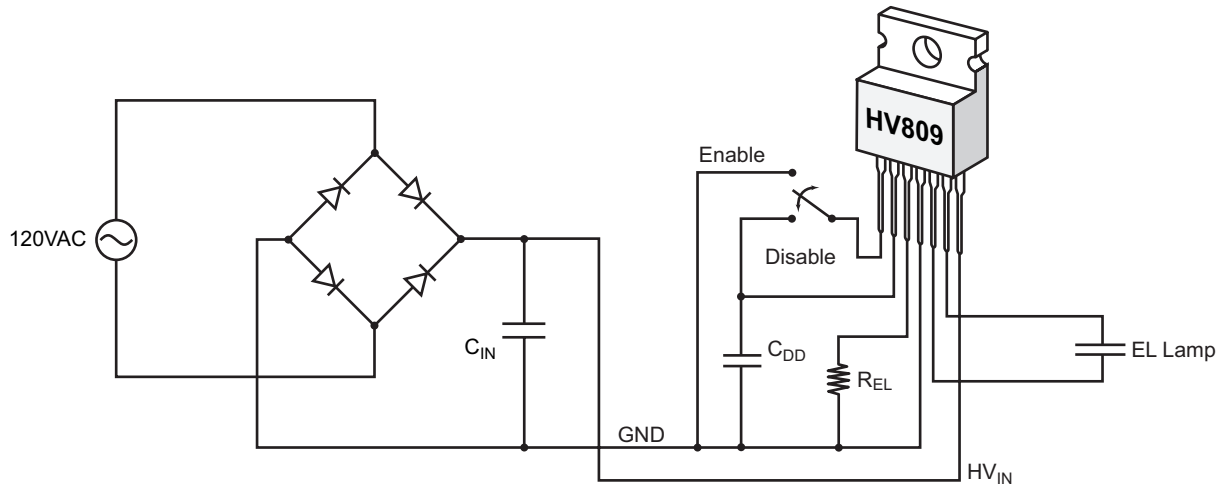


Figure 2. Pulsing EL Lamp

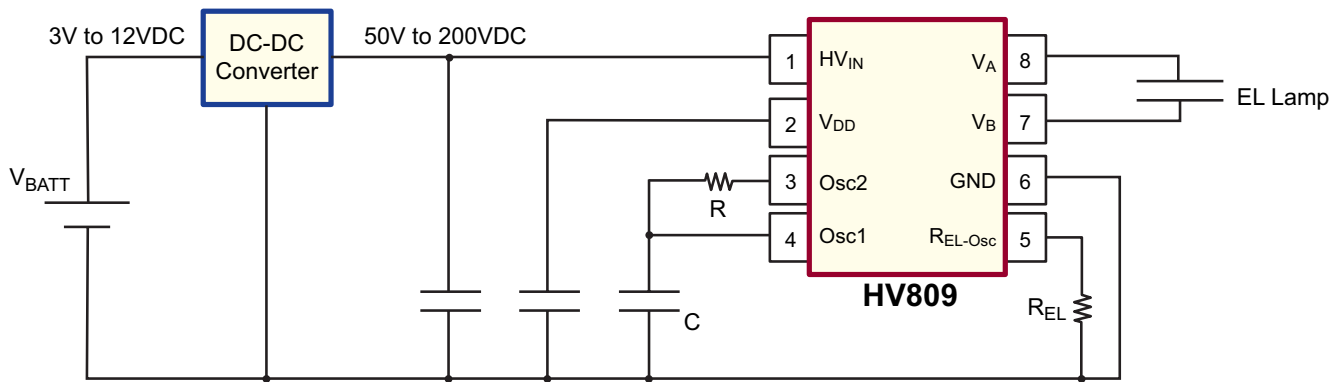
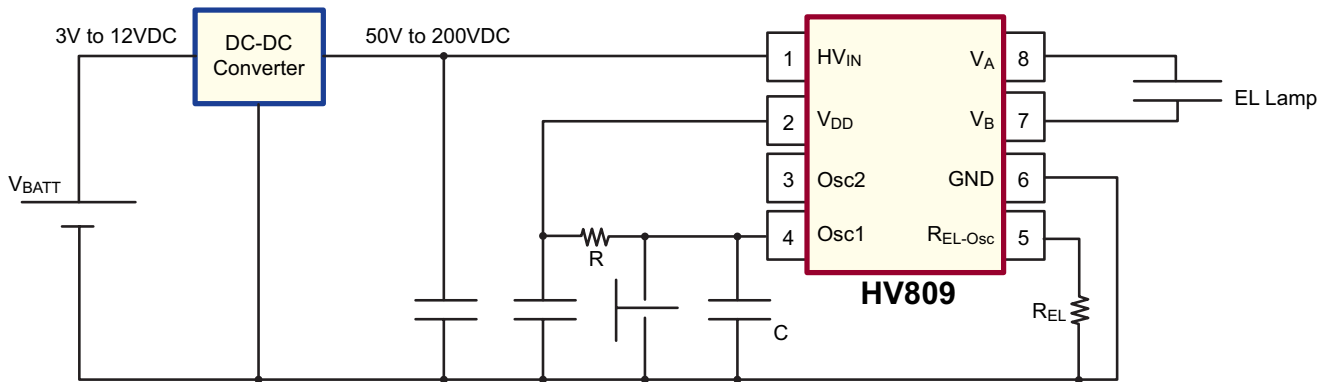
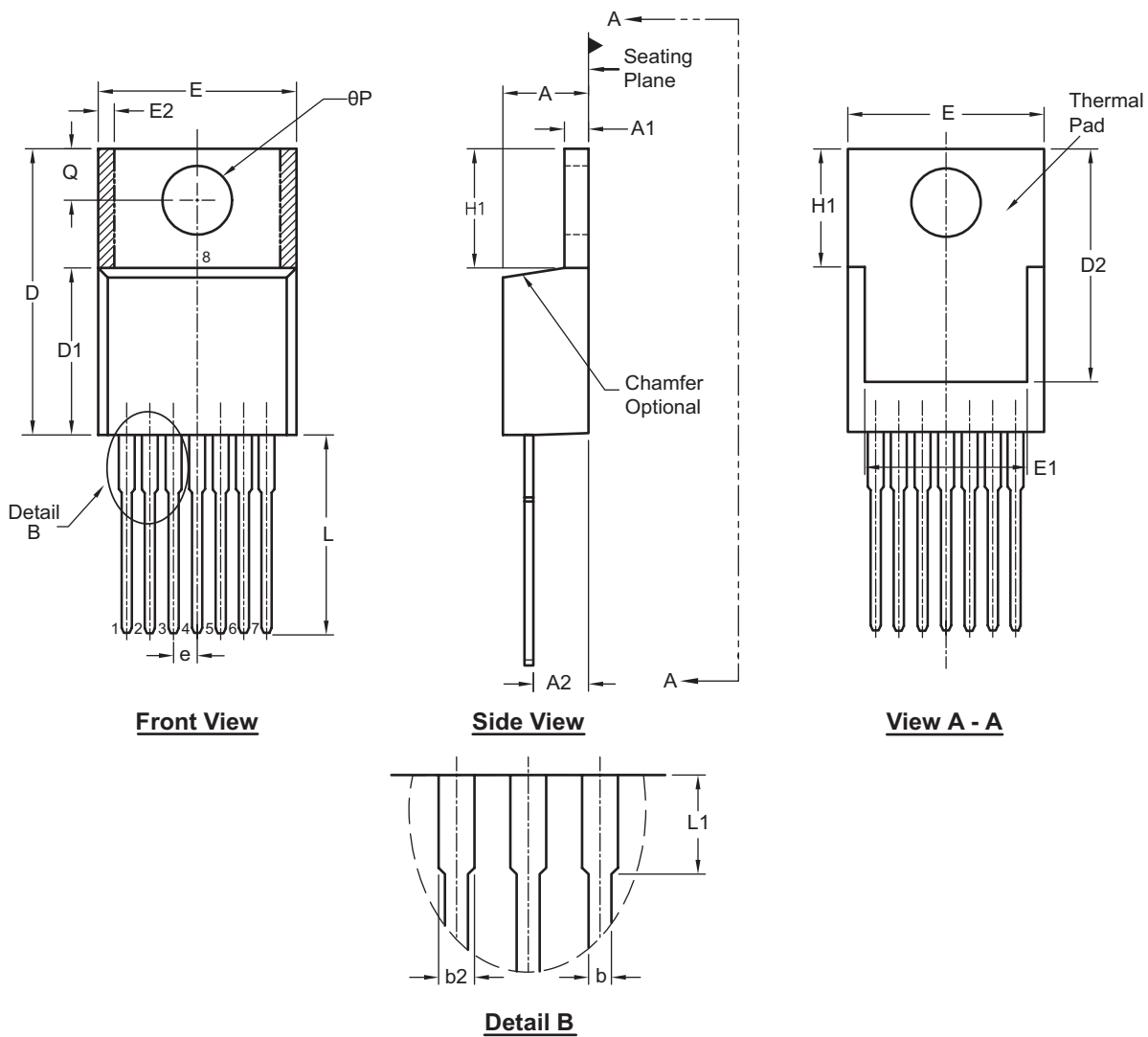


Figure 3. Push-Button, Delayed Turn Off



# 7-Lead TO-220 Package Outline (K2)

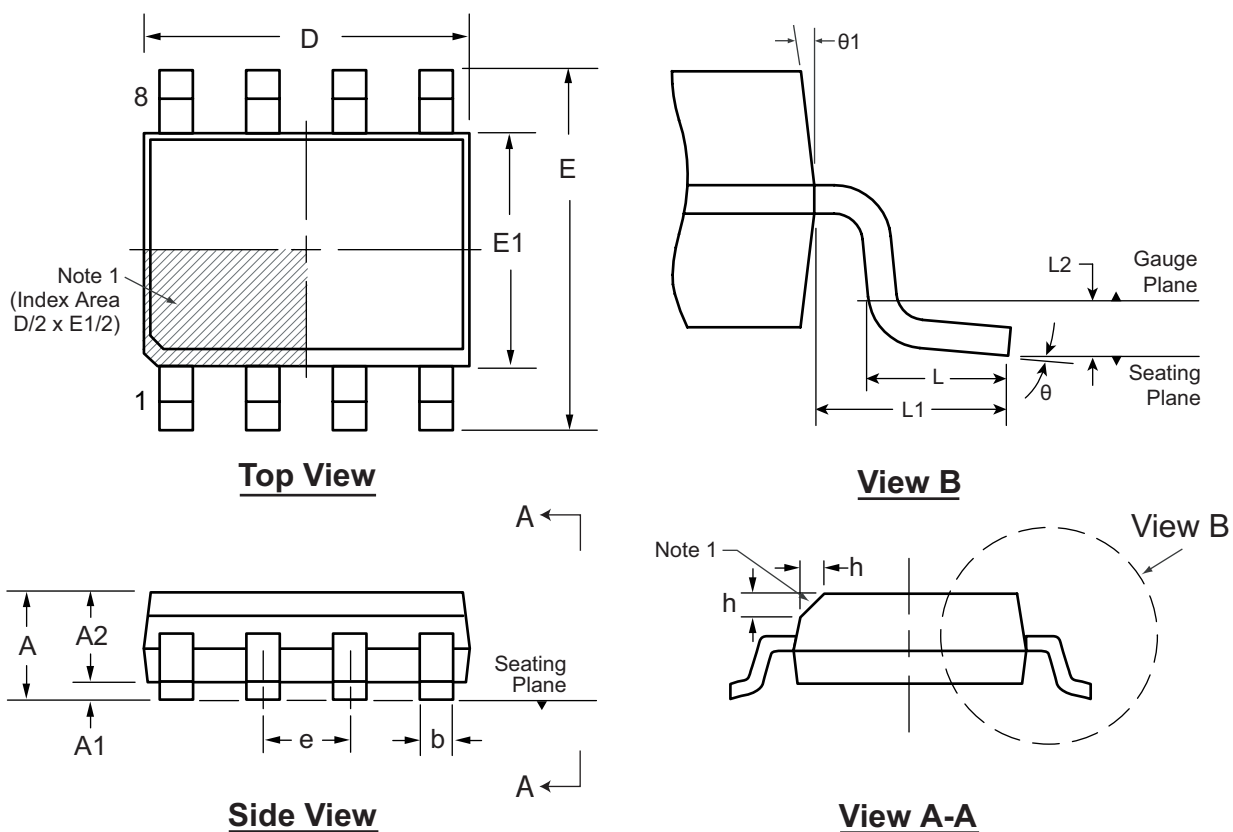


Symbol	A	A1	A2	b	b2	D	D1	D2	E	E1	E2	e	H1	L	L1	Q	$\theta P$
Dimension (inches)	MIN	.140	.020	.080	.015	.045	.560	.330	.480	.380	.270	-	.230	.500	-	.100	.139
	NOM	-	-	-	.027	.057	-	-	-	-	-	.100 BSC	-	-	-	-	-
	MAX	.190	.055	.115	.040	.070	.650	.355	.507	.420	.350	.030	.270	.580	.250	.135	.161

JEDEC Registration TO-220, Variation AB, Issue K, April 2002.  
 Drawings not to scale.

# 8-Lead SOIC (Narrow Body) Package Outline (LG/TG)

4.9x3.9mm body, 1.75mm height (max), 1.27mm pitch



**Note 1:**

This chamfer feature is optional. If it is not present, then a Pin 1 identifier must be located in the index area indicated. The Pin 1 identifier may be either a mold, or an embedded metal or marked feature.

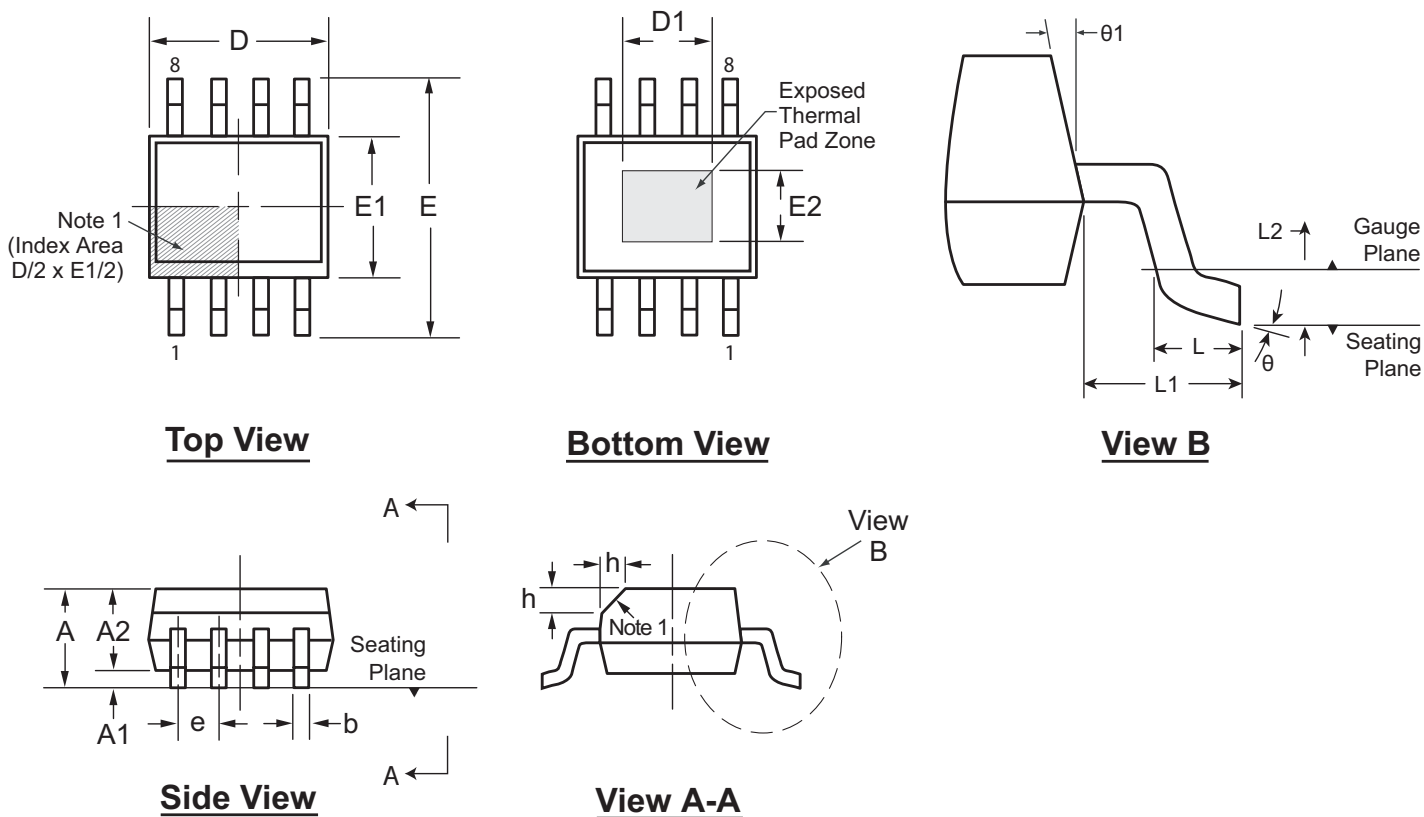
Symbol		A	A1	A2	b	D	E	E1	e	h	L	L1	L2	$\theta$	$\theta 1$
Dimension (mm)	MIN	1.35	0.10	1.25	0.31	4.80	5.80	3.80	1.27 BSC	0.25	0.40	1.04 REF	0.25 BSC	0°	5°
	NOM	-	-	-	-	4.90	6.00	3.90		-	-			-	-
	MAX	1.75	0.25	1.50	0.51	5.00	6.20	4.00		0.50	1.27			8°	15°

JEDEC Registration MS-012, Variation AA, Issue E, Sept. 2005.

Drawings not to scale.

# 8-Lead SOIC (Narrow Body w/Heat Slug) Package Outline (SG)

4.90x3.90mm body, 1.70mm height (max), 1.27mm pitch



**Note 1:**

This chamfer feature is optional. If it is not present, then a Pin 1 identifier must be located in the index area indicated. The Pin 1 identifier may be either a mold, or an embedded metal or marked feature.

Symbol	A	A1	A2	b	D	D1	E	E1	E2	e	h	L	L1	L2	θ	θ1				
Dimension (mm)	MIN	1.25	0.00	1.25	0.31	4.80	3.30*	5.80	3.80	2.29*	1.27 BSC	0.25	0.40	1.04 REF	0.25 BSC	0°	5°			
	NOM	-	-	-	-	4.90	-	6.00	3.90	-		-	-			-	-	-	-	-
	MAX	1.70	0.15	1.70	0.51	5.00	3.81*	6.20	4.00	2.79*		0.50	1.27			8°	15°			

JEDEC Registration MS-012, Variation BA, Issue E, Sept. 2005.

Dimensions marked with (\*) are non-JEDEC dimensions.

Drawings not to scale.

(The package drawing(s) in this data sheet may not reflect the most current specifications. For the latest package outline information go to <http://www.supertex.com/packaging.html>.)

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