

■ FEATURES

- Flexible Voltage Detect
- Wide Range, Programmable LED Voltage
- Thermal Regulation
- Fixed Current Operation: 15mA, 20mA, 25mA, 30mA and 35mA
- Can be Paralleled for Higher Current
- 5V to 90V Supply Voltage Range
- Low Quiescent Current
- High Efficiency
- LED Brightness Stable
- No Need External Component
- Available in SOP-8 Exposed Pad (Heat Sink) and TO-252(3Pin & 5Pin) Package
- Patent Pending Drive Architecture

■ DESCRIPTION

The AIC6600 is off-line linear LED driver. The application of high bright LED is widely used for general illumination.

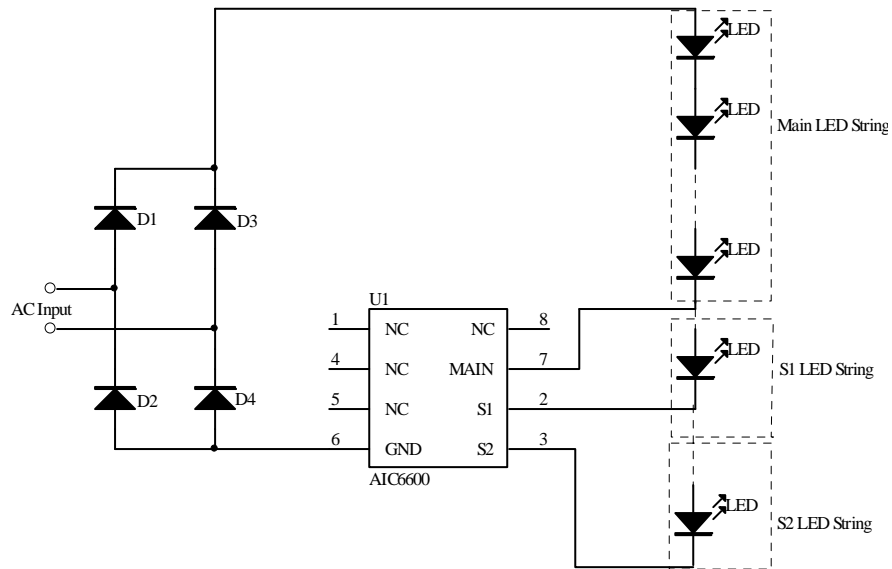
The AIC6600 can drive a plurality of LED strings. When the voltage detecting circuit detects the different voltage level of input voltage, it can control the LED strings. If the input voltage is lower, it will bypass some LED strings. And turn on all LED strings when the input voltage is higher. The number of LEDs in LED array is dependent on the voltage level of the AC power source, that includes of $\pm 15\%$ variations. A typical application for the AIC6600 is to drive LEDs with a constant current of 15mA, 20mA, 25mA, 30mA and 35mA. Multiple AIC6600 can also be used in parallel to provide higher current.

The AIC6600 is available in SOP-8 Exposed Pad (Heat Sink) and TO-252(3Pin & 5Pin) Package.

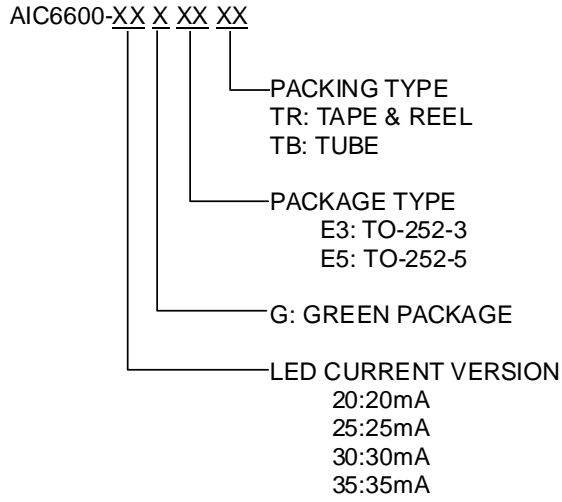
■ APPLICATIONS

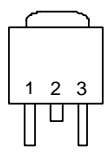
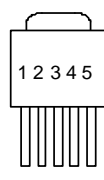
- LED Lamps (e.g. E27, GU10)
- General Illumination
- LED Strings (e.g. T-8 Tube)
- Constant Current Source
- Constant Current Sink

■ TYPICAL APPLICATION CIRCUIT



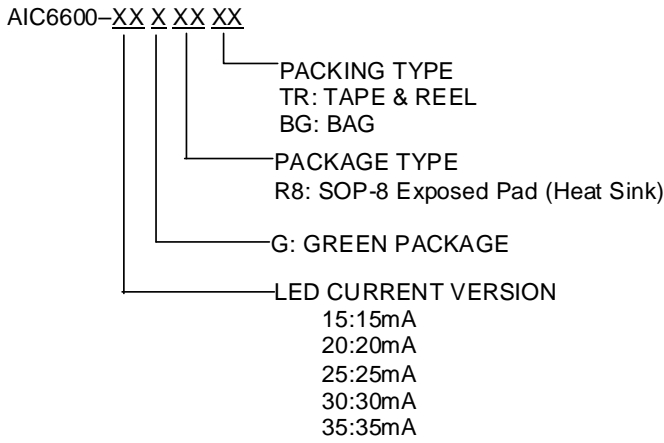
ORDERING INFORMATION

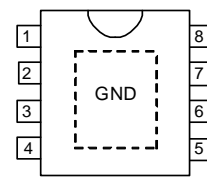


PACKAGE TYPE	PIN CONFIGURATION
TO-252-3 (E3) 1: MAIN 2: GND (TAB) 3: S2	TOP VIEW 
TO-252-5 (E5) 1: MAIN 2: S1 3: GND (TAB) 4: S2 5: NC	TOP VIEW 

Example: AIC6600-20GE3TR
 → 20mA Version, in TO-252-3 Green Package and Tape & Reel Packing Type

Example: AIC6600-30GE5TR
 → 30mA Version, in TO-252-5 Green Package and Tape & Reel Packing Type

ORDERING INFORMATION(Continued)


PACKAGE TYPE	PIN CONFIGURATION
R8 (SOP-8)	SOP-8 Exposed Pad (Heat Sink) TOP VIEW 1: NC 2: S1 3: S2 4: NC 5: NC 6: GND(TAB) 7: MAIN 8: NC 

Example: AIC6600-20GR8TR

→ 20mA Version, in SOP-8 Expose Pad(Heat Sink)
Green Package and TAPE & REEL Packing.Type

■ ABSOLUTE MAXIMUM RATINGS

Input Voltage	92V
Operating Ambient Temperature Range T_A	-40°C~85°C
Operating Maximum Junction Temperature T_J	150°C
Storage Temperature Range T_{STG}	-65°C~150°C
Lead Temperature (Soldering 10 Sec.).....	260°C
Thermal Resistance Junction to Case TO-252	8°C /W
Thermal Resistance Junction to Ambient TO-252	100°C /W
(Assume no Ambient Airflow, no Heatsink)	
Thermal Resistance Junction to Case SOP-8 Exposed Pad*	15°C /W
Thermal Resistance Junction to Ambient SOP-8 Exposed Pad*	60°C /W
(*The package is place on a two layers PCB with 2 ounces copper and 2 square inch, connected by 8 vias.)	

Absolute Maximum Ratings are those values beyond which the life of a device may be impaired.

■ ELECTRICAL CHARACTERISTICS

 (T_J=25°C, unless otherwise specified) (Note 1)

PARAMETER	TEST CONDITIONS	SYMBOL	MIN.	TYP.	MAX.	UNIT
Supply Voltage Section						
VDD Operation Voltage			5		90	V
Quiescent Current		I _Q		120		μA
LED Current						
LED Current Tolerance	I _(S1) , I _(S2)		-10		+10	%
Fault Protection						
Thermal Regulation				130		°C
Thermal Regulation Current	Temperature at 135°C, I _{LED} Current			50		%

Note 1: Specifications are production tested at T_A=25°C. Specifications over the -40°C to 85°C operating temperature range are assured by design, characterization and correlation with Statistical Quality Controls (SQC).

TYPICAL PERFORMANCE CHARACTERISTICS

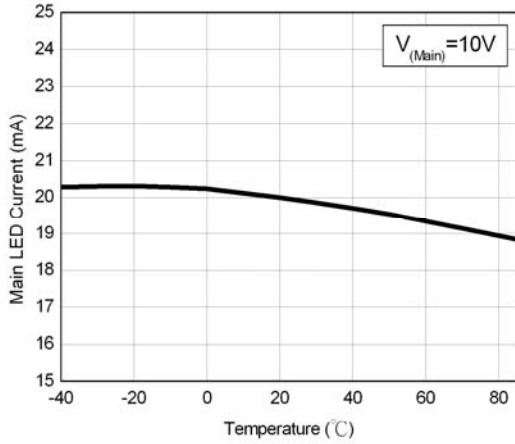


Fig. 1 Main LED Current vs. Temperature

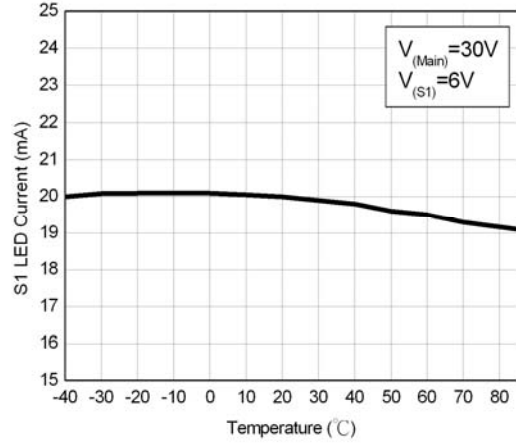


Fig. 2 S1 LED Current vs. Temperature

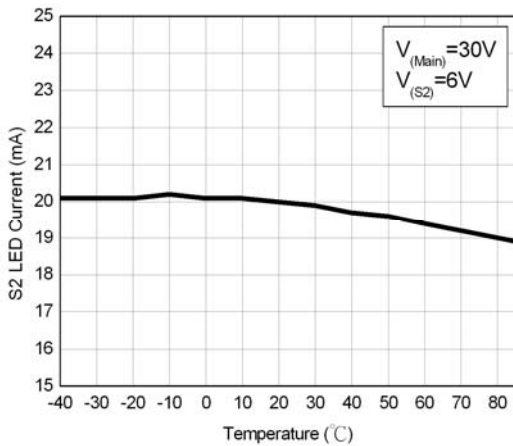


Fig. 3 S2 LED Current vs. Temperature

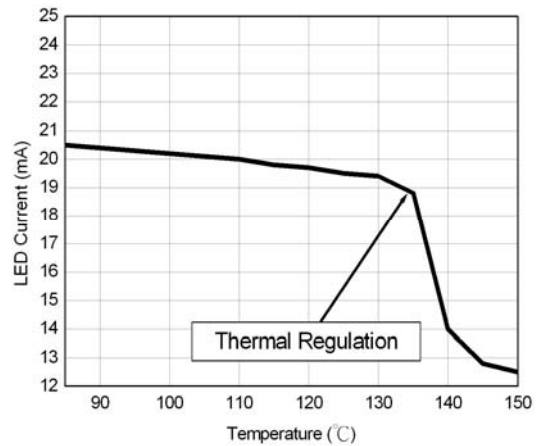


Fig. 4 Thermal Regulation

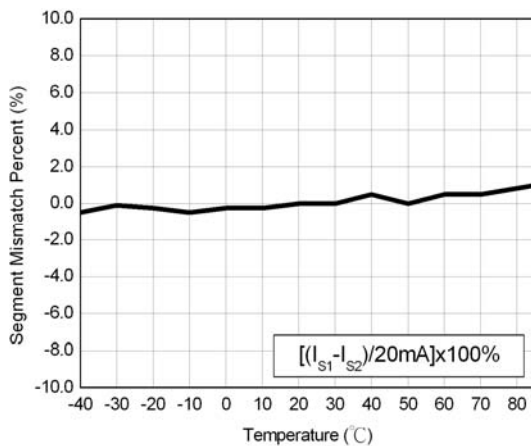


Fig. 5 Current Mismatch vs. Temperature

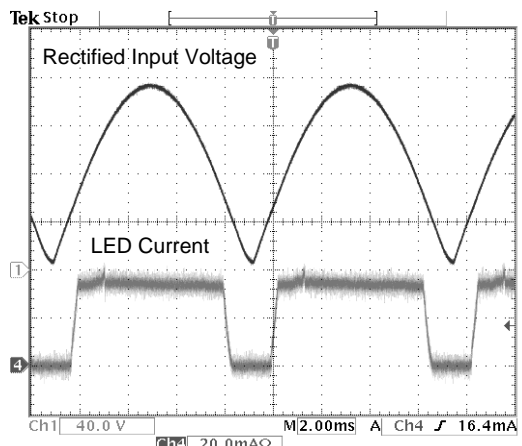
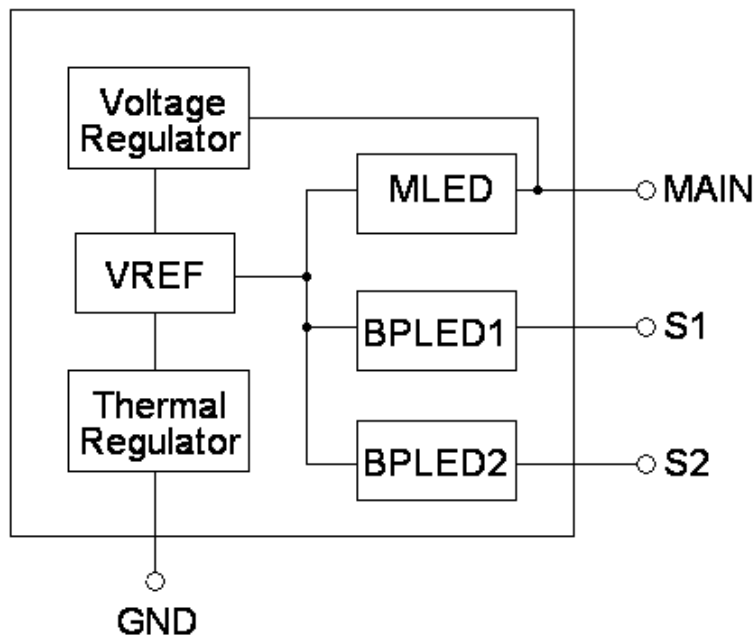


Fig. 6 LED Current Waveform at 110 V_{AC} Input

■ BLOCK DIAGRAM



■ PIN DESCRIPTION

- MAIN PIN -LED Main Cathode Connection.
- S1 PIN -LED S1 Cathode Connection.
- S2 PIN -LED S2 Cathode Connection.
- GND PIN -Ground.

APPLICATION INFORMATION

The AIC6600 is off-line constant current LED driver. It can drive a plurality of LED strings. The AIC6600 can flexibly control the LED strings according to the variance of input voltage. If the input voltage is lower, it will bypass some LED strings. When the input voltage is higher than the total forward voltage of all LED strings, all LED strings will be turned on. The number of LEDs in LED array is dependent on the voltage level of the AC power source. Multiple AIC6600 can also be used in parallel to provide higher LED current.

THERMAL REGULATION

The AIC6600 includes the thermal-regulation circuit, which are designed to protect the device from excessive temperature. The internal thermal-regulation circuit reduces the LED current if the junction temperature rises above the preset value of about 130°C.

POWER DISSIPATION

The maximum power dissipation of AIC6600 depends on the thermal resistance of its case and circuit board, the temperature difference between the die junction and ambient air, and the rate of airflow. The rate of temperature rise is greatly affected by the mounting pad configuration on the PCB, the board material, and the ambient temperature. When the IC mounting with good thermal conductivity is used, the junction temperature will be low even when large power dissipation applies.

As a general rule, the lower temperature is, the better reliability of the device is. So the PCB mounting pad should provide maximum thermal conductivity to maintain low device temperature.

APPLICATION CIRCUIT

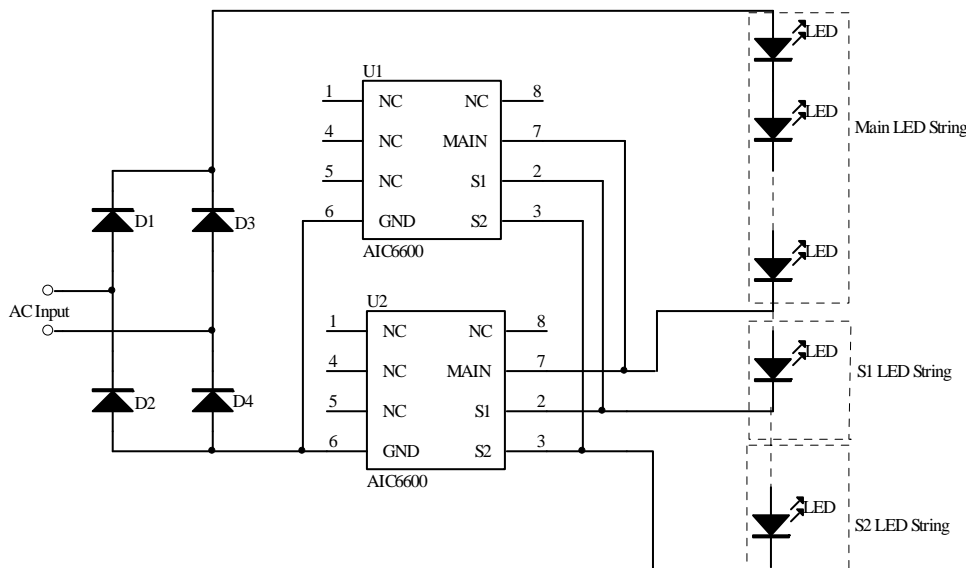
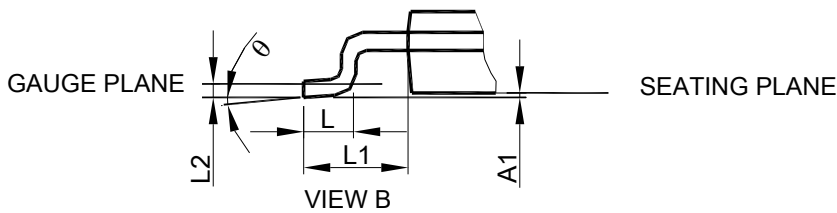
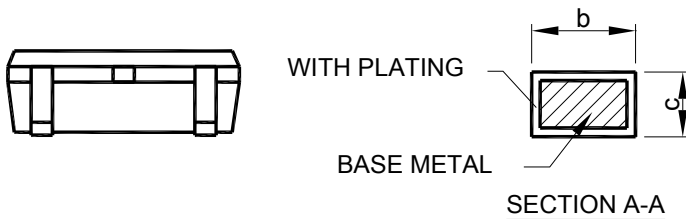
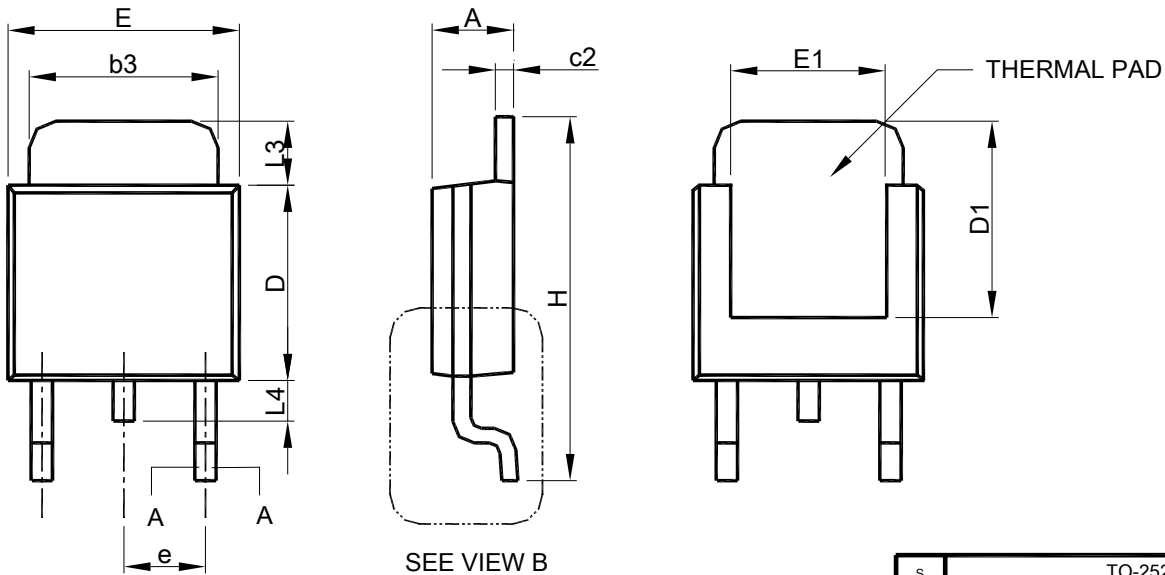
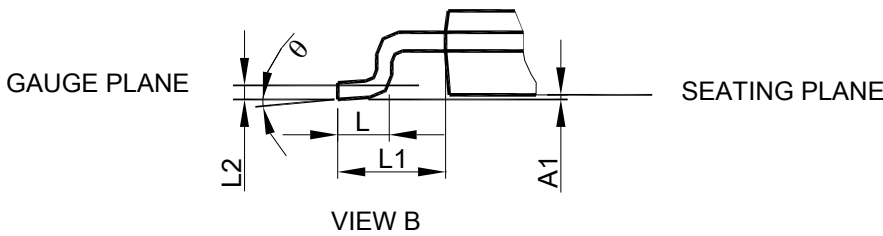
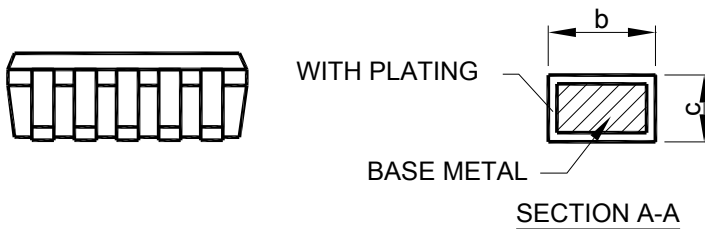
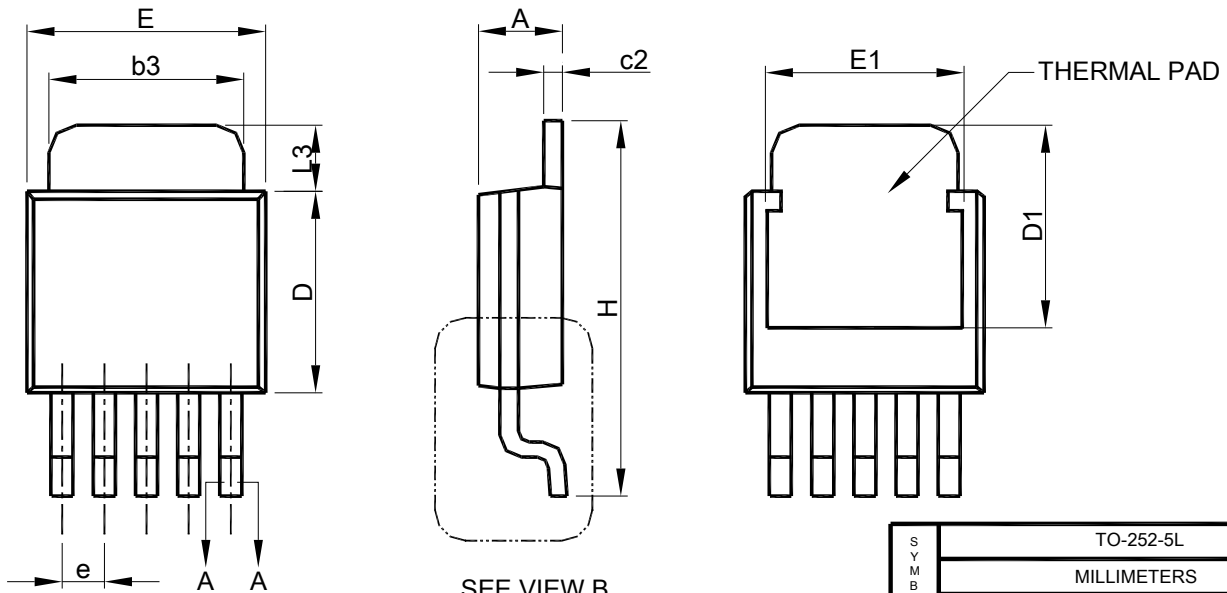


Fig. 7 AIC6600 for Higher LED Current Application

PHYSICAL DIMENSIONS
TO-252-3L


SYMBOL	TO-252-3L	
	MILLIMETERS	
	MIN.	MAX.
A	2.19	2.38
A1	0.00	0.13
b	0.64	0.89
b3	4.95	5.46
c	0.46	0.61
c2	0.46	0.89
D	5.33	6.22
D1	4.60	6.00
E	6.35	6.73
E1	3.90	5.46
e	2.28 BSC	
H	9.40	10.41
L	1.40	1.78
L1	2.67 REF	
L2	0.51 BSC	
L3	0.89	2.03
L4	—	1.02
θ	0°	8°

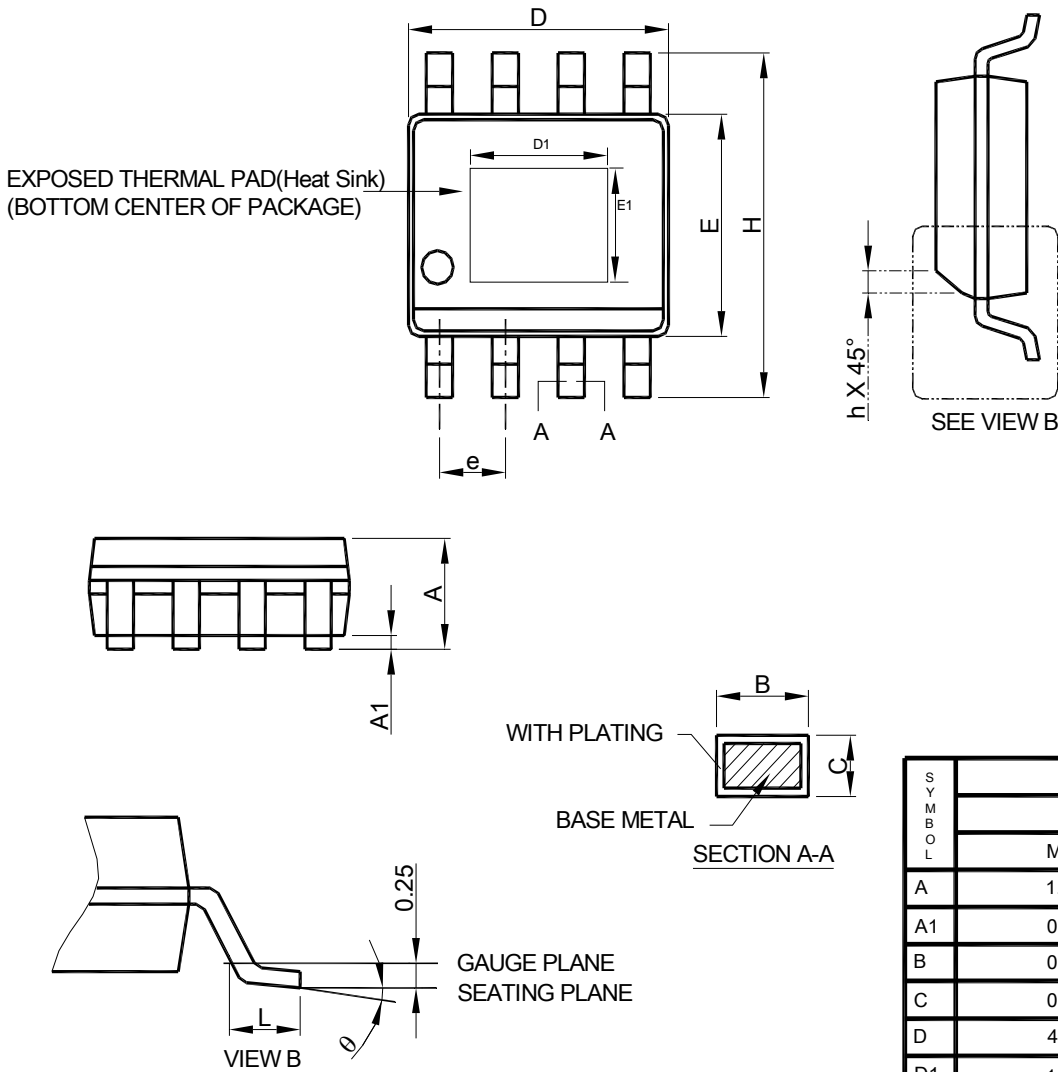
- Note: 1. Refer to JEDEC TO-252AA and AB.
 2. Dimension "E" does not include mold flash, protrusions or gate burrs. Mold flash, protrusion or gate burrs shall not exceed 6 mil per side .
 3. Dimension "D" does not include inter-lead flash or protrusions.
 4. Controlling dimension is millimeter, converted inch dimensions are not necessarily exact.

• TO-252-5L


SYMBOL	TO-252-5L	
	MILLIMETERS	
	MIN.	MAX.
A	2.19	2.38
A1	0.00	0.13
b	0.51	0.71
b3	4.32	5.46
c	0.46	0.61
c2	0.46	0.89
D	5.33	6.22
D1	4.90	6.00
E	6.35	6.73
E1	4.32	5.33
e	1.27 BSC	
H	9.40	10.41
L	1.40	1.78
L1	2.67 REF	
L2	0.51 BSC	
L3	0.89	2.03
θ	0°	8°

- Note: 1. Refer to JEDEC TO-252AD and AB.
 2. Dimension "E" does not include mold flash, protrusions or gate burrs. Mold flash, protrusion or gate burrs shall not exceed 6 mil per side .
 3. Dimension "D" does not include inter-lead flash or protrusions.
 4. Controlling dimension is millimeter, converted inch dimensions are not necessarily exact.

- SOP-8 Exposed Pad (Heat Sink)**



SYMBOL	SOP-8 Exposed Pad(Heat Sink)	
	MILLIMETERS	
	MIN.	MAX.
A	1.35	1.75
A1	0.00	0.15
B	0.31	0.51
C	0.17	0.25
D	4.80	5.00
D1	1.50	3.50
E	3.80	4.00
E1	1.0	2.55
e	1.27 BSC	
H	5.80	6.20
h	0.25	0.50
L	0.40	1.27
θ	0°	8°

- Note :
1. Refer to JEDEC MS-012E.
 2. Dimension "D" does not include mold flash, protrusions or gate burrs. Mold flash, protrusion or gate burrs shall not exceed 6 mil per side .
 3. Dimension "E" does not include inter-lead flash or protrusions.
 4. Controlling dimension is millimeter, converted inch dimensions are not necessarily exact.

Note:

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