

3A Ultra Low Dropout Linear Regulator

FEATURES

- Guaranteed 3A Output Current
- Low Ground Current
- 0.5 μ A Quiescent Current in Shutdown
- Fixed Output Voltage of 1.5V, 1.8V, 2.5V, 3.3V
- Fast Transient Response
- Current Limit and Thermal Limit
- Available in SOT-223, TO-220, TO-263 TO-263-5, TO-252 and TO-252-5 Packages

APPLICATIONS

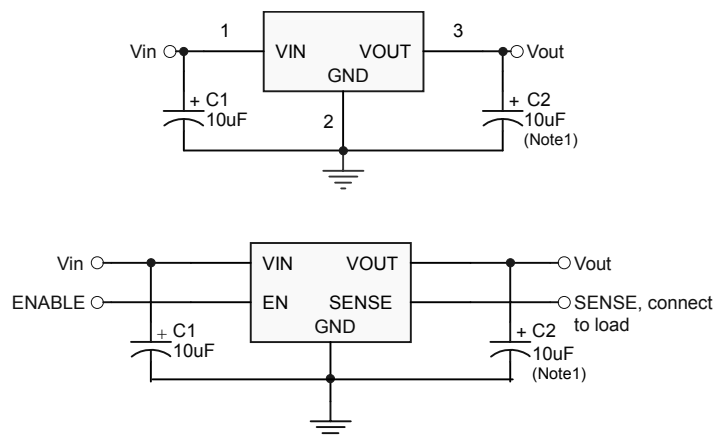
- Mother Board and Notebook
- Gigabit Ethernet Switch
- Microprocessor Power Systems
- Network Cards
- Peripheral Cards
- GTL, GTL+, BTL, and SSTL Bus Terminators
- DSPs Power Supplies
- Battery Powered Applications

DESCRIPTION

The AIC1185 is an ultra low dropout and high performance linear regulator with 3A output current capability. The output voltage is fixed 1.5V, 1.8V, 2.5V and 3.3V. Its low dropout voltage and fast transient response make it ideal for low voltage microprocessor applications.

In addition, the enable pin reduces power dissipation at shutdown mode. Current limit and thermal protection provide protection against any overload condition that would create excessive junction temperatures.

TYPICAL APPLICATION CIRCUIT

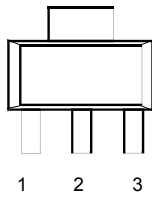
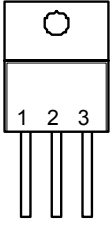
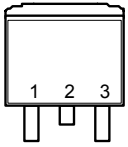
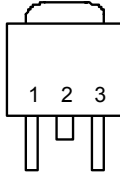
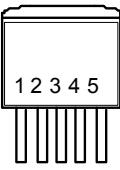



ORDERING INFORMATION

AIC1185-XXXXXX

- PACKING TYPE
TR: TAPE & REEL
TB: TUBE
- PACKAGING TYPE
Y: SOT-223
M: TO-263
E: TO-252
T: TO-220
M5: TO-263-5
E5: TO-252-5
- C: Commercial
P: Lead Free Commercial
G: Green Package
- OUTPUT VOLTAGE
15: 1.5V
18: 1.8V
25: 2.5V
33: 3.3V

Example: AIC1185-15CYTR
 → 1.5V version in SOT-223
 Package & Taping & Reel
 Packing Type
 AIC1185-15PYTR
 → 1.5V Version, in SOT-223 Lead
 Free Package & Tape & Reel
 Packing Type
 AIC1185-15GYTR
 → 1.5V Version, in SOT-223 Green
 Package & Tape & Reel Packing
 Type

PIN CONFIGURATION	
SOT-223 TOP VIEW 1: VIN 2: GND (TAB) 3: VOUT	
TO-220 FRONT VIEW 1: VIN 2: GND (TAB) 3: VOUT	
TO-263 TOP VIEW 1: VIN 2: GND (TAB) 3: VOUT	
TO-252 TOP VIEW 1: VIN 2: GND (TAB) 3: VOUT	
TO-263-5 TOP VIEW 1: VIN 2: EN 3: GND (TAB) 4: SENSE 5: VOUT	
TO-252-5 TOP VIEW 1: VIN 2: EN 3: GND (TAB) 4: SENSE 5: VOUT	

■ ABSOLUTE MAXIMUM RATINGS

Supply Voltage.....	5.5V
Storage Temperature Rang.....	-65°C~150°C
Operating Temperature Range	-40°C~85°C
Junction Temperature.....	125°C
Lead Temperature (Soldering, 10sec).....	260°C
Thermal Resistance (Junction to Case) TO-220.....	3°C /W
SOT-223.....	15°C /W
TO-263, TO-263-5.....	6°C /W
TO-252, TO-252-5.....	12.5°C /W
Thermal Resistance Junction to Ambient TO-220.....	50°C /W
(Assume no ambient airflow, no heatsink) SOT-223.....	130°C /W
TO-263, TO-263-5.....	60°C /W
TO-252, TO-252-5.....	100°C /W

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

■ TEST CIRCUIT

Refer to "TYPICAL APPLICATION CIRCUIT".

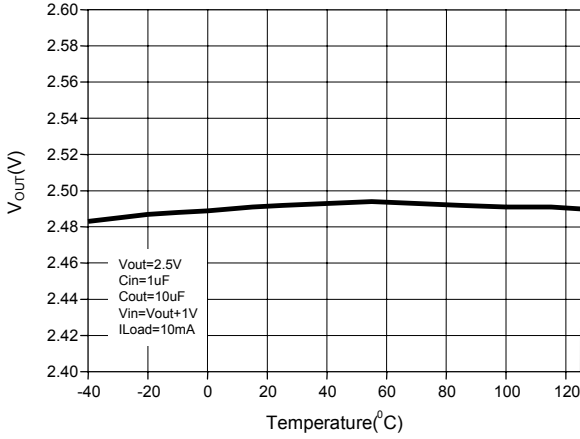
■ **ELECTRICAL CHARACTERISTICS** ($V_{IN}=V_O+0.7V$, $I_{OUT}=10mA$, $V_{EN}=V_{IN}$, $T_A=25^\circ C$, unless otherwise specified) (Note 2)

PARAMETER	TEST CONDITIONS	SYMBOL	MIN.	TYP.	MAX.	UNIT	
Input Voltage Range		V_{IN}	2.25		5.5	V	
Output Voltage Tolerance			-1.5		+1.5	%	
Line Regulation	$V_{IN} = V_{OUT} + V_{Drop(max)}$ to 5.5V	ΔV_{LIR}		0.3	1	%	
Load Regulation	$V_{IN} = V_{OUT} + 0.7$	ΔV_{LOR}		30	60	mV	
Dropout Voltage	$I_{OUT}=3A$	V_{DROP}		$V_0 \geq 1.8$	550	700	mV
				$V_0 = 1.5$		750	
Quiescent Current		I_Q		1	2	mA	
Shutdown Supply Current	$V_{EN}=0V$	I_{SD}		0.5	5	μA	
Output Current Limit	$V_{IN}=V_{OUT} + 0.7$	I_{IL}	3	5		A	
Shutdown Terminal Specifications							
EN Pin Shutdown Threshold	Output=H	V_{EN}	1.2			V	
	Output=L				0.4		
EN Pin Current	$V_{EN}=V_{IN}$	I_{EN}		0.1		nA	
FLG Pin Leakage Current				1		nA	
FLG Pin Sink Current	$V_{FLG}=0.5V$		2			mA	
Thermal Protection							
Thermal Shutdown Temperature	Guaranteed by design	T_{SD}		170		$^\circ C$	
Thermal Shutdown Hysteresis	Guaranteed by design	T_{HYST}		10		$^\circ C$	

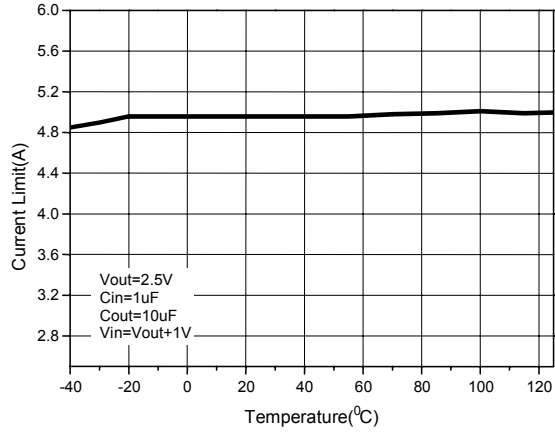
Note 1: To avoid output oscillation, aluminum electrolytic or tantalum output capacitor is recommended and ceramic capacitor is not suggested.

Note 2: Specifications are production tested at $T_A=25^\circ C$. Specifications over the $-40^\circ C$ to $85^\circ C$ operating temperature range are assured by design, characterization and correlation with Statistical Quality Controls (SQC).

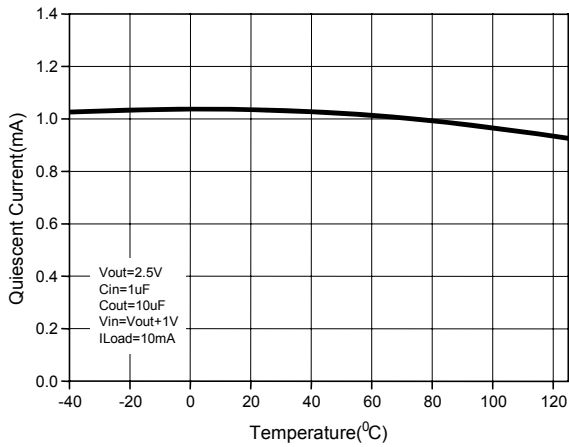
TYPICAL PERFORMANCE CHARACTERISTICS



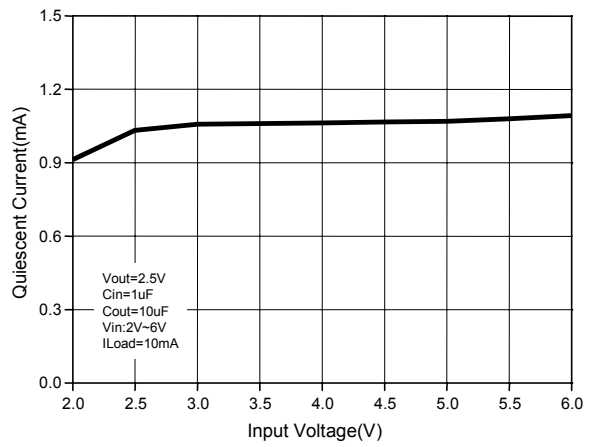
Output Voltage vs. Temperature



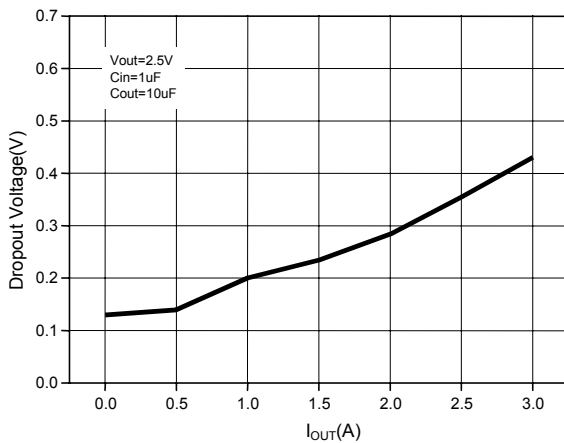
Current Limit vs. Temperature



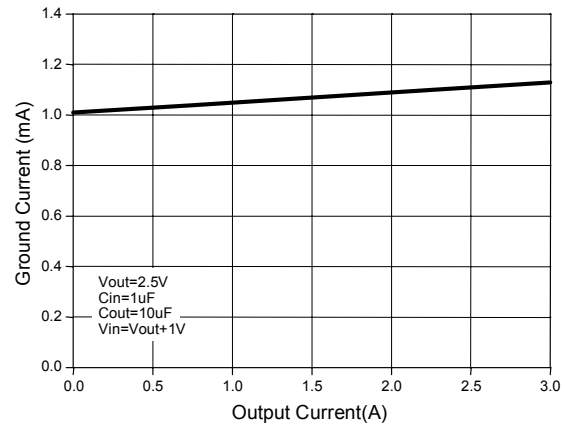
Quiescent Current vs. Temperature



Quiescent Current vs. Input Voltage

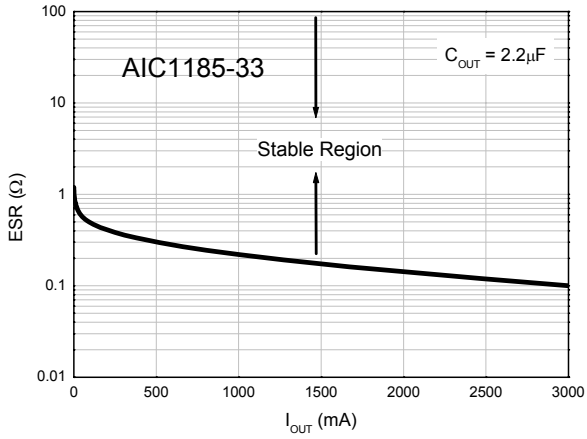


Dropout Voltage vs. Output Current

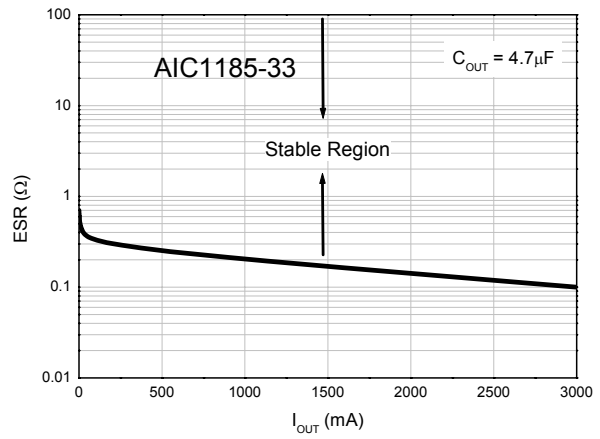


Ground Current vs. I_{out} Current

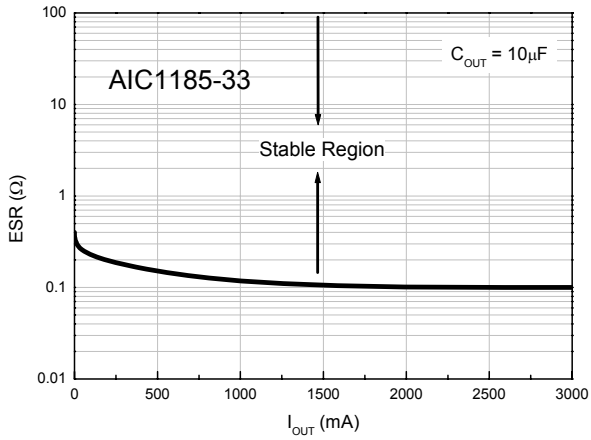
■ TYPICAL PERFORMANCE CHARACTERISTICS (Continued)



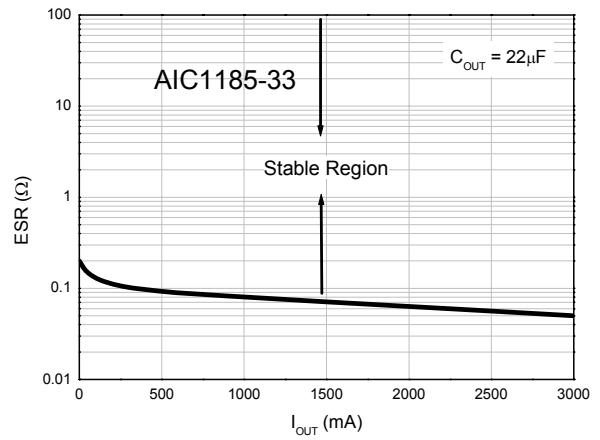
Region of Stable $C_{OUT}(2.2\mu F)$ ESR vs. Load Current



Region of Stable $C_{OUT}(4.7\mu F)$ ESR vs. Load Current

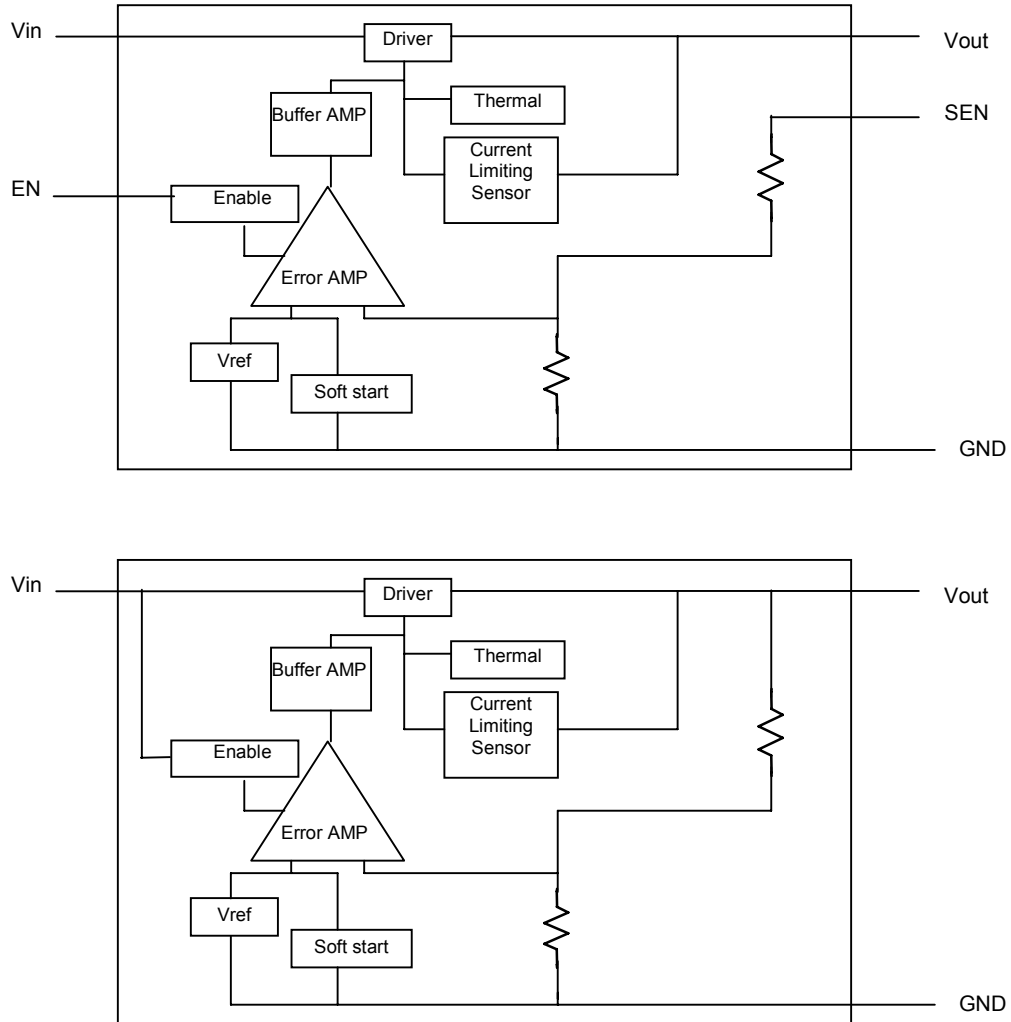


Region of Stable $C_{OUT}(10\mu F)$ ESR vs. Load Current



Region of Stable $C_{OUT}(22\mu F)$ ESR vs. Load Current

■ BLOCK DIAGRAM



■ PIN DESCRIPTIONS

- VOUT PIN - Output voltage.
- GND PIN - Power GND.
- SEN PIN - Remote sense.
- VIN PIN - Power Input.
- EN PIN - Enable Input.

APPLICATION INFORMATIONS

Input/Output Capacitors

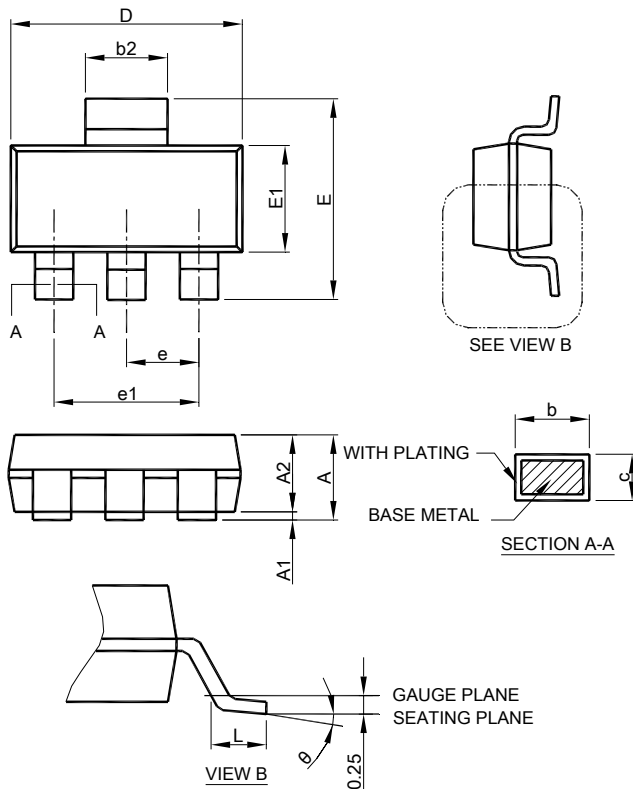
Linear regulators require input and output capacitors to maintain stability. A 4.7 μ F or 10 μ F electrolytic or tantalum output capacitor is recommended. To avoid oscillation, it is recommended to follow the figures of "Region of Stable C_{OUT} ESR vs. Load Current" to choose proper capacitor specifications.

Sense

Load is not usually close to regulator in actual application. The distance between these two devices results in decay of the load. A SENSE pin of the regulator connects to the load and traces the load voltage. AIC1185 will adjust the output voltage of the regulator to maintain the load at expected voltage.

PHYSICAL DIMENSIONS

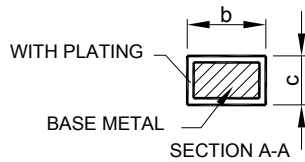
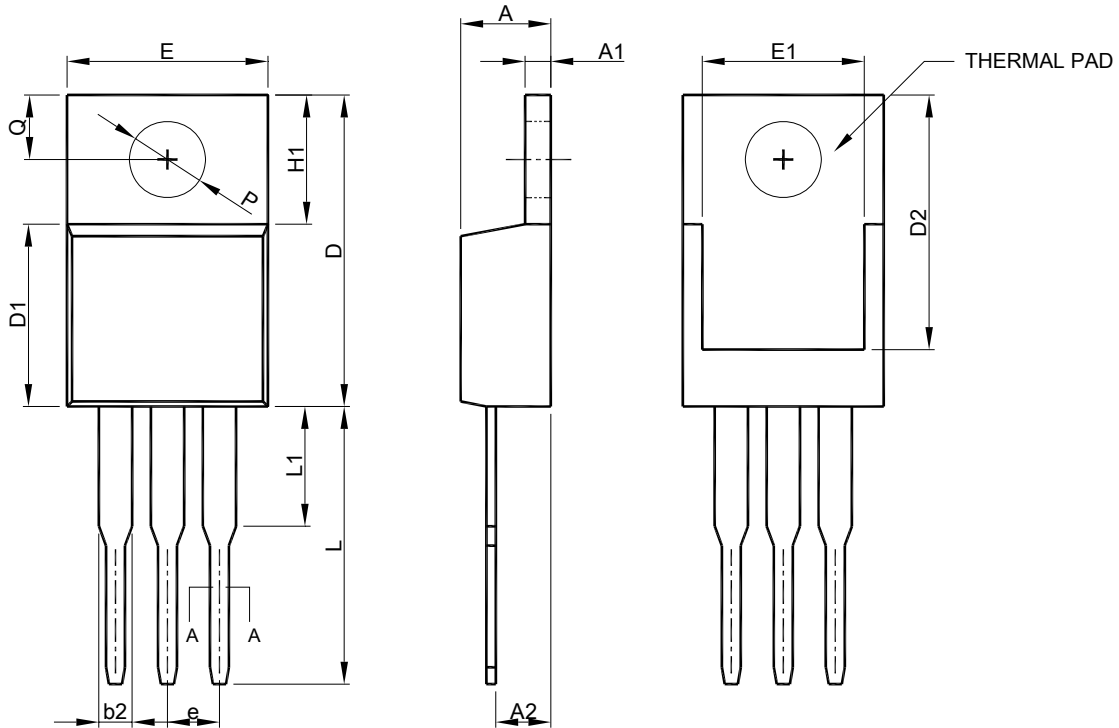
SOT-223



SYMBOL	SOT-223	
	MILLIMETERS	
	MIN.	MAX.
A		1.80
A1	0.02	0.10
A2	1.55	1.65
b	0.66	0.84
b2	2.90	3.10
c	0.23	0.33
D	6.30	6.70
E	6.70	7.30
E1	3.30	3.70
e	2.30 BSC	
e1	4.60 BSC	
L	0.90	
θ	0°	8°

- Note: 1. Refer to JEDEC TO-261AA.
 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 "E1" does not include inter-lead flash or protrusions.
 4. Controlling dimension is millimeter, converted inch dimensions are not necessarily exact.

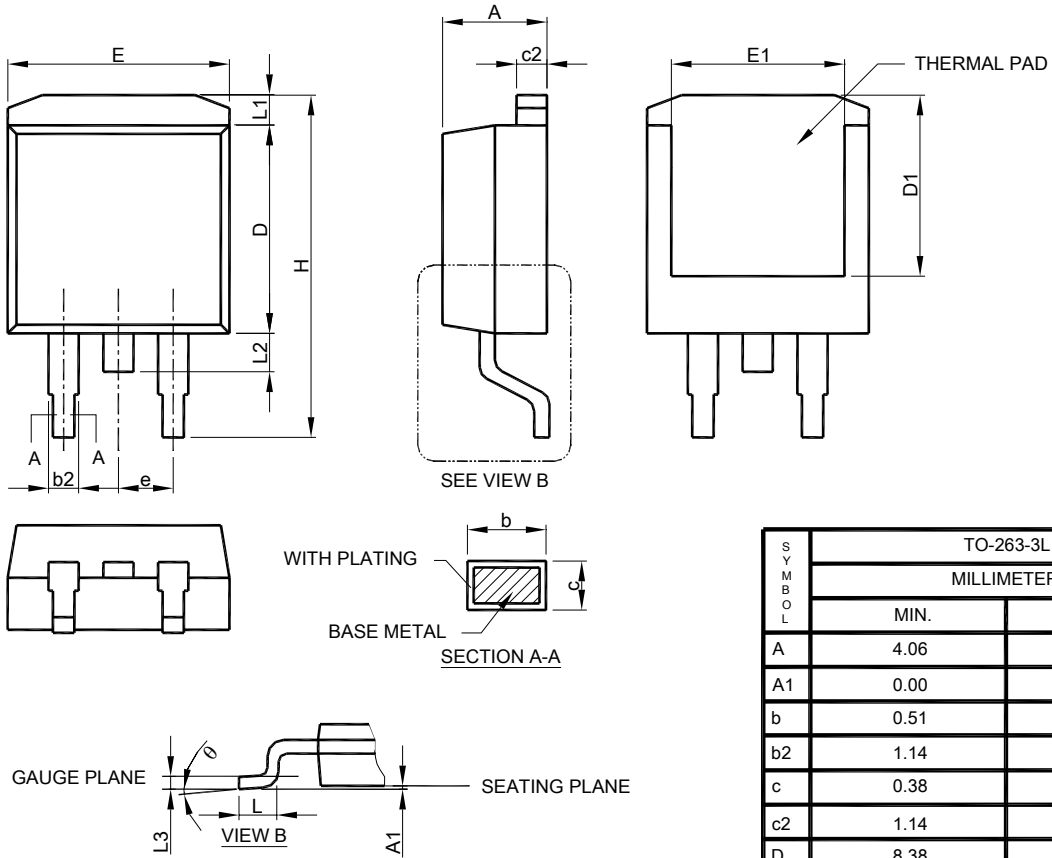
• TO-220



- Note: 1. Refer to JEDEC TO-220AB.
 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 "D1" does not include inter-lead flash or protrusions.
 4. Controlling dimension is millimeter, converted inch dimensions are not necessarily exact.

SYMBOL	TO-220	
	MILLIMETERS	
	MIN.	MAX.
A	3.56	4.82
A1	0.51	1.39
A2	2.04	2.92
b	0.38	1.01
b2	1.15	1.77
c	0.35	0.61
D	14.23	16.51
D1	8.38	9.02
D2	11.75	12.88
E	9.66	10.66
E1	6.86	8.90
e	2.54 BSC	
H1	5.85	6.85
L	12.70	14.73
L1	--	6.35
P	3.54	4.08
Q	2.54	3.42

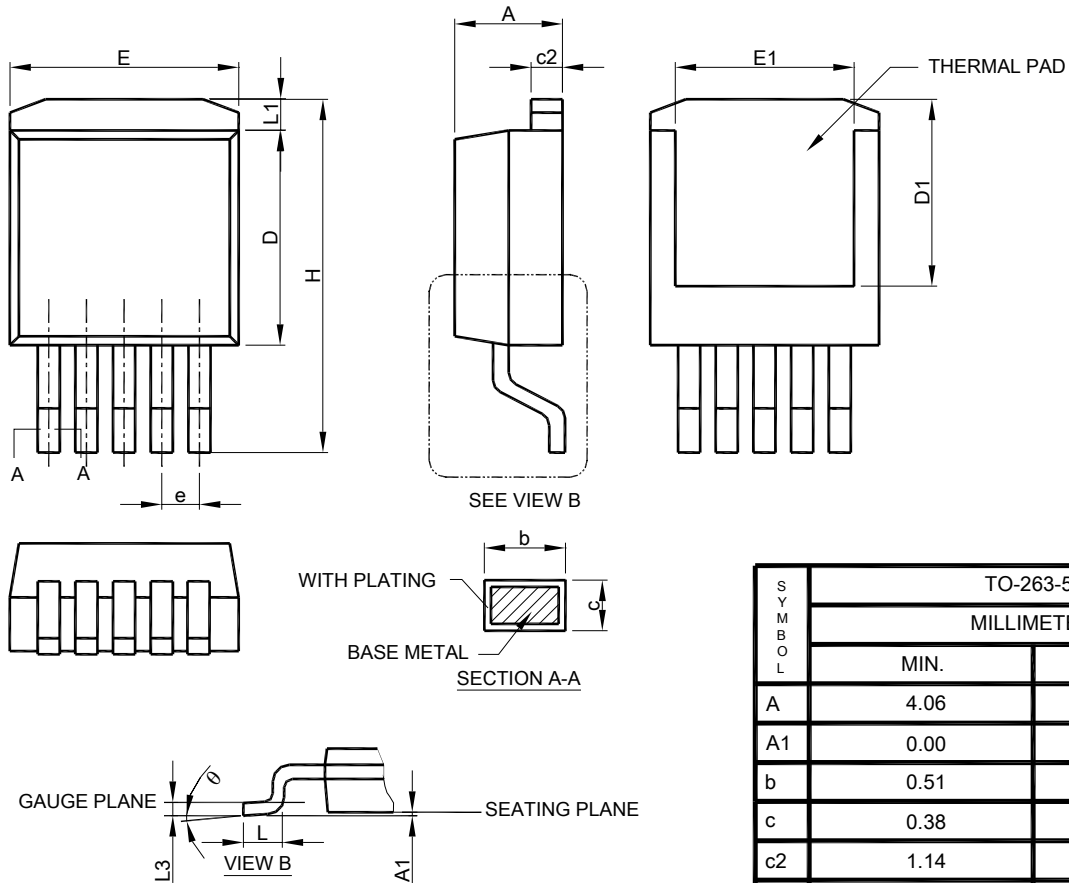
● TO-263



SYMBOL	TO-263-3L	
	MILLIMETERS	
	MIN.	MAX.
A	4.06	4.83
A1	0.00	0.25
b	0.51	0.99
b2	1.14	1.78
c	0.38	0.74
c2	1.14	1.65
D	8.38	9.65
D1	6.86	--
E	9.65	10.67
E1	6.23	--
e	2.54 BSC	
H	14.61	15.88
L	1.78	2.79
L1	--	1.68
L2	--	1.78
L3	0.25 BSC	
q	0°	8°

- Note: 1. Refer to JEDEC TO-263AB.
 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.

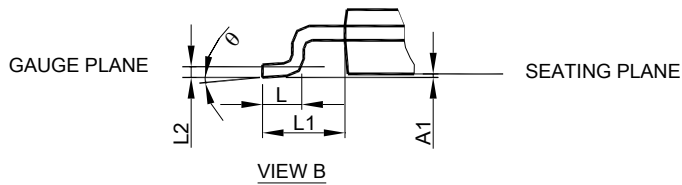
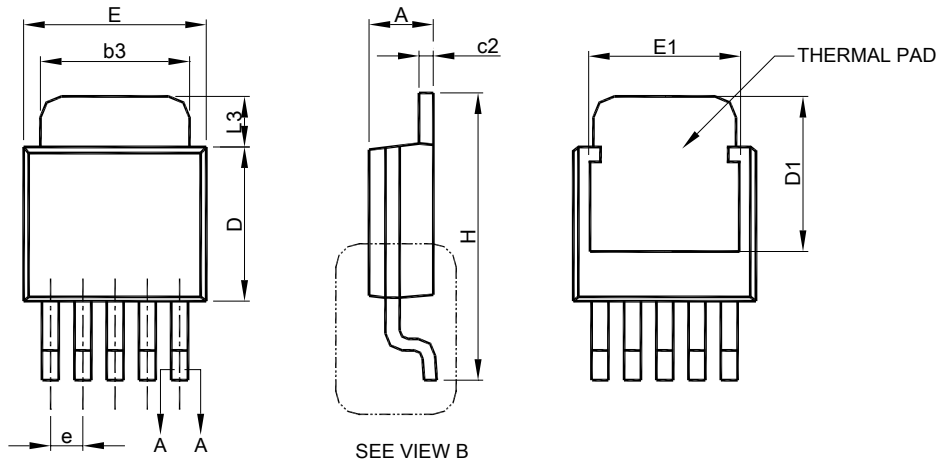
● TO-263-5



- Note: 1. Refer to JEDEC TO-263BA.
 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.

SYMBOL	TO-263-5L	
	MILLIMETERS	
	MIN.	MAX.
A	4.06	4.83
A1	0.00	0.25
b	0.51	0.99
c	0.38	0.74
c2	1.14	1.65
D	8.38	9.65
D1	6.86	--
E	9.65	10.67
E1	6.23	--
e	1.70 BSC	
H	14.61	15.88
L	1.78	2.79
L1	--	1.68
L3	0.25 BSC	
q	0°	8°

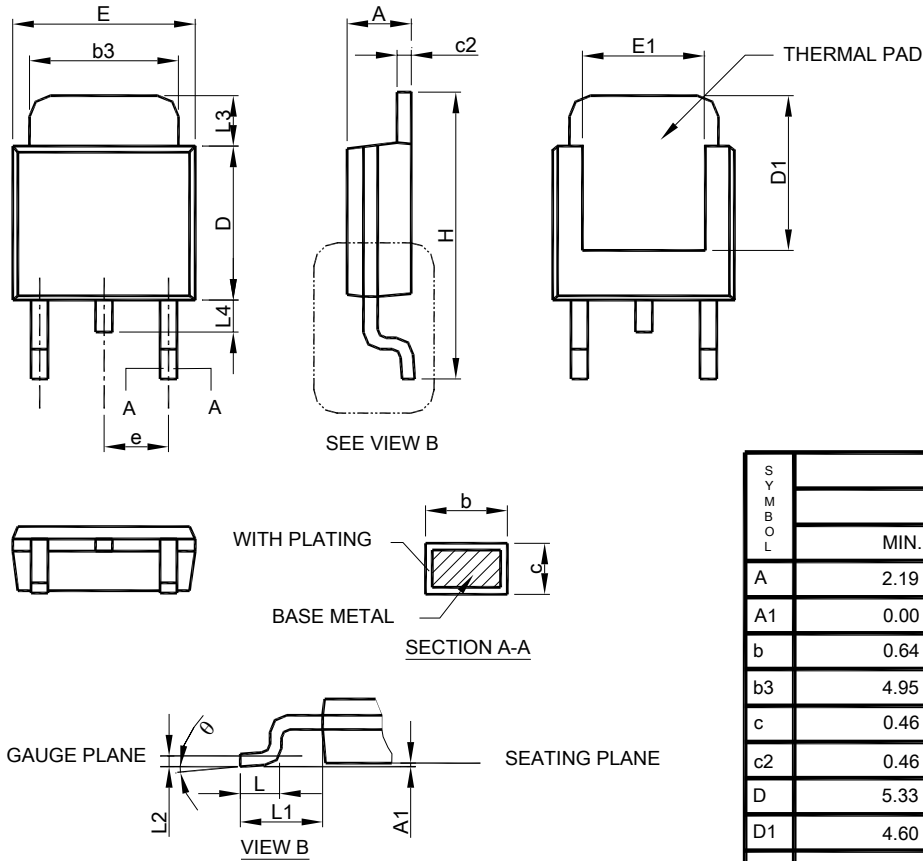
- TO-252-5



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
q	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.

- TO-252



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.

Note:

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