



## DESCRIPTION

The A78L05~A78L24 is available in SOT89-3 package.

## FEATURES

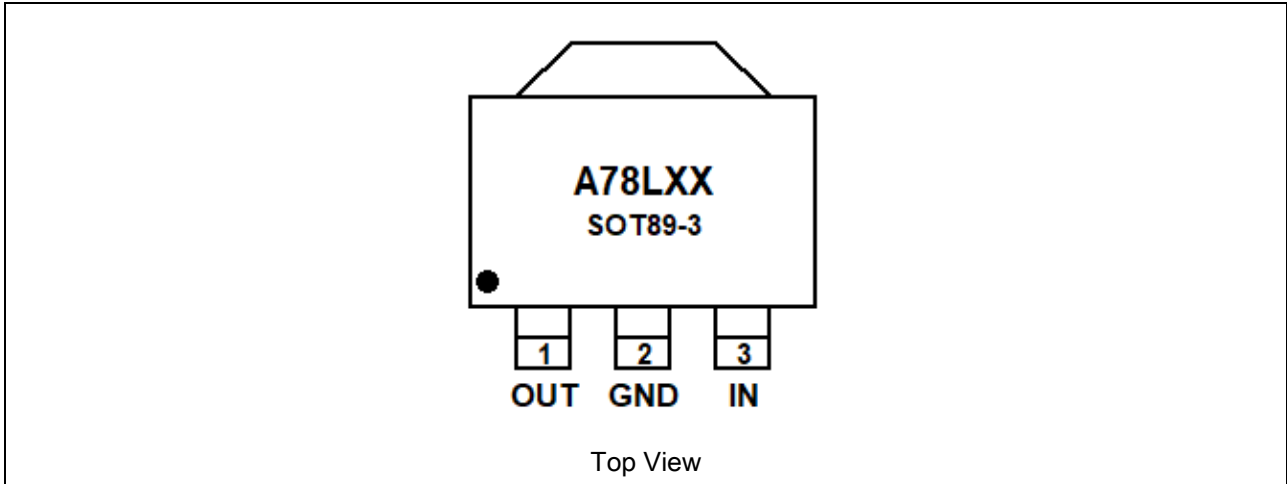
- Maximum Output Current  $I_o$ : 0.15A
- Output Voltage  $V_o$ :  
5V/6V/8V/9V/10V/12V/15V/18V/20V/24V
- Continuous Total Dissipation
- $P_D$ : 0.5 W ( $T_A = 25^\circ\text{C}$ )
- Available in SOT89-3 package

## ORDERING INFORMATION

Package Type	Part Number	
SOT89-3 SPQ: 1,000pcs/Reel	K3	A78LXXK3R
		A78LXXK3VR
Note	XX: Output Voltage 05=5.0V, 12=12V V: Halogen free Package R: Tape & Reel	
AiT provides all RoHS products		



## PIN DESCRIPTION



Top View

Pin #	Symbol	Function
1	OUT	Output
2	GND	Ground
3	IN	Input



## ABSOLUTE MAXIMUM RATINGS

$T_A=25^{\circ}\text{C}$

V <sub>i</sub> , Input Voltage	A78L05~A78L15	35V
	A78L18~A78L24	40V
I <sub>o</sub> , Output Current	A78L05~A78L24	150mA
P <sub>tot</sub> , Power Dissipation		500mW <sup>NOTE1</sup>
T <sub>opr</sub> , Operating Temperature		-40°C ~ +85°C
T <sub>J</sub> , Junction Temperature Range		-40°C ~ +125°C
T <sub>STG</sub> , Storage Temperature Range		-55°C ~ +150°C

Stresses above may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the Electrical Characteristics is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

NOTE1: Device is installed in the heat dissipation good environment

## ELECTRICAL CHARACTERISTICS

### A78L05

$T_A = 25^{\circ}\text{C}$ ,  $V_i = 10\text{V}$ ,  $I_o = 40\text{mA}$ ,  $C_i = 0.33\mu\text{F}$ ,  $C_o = 0.1\mu\text{F}$ , unless otherwise specified

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Output Voltage	V <sub>o</sub>	T <sub>J</sub> = 25°C	4.75	5	5.25	V
		7V ≤ V <sub>i</sub> ≤ 20V, 1mA ≤ I <sub>o</sub> ≤ 40mA	4.65	5	5.35	V
Voltage Regulation	S <sub>v</sub>	7V ≤ V <sub>i</sub> ≤ 20V, T <sub>J</sub> = 25°C	-	-	150	mV
		8V ≤ V <sub>i</sub> ≤ 20V, T <sub>J</sub> = 25°C	-	-	100	
Current Regulation	S <sub>i</sub>	1mA ≤ I <sub>o</sub> ≤ 100mA, T <sub>J</sub> = 25°C	-	-	60	mV
Quiescent Current	I <sub>q</sub>	T <sub>J</sub> = 25°C	-	-	6	mA
Quiescent Current Change	ΔI <sub>q</sub>	8V ≤ V <sub>i</sub> ≤ 20V	-	-	1.5	mA
		1mA ≤ I <sub>o</sub> ≤ 40mA	-	-	0.1	
Ripple Rejection	S <sub>rip</sub>	f = 120Hz, 8V ≤ V <sub>i</sub> ≤ 18V, T <sub>J</sub> = 25°C	-	49	-	dB
Dropout Voltage	V <sub>Drop</sub>	T <sub>J</sub> = 25°C	-	1.7	-	V



**A78L06**

$T_A = 25^\circ\text{C}$ ,  $V_I = 10\text{V}$ ,  $I_O = 40\text{mA}$ ,  $C_I = 0.33\mu\text{F}$ ,  $C_O = 0.1\mu\text{F}$ , unless otherwise specified

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Output Voltage	$V_O$	$T_J = 25^\circ\text{C}$	5.70	6	6.30	V
		$8.1\text{V} \leq V_I \leq 21\text{V}$ , $1\text{mA} \leq I_O \leq 40\text{mA}$	5.58	6	6.42	V
Voltage Regulation	$S_V$	$8.1\text{V} \leq V_I \leq 21\text{V}$ , $T_J = 25^\circ\text{C}$	-	-	150	mV
		$9\text{V} \leq V_I \leq 21\text{V}$ , $T_J = 25^\circ\text{C}$	-	-	110	
Current Regulation	$S_I$	$1\text{mA} \leq I_O \leq 100\text{mA}$ , $T_J = 25^\circ\text{C}$	-	-	70	mV
Quiescent Current	$I_Q$	$T_J = 25^\circ\text{C}$	-	-	6	mA
Quiescent Current Change	$\Delta I_Q$	$9\text{V} \leq V_I \leq 21\text{V}$	-	-	1.5	mA
		$1\text{mA} \leq I_O \leq 40\text{mA}$	-	-	0.1	
Ripple Rejection	$S_{rip}$	$f = 120\text{Hz}$ , $9\text{V} \leq V_I \leq 19\text{V}$ , $T_J = 25^\circ\text{C}$	-	47	-	dB
Dropout Voltage	$V_{Drop}$	$T_J = 25^\circ\text{C}$	-	1.7	-	V

**A78L08**

$T_A = 25^\circ\text{C}$ ,  $0 \leq T_J \leq +125^\circ\text{C}$ ,  $V_I = 14\text{V}$ ,  $I_O = 40\text{mA}$ ,  $C_I = 0.33\mu\text{F}$ ,  $C_O = 0.1\mu\text{F}$ , Unless otherwise specified

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Output Voltage	$V_O$	$T_J = 25^\circ\text{C}$	7.60	8	8.40	V
		$10.5\text{V} \leq V_I \leq 23\text{V}$ , $1\text{mA} \leq I_O \leq 40\text{mA}$	7.44	8	8.56	V
Voltage Regulation	$S_V$	$10.5\text{V} \leq V_I \leq 23\text{V}$ , $T_J = 25^\circ\text{C}$	-	-	175	mV
		$11\text{V} \leq V_I \leq 23\text{V}$ , $T_J = 25^\circ\text{C}$	-	-	125	
Current Regulation	$S_I$	$1\text{mA} \leq I_O \leq 100\text{mA}$ , $T_J = 25^\circ\text{C}$	-	-	80	mV
Quiescent Current	$I_Q$	$T_J = 25^\circ\text{C}$	-	-	6.5	mA
Quiescent Current Change	$\Delta I_Q$	$11\text{V} \leq V_I \leq 23\text{V}$	-	-	1.5	mA
		$1\text{mA} \leq I_O \leq 40\text{mA}$	-	-	0.1	
Ripple Rejection	$S_{rip}$	$f = 120\text{Hz}$ , $12\text{V} \leq V_I \leq 23\text{V}$ , $T_J = 25^\circ\text{C}$	-	45	-	dB
Dropout Voltage	$V_{Drop}$	$T_J = 25^\circ\text{C}$	-	1.7	-	V

**A78L09**

$T_A = 25^\circ\text{C}$ ,  $0 \leq T_J \leq +125^\circ\text{C}$ ,  $V_I = 15\text{V}$ ,  $I_O = 40\text{mA}$ ,  $C_I = 0.33\mu\text{F}$ ,  $C_O = 0.1\mu\text{F}$ , unless otherwise specified

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Output Voltage	$V_O$	$T_J = 25^\circ\text{C}$	8.55	9	9.45	V
		$11.4\text{V} \leq V_I \leq 24\text{V}$ , $1\text{mA} \leq I_O \leq 40\text{mA}$	8.37	9	9.63	V
Voltage Regulation	$S_V$	$11.4\text{V} \leq V_I \leq 24\text{V}$ , $T_J = 25^\circ\text{C}$	-	-	200	mV
		$12\text{V} \leq V_I \leq 24\text{V}$ , $T_J = 25^\circ\text{C}$	-	-	160	
Current Regulation	$S_I$	$1\text{mA} \leq I_O \leq 100\text{mA}$ , $T_J = 25^\circ\text{C}$	-	-	90	mV
Quiescent Current	$I_Q$	$T_J = 25^\circ\text{C}$	-	-	6.5	mA
Quiescent Current Change	$\Delta I_Q$	$12\text{V} \leq V_I \leq 24\text{V}$	-	-	1.5	mA
		$1\text{mA} \leq I_O \leq 40\text{mA}$	-	-	0.1	
Ripple Rejection	$S_{rip}$	$f = 120\text{Hz}$ , $12\text{V} \leq V_I \leq 24\text{V}$ , $T_J = 25^\circ\text{C}$	-	44	-	dB
Dropout Voltage	$V_{Drop}$	$T_J = 25^\circ\text{C}$	-	1.7	-	V



**A78L10**

$T_A = 25^\circ\text{C}$ ,  $0 \leq T_J \leq +125^\circ\text{C}$ ,  $V_I = 16\text{V}$ ,  $I_O = 40\text{mA}$ ,  $C_I = 0.33\mu\text{F}$ ,  $C_O = 0.1\mu\text{F}$ , unless otherwise specified

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Output Voltage	$V_O$	$T_J = 25^\circ\text{C}$	9.50	10	10.50	V
		$12.5\text{V} \leq V_I \leq 25\text{V}$ , $1\text{mA} \leq I_O \leq 40\text{mA}$	9.30	10	10.70	V
Voltage Regulation	$S_V$	$12.5\text{V} \leq V_I \leq 25\text{V}$ , $T_J = 25^\circ\text{C}$	-	-	230	mV
		$13\text{V} \leq V_I \leq 25\text{V}$ , $T_J = 25^\circ\text{C}$	-	-	170	
Current Regulation	$S_I$	$1\text{mA} \leq I_O \leq 100\text{mA}$ , $T_J = 25^\circ\text{C}$	-	-	90	mV
Quiescent Current	$I_Q$	$T_J = 25^\circ\text{C}$	-	-	6.5	mA
Quiescent Current Change	$\Delta I_Q$	$13\text{V} \leq V_I \leq 25\text{V}$	-	-	1.5	mA
		$1\text{mA} \leq I_O \leq 40\text{mA}$	-	-	0.1	
Ripple Rejection	$S_{rip}$	$f = 120\text{Hz}$ , $13\text{V} \leq V_I \leq 24\text{V}$ , $T_J = 25^\circ\text{C}$	-	43	-	dB
Dropout Voltage	$V_{Drop}$	$T_J = 25^\circ\text{C}$	-	1.7	-	V

**A78L12**

$T_A = 25^\circ\text{C}$ ,  $0 \leq T_J \leq +125^\circ\text{C}$ ,  $V_I = 19\text{V}$ ,  $I_O = 40\text{mA}$ ,  $C_I = 0.33\mu\text{F}$ ,  $C_O = 0.1\mu\text{F}$ , unless otherwise specified

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Output Voltage	$V_O$	$T_J = 25^\circ\text{C}$	11.40	12	12.60	V
		$14.5\text{V} \leq V_I \leq 27\text{V}$ , $1\text{mA} \leq I_O \leq 40\text{mA}$	11.16	12	12.84	V
Voltage Regulation	$S_V$	$14.5\text{V} \leq V_I \leq 27\text{V}$ , $T_J = 25^\circ\text{C}$	-	-	250	mV
		$16\text{V} \leq V_I \leq 27\text{V}$ , $T_J = 25^\circ\text{C}$	-	-	200	
Current Regulation	$S_I$	$1\text{mA} \leq I_O \leq 100\text{mA}$ , $T_J = 25^\circ\text{C}$	-	-	100	mV
Quiescent Current	$I_Q$	$T_J = 25^\circ\text{C}$	-	-	6.5	mA
Quiescent Current Change	$\Delta I_Q$	$16\text{V} \leq V_I \leq 27\text{V}$	-	-	1.5	mA
		$1\text{mA} \leq I_O \leq 40\text{mA}$	-	-	0.1	
Ripple Rejection	$S_{rip}$	$f = 120\text{Hz}$ , $15\text{V} \leq V_I \leq 25\text{V}$ , $T_J = 25^\circ\text{C}$	-	43	-	dB
Dropout Voltage	$V_{Drop}$	$T_J = 25^\circ\text{C}$	-	1.7	-	V

**A78L15**

$T_A = 25^\circ\text{C}$ ,  $0 \leq T_J \leq +125^\circ\text{C}$ ,  $V_I = 23\text{V}$ ,  $I_O = 40\text{mA}$ ,  $C_I = 0.33\mu\text{F}$ ,  $C_O = 0.1\mu\text{F}$ , unless otherwise specified

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Output Voltage	$V_O$	$T_J = 25^\circ\text{C}$	14.25	15	15.75	V
		$17.5\text{V} \leq V_I \leq 30\text{V}$ , $1\text{mA} \leq I_O \leq 40\text{mA}$	13.95	15	16.05	V
Voltage Regulation	$S_V$	$17.5\text{V} \leq V_I \leq 30\text{V}$ , $T_J = 25^\circ\text{C}$	-	-	200	mV
		$20\text{V} \leq V_I \leq 30\text{V}$ , $T_J = 25^\circ\text{C}$	-	-	250	
Current Regulation	$S_I$	$1\text{mA} \leq I_O \leq 100\text{mA}$ , $T_J = 25^\circ\text{C}$	-	-	150	mV
Quiescent Current	$I_Q$	$T_J = 25^\circ\text{C}$	-	-	6.5	mA
Quiescent Current Change	$\Delta I_Q$	$20\text{V} \leq V_I \leq 30\text{V}$	-	-	1.5	mA
		$1\text{mA} \leq I_O \leq 40\text{mA}$	-	-	0.1	
Ripple Rejection	$S_{rip}$	$f = 120\text{Hz}$ , $18.5\text{V} \leq V_I \leq 28.5\text{V}$ , $T_J = 25^\circ\text{C}$	-	40	-	dB
Dropout Voltage	$V_{Drop}$	$T_J = 25^\circ\text{C}$	-	1.7	-	V



**A78L18**

$T_A = 25^\circ\text{C}$ ,  $0 \leq T_J \leq +125^\circ\text{C}$ ,  $V_I = 27\text{V}$ ,  $I_O = 40\text{mA}$ ,  $C_I = 0.33\mu\text{F}$ ,  $C_O = 0.1\mu\text{F}$ , unless otherwise specified

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Output Voltage	$V_O$	$T_J = 25^\circ\text{C}$	17.10	18	18.90	V
		$21.4\text{V} \leq V_I \leq 33\text{V}$ , $1\text{mA} \leq I_O \leq 40\text{mA}$	16.74	18	19.26	V
Voltage Regulation	$S_V$	$21.4\text{V} \leq V_I \leq 33\text{V}$ , $T_J = 25^\circ\text{C}$	-	-	325	mV
		$22\text{V} \leq V_I \leq 33\text{V}$ , $T_J = 25^\circ\text{C}$	-	-	275	
Current Regulation	$S_I$	$1\text{mA} \leq I_O \leq 100\text{mA}$ , $T_J = 25^\circ\text{C}$	-	-	170	mV
Quiescent Current	$I_Q$	$T_J = 25^\circ\text{C}$	-	-	6.5	mA
Quiescent Current Change	$\Delta I_Q$	$22\text{V} \leq V_I \leq 33\text{V}$	-	-	1.5	mA
		$1\text{mA} \leq I_O \leq 40\text{mA}$	-	-	0.1	
Ripple Rejection	$S_{rip}$	$f = 120\text{Hz}$ , $23\text{V} \leq V_I \leq 33\text{V}$ , $T_J = 25^\circ\text{C}$	-	38	-	dB
Dropout Voltage	$V_{Drop}$	$T_J = 25^\circ\text{C}$	-	1.7	-	V

**A78L20**

$T_A = 25^\circ\text{C}$ ,  $0 \leq T_J \leq +125^\circ\text{C}$ ,  $V_I = 29\text{V}$ ,  $I_O = 40\text{mA}$ ,  $C_I = 0.33\mu\text{F}$ ,  $C_O = 0.1\mu\text{F}$ , unless otherwise specified

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Output Voltage	$V_O$	$T_J = 25^\circ\text{C}$	19.0	20	21.0	V
		$23.5\text{V} \leq V_I \leq 35\text{V}$ , $1\text{mA} \leq I_O \leq 40\text{mA}$	18.60	20	21.40	V
Voltage Regulation	$S_V$	$23.5\text{V} \leq V_I \leq 35\text{V}$ , $T_J = 25^\circ\text{C}$	-	-	330	mV
		$24\text{V} \leq V_I \leq 35\text{V}$ , $T_J = 25^\circ\text{C}$	-	-	285	
Current Regulation	$S_I$	$1\text{mA} \leq I_O \leq 100\text{mA}$ , $T_J = 25^\circ\text{C}$	-	-	180	mV
Quiescent Current	$I_Q$	$T_J = 25^\circ\text{C}$	-	-	6.5	mA
Quiescent Current Change	$\Delta I_Q$	$24\text{V} \leq V_I \leq 35\text{V}$	-	-	1.5	mA
		$1\text{mA} \leq I_O \leq 40\text{mA}$	-	-	0.1	
Ripple Rejection	$S_{rip}$	$f = 120\text{Hz}$ , $25\text{V} \leq V_I \leq 35\text{V}$ , $T_J = 25^\circ\text{C}$	-	37	-	dB
Dropout Voltage	$V_{Drop}$	$T_J = 25^\circ\text{C}$	-	1.7	-	V

**A78L24**

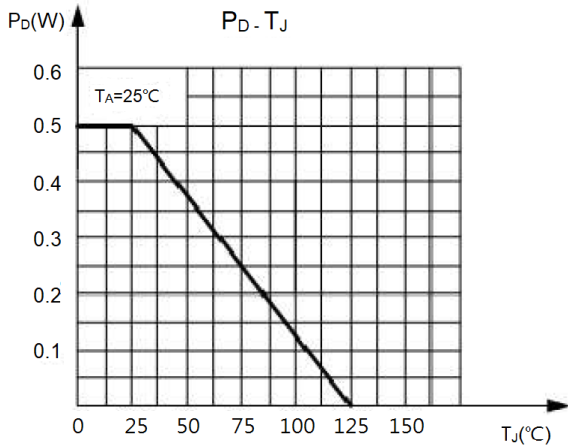
$T_A = 25^\circ\text{C}$ ,  $0 \leq T_J \leq +125^\circ\text{C}$ ,  $V_I = 33\text{V}$ ,  $I_O = 40\text{mA}$ ,  $C_I = 0.33\mu\text{F}$ ,  $C_O = 0.1\mu\text{F}$ , unless otherwise specified

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Output Voltage	$V_O$	$T_J = 25^\circ\text{C}$	22.80	24	25.20	V
		$27.5\text{V} \leq V_I \leq 38\text{V}$ , $1\text{mA} \leq I_O \leq 40\text{mA}$	22.32	24	25.68	V
Voltage Regulation	$S_V$	$27.5\text{V} \leq V_I \leq 38\text{V}$ , $T_J = 25^\circ\text{C}$	-	-	350	mV
		$28\text{V} \leq V_I \leq 38\text{V}$ , $T_J = 25^\circ\text{C}$	-	-	300	
Current Regulation	$S_I$	$1\text{mA} \leq I_O \leq 100\text{mA}$ , $T_J = 25^\circ\text{C}$	-	-	200	mV
Quiescent Current	$I_Q$	$T_J = 25^\circ\text{C}$	-	-	6.5	mA
Quiescent Current Change	$\Delta I_Q$	$28\text{V} \leq V_I \leq 38\text{V}$	-	-	1.5	mA
		$1\text{mA} \leq I_O \leq 40\text{mA}$	-	-	0.1	
Ripple Rejection	$S_{rip}$	$f = 120\text{Hz}$ , $29\text{V} \leq V_I \leq 39\text{V}$ , $T_J = 25^\circ\text{C}$	-	35	-	dB
Dropout Voltage	$V_{Drop}$	$T_J = 25^\circ\text{C}$	-	1.7	-	V

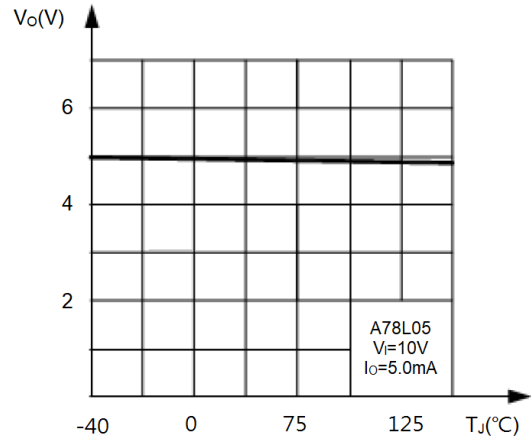


## TYPICAL CHARACTERISTICS

1. Dissipation power relationship with the temperature curve



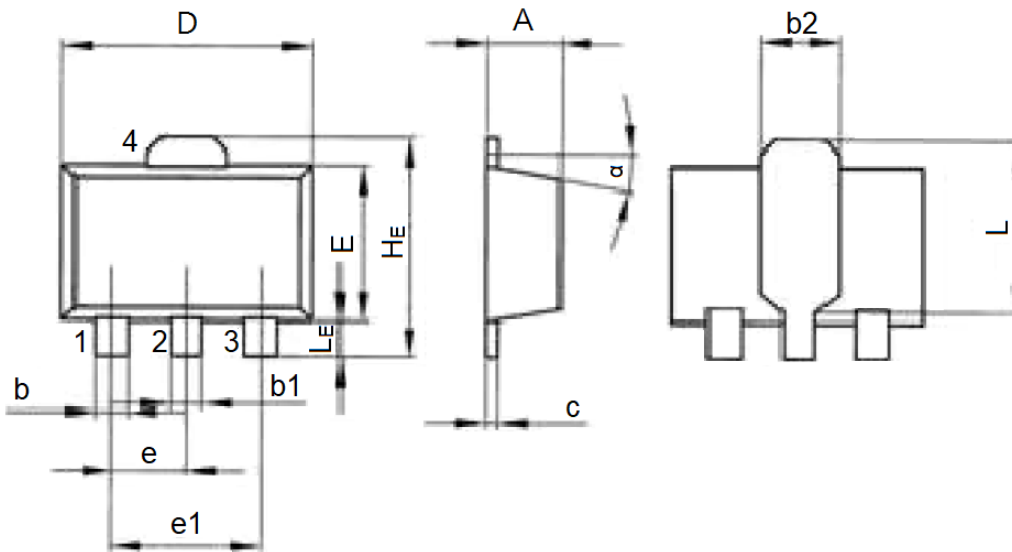
2. Output Voltage and junction temperature curve





## PACKAGE INFORMATION

Dimension in SOT89-3 (Unit: mm)



Symbol	Min	Max
A	1.4	1.6
b	0.35	0.55
b1	0.4	0.65
b2	1.6 TYP.	
c	0.35	0.45
D	4.4	4.6
E	2.35	2.55
e	1.5 TYP.	
e1	3 TYP.	
HE	4.15 TYP.	
L	2.7 TYP.	
LE	1.0 TYP.	
$\alpha$	5°TYP.	





## IMPORTANT NOTICE

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