

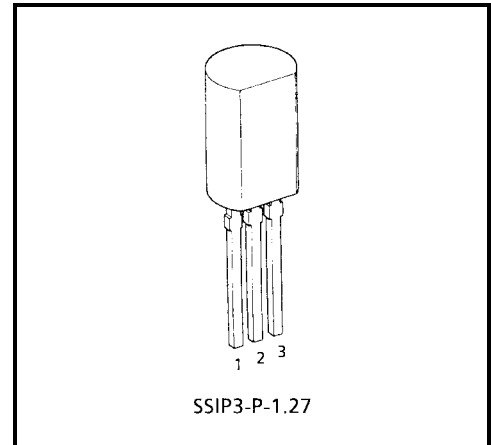
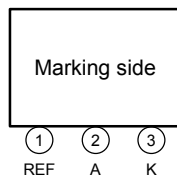
TA76431S

Adjustable Precision Shunt Regulator

Features

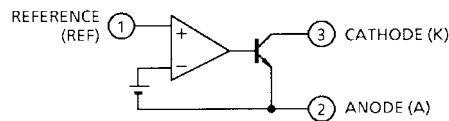
- Precision reference voltage: $V_{REF} = 2.495 \text{ V} \pm 2\%$
- Small temperature coefficient: $|\alpha V_{REF}| = 46 \text{ ppm}/^\circ\text{C}$
- Adjustable output voltage: $V_{REF} \leq V_{OUT} \leq 36 \text{ V}$
- Low dynamic output impedance: $|Z_{KA}| = 0.15 \Omega \text{ (Typ.)}$

Pin Assignment

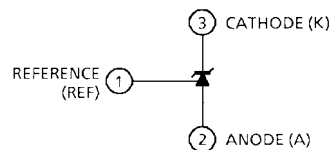


Weight: 0.36 g (Typ.)

Functional Block Diagram

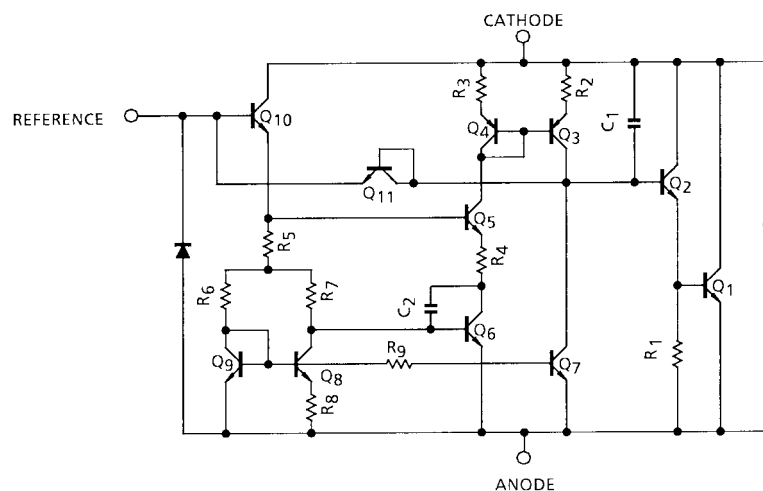


Circuit Symbol



This IC contains electrostatic sensitive element.
Please handle with caution.

Equivalent Circuit



Maximum Ratings (Ta = 25°C)

Characteristics	Symbol	Rating	Unit
Cathode voltage	V _{KA}	37	V
Cathode current	I _K	−100~150	mA
Reference voltage	V _{REF}	7	V
Reference current	I _{REF}	50	μA
Reference-anode reverse current	−I _{REF}	10	mA
Power dissipation	Ta = 25°C P _D	800	mW
Operating temperature	T _{opr}	−40~85	°C
Storage temperature	T _{stg}	−55~150	°C

Recommended Operating Conditions

Characteristics	Symbol	Min	Typ.	Max	Unit
Cathode voltage	V _{KA}	V _{REF}	—	36	V
Cathode current	I _K	1	—	100	mA
Operating temperature	T _{opr}	−40	—	85	°C

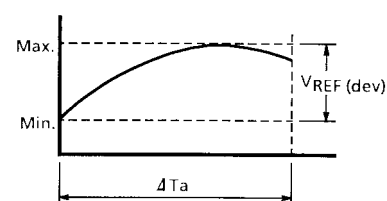
Electrical Characteristics (Unless otherwise specified, Ta = 25°C, I_K = 10 mA)

Characteristics	Symbol	Test Circuit	Test Condition	Min	Typ.	Max	Unit
Reference voltage	V _{REF}	—	V _{KA} = V _{REF}	2.440	2.495	2.550	V
Deviation of reference input voltage over temperature	V _{REF (dev)} (Note 1)	—	0°C ≤ Ta ≤ 70°C, V _{KA} = V _{REF}	—	8	17	mV
Ratio of change in reference input voltage to the change in cathode voltage	ΔV _{REF} /ΔV	—	V _{REF} ≤ V _{KA} ≤ 10 V	—	0.8	2.7	mV/V
		—	10 V ≤ V _{KA} ≤ 36 V	—	0.5	2.0	
Reference input current	I _{REF}	—	V _{KA} = V _{REF}	—	1.4	4	μA
Deviation of reference input current over temperature	I _{REF (dev)} (Note 1)	—	0°C ≤ Ta ≤ 70°C, V _{KA} = V _{REF} R ₁ = 10 kΩ, R ₂ = ∞	—	0.3	1.2	μA
Minimum cathode current for regulation	I _{Kmin}	—	V _{KA} = V _{REF}	—	0.4	1.0	mA
Off-state cathode current	I _{Koff}	—	V _{KA} = 36 V, V _{REF} = 0 V	—	—	1.0	μA
Dynamic impedance	Z _{KA}	—	V _{KA} = V _{REF} , f ≤ 1 kHz 1 mA ≤ I _K ≤ 100 mA	—	0.15	0.5	Ω

Note 1: The deviation parameters V_{REF (dev)} and I_{REF (dev)} are defined as the maximum variation of the V_{REF} and I_{REF} over the rated temperature range.

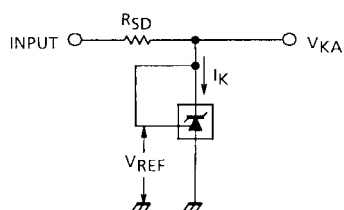
The average temperature coefficient of the V_{REF} is defined as;

$$|\alpha V_{REF}| = \frac{\frac{V_{REF (dev)}}{V_{REF@25^\circ C}} \times 10^6}{\Delta T_a} \quad (\text{ppm} / ^\circ\text{C})$$

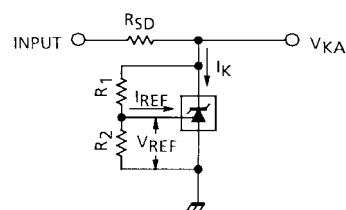


Test Parameter

(1) $V_{KA} = V_{REF}$ mode

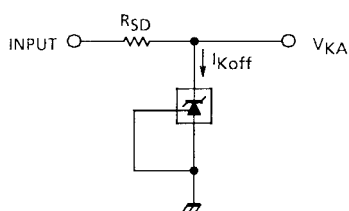


(2) $V_{KA} > V_{REF}$ mode



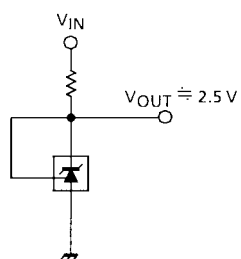
$$V_{KA} = V_{REF} \left(1 + \frac{R_1}{R_2} \right) + I_{REF} \cdot R_1$$

(3) Off-state mode

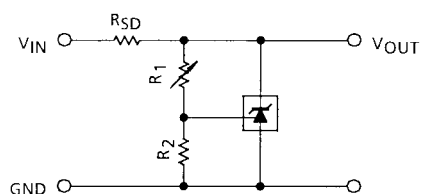


Typical Applications

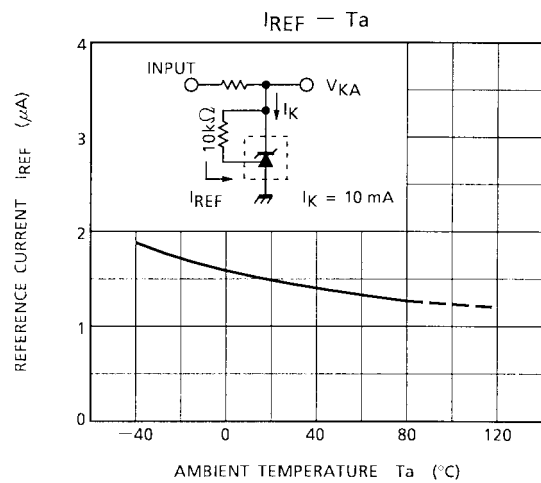
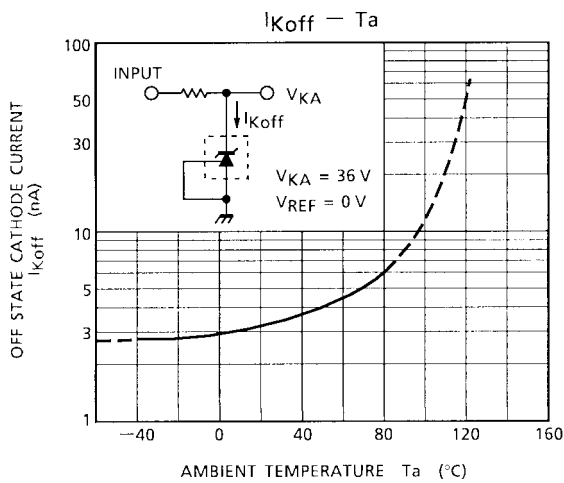
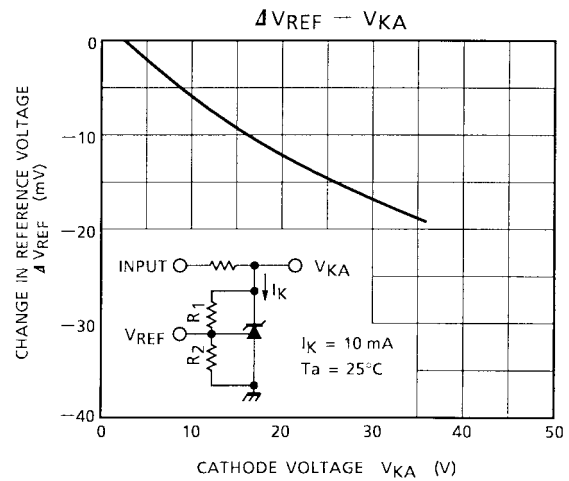
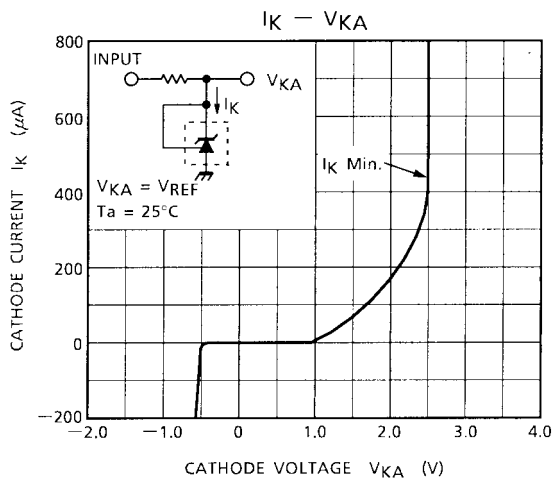
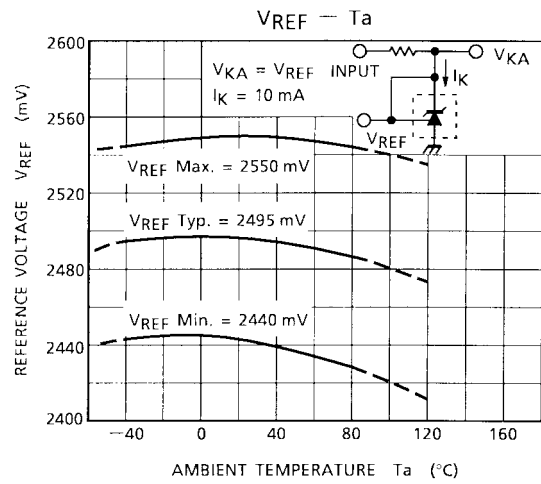
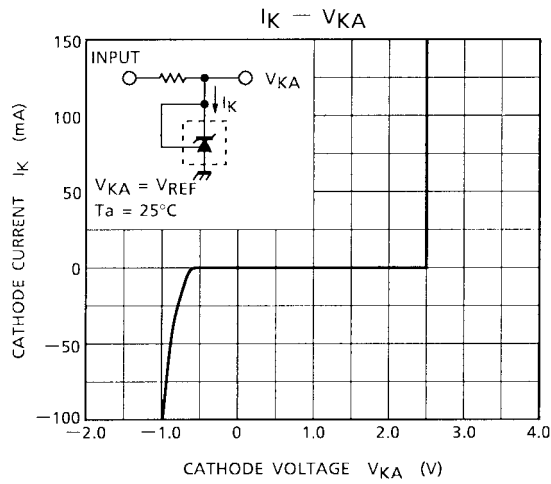
(1) 2.5 V reference

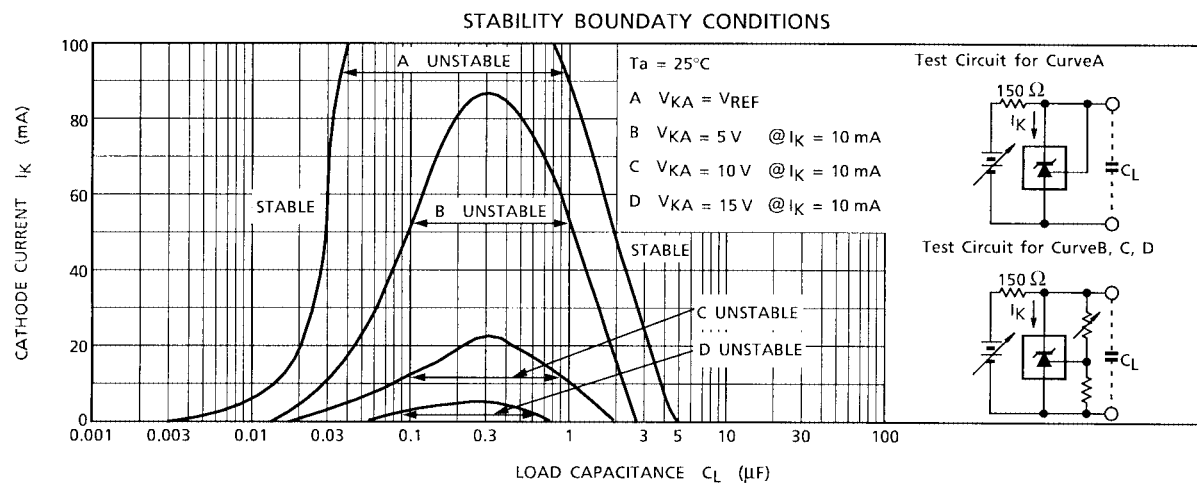
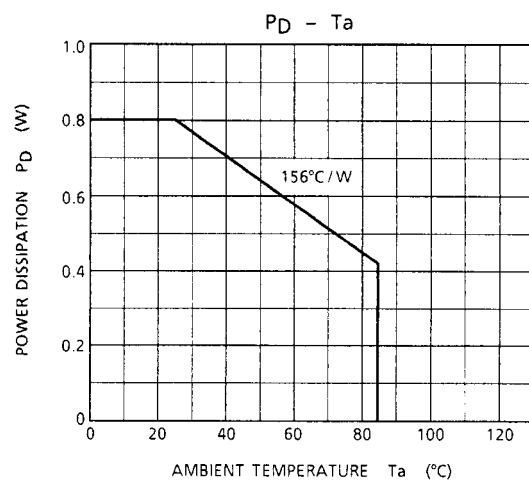
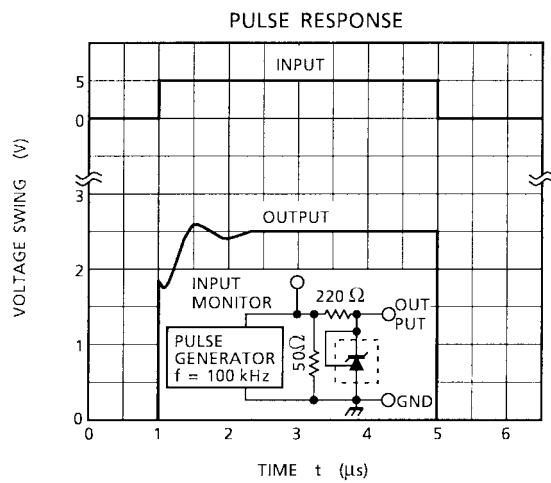
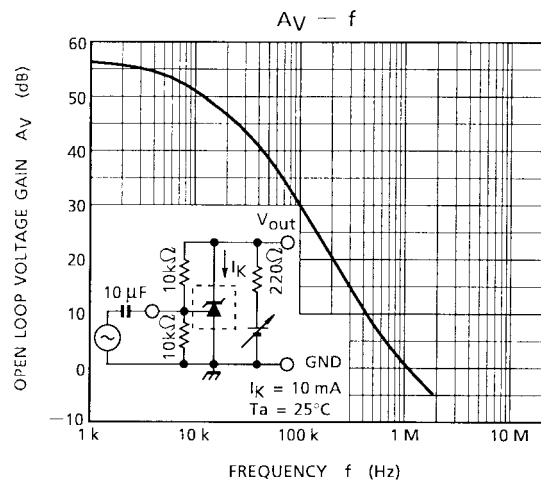
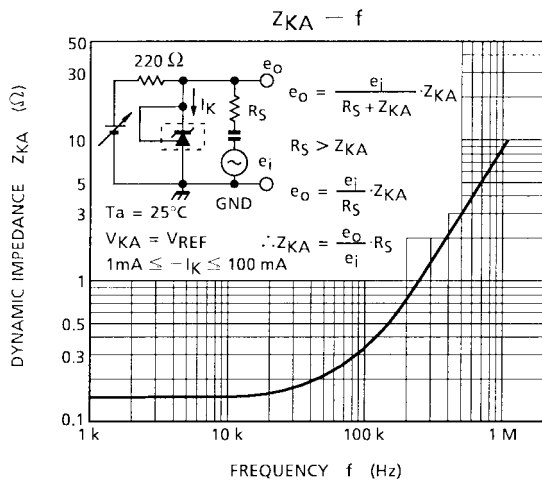


(2) Shunt regulator



$$V_{OUT} = V_{REF} \left(1 + \frac{R_1}{R_2} \right) + I_{REF} \cdot R_1$$

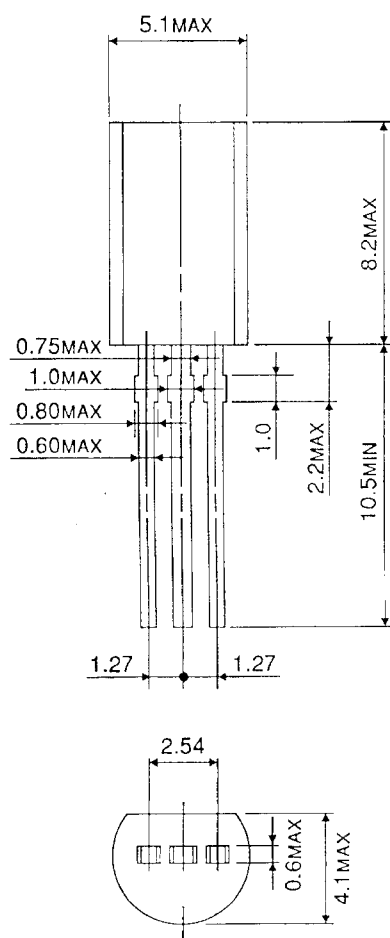




Package Dimensions

SSIP3-P-1.27

Unit : mm



Weight : 0.36 g (Typ.)

RESTRICTIONS ON PRODUCT USE

000707EBA

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