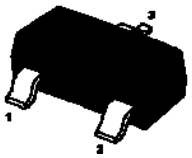
迈拓电子
MAITUO ELECTRONIC

MMTL431 Programmable Precision Reference

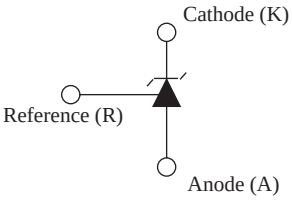
Features:

- Programmable output Voltage to 36 V
- Low dynamic output impedance
- Sink current capability of 1 to 100 mA
- Low output noise voltage
- Fast turn on response

Marking : 431



1. Reference 2.Cathode 3. Anode



SOT-23

Absolute Maximum Ratings (T_a = 25 °C, unless otherwise noted.)

Parameter	Symbol	Value	Unit
Cathode Voltage	V_{KA}	37	V
Cathode Current Range (Continuous)	I_{KA}	- 100 to + 150	mA
Reference Input Current Range	I_{REF}	- 0.05 to + 10	mA
Power Dissipation	P_D	350	mW
Operating Temperature Range	T_{opr}	- 25 to + 85	°C
Junction Temperature	T_j	150	°C
Storage Temperature Range	T_{stg}	- 65 to + 150	°C

Recmmended Operating Conditions

Parameter	Symbol	Min.	Max.	Unit
Cathode Voltage	V_{KA}	V_{REF}	36	V
Cathode Current	I_{KA}	1	100	mA

Characteristics at T_a = 25 °C

Parameter	Symbol	Min.	Typ.	Max.	Unit
Reference Input Voltage at $V_{KA} = V_{REF}$, I_{KA} = 10 mA 0.5%	V_{REF}	2.487	2.50	2.513	V
Reference Input Voltage at $V_{KA} = V_{REF}$, I_{KA} = 10 mA 1%	V_{REF}	2.475	2.50	2.525	V
Reference Input Voltage at $V_{KA} = V_{REF}$, I_{KA} = 10 mA 2%	V_{REF}	2.44	2.50	2.55	V
Deviation of Reference Input Voltage Over Temperatue at $V_{KA} = V_{REF}$, I_{KA} = 10 mA, - 25°C ≤ T_a ≤ + 85 °C	$\Delta V_{REF}/\Delta T$	-	4.5	17	mV
Ratio of Change in Reference Input Voltage to the Change in Cathode Voltage at I_{KA} = 10 mA ΔV_{KA} = 10 V to V_{REF} ΔV_{KA} = 36 V to 10 V	$\Delta V_{REF}/\Delta V_{KA}$	- -	-1.0 -0.5	-2.7 -2	mV/V
Reference Input Current at I_{KA} = 10 mA, R1 = 10 KΩ, R2 = ∞	I_{REF}	-	1.5	4	μA
Deviation of Reference Input Current Over Full Temperatue at I_{KA} = 10 mA, R1 = 10 KΩ, R2 = ∞, - 25°C ≤ T_a ≤ + 85 °C	$\Delta I_{REF}/\Delta T$	-	0.4	1.2	μA
Minimum Cathode Current for Regulation at $V_{KA} = V_{REF}$	$I_{KA(min)}$	-	0.45	1	mA
Off-Stage Cathode Current at V_{KA} = 36 V, V_{REF} = 0	$I_{KA(OFF)}$	-	0.05	1	μA
Dynamic Impedance at $V_{KA} = V_{REF}$, I_{KA} = 1 to 100 mA, f ≤ 1 KHz	Z_{KA}	-	0.15	0.5	Ω

FIGURE 1-TEST CIRCUIT FOR $V_{KA} = V_{ref}$

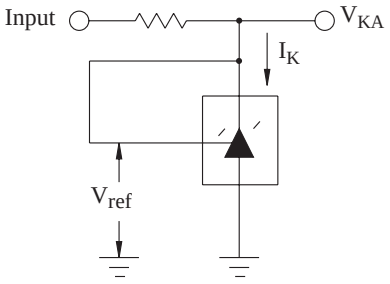
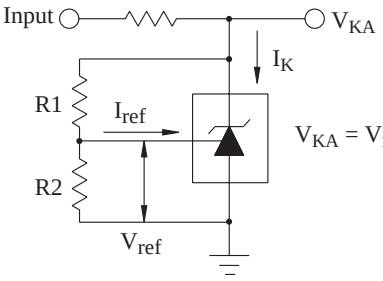


FIGURE 2-TEST CIRCUIT FOR $V_{KA} > V_{ref}$

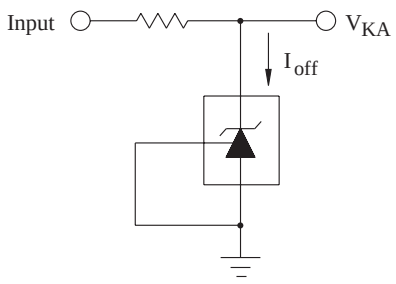


$$V_{KA} = V_{ref}\left(1+\frac{R1}{R2}\right) + I_{ref} \times R1$$

Note 1:

The deviation parameter ΔV_{ref} is defined as the differences between the maximum and minimum values obtained over the full operating ambient temperature range that applies.

FIGURE 3-TEST CIRCUIT FOR I_{off}



Example : ΔV_{ref} = 8.0mV and slope is positive,

V_{ref} at 25℃=2.495V, ΔTa=70℃

$$\alpha V_{ref} = \frac{0.008 \times 10^6}{70 \times (2.495)} = 45.8 \text{ ppm/℃}$$

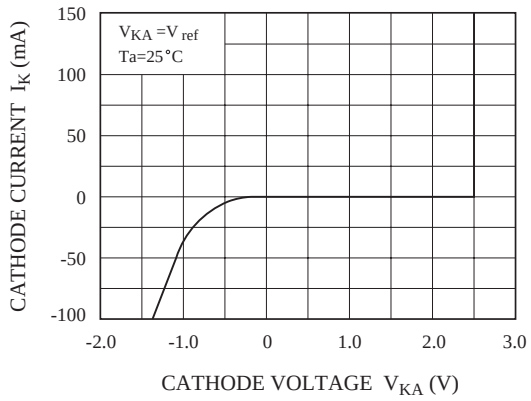
Note 2: The dynamic impedance Z_{ka} is defined as:

$$|Z_{ka}| = \frac{\Delta VKA}{\Delta Ik}$$

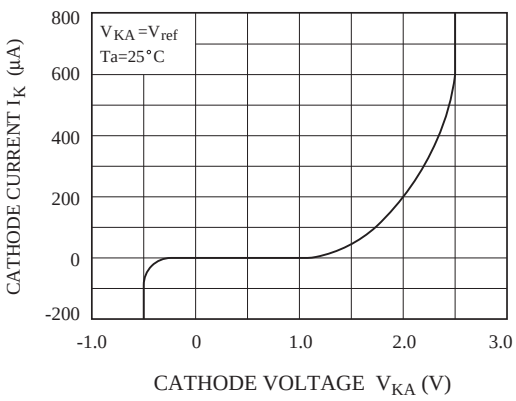
When the device is programmed with two external resistors, R1 and R2, (refer to Figure 2) the total dynamic impedance of the circuit is defined as:

$$|Z_{ka'}| = |Z_{ka}|\left(1+\frac{R1}{R2}\right)$$

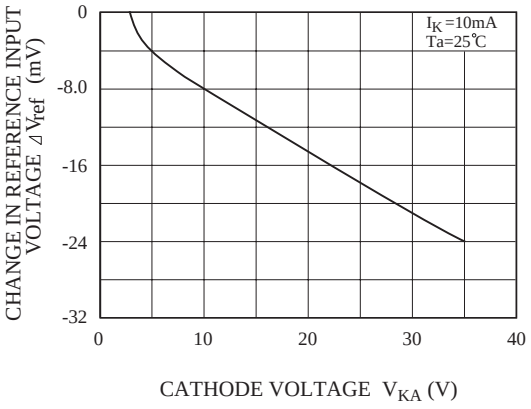
I_K - V_{KA}



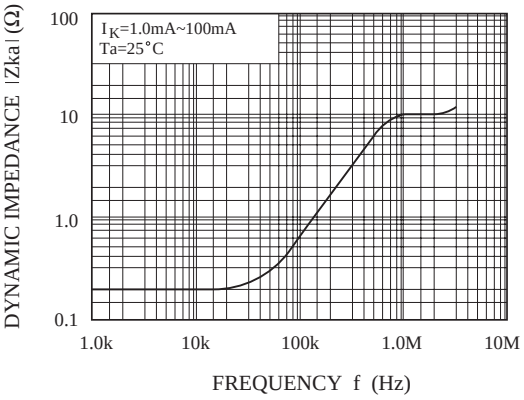
I_K - V_{KA}



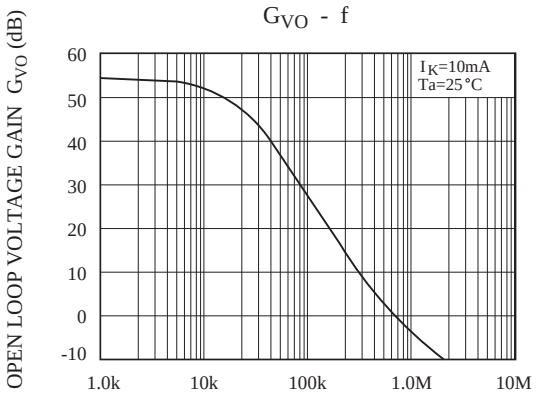
ΔV_{ref} - V_{KA}



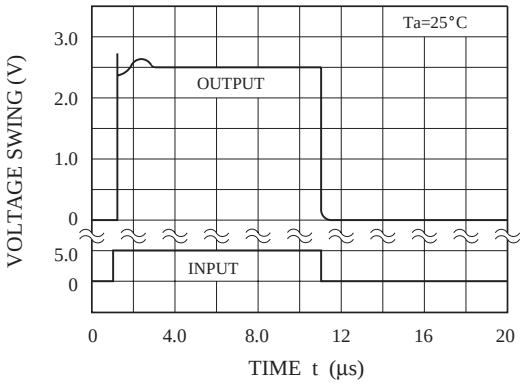
| Zka | - f



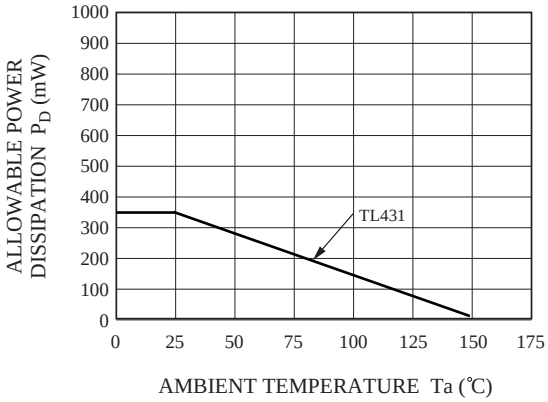
G_{VO} - f



PULSE RESPONSE



P_D - Ta



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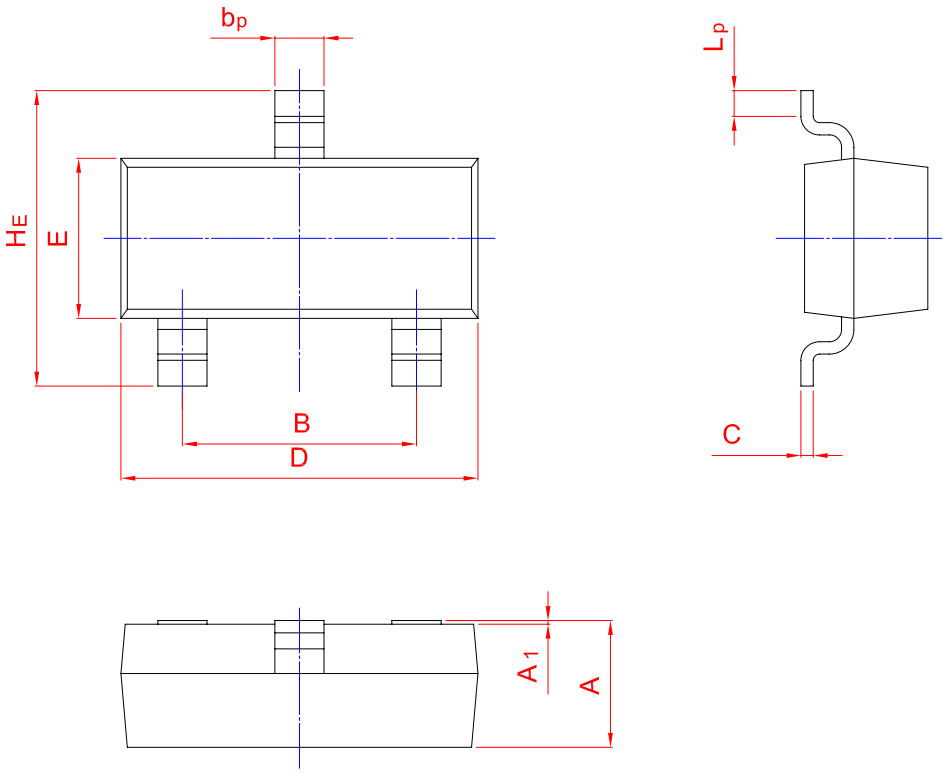
PACKAGE OUTLINE

Plastic surface mounted package; 3 leads **SOT-23**



UNIT	A	B	bp	C	D	E	HE	A1	Lp
mm	1.40 0.95	2.04 1.78	0.50 0.35	0.19 0.08	3.10 2.70	1.65 1.20	3.00 2.20	0.100 0.013	0.50 0.20