ADJUSTABLE HIGH PRECISION SHUNT REGULATOR

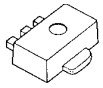
■GENERAL DESCRIPTION

NJM2373 / NJM2373A / NJM2376 is an adjustable high precision shunt regulator.

The output voltage can be adjusted to any value between reference voltage and 14V by two extend resistors.

■PACKAGE OUTLINE

NJM2373F/AF
NJM2376F

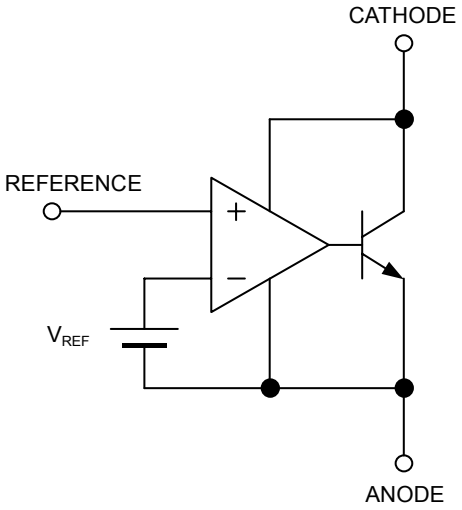


NJM2373AU
NJM2376U

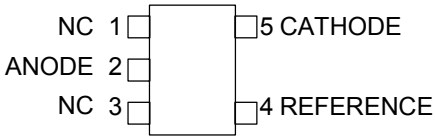
■FEATURES

- Operating Voltage V_{REF} to 13V
- High Precision Voltage Reference NJM2373 1.25V±2%
  NJM2373A/76 1.25V±1%
- Minimum Input Current 80μA typ.
- Adjustable Output Voltage
- Bipolar Technology
- Package Outline SOT-89 (3pin), MTP5

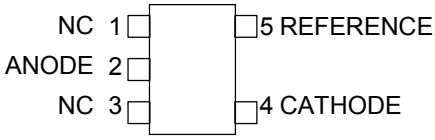
■BLOCK DIAGRAM



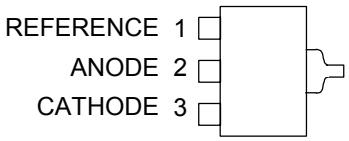
■PIN CONFIGURATION



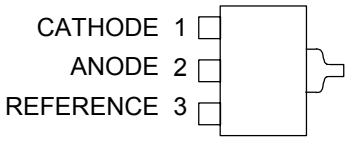
NJM2373F/73AF



NJM2376F



NJM2373AU



NJM2376U

■ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

PARAMETER	SYMBOL	MAXIMUM RATINGS	UNIT
Cathode Voltage	V_{KA}	+14	V
Continuous Cathode Current	I_K	-30 ~ 50	mA
Reference Input Current	I_{REF}	-10 ~ 0.05	mA
Power Dissipation	P_D	(SOT-89) 350 (MTP5) 200	mW
Operating Temperature Range	T_{OPR}	-40 ~ +85	°C
Storage Temperature Range	T_{STG}	-40 ~ +150	°C

■RECOMMENDED OPERATING CONDITIONS (Ta=25°C)

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT
Cathode Voltage	V_{KA}	V_{REF}	–	13	V
Cathode Current	I_K	0.5	–	30	mA

■ELECTRICAL CHARACTERISTICS (I_K=1mA, Ta=25°C)

PARAMETER	SYMBOL	TEST CONDITION		MIN.	TYP.	MAX.	UNIT
Reference Voltage	V_{REF}	$V_{KA}=V_{REF}$ NJM2373A	(*1)	1225	1250	1275	mV
		$V_{KA}=V_{REF}$ NJM2373A/ NJM2376	(*1)	1237	1250	1263	
Reference Voltage Change vs. Cathode Voltage Change	$\Delta V_{REF}/\Delta V_{KA}$	$\lvert V_{REF} \rvert \leq V_{KA} \leq 5V$	(*2)	–	–	±2.7	mV/V
		$5V \leq V_{KA} \leq 13V$	(*2)	–	–	±2.0	mV/V
Reference Input Current	I_{REF}	$V_{KA}=V_{REF}$ R1=10kΩ, R2=∞	(*2)	–	2.0	4.0	μA
Minimum Input Current	I_{MIN}	$V_{KA}=V_{REF}$, ΔV_{REF}=±1%	(*1)	–	80	500	μA
Cathode Current (Off Cond.)	I_{OFF}	V_{KA}=13V, V_{REF}=0V	(*3)	–	0.01	1.0	μA
Dynamic Impedance	$\lvert Z_{KA} \rvert$	$V_{KA}=V_{REF}$, f≤1kHz 0.5mA ≤ I_K ≤ 30mA	(*1)	–	0.12	–	Ω

■TEMPERATURE CHARACTERISTICS (I_K=1mA, Ta= -40°C ~ 85°C)

PARAMETER	SYMBOL	TEST CONDITION		MIN.	TYP.	MAX.	UNIT
Reference Voltage Change	ΔV_{REF}	$V_{KA}=V_{REF}$	(*1)	–	±10	–	mV
Reference Input Current Change	ΔI_{REF}	$V_{KA}=V_{REF}$ R1=10kΩ, R2=∞	(*2)	–	0.5	–	μA

$\lvert V_{REF} \rvert$ ···Reference voltage includes error.

(*1): Test Circuit (Fig.1)

(*2): Test Circuit (Fig.2)

(*3): Test Circuit (Fig.3)

■TEST CIRCUIT

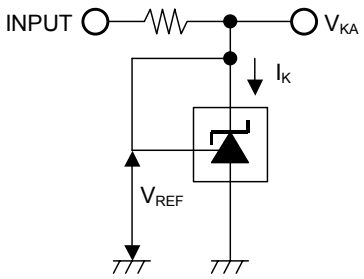


Fig.1 $V_{KA}=V_{REF}$ to test circuit

$V_O=V_{KA}=V_{REF}$

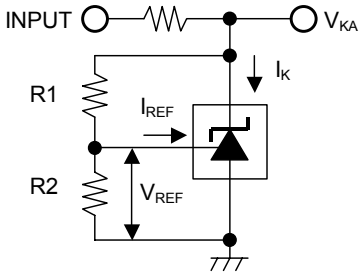


Fig.2 $V_{KA}>V_{REF}$ to test circuit

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

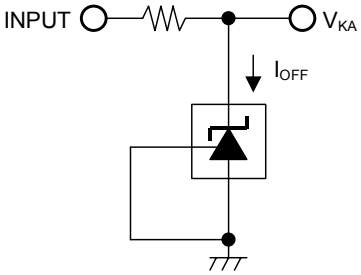


Fig.3 I_{OFF} to test circuit

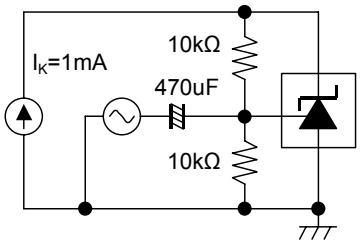


Fig.4 Gain and Phase to test circuit

■POWER DISSIPATION VS. AMBIENT TEMPERATURE