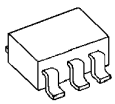
Adjustable High Precision Shunt Regulator

■ GENERAL DESCRIPTION

The NJM2373/73A and NJM2376 are adjustable high precision shunt regulators.

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

■ PACKAGE OUTLINE



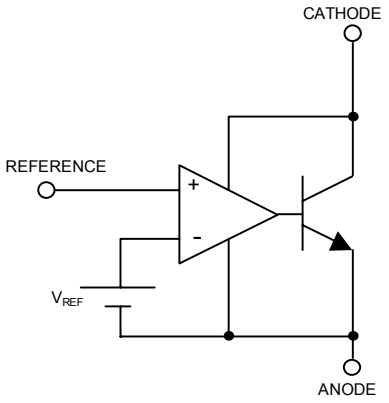
NJM2373F/AF
NJM2376F

NJM2373U / AU
NJM2376U

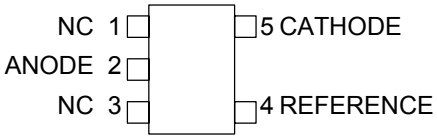
■ FEATURES

- Operating Voltage (V_{REF} to 13V)
- High Precision Reference Voltage
  NJM2373 1.25V±2%
  NJM2373A/76 1.25V±1%
- Minimum External Parts
- Bipolar Technology
- Package Outline MTP5 , SOT-89

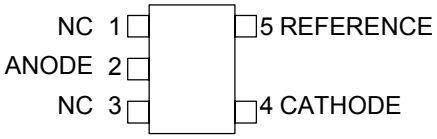
■ BLOCK DIAGRAM



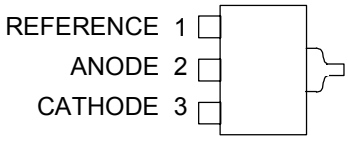
■ PIN CONFIGURATION



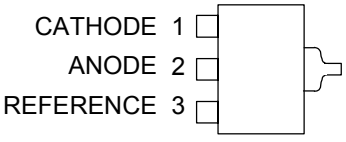
(NJM2373F/73AF)



(NJM2376F)



(NJM2373U / AU)



(NJM2376U)

■ ABUSOLUTE MAXIMUM RATINGS (Ta=25°C)

PARAMETER	SYMBOL	RATINGS	UNIT
Cathode Voltage	V_{KA}	+14	V
Continuous Cathode Current	I_{KA}	-30 to 50	mA
Reference Input Current	I_{REF}	-10 to 0.05	mA
Power Dissipation	P_D (MTP5)	250	mW
	(SOT-89)	350	
Operating Temperature Range	Topr	-40 to +85	°C
Storage Temperature Range	Tstg	-40 to +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	1	—	30	mA

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

PARAMETER	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNIT
Reference Voltage	V_{REF}	$V_{KA}=V_{REF}$ (*1) . NJM2373	1225	1250	1275	mV
		$V_{KA}=V_{REF}$ (*1) , NJM2373A NJM2376	1237.5	1250	1262.5	
Reference Voltage Change vs. Cathode Voltage Change	$\Delta V_{REF}/\Delta V_{REF}$	$\lvert V_{REF}\rvert \leq V_{KA} \leq 5V$(*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}	$V_{KA}=V_{REF},\Delta V_{REF}$=-1%(*1)	—	0.4	1.0	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 1mA≤I_K≤100mA(*1)	—	0.12	—	Ω

■ TEMPERATURE CHARACTERISTICS (I_K=10mA, Ta=-20 to +85°C)

PARAMETER	SYMBOL	CONDITIONS	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

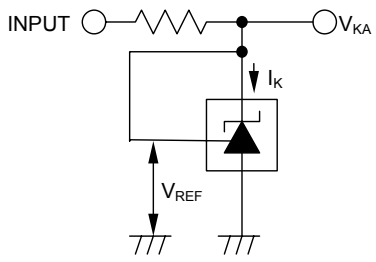
$\lvert V_{REF}\rvert$ ••• Reference Voltage includes error.

(*1) : TEST CIRCUIT1(Fig.1)

(*2) : TEST CIRCUIT2(Fig.2)

(*3) : TEST CIRCUIT3(Fig.3)

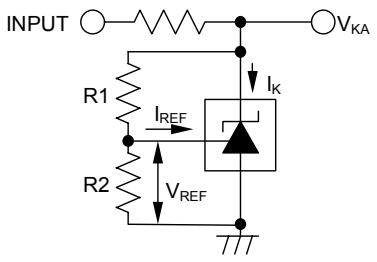
■ TEST CIRCUIT



1. $V_{KA}=V_{REF}$

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

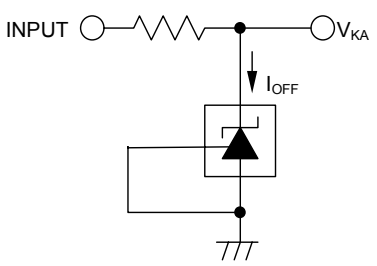
(Fig.1)



2. $V_{KA}>V_{REF}$

$V_O = V_{KA} = V_{REF}(1+R1/R2)+I_{REF}\cdot R1$

(Fig.2)

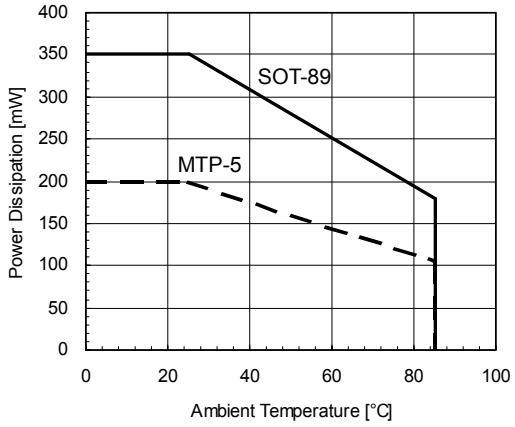


3. I_{OFF}

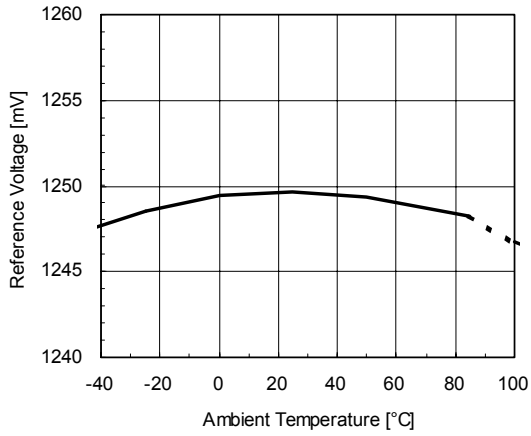
(Fig.3)

■ TYPICAL CHARACTERISTICS

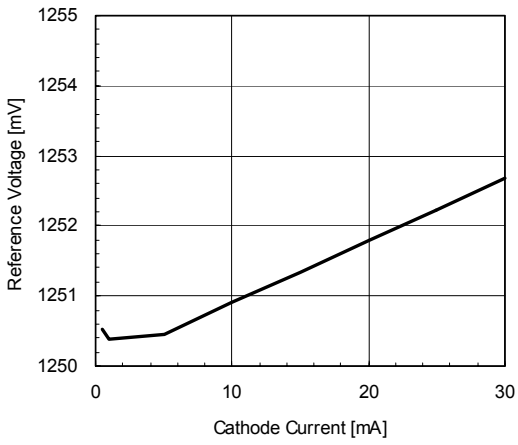
Pow e Dissipation VS. Ambient Temperature



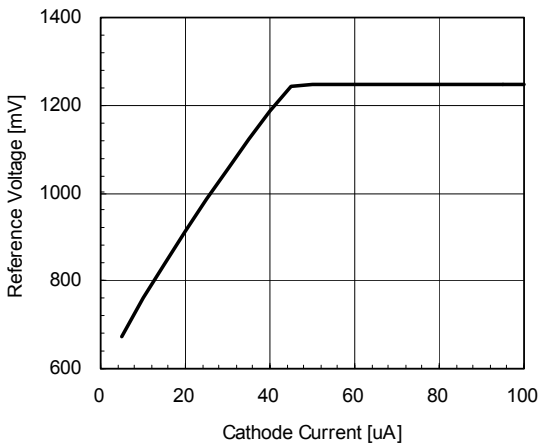
Reference Voltage VS. Ambient Temperature
IK=1mA,VKA=VREF



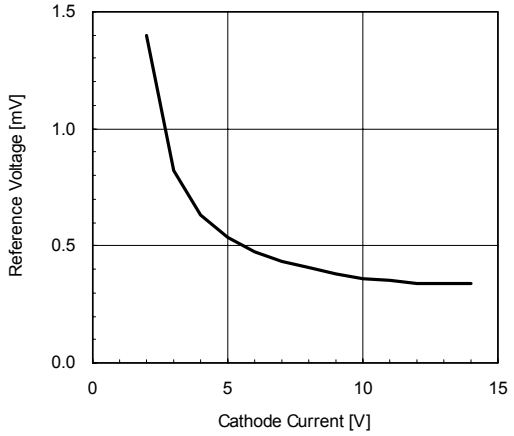
Reference Voltage VS. Cathode Current
VKA=VREF,Ta=25°C



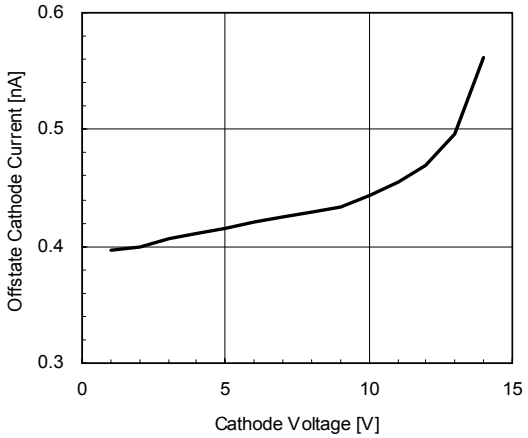
Reference Voltage VS. Cathode Current
VKA=VREF,Ta=25°C



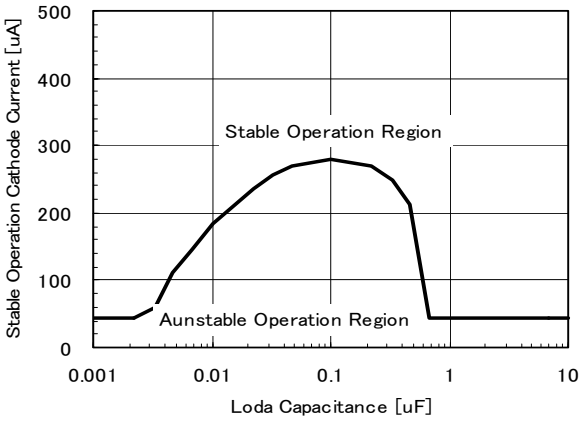
Reference Voltage VS. Cathode Current
(IK=1mA,R1=10kΩ,R2=val500kΩ,Ta=25°C)



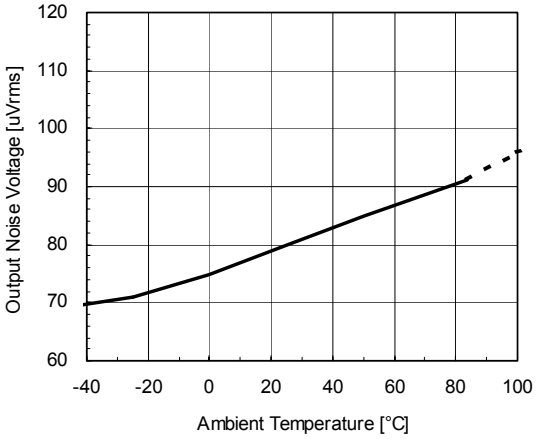
Offstate Cathode Current VS. Cathode Voltage
VREF=VA,Ta=25°C



Stable Operation Cathode Current
VS. Load Capacitance
$V_{KA}=V_{REF}$,T_a=25°C

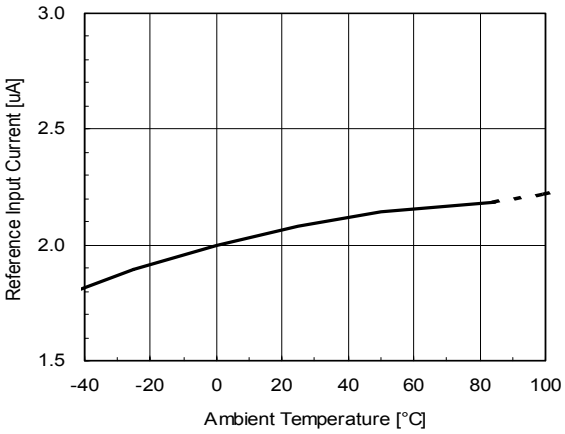


Output Noise Voltage VS. Ambient Temperature
IK=1mA,VKA=VREF

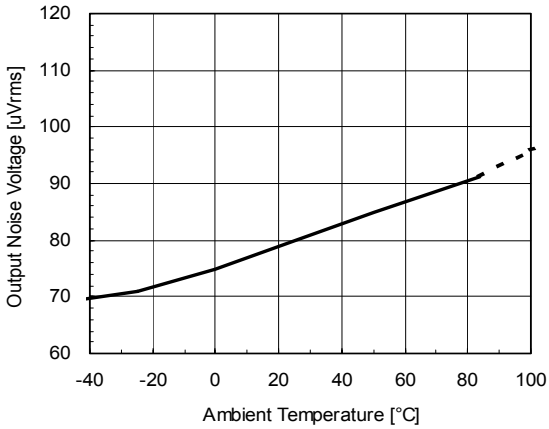


Note) Oscillation might occur while operating within the range of safety curve.
So that, it is necessary to make ample margins by taking considerations of fluctuation of the device

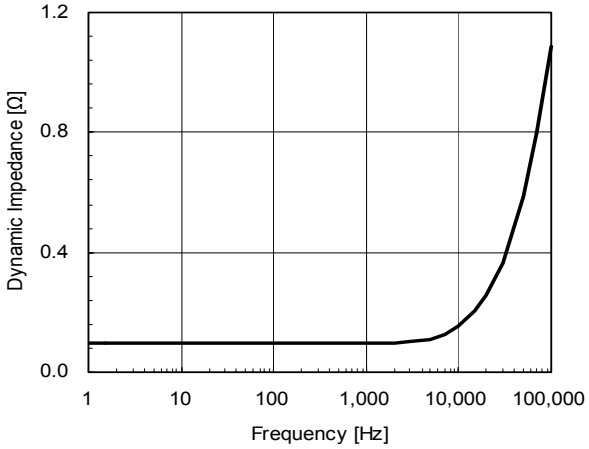
Reference Input Current VS. Ambient Temperature
IK=1mA,R1=10kΩ,R2=∞



Output Noise Voltage VS. Ambient Temperature
IK=1mA,VKA=VREF



Dynamic Impedance VS. Frequency
IK=1mA,VKA=VREF,Ta=25°C



Voltage Gaine VS. Frequency
IK=1mA,Ta=25°C