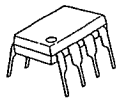
ADJUSTABLE HIGH PRECISION SHUNT REGULATOR

■ GENERAL DESCRIPTION

The NJM2380/A is an adjustable high precision shunt regulator.

It is adapted for downsizing power supply module, battery charger and others,because an ultra mini package(MTP5) is included in the package line-up.

■ PACKAGE OUTLINE


NJM2380D/AD


NJM2380M/AM


NJM2380E/AE


NJM2380L/AL

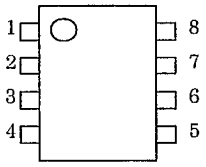

NJM2380U/AU


NJM2380F/AF

■ FEATURES

- ●Operating Voltage (V_{REF}～18V)
- ●High Precision Voltage Reference (2.465V±2%)
  (2.465V±1%:A Version)
- ●Mounted in Ultra Mini Package(MTP5)
- ●Minimum External Parts
- ●Bipolar Technology
- ●Package Outline DIP8,DMP8,EMP8
  SOT-89(3pin),TO-92,MTP5

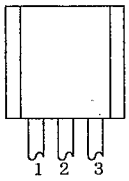
■ PIN CONFIGURATION



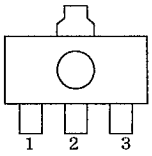
NJM2380D/AD
NJM2380M/AM
NJM2380E/AE

PIN FUNCTION

1. CATHODE	5. NC
2. NC	6. ANODE
3. NC	7. NC
4. NC	8. REFERENCE

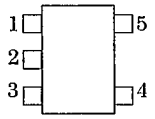


NJM2380L/AL



NJM2380U/AU

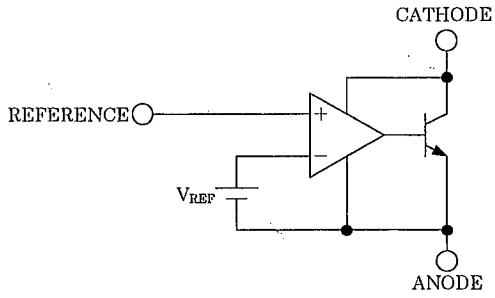
PIN FUNCTION
1. REFERENCE
2. ANODE
3. CATHODE



NJM2380/F/AF

PIN FUNCTION
1. NC
2. ANODE
3. NC
4. CATHODE
5. REFERENCE

■ BLOCK DIAGRAM



■ABSOLUTE MAXIMUM RATING (Ta=25°C)

PARAMETER	SYMBOL	RATINGS	UNIT
Cathode Voltage	V_{KA}	+20	V
Continuous Cathode Current	I_{KA}	−100～150	mA
Reference Input Current	I_{REF}	−0.05～10	mA
Power Dissipation	P_D	(DIP8) 700 (DMP8) 300 (EMP8) 300 (TO-92) 500 (SOT-89) 350 (MTP-5) 200	mW
Operating Temperature	Topr	−40～+85	°C
Storage Temperature	Tstg	−50～+150	°C

■RECOMMENDED OPERATING CONDITION

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT
Cathode Voltage	V_{KA}	V_{REF}	—	18	V
Cathode Current	I_K	1	—	100	mA

■ELECTORICAL CHARACTERISTICS (I_K=10mA,Ta=25°C)

PARAMETER	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT
Reference Voltage	V_{REF}	$V_{KA}=V_{REF}$(＊1)	2415	2465	2515	mV
		$V_{KA}=V_{REF}$(＊1)、A Version	2440	2465	2490	
Reference Voltage Change vs. Cathode Voltage Change	$\Delta V_{REF}/\Delta V_{KA}$	$\lvert V_{REF} \rvert \leqq V_{KA} \leqq 10V$(＊2)	—	±1.4	±2.7	mV/V
		$10 \leqq V_{KA} \leqq 18V$(＊2)	—	±1	±2	mV/V
Reference Input Current	I_{REF}	R1=10kΩ,R2=∞(＊2)	—	2	4	μA
Minimum Input Current	I_{MIN}	$V_{KA}=V_{REF}$(＊1)	—	0.4	1.0	mA
Cathode Current (Off Cond.)	I_{OFF}	V_{KA}=18V,V_{REF}=0V(＊3)	—	0.1	1.0	μA
Dynamic Impedance	$\lvert Z_{KA} \rvert$	$V_{KA}=V_{REF}$,f≦1kHz 1mA≦Ik≦100mA(＊1)	—	0.2	—	Ω

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

PARAMETER	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT
Reference Voltage Change	ΔV_{REF}	$V_{KA}=V_{REF}$(＊1)	—	8	17	mV
Reference Input Current Change	ΔI_{REF}	R1=10kΩ,R2=∞(＊2)	—	0.4	1.2	μA

The "Reference Voltage Change" and "Reference Input Current Change" is tested to using some samples of the first five lots. These "TEMPERATURE CHARACTERISTICS" are not guaranteed.

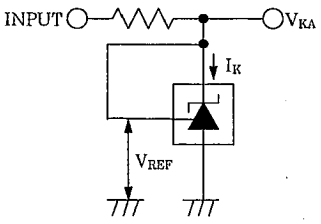
$\lvert V_{REF} \rvert$ ···Reference voltage includes error.

(＊1) : TEST CIRCUIT1(Fig.1)

(＊2) : TEST CIRCUIT2(Fig.2)

(＊3) : TEST CIRCUIT3(Fig.3)

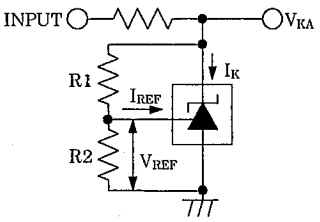
■TEST CIRCUIT



1、$V_{KA}=V_{REF}$

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

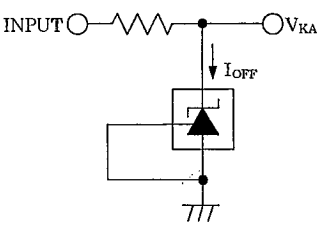
(Fig.1)



2、$V_{KA}>V_{REF}$

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

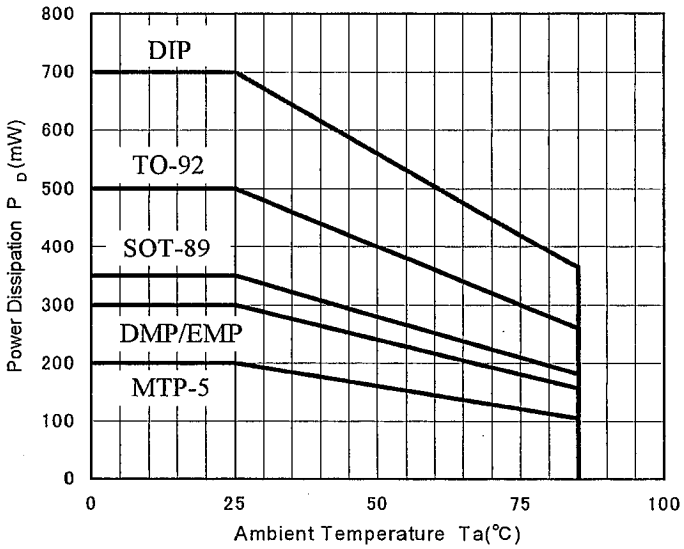
(Fig.2)



3、I_{OFF}

(Fig.3)

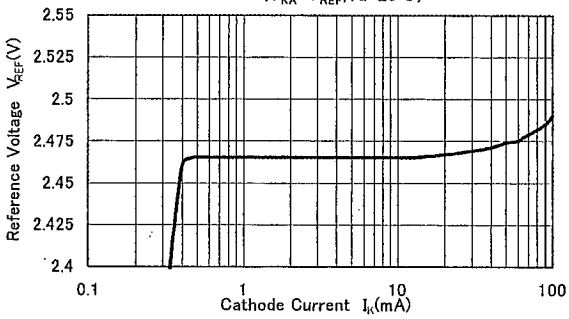
■POWER DISSIPATION VS. AMBIENT TEMPERATURE



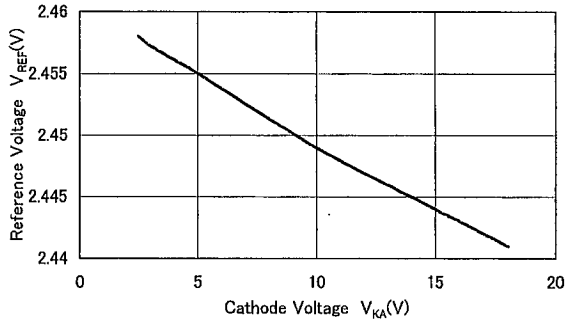
6

■TYPICAL CHARACTERISTICS

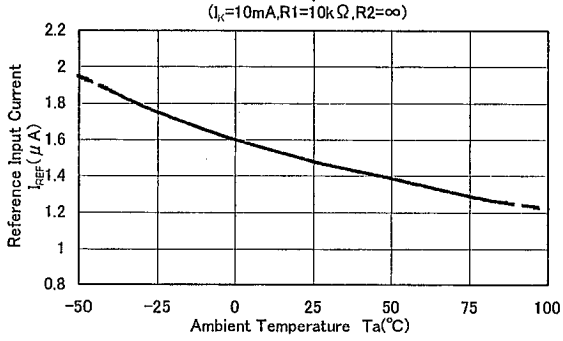
Reference Voltage
($V_{KA}=V_{REF}$,Ta=25°C)



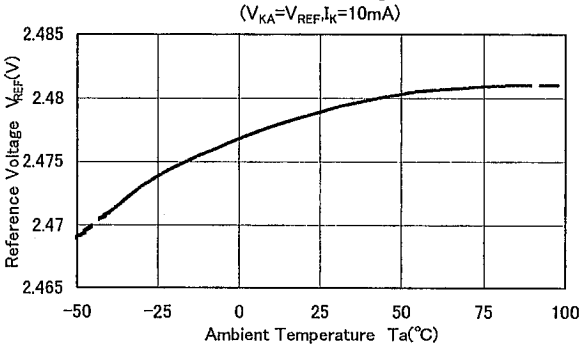
Reference Voltage
(I_K=10mA,R1=Variable,R2=2.5kΩ,Ta=25°C)



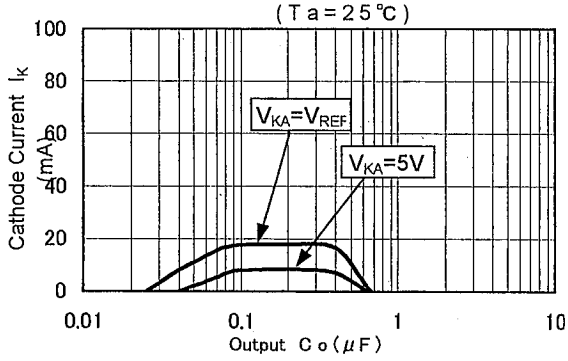
Reference Input Current
(I_K=10mA,R1=10kΩ,R2=∞)



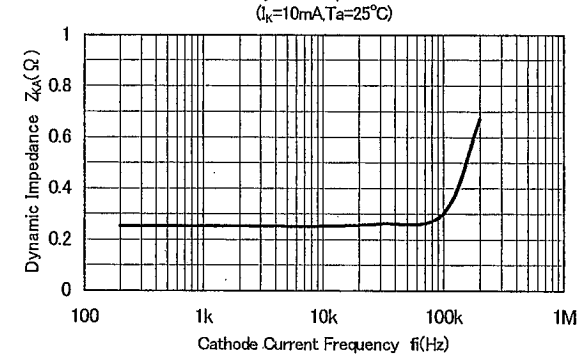
Reference Voltage
($V_{KA}=V_{REF}$,I_K=10mA)



Sefety Operating Boundary Condition
(T a = 2 5 °C)



Dynamic Impedance
(I_K=10mA,Ta=25°C)



Note)Oscillation might occure 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

6

MEMO