

**52065**  
**52098**  
**REF101 REPLACEMENTS**



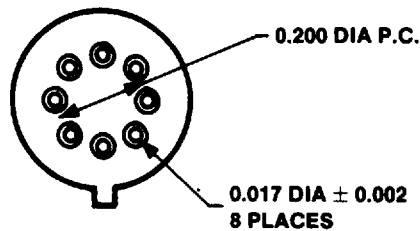
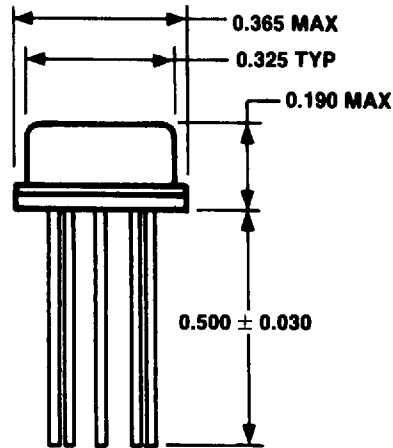
**FEATURES**

- 200°C Operating Temperature Capability (52065 Only)
- 10 V Output
- High Accuracy -  $\pm 0.005$  V
- Very Low Drift
- Excellent Stability - 25 ppm/°C/1000 hrs
- Wide Supply Range - Up to 35 V
- Low Quiescent Current
- Matched Resistor Pair Included

**HIGH-TEMPERATURE PRECISION  
VOLTAGE REFERENCES**

**GENERAL DESCRIPTION**

The MII 52065 and 52098 are precision voltage references which provide a +10 V output over a wide range of operating temperatures. Superior stability, low drift rate, and low quiescent current are provided by a heaterless design. The output voltage can be adjusted with minimal effect upon either drift or stability. For convenience, a precision matched pair of 20K resistors are accessible to the user. The matched resistor pair may be used to implement a precision 5 V reference, or for a variety of other applications. Both references operate with a single supply voltage of 13.5V to 35V. They are ideal choices for demanding applications such as D/A and A/D converter references, calibration standards, transducer excitation, and test equipment.



**TO-99 METAL CAN**

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**APPLICATIONS INFORMATION**

**OUTPUT CURRENT**

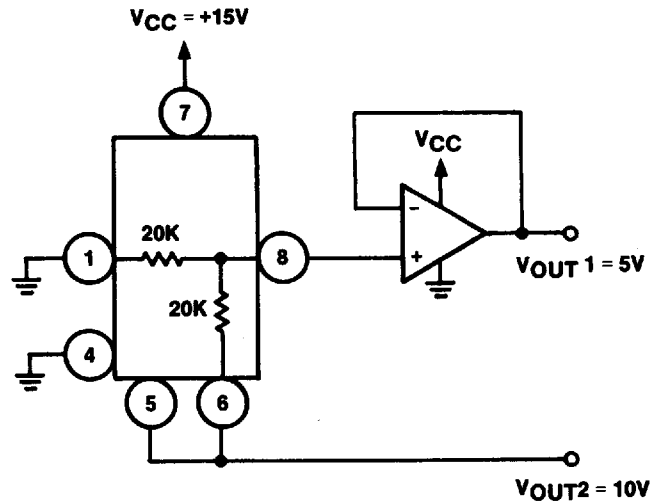
Additional output current may be supplied by connecting a resistor to the power supply. This may cause some degradation in supply regulation.

**5 V PRECISION REFERENCE**

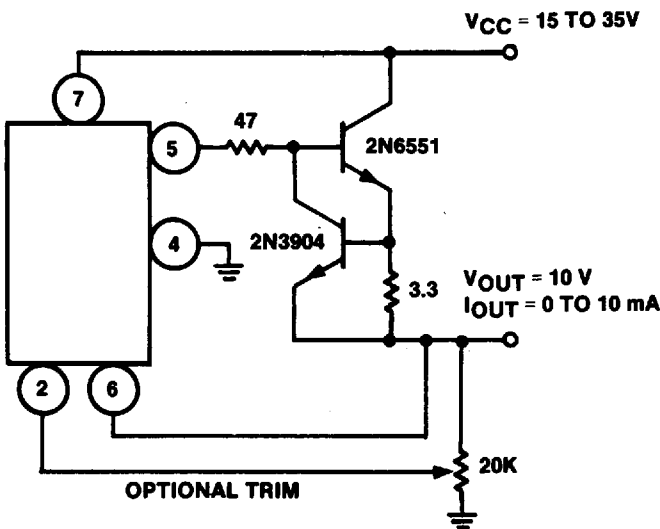
Figure 1 illustrates a circuit to provide a precision 5 VDC output utilizing the internal 20KΩ resistors. A buffer is shown connected to pin 8, since this voltage point has very little drive capability.

**ADJUSTABLE OUTPUT VOLTAGE**

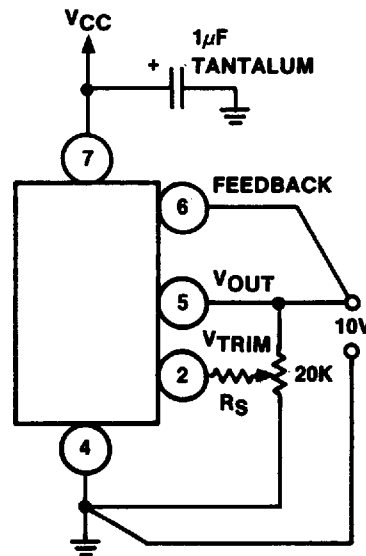
Adjustable output voltage circuits are shown in Figures 2 and 3. Output voltage trim in Figure 2 will change the voltage drift by about 0.01 ppm/°C/mV of trimmed voltage. Any mismatch in TCR between the legs of the potentiometer will also affect TC by a ratio of 1/40. Figure 3 shows a circuit with greater resolution. To minimize the effect of TCR,  $R_s$  should be larger than the 150 KΩ internal resistor



**Figure 1**



**Figure 2**



**Figure 3**

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**ABSOLUTE MAXIMUM RATINGS**

Isolation Voltage ..... 40 V  
 Power Dissipation at 25°C ..... 200 mW  
 Operating Temperature Range: 52098 ..... -55°C to +125°C Case  
 52065 ..... -55°C to +200°C Case  
 Storage Temperature Range: 52098 ..... -55°C to +125°C Case  
 52065 ..... -55°C to +200°C Case

**RECOMMENDED OPERATING CONDITIONS**

PARAMETER	MIN	NOM	MAX	UNITS
Supply Voltage VCC	13.5	15	35	Volts
Operating Case Temperature 52098	-55		125	°C
52065	-55		200	°C

**ELECTRICAL CHARACTERISTICS\*** Ta = 25° C V<sub>CC</sub> = 15 VDC Unless Otherwise Noted

PARAMETER	CONDITIONS	52098			52065			UNITS
		MIN	TYP	MAX	MIN	TYP	MAX	
Quiescent Supply Current			6			6		mA
Output Voltage	Ta = +25 °C	9.995	10.000	10.005	9.995	10.000	10.005	Volts
5V Output Using 20 KΩ Resistors	Ta = -25 °C	4.995	5.000	5.005	4.995	5.000	5.005	Volts
Trim Range <sup>1,3</sup>		-0.100		+0.250	-0.100		+0.250	Volts
Output Current	Source or Sink	10			10			mA
Output Impedance	0 to 1 MHz		0.01			0.01		ohm
VRS Temperature	Operating Temp. Range			3		5	10	ppm/°C
VRS Output Current <sup>2</sup>	I <sub>L</sub> = 0 to 10 mA		0.00025			0.00025		%/mA
VRS Supply Regulation	V <sub>CC</sub> = 13.5 to 35V		0.00025			0.00025		%/VDC
VRS Time	T <sub>C</sub> = 25°C T <sub>C</sub> = 200°C		2.5			100		ppm/ 100 hrs
Noise <sup>3</sup>	0.1 Hz to 10 Hz		6	25		6	25	V p-p
Uncommitted Resistors:								
Resistance			20			20		K ohm
Match			±0.01	±0.05		±0.01	±0.05	%
TCR			50			50		ppm/°C
TCR Tracking			5			5		ppm/°C

- NOTES:** 1 Trimming the offset voltage will affect the drift slightly  
 2 Source/sink current must be derated to 2 mA at maximum rated operating temperature. See Application Information for details  
 3 Guaranteed by design

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