The Infinite Bandwidth Company™

MIC820

Teeny™ Ultra Low Power Op Amp

Final Information

General Description

The MIC820 is a rail-to-rail output, operational amplifier in *Teeny*™ SC70 packaging. The MIC820 provides 5MHz, -3dB bandwidth while consuming an incredibly low 22µA supply current.

The SC70 packaging achieves significant board space savings over devices packaged in SOT-23 or MSOP-8 packaging. The SC70 occupies approximately half the board area of a SOT-23 package.

Features

- *Teeny*™ SC70 packaging
- 5MHz, –3dB bandwidth product
- 4MHz gain-bandwidth product
- 22µA supply current
- Rail-to-Rail output
- Ground sensing at input common mode to GND
- Common mode to GND
- Drive large capactive loads

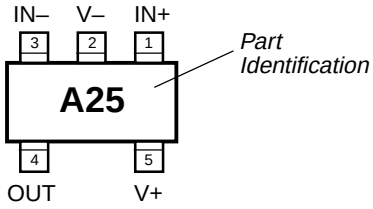
Applications

- Portable equipment

Ordering Information

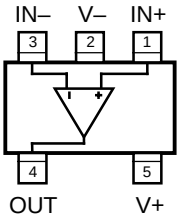
Part Number	Marking	Junction Temp. Range*	Package
MIC820BC5	A25	–40°C to +85°C	SC70-5

Pin Configuration



SC-70

Functional Pinout



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Absolute Maximum Ratings (Note 1)

Supply Voltage ($V_{V+} - V_{V-}$) ..... +6.0V
Differential Input Voltage ($|V_{IN+} - V_{IN-}|$) ..... +6.0lV
Input Voltage ($V_{IN+} - V_{IN-}$) ..... V_{V+} + 0.3V, V_{V-} –0.3V
Lead Temperature (soldering, 5 sec.) ..... 260°C
Output Short Circuit Current Duration ..... Indefinite
Storage Temperature (T_S) ..... 150°C
ESD Rating, **Note 3**

Operating Ratings (Note 2)

Supply Voltage (V_S) ..... +4.75V to +5.25V
Ambient Temperature Range ..... –40°C to +85°C
Package Thermal Resistance ..... 450°C/W

Electrical Characteristics (0V to 5V)

V_{V+} = +5V, V_{V-} = 0V, V_{CM} = V+/2; R_L = 1MΩ; T_A = 25°C, **bold** values indicate –40°C ≤ T_A ≤ +85°C; unless noted.

Symbol	Parameter	Condition	Min	Typ	Max	Units
V_{OS}	Input Offset Voltage			1	15	mV
	Input Offset Voltage Temp Coefficient			13		µV/°C
I_B	Input Bias Current			0.165	5	nA
I_{OS}	Input Offset Current			0.1	5	nA
V_{CM}	Input Voltage Range	CMRR > 35dB	0		V_{CC}-2.5	V
CMRR	Common-Mode Rejection Ratio	0 < V_{CM} < 2.5V	35	50		dB
PSRR	Power Supply Rejection Ratio	**Note 5**	40	70		dB
A_{VOL}	Large-Signal Voltage Gain	R_L = 1M, –0.5 < V_{OUT} < 3.5V	60	72		dB
V_{OUT}	Maximum Output Voltage Swing	R_L = 200k	4.95	5		V
V_{OUT}	Minimum Output Voltage Swing	R_L = 200k	0	50		mV
BW	–3db Bandwidth			5		MHz
GBW	Gain-Bandwidth Product			4		MHz
SR	Slew Rate			5		V/µs
I_{SC}	Short-Circuit Output Current	Source	2	2.85		mA
		Sink	0.15	0.26		mA
I_{GND}	Supply Current	V_{CC} = ±2.5V, V_{OUT} = 0V		22	35	µA
		V_{CC} = ±2.5V, V_{OUT} = –2.5V		35	60	µA

Note 1. Exceeding the absolute maximum rating may damage the device.

Note 2. The device is not guaranteed to function outside its operating rating.

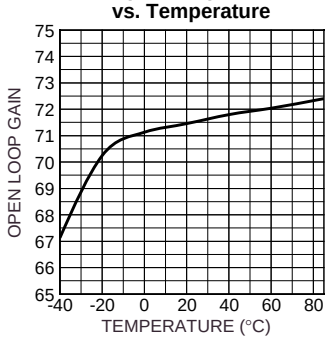
Note 3. Devices are ESD sensitive. Handling precautions recommended. Human body model, 1.5k in series with 100pF. Pin 4 is ESD sensetive

Note 4. Exceeding the maximum differential input voltage will damage the input stage and degrade performance (in particular, input bias current is likely to increase.

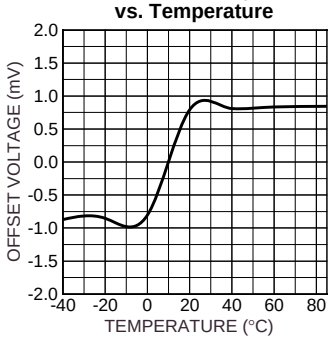
Note 5. Supply Voltage change of 1V.

Typical Characteristics

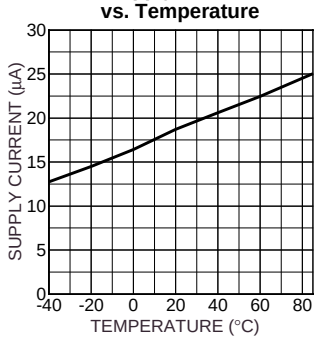
Open Loop Gain vs. Temperature



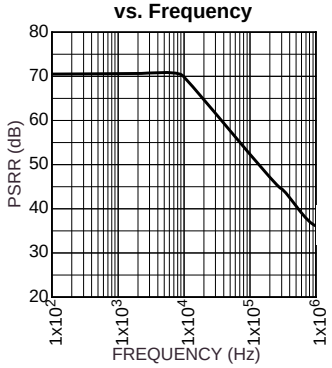
Offset Voltage vs. Temperature



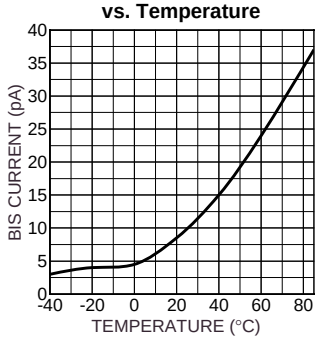
Supply Current vs. Temperature



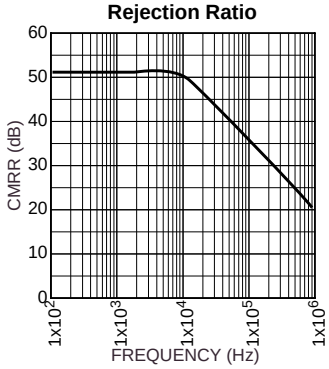
MIC820 + PSRR vs. Frequency

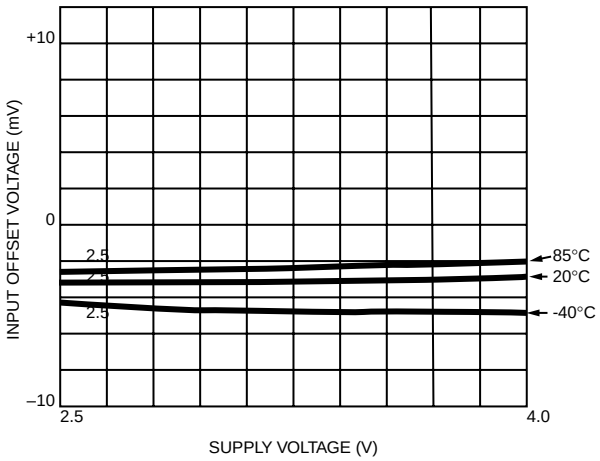


Bias Current vs. Temperature



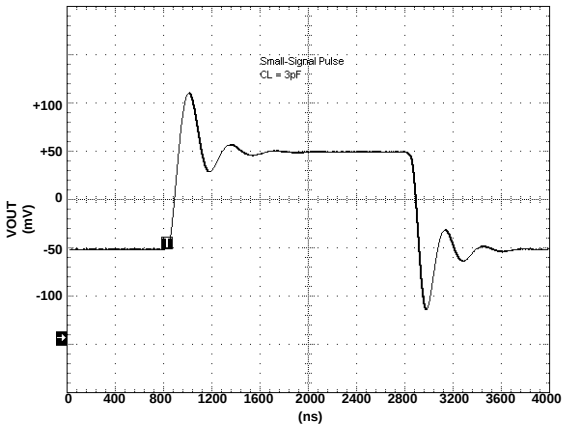
MIC820 Common Mode Rejection Ratio



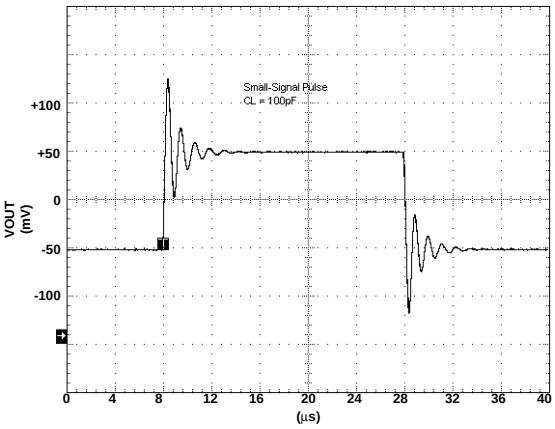


Functional Characteristics

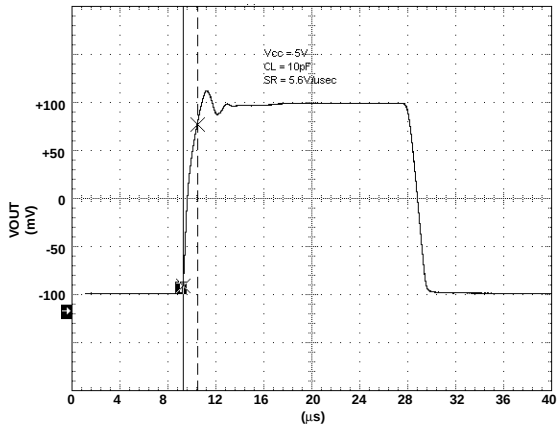
Small-Signal Pulse Reponse
A_V=1 C_L=3pF



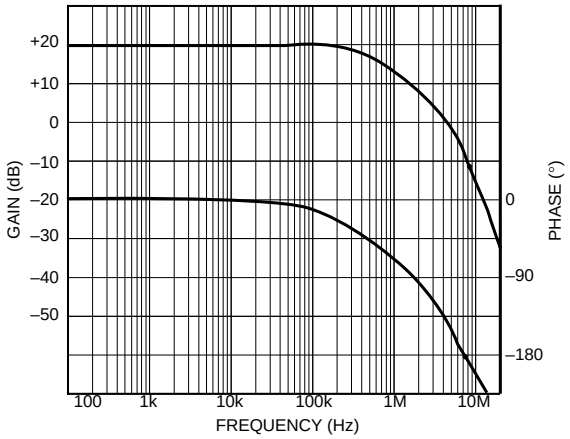
Small-Signal Pulse Reponse
A_V=1 C_L=100pF



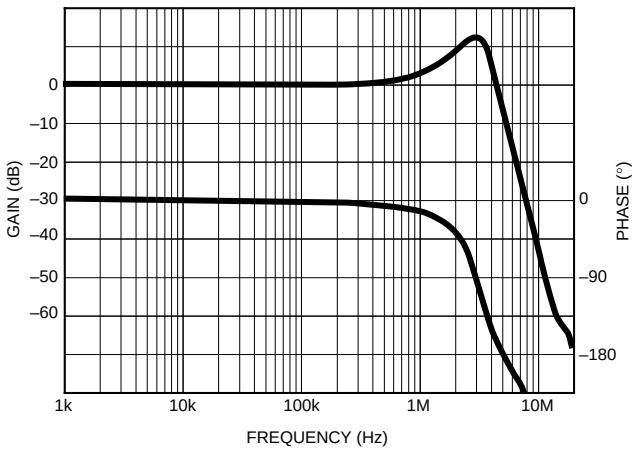
Large-Signal Pulse Reponse
A_V=1 C_L=10pF



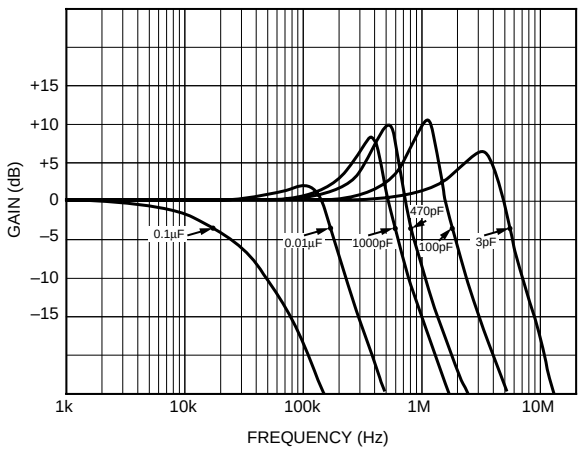
Gain Bandwidth of MIC820



Closed Loop Frequency Response AV = 1



Closed Loop Gain (A_V = +1)
vs. Load Capacitance



Applications Information

Power Supply Bypassing

Regular supply bypassing techniques are recommended. A 10µF capacitor in parallel with a 0.1µF capacitor on both the positive and negative supplies are ideal. For best performance all bypassing capacitors should be located as close to the op amp as possible and all capacitors should be low ESL (equivalent series inductance), ESR (equivalent series resistance). Surface-mount ceramic capacitors are ideal.

Package Information

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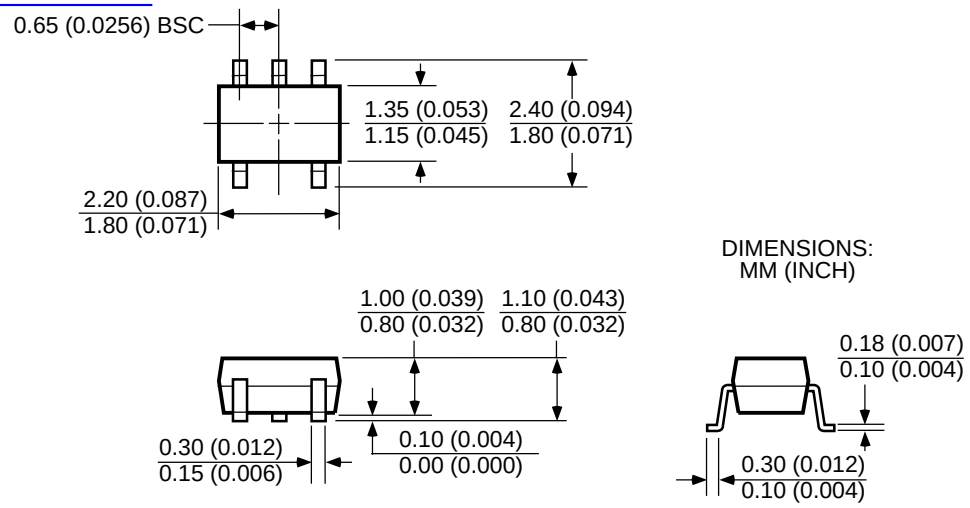

SC70-5

MICREL INC. 1849 FORTUNE DRIVE SAN JOSE, CA 95131 USA

TEL + 1 (408) 944-0800 FAX + 1 (408) 944-0970 WEB http://www.micrel.com