RC4560

Wide-Bandwidth Dual Operational Amplifier

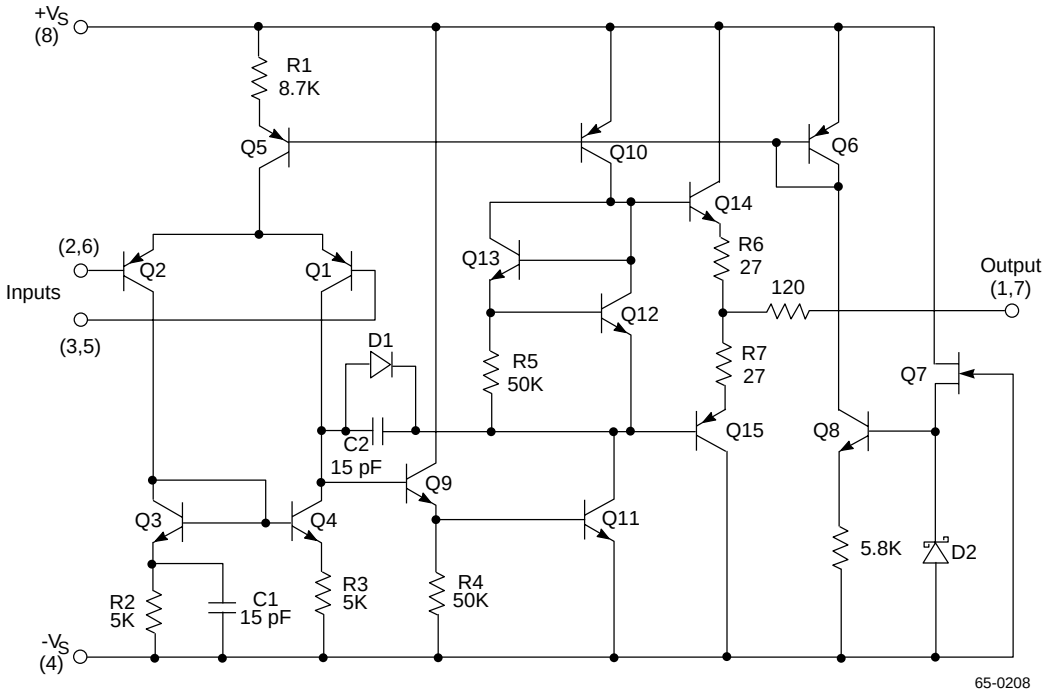
Features

- Unity gain bandwidth (A_V = 1) — 10 MHz
- Slew rate — 4.0V/μS
- Noise voltage at 1 kHz — 7.0nV/$\sqrt{Hz}$
- Noise voltage current at 1 kHz — 0.4pA/$\sqrt{Hz}$
- ±10V Output into 400Ω loads (±25mA)
- Supply current per amplifier — 1.8mA
- Input offset voltage — 2.0mV
- Input offset current — 5.0nA
- Unity gain frequency compensated
- Output short circuit protected

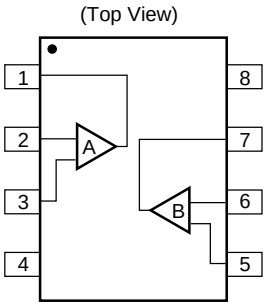
Description

The RC4560 integrated circuit is a high-gain, wide-bandwidth, dual operational amplifier capable of driving 20V peak-to-peak into 400Ω loads. The RC4560 combines many of the features of the RC4558 as well as providing the capability of wider bandwidth, and higher slew rate make the RC4560 ideal for active filters, data and telecommunications, and many instrumentation applications. The availability of the RC4560 in the surface mounted SOIC package allows it to be used in critical applications requiring very high packing densities.

Schematic Diagram (1/2 Shown)



Pin Assignments



Pin Descriptions

Pin	Function
1	A Output
2	A –Input
3	A +Input
4	$+V_S$
5	B +Input
6	B –Input
7	B Output
8	$–V_S$

Thermal Characteristics

	SOIC	Plastic DIP
Max. Junction Temp.	125°C	125°C
Max. $P_D T_A < 50°C$	300mW	468mW
Therm. Res. Θ_{JC}	—	—
Therm. Res. Θ_{JA}	240°C/W	160°C/W
For $T_A > 50°C$ Derate at	4.17mW/°C	6.25mW/°C

Absolute Maximum Ratings

(beyond which the device may be damaged)

Parameter		Max.
Supply Voltage		±18V
Input Voltage[1]		±15V
Differential Input Voltage		30V
Output Short Circuit Duration[2]		Indefinite
Operating Temperature Range		–20°C to +75°C
Lead Soldering Temperature	RC4560N	+300°C
	RC4560M	+260°C

Notes:

1. For supply voltages less than ±15V, the absolute maximum input voltage is equal to the supply voltage.
2. Short circuit may be to ground on one amp only. Rating applies to +75°C ambient temperature.

Matching Characteristics

(V_S = ±15V, T_A = +25°C)

Parameter	Conditions	Typ.	Units
Voltage Gain	$R_L \geq 2$ kΩ	±1.0	dB
Input Bias Current		±15	nA
Input Offset Current		±7.5	nA
Input Offset Voltage	$R_S \geq 10$ kΩ	±0.2	mV

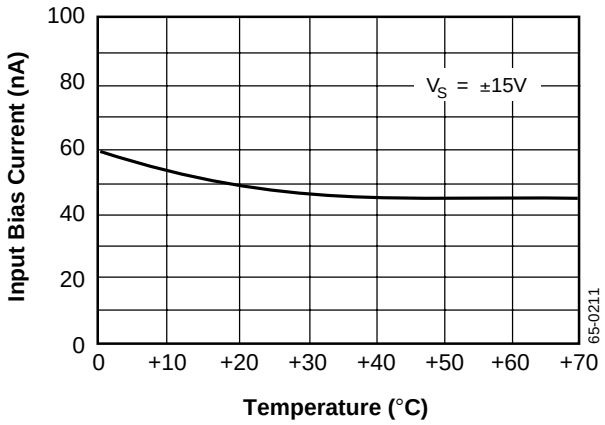
Electrical Characteristics

(V_S = ±15V and T_A = +25°C unless otherwise specified)

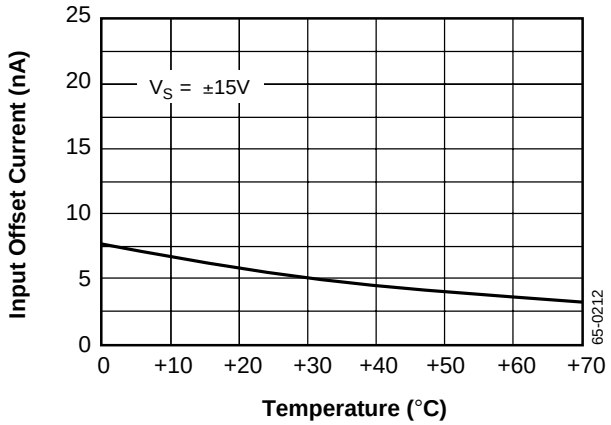
Parameters		Test Conditions	Min.	Typ.	Max.	Units
Input Offset Voltage		$R_S \le 10k\Omega$		2.0	6.0	mV
Input Offset Current				5.0	200	nA
Input Bias Current				50	500	nA
Input Resistance (Differential Mode)			0.3	0.1		MΩ
Large Signal Voltage Gain		$R_L \ge 2k\Omega$, V_{OUT} = ±10V	20	300		V/mV
Output Voltage Swing		$R_L \ge 10k\Omega$	±12	±14		V
		$I_O \ge 25mA$	±10	±11.5		
Input Voltage Range			±12	±13		V
Common Mode Rejection Ratio		$R_S \le 10k\Omega$	70	90		dB
Power Supply Rejection Ratio		$R_S \le 10k\Omega$	76	90		dB
Power Consumption		$R_L = \infty$		135	200	mW
Transient Response	Rise Time	V_{IN} = 20 mV, R_L = 2kΩ		0.05		µS
	Overshoot	$C_L \le 100pF$		35		%
Slew Rate		$R_L \le 2k\Omega$, Gain = 1		4.0		V/µS
Channel Separation		f = 10kHz R_S = 1kΩ, Gain = 100		100		dB
Unity Gain Bandwidth		A_V = +1, V_O = -3dB		10		MHz
The following specifications apply for -20°C ≤ T_A ≤ +75°C						
Input Offset Voltage		$R_S \le 10k\Omega$			7.0	mV
Input Offset Current					300	nA
Input Bias Current					800	nA
Large Signal Voltage Gain		$R_L \ge 2k\Omega$, V_{OUT} = ±10V	15			V/mV
Output Voltage Swing		$R_L \ge 2k\Omega$	±10			V
Power Consumption		T_A = +75°C		135	200	mW
		T_A = –20°C		165	230	

Typical Performance Characteristics

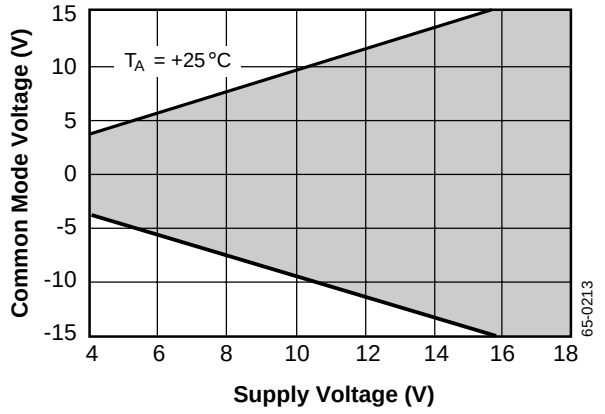
Input Bias Current vs. Ambient Temperature



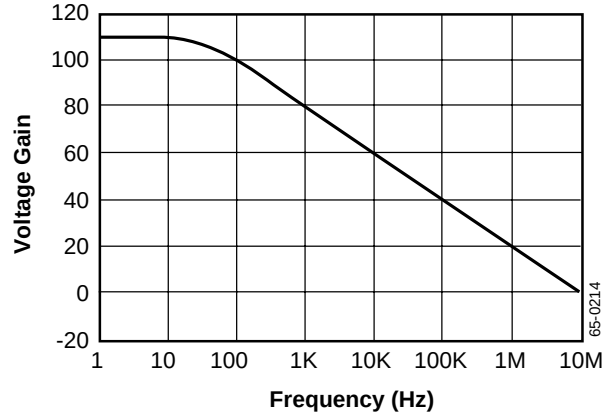
Input Offset Current vs. Ambient Temperature



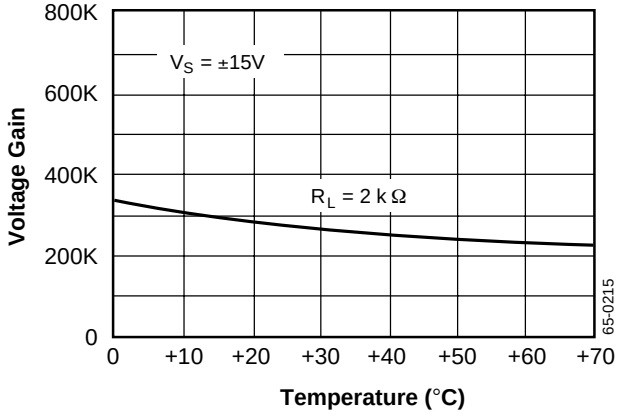
Common Mode Range vs. Supply Voltage



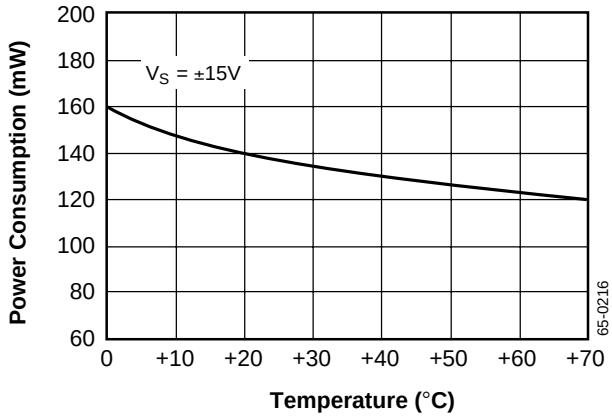
Open Loop Voltage Gain vs. Frequency



Open Loop Gain vs. Temperature

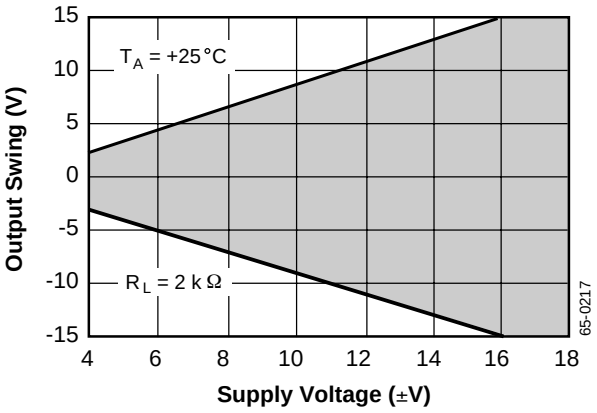


Power Consumption vs. Ambient Temperature

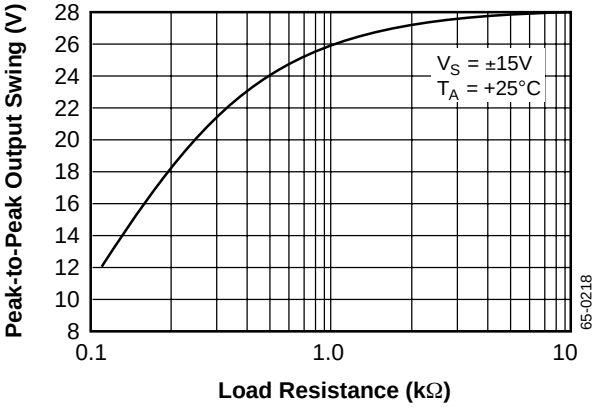


Typical Performance Characteristics (continued)

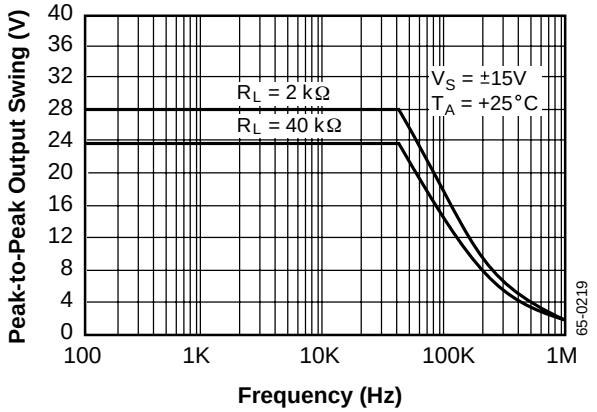
Typical Output Voltage vs. Supply Voltage



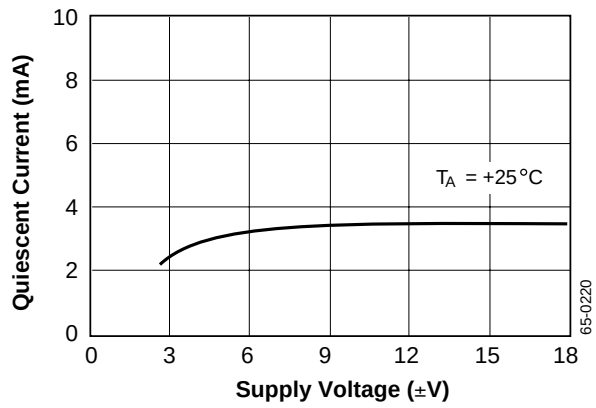
Output Voltage Swing vs. Load Resistance



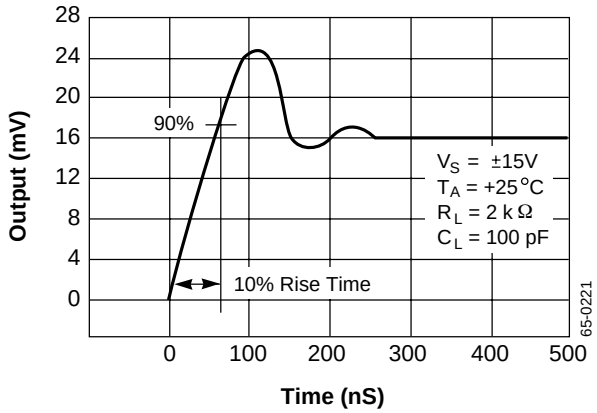
Output Voltage vs. Frequency



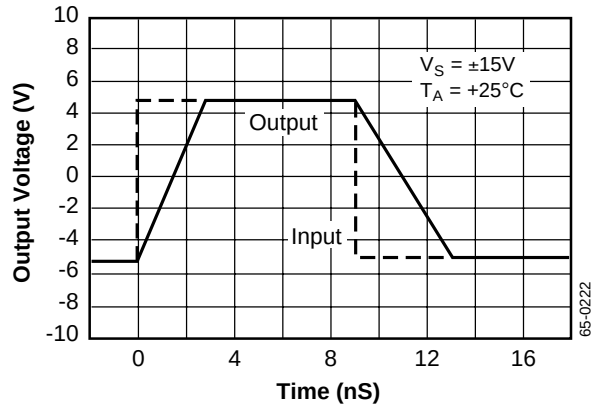
Quiescent Current vs. Supply Voltage



Transient Response

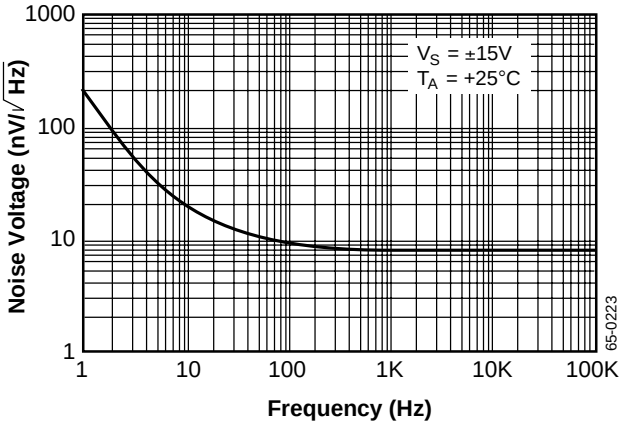


Voltage Follower Large Signal Pulse Response

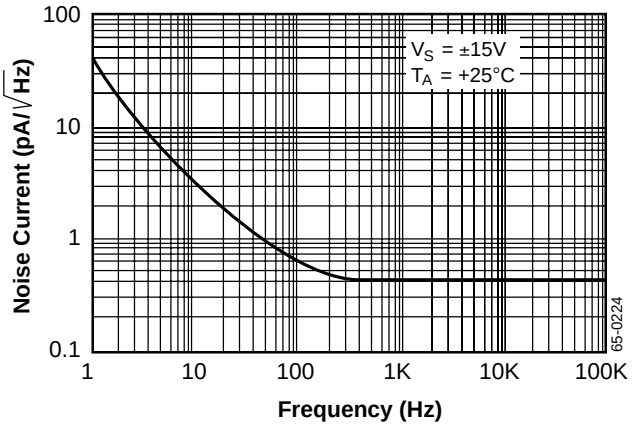


Typical Performance Characteristics (continued)

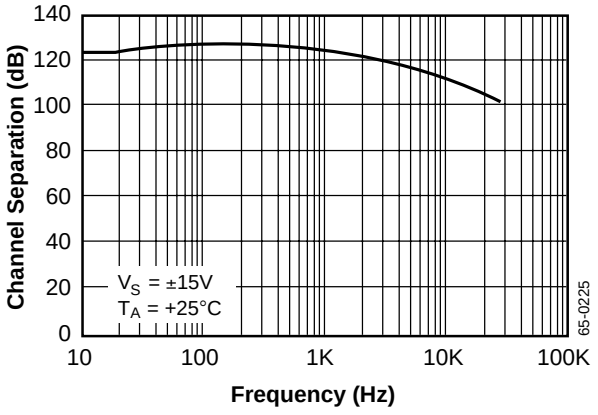
Input Noise Voltage vs. Frequency



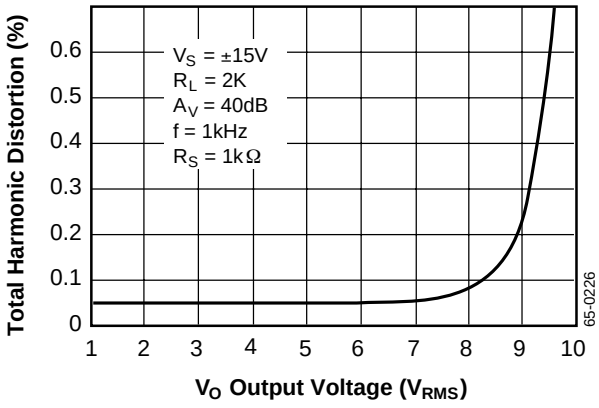
Input Noise Current vs. of Frequency



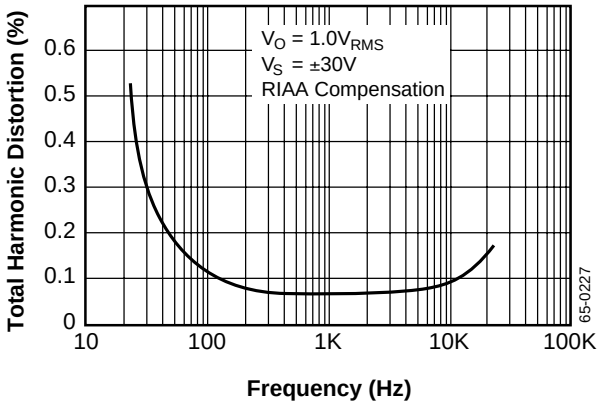
Channel Separation



Total Harmonic Distortion vs. Output Voltage



Distortion vs. Frequency



Notes

Notes

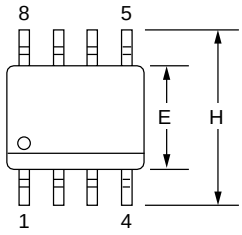
Notes

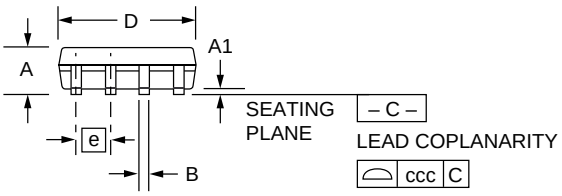
Mechanical Dimensions

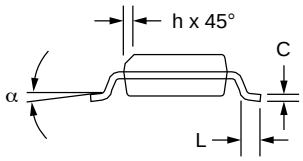
Symbol	Inches		Millimeters		Notes
	Min.	Max.	Min.	Max.	
A	.053	.069	1.35	1.75	
A1	.004	.010	0.10	0.25	
B	.013	.020	0.33	0.51	
C	.008	.010	0.20	0.25	5
D	.189	.197	4.80	5.00	2
E	.150	.158	3.81	4.01	2
e	.050 BSC		1.27 BSC		
H	.228	.244	5.79	6.20	
h	.010	.020	0.25	0.50	
L	.016	.050	0.40	1.27	3
N	8		8		6
α	0°	8°	0°	8°	
ccc	—	.004	—	0.10	

Notes:

1. Dimensioning and tolerancing per ANSI Y14.5M-1982.
2. "D" and "E" do not include mold flash. Mold flash or protrusions shall not exceed .010 inch (0.25mm).
3. "L" is the length of terminal for soldering to a substrate.
4. Terminal numbers are shown for reference only.
5. "C" dimension does not include solder finish thickness.
6. Symbol "N" is the maximum number of terminals.







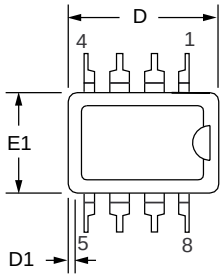
Mechanical Dimensions

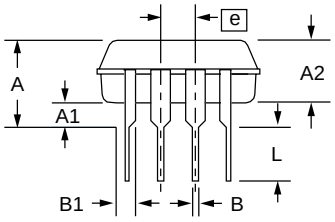
8-Lead Plastic DIP Package

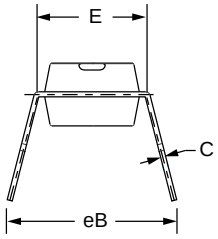
Symbol	Inches		Millimeters		Notes
	Min.	Max.	Min.	Max.	
A	—	.210	—	5.33	
A1	.015	—	.38	—	
A2	.115	.195	2.93	4.95	
B	.014	.022	.36	.56	
B1	.045	.070	1.14	1.78	
C	.008	.015	.20	.38	4
D	.348	.430	8.84	10.92	2
D1	.005	—	.13	—	
E	.300	.325	7.62	8.26	
E1	.240	.280	6.10	7.11	2
e	.100 BSC		2.54 BSC		
eB	—	.430	—	10.92	
L	.115	.160	2.92	4.06	
N	8°		8°		5

Notes:

1. Dimensioning and tolerancing per ANSI Y14.5M-1982.
2. "D" and "E1" do not include mold flashing. Mold flash or protrusions shall not exceed .010 inch (0.25mm).
3. Terminal numbers are for reference only.
4. "C" dimension does not include solder finish thickness.
5. Symbol "N" is the maximum number of terminals.







Ordering Information

Product Number	Temperature Range	Package
RC4560M	-20° to +75°C	8-Lead SOIC
RC4560N	-20° to +75°C	8-Lead Plastic DIP

5/20/98 0.0m 001
Stock#DS30004560