

MB324

LOW POWER QUAD OPERATIONAL AMPLIFIERS



CBC Microelectronics
<http://www.cbev.net>

General Description

The MB324 consist of four independent , high gain and internally frequency compensated operational amplifiers. They are specifically designed to operate from a single power supply . Operation from split power supplies is also possible and the low power supply current drain is independent of the magnitude of the power supply voltage. Typical applications include transducer amplifiers, DC gain blocks and most conventional operational amplifier circuits.

The MB324 series are compatible with industry standard 324.

The MB324 are available in two industry standard packages: DIP-14 and SOP-14.



Figure 1: Package Types of MB324

Features

Internally Frequency Compensated for Unity Gain

- Large Voltage Gain: 100dB (Typical)
- Low Input Bias Current: 20nA (Typical)
- Low Input Offset Voltage: 2mV (Typical)
- Low Supply Current: 0.7mA (Typical)
- Wide Power Supply Voltage:
 - Single Supply: 3V to 36V
 - Dual Supplies: $\pm 1.5V$ to $\pm 18V$
- Input Common Mode Voltage Range Includes Ground

Applications

Battery Charger

- Cordless Telephone
- Switching Power Supply

Pin Configuration

(DIP-14 / SOP-14)

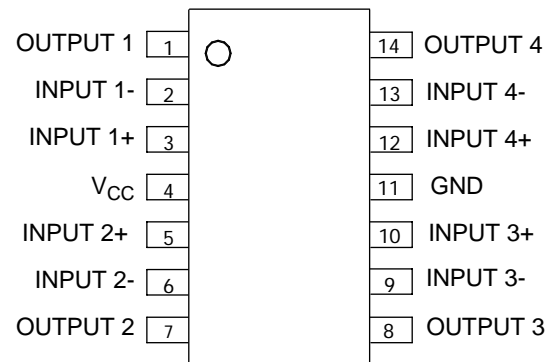
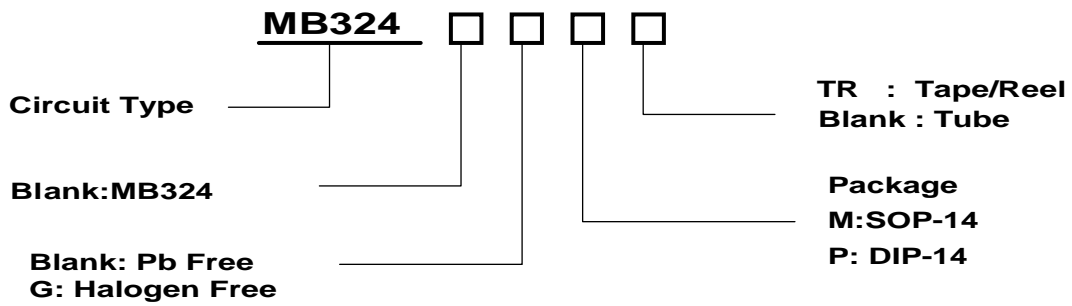


Figure 2: Pin Configuration of MB324 (Top View)

MB324

Ordering Information



Package	Condition	Part Number		Marking ID		Packing Type
		Pb-free	Halogen-Free	Pb-free	Halogen-Free	
SOP-14	3.0mV	MB324M	MB324GM	MB324M	MB324GM	Tube
	3.0mV	MB324MTR	MB324GMTR	MB324M	MB324GM	Tape&Reel
DIP-14	3.0mV	MB324P	MB324GP	MB324P	MB324GP	Tube

Typical Application

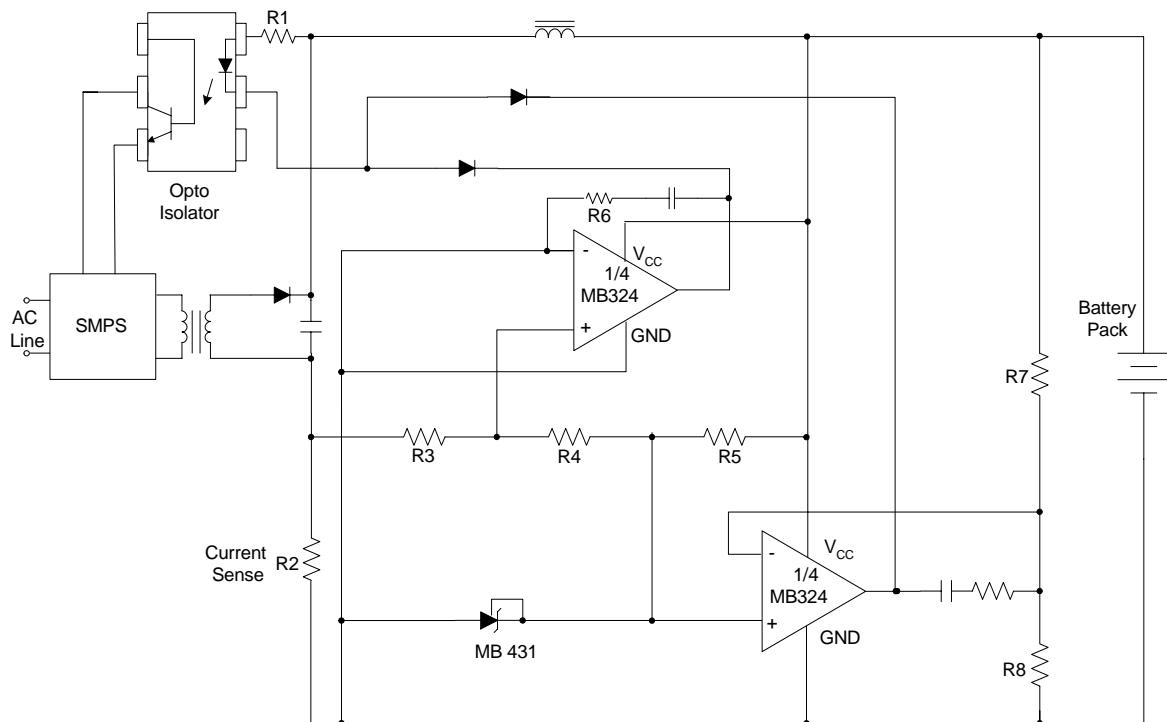


Figure 3: Battery Charger

MB324

Typical Application (Continued)

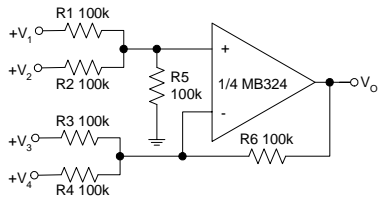


Figure 4: DC Summing Amplifier

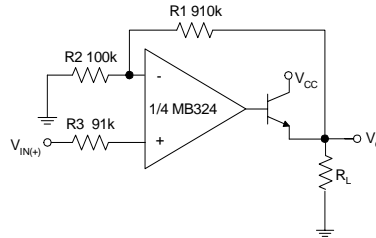


Figure 5: Power Amplifier

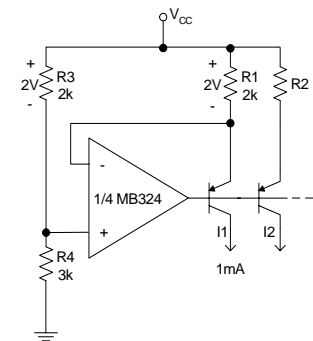


Figure 6: Fixed Current Sources

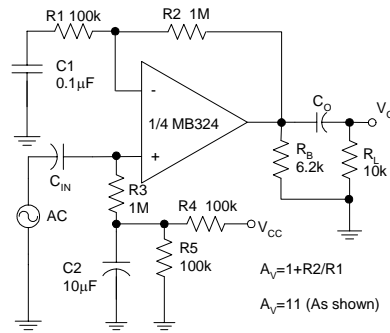


Figure 7: AC Coupled Non-Inverting Amplifier

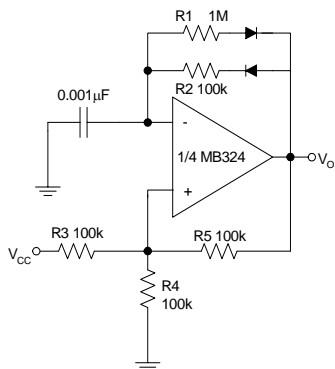


Figure 8: Pulse Generator

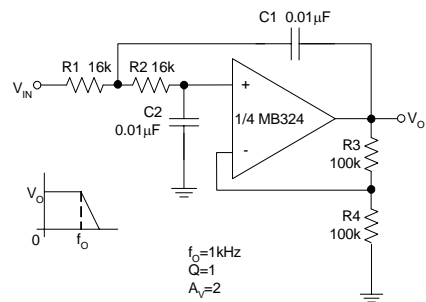


Figure 9: DC Coupled Low-Pass RC Active Filter

MB324

Functional Block Diagram

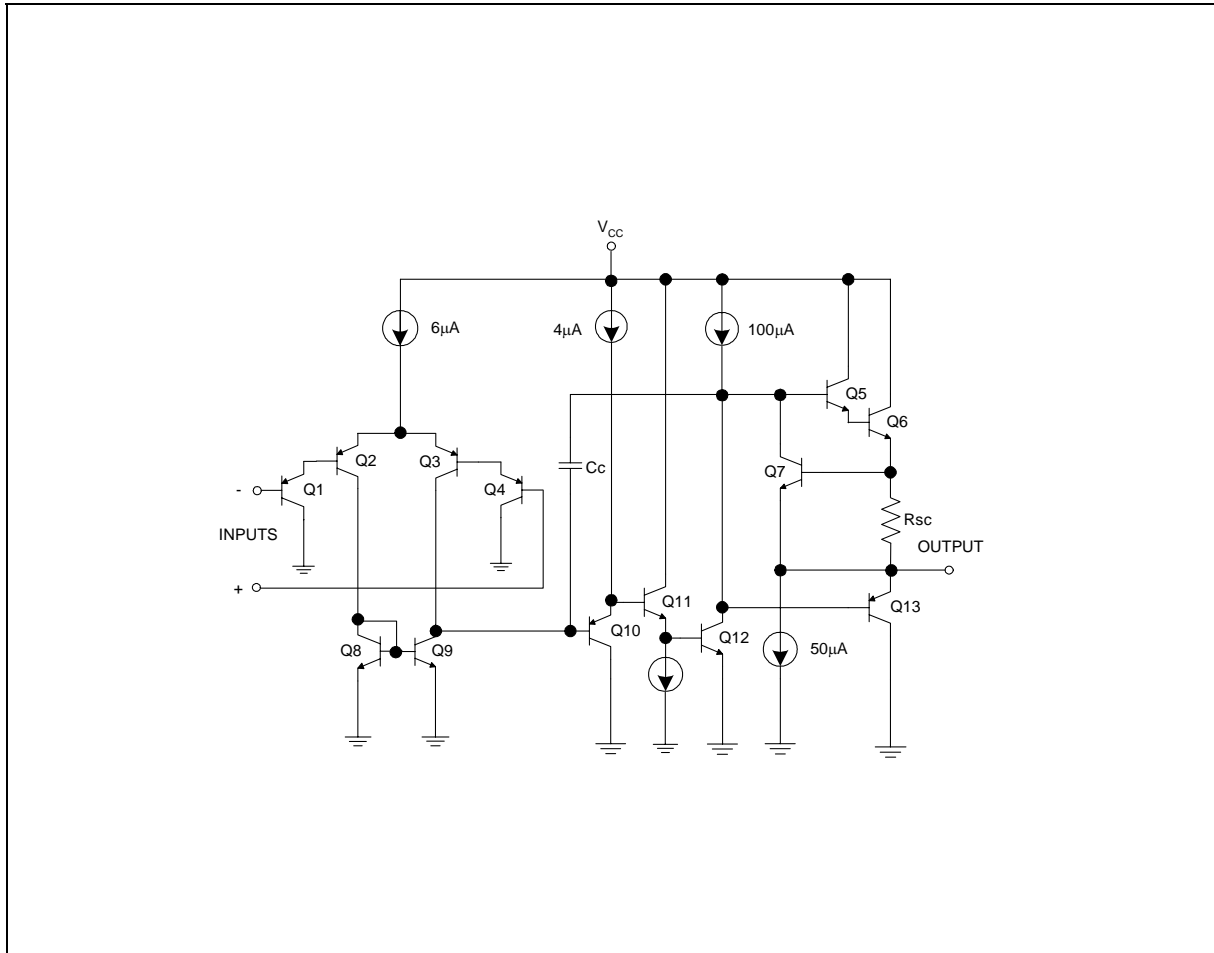


Figure 10: Functional Block Diagram of MB324 (Each Amplifier)

Absolute Maximum Ratings (Note 1)

Parameter	Symbol	Value	Unit
Power Supply Voltage	V _{CC}	40	V
Differential Input Voltage	V _{ID}	40	V
Input Voltage	V _{IC}	-0.3 to 40	V
Power Dissipation	P _D	DIP-14: 1130	mW
		SOP-14: 800	mW
Storage Temperature Range	T _{stg}	-50 to 150	
Lead Temperature (Soldering, 10 Seconds)		260	

Note1: Stresses greater than those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under "Recommended Operating Conditions" is not implied. Exposure to "Absolute Maximum Ratings" for extended periods may affect device reliability.

MB324

Recommended Operating Conditions

Parameter	Symbol	Min	Max	Unit
Supply Voltage	V _{CC}	3	36	V
Ambient Operating Temperature	T _A	-40	+105	

Electrical Characteristics

V_{CC} = 5V, GND = 0V, T_A = 25 unless otherwise specified.

Parameter	Symbol	Conditions	Min	Typ	Max	Unit	
Input Offset Voltage	V _{IO}	V _O =1.4V, R _S =0 V _{CC} =5V to 30V	MB324	-1.7	2.7	3.0	mV
Input Bias Current	I _{BIAS}	I _{IN+} or I _{IN-} , V _{CM} =0V			20	150	nA
Input Offset Current	I _{IO}	I _{IN+} - I _{IN-} , V _{CM} =0V			5	35	nA
Input Common Mode Voltage Range	V _{IR}	V _{CC} =30V	0			V _{CC} -1.5	V
Supply Current	I _{CC}	T _A =-20 to 85 , V _{CC} =30V			1.0	3.0	mA
		T _A =-20 to 85 , V _{CC} =5V			0.7	1.2	mA
Large Signal Voltage Gain	G _V	V _{CC} =15V, V _O =1V to 11V R _L ≥2KΩ	85		100		dB
Common Mode Rejection Ratio	CMRR	DC, V _{CM} =0 to (V _{CC} -1.5)V	60		70		dB
Power Supply Rejection Ratio	PSRR	V _{CC} =5V to 30V	70		100		dB
Channel Separation	CS	f=1kHz to 20kHz			-120		dB
Output Source Current	I _{SOURCE}	V ₊ =1V, V ₋ =0V, V _{CC} =15V V _O =2V	20		40		mA
Output Sink Current	I _{SINK}	V ₊ =0V, V ₋ =1V, V _{CC} =15V V _O =2V	10		15		mA
		V ₊ =0V, V ₋ =1V, V _{CC} =15V V _O =0.2V	12		50		μA
Output Short circuit current to Ground	I _{SC}	V _{CC} =15V			40	60	mA
Output Voltage Swing	V _{OH}	V _{CC} =30V, R _L =2KΩ	26				V
		V _{CC} =30V, R _L =10KΩ	27		28		V
	V _{OL}	V _{CC} =5V, R _L =10KΩ			5	20	mV

MB324

Typical Performance Characteristics

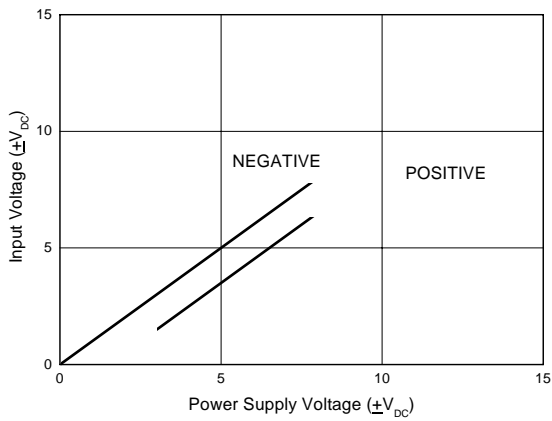


Figure 11: Input Voltage Range

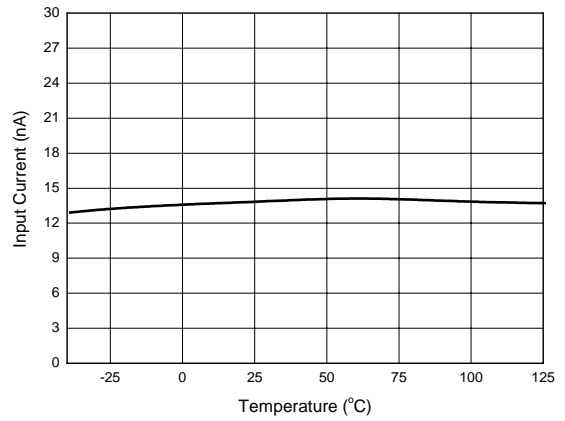


Figure 12: Input Current

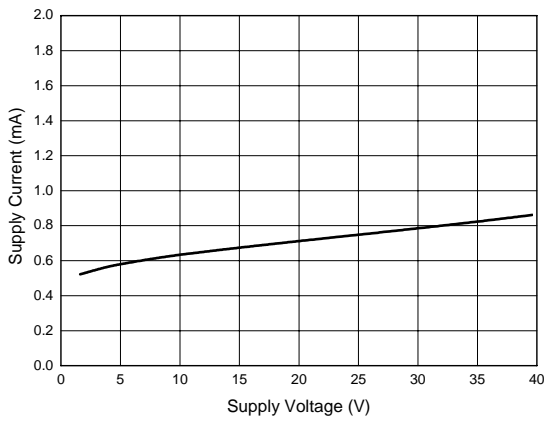


Figure 13: Supply Current

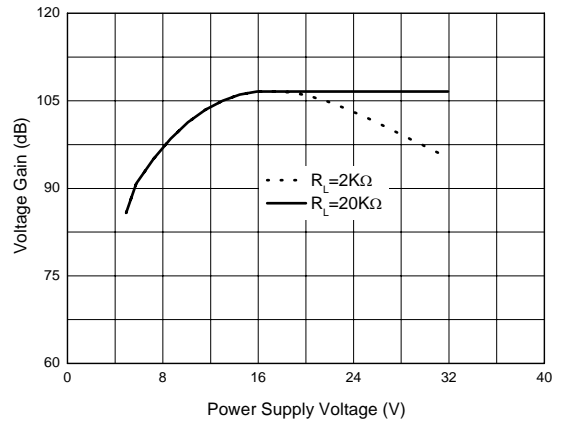


Figure 14: Voltage Gain

MB324

Typical Performance Characteristics (Continued)

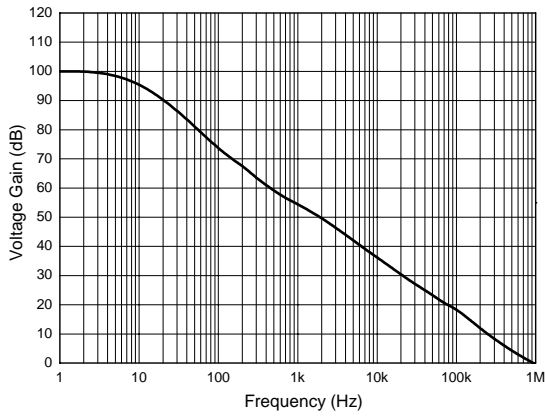


Figure 15: Open Loop Frequency Response

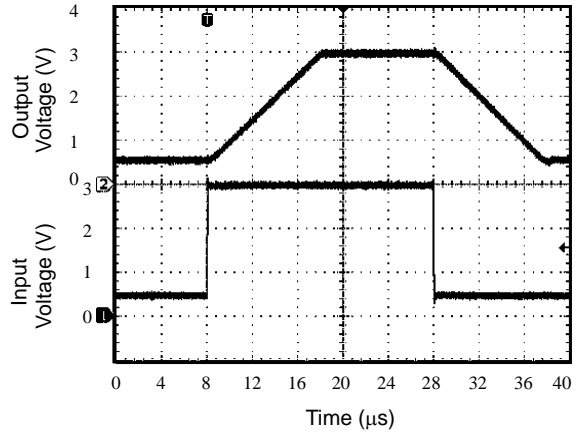


Figure 16: Voltage Follower Pulse Response

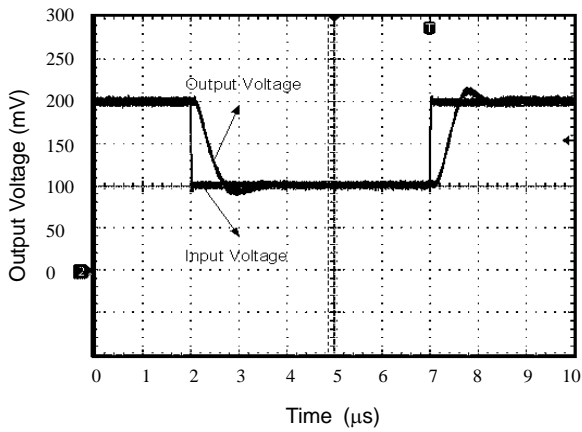


Figure 17: Voltage Follower Pulse Response (Small Signal)

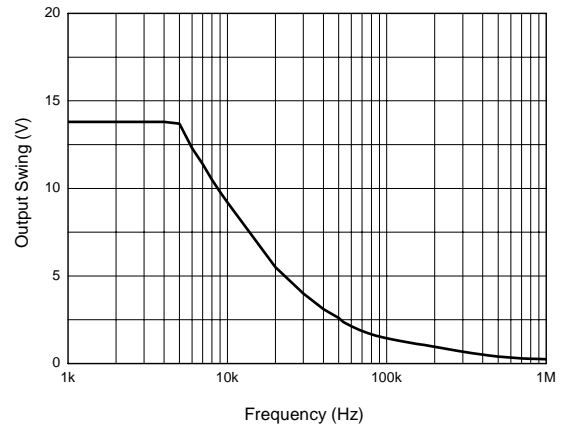


Figure 18: Large Signal Frequency Response

Typical Performance Characteristics (Continued)

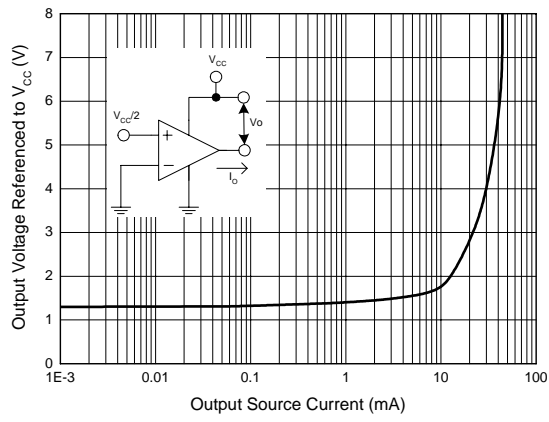


Figure 19: Output Characteristics: Current Sourcing

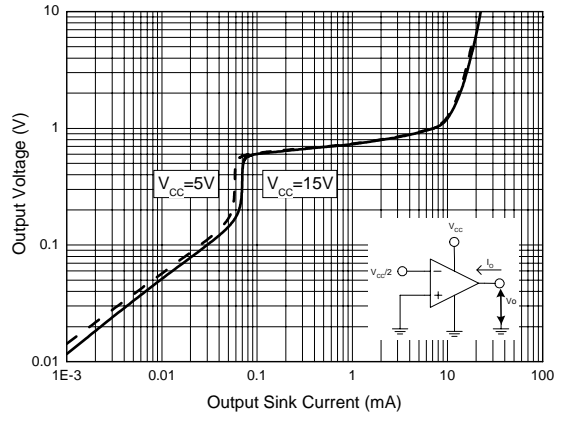


Figure 20: Output Characteristics: Current Sinking

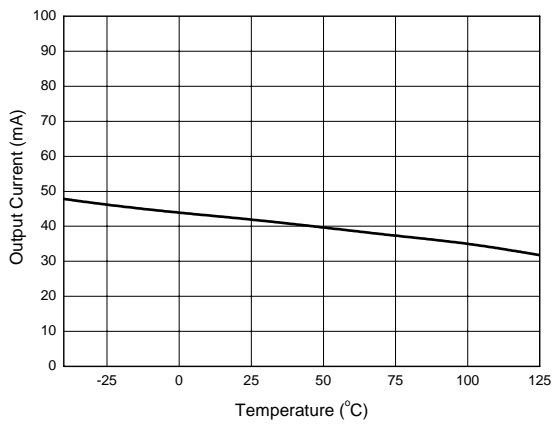


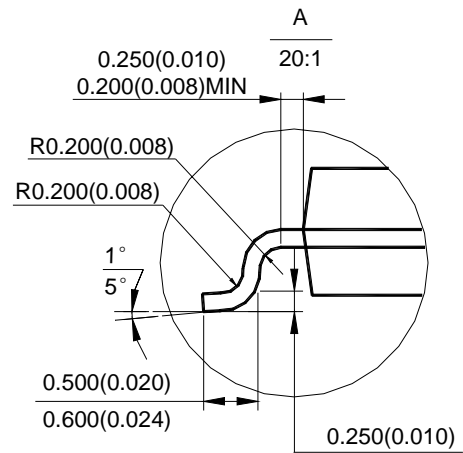
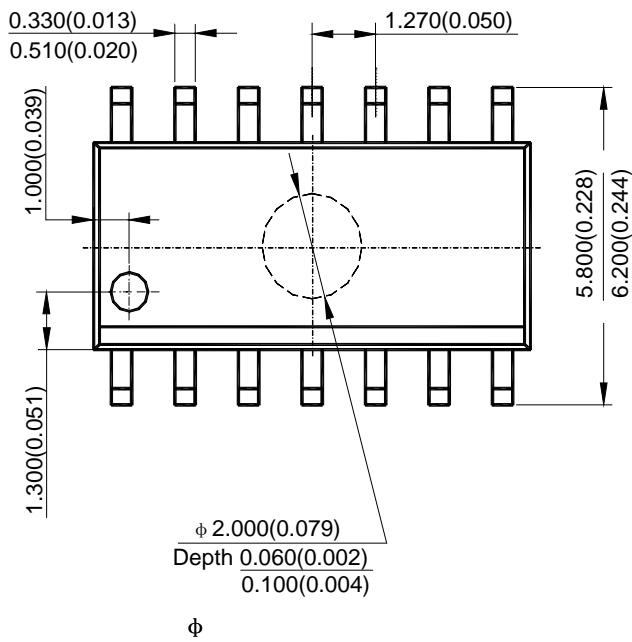
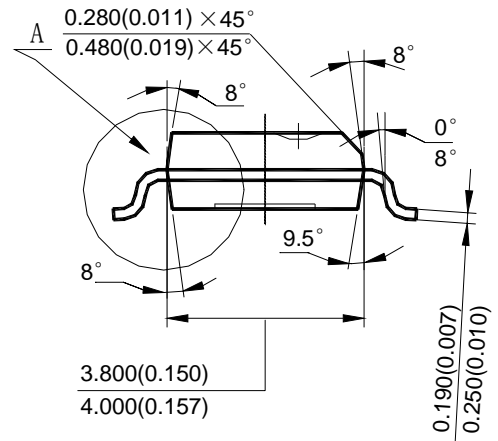
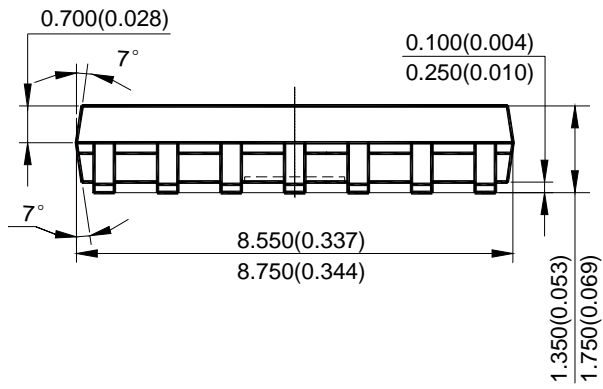
Figure 21: Current Limiting

MB324

Mechanical Dimensions (Cont'd)

SOP-14

Unit: mm(inch)



IMPORTANT NOTICE

CBC Microelectronics Co., LTD reserves the right to make changes without further notice to any products or specifications herein. CBC Microelectronics Co., LTD does not assume any responsibility for use of any its products for any particular purpose, nor does CBC Microelectronics Co., LTD assume any liability arising out of the application or use of any its products or circuits. CBC Microelectronics Co., LTD does not convey any license under its patent rights or other rights nor the rights of others.