



AME7700/AME7701/AME7702

Switched Capacitor Voltage Doublers

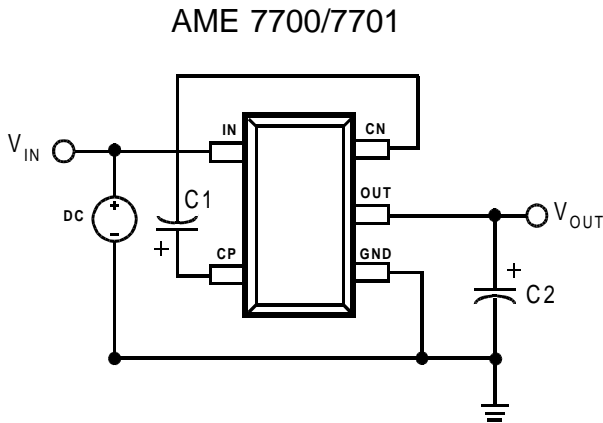
General Description

The AME7700 series of economical, Charge-Pump Converters efficiently double a +1.5V to +5.5V input to +3.0V to +11V, with a working current exceeding 100mA. Due to their simplicity, small size, and performance, these CMOS converters have numerous applications.

For most cases, only (2) external capacitors are required, however, in some cases, a single capacitor is acceptable. Minimum capacitance is obtained with the AME7701, while the AME7700 offers the lowest stand-by current. The AME7702 has a Frequency-Select pin for added flexibility. The input voltage can be tripled or quadrupled by cascading 2 Charge-Pumps. A single alkaline battery

With it's low start-up voltage, a single alkaline battery can be configured with (2) AME7700's to quadruple the voltage and produce 5V out. Alternately, with a 5V source, (2) AME7700's can be configured to triple the voltage and produce 15V out.

Typical Connection



Features

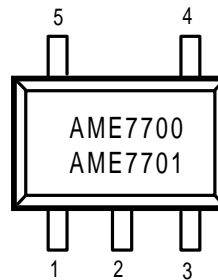
- Small packages: SOT-25, SOT-26
• +1.5V to +5.5V Input Range
• 60uA Quiescent Current (AME7700)
• 99% Conversion Efficiency
• Output Current Exceeding 100mA
• User Selectable Frequency (AME7702)

Applications

- Cellular Phones
• Digital Cameras
• Battery Chargers
• High Tech Flashlights
• PDA's - LCD displays
• Consumer Electronics
• Pagers
• Portable Electronics

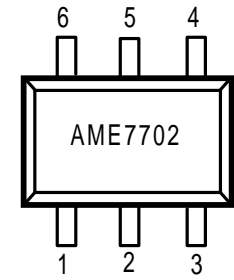
Pin Configuration

SOT-25 Top View



- 1: GND 4: IN
2: OUT 5: CP
3: CN

SOT-26 Top View



- 1: GND 4: IN
2: CN 5: FC
3: OUT 6: CP



■ Pin Description

AME7700AEEV/ AME7701AEEV

Pin	Designation	Function
1	GND	Ground (-Supply)
2	OUT	Power Output
3	CN	Capacitor (-)
4	IN	Power Input
5	CP	Capacitor (+)

AME7702AEEY

Pin	Designation	Function
1	GND	Ground (-Supply)
2	CN	Capacitor(-)
3	OUT	Power Output
4	IN	Power Input
5	FC	Frequency Control
6	CP	Capacitor (+)

■ Order Information

Part Number	Package	Operating Temp.
AME7700AEEV	SOT-25	-40°C to +85°C
AME7701AEEV	SOT-25	-40°C to +85°C
AME7702AEEY	SOT-26	-40°C to +85°C



■ Absolute Maximum Ratings

Parameter	Maximum	Unit
Supply Voltage	6	V
ESD Classification	B	

■ Recommended Operating Conditions

Parameter	Rating
Supply Voltage	1.5 - 5.5 V
Ambient Temperature Range	-40 to +85 °C
Junction Temperature	-40 to +125 °C

■ Thermal Information

Parameter	Maximum	Unit
Thermal Resistance (SOT-25,26)	250	°C/W
Maximum Junction Temperature	150	°C
Maximum Lead Temperature (10 Sec)	300	°C

Caution: Stress above the listed absolute rating may cause permanent damage to the device



■ Electrical Specification

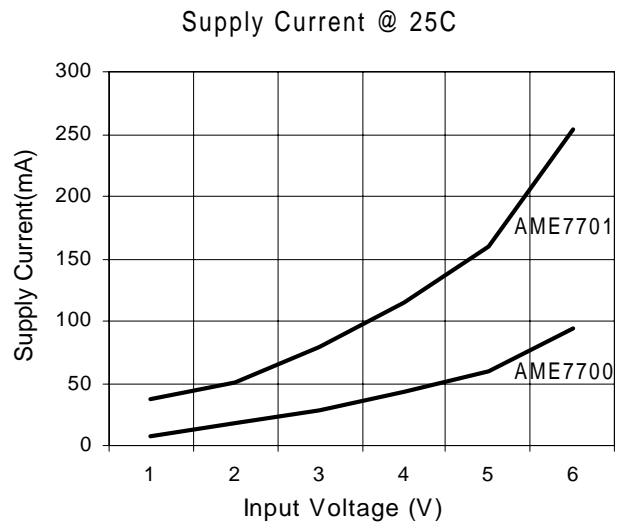
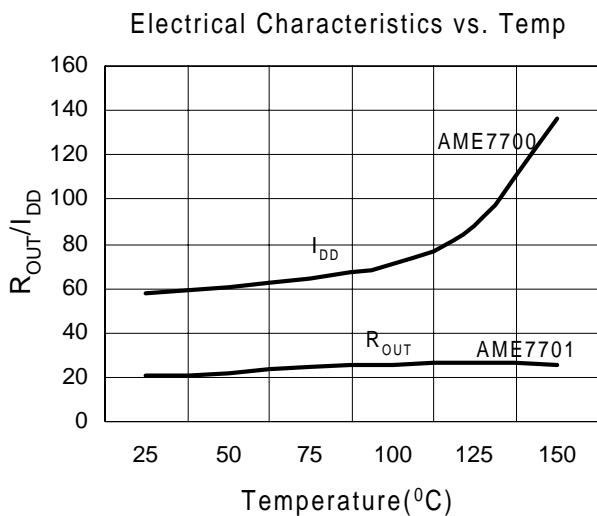
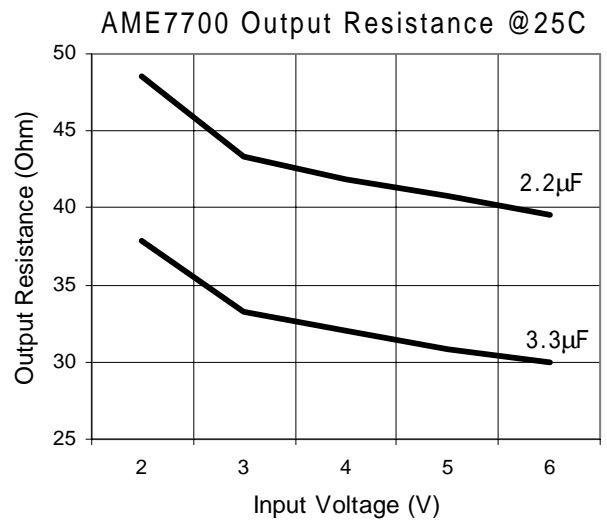
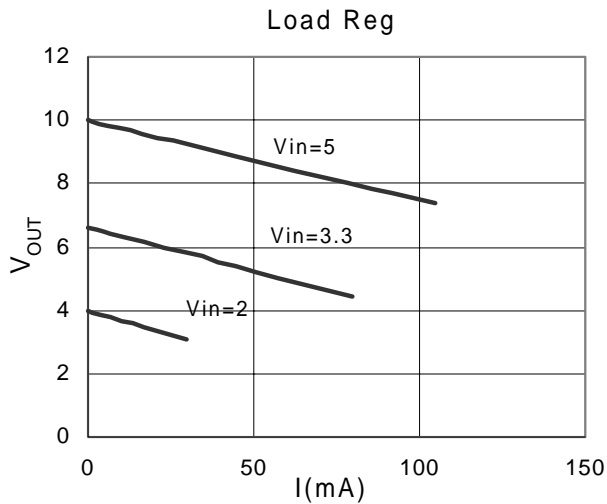
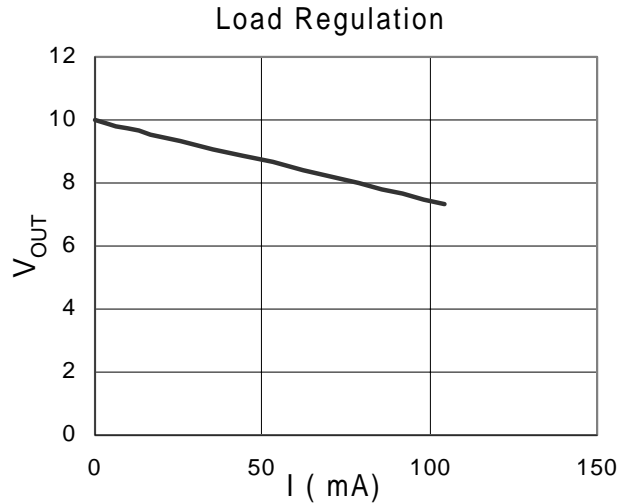
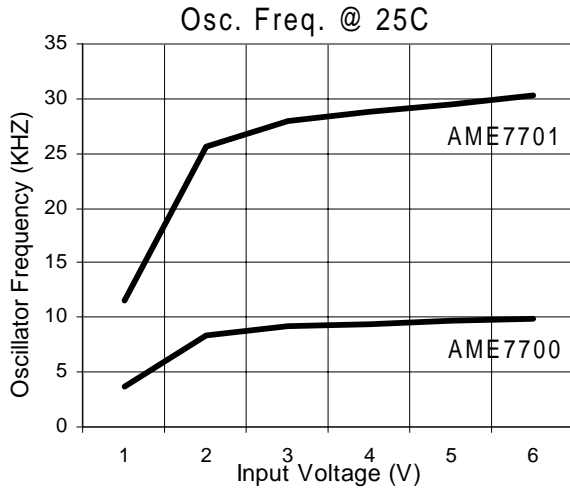
$T_A = 25\text{ C}$, $V_{IN} = 5\text{ V}$ unless otherwise noted, $C_1 = C_2 = 3.3\mu\text{F}$

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNITS
No Load Current	I_{IN}	AME7700 AME7702 FC is LO		60	100	μA
		AME7701 AME7702 FC is HI		215	300	
Supply Voltage Range	V_{IN}	$R_L = 10\text{ K}$	1.5		5.5	V
Oscillator Frequency	F_{OSC}	AME7700 AME7702 FC is LO	8.5	12	15.5	KHz
		AME7701 AME7702 FC is HI	24.5	35	45.5	
Output Resistance	R_o	AME7700 AME7702 FC is LO		40	50	ohms
		AME7701 AME7702 FC is HI		20	35	
Voltage Conversion Efficiency	V_{EFF}	No load	97	99		%
Power Efficiency	P_{EFF}	$R_L = 10\text{ K}$	88	92		%



AME7700/AME7701/AME7702

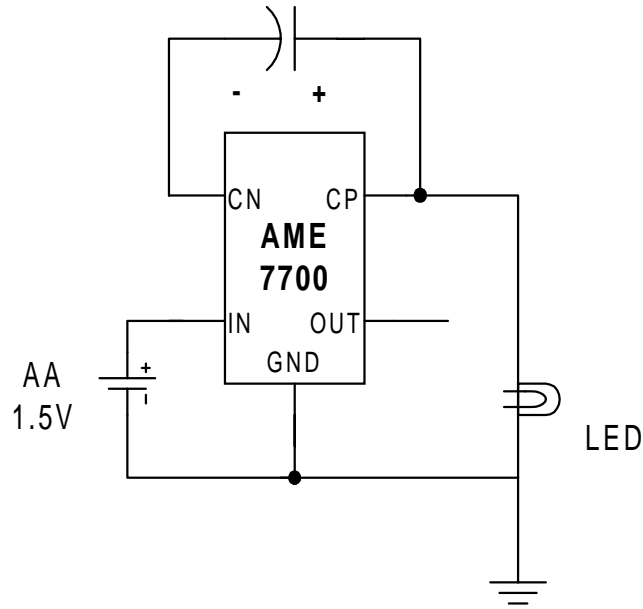
Switched Capacitor Voltage Doublers



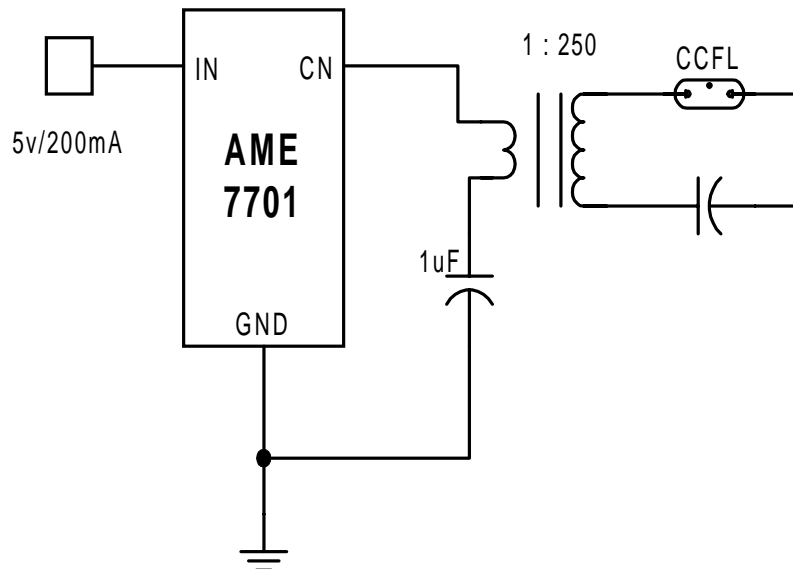


■ Applications

Single Cell Led Flashlight



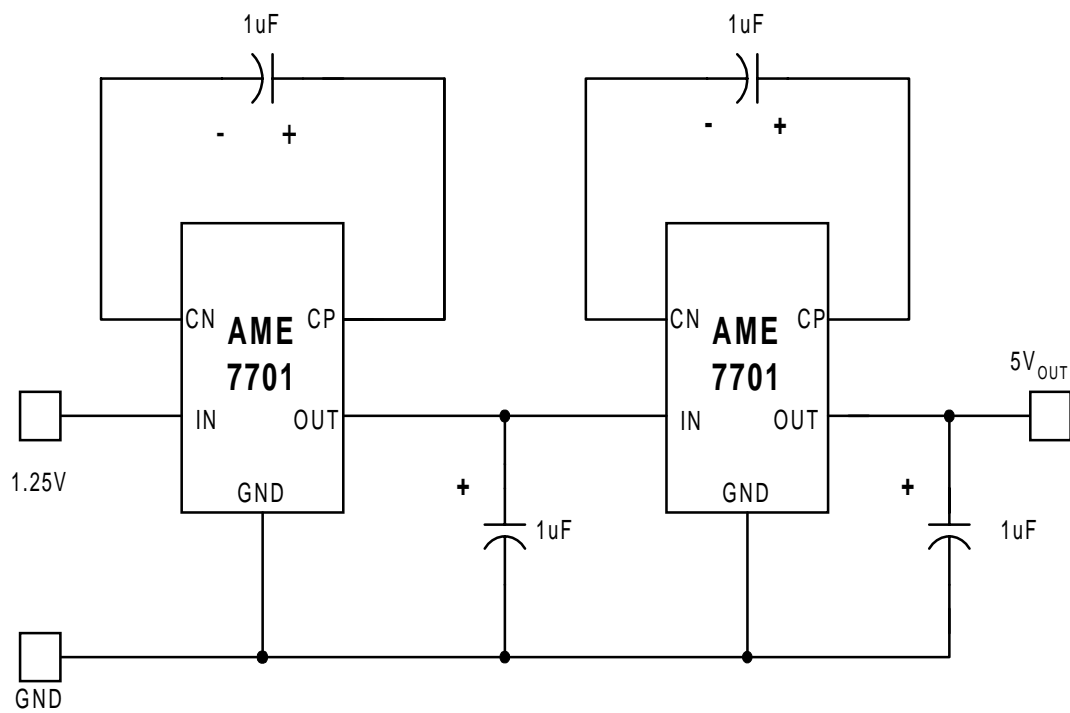
1 Watt Fluorescent Lamp Driver





■ Applications(Continued)

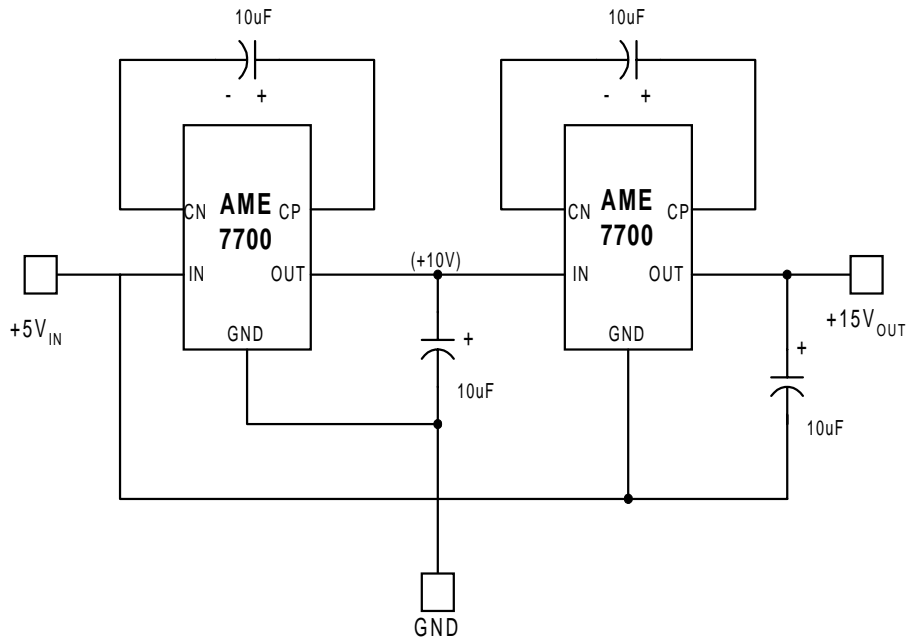
1.25V to 5.0V Converter



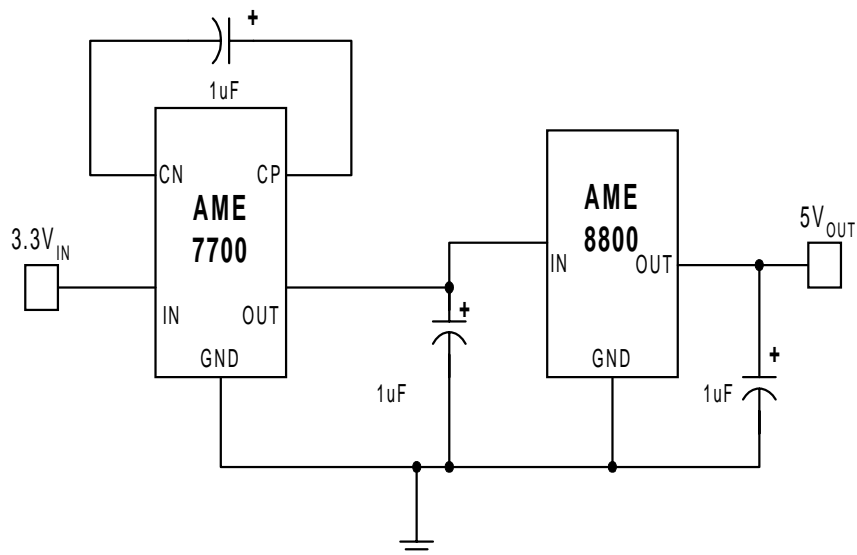


■ Applications(Continued)

+5V to +15V Converter



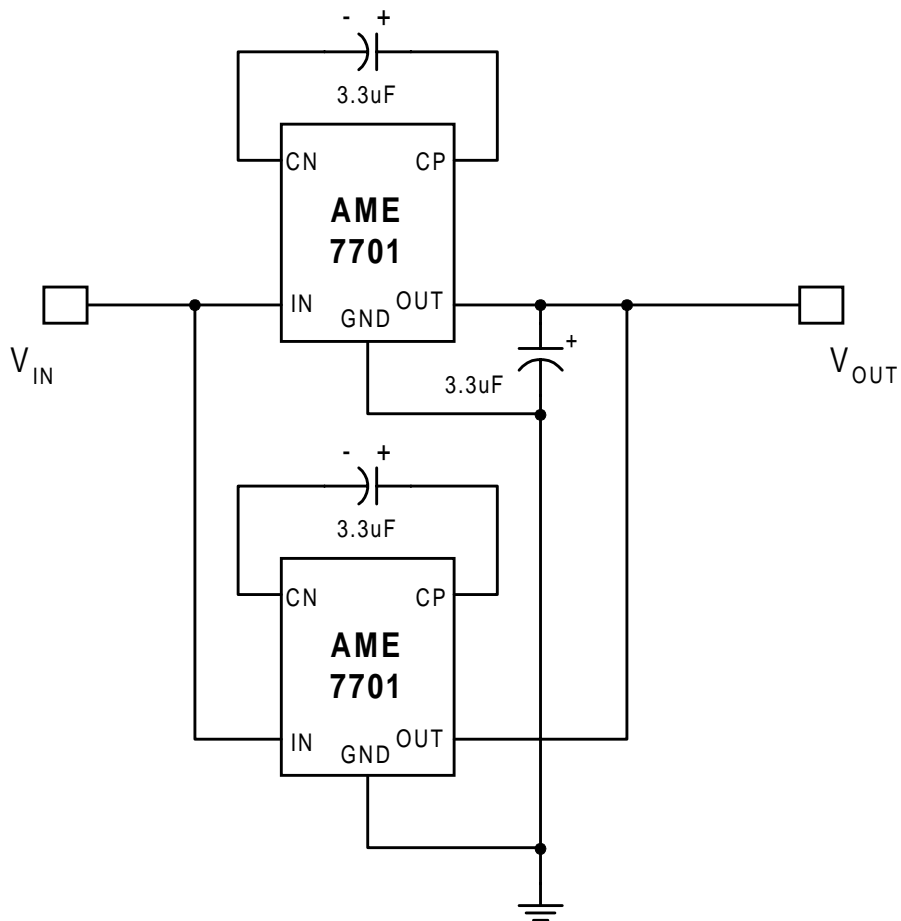
3.3V-Input to Regulated 5V-Output Converter





■ Applications(Continued)

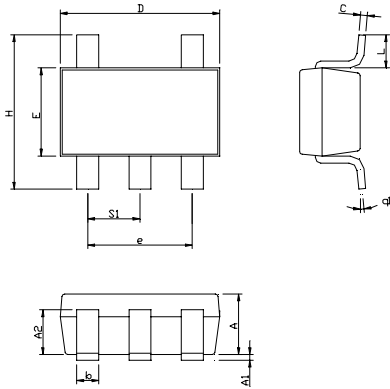
Paralleling Devices





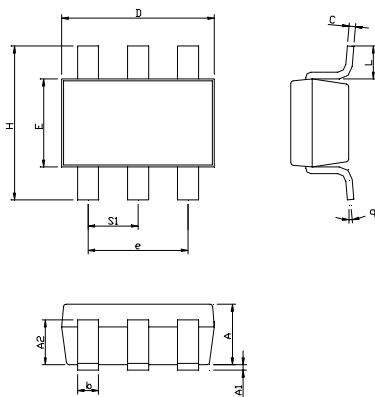
■ Package Dimension

SOT-25



SYMBOLS	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	1.00	1.45	0.0394	0.0571
A ₁	0.00	0.15	0.0000	0.0591
A ₂	0.70	1.25	0.0276	0.0492
b	0.35	0.55	0.0138	0.0217
C	0.08	0.25	0.0031	0.0098
D	2.70	3.10	0.1063	0.1220
E	1.40	1.80	0.0551	0.0709
e	1.90 BSC		0.07480 BSC	
H	2.60	3.00	0.1024	0.1181
L	0.30	-	0.0118	-
θ ₁	0°	10°	0°	10°
S ₁	0.85	1.05	0.0335	0.0413

SOT-26



SYMBOLS	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	1.00	1.40	0.0394	0.0551
A ₁	0.00	0.15	0.0000	0.0591
A ₂	0.70	1.25	0.0276	0.0492
b	0.35	0.50	0.0138	0.0197
C	0.08	0.25	0.0031	0.0098
D	2.70	3.10	0.1063	0.1220
E	1.40	1.80	0.0551	0.0709
e	1.90 BSC		0.0748 BSC	
H	2.60	3.00	0.1024	0.1181
L	0.35	-	0.0138	-
θ ₁	0°	9°	0°	9°
S ₁	0.85	1.05	0.0335	0.0413



www.analogmicro.com
E-Mail: info@analogmicro.com

Life Support Policy:

These products of Analog Microelectronics, Inc. are not authorized for use as critical components in life-support devices or systems, without the express written approval of the president of Analog Microelectronics, Inc.

Analog Microelectronics, Inc. reserves the right to make changes in the circuitry and specifications of its devices and advises its customers to obtain the latest version of relevant information.

© Analog Microelectronics, Inc. , July 2001

Document: 2027-doc-B-0731

Corporate Headquarters
Analog Microelectronics, Inc.

3100 De La Cruz Blvd. Suite 201
Santa Clara, CA. 95054-2046
Tel : (408) 988-2388
Fax: (408) 988-2489

Asia Pacific Headquarters
AME, Inc.

2F, 187 ,Kang-Chien Rd,Nei-Hu Dist
Taipei 114, Taiwan, R.O.C.
Tel : 886 2 2627-8687
Fax: 886 2 2659-2989