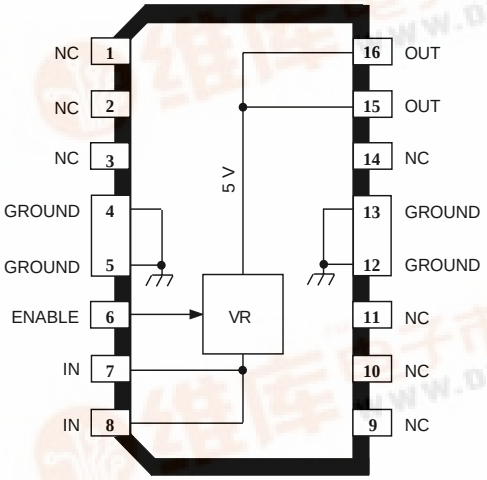
LOW-DROPOUT, 5 V REGULATOR — HIGH EFFICIENCY



Dwg. PS-018

ABSOLUTE MAXIMUM RATINGS at T_A = +25°C

Input Voltage, V_I ..... **10 V**
Output Current, I_O
(40% duty cycle) ..... **1 A***
(75% duty cycle) ..... **500 mA***
(continuous) ..... **370 mA***
Operating Temperature Range,
T_A ..... **-20°C to +85°C**
Junction Temperature, T_J ..... **+150°C†**
Storage Temperature Range,
T_S ..... **-40°C to +150°C**

* Output current rating is limited by input voltage, duty cycle, and ambient temperature. Under any set of conditions, do not exceed a junction temperature of +150°C. See next page.

† Fault conditions that produce excessive junction temperature will activate device thermal shutdown circuitry. These conditions can be tolerated but should be avoided.

Especially suited for hand-held, portable, battery-operated equipment such as cellular telephones, the A8181SLB low dropout voltage regulator provides high efficiency for maximum battery life in a minimum package size. Equally applicable to camcorders and portable computers, the device provides a fixed 5 V regulated continuous output at almost 200 mA of load current under worst-case conditions. Under normal operating conditions, output currents over 500 mA are permitted.

A MOSFET pass element delivers high output current with an input-output differential of less than 300 mV. For high efficiency, the low dropout voltage allows a longer battery discharge before output voltage regulation is lost. A low quiescent current, even during high load conditions, makes the device ideal for standby power systems. High regulator accuracy and excellent temperature characteristics are provided by a bandgap reference. An enable input gives the designer complete control over sequential power-up or emergency shutdown.

This device is supplied in a 16-lead wide-body, small-outline plastic power package (SOIC) for surface-mount applications. The copper batwing provides for maximum package power dissipation in the smallest possible construction. The A8181SLB is rated for operation over a temperature range of -20°C to +85°C.

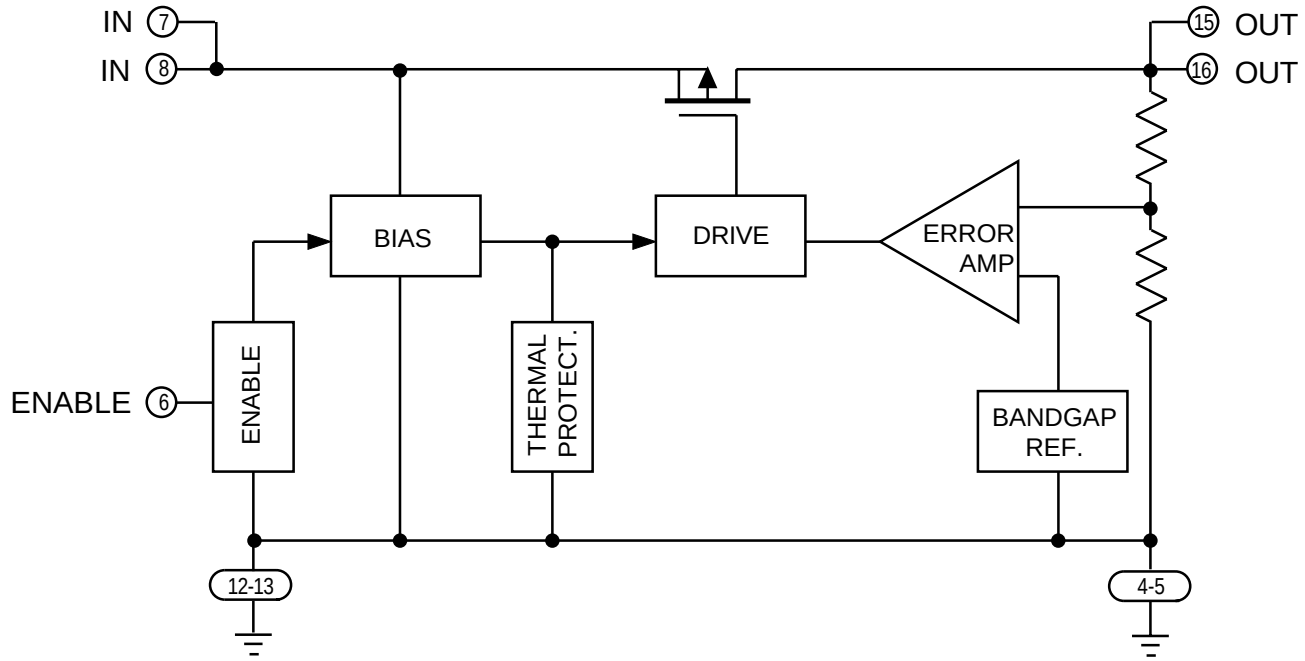
FEATURES AND BENEFITS

- High Efficiency Provides Extended Battery Life
- Less Than 300 mV Dropout Voltage
- Low Quiescent Current
- >200 mA Output Current
- LSTTL-Compatible ON/OFF Control
  For Sequential Power-up or Emergency Shutdown
- Internal Thermal Protection
- SOIC Surface-Mount Package

Always order by complete part number: **A8181SLB** .

8181
LOW-DROPOUT, 5 V REGULATOR

FUNCTIONAL BLOCK DIAGRAM



Dwg. FS-012

MAXIMUM ALLOWABLE OUTPUT CURRENT with device mounted on 2.24" x 2.24" (56.9 mm x 56.9 mm) solder-coated copper-clad board in still air.

	Maximum Allowable Output Current in Milliamperes with V_I = 10 V, T_J = 150°C*								
	dc (Duty Cycle)								
T_A	100%	90%	80%	70%	60%	50%	40%	30%	20%
25°C	370	415	465	530	620	745	930	1000	1000
50°C	295	330	370	425	495	595	745	995	1000
70°C	235	265	295	340	395	475	595	795	1000
85°C	190	215	240	275	320	385	485	645	970

* $I_O = (T_J - T_A)/([V_I - V_O] R_{\theta JA} \bullet dc) = (150 - T_A)/(5 \bullet 67 \bullet dc)$

Output current rating can be increased (to 1 A maximum) by heat sinking or reducing the input voltage. With an infinite heat sink, $R_{-JA} = R_{-JT}$ = 6°C/W. Conditions that produce excessive junction temperature will activate device thermal shutdown circuitry. These conditions can be tolerated but should be avoided.

ELECTRICAL CHARACTERISTICS at T_A +25°C (unless otherwise noted).

Characteristic	Symbol	Test Conditions	Limits			
			Min.	Typ.	Max.	Units
Output Voltage	V_O	T_A = 25°C, 5.5 V ≤ V_I ≤ 10 V, 0 mA ≤ I_O ≤ 500 mA†	4.90	5.00	5.10	V
		T_A = 85°C, 5.5 V ≤ V_I ≤ 10 V, 0 mA ≤ I_O ≤ 500 mA*†	4.85	—	5.15	V
Output Volt. Temp. Coeff.	α_{VO}	I_O = 0	—	±100	—	µV/°C
Line Regulation	$\Delta V_{O(\Delta VI)}$	5.5 V ≤ V_I ≤ 10 V, Output open	—	10	30	mV
Load Regulation	$\Delta V_{O(\Delta IO)}$	0 mA ≤ I_O ≤ 500 mA†, V_I = 6 V	—	40	100	mV
Dropout Voltage	$V_I$min - V_O	I_O = 500 mA†	—	—	300	mV
Quiescent Current (GND terminal current)	I_Q	V_I = 10 V, I_O = 500 mA†	—	87	120	µA
		V_I = 10 V, Output open	—	86	120	µA
	$I_{Q(off)}$	V_I = 10 V, Output open, V_E = 0.4 V	—	—	20	µA
ENABLE Input Voltage	V_{EH}	Output ON, V_I = 10 V	2.4	—	—	V
	V_{EL}	Output OFF, V_I = 10 V	—	—	0.4	V
ENABLE Input Current	I_E	V_E = V_I = 10 V	—	—	±0.1	µA
Thermal Shutdown Temp.	T_J		—	165	—	°C
Thermal Resistance	$R_{\theta JA}$	Mounted on 2.24" x 2.24" solder-coated copper-clad board in still air	—	67	—	°C/W
	$R_{\theta JT}$		—	6.0	—	°C/W

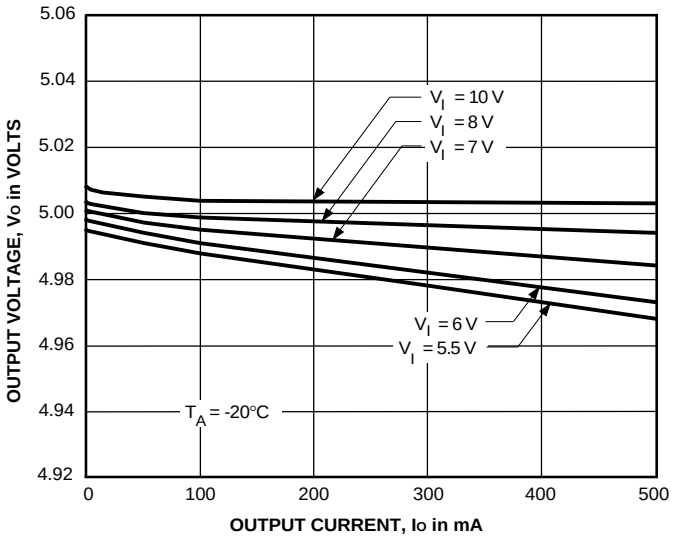
Typical values are given for circuit design information only.

* This parameter is tested to a lot sample plan only.

† Pulse test (<20 ms).

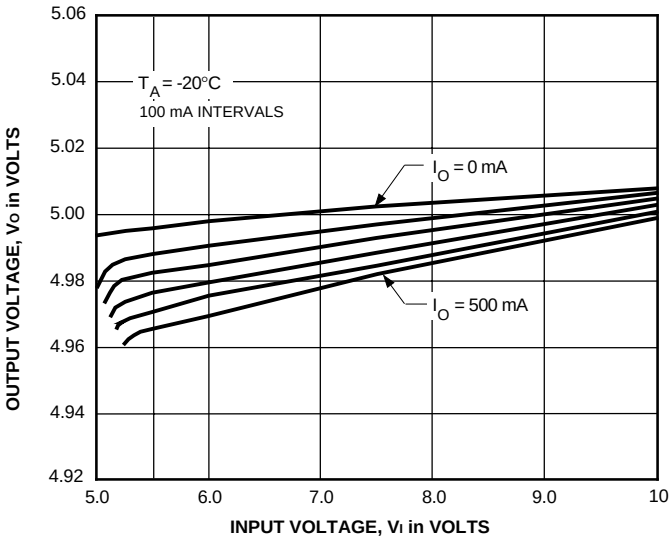
TYPICAL CHARACTERISTICS

LOAD REGULATION

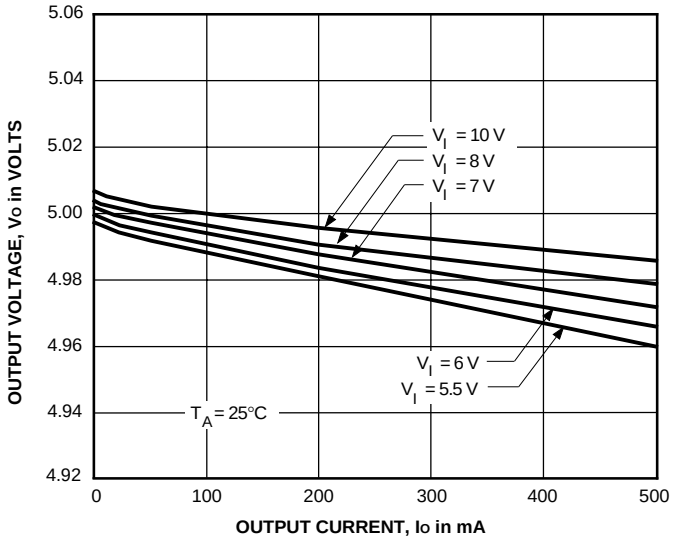


Dwg. GP-039

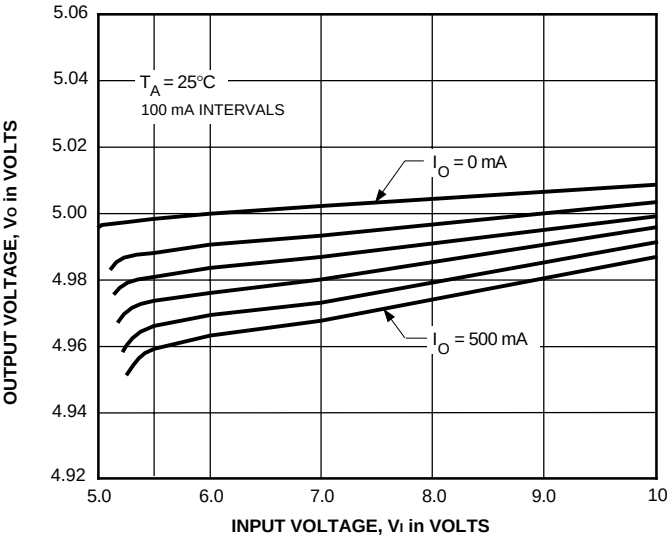
LINE REGULATION



Dwg. GP-040



Dwg. GP-039-1

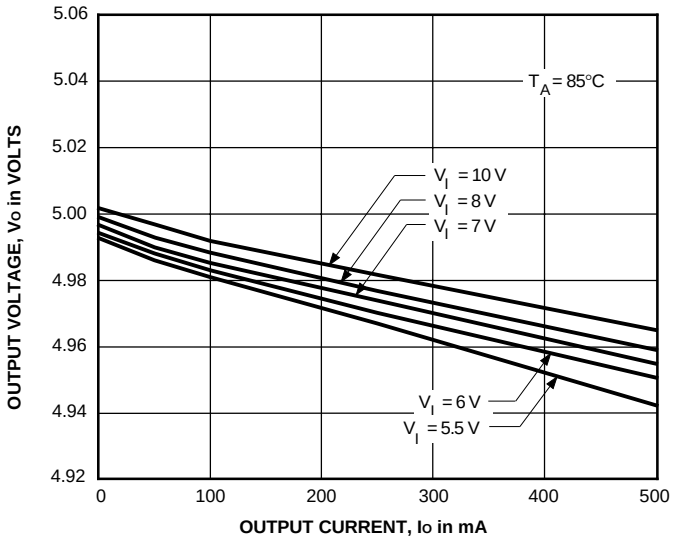


Dwg. GP-040-1

CAUTION: Maximum allowable duty cycle will be significantly less than 100% at high temperatures, at high input voltages, or at high output currents. See Maximum Allowable Output Current table.

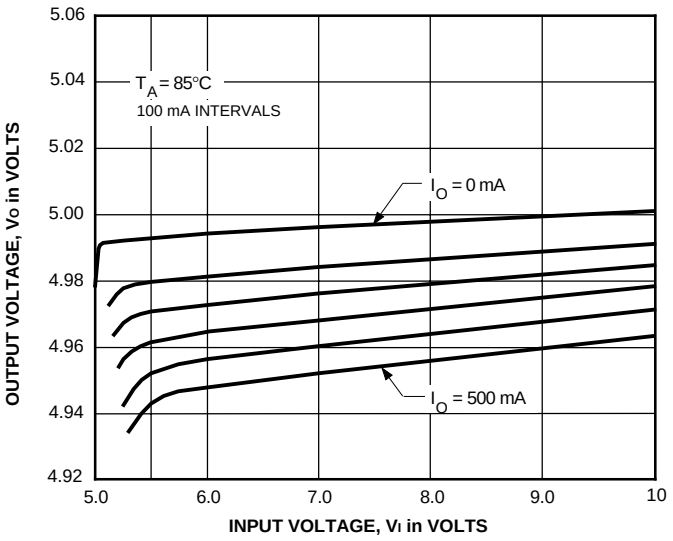
TYPICAL CHARACTERISTICS (cont'd)

LOAD REGULATION



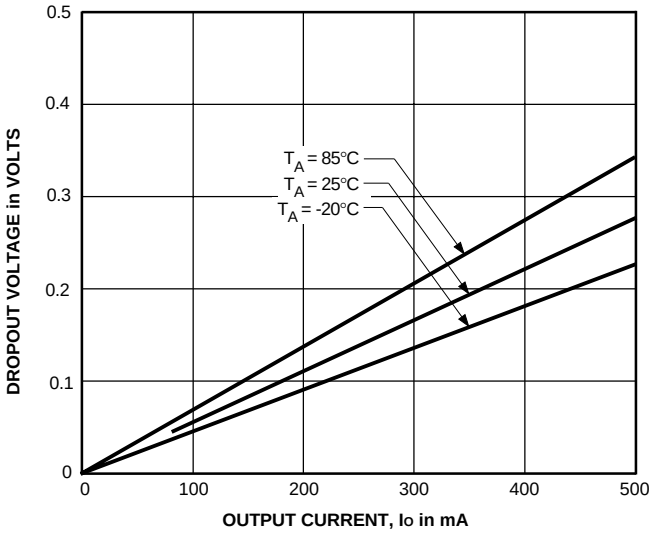
Dwg. GP-039-2

LINE REGULATION



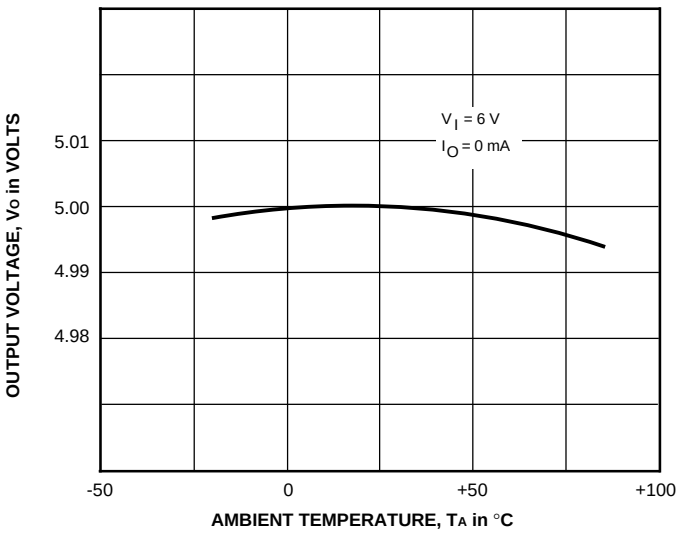
Dwg. GP-040-2

DROPOUT VOLTAGE



Dwg. GP-041

OUTPUT VOLTAGE vs TEMP.

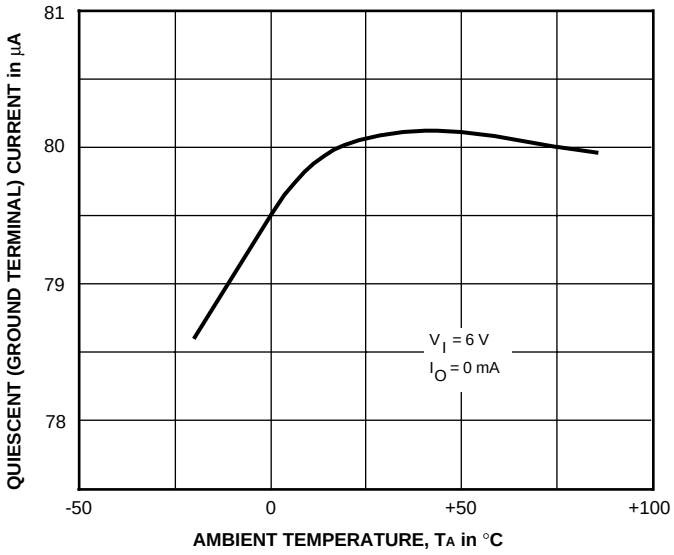


Dwg. GP-036

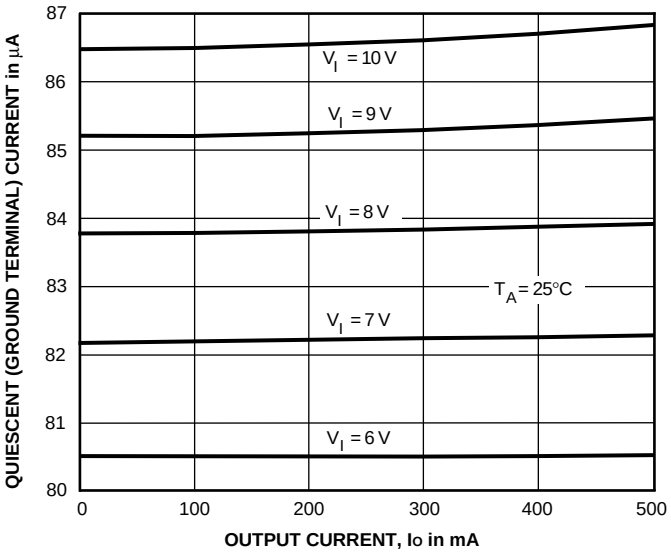
CAUTION: Maximum allowable duty cycle will be significantly less than 100% at high temperatures, at high input voltages, or at high output currents. See Maximum Allowable Output Current table.

TYPICAL CHARACTERISTICS (cont'd)

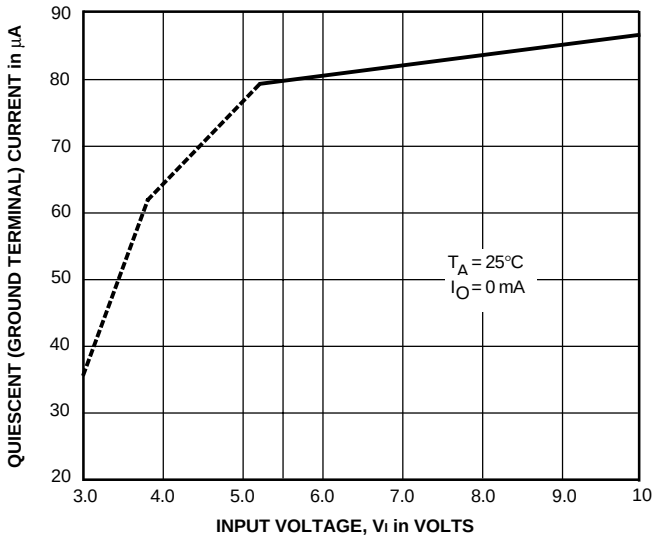
QUIESCENT (GROUND TERMINAL) CURRENT



Dwg. GP-037



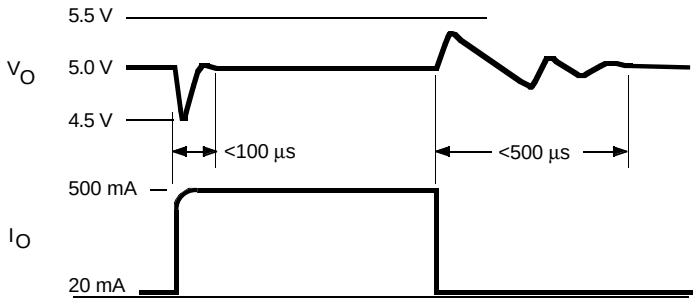
Dwg. GP-038



Dwg. GP-042

TRANSIENT PERFORMANCE

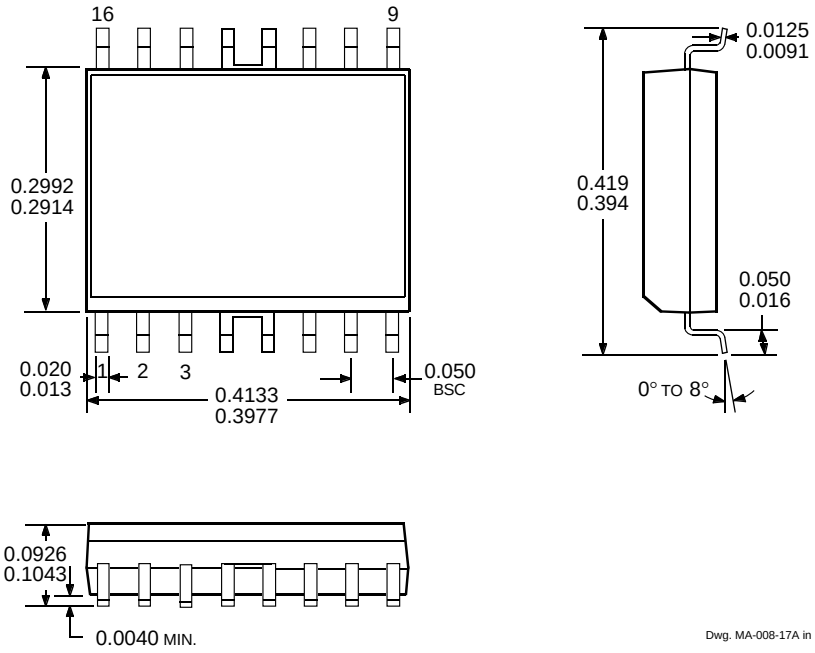
V_I = 5.5 V to 10 V, T_A = -20°C to +85°C, C_O = 4.7 µF



Dwg. WP-018

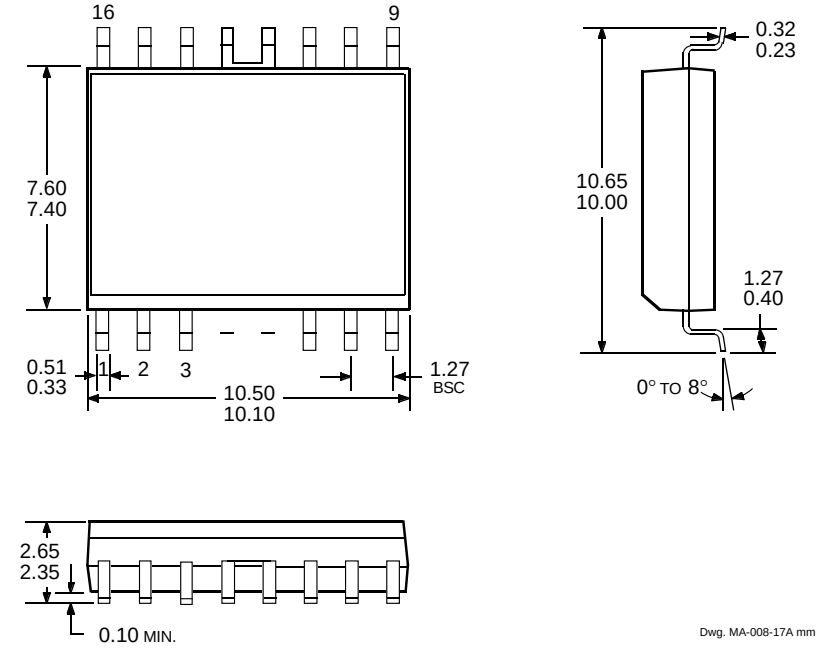
CAUTION: Maximum allowable duty cycle will be significantly less than 100% at high temperatures, at high input voltages, or at high output currents. See Maximum Allowable Output Current table.

Dimensions in Inches
(Based on 1 mm = 0.3937")



Dwg. MA-008-17A in

Dimensions in Millimeters



Dwg. MA-008-17A mm

NOTES: 1. Webbed lead frames. Leads 4, 5, 12, and 13 are internally one piece.

2. Lead spring tolerance is non-cumulative.

3. Exact body and lead configuration at vendor's option within limits shown.

8181
LOW-DROPOUT, 5 V REGULATOR

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