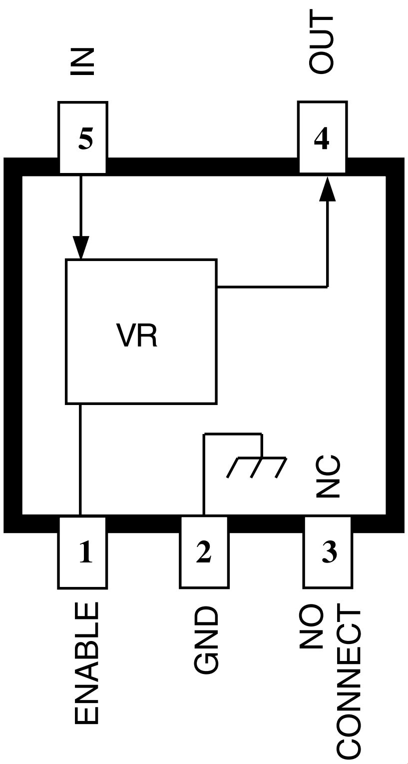
8226 THRU 8233

PRELIMINARY INFORMATION
(subject to change without notice)
January 18, 2000

LOW-DROPOUT REGULATORS — HIGH EFFICIENCY

A82xxSLM



Dwg. PS-021-3

ABSOLUTE MAXIMUM RATINGS

Input Voltage, V_I . . . . **7 V**
Peak Output Current,
I_{OM} . . . . **100 mA***
Enable Input Voltage, V_E . . . . **V_I**
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 following pages.

Designed specifically to meet the requirement for extended operation of battery-powered equipment such as cordless and cellular telephones, the A8226SLM thru A8233SLM voltage regulators offer the reduced dropout voltage and quiescent current essential for maximum battery life. Applicable also to palmtop computers and personal data assistants, these devices deliver a regulated output at up to 100 mA (transient), which is limited only by package power dissipation. Regulated output voltages of 2.6, 2.7, 2.8, 2.9, 3.0 and 3.3 are currently provided. Other voltages, down to 2.0 volts, are available on special order.

A PMOS pass element provides a typical dropout voltage of only 125 mV at 50 mA of load current. The low dropout voltage permits deeper battery discharge before output regulation is lost. Quiescent current does not increase significantly as the dropout voltage is approached, an ideal feature in standby/resume power systems where data integrity is crucial. Regulator accuracy and excellent temperature characteristics are provided by a bandgap reference. The A8226SLM thru A8233SLM include ENABLE inputs to give the designer complete control over power up, standby, or power down.

These devices are supplied in a thermally enhanced 5-lead small-outline plastic package similar to the SOT-23, and fitting the SC-74A footprint. All devices are rated for operation over a temperature range of -20°C to +85°C.

FEATURES AND BENEFITS

- High Efficiency Provides Extended Battery Life
- 125 mV Typical Dropout Voltage at I_O = 50 mA
- 32 µA Typical Quiescent Current
  Less Than 1 µA "Sleep" Current
- Low Output Noise
- 100 mA Peak Output Current
- Improved PSRR and Transient Performance

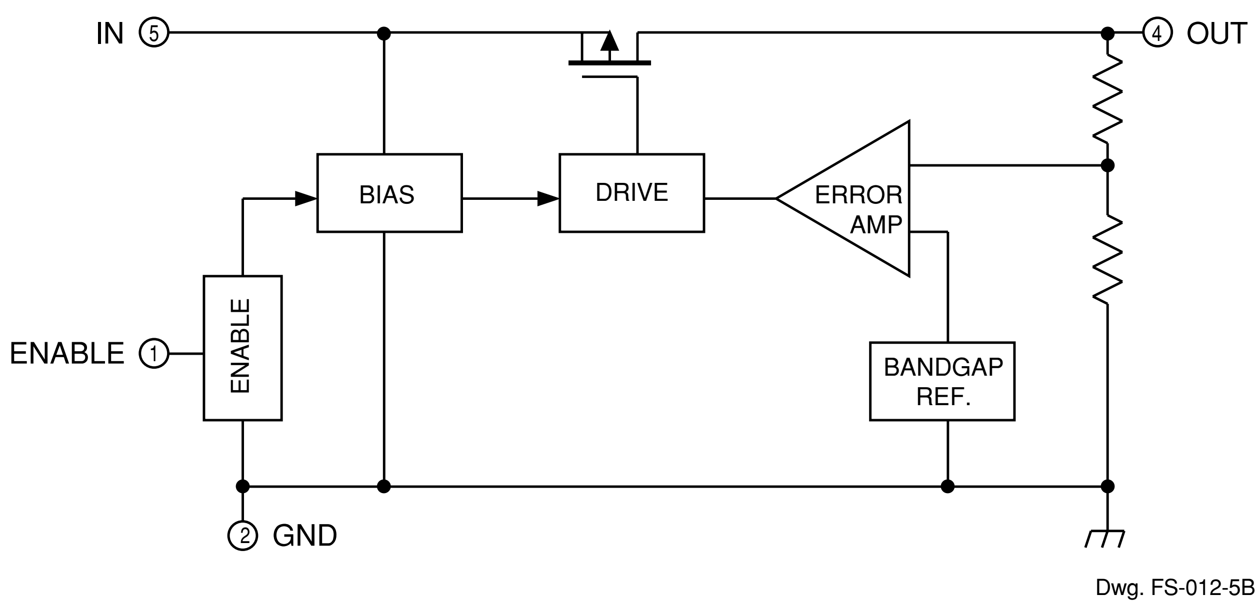
APPLICATIONS

- Cordless and Cellular Telephones
- Personal Data Assistants
- Personal Communicators
- Palmtop Computers

Always order by complete part number, e.g., **A82xxSLM** , where "xx" is the required output voltage in tenths.

DISCONTINUED PRODUCT — FOR REFERENCE ONLY

FUNCTIONAL BLOCK DIAGRAM



A82xxSLM Maximum Allowable Average 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.

T_A	Allowable Total Average (10 ms) Output Current in Milliamperes with T_J = 150°C, Duty Cycle = 100%†						
	V_I - V_O						
	1.5	2.0	2.5	3.0	3.5	4.0*	4.5*
25°C	100	100	100	100	100	100	100
50°C	100	100	100	100	100	100	100
70°C	100	100	100	100	100	91	81
85°C	100	100	100	98	84	74	66

* Absolute maximum peak output current rating is 100 mA; absolute maximum input voltage is 7 V.

† $I_O = (T_J - T_A)/([V_I - V_O] R_{\theta JA} \text{ x dc}) = (150 - T_A)/([V_I - V_O] \text{ x } 220 \text{ x } 1.00)$

Output current rating can be increased (to 100 mA maximum) by additional heat sinking or reducing the duty cycle.

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ELECTRICAL CHARACTERISTICS at T_A = +25°C, V_E ≥ 2.0 V (unless otherwise noted).

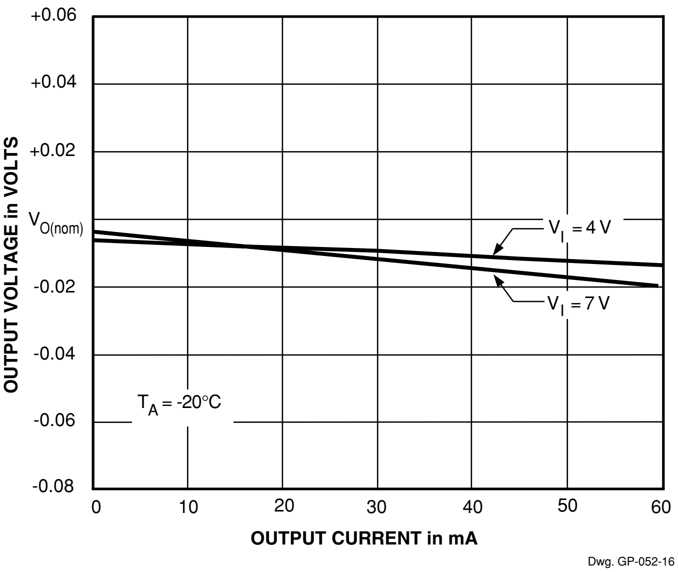
Characteristic	Symbol	Test Conditions	Limits			
			Min.	Typ.	Max.	Units
Output Voltage (reference specified $V_{O(nom)}$)	V_O	4 V ≤ V_I ≤ 7 V, 10 µA ≤ I_O ≤ 50 mA*	-0.05	0.00	+0.05	V
		V_I = $V_{O(nom)}$, I_O = 50 mA	—	—	-0.25	V
Output Volt. Temp. Coeff.	a_{VO}	V_I = 6 V, I_O = 10 mA, T_J ≤ 125°C	—	-0.20	—	mV/°C
Line Regulation	$\Delta V_{O(\Delta VI)}$	4 V ≤ V_I ≤ 7 V, I_O = 1 mA	—	3.0	10	mV
Load Regulation	$\Delta V_{O(\Delta IO)}$	1 mA ≤ I_O ≤ 50 mA*, 4 V ≤ V_I ≤ 7 V	—	—	20	mV
Dropout Voltage	$V_I$min - V_O	I_O = 50 mA	—	125	250	mV
Ground Terminal Current	I_{GND}	V_I < 7 V, I_O ≤ 50 mA	—	32	45	µA
	I_Q	V_I ≤ 7 V, V_E ≤ 0.8 V, I_O = 0 mA	—	—	1.0	µA
ENABLE Input Voltage	V_{EH}	4 V ≤ V_I ≤ 7 V, Output ON	2.0	—	—	V
	V_{EL}	4 V ≤ V_I ≤ 7 V, Output OFF	—	—	0.8	V
ENABLE Input Current	I_E	V_E = V_I = 7 V	—	—	±1.0	µA
Rejection Ratio	PSRR	V_I = $V_{O(nom)}$ + 1.5 V, V_i = 100 mV, I_O = 10 mA, f = 1 kHz	—	70	—	dB
		f = 10 kHz	—	52	—	dB
Output Noise	e_n	10 Hz ≤ f ≤ 100 kHz, I_O = 10 mA, C_O = 10 µF	—	0.5	—	µV/√Hz

Typical values are at T_A = +25°C and are given for circuit design information only.

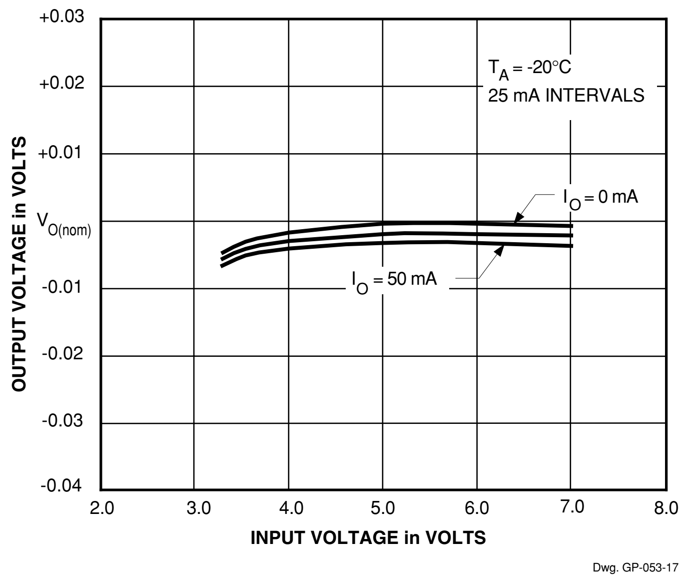
* Pulse test (≤20 ms). See previous page for duty cycle limitations.

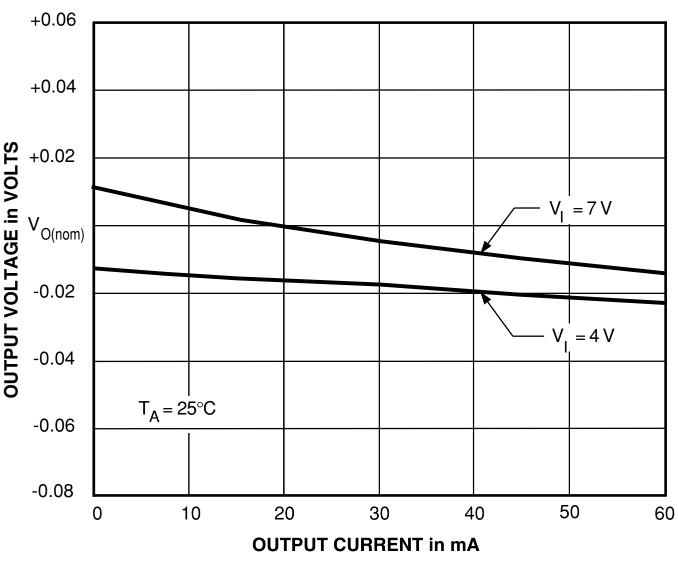
TYPICAL CHARACTERISTICS

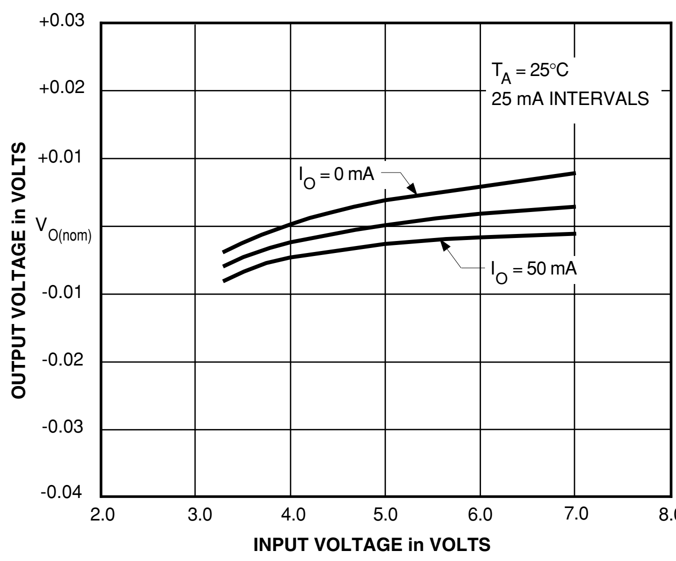
LOAD REGULATION



LINE REGULATION



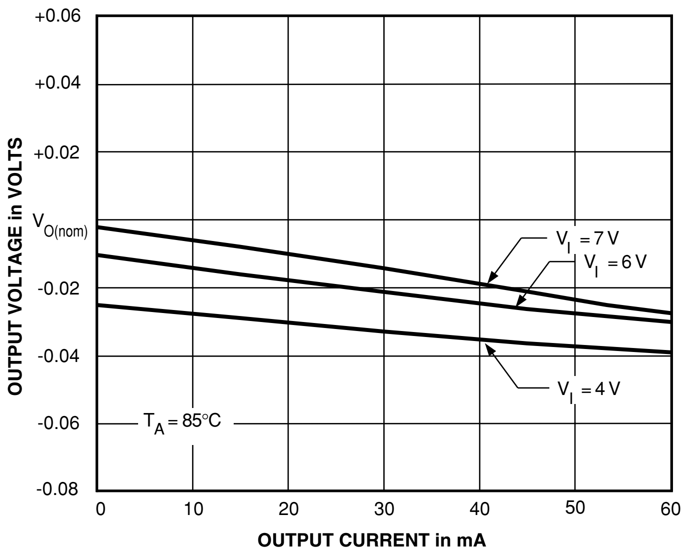




CAUTION: Maximum allowable duty cycle will be significantly less than 100% at high temperatures, at high input voltages, or at high output currents. See appropriate Maximum Allowable Output Current table.

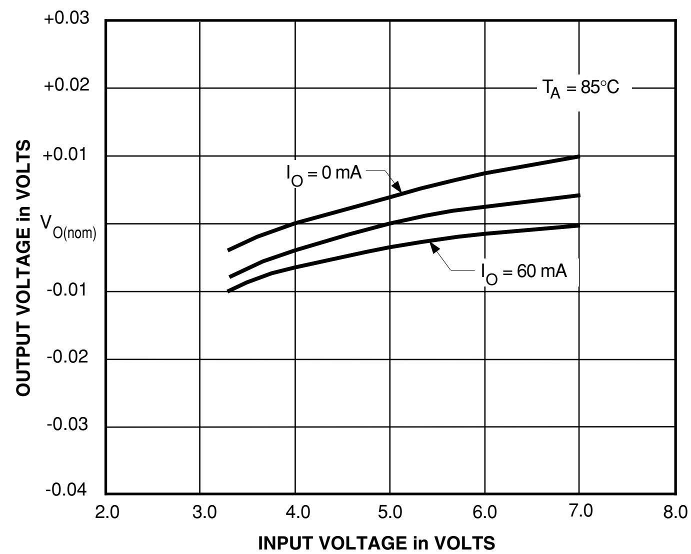
TYPICAL CHARACTERISTICS (cont'd)

LOAD REGULATION



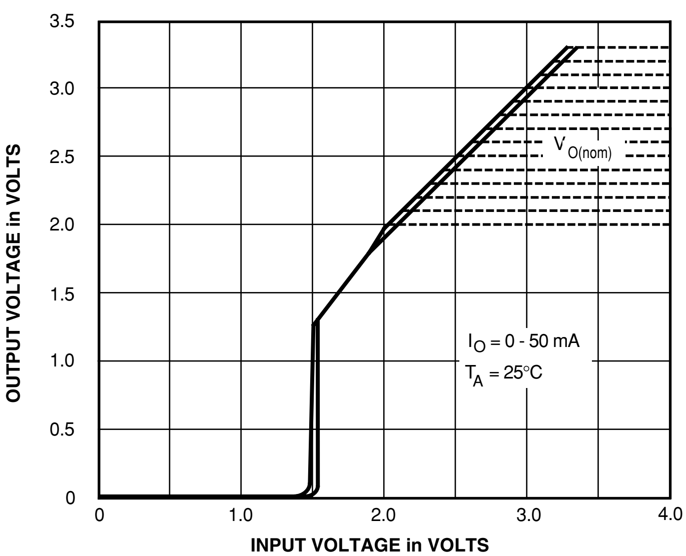
Dwg. GP-052-15

LINE REGULATION

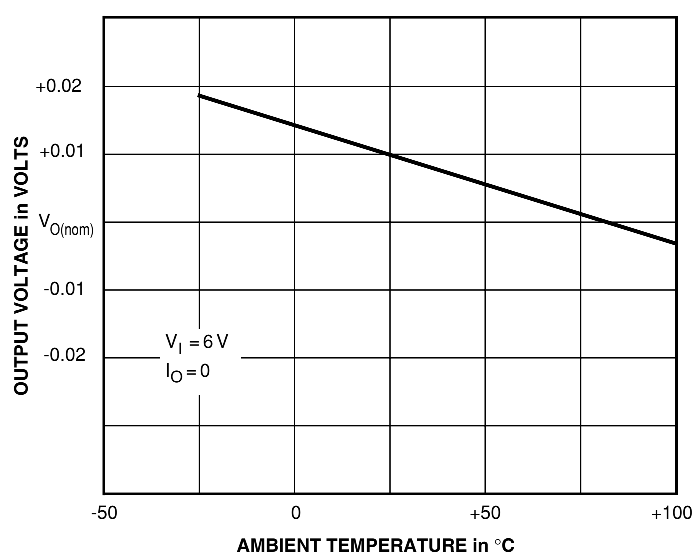


Dwg. GP-053-16

OUTPUT VOLTAGE



Dwg. GP-059-3

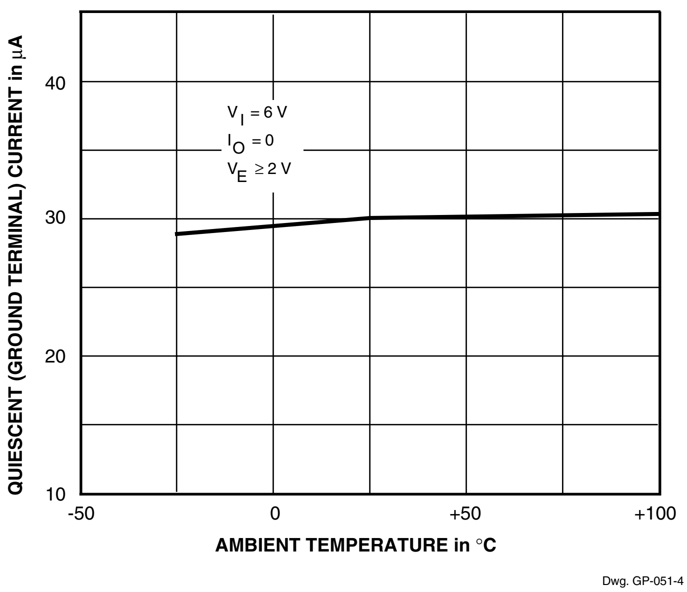


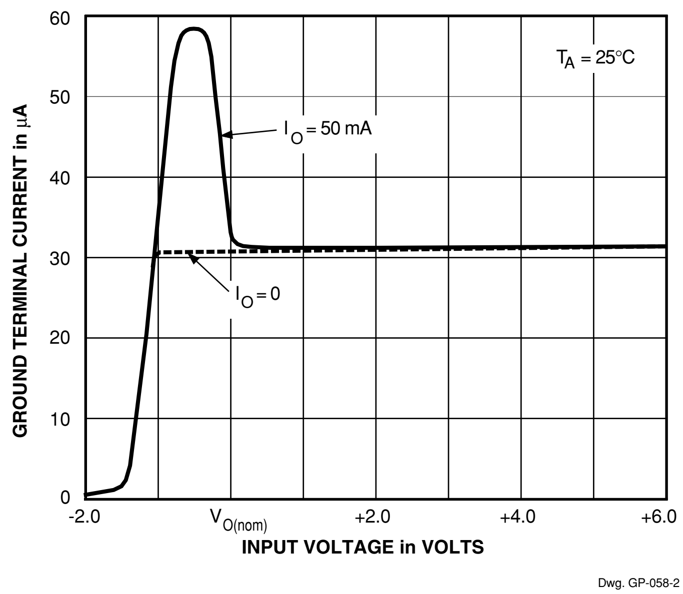
Dwg. GP-050-4

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

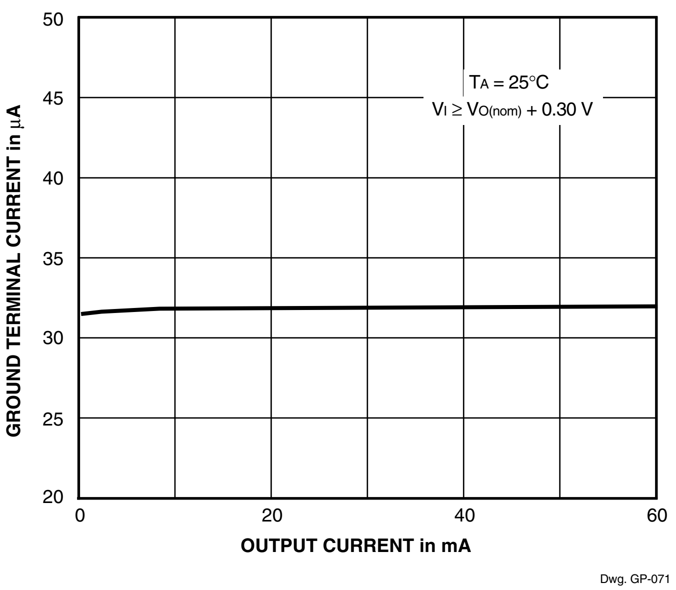
TYPICAL CHARACTERISTICS (cont'd)

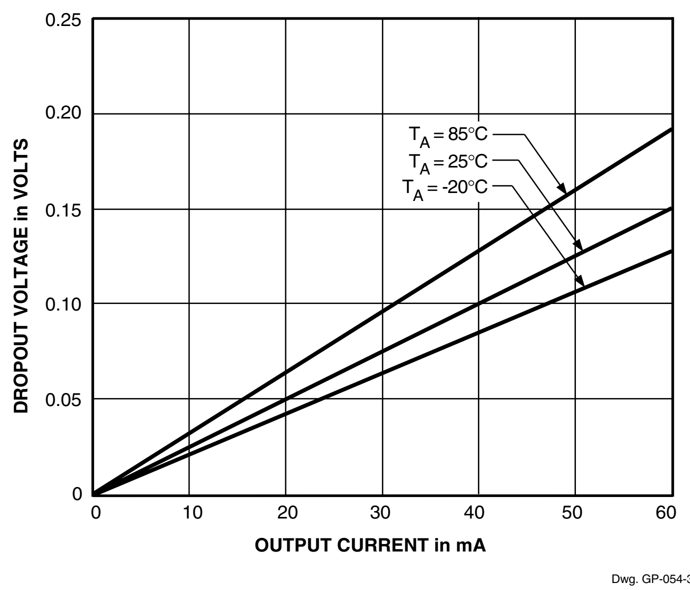
GROUND TERMINAL/QUIESCENT CURRENT





DROPOUT VOLTAGE



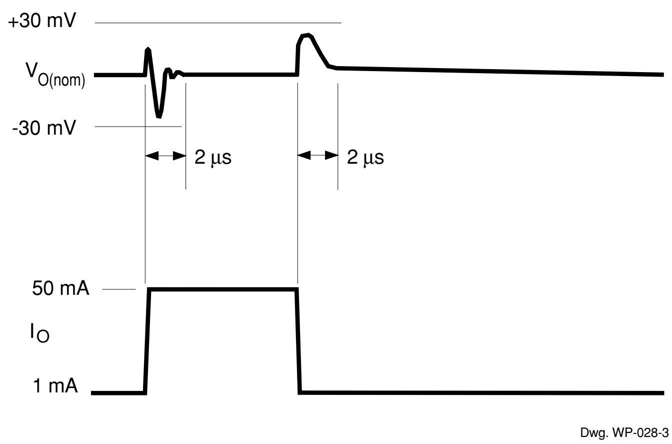


CAUTION: Maximum allowable duty cycle will be significantly less than 100% at high temperatures, at high input voltages, or at high output currents. See appropriate Maximum Allowable Output Current table.

TYPICAL CHARACTERISTICS (concluded)

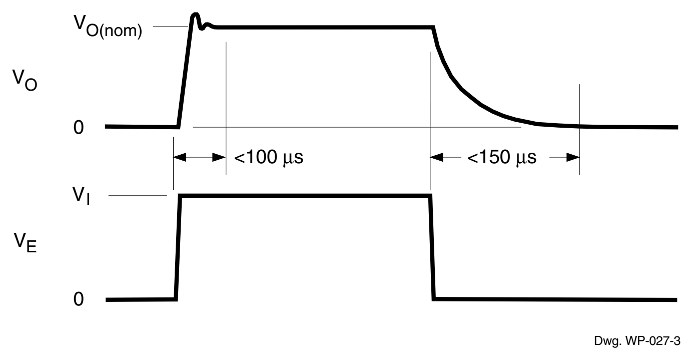
LOAD TRANSIENT PERFORMANCE

V_I = 3.2 V to 6.2 V, C_O = 4.7 µF, T_A = 25°C



ENABLE TRANSIENT PERFORMANCE

V_I = 3.2 V to 6.2 V, C_O = 1 µF, T_A = 25°C



APPLICATIONS INFORMATION

Linear regulators require input and output capacitors in order to maintain over-all loop stability. The recommended minimum value for the input capacitor is 0.1 µF. The output capacitor is the dominant pole that provides the high-frequency compensation required for over-all regulator loop stability. These devices are stable with as little as 1 µF. However, to ensure stable operation under all conditions and capacitor types, the recommended minimum value is 4.7 µF. The output capacitor may be partially distributed through the load circuits. However, at least 1 µF should be connected at the regulator using the shortest and widest foil pattern possible.

Thermal Considerations

These devices are intended to provide up to 100 mA of load current in a very small package. The table on page 2 of this data sheet gives the maximum allowable average output current for a worst-case printed circuit design ($R_{\theta JA}$ = 220°C/W with a minimum footprint). Performance improvement is easily accomplished with the addition of 1 square inch of copper at terminal 2 ($R_{\theta JA}$ = 170°C/W).

The products described here are manufactured under one or more U.S. patents or U.S. patents pending.

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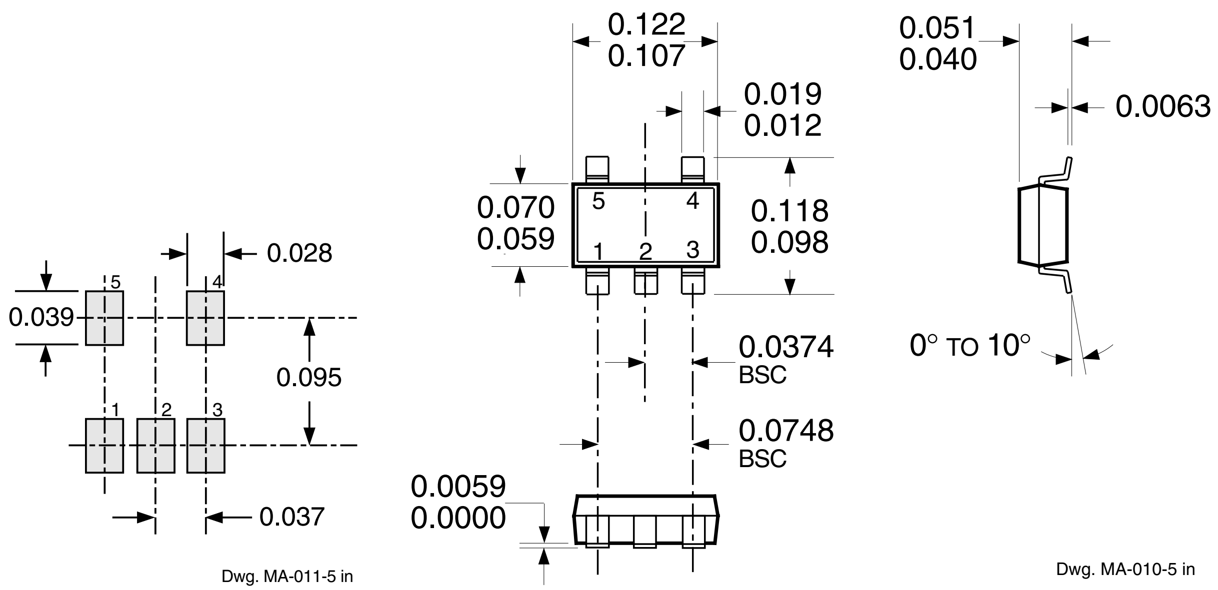
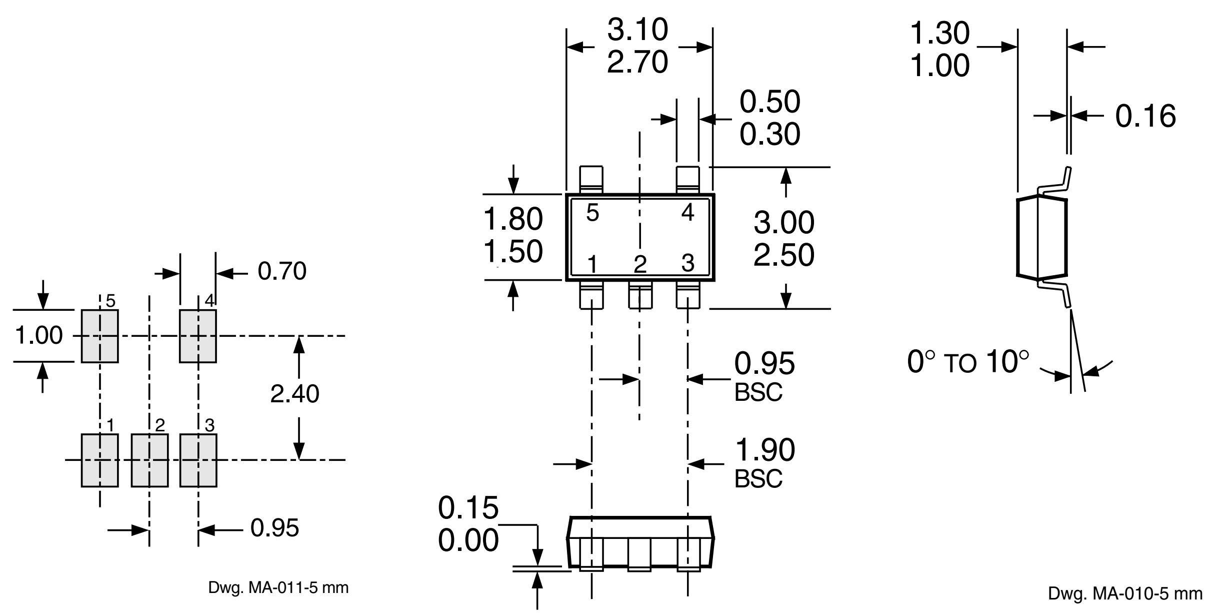
Dimensions in Inches
(for reference only)



Dimensions in Millimeters
(controlling dimensions)



NOTE: Exact body and lead configuration at vendor’s option within limits shown.

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