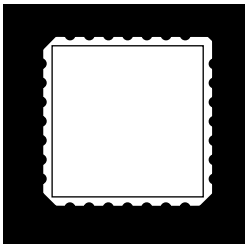
SURFACE MOUNT 0.5 VOLT LOW DROPOUT POSITIVE REGULATOR



Isolated Hermetic Surface Mount Package
Three Terminal, Fixed Voltage, 1 Amp Low Dropout Voltage Regulator

FEATURES

- Similar To Industry Standard LM2940
- Dropout Voltage Typically 0.5V @ I_O = 1A
- Output Current Up To 1A
- Reverse Battery Protection
- Internal Short Circuit Protection
- Isolated Hermetic Surface Mount Package

DESCRIPTION

These three terminal fixed voltage regulators are designed to provide 1.0A with high efficiency. It has the ability to source 1A of output current with a typical dropout voltage of .5V and a maximum of 1V over the entire temperature range. It is supplied in a hermetic surface mount package and is ideally suited for Military applications where small size and high reliability are required.

ABSOLUTE MAXIMUM RATINGS @ 25°C

Input Voltage . . . . . 26 Vdc
Output Voltage . . . . . +5V, +12V, +15 Vdc
Operating Junction Temperature Range . . . . . - 55°C to + 125°C
Storage Temperature Range . . . . . - 65°C to + 150°C
Lead Temperature (Soldering 10 Seconds) . . . . . 300°C
Thermal Resistance:
θ_{JC} (Isolated) . . . . . 15°C/W
Maximum Output Current 1.0A

ELECTRICAL CHARACTERISTICS, P/N OM2940-5SM (5 Volts)

-55°C ≤ T_A ≤ 125°C, V_{IN} = 10 V, I_O = 1 A, C_{OUT} = 22 µF (unless otherwise specified).

Parameter	Symbol	Test Conditions	Notes	Min.	Max.	Unit
Output Voltage	V_{OUT}	V_{IN} = 10 V, I_{OUT} = 5 mA	1	4.85	5.15	V
			2	4.75	5.25	
		V_{IN} = 6 V, I_{OUT} = 5 mA	1	4.85	5.15	
			2	4.75	5.25	
		V_{IN} = 7 V, I_{OUT} = 5 mA	1	4.85	5.15	
			2	4.75	5.25	
		V_{IN} = 26 V, I_{OUT} = 5 mA	1	4.85	5.15	
			2	4.75	5.25	
		V_{IN} = 10 V, I_{OUT} = 1 A	1	4.85	5.15	
			2	4.75	5.25	
		V_{IN} = 6 V, I_{OUT} = 1 A	1	4.85	5.15	
			2	4.75	5.25	
		V_{IN} = 6 V, I_{OUT} = 50 mA	1	4.85	5.15	
			2	4.75	5.25	
		V_{IN} = 10 V, I_{OUT} = 50 mA	1	4.85	5.15	
			2	4.75	5.25	
Maximum Line Transient	V_{LT}	V_O ≤ 6 V, R_O = 100 Ω, t = 20 ms	1, 2	40		V
Reverse Polarity Input Voltage DC	V_{RIN}	R_O = 100 Ω	1, 2	-15		V
Reverse Polarity Input Voltage Transient	V_{RIT}	R_O = 100 Ω, t =20 ms	1, 2	-45		V
Quiescent Current	I_Q	V_{IN} = 10 V, I_{OUT} = 5 mA	1		20	mA
			2		30	
		V_{IN} = 7 V, I_{OUT} = 5 mA	1		20	
			2		30	
		V_{IN} = 26 V, I_{OUT} = 5 mA	1		20	
			2		30	
		V_{IN} = 10 V, I_{OUT} = 1 A	1		70	
			2		120	
Line Regulation	V_{RLN}	7 V ≤ V_{IN} ≤ 26 V, I_{OUT} = 5 mA	1		±55	mV
			2		±80	
Load Regulation	V_{RLD}	V_{IN} = 10 V, 50 mA ≤ I_{OUT} ≤ 1 A	1		±65	mV
			2		±120	
Dropout Voltage	V_{DO}	I_{OUT} = 1 A	1		.7	V
			2		1	
		I_{OUT} = 100 mA	1		150	mV
			2		200	
Output Noise Voltage	V_{ON}	V_{IN} = 10 V, I_O = 5 mA, 10 Hz - 100 Hz	1, 2		700	µV rms
Output Impedance	R_O	V_{IN} = 10 V, I_{OUT} = 100 mA dc and 20 mA ac, f_O = 120 Hz	1, 2		1	Ω
Short Circuit Current	I_{OS}	V_{IN} = 10 V	1	1.2		A
			2	1.0		
Ripple Rejection	R_R	V_{IN} = 10 V + 1 V rms, I_{OUT} = 5 mA, f = 1 kHz	1	60		dB
			2	50		

Notes: 1. T_A = 25°C.
2. Over full operating temperature range.

ELECTRICAL CHARACTERISTICS, P/N OM2940-12SM (12 Volts)

-55°C ≤ T_A ≤ 125°C, V_{IN} = 17 V, I_O = 1 A, C_{OUT} = 22 µF (unless otherwise specified).

Parameter	Symbol	Test Conditions	Notes	Min.	Max.	Unit
Output Voltage	V_{OUT}	V_{IN} = 17 V, I_{OUT} = 5 mA	1	11.64	12.36	V
			2	11.40	12.60	
		V_{IN} = 13.6 V, I_{OUT} = 5 mA	1	11.64	12.36	
			2	11.40	12.60	
		V_{IN} = 14 V, I_{OUT} = 5 mA	1	11.64	12.36	
			2	11.40	12.60	
		V_{IN} = 26 V, I_{OUT} = 5 mA	1	11.64	12.36	
			2	11.40	12.60	
		V_{IN} = 17 V, I_{OUT} = 1 A	1	11.64	12.36	
			2	11.40	12.60	
		V_{IN} = 13.6 V, I_{OUT} = 1 A	1	11.64	12.36	
			2	11.40	12.60	
		V_{IN} = 13.6 V, I_{OUT} = 50 mA	1	11.64	12.36	
			2	11.40	12.60	
		V_{IN} = 17 V, I_{OUT} = 50 mA	1	11.64	12.36	
			2	11.40	12.60	
Maximum Line Transient	V_{LT}	V_O ≤ 13 V, R_O = 100 Ω, t = 20 ms	1, 2	40		V
Reverse Polarity Input Voltage DC	V_{RIN}	R_O = 100 Ω	1, 2	-15		V
Reverse Polarity Input Voltage Transient	V_{RIT}	R_O = 100 Ω, t =20 ms	1, 2	-45		V
Quiescent Current	I_Q	V_{IN} = 17 V, I_{OUT} = 5 mA	1		20	mA
			2		30	
		V_{IN} = 14 V, I_{OUT} = 5 mA	1		20	
			2		30	
		V_{IN} = 26 V, I_{OUT} = 5 mA	1		20	
			2		30	
		V_{IN} = 17 V, I_{OUT} = 1 A	1		70	
			2		120	
Line Regulation	V_{RLN}	14 V ≤ V_{IN} ≤ 26 V, I_{OUT} = 5 mA	1		±110	mV
			2		±180	
Load Regulation	V_{RLD}	V_{IN} = 17 V, 50 mA ≤ I_{OUT} ≤ 1 A	1		±160	mV
			2		±220	
Dropout Voltage	V_{DO}	I_{OUT} = 1 A	1		.7	V
			2		1	
		I_{OUT} = 100 mA	1		150	mV
			2		200	
Output Noise Voltage	V_{ON}	V_{IN} = 17 V, I_O = 5 mA, 10 Hz - 100 Hz	1		1000	µV rms
Output Impedance	R_O	V_{IN} = 17 V, I_{OUT} = 100 mA dc and 20 mA ac, f_O = 120 Hz	1, 2		1	Ω
Short Circuit Current	I_{OS}	V_{IN} = 17 V	1	1.2		A
			2	1.0		
Ripple Rejection	R_R	V_{IN} = 17 V + 1 V rms, I_{OUT} = 5 mA, f = 1 kHz	1	52		dB
			2	46		

Notes: 1. T_A = 25°C.
2. Over full operating temperature range.

ELECTRICAL CHARACTERISTICS, P/N OM2940-15SM (15 Volts)

-55°C ≤ T_A ≤ 125°C, V_{IN} = 20 V, I_O = 1 A, C_{OUT} = 22 µF (unless otherwise specified).

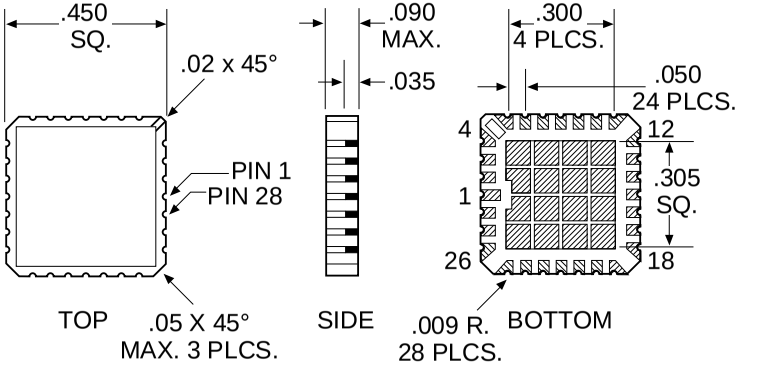
Parameter	Symbol	Test Conditions	Notes	Min.	Max.	Unit
Output Voltage	V_{OUT}	V_{IN} = 20 V, I_{OUT} = 5 mA	1	14.55	15.45	V
			2	14.25	15.75	
		V_{IN} = 16.75 V, I_{OUT} = 5 mA	1	14.55	15.45	
			2	14.25	15.75	
		V_{IN} = 17 V, I_{OUT} = 5 mA	1	14.55	15.45	
			2	14.25	15.75	
		V_{IN} = 26 V, I_{OUT} = 5 mA	1	14.55	15.45	
			2	14.25	15.75	
		V_{IN} = 20 V, I_{OUT} = 1 A	1	14.55	15.45	
			2	14.25	15.75	
		V_{IN} = 16.75 V, I_{OUT} = 1 A	1	14.55	15.45	
			2	14.25	15.75	
		V_{IN} = 16.75 V, I_{OUT} = 50 mA	1	14.55	15.45	
			2	14.25	15.75	
		V_{IN} = 20 V, I_{OUT} = 50 mA	1	14.55	15.45	
			2	14.25	15.75	
Maximum Line Transient	V_{LT}	V_O ≤ 16 V, R_O = 100 Ω, t = 20 ms	1, 2	40		V
Reverse Polarity Input Voltage DC	V_{RIN}	R_O = 100 Ω	1, 2	-15		V
Reverse Polarity Input Voltage Transient	V_{RIT}	R_O = 100 Ω, t =20 ms	1, 2	-45		V
Quiescent Current	I_Q	V_{IN} = 20 V, I_{OUT} = 5 mA	1		20	mA
			2		30	
		V_{IN} = 17 V, I_{OUT} = 5 mA	1		20	
			2		30	
		V_{IN} = 26 V, I_{OUT} = 5 mA	1		20	
			2		30	
		V_{IN} = 20 V, I_{OUT} = 1 A	1		70	
			2		120	
Line Regulation	V_{RLN}	17 V ≤ V_{IN} ≤ 26 V, I_{OUT} = 5 mA	1		±125	mV
			2		±350	
Load Regulation	V_{RLD}	V_{IN} = 20 V, 50 mA ≤ I_{OUT} ≤ 1 A	1		±200	mV
			2		±400	
Dropout Voltage	V_{DO}	I_{OUT} = 1 A	1		.7	V
			2		1	
		I_{OUT} = 100 mA	1		150	mV
			2		200	
Output Noise Voltage	V_{ON}	V_{IN} = 20 V, I_O = 5 mA, 10 Hz - 100 Hz	1		1000	µV rms
Output Impedance	R_O	V_{IN} = 20 V, I_{OUT} = 100 mA ac and 20 mA dc, f_O = 120 Hz	1, 2		1	Ω
Short Circuit Current	I_{OS}	V_{IN} = 20 V	1	1.2		A
			2	1.0		
Ripple Rejection	R_R	V_{IN} = 20 V + 1 V rms, I_{OUT} = 5 mA, f = 1 kHz	1	48		dB
			2	42		

Notes: 1. T_A = 25°C.
2. Over full operating temperature range.

PIN CONNECTION

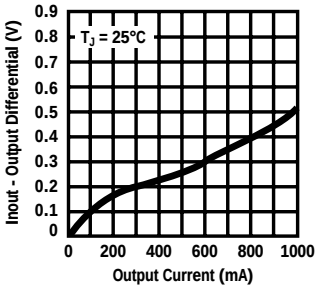
Pin 1, 15 thru 28: IN
Pin 2, 3, 13, and 14: GND
Pin 4 thru 12: OUT

MECHANICAL OUTLINE

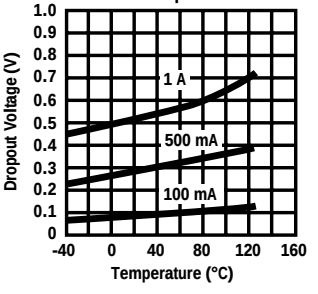


TYPICAL APPLICATIONS

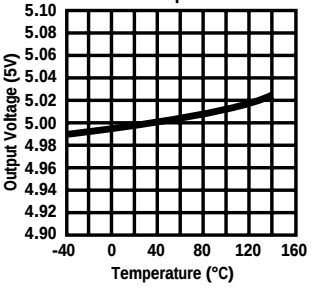
Dropout Voltage



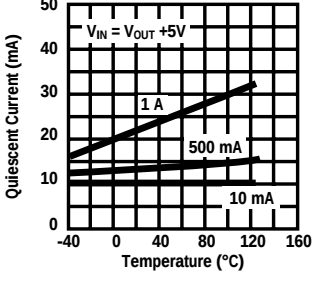
Dropout Voltage vs Temperature



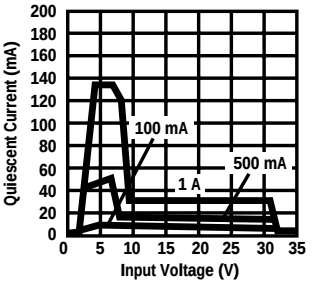
Output Voltage vs Temperature



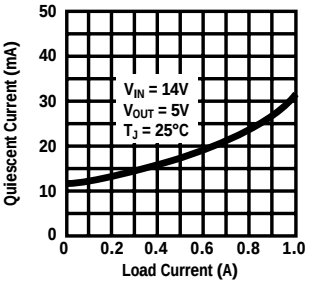
Quiescent Current vs Temperature



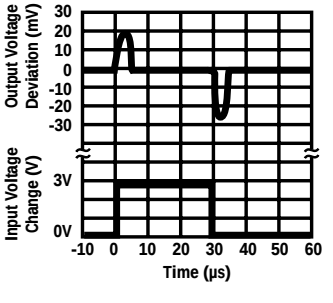
Quiescent Current



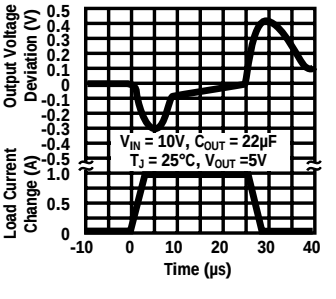
Quiescent Current



Line Transient Response



Load Transient Response



Ripple Rejection