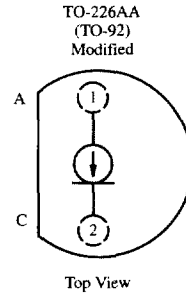


**Current Regulator Diodes**

**J500 J503 J506 J509  
J501 J504 J507 J510  
J502 J505 J508 J511**

**Product Summary**

Part Number	Typ I <sub>F</sub> (mA)	P <sub>OV</sub> (V)	Part Number	Typ I <sub>F</sub> (mA)	P <sub>OV</sub> (V)
J500	0.24	50	J506	1.40	50
J501	0.33	50	J507	1.80	50
J502	0.43	50	J508	2.40	50
J503	0.56	50	J509	3.00	50
J504	0.75	50	J510	3.60	50
J505	1.00	50	J511	4.70	50



**Current Regulators**

**Features**

- Two-Lead Plastic Package
- Guaranteed ±20% Tolerance
- Operation from 1 V (J500–J503) to 50 V
- Excellent Temperature Stability

**Benefits**

- Simple Series Circuitry, No Separate Voltage Source
- Tight Guaranteed Circuit Performance
- Excellent Performance in Low-Voltage/Battery Circuits and High-Voltage Spike Protection
- High Circuit Stability vs. Temperature

**Applications**

- Constant-Current Supply
- Current-Limiting
- Timing Circuits

**Description**

The J500 series is a family of ±20% range current regulators designed for demanding applications in test equipment and instrumentation. These devices utilize the JFET techniques to produce a single two-leaded device which is extremely simple to operate.

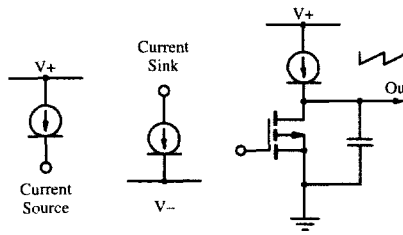
With nominal current ranges from 0.24 mA to 4.7 mA, the J500 series will meet a wide array of design requirements.

The low-cost TO-226A package ensures a cost-effective design solution.

**Schematic Diagram**



**Applications**



Updates to this data sheet may be obtained via facsimile by calling Siliconix FaxBack, 1-408-970-5600. Please request FaxBack document #70196. Applications information may also be obtained via FaxBack, request document #70596.

## Absolute Maximum Ratings

Peak Operating Voltage	50 V	Power Dissipation <sup>a</sup>	350 mW
Reverse Current	50 mA	Notes:	
Storage Temperature	-55 to 150°C	a. Derate 2.8 mW/°C above 25°C	

## Specifications<sup>a</sup>

Parameter	Symbol	Test Conditions	Limits			Unit
			Min	Typ <sup>b</sup>	Max	
Peak Operating Voltage	$P_{OV}$	$I_F = 1.1 I_{F(max)}^c$	50	95		V
Reverse Voltage	$V_R$	$I_R = 1 \text{ mA}$		0.8		
Capacitance	$C_F$	$V_F = 25 \text{ V}, f = 1 \text{ MHz}$		2.2		pF

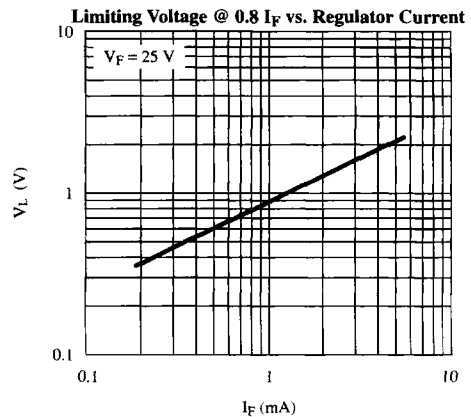
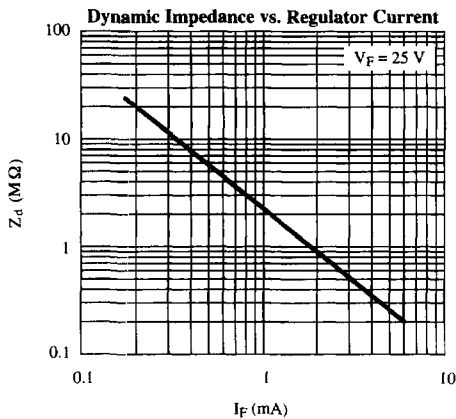
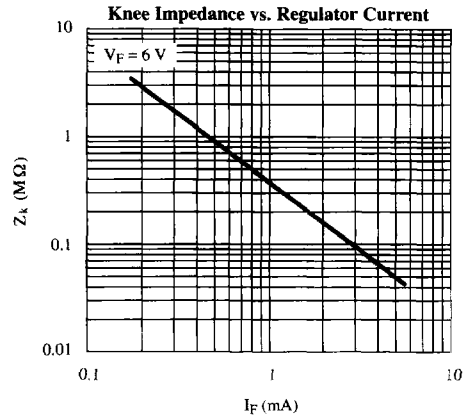
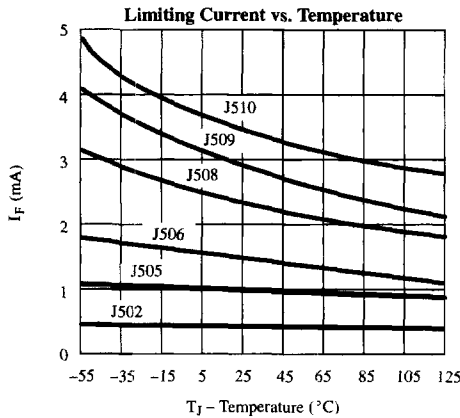
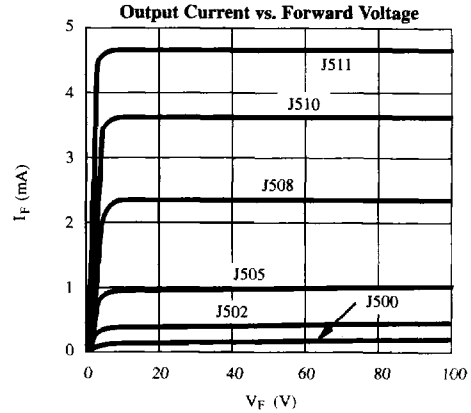
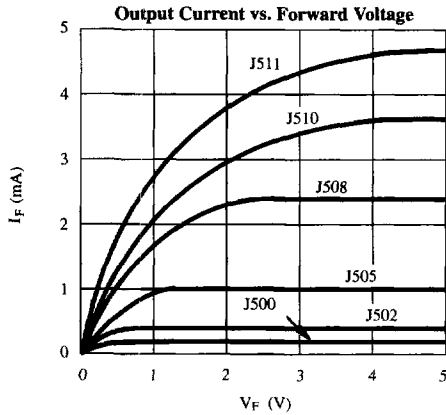
Part Number	Regulator Current <sup>d</sup> ( $I_F$ )			Dynamic Impedance <sup>e</sup> ( $Z_d$ )		Knee Impedance ( $Z_k$ )	Limiting Voltage <sup>f</sup> ( $V_L$ )		Temperature Coefficient ( $\theta_T$ )
	$V_F = 25 \text{ V}$			$V_F = 25 \text{ V}$		$V_F = 6 \text{ V}$	$I_F = 0.8 I_{F(min)}$		$V_F = 25 \text{ V}$ $0^\circ\text{C} \leq T_A \leq 100^\circ\text{C}$
	Min	Nom	Max	Min	Typ <sup>b</sup>	Typ <sup>b</sup>	Max	Typ <sup>b</sup>	Typ <sup>b</sup>
J500	0.192	0.24	0.288	4.00	15	2.50	1.2	0.4	1300
J501	0.264	0.33	0.396	2.20	10	1.60	1.3	0.5	600
J502	0.344	0.43	0.516	1.50	7	1.10	1.5	0.6	0
J503	0.448	0.56	0.672	1.20	5	0.80	1.7	0.7	-400
J504	0.600	0.75	0.900	0.80	3.5	0.55	1.9	0.8	-1000
J505	0.800	1.00	1.200	0.50	2	0.40	2.1	0.9	-1300
J506	1.120	1.40	1.680	0.33	1.5	0.25	2.5	1.1	-1900
J507	1.440	1.80	2.160	0.20	1	0.19	2.8	1.3	-2200
J508	1.900	2.40	2.900	0.20	0.7	0.13	3.1	1.5	-2600
J509	2.400	3.00	3.600	0.15	0.5	0.09	3.5	1.7	-2800
J510	2.900	3.60	4.300	0.15	0.4	0.07	3.9	1.9	-3000
J511	3.800	4.70	5.600	0.12	0.3	0.05	4.2	2.1	-3000

Notes:

- $T_A = 25^\circ\text{C}$  unless otherwise noted.
- Typical values are for DESIGN AID ONLY, not guaranteed nor subject to production testing.
- Max  $V_F$  where  $I_F = 1.1 I_{F(max)}$  is guaranteed.
- Pulse test—steady state currents may vary.
- Pulse test—steady state impedances may vary.
- Min  $V_F$  required to insure  $I_F = 0.8 I_{F(min)}$ .

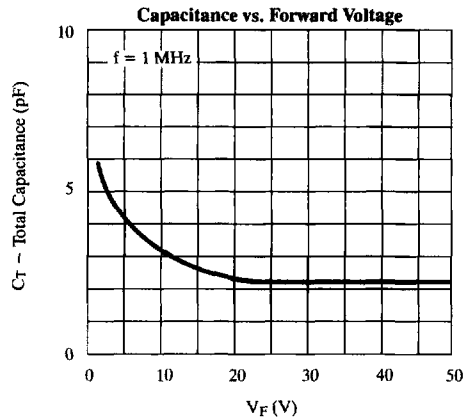
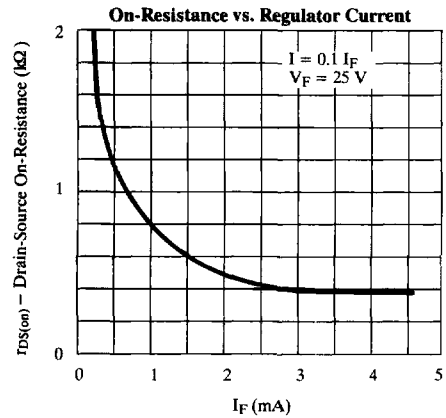
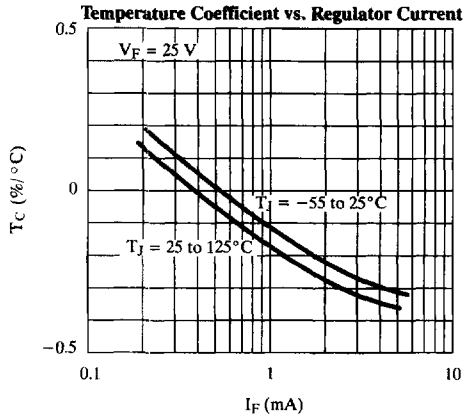
NCL

**Typical Characteristics**



Current Regulators

## Typical Characteristics (Cont'd)



## Current Regulator Diode V-I Characteristic

