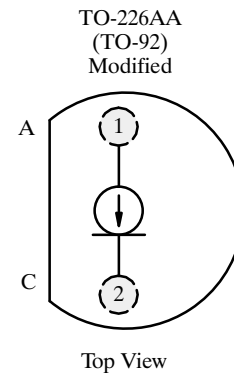


## Current Regulator Diodes

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

### Product Summary

Part Number	Typ $I_F$ (mA)	$P_{OV}$ (V)	Part Number	Typ $I_F$ (mA)	$P_{OV}$ (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



For applications information see AN103.

### Features

- Two-Lead Plastic Package
- Guaranteed  $\pm 20\%$  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

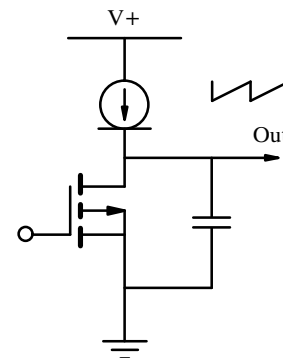
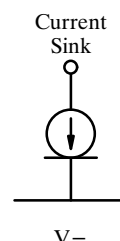
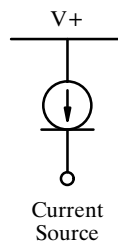
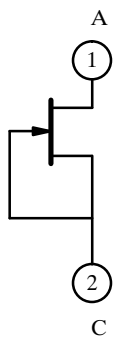
### Description

The J500 series is a family of  $\pm 20\%$  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



Linear Ramp Generator

# J500 Series

## Absolute Maximum Ratings

Peak Operating Voltage ..... 50 V  
 Reverse Current ..... 50 mA  
 Storage Temperature ..... -55 to 150°C

Power Dissipation<sup>a</sup> ..... 350 mW

Notes:

a. Derate 2.8 mW/°C above 25°C

## Specifications<sup>a</sup>

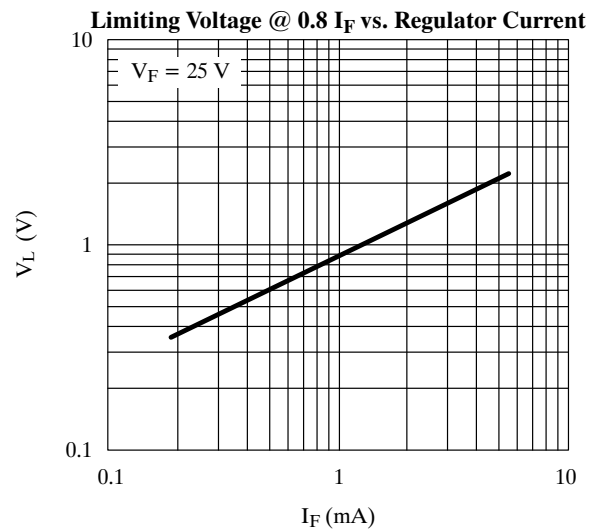
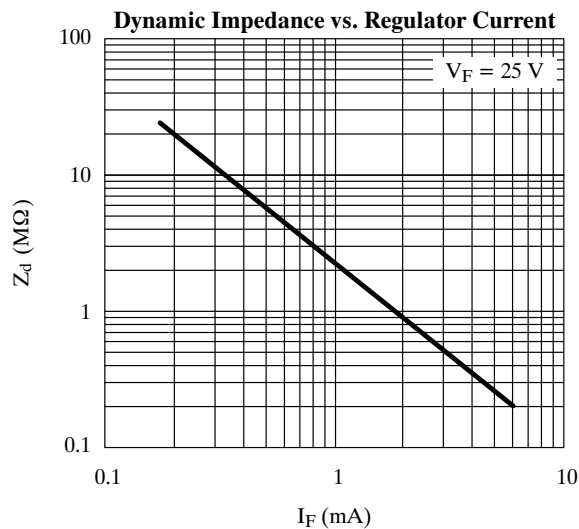
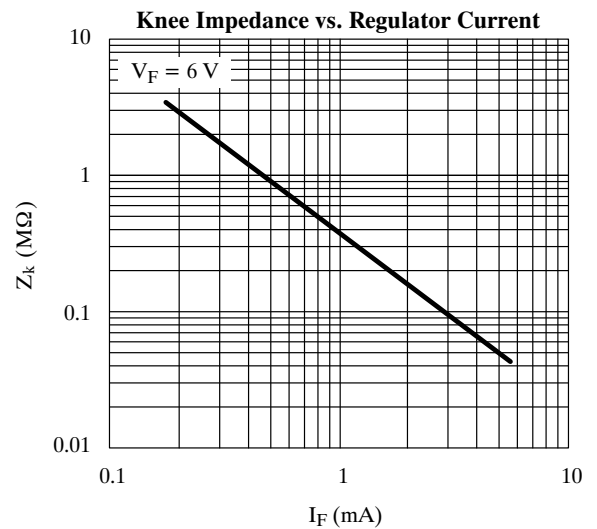
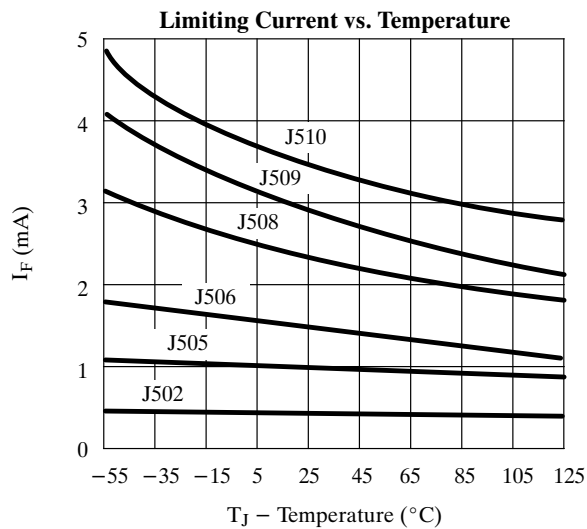
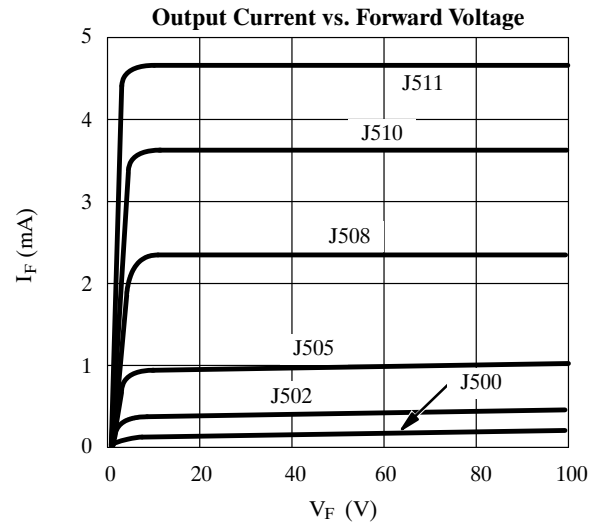
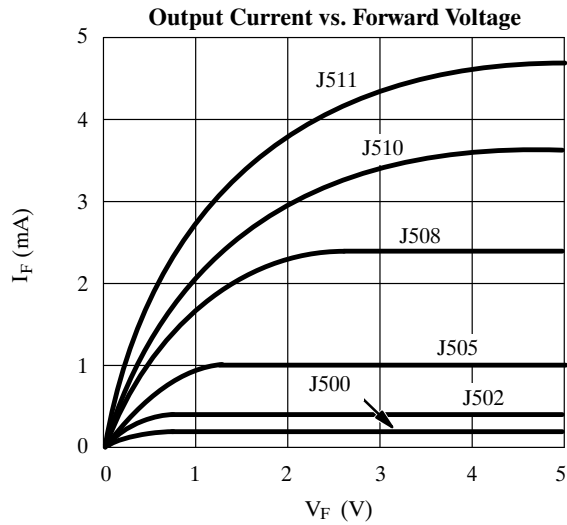
Parameter	Symbol	Test Conditions	Limits			Unit
			Min	Typ <sup>b</sup>	Max	
Peak Operating Voltage	P <sub>OV</sub>	I <sub>F</sub> = 1.1 I <sub>F(max)</sub> <sup>c</sup>	50	95		V
Reverse Voltage	V <sub>R</sub>	I <sub>R</sub> = 1 mA		0.8		
Capacitance	C <sub>F</sub>	V <sub>F</sub> = 25 V, f = 1 MHz		2.2		pF

Part Number	Regulator Current <sup>d</sup> (I <sub>F</sub> )			Dynamic Impedance <sup>e</sup> (Z <sub>d</sub> )		Knee Impedance <sup>e</sup> (Z <sub>k</sub> )	Limiting Voltage <sup>f</sup> (V <sub>L</sub> )		Temperature Coefficient (θ <sub>I</sub> )
	Min	Nom	Max	Min	Typ <sup>b</sup>	Typ <sup>b</sup>	Max	Typ <sup>b</sup>	ppm/°C
	V <sub>F</sub> = 25 V			V <sub>F</sub> = 25 V		V <sub>F</sub> = 6 V	I <sub>F</sub> = 0.8 I <sub>F(min)</sub>		V <sub>F</sub> = 25 V 0°C ≤ T <sub>A</sub> ≤ 100°C
	mA			MΩ		MΩ	V		ppm/°C
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:

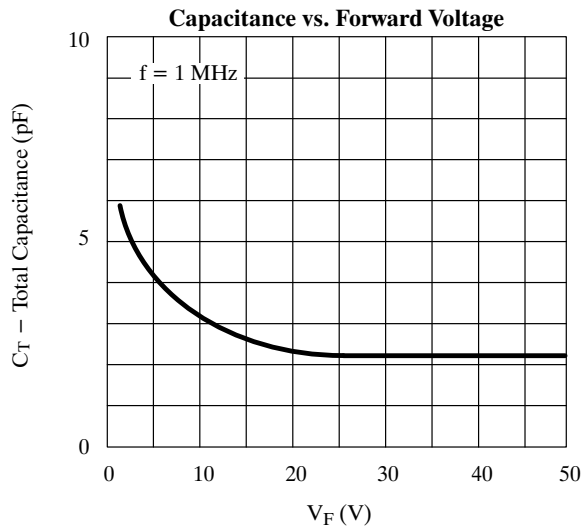
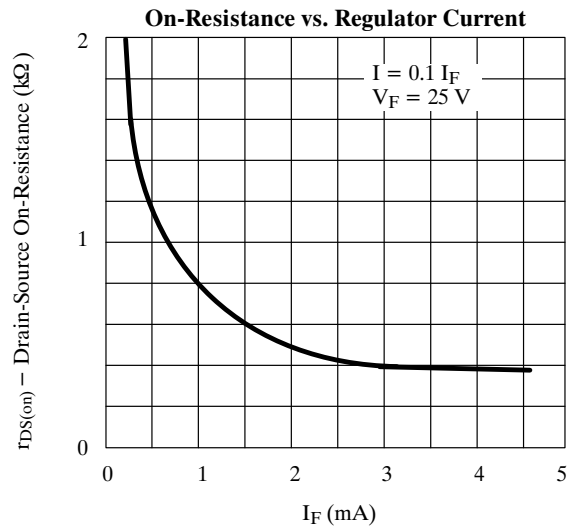
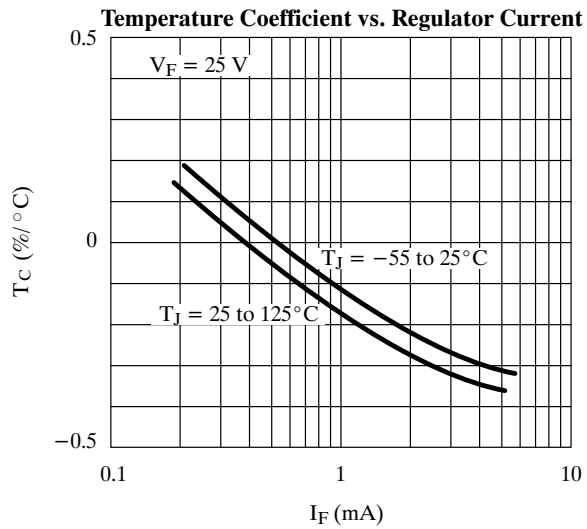
- T<sub>A</sub> = 25°C unless otherwise noted.
- Typical values are for DESIGN AID ONLY, not guaranteed nor subject to production testing.
- Max V<sub>F</sub> where I<sub>F</sub> = 1.1 I<sub>F(max)</sub> is guaranteed.
- Pulse test—steady state currents may vary.
- Pulse test—steady state impedances may vary.
- Min V<sub>F</sub> required to insure I<sub>F</sub> = 0.8 I<sub>F(min)</sub>.

## Typical Characteristics



## J500 Series

### Typical Characteristics (Cont'd)



### Current Regulator Diode V-I Characteristic

