

# CR022 SERIES

## Current Regulator Diodes

The CR022 Series is a family of precision current regulators designed for demanding applications in test equipment and instrumentation. These devices combine the proven performance of a JFET with an integrated resistor to produce a single two-lead device which is extremely simple to operate. With nominal current ranges from 0.22 mA to 5.30 mA, the CR022 Series will meet a wide array of design requirements. In addition to its two-lead construction, this series features 10% current ranges, improved current control over wide temperature ranges, and simple "floating" operation as no power supplies are required for biasing. Finally, its TO-18 hermetically sealed package is available with military processing per MIL-S-19500. (See Section 1.)

PART	I <sub>F</sub> (mA)	PART	I <sub>F</sub> (mA)	PART	I <sub>F</sub> (mA)
CR022	0.22	CR075	0.75	CR200	2.00
CR024	0.24	CR082	0.82	CR220	2.20
CR027	0.27	CR091	0.91	CR240	2.40
CR030	0.30	CR100	1.00	CR270	2.70
CR033	0.33	CR110	1.10	CR300	3.00
CR039	0.39	CR120	1.20	CR330	3.30
CR043	0.43	CR130	1.30	CR360	3.60
CR047	0.47	CR140	1.40	CR390	3.90
CR056	0.56	CR150	1.50	CR430	4.30
CR062	0.62	CR160	1.60	CR470	4.70
CR068	0.68	CR180	1.80	CR530	5.30

For additional design information please see typical performance curves (Section 7) as follows:

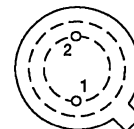
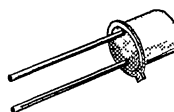
CR022 - CR062 .... NKL  
 CR068 - CR150 .... NKM  
 CR160 - CR530 .... NKO

### SIMILAR PRODUCTS

- TO-92, See J500 Series
- 20% Ranges, See CRR0240 Series
- Chips, Order CRXXXCHP

TO-18 2 LEADS

BOTTOM VIEW



1 ANODE  
 2 CATHODE

### ABSOLUTE MAXIMUM RATINGS (T<sub>A</sub> = 25 °C unless otherwise noted)

PARAMETERS/TEST CONDITIONS	SYMBOL	LIMIT	UNITS
Peak Operating Voltage	P <sub>OV</sub>	100	V
Reverse Current	I <sub>R</sub>	50	mA
Thermal Resistance	R <sub>thJC</sub>	100	°C/W
Power Dissipation at T <sub>C</sub> = 25°C	P <sub>D</sub>	1.25	W
Operating Junction Temperature	T <sub>J</sub>	-55 to 150	°C
Storage Temperature	T <sub>stg</sub>	-55 to 200	

**ELECTRICAL CHARACTERISTICS ( $T_A = 25^\circ\text{C}$  unless otherwise noted)**

SYMBOL	$I_F$			$Z_d$		$Z_k$		$V_L$		POV		$C_F$	$\theta_1$			
PARAMETER	REGULATOR CURRENT			DYNAMIC IMPEDANCE		KNEE IMPEDANCE		LIMITING VOLTAGE		PEAK OPERATING VOLTAGE		CAPACITANCE	TEMPERATURE COEFFICIENT			
TEST CONDITIONS	$V_F = 25\text{ V}$ (Note 1)			$V_F = 25\text{ V}$ (Note 2)		$V_F = 6\text{ V}$		$I_F = 0.8 I_{F(MIN)}$ (Note 3)		$I_F = 1.1 I_{F(MAX)}$ (Note 4)		$V_F = 25\text{ V}$ $f = 1\text{ MHz}$	$V_F = 25\text{ V}$ $0^\circ\text{C} \leq T_A \leq 100^\circ\text{C}$			
UNITS	mA			M $\Omega$		M $\Omega$		V		V		pF	ppm/ $^\circ\text{C}$			
	NOM	MIN	MAX	MIN	TYP	MIN	TYP	MAX	TYP	MIN	TYP	TYP	TYP			
CR022	0.22	0.198	0.242	9.000	18.00	2.750	3.50	1.00	0.40	100 (All)	180 (All)	2.2 (All)	2200			
CR024	0.24	0.216	0.264	8.000	15.50	2.350	3.00	1.00	0.45				1800			
CR027	0.27	0.243	0.297	7.000	13.00	1.950	2.50	1.00	0.50				1450			
CR030	0.30	0.270	0.330	6.000	11.50	1.600	2.00	1.00	0.55				1100			
CR033	0.33	0.297	0.363	5.000	10.00	1.350	1.80	1.00	0.60				800			
CR039	0.39	0.351	0.429	4.100	9.00	1.000	1.50	1.05	0.65				500			
CR043	0.43	0.387	0.473	3.300	8.00	0.870	1.30	1.05	0.70				250			
CR047	0.47	0.423	0.517	2.700	7.00	0.750	1.20	1.10	0.75				0			
CR056	0.56	0.504	0.616	1.900	6.00	0.560	0.90	1.20	0.82				-200			
CR062	0.62	0.558	0.682	1.550	4.50	0.470	0.70	1.30	0.90				-600			
CR068	0.68	0.612	0.748	1.350	10.00	0.400	1.80	1.15	0.85				100 (All)	180 (All)	4.2 (All)	-350
CR075	0.75	0.675	0.825	1.150	9.00	0.335	1.60	1.20	0.90							-450
CR082	0.82	0.738	0.902	1.000	7.80	0.290	1.40	1.25	0.95	-550						
CR091	0.91	0.819	1.001	0.880	6.60	0.240	1.20	1.29	1.00	-650						
CR100	1.00	0.900	1.100	0.800	5.50	0.205	1.00	1.35	1.05	-750						
CR110	1.10	0.990	1.210	0.700	4.80	0.180	0.90	1.40	1.12	-875						
CR120	1.20	1.080	1.320	0.640	4.10	0.155	0.80	1.45	1.18	-1000						
CR130	1.30	1.170	1.430	0.580	3.50	0.135	0.80	1.50	1.25	-1100						
CR140	1.40	1.260	1.540	0.540	3.10	0.115	0.70	1.55	1.32	-1200						
CR150	1.50	1.350	1.650	0.510	2.70	0.105	0.60	1.60	1.40	-1300						
CR160	1.60	1.440	1.760	0.475	1.10	0.092	0.40	1.65	0.70	100 (All)	175 (All)	6 (All)				1000
CR180	1.80	1.620	1.980	0.420	1.00	0.074	0.34	1.75	0.75							650
CR200	2.00	1.800	2.200	0.395	0.90	0.061	0.28	1.85	0.80				300			
CR220	2.20	1.980	2.420	0.370	0.83	0.052	0.25	1.95	0.85				100			
CR240	2.40	2.160	2.640	0.345	0.76	0.044	0.22	2.00	0.90				0			
CR270	2.70	2.430	2.970	0.320	0.70	0.035	0.19	2.15	0.95				-200			
CR300	3.00	2.700	3.300	0.300	0.65	0.029	0.16	2.25	1.00				-400			
CR330	3.30	2.970	3.630	0.280	0.60	0.024	0.14	2.35	1.05				-550			
CR360	3.60	3.240	3.960	0.265	0.54	0.020	0.13	2.50	1.10				-730			
CR390	3.90	3.510	4.290	0.255	0.47	0.017	0.12	2.60	1.17				-820			
CR430	4.30	3.870	4.730	0.245	0.40	0.014	0.10	2.75	1.25				-1000			
CR470	4.70	4.230	5.170	0.235	0.35	0.012	0.09	2.90	1.32				-1125			
CR530	5.30	4.770	5.830	0.220	0.30	0.010	0.07	3.10	1.40	-1250						

- NOTES: 1. Pulse test - steady state currents may vary.  
 2. Pulse test - steady state impedances may vary.  
 3. Min  $V_F$  required to insure  $I_F > 0.8 I_{F(MIN)}$ .  
 4. Max  $V_F$  where  $I_F < 1.1 I_{F(MAX)}$  is guaranteed.