

MAXIMUM RATINGS (T_A = 25 C unless otherwise noted)

Rating		Symbol	Value	Unit
Anode–Cathode Voltage		Vak Max	120	V
Reverse Voltage		V _R	500	mV
Operating Junction and Storage Temperature Range		T _J , T _{stg}	–55 to +175	С
ESD Rating:	Human Body Model Machine Model	ESD	Class 3A (4000 V) Class C (400 V)	

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

ELECTRICAL CHARACTERISTICS ($T_A = 25$ C unless otherwise noted)

Characteristic	Symbol	Min	Тур	Max	Unit
Steady State Current @ Vak = 7.5 V (Note 1)	I _{reg(SS)}	25.5	30	34.5	mA
Voltage Overhead (Note 2)	Voverhead		1.8		V
Pulse Current @ Vak = 7.5 V (Note 3)	I _{reg(P)}	27.0	32.8	38.2	mA

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

1. $I_{reg(SS)}$ steady state is the voltage (Vak) applied for a time duration 80 sec, using 100 mm², 1 oz. Cu (or equivalent), in still air. 2. $V_{overhead} = V_{in} - V_{LEDs}$. $V_{overhead}$ is typical value for 85% $I_{reg(SS)}$. 3. $I_{reg(P)}$ non-repetitive pulse test. Pulse width t 360 µsec.



Figure 1. CCR Voltage Current Characteristic

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Total Device Dissipation (Note 4) $T_A = 25 C$ Derate above 25 C	P _D	1210 8.0	mW mW/ C
Thermal Resistance, Junction-to-Ambient (Note 4)	$R_{ hetaJA}$	124	C/W
Thermal Reference, Junction-to-Tab (Note 4)	R_{yJL}	17.5	C/W
Total Device Dissipation (Note 5) $T_A = 25 C$ Derate above 25 C	P _D	1282 8.5	mW mW/ C
Thermal Resistance, Junction-to-Ambient (Note 5)	$R_{ ext{ heta}JA}$	117	C/W
Thermal Reference, Junction-to-Tab (Note 5)	R_{yJL}	18.2	C/W
Total Device Dissipation (Note 6) T _A = 25 C Derate above 25 C	P _D	1667 11.1	mW mW/ C
Thermal Resistance, Junction-to-Ambient (Note 6)	$R_{ heta JA}$	90	C/W
Thermal Reference, Junction-to-Tab (Note 6)	$R_{\psi JL}$	16.4	C/W

Total Device Dissipation (Note 7) $T_A = 25 C$ Derate above 25 C

TYPICAL PERFORMANCE CURVES

(Minimum FR-4 @ 100 mm², 1 oz. Copper Trace, Still Air)



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Higher Current LED Strings

Two or more fixed current CCRs can be connected in parallel. The current through them is additive (Figure 11).



Figure 11.

Other Currents

The adjustable CCR can be placed in parallel with any other CCR to obtain a desired current. The adjustable CCR provides the ability to adjust the current as LED efficiency increases to obtain the same light output (Figure 12).



Figure 12.

Dimming using PWM

The dimming of an LED string can be easily achieved by placing a BJT in series with the CCR (Figure 13).



The method of pulsing the current through the LEDs is known as Pulse Width Modulation (PWM) and has become the preferred method of changing the light level. LEDs being a silicon device, turn on and off rapidly in response to the current through them being turned on and off. The switching time is in the order of 100 nanoseconds, this equates to a maximum frequency of 10 Mhz, and applications will typically operate from a 100 Hz to 100 kHz. Below 100 Hz the human eye will detect a flicker from the light emitted from the LEDs. Between 500 Hz and 20 kHz the circuit may generate audible sound. Dimming is achieved by turning the LEDs on and off for a portion of a single cycle. This on/off cycle is called the Duty cycle (D) and is expressed by the amount of time the LEDs are on (Ton) divided by the total time of an on/off cycle (Ts) (Figure 14).



The current through the LEDs is constant during the period they are turned on resulting in the light being consistent with



XXXXX = Specific Device Code A = Assembly Location

- = Year
- Y WW = Work Week
- . = Pb-Free Package

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