General Specifications

Electrical Capacity (Resistive Load)

Low Level: 100mA maximum @ 12V DC

Other Ratings

Contact Resistance: 200 milliohms maximum
Insulation Resistance: 100 megohms minimum @ 250V DC
Dielectric Strength: 1,000V AC minimum between contacts for 1 minute minimum
1,500V AC minimum between contacts & case for 1 minute minimum
Mechanical Life: 5,000,000 operations minimum;
1,000,000 operations minimum for Rectangular Switch/Cap Assembly (at center of cap)
Electrical Life: 5,000,000 operations minimum;
1,000,000 operations minimum for Rectangular Switch/Cap Assembly (at center of cap)
Nominal Operating Force: **KP01:** 1.9N maximum for Tactile & Nontactile models (at center of cap)
KP02: 1.6N maximum for Tactile, Nontactile & Tactile/Audible models (at center of cap)
Travel: **KP01:** Pretravel .122" (3.1mm); Overtravel .055" (1.4mm); Total Travel .177" (4.5mm)
KP02: Pretravel .091" (2.3mm); Overtravel .047" (1.2mm); Total Travel .138" (3.5mm)

Materials & Finishes

Plunger/Upper Housing: Polyacetal
Lower Housing: Glass fiber reinforced PBT (UL94V-0)
Movable Contact: Stainless steel with gold plating
Stationary Contacts: Gold over copper alloy
Switch Terminals: Brass with tin plating

Environmental Data

Operating Temperature Range: –25°C through +50°C (–13°F through +122°F)
Humidity: 90-95% humidity for 240 hours @ 40°C (104°F)
Vibration: 10 ~ 55Hz with peak-to-peak amplitude of 1.5mm traversing the frequency range & returning in 1 minute; 3 right angled directions for 2 hours
Shock: 51G (500m/s^2) acceleration (tested in 6 right angled directions, with 5 shocks in each direction)

Installation

Cap Installation Force: 50.0N maximum downward force on actuator

PCB Processing

Soldering: **For RGBP 4-pin:** Wave Soldering. Preheat temperature: 140°C @ 60 seconds;
Peak temperature: 270°C @ 11 seconds; Cycles: 2
Manual Soldering. 410°C @ 4 seconds; Cycles: 2
For all others: Wave Soldering. Preheat temperature: 110°C @ 40 seconds;
Peak temperature: 270°C @ 6 seconds; Cycles: 2
Manual Soldering. 390°C @ 4 seconds; Cycles: 2
Cleaning: These devices are not process sealed. Hand clean locally using alcohol based solution.

Standards & Certifications

Flammability Standards: UL94V-0 lower housing

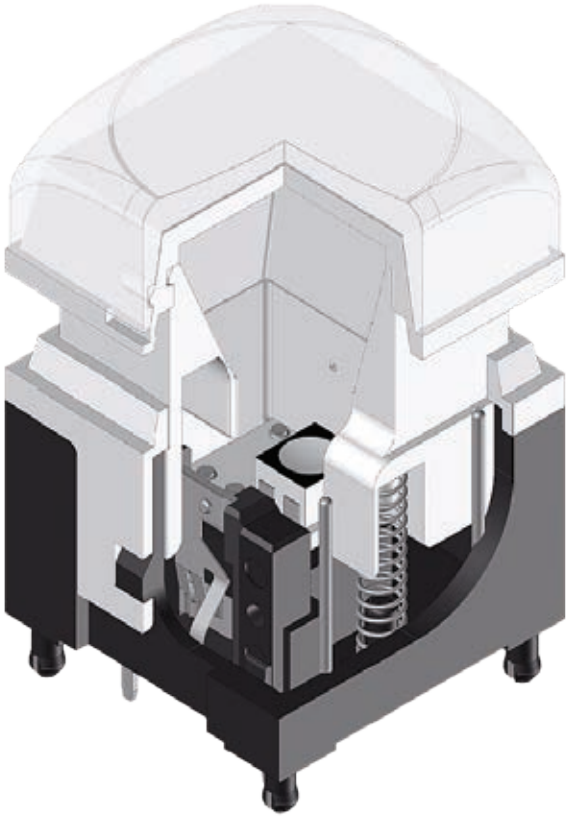
The KP Series pushbuttons have not been tested for UL recognition or CSA certification.
These switches are designed for use in a low-voltage, low-current, logic-level circuit.
When used as intended in a logic-level circuit, the results do not produce hazardous energy.

Distinctive Characteristics

KP series offers a complete switch solution for all control panel needs, including home keys and the rectangular switch/cap assembly.

Distinct, long total travel of .177" (4.5mm) for KP01 or shorter stroke of .138" (3.5mm) for KP02.

Available with super bright amber/blue bicolor LED or super bright RGB LED. The RGB LED provides vibrant full color spectrum in unlimited color combinations, and is offered in both 4-pin or 8-pin terminations.



Unique actuation guide gives positive indication of circuit transfer as well as smooth and silent operation.

Choices of tactile, nontactile or tactile/audible actuation.

Compact design with height of .906" (23.0mm) from PC board to top of cap (same height as programmable SmartDisplay).

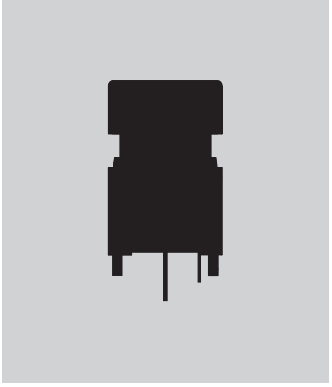
Flat, sculptured or home key square caps in three common sizes for design flexibility in various applications.

Twin contacts with gold plating assure high reliability and long life of 5,000,000 operations minimum.

Improved profile for soldering specifications (RGBP models).

Standard and custom alternating legends available.

Actual Size



TYPICAL SWITCH

KP | 01 | 15A | N | B | K | G03 | RGBP

Pole & Circuit

15A	SPST	OFF	(ON)

( ) = Momentary
Normally Open Contacts

Travel & Force

01	Stroke: 4.5mm (.177″) Actuation Force: 1.9N
02	Stroke: 3.5mm (.138″) Actuation Force: 1.6N

Actuation

01

C	Tactile
N	Nontactile

02

C	Tactile
N	Nontactile
S	Tactile/Audible

Plungers

A	9.2mm Plunger for 12.0mm Cap
B	11.6mm Plunger for 15.0mm & 17.4mm Caps

Housing

K	Black Only

Contacts & Terminals

G03	Gold Contacts and Straight PC Terminals; 100mA @ 12V DC

LEDs

6DG	Super Bright Amber/Blue Bicolor
RGBP	Red/Green/Blue 4-Pin
RGB	Red/Green/Blue 8-Pin

* See Notes Next Page

DESCRIPTION FOR TYPICAL ORDERING EXAMPLE

KP0115ANBKG03RGBP-2SJB

- 11.6mm Plunger and 15.0mm Sculptured Cap Clear Lens and White Diffuser
- SPST OFF-Momentary ON Circuit Normally Open Contacts
- Straight PC Terminals
- RGB LED with 4 Pins
- Nontactile Actuation
- Black Housing
- Gold Contacts with 100mA Rating

ORDERING EXAMPLE

— 2 S ☐ ☐

Cap Sizes

1	12.0mm Square
2	15.0mm Square
3	17.4mm Square

** See Notes

Cap Types

F	Flat
S	Sculptured
T	Home Key

Cap Colors

JB	Clear Lens & White Diffuser

Bicolor Alternating Legend Caps

JCF	Red/Green (Combines with RGBP LED only)
JDG	Amber/Blue (Combines with 6DG LED only)

*** See Notes

Alternating Legends

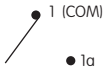
11	ON / OFF (Positive – Black Legend, Clear Background)
12	ON / OFF (Negative – Clear Legend, Black Background)
13	START / STOP
14	OPEN / CLOSE

*** See Notes

Contact factory for custom options.

Notes	Page No.
* Amber/Blue Bicolor	D43
* RGBP LED	D44
* RGB LED (not recommended for new design)	D45
** Rectangular Cap	D46
*** Alternating Legends	D42

POLE & CIRCUIT

		Plunger Position ( ) = Momentary		Connected Terminals		Throw & Switch Schematic
Pole	**Model**	**Normal**	**Down**	**Normal**	**Down**	Note: Switch terminals "1" & "1a" are actually marked on the switch.
SP	**KP0115A** **KP0215A**	OFF	(ON)	Normally Open	1-1a	SPST 

ACTUATION

C **Tactile**
KP01 or KP02

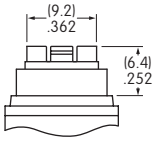
N **Nontactile**
KP01 or KP02

S **Tactile/Audible**
KP02 only

PLUNGERS

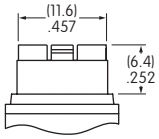
A **9.2mm Plunger for 12.0mm Cap**

9.2mm Plunger is designed with a narrower neck to hold the 12.0mm Cap.



B **11.6mm Plunger for 15.0mm & 17.4mm Caps**

11.6mm Plunger is designed with a wider neck to hold both the 15.0mm and 17.4mm Caps.



HOUSING

K **Black Only**

CONTACTS, TERMINALS, & RATING

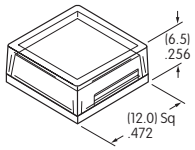
G03 **Gold Contacts** **Straight PC Terminals** **100mA @ 12V DC**

CAP TYPES & COLORS

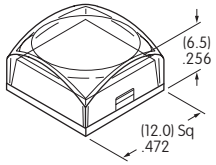
Caps for Bicolor, RGBP & RGB

1 **12.0mm Square** Used on A Plunger

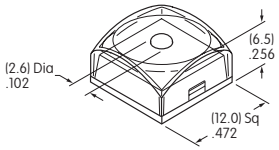
F **AT3083 Flat Cap**



S **AT3078 Sculptured Cap**

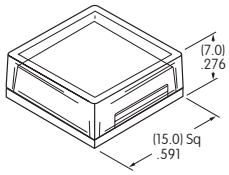


T **AT3086 Home Key Cap**

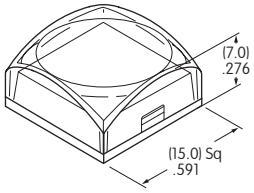


2 **15.0mm Square** Used on B Plunger

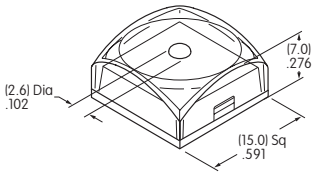
F **AT3084 Flat Cap**



S **AT3079 Sculptured Cap**

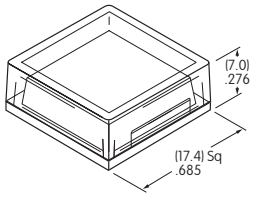


T **AT3087 Home Key Cap**

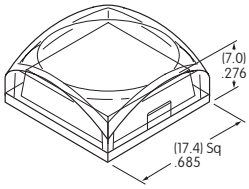


3 **17.4mm Square** Used on B Plunger

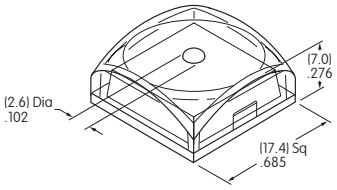
F **AT3085 Flat Cap**



S **AT3080 Sculptured Cap**



T **AT3088 Home Key Cap**

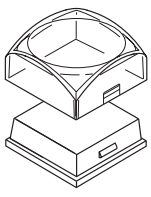


JB

Lens & Diffuser Colors Available:

Clear/White

Materials & Finishes: Lens - Polycarbonate with glossy finish
Diffuser - Polycarbonate with textured finish
Optional Protective Guard AT4170 available; contact factory.



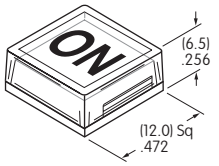
Clear Lens

White Diffuser

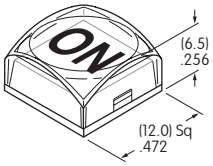
Caps for Alternating Legends

1 **12.0mm Square** Used on A Plunger

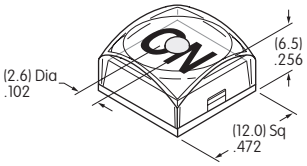
F **AT3093 Flat Cap**



S **AT3090 Sculptured Cap**

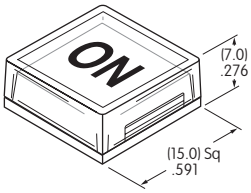


T **AT3096 Home Key Cap**

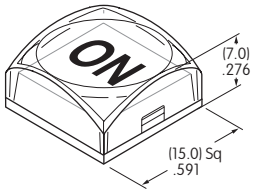


2 **15.0mm Square** Used on B Plunger

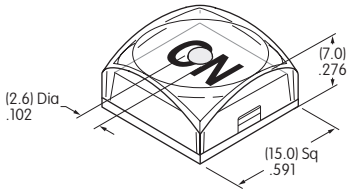
F **AT3094 Flat Cap**



S **AT3091 Sculptured Cap**

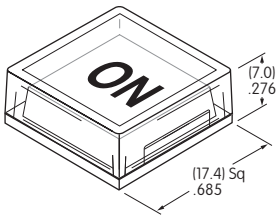


T **AT3097 Home Key Cap**

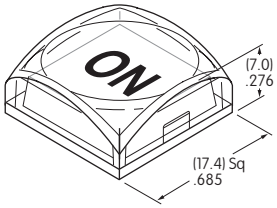


3 **17.4mm Square** Used on B Plunger

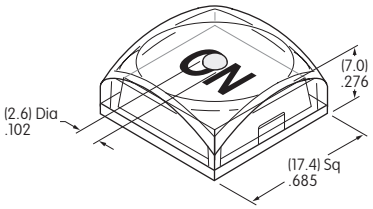
F **AT3095 Flat Cap**



S **AT3092 Sculptured Cap**



T **AT3098 Home Key Cap**



Standard Alternating Legend Pairs

11 O N | OFF — Green/Red or Blue/Amber

12 O N | OFF — Green/Red or Blue/Amber

13 START | STOP — Green/Red or Blue/Amber

14 OPEN | CLOSE — Green/Red or Blue/Amber

Cap illumination is alternating Green/Red or Blue/Amber; legend text is black.
Contact factory for other Alternating Legends.

Legend illustrations are approximate representations of the actual characters on the filters.

Part Numbers for Alternating Legends

Color	Cap Size	Flat Cap	Sculptured Cap	Home Key Cap
		Part Number	Part Number	Part Number
Red/Green	12mm Square	AT3093JCF11 ~ AT3093JCF14	AT3090JCF11 ~ AT3090JCF14	AT3096JCF11 ~ AT3096JCF14
	15mm Square	AT3094JCF11 ~ AT3094JCF14	AT3091JCF11 ~ AT3091JCF14	AT3097JCF11 ~ AT3097JCF14
	17.4mm Square	AT3095JCF11 ~ AT3095JCF14	AT3092JCF11 ~ AT3092JCF14	AT3098JCF11 ~ AT3098JCF14
Amber/Blue	12mm Square	AT3093JDG11 ~ AT3093JDG14	AT3090JDG11 ~ AT3090JDG14	AT3096JDG11 ~ AT3096JDG14
	15mm Square	AT3094JDG11 ~ AT3094JDG14	AT3091JDG11 ~ AT3091JDG14	AT3097JDG11 ~ AT3097JDG14
	17.4mm Square	AT3095JDG11 ~ AT3095JDG14	AT3092JDG11 ~ AT3092JDG14	AT3098JDG11 ~ AT3098JDG14

See Ordering Table for Alternating Legend that corresponds with last 2 digits of part number.

SUPER BRIGHT BICOLOR LED SPECIFICATIONS

ATTENTION
ELECTROSTATIC SENSITIVE DEVICES

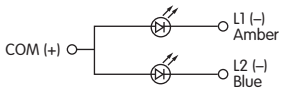
The electrical specifications shown are determined at a basic temperature of 25°C.

LEDs are an integral part of the switch and are not available separately.

LED circuit is isolated and requires an external power source.

If the source voltage exceeds the rated voltage, a ballast resistor is required.

The resistor value can be calculated by using the formula in the Supplement Section.

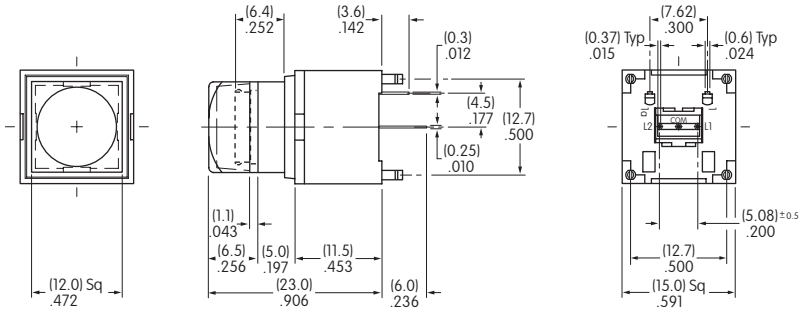


	Colors	6DG Amber	6DG Blue	Unit
Minimum Luminous Intensity	I_V	204	113	mcd
Standard Luminous Intensity	I_V	340	188	mcd
Maximum Forward Current	I_{FM}	30	25	mA
Typical Forward Current	I_F	20	20	mA
Forward Voltage	V_F	2.1	3.2	V
Power Peak Dissipation	P_D	75	100	mW
Maximum Reverse Voltage	V_{RM}	4	4	V
Wavelength at Peak Emission	λ	583 ~ 595	464 ~ 476	nm
Current Reduction Rate Above 25°C	ΔI_F	0.40	0.33	mA/°C
Ambient Temperature Range		–25 ~ +50		°C

Purple can be achieved by simultaneous illumination of Amber & Blue.

TYPICAL SWITCH DIMENSIONS

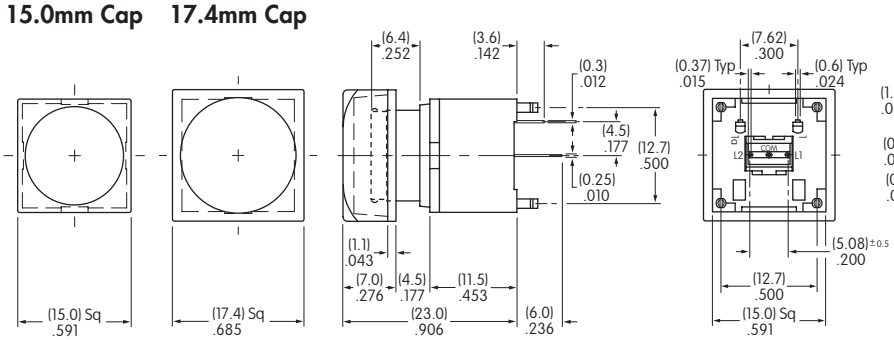
12.0mm Square Cap



KP0115ACAKG036DG-1SJB

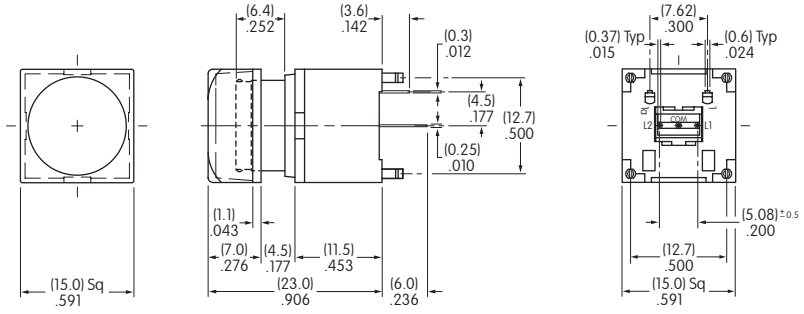
15.0mm Cap 17.4mm Cap

15.0mm & 17.4mm Square Caps



KP0115ANBKG036DG-3SJB

Bicolor Alternating Legend • 15.0mm Square Cap



KP0115ANBKG036DG-2SJDG

LED SPECIFICATIONS • RGBP with 4 Pins

The electrical specifications shown are determined at a basic temperature of 25°C.

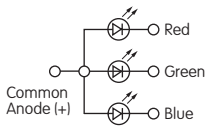
LEDs are an integral part of the switch and are not available separately.

LED circuit is isolated and requires an external power source.

If the source voltage exceeds the rated voltage, a ballast resistor is required.

The resistor value can be calculated by using the formula in the Supplement Section.

Note: For applications that require white illumination, contact factory.



ATTENTION ELECTROSTATIC SENSITIVE DEVICES

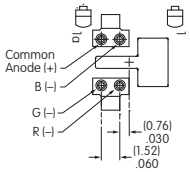
Color		RGBP Red	RGBP Green	RGBP Blue	Unit
Maximum Forward Current	I_{FM}	50	30	30	mA
Typical Forward Current	I_F	15	16	10	mA
*Forward Voltage	V_F	2.0	2.9	2.9	V
Power Peak Dissipation	P_D	100	80	80	mW
Maximum Reverse Voltage	V_{RM}	5	5	5	V
Dominant Wavelength	λ_d	620	525	467	nm
Current Reduction Rate Above 25°C	Δ_{IF}	0.75	0.25	**0.22	mA/°C
Ambient Temperature Range		−25 ~ +50			°C

*Forward Voltage (V_F) and Dominant Wavelength (λ_d) are Typical Value measured by Typical Forward Current (I_F).

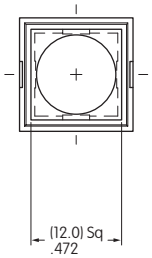
**Current Reduction Rate (Δ_{IF}) Above 40°C

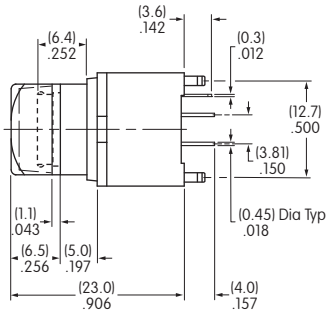
TYPICAL SWITCH DIMENSIONS

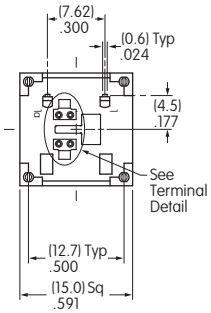
12.0mm Square Cap with RGBP LED

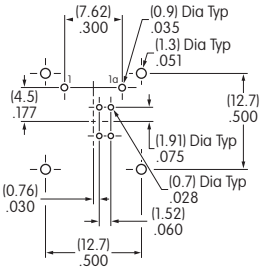


Terminal Detail



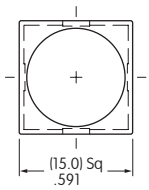




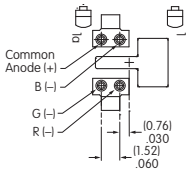


KP0115ACAKG03RGBP-1SJB

15.0mm & 17.4mm Square Caps with RGBP LEDs

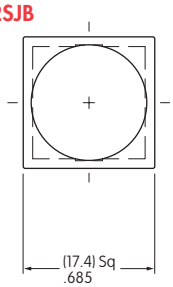


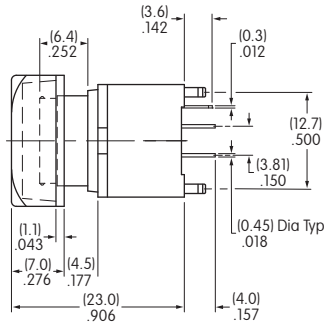
15.0mm Cap

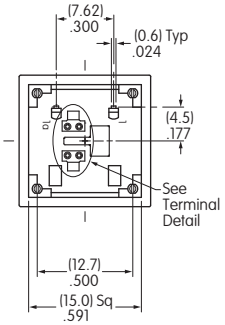


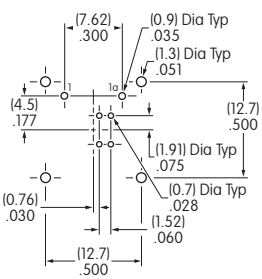
Terminal Detail

KP0115ANBKG03RGBP-2SJB









KP0115ANBKG03RGBP-3SJB

17.4mm Cap

LED SPECIFICATIONS • RGB with 8 Pins

The electrical specifications shown are determined at a basic temperature of 25°C.

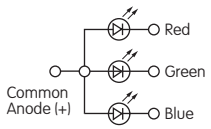
LEDs are an integral part of the switch and are not available separately.

LED circuit is isolated and requires an external power source.

If the source voltage exceeds the rated voltage, a ballast resistor is required.

The resistor value can be calculated by using the formula in the Supplement Section.

Note: For applications that require white illumination, contact factory.



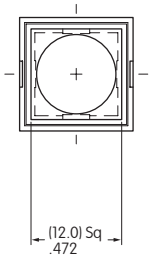
ATTENTION
ELECTROSTATIC SENSITIVE DEVICES

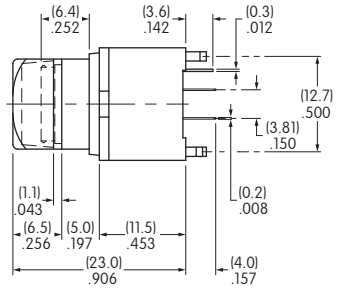
Color		RGB Red	RGB Green	RGB Blue	Unit
Maximum Forward Current	I_{FM}	30	30	30	mA
Typical Forward Current	I_F	20	14	9	mA
*Forward Voltage	V_F	2.0	2.9	2.9	V
Power Peak Dissipation	P_D	60	80	80	mW
Maximum Reverse Voltage	V_{RM}	5	5	5	V
Dominant Wavelength	λ_d	621.5	522.5	472.5	nm
Current Reduction Rate Above 25°C	Δ_{IF}	0.50	0.50	0.50	mA/°C
Ambient Temperature Range		−25 ~ +50			°C

*Forward Voltage (V_F) and Dominant Wavelength (λ_d) are Typical Value measured by Typical Forward Current (I_F).

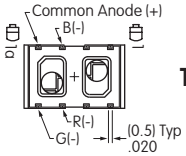
TYPICAL SWITCH DIMENSIONS

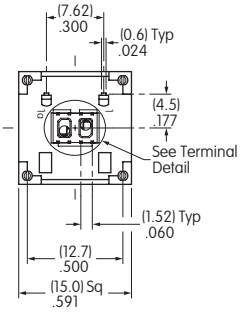
12.0mm Square Cap with RGB LED

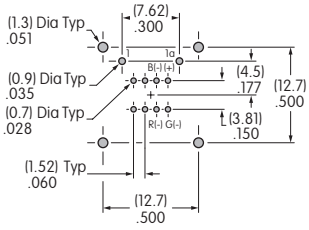




Terminal Detail

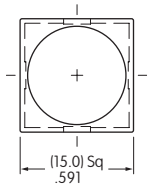




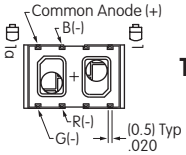


KP0115ACAKG03RGB-1SJB

15.0mm & 17.4mm Square Caps with RGB LEDs

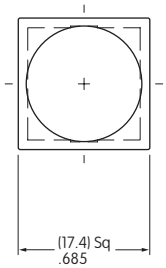


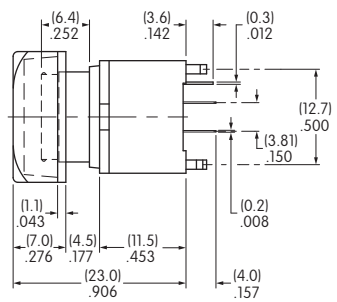
15.0mm Cap

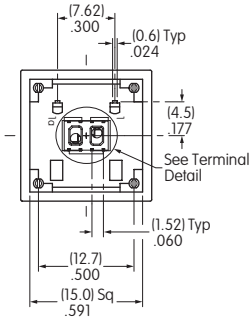


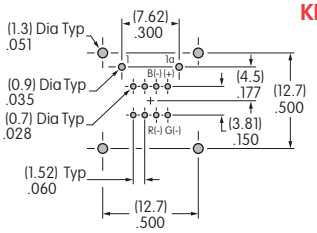
Terminal Detail

KP0115ANBKG03RGB-2SJB







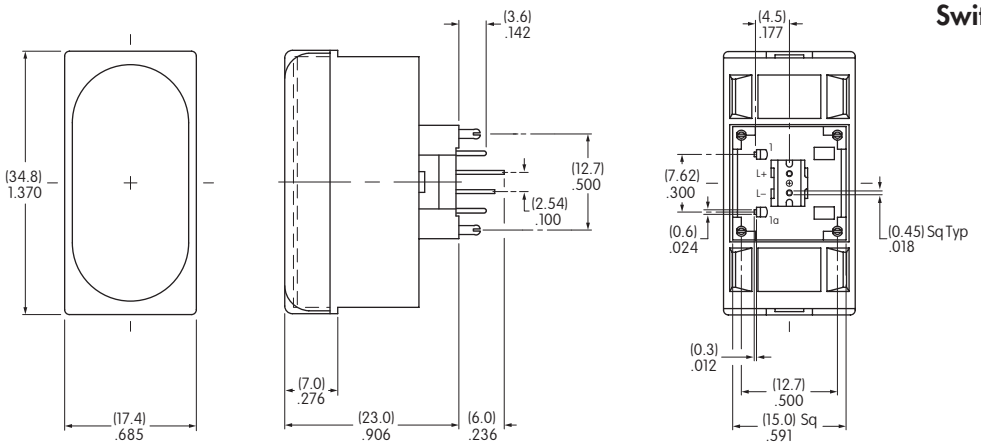


KP0115ANBKG03RGB-3SJB

17.4mm Cap

RECTANGULAR CAP ASSEMBLY

CAP ASSEMBLY DIMENSIONS



See below for complete assembly of switch, LEDs and LED holders.

Switch/Rectangular Cap Assembly

KP0115ACBKG03CJB for Tactile
KP0115ANBKG03CJB for Nontactile

LED SPECIFICATIONS

The electrical specifications shown are determined at a basic temperature of 25°C.

Center LED is an integral part of the switch. LEDs are not sold separately.

LED circuits are isolated and require an external power source.

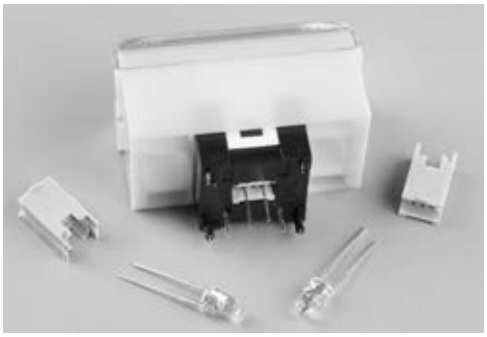
If the source voltage exceeds the rated voltage, a ballast resistor is required.

The resistor value can be calculated by using the formula in the Supplement Section.

(+) (-)	Color	Red	Unit
Maximum Forward Current	I_{FM}	30	mA
Typical Forward Current	I_F	20	mA
Forward Voltage	V_F	2.0	V
Maximum Reverse Voltage	V_{RM}	4	V
Dominant Wavelength	λ_d	623	nm
Current Reduction Rate Above 25°C	ΔI_F	0.32	mA/°C
Ambient Temperature Range		–25 ~ +50	°C

Contact factory for other LED colors.

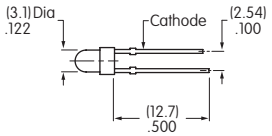
ASSEMBLY & INSTALLATION INSTRUCTIONS



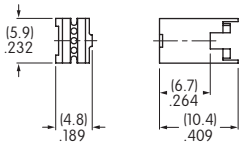
Switch/Rectangular Cap assembly has 3 LEDs to achieve bright and even illumination.

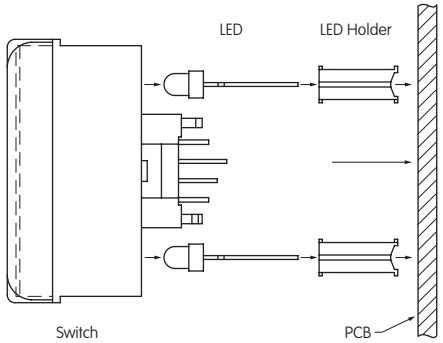
One LED (in center of switch bottom) is an integral part of the switch; the other 2 LEDs and 2 LED Holders are packaged separately.

LED

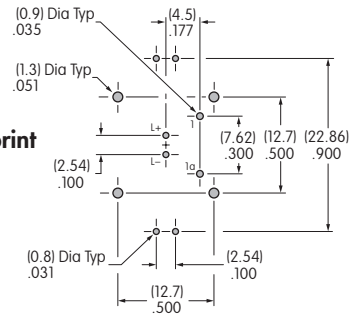


LED Holder





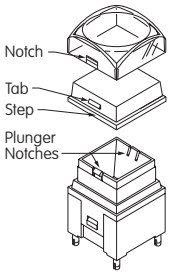
Footprint



1. Install LED into LED Holder (quantity 2).
2. Solder LEDs and LED Holders into PCB.
3. Solder switch into PCB making sure that the two outer LEDs and LED Holders clear the bottom side opening of the cap.

ASSEMBLY INSTRUCTIONS FOR SQUARE CAPS

ATTENTION
ELECTROSTATIC SENSITIVE DEVICES



Cap Orientation

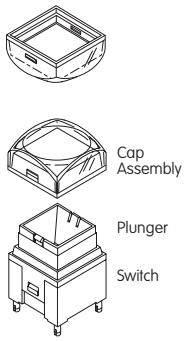
As shown in the accompanying illustration, the cap and plunger are designed with tabs and notches to assure proper orientation of the cap on the switch.

Removal of Cap Assembly & Separation of Lens & Diffuser

Holding the switch tightly, pull the cap off the switch. Once the cap assembly is released from the plunger, the lens and diffuser can be separated. Pry up the lens with fingernail or flat tip screwdriver inserted at the step on the diffuser.

Installation or Replacement of Cap

After aligning notches with tabs, join the lens and diffuser. Hold the switch tightly without touching the terminals. Firmly press the cap onto the plunger by applying pressure from one side to the other until both are snapped together.



LEGENDS

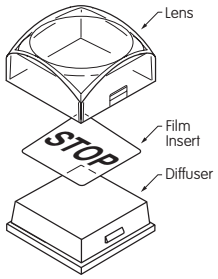
NKK Switches can provide custom legends for caps. Contact factory for more information.

Suggested Printable Areas for KP Lens

Recommended Methods:

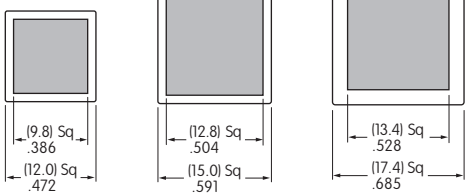
Laser Etch on clear lens, Screen Print, or Pad Print on lens.
Laser Print on film insert.
Epoxy based ink is recommended.

Shaded areas are suggested printable areas for Lens.

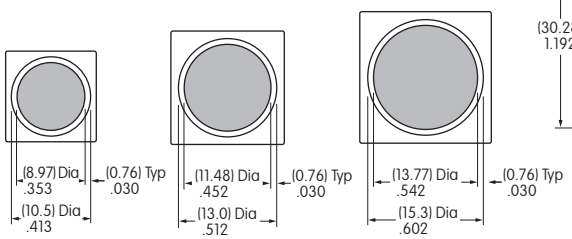


Printing on Diffuser is not advisable.

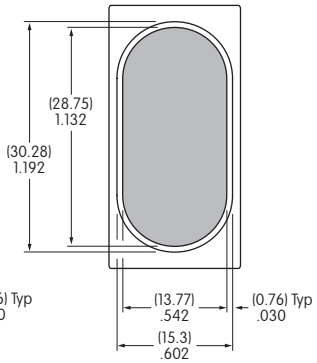
Flat Cap Lens



Sculptured Cap Lens



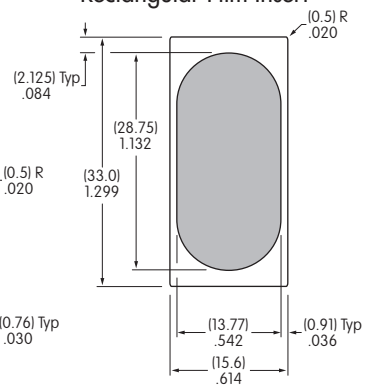
Rectangular Cap Lens



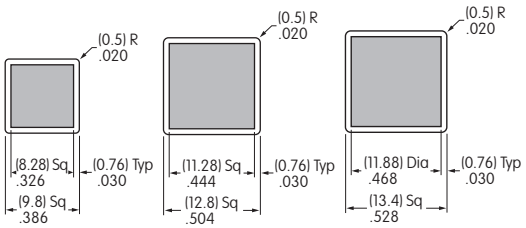
Suggested Printable Areas for KP Film Insert

Shaded areas are suggested printable areas for Film Insert.

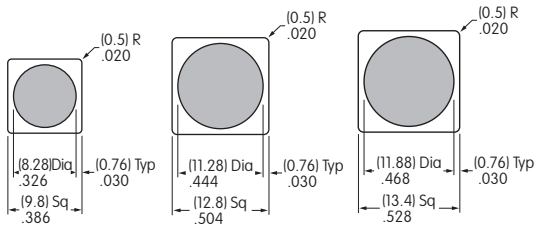
Rectangular Film Insert



Flat Cap Film Inserts



Sculptured or Home Key Cap Film Inserts



Film Insert Material and Thickness: Clear Polyester; 4 mil (100µ) maximum thickness