INTRODUCTION

All dimensions, operating characteristics, specifications and materials shown in this catalog are for reference only and are subject to change without notice. The data in this catalog shows nominal values; that is, they can exceed or fall short of specified values taking into account the effect of other parameters.

C&K Components assumes no liability resulting from misapplication of its products.

AGENCY APPROVALS

Many of our products are suitable for power switching, and are available with approvals by one or more of the following listing agencies:

UL . . . File No. E42363 Recognized under the recognized component program of Underwriters Laboratories, Inc.

CSA . . File Nos. LR29210 (Newton, MA-USA)
Master Contract 150508
Legacy File LR 29210

Listed by the Canadian Standards Association as certified.

VDE . . . . . File No. 8869-4401

Wiring harness certified under file no. E130055

Some switches are supplied with agency approvals automatically when ordered with the appropriate contact materials (eg: E Series, 8500 Series). In some series, switches have agency approvals only when specific model numbers are selected (eg: 7000 Series, 8020 Series). Otherwise, no approvals appear on the switches. See the appropriate switch section for ratings, agency approvals and other specifications. Also see CONTACT MATERIAL.

Note: Switches with contact material options of 'G', 'L' and 'R' are electrically equivalent to 'B, Q, K and M' contact materials and can be used where either dry circuit* or power conditions are encountered. When the dry circuit rating is exceeded, the gold plating is removed from the contact interface and the switch cannot then be used in dry circuits. 'G' or 'L' contact material should be specified where UL approval is required on a switch used in a dry circuit application.

* Dry Circuit: Conditions where no arcing occurs during switching (i.e., 0.4 VA max. @ 20 V AC or DC max.)

ISO / QS

Our manufacturing locations in Newton, Massachusetts and San Jose, Costa Rica have been certified as compliant to ISO 9001 and QS 9000. Our Chinese facility is ISO 9000. Our Dole, France facility has been certified as compliant to ISO TS 16949 and QS 9000.

CONTACT MATERIAL

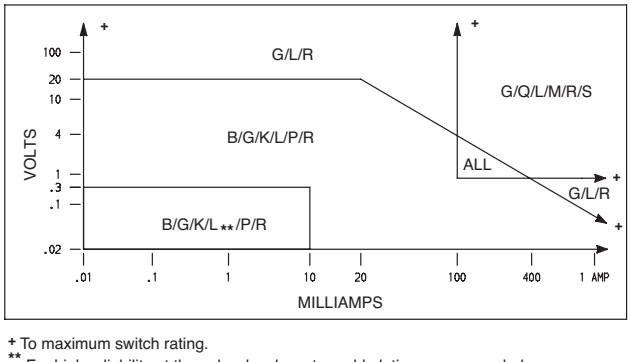
Many of our switches offer three contact material options: gold, silver, and gold over silver. Switch terminal plating may be gold, silver, tin-lead or matte tin. See desired switch section for availability of specific options. Also see *Agency Approvals* section included in this catalog. Figures 1 & 2 below provide contact material vs rating recommendations. For special requirements or assistance, consult Customer Service Center

CONTACT MATERIAL	CHARACTERISTICS
Gold (B) **Gold with tin lead (K)** **Gold with tin terminals (P)**	LOW LEVEL OR DRY CIRCUIT RATED: 0.4 VA DC max. Contact material: Gold.
Silver (Q) **Silver with tin lead (M)** **Silver with tin terminals (S)**	POWER RATED: Ratings from 100mA to 10 AMPS @ 125 V AC are available. See switch sections for applicable ratings and available agency approvals. Contact material: Silver
Gold (G) **Gold over silver with tin lead (L)** **Gold over silver with tin terminals (R)**	POWER OR LOW LEVEL/DRY CIRCUIT RATED: Electrically equivalent to 'B, Q, K and M' contact materials and can be used where either low level/dry circuit* or power conditions are encountered. When the dry circuit rating is exceeded, the gold plating is removed from the contact interface and the switch cannot then be used in dry circuits. 'G' or 'L' contact material should be specified where agency approvals are required on a switch used in a dry circuit application. Contact material: Gold over silver

* Dry Circuit: Conditions where no arcing occurs during switching, i.e. 0.4 VA max. @ 20 V AC or DC max.

Fig. 1

RECOMMENDED CONTACT MATERIALS VS. VOLTAGE AND CURRENT



+ To maximum switch rating.
** For high reliability at these low levels, extra gold plating recommended, consult Customer Service Center

Fig. 2

TACT SWITCHES

The choice of contact material to be used depends on what is expected of the switch in terms of electrical properties and under consideration of the ambient condition.

Two different contact materials have proved themselves to be especially suitable:

CONTACT MATERIAL	CHARACTERISTICS
Gold (3)	a) For switching levels < 12 V and < 100 mA b) For application in corrosive atmospheres. c) For applications at V and A levels including infrequent usage. In this case, please contact us directly in order to select the most suitable switch for your application.
Silver (1)	For switching levels > 0.5 V and > 100 mA under normal ambient conditions.

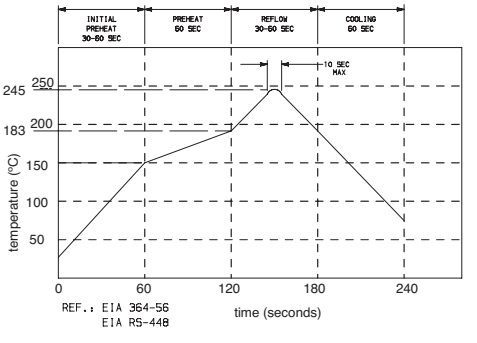
SOLDERING AND CLEANING

Most manufacturing and field problems experienced by users of unsealed switches are caused by contamination of the internal switch contacts during soldering and cleaning processes. Switches may become intermittent, especially in low power applications, and may become open during factory testing or later in the field. Care during soldering and cleaning can prevent most process contamination problems encountered.

Contamination can occur in both hand soldering and machine soldering processes. Hand soldering and cleaning are acceptable with properly trained personnel, small diameter solder (.030-.040 in.) and low wattage soldering irons (25-40 watts max.). Solder time is approximately 3 seconds maximum. *Do not* immerse or spray the unsealed areas of the switches with cleaners during flux removal.

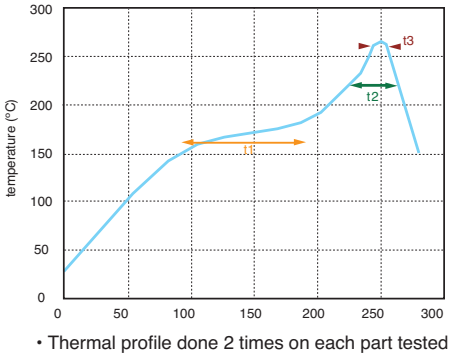
Typical SMT Reflow Profile

Pre-heat to a maximum of 200° C for 30 seconds.
Reflow at a maximum of 245° C for 10 seconds.
Maximum time above 183° C for 60 seconds.



SMT reflow soldering profile of reference

Thermal shock resistance

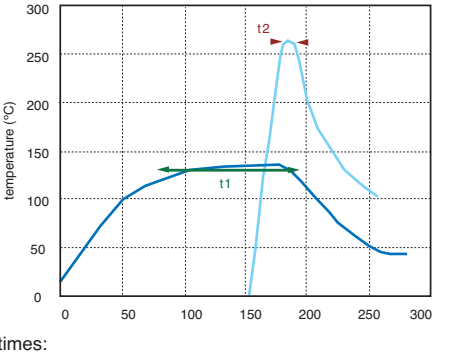


- Thermal profile done 2 times on each part tested
- Thermal profile in accordance with CEI 60068-2-58/ EN 60068-2-58

PARAMETER	REFERENCE	LEAD FREE SPECIFICATION
Time between 150°C and 180°C	t1	90 seconds
Time above 220°C	t2	40 seconds
Time at/above 250° (peak)	t3	10 seconds
Peak temperature	T peak	260°C 0/+5°C

Wave soldering profile of reference

Thermal shock resistance



Thermal profile done in 2 times:

- Preheat thermal profile
- Soldering heat resistance
- Thermal profile done 2 times on each part listed
- Thermal profile in accordance with CEI 60068-2-58/ EN 60068-2-58

PARAMETER	REFERENCE	LEAD FREE SPECIFICATION
Preheat time exposure	t1	Between 100s and 120s
Preheat	T1	>120° C
Time at max. body temp	t2	10 seconds max
Peak board bottom temp	T2	260°C 0/+5°C

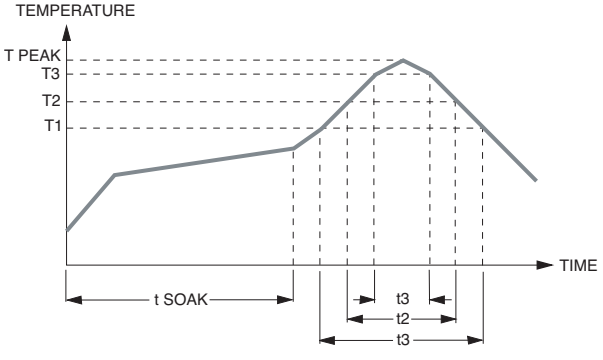
NOTE: Not all of C&K Components products have been tested to this profile. Please refer to product section for more information.

RoHS compliant = Complies with EU directive 2002/95/EC restriction of hazardous substances.

RoHS compatible = Compatible with lead free soldering process.

REFLOW SOLDER PROFILE REQUIREMENT

PARAMETER	REFERENCE	TIN/LEAD SPECIFICATION	LEAD FREE SPECIFICATION
Preheat Temperature Gradient		+1-4 C/sec	+1-4 C/sec
Soak Time	t Soak	2 min. max	2-3 min.
Time Above 100C		Not Specified	420 sec. max
Time Above 183C		60-120 sec.	120-180 sec.
Time Above 217C	t1 / T1	Not Specified	90 sec. max
Time Above 230C	t2 / T2	10-40 sec.	20-60 sec.
Time Above 250C	t3 / T3	0	10 sec. max
Peak Temperature	T Peak	235 -0/+5C	255 -0/+5C
Cooling Temperature Gradient		-6C/sec. max	-6C/sec. max



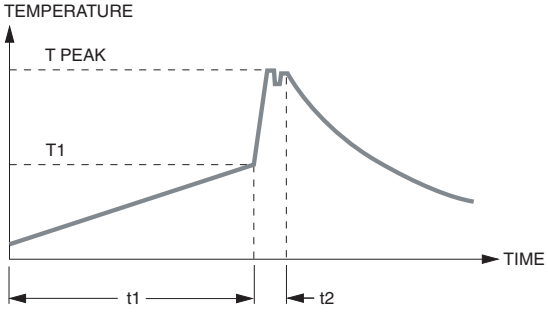
TIN/LEAD SPECIFICATIONS ARE TAKEN FROM:
ANSI/IPC-9504 JUNE 1998

WAVE SOLDER REQUIREMENT

For Soldering Heat Resistance Testing

PARAMETER	REFERENCE	TIN/LEAD SPECIFICATION	LEAD FREE SPECIFICATION
Preheat Temperature Gradient		+1-4 C/sec.	+1-4 C/sec.
Soak Time	t1	2 min. max	2-3 min.
Preheat Temp	T1	> 90° C	> 100° C
Solder Pot Temp	T2	245° - 260° C	260° - 275° C
Solder Pot Contact Time	t2	2 - 2.5 sec.	2 - 3.5 sec.
Lead Thermal Trans. Spike		> 130° C	> 130° C
Component Body Temp		> 180° C	> 200° C
Time@ Max. Body Temp		> 10 sec.	> 10 sec.
Peak Temperature	T Peak	235° -0°/+5°C	255° -0°/+5°C
Cooling Temperature Gradient		-6C/sec. max	-6C/sec. max

Wave Solder Thermal Profile (TH Components)



TIN/LEAD SPECIFICATIONS ARE TAKEN FROM:

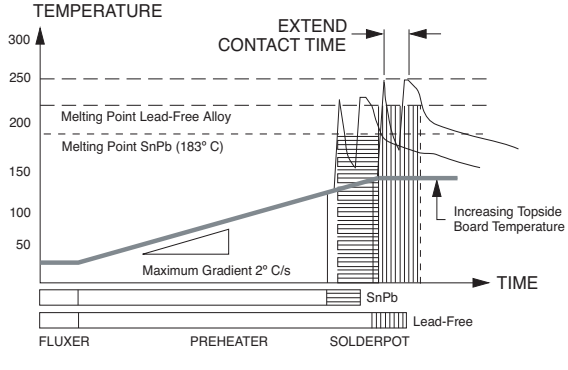
ANSI/IPC-9504
COOKSON ELECTRONICS
National Electronics
Manufacturing Initiative, Inc.

SURFACE MOUNT TECHNOLOGY ASSOCIATION
COOKSON ELECTRONICS
National Electronics
Manufacturing Initiative, Inc.

WAVE SOLDER REQUIREMENT

For Soldering Heat Resistance Testing

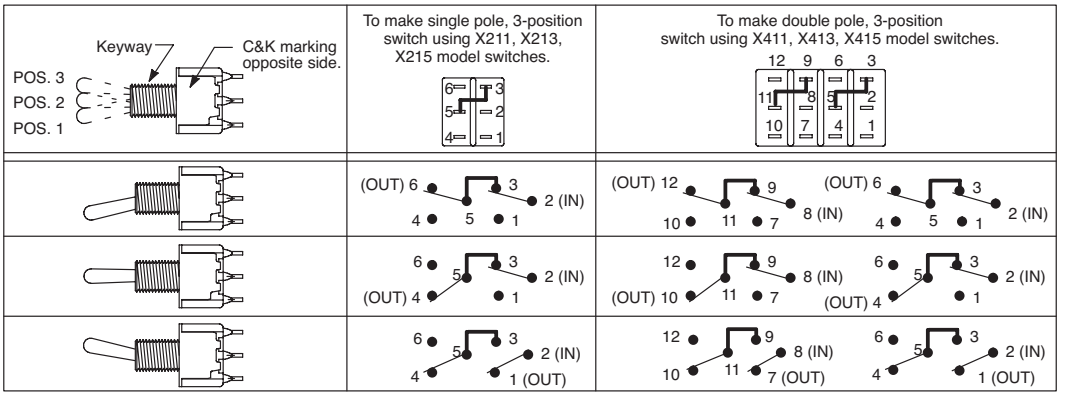
Diference Between SnPb and Lead-Free Wave Soldering



Note: Not all of C&K Components products have been tested to these profiles. Please refer to product section for more information.

WIRING FOR 3-WAY SWITCHES

3-Position toggle and rocker switches with ON-ON-ON switch functions may be externally wired for '3-way' function. See wiring diagram and schematics below. **Note**: Jumpers are added by customer.



These switch series have one or more models that may be wired to achieve SP3T or DP3T functions:

7000 Series
(including UL/CSA Models)
E Series
ET Series
T Series

MODE OF SWITCHING

We can deliver some switch types with non-shorting (BBM=Break-Before-Make) or shorting (bridging: MBB=Make-Before-Break) modes of switching. In the non-shorting (BBM) mode there is no connection between two neighboring contacts during the switching operation. The moving contact leaves its starting position before making contact in the next position. In the shorting (MBB) mode a bridging is effected during the switching operation.

The mode of switching is non-shorting unless otherwise specified.

U=Changeover contact

A=Make contact (SPST N.O.)

R=Break contact (SPST N.C.)