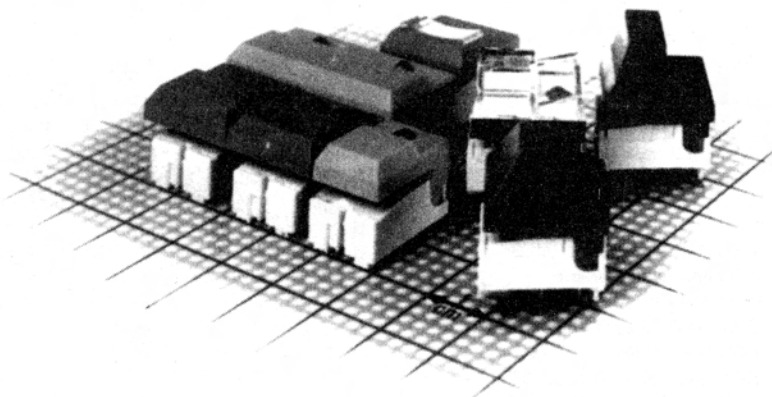


DIGITAST SE Key Switch



A high performance momentary (OA) or push-push (EE) key switch especially for digital input.

- Long operating life.
- Double or triple wide buttons available.
- LED – one or two – optional.
- DIGITAST F with a flat button design

General description

The DIGITAST SE is a most versatile electronic switch for printed circuit boards, especially when used with dual in-line packages.

Vibration free, short smooth travel through pivoted button tops.

Available as momentary button switch (OA) as well as push-push action with over-travel release (EE).

Micro SPDT system with tactile feeling.

Two integral molded "standoff" pins for alignment on PC boards.

Overall height 14.3 mm [.563 inch], sealed terminals, 1 or 2 LEDs optional to indicate functions.

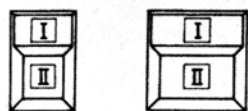
Ordering code		1	2	3	4	5	6	7
Example:		SE	AU	EE	01	03	R	G
1	Designation: SE	→						
2	Contact material: AU = gold		→					
3	Mechanical function: OA = momentary EE = push-push**)			→				
4	Key cap color: 01 = black, 02 = white, 03 = red, 05 = grey, 06 = yellow, 07 = blue, 08 = green, 12 = orange				→			
5	Key cap style: 01 to 27					→		
6	LED color, position 1*): R = red, G = green, Y = yellow						→	
7	LED color, position 2*): R = red, G = green, Y = yellow							→

*) With 2 LEDs: LED color of position 1 is always meant for the left LED looking on the button with LEDs on top.

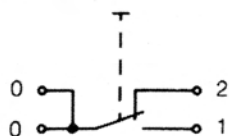
**) Push-push available with button styles 01, 02, 03, 04, 05, 06, 07, 08, 13, 22, 23, 24, 25

DIGITAST SE Key Switch

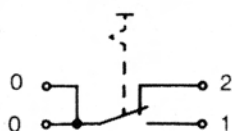
Marking Area DIGITAST



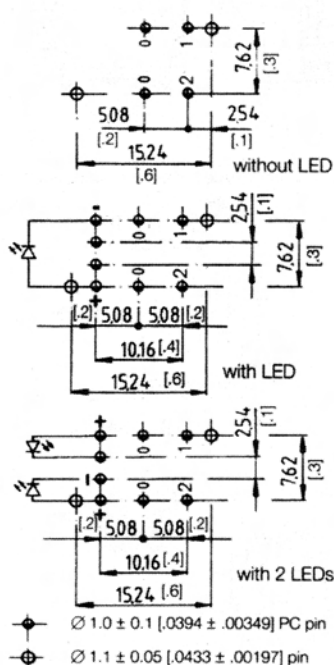
Operating diagram DIGITAST:
Momentary (OA)



Operating diagram DIGITAST:
Push-push (EE)



PCB layout DIGITAST SE: mm [inch]



Construction

Function	Momentary (OA) or push-push (EE) Push-push button switches: select button/styles
Contact arrangement	1 changeover contact (SPDT)
Mode of switching	Non-shorting
Illumination	Optional with 1 or 2 LED ¹⁾
Contacts	PC pins
Mounting	Soldering, centering pins

Electrical data

Switching power max.	240 mW DC
Switching voltage max.	24 V DC
Switching current max.	10 mA DC
Spacing current at 20°C (EE)	100 mA
Dielectric strength (50 Hz, 1 Min.)	500 V
Operating life with or without max. switching power	OA: $\geq 5 \times 10^6$ operations EE: $\geq 5 \times 10^5$ operations
Contact resistance initial	$\leq 50 \text{ m}\Omega$
after 5×10^6 operations	$\leq 100 \text{ m}\Omega$
Insulation resistance	$\geq 10^9 \Omega$
Capacitance at $f = 10 \text{ kHz}$	$\leq 0.8 \text{ pF}$
Contact bounce	$\leq 2.5 \text{ ms}$
Operating speed 400 mm/s [15.7 inch/s]	

Mechanical data

Total travel	$\leq 3 \text{ mm}$ [.118 inch]
Switching travel	1.5 mm [.0591 inch]
Latching travel	1.8 mm [.0709 inch]
Operating force	$1.5 \pm 0.5 \text{ N}$ [150 $\pm$ 50 grams]

Further data

Contact material	AU over Ni
Insulation material	Thermoplastic
Button colors	Black, white, grey, blue, red, orange, green, yellow
LED-colors	Red, green, yellow
Marking area	Button field I and II (with LED only field II)
Graphics	Please consult factory
Sealing	Sealed contacts for soldering
Max. soldering time and temperature	5 s at 260°C
Operating temperature	- 25°C to + 85°C

¹⁾ Standard: 10 mA; 2 mA on request

2

SWITCHES & KNOBS

KSA and KSF Tact Switches

KSA (1 Million operations)

(Green actuator)

In this version, a special bronze click washer is used. The KSA 1 Million operations is particularly adapted for long operating life requirements such as telephone, data processing, and so on.

KSA high temperature

(Red actuator)

The KSA high temperature has been designed for use under wide temperature changes (-40°C to $+125^{\circ}\text{C}$) or very severe climatic conditions. In this version contacts are gold plated and the operating life is 1 million operations.

Applications: heating control systems, household appliances, microwave ovens, automotive.

KSA high sealed version

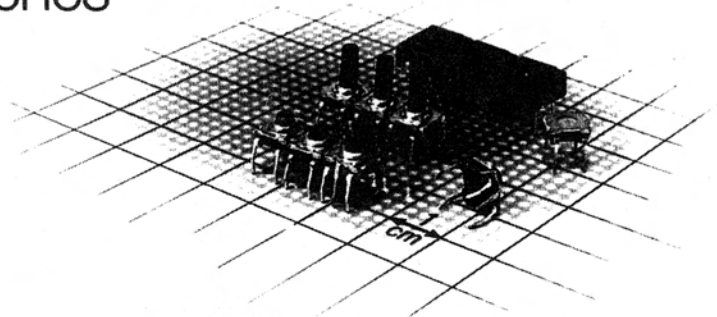
This totally sealed version withstands soldering process with organic flux, washing and thermal shock, see diagram EIA - RS-448.

KSF

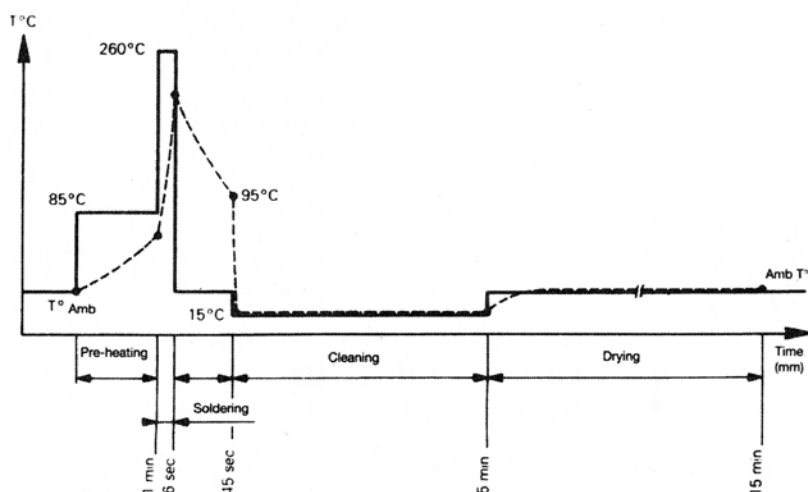
Flat miniature tact switch, single pole, single throw, normally open versions, of the KS family, designed for automatic or manual insertion.

Main features:

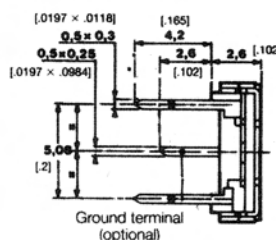
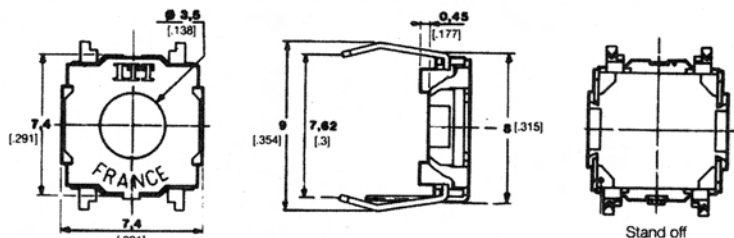
- Operating force 1.6 or 3 or 5N [160 or 300 or 500 grams] $\pm 25\%$. For gold version, operating force must be increased by 0.3N [30 grams]
- Positive tactile feedback
- Travel 0.3 mm [.0118 inch]
- 5.08×7.62 mm [.200 $\times$.300 inch] footprint
- Thickness 2.6 mm [.102 inch]
- Available with cambered terminals to ensure self-retention on the printed circuit board in manual insertion, or with straight terminals for use in automatic insertion machines
- Minimum center to center spacing of 7.62×10.16 mm [.300 $\times$.400 inch]
- Sealed against flux soldering
- Can be delivered either in tubes of 65 pieces for automatic insertion, or in boxes of 500 pieces for manual insertion
- Optional: ground terminal
- Snap-in square button 10×10 mm [.394 $\times$.394 inch], height 5.6 mm [.220 inch] above PC board.



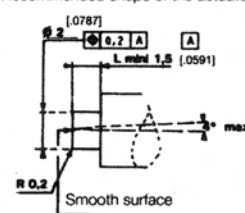
Solder test EIA - RS-448



Dimensional Drawings KSF - Dimensions in mm [inch]



Recommended shape of the actuator

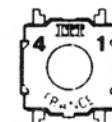


Material: polyamid or similar

Note: Identification

- The 5th and 6th digits of the ordering codes are stamped on the metallic top plate.
- The other characteristics of the ordering codes can actually be seen on the product.

Example:

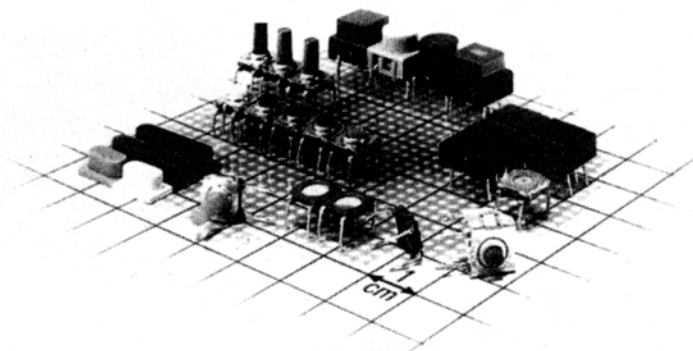


4 = 3 Newtons force,
100 K, operations
1 = temperature
 -40° to $+90^{\circ}$ C

KSA General Characteristics

2

SWITCHES & KNOBS

**Mechanical and environment characteristics of main KS types**

All mechanical, electrical and environmental characteristics of main KS types on the following pages are included in the 2 following tables.

Note: KSA, KSB, KSF, KSL are the basic models,

- with suffix 3N or 5N they are available with 3 Newtons [300 grams] or 5 Newtons [500 grams] actuation force,
- with suffix V means vertical mounting.

Data	Type	KSA	KSA 3N	KSA 5N	KSB KSD	KSB 3N	KSF	KSF 3N	KSF 5N	KSL	KSL 3N	KSL 5N	KSAV	KSLV	KSI	KSJ
Actuator color silver contact version	White ³⁾ Green	Blue	Yellow	—	—	—	—	—	—	Dark grey	Blue	Yellow	White	Dark grey	Red	—
Actuator color gold contact version	Red	Dark grey	Orange	—	—	—	—	—	—	Red	Light grey	Orange	Red	Red	Red	—
Travel mm [inch]	0.3 ^{±0.04} [.0118]	0.4 ^{±0.04} [.0157]	0.5 ^{±0.04} [.0197]	0.2 ^{±0.01} [.00787]	0.2 ^{±0.01} [.00787]	0.3 ^{±0.04} [.0118]	0.4 ^{±0.04} [.0157]	0.5 ^{±0.04} [.0197]	0.3 ^{±0.04} [.0118]	0.4 ^{±0.04} [.0157]	0.5 ^{±0.04} [.0197]	0.3 ^{±0.04} [.0118]	0.3 ^{±0.04} [.0118]	1.1 ^{±0.02} [.0433]	0.4 ^{±0.01} [.0157]	
Operating force N [grams] ± 25%	1.3 [130]	3 ¹⁾ [300]	5 ¹⁾ [500]	1.6 [160]	3 [300]	1.6 [160]	3 ¹⁾ [300]	5 ¹⁾ [500]	1.3 [130]	3 ¹⁾ [300]	5 ¹⁾ [500]	1.3 [130]	1.3 [130]	3 [300]	1 [100] 3 [300]	
Max. actuation force N [grams]	40 [4000]	40 [4000]	75 [7500]	40 [4000]	40 [4000]	40 [4000]	40 [4000]	75 [7500]	40 [4000]	40 [4000]	75 [7500]	40 [4000]	40 [4000]	40 [4000]	40 [4000]	40 [4000]
Operating life with actuation force = 2 time nominal force	5×10 ⁵ or 10 ⁶ 2)	10 ⁵	10 ⁵	10 ⁵	10 ⁵	5×10 ⁵ 2)	10 ⁵	10 ⁵	5×10 ⁵ 2)	10 ⁵	10 ⁵	5×10 ⁵ 2)	5×10 ⁵	5×10 ⁵	10 ⁵	10 ⁵
M = Manual insertion A = Automatic insertion	M A	M A	M A	M A	M A	M A	M A	M A	M A	M A	M A	M A	M A	M A	M A	M A
AG = Silver contacts AU = Gold contacts	AG AU	AG AU	AG AU	AG AU ⁴⁾	AG AU	AG AU	AG AU	AG AU	AG AU	AG AU	AG AU	AG AU	AG AU	AG AU	AG AU	AG AU
Storage temperature Silver version °C	−40 to +90	−40 to +90	−40 to +90	−40 to +90	−40 to +90	−40 to +90	−40 to +90	−40 to +90	−40 to +90	−40 to +90	−40 to +90	−40 to +90	−40 to +90	−40 to +90	−55 to +90	−55 to +90
Gold version °C	−55 to +125	−55 to +125	−55 to +125	−55 to +125	−40 to +90	−55 to +125	−55 to +125	−55 to +125	−55 to +125	−55 to +125	−55 to +125	−55 to +125	−55 to +125	−55 to +125	−50 to +125	−55 to +125
Operating temperature Silver version °C	−40 to +90	−40 to +90	−40 to +90	−40 to +90	−40 to +90	−40 to +90	−40 to +90	−40 to +90	−40 to +90	−40 to +90	−40 to +90	−40 to +90	−40 to +90	−40 to +90	−40 to +90	−40 to +90
Gold version °C	−40 to +125	−40 to +125	−40 to +125	−40 to +125	−40 to +125	−40 to +125	−40 to +125	−40 to +125	−40 to +125	−40 to +125	−40 to +125	−40 to +125	−40 to +125	−40 to +125	−40 to +125	−40 to +125
SO ₂ and H ₂ S protected X = Yes O = No	X	X	X	O	O	X	X	X	X	X	X	X	X	X	X	X
Flux tight	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Flux tight washing without thermal shock	X	X	X	O	O	X	X	X	X	X	X	X	X	X	X	X
Flux tight washing with thermal shock	X	X	X	O	O	X	X	X	X	X	X	X	X	X	X	X

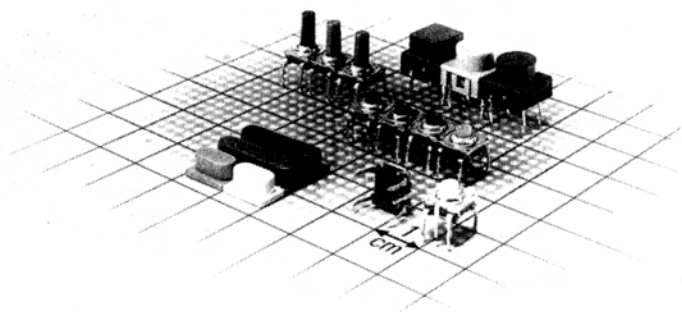
¹⁾ In gold version nominal force is 0.3N [30 grams] higher than in silver version and 0.6N [60 grams] for the 5N [500 grams] versions.

²⁾ Basic models KSA, KSF, KSL on request, can be delivered for 1 million operations in silver version, in gold version they are automatically supplied with 1 million operations.

³⁾ White for 500 k operations, green for 1 million operations.

⁴⁾ KSD not available in gold contacts.

KSA Miniature Tact Switches



KSA

Miniature tact switch, single pole, single throw, normally open, designed for automatic or manual insertion.

Main features:

- Positive tactile feedback
- Travel 0.3 mm [.012 inch] $\pm 6\%$ typical
- 5.08×7.62 mm [.200 $\times$.300 inch] footprint
- Available with cambered terminals to ensure self-retention on the printed circuit board in manual insertion, or with straight terminals for use in automatic insertion machines
- Minimum center to center spacing of 7.62×10.16 mm [.300 $\times$.400 inch]
- Sealed against flux soldering
- Can be delivered in packaging tubes of 65 pieces for automatic insertion or in a box of 500 pieces for manual insertion (250 for KSL-KSLV-KSAV)
- Optional: ground terminal
- KSA can be used in low level applications, with 5 Volts – 10 μ A or 20 mV – 1 mA in TTL or CMOS applications

KSL

KSA with long actuator.
Height above PC board 10 ± 0.3 mm [.390 $\pm$.012 inch].

KSA 3N [300 grams]

(Blue actuator)

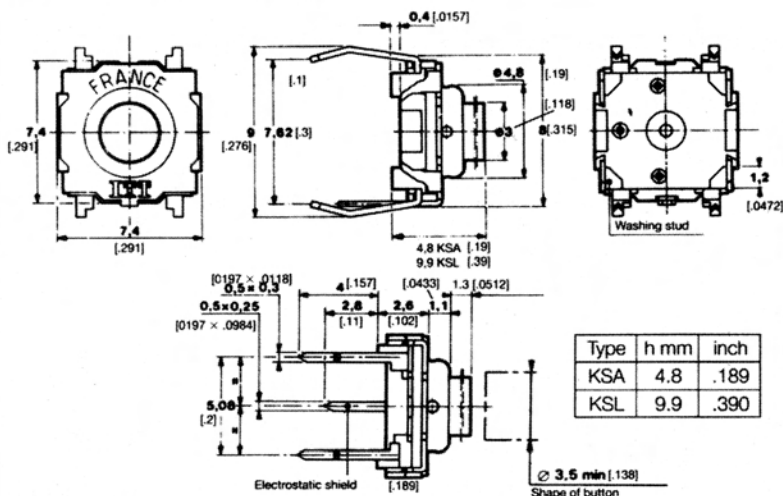
The KSA 3N [300 grams] is a version with higher actuation force 3N [300 grams] $\pm 25\%$ instead of 1.3N [130 grams] $\pm 25\%$. This new version is more suited to applications where tactile feedback is necessary. It can be used when the button, or actuation mechanism absorbs a part of the actuation force, with, for example, hinge buttons. This new version shows a large difference between the actuation force and the return force, giving a good tactile feedback. See graph.

KSA 5N [500 grams]

(Yellow actuator)

This version with a higher actuation force of 5N [500 grams] gives a very good tactile feedback. Typical applications are in automotive and aircraft industries.

Dimensional Drawings · Dimensions in mm [inch]



Typical curves / operating life

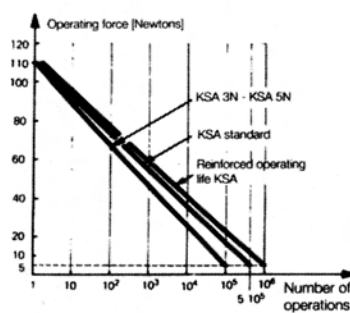


fig 1

Typical curves operating force / travel

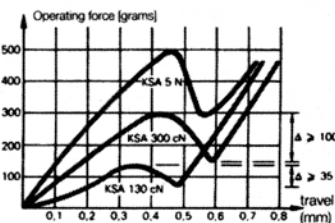
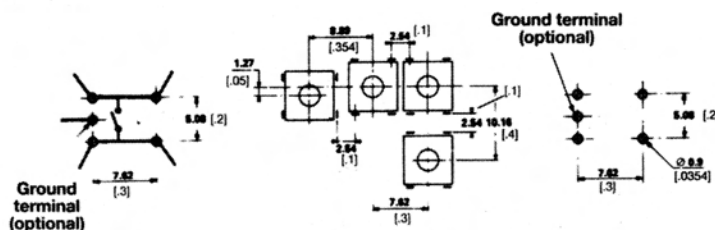


fig 2

PCB layout



Main Values for KS Versions

2

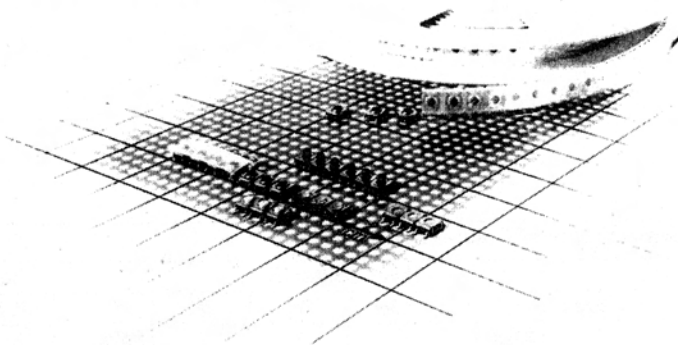
S
W
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Overview of the main electrical values of KS versions

Contact material		Silver contacts			Gold contacts			Silver contacts		
Type		1.3N	3N	5N		1.3N	3N	5N		
Data	KSA	X	X	X	KSA	X	X	X	KSB	X
	KSF	X (1.6)	X	X	KSF	X	X	X	KSD	X
	KSL	X	X	X	KSL	X	X	X		
	KSAV	X	X	X	KSAV	X	X	X		
	KSLV	X	X	X	KSLV	X	X	X		
	KSI	X	X	X	KSI	X	X	X		
	KSJ	X (1.0)	X		KSJ	X (1.0)	X			
Ground terminal		Upon request				Upon request				No
Max. voltage		50 V				50 V				50 V
Min. voltage		20 mV				20 mV				5 V
Max. switching current		50 mA				10 mA				50 mA
Min. switching current		1 mA				1 mA				10 mA
Max. switching power		1 VA				0.2 VA				1 VA
Contact resistance		50 mΩ				50 mΩ				100 mΩ
Dielectric strength		300 Vrms				300 Vrms				300 Vrms
Insulation resistance (100 V)		10 ¹¹ Ω				10 ¹¹ Ω				10 ¹¹ Ω
Bounce		≤ 1 ms				≤ 1 ms				≤ 1 ms
Operating life with actuation force less than 2 times nominal force		5 × 10 ⁵	10 ⁵	10 ⁵		10 ⁶	10 ⁵	10 ⁵		10 ⁵
		10 ⁶ upon request	5 × 10 ⁵ upon request				5 × 10 ⁵ upon request			10 ⁵

Ordering code		1	2	3	4	5	6	7
Example:		KS	A	1	A	3	3	1
1	Designation: KS							
2	Actuator: A = short, L = long, B = without, F = flat, I = soft, J = long travel (spherical)							
3	Ground terminal: 0 = without (B only 0), 1 = with							
4	Insertion: M = manual, A = automatic, V = vertical (for KSA, KSI and KSL, not for KSB and KSF)							
5	Operation force (N [grams]), operating life (k operations): 1 = 1.6N [160 grams] and 100 k operations 2 = 1.3N [130 grams] and 500 k operations (KSA/KSL) 1.6N [160 grams] and 500 k operations (KSF) 3 = 1.3N [130 grams] and more than 1000 k operations 4 = 3.0N [300 grams] and more than 100 k operations 5 = 5.0N [500 grams] and more than 100 k operations 9 = 3.0N [300 grams] and 500 k operations							
6	Operating temperature: 1 = low temperature - 40°C to + 90°C (silver contacts) 3 = high temperature - 40°C to + 125°C (gold contacts)							
7	Sealing: 0 = sealed against flux, 1 = totally sealed acc. to EIA RS448-2							

KSC Miniature Tact Switch for SMT



KSC

Miniature tact switch designed to be surface mounted (SMT) on PCB, single pole, normally open contact.

Available in 4 versions:

- KSC1: without actuator
- KSC2: with short soft actuator
- KSC3: with short hard actuator
- KSC4: with long soft actuator

2 types of KSC4:

- standard with yellow actuator: 70 shore
- low force with red actuator: 50 shore

Main features

- With or without actuator
- Positive tactile feedback
- Operating force from 1.1N [110 grams] to 5.5N [550 grams]
- Typical travel from 0.3 mm [.118 inch] to 0.75 mm [.295 inch]
- Tin plated terminals for easy soldering
- Gullwing or J-type terminals
- Adapted to the main soldering methods of surface mounted components (SMT)
- This product is totally washable and sealed according to EIA - RS-448-2 test and IP 67 (dust tight, protected against the effects of immersion in water)
- Can be used in the major automatic insertion machines
- Delivered in thermoformed tape and reels of 2000 pieces, KSC4 of 1000 pieces

Note: Identification

- The 4th and 5th digits of KSC code are stamped on the metallic top plate
- The other characteristics of the code can actually be seen on the product.

Example



- 2 = 1.6N [160 grams] and 200 k operations
- 1 = temperature - 40°C to + 85°C

Construction

Function	Momentary action
Contact arrangement	1 make contact = SPST, NO
Terminals	PC pins: J-type or gullwing-type
Mounting	SMT (surface mount technology)

Electrical data

	S = silver	G = gold
Switching power min./max.	1 VA	0.2 VA
Switching voltage min./max.	20 mV/50 V	20 mV/50 V
Switching current min./max.	1 mA/50 mA	1 mA/10 mA
Dielectric strength (50 Hz, 1 Min.)	≥ 250 V	≥ 250 V
Operating life with max. switching power	See table next page	
Contact resistance, initial	≤ 100 mΩ	≤ 100 mΩ
Insulation resistance (100 V)	≥ 10 ⁹ Ω	≥ 10 ⁹ Ω
Bounce-time	≤ 1 ms	≤ 1 ms

Mechanical data

Total travel	See table next page
Max. operating force	40N [4000 grams]

Further data

Contact material	Silver	Gold
Insulation material	See table next page	
Operating temperature	- 40°C to + 85°C	- 40°C to + 125°C
Storage temperature	- 55°C to + 85°C	- 55°C to + 125°C

Packaging:
KSC1, KSC2 and KSC3 are delivered on continuous tape in reels of 2000 pieces, KSC4 in reels of 1000 pieces. Dimensions of reels according to EIA RS481 or IEC 2863. External diameter 330 mm ± 2 mm.

Soldering:

Depending on the application of the KSC, this component is suited to the following methods:

Flow soldering

- The KSC terminals being SnPb plated over a Nickel barrier, the use of slightly activated flux is suitable.
- Soldering on double wave machine. The bath temperature is generally 255°C ± 5°C and soldering time < 5 sec.
- Cleaning according to usual washing processes.

Vapor phase reflow soldering	Temperature: 215°C; Duration: up to 60 seconds
Infrared reflow soldering	Temperature: 200°C, with peak of 230°C during 10 to 15 seconds

Conductive inks

Silver based inks can be used for the connection of KSC on PC board. Curing conditions depend on the type of conductive ink.

KSC Miniature Tact Switch for SMT

2

SWITCHES & KNOBS

Selection guide

	KSC1	KSC2	KSC3	KSC4
Actuator	without	short, soft	short, hard	long, soft
Actuator material	—	silicone	thermoplastic	silicone
Housing material	thermoplastic	thermoplastic	thermoplastic	thermoplastic
Operating force (Newton)	See table below.			
Travel min./max. mm [inch]				
Life expectancy (k operations)				
Total height above P.C.B	2.5 mm [.0984 inch]	3.5 mm [.138 inch]	3.5 mm [.138 inch]	5.2 mm [.205 inch]
EIA 448-2	YES	YES	YES	YES
Tightness/washability				
Gold: high temperature version	YES	YES	YES	YES
Terminal plating	tin plated	tin plated	tin plated	tin plated
Terminal type: G (gullwing), J (J type)	G or J	G or J	G or J	G or J
Soldering process infrared/double wave/ vapor phase max. 265°C/5 seconds	YES	YES	YES	YES

Operating force / operating life / travel table

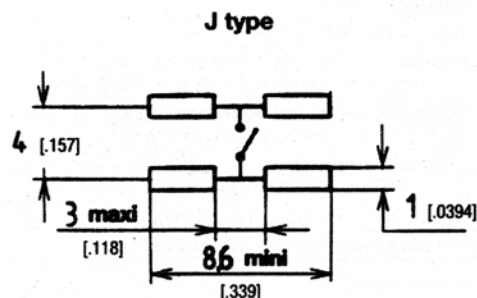
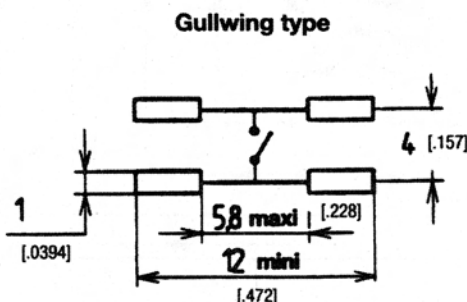
Type ¹⁾	Operating force FA ²⁾ N [grams]	Operating life k operations	Travel mm [inch]
KSC121	1.6 [160]	200	0.25 [.00984] $^{+0.04}_{-0}$
KSC141	3.0 [300]	200	0.30 [.0118] $^{+0.04}_{-0}$
KSC151	5.5 [550]	100	0.30 [.0118] $^{+0.04}_{-0}$
KSC221	2.0 [200]	500	0.35 [.0138] $^{+0.03}_{-0.1}$
KSC241	3.5 [350]	300	0.40 [.0157] $^{+0.04}_{-0.1}$
KSC321	1.6 [160]	500	0.20 [.00787] $^{+0.03}_{-0}$
KSC341	3.0 [300]	300	0.20 [.00787] $^{+0.03}_{-0}$
KSC351	5.5 [550]	100	0.25 [.00984] $^{+0.03}_{-0}$
KSC401 (50 shore)	1.1 [110]	5000	0.50 [.0197] $^{+0.05}_{-0.05}$
KSC411	1.4 [140]	1000	0.35 [.0138] $^{+0.05}_{-0.15}$
KSC421	1.7 [170]	1000	0.50 [.0197] $^{+0.05}_{-0.05}$
KSC441	3.2 [320]	300	0.75 [.0295] $^{+0.05}_{-0.05}$

¹⁾ Last digit: 1 = silver contacts, 3 = gold contacts

²⁾ Tolerance of operating force FA is $\pm 25\%$; operating force values of gold contact types higher: + 0.3N [30 grams]

Note: Operating life is given for tested forces corresponding to the actuator force value $\times 2$.

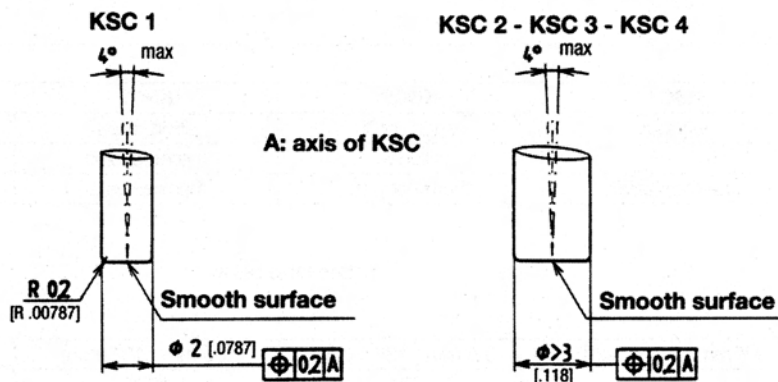
PCB layout



KSC Miniature Tact Switch for SMT

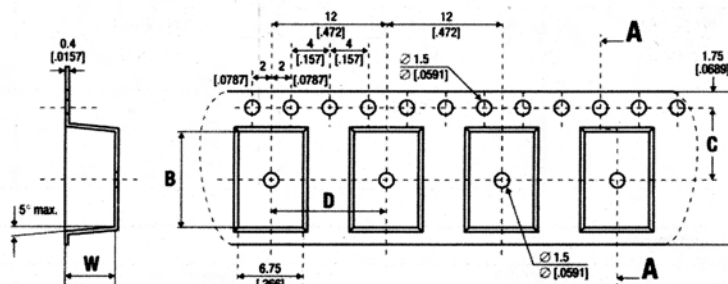
Dimensional Drawings Actuator · Dimensions in mm [inch]

Recommended dimensions

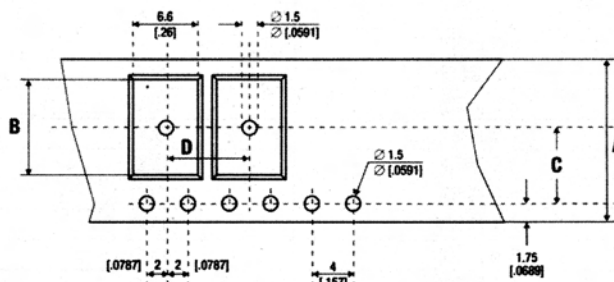


Dimensional Drawings Packaging · Dimensions in mm [inch]

KSC4



KSC1, KSC2, KSC3



	W
KSC1	2.9 mm [.114 inch]
KSC2	3.7 mm [.146 inch]
KSC3	3.7 mm [.146 inch]
KSC4	5.5 mm [.217 inch]

		A	B	C	D
KSC1, KSC2, KSC3	G type	16 [.630]	10.4 [.409]	7.5 [.295]	8 [.315]
	J type	12 [.472]	7.2 [.283]	5.5 [.217]	8 [.315]
KSC4	G type	16 [.630]	10.5 [.413]	7.5 [.295]	12 [.472]
	J type	16 [.630]	7.3 [.287]	7.5 [.295]	12 [.472]

Ordering code

1	2	3	4	5	6	7
Designation: KS	C	4	2	1	J	B
Type: C (for SMT)						
Actuator: 1 = without; 2 = short, soft actuator; 3 = short, hard actuator; 4 = long, soft actuator						
Operating force and operating life: 0, 1, 2, 4, 5 see table page A-15: operating force						
Ambient temperature: 1 = -40°C to +85°C (low, silver contacts), 3 = -40°C to +125°C (high, gold contacts)						
Terminals: J = J type, G = gullwing						
Housing material: B = Thermoplastic						

KSC Miniature Tact Switch for SMT

Dimensional Drawings · Dimensions in mm [inch]

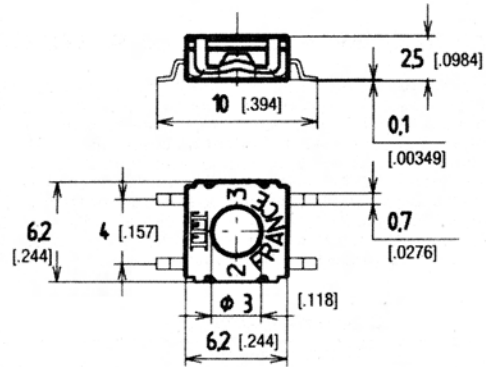
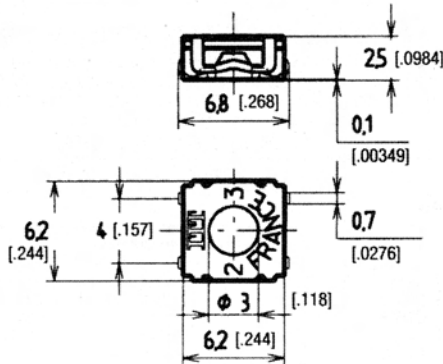
2

SWITCHES & KNOBS

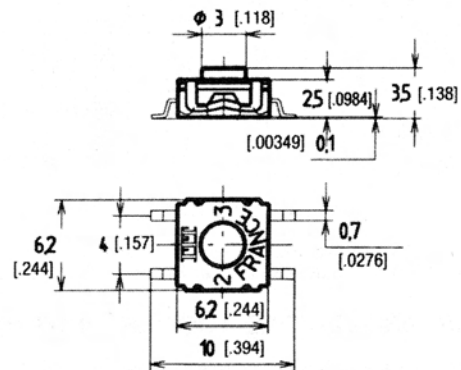
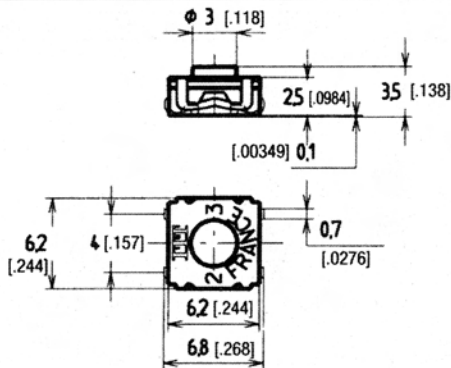
J type: internal bending

Gullwing type: external bending

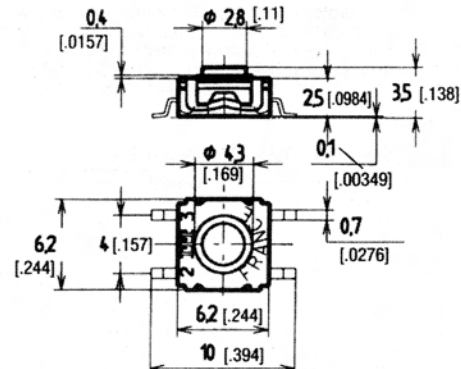
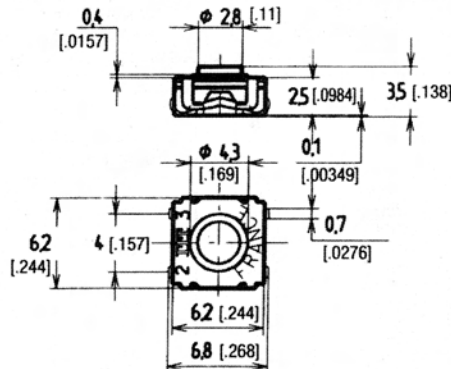
KSC1



KSC2



KSC3



KSC4

