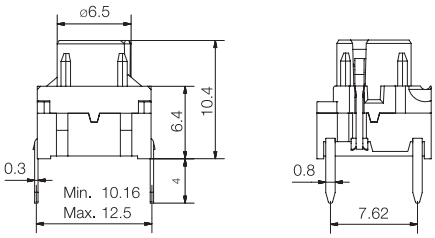
multimec®

illumec™ 4F

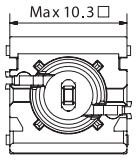
Technical Data

- through-hole or SMD
- 50mA/24VDC
- single pole/momentary
- 10.000.000 operations life time
- IP67 sealing
- temperature range:
  high temp. switch; -40/+160°C
  LED: -30/+85°C

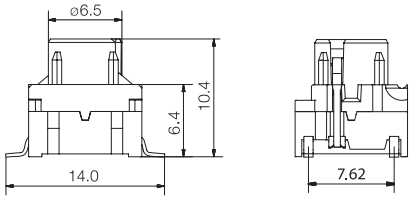
Dimensions (through-hole)



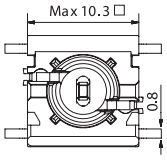
Top View



Dimensions (SMD)

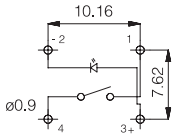


Top View

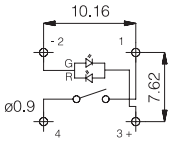


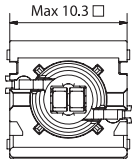
PCB layout and Circuit Diagram

1 LED



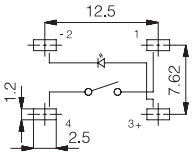
2 LEDS



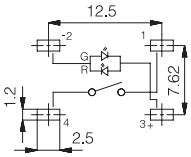


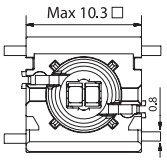
PCB layout and Circuit Diagram

1 LED



2 LEDS





Technical specifications for 4F switch and LEDs see pages 35 and 36

How to order

4 F			+			
Switch	Mounting		LED	Illuminated Cap		
	SH9 surface mount		**01**		**1D**	
	TH9 through-hole		**22**		**1K,1KB,1KC**	
			42		**1N**	
			61		**1S**	
			82		**1T**	
			2242		**1U**	
			8222		**1V**	
			8242		**1WA,1WD,1WP**	
					1X	

Colour code

		Cap	Solid Colour / Illuminated Lens
11,16			
11,16			
10,12,14,16,18			**1E Solid Colour + lens 1,2,4,6,8**
11			**1F Solid Colour + lens 1,2,4,6,8**
16			**1Q Solid Colour + lens 1,6**
16			**1R Solid Colour + lens 1,6**
16			
16			
11			

Colour codes

LEDs	Illuminated Caps	Lenses
01 blue	**10** frosted blue	**1** transparent
22 green	**11** transparent	**2** green
42 yellow	**12** frosted green	**4** yellow
61 white	**14** frosted yellow	**6** frosted white
82 red	**16** frosted white	**8** red
2242 green/yellow	**18** frosted red	
8222 red/green		
8242 red/yellow		

Solid Colours

1E,1F	1Q,1R
00 blue	**00** blue
02 green	**03** grey
03 grey	**08** red
04 yellow	**09** black
06 white	
08 red	
09 black	

Dimensions

Ordering example: 4FSH98242 + 1D11 or 4FTH922 + 1T16

For updates of products and/or changes of specifications please see **www.mec.dk**

multimec® technical specifications

RoHS Compatible

	3A-3C-3E-3F Low Temperature Versions		3A-3C-3E-3F High Temperature Versions		illumec™ 4A - 4F High Temperature Versions	
	Silver	Gold	Silver	Gold	Silver	Gold
Electrical Specifications						
Contact resistance	<30m Ω - typ. 10m Ω		<30m Ω - typ. 10m Ω		<30m Ω - typ. 10 m Ω	
Insulation resistance	>10M Ω		>10M Ω		>10M Ω	
Recommended load	0.5-50mA 24VDC	0.5µ-50mA 24VDC	0.5-50mA 24VDC	0.5µ-50mA 24VDC	0.5-50mA 24VDC	0.5µ-50mA 24VDC
Contact bounce	<2mS - typically 0.5mS		<2mS - typically 0.5mS		<2mS - typically 0.5mS	
Mechanical Specifications						
Standard actuation force (switch)	3.0N typ.		3.0N typ.		3.0N typ.	
Max. actuation force without cap	100N for 10 sec.		100N for 10 sec.		100N for 10 sec.	
Key travel (switch)	1 mm		1 mm		1 mm	
Life time (switch)	>10.000.000 cycles		>10.000.000 cycles		>10.000.000 cycles	
Temperature Range						
Working temperature	Min. -40°C Max. +115°C		Min. -40°C Max. +160°C		Min. -30°C Max. +85°C*	
Storage temperature	Min. -40°C Max. +115°C		Min. -40°C Max. +160°C		Min. -30°C Max. +85°C*	
Soldering IEC 68-2-20	Wave - max. 260°C for max. 10 sec., please refer to usage guidelines. Soldering iron - max. 350°C for max. 3 sec. Flux tight.		Infrared, vapour phase, wave - max. 240°C for max. 40 sec. or max. 260°C for max. 30 sec. Soldering iron - max. 350°C for max. 3 sec. Flux tight.		Infrared, vapour phase, wave - max. 240°C for max. 40 sec. or max. 260°C for max. 30 sec. Soldering iron - max. 350°C for max. 3 sec. Flux tight.	
Environmental Endurance IEC 68-2-3						
Temperature	+40°C		+40°C		+40°C	
Humidity	93% RH		93% RH		93% RH	
Duration	56 Days		56 Days		56 Days	
Temperature Cycling IEC 68-2-14						
Temperature limit	Min. -40°C - Max. +125°C		Min. -40°C - Max. +125°C		Min. -40°C - Max. +125°C	
Number of cycles	10		10		10	
Exposure time at each temperature	30 min.		30 min.		30 min.	
Recovery time before measurements	16 hrs.		16 hrs.		16 hrs.	
Sealing IEC 529	IP-67		IP-67		IP-67	
Cleaning	Standard methods - see usage guidelines		Standard methods - see usage guidelines		Standard methods - see usage guidelines	
Vibration Test IEC 68-2-6						
Cycles					10	
Cycles time					2 hrs.	
Material Specifications - Switches						
Housing	PBT UL94VO		PPS UL94VO		PPS UL94VO	
Actuator	PBT UL94VO		PPS UL94VO		PPS UL94VO	
Sealing + spring	Silicone rubber		Silicone rubber		Silicone rubber	
Contact spring	Stainless steel + 3µAg	Stainless steel + 1µAu	Stainless steel + 3µAg	Stainless steel + 1µAu	Stainless steel + 3µAg	Stainless steel + 1µAu
Fixed contacts	SnCu + 2µNI + 3µAg	SnCu + 2µNI + 1µAu	SnCu + 2µNI + 3µAg	SnCu + 2µNI + 1µAu	SnCu + 2µNI + 3µAg	SnCu + 2µNI + 1µAu
Terminals	SnCu + 2µNI + 3µSn100	SnCu + 2µNI + 3µSn100	SnCu + 2µNI + 3µSn100	SnCu + 2µNI + 3µSn100	SnCu + 2µNI + 3µSn100	SnCu + 2µNI + 3µSn100

Material Specifications - Caps & Bezels			
Material	**Parts**	**Temp limit**	**UL rating**
ABS	1A, 1B, 1C, 1D, 1E, 1F, 1H, 1K, 1M, 1N, 1P, 1Q, 1R, 1T, 1U, 1V, 1WA, 1WD, 1WP, 1X, 1ZA, 1ZB, 1ZC.	Max. 65°C	UL94HB
Polycarbonate	All lenses, 3E coloured actuators	Max. 85°C	UL94V1
LCP	Black actuator of 3E	Max. 160°C	UL94VO
PPS	1S, 2S	Max. 160°C	UL94VO
Polyamide	Actuator of Varimec™, 1GA/1GC	Max. 160°C	UL94VO
Legends Adhesion	ISO Class: 1/ASTM Class: 4B DIN EN ISO 2409		

* LED max. working temperature

Specifications are subject to change without notice.

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multimec® LEDs

For 3A switches		3AXXX (for 1C/1H)				2BXXX			
Colour		**B**	**G**	**Y**	**R**	**G**	**Y**	**R**	
Colur Codes		00	20	40	80	20	40	80	
Absolute Maximum Ratings	(Ta=25°C)								
Power	mW	105	100	60	100	75	60	60	
Current forward	mA	30	30	20	30	20	20	20	
Forward peak current	mA	150	120	80	120	60**	60**	60**	
Voltage reverse	V	5	5	5	5	3	3	3	
Operating temperature	°C	-40 - +85	-55 - +100			-25 - +85			
Storage temperature	°C	-40 - +85	-55 - +100			-30 - +100			
Soldering temperature	°C	260/5 sec.	260 for max. 3 sec.			260 for max. 5 sec.			
Electrical-Optical Characteristics	(Ta=25°C)								
Voltage forward	Typ. V	3.8	2.1*	2.1*	2.0*	2.1	2.1	2.0	
	Max. V	4.5	2.8*	2.8*	2.8*	3.0	3.0	3.0	
Current reverse (V_R = 5V)	µA	10	100	100	100	10	10	10	
Wave length	nm	466	565	585	630	563	585	650	
Spread	Δnm	30	30	35	40	40	40	40	
Spread angle	degree	40	90	90	90	45	45	45	
Luminous Intensity	Min. mcd	4	0.7	1.7	1.1	9.0	5.6	5.6	
	Typ. mcd	10	2.5	5.6	3.7	25	16	16	
Orientation	The longer pin is the anode, the shorter is the cathode								

*/$_F$ = 20mA, **Pulse width 1ms Duty cycle 1:5

For 3F switches		3FXXX (for 1E-1F-1N-1Q-1R-1S-1X)							3FXXX (for 1K-1T-1U-1V-1W-1WD)		
Colour		**B**	**G**	**Y**	**R**	**G/Y**	**R/G**	**R/Y**	**G**	**Y**	**R**
Colur Codes		00	20	40	80	2040	8020	8040	23	45	88
Absolute Maximum Ratings	(Ta=25°C)										
Power	mW	105	70	60	60	120	120	120	150	130	300
Current forward	mA	30	20	20	20	25	25	25	40	40	90
Forward peak current	mA	200	60**	60**	60**	150	150	150	500	500	1000
Voltage reverse	V	5	3	3	3	5	5	5	12	12	5
Operating temperature	°C	-25 - +85				-40 - +85			-55 - +100		
Storage temperature	°C	-30 - +100				-40 - +85			-55 - +100		
Soldering temperature	°C	260 for max. 5 sec.				260 for max. 2 sec.			300 for max. 3 sec.		
Electrical-Optical Characteristics	(Ta=25°C)										
Voltage Forward	Typ. V	2.1	2.1	2.1	2.0	2.1	2.1	2.1	2.1*	2.3***	2.4***
	Max. V	2.8	3.0	3.0	3.0	2.8	2.8	2.8	2.5*	2.5***	3.8***
Current reverse (V_R = 5V)	µA	2	10	10	10	2	2	2	10	10	10
Wave length	nm	460	563	585	650	565/590	625/565	625/590	570	587	635
Spread	Δnm	40	40	40	40	35	35	35	25	45	45
Spread angle	degree	20	45	45	45	60	60	60	80	90	55
Luminous Intensity	Min. mcd	20	9.0	5.6	5.6	8	8	8	71****	71****	100****
	Typ. mcd	25	25	16	16	25	25	25	112****	112****	160****
Orientation	The longer pin is the anode, the shorter is the cathode. For bicolor LEDs the anode for the first colour (ex. 2080) is the longer pin.										

***/$_F$ = 50mA, ****Luminous Flux mlm

For 4A/4F switches		illumec™ LEDs specifications				
Colour		**B**	**G**	**Y**	**W**	**R**
Colur Codes		01	22	42	61	82
Absolute Maximum Ratings	(Ta=25°C)					
Power	mW	60	65	65	80	65
Current forward	mA	20	25	25	15	25
Forward peak current	mA	150	150	100	200	100
Voltage reverse	V	5	12	12	5	12
Operating temperature	°C	-30 - +85				
Storage temperature	°C	-30 - +85				
Soldering temperature	°C	245 for max. 10 sec.				
Electrical-Optical Characteristics	(Ta=25°C)					
Voltage forward	Typ. V	3.35	2.2	2	3.05	2
	Max. V	3.5	2.5	2.5	3.2	2.5
Current reverse (V_R = 5V)	µA	0.01	0.02	0.01	0.01	0.01
Wave length	nm	470	570	588	n.a.	633
Spread	Δnm	n.a.	30	16	n.a.	16
Spread angle	degree	145	160	160	138	160
Luminous Intensity	Min. mcd	30	28	112	28	112
	Typ. mcd	35	70	150	35	150
Optical Intensity	Lm/w	4			2.5	

B= Blue, G= Green, Y= Yellow, R= Red, W= White, G/Y= Green/Yellow, R/G= Red/Green, R/Y= Red/Yellow
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