MOSFET BASED DC SOLID-STATE RELAY

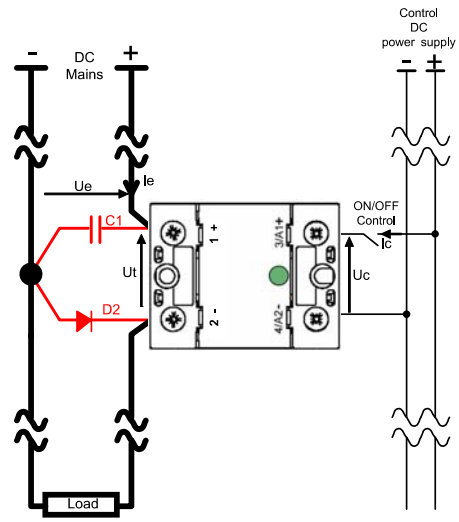
SOM02060

- Latest MOSFET technology generation.
- Ultra low on-state resistance.
- Low output leakage current.
- Low control current consumption.
- Built-in overvoltage protection
- Reverse protected triggered control input to avoid linear control risks
- No radiated or conducted disturbances
- Touch protected housing IP20

Control voltage range	3.5-32VDC
Max. permanent output voltage	40VDC
Max. load current with heatsink	20ADC

Load voltage range	Load current range	Control input voltage range	In & case / Out Insulation	Connections	Dimensions (WxHxD)	Weight
5-40VDC	Up to 20A (with heatsink)	3.5-32VDC	2.5kV	Screw terminals	45 x 58.5 x 30	80g

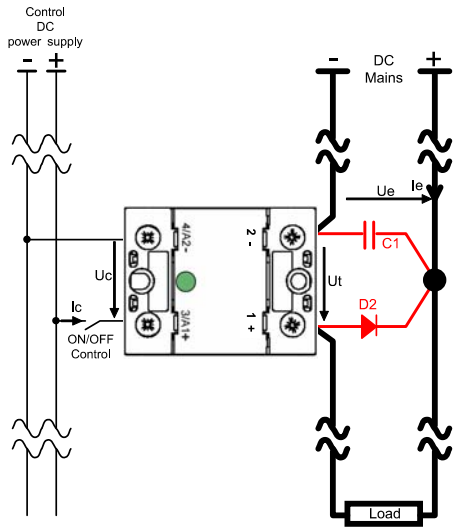
Fig. 1 HIGH SIDE WIRING DIAGRAM (Load connected to "-")



See Instruction sheet to select the right protective components

The red paths (C1/D2) must be as short as possible !

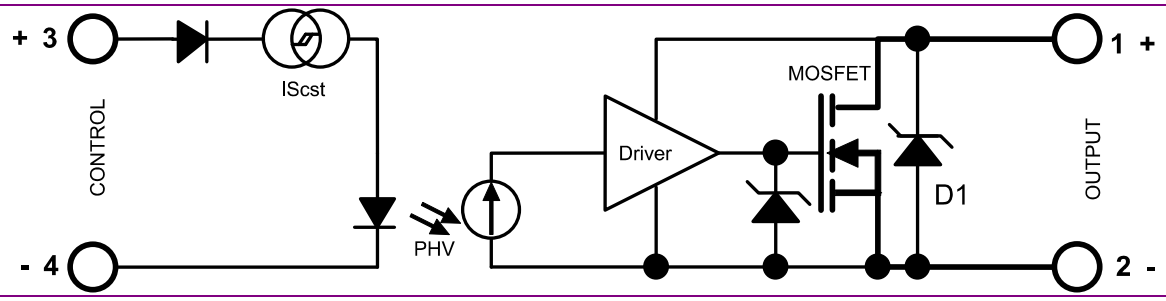
Fig. 2 LOW SIDE WIRING DIAGRAM (Load connected to "+")



See Instruction sheet to select the right protective components

The red paths (C1/D2) must be as short as possible !

Fig. 3 INTERNAL DIAGRAM



CONTROL INPUT CHARACTERISTICS

INPUT CIRCUIT

CHARACTERISTIC	LABEL	VALUE	INFO.
Nom. Control voltage	Ucnom	12-24VDC	
Min. Control current	Icmin	35mADC	-100µA/°C
Control voltage range	Uc	3.5 – 32VDC	typical ON=3.3V
Control current consumption	Ic	32 – 35mADC (for control voltage range)	See fig. 5
Releasing control voltage	Ucoffmax	1VDC	typical OFF= 2.6V
Max. reverse control voltage	-Ucmax	32VDC	-Icmax<100µA
Input impedance	Rin	Current limitation	See fig. 5

POWER OUTPUT CHARACTERISTICS

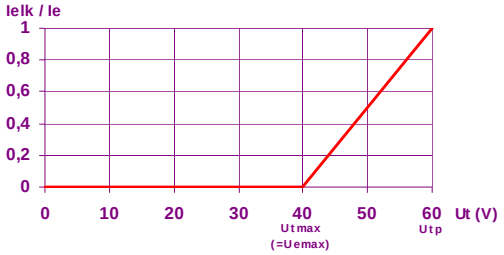
POWER CIRCUIT

CHARACTERISTIC	LABEL	VALUE	INFO.
Nominal voltage	Uenom	24VDC	
Voltage range	Ut / Ue	5-40VDC	
Non-repetitive peak voltage	Utp	60V	
Overvoltage protection	D1	Transient voltage suppressor 39V (1500W/1ms)	
Max reverse voltage drop (internal diode at OFF state)	-Ut	1.5V	@Ie=55A @Uc=0
Maximum nominal currents	Ie max	Resistive: 20A / Motor: Please contact us	See fig. 7 (limits)
Non-repetitive peak overload current	Id max	200A	See fig. 8
Min. load current	Iemin	5mA	
Max. leakage current	Ielk max	3mA	@Utmax @Tjmax
Max. on-state resistance	RDSon	36mΩ	@Iemax @Tjmax
Typ. output capacitance	Cout	0.3nF	
Junction/case thermal resistance per power element	Rthjc	1.8K/W	
Built-in heatsink thermal resistance vertically mounted	Rthra	10K/W	@ΔTra=75°C
Heatsink thermal time constant	Tthra	10 minutes	@ΔTra=40°C
Control inputs/power outputs insulation voltage	Uimp	2.5kV	
Inputs/case insulation voltage	Uimp	2.5kV	
Outputs/case insulation voltage	Uimp	2.5kV	
Isolation resistance	Rio	1GΩ	
Isolation capacitance	Cio	<8pF	
Maximum junction temperature	Tjmax	175°C	
Storage ambient temperature	Tstg	-40->+100°C	
Operating ambient temperature	Tamb	-25->+90°C	See fig. 7
Max. case temperature	Tc	100°C	

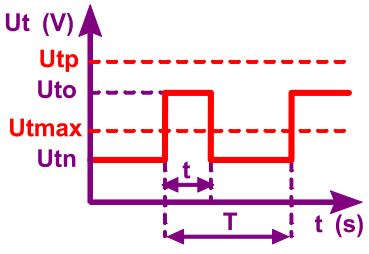
PROTECTION CHARACTERISTICS

PROTECTION

Leakage current (Ielk) vs DC voltage (Ut)



Absolute limits



$$Uto < Utp$$

$$t\,max = \frac{0.75}{(Uto - Ut\,max) \times Ie}$$

$$P_{(protection)} = 1W_{max}$$

$$\Rightarrow \frac{(Uto - Ut\,max) \times Ie \times t}{T} \leq 1$$

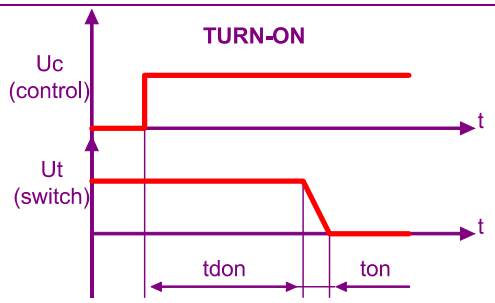
Ielk : Leakage current of the relay
Ie : User load nominal current
Utp : Relay max. non repetitive peak voltage

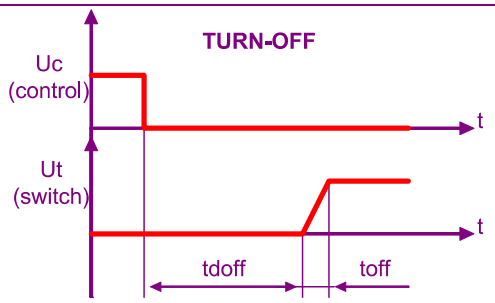
Utmax : Max. nominal voltage of the relay
Uto : Possible overvoltage above Utmax
Utn = Ue : User DC power supply voltage

t : Overvoltage duration
T: Time between 2 overvoltage

TIME CHARACTERISTICS

Fig. 4 TIME DIAGRAMS





TIME CHARACT.	CHARACTERISTIC	LABEL	VALUE	INFO.
	Turn on time	ton	20µs	
	Turn on delay	tdon	20µs	
	Turn off time	toff	20µs	
	Turn off delay	tdoff	20µs	
	Max. On-Off frequency	$F_{(on-off)}$	>1000Hz (for high frequency, take 2 x Ie to calculate the heatsink; the protections must be chosen carefully)	Refer to the instruction sheet

GENERAL INFORMATION

MISC.				
	Display		Green LED (indicates relay has switched ON)	
	Housing		UL94V0	
	Mounting		2 screws (M4x12mm ; tightening = 1.2N.m)	See mounting sheet
	Noise level		None	
	Weight		80g	

STANDARDS

GENERAL				
	Standards		IEC60947-1	
	Protection level		IP20	
	Protection against direct touch		Yes	
	CE marking		Yes	
	UL, cULUS		Yes	

E.M.C. IMMUNITY	TYPE OF TEST	STANDARD	LEVEL	EFFECT
	Fast transients bursts	EN61000-4-4	4kV criterion B	
	Electric chocks	EN61000-4-5	1kV criterion B	
	Voltage drop	EN61000-4-11	-	

CHARACTERISTIC CURVES

Fig. 5 INPUT CHARACTERISTIC

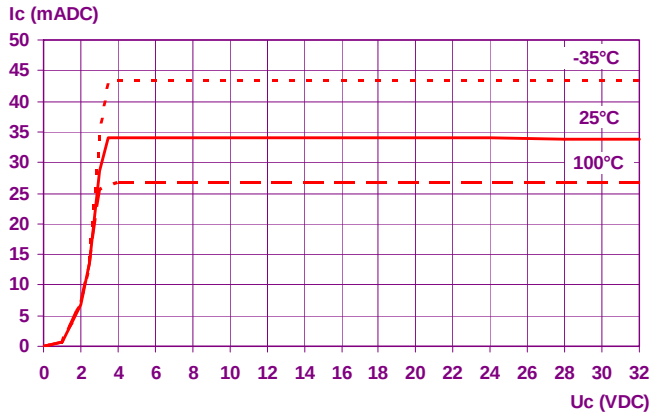


Fig. 6 ON RESISTANCE VS JUNCTION TEMPERATURE

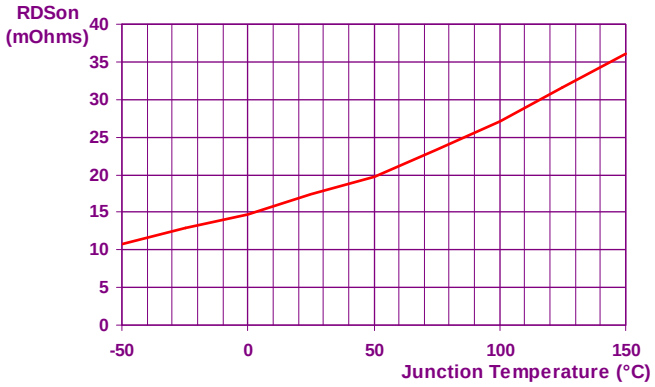
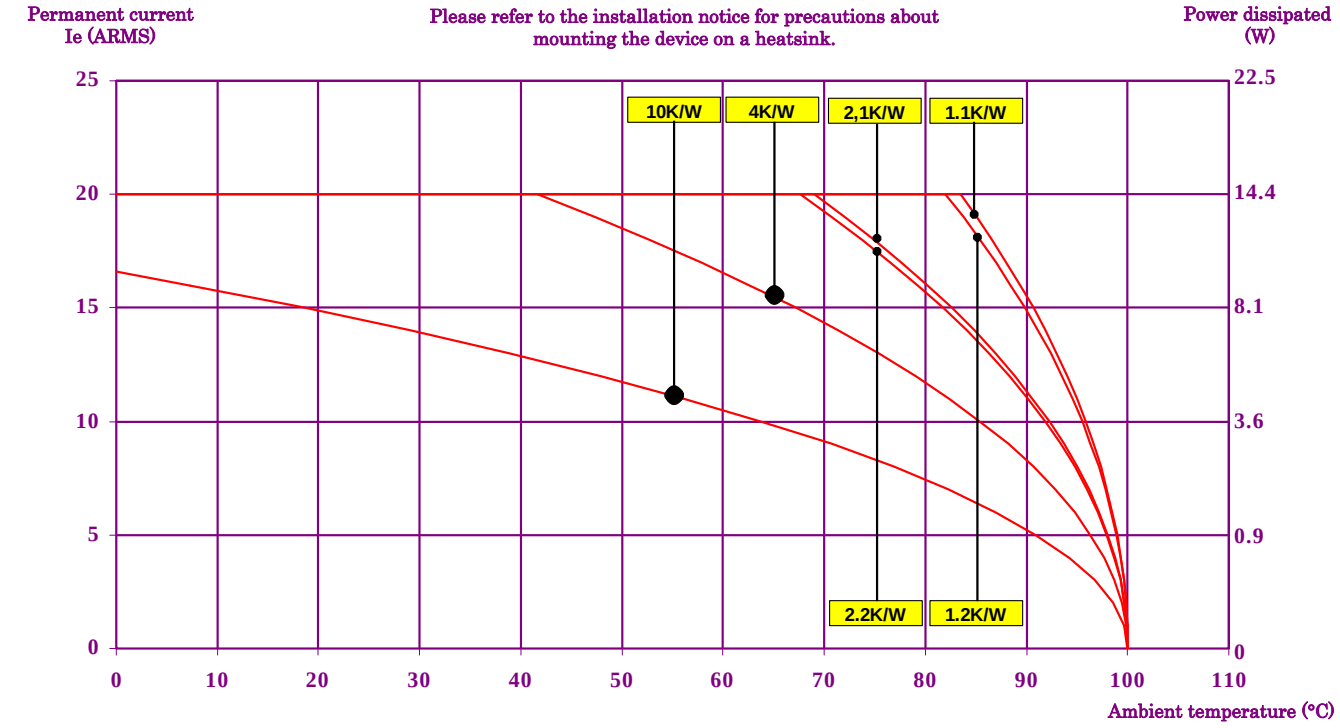


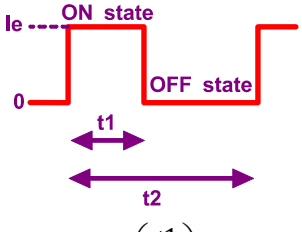
Fig. 7 POWER DISSIPATED AND LOAD CURRENT LIMIT VS TEMPERATURE

Please refer to the installation notice for precautions about mounting the device on a heatsink.

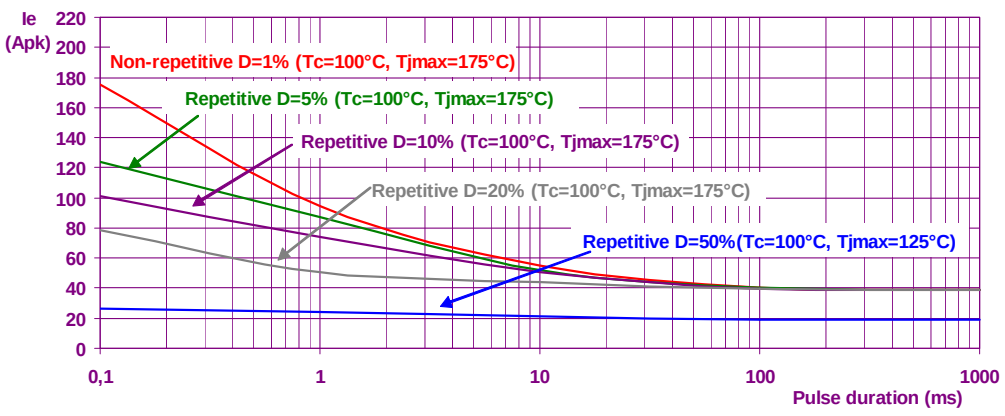


10K/W = No Heatsink
2.1K/W = WF210000
4K/W = 150x150x3mm aluminium sheet
1.2K/W = WF121000
2.2K/W = WF262100
1.1K/W = WF131100
2.2K/W = WF151200

Fig. 8 PEAK OVERLOAD CURRENT vs. PULSE DURATION CHARACTERISTIC



$$D(\%) = \left(\frac{t1}{t2}\right) \times 100$$

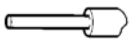
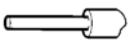


CONNECTIONS

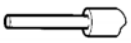
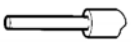
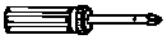
Direct connection with wires with or without ferrules

With ring terminals

okpac® — Control wiring

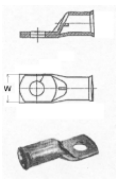
Number of wires				Screwdriver type	Recommended tightening torque M4 screw
1		2			
SOLID (No ferrule)	FINE STRANDED (With ferrule)	SOLID (No ferrule)	FINE STRANDED (With ferrule)		
					N.m
0,75 ... 2,5 mm² AWG18....AWG14	0,75 ... 2,5 mm² AWG18....AWG14	0,75 ... 2,5 mm² AWG18....AWG14	0,75 ... 2,5 mm² AWG18....AWG14	POZIDRIV 2	Mini 1,2 / Typ 1.5 / Max 2

okpac® — Power wiring

Number of wires				Modèle de tournevis / Screwdriver type	Recommended tightening torque M5 screw
1		2			
SOLID (No ferrule)	FINE STRANDED (With ferrule)	SOLID (No ferrule)	FINE STRANDED (With ferrule)		
					N.m
1,5 ... 10 mm² AWG16....AWG8	1,5 ... 6 mm² AWG16....AWG10	1,5 ... 10 mm² AWG16....AWG8	1,5 ... 6 mm² AWG16....AWG10	POZIDRIV 2	Mini 2 / Typ 2.4 / Max 3

Power with ring terminals.

W max =12,6mm
16 mm² (AWG6)
25 mm² (AWG4)
35mm² (AWG2 /AWG3)
50mm² (AWG0 /AWG1)



Suitable ring terminals and special kit for high current can be delivered: see high power SSR and data-sheet for power connection.

IP20 flaps

Flaps are delivered mounted on the relay.

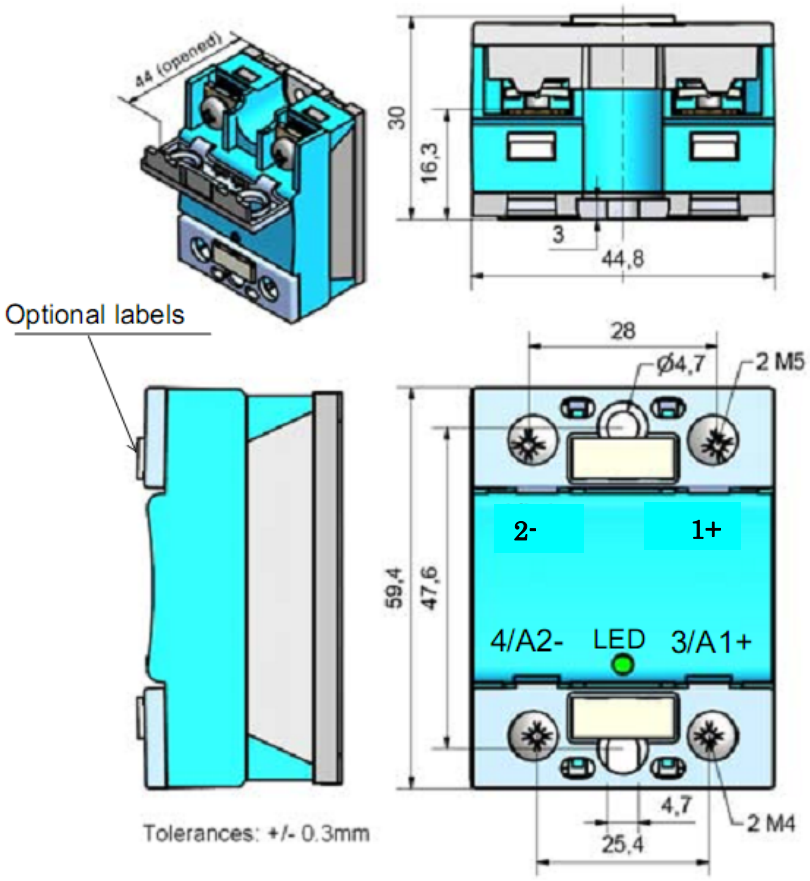
Labels
Marking labels are available, for mounting on flaps.
Part number : 1MZ09000
(delivered per 200 parts)

FASTONS : Consult us

DIMENSIONS AND ACCESSORIES

Fig. 12 DIMENSIONS (mm)

CAD documents : www.celduc-relais/uk/plan3D.asp



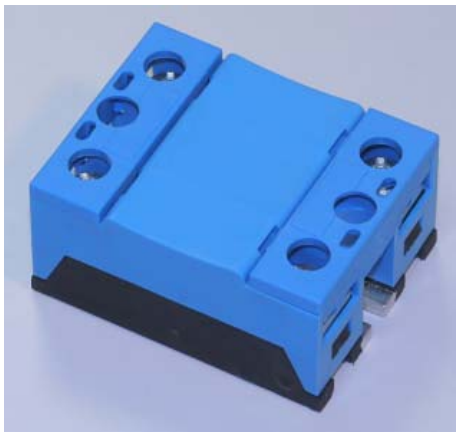
ACCESSORIES

READY TO USE OVERVOLTAGE PROTECTION
ESO01000

(Please check our website for availability)

This device includes a diode (D2) and a capacitor (C1) suitable for most of the DC application.

To be mounted close to the SOM.



Please consult our website for other accessory references
(Heatsinks, mounting adaptors, thermal grease…)

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