MOSFET BASED DC SOLID-STATE RELAY

(With built-in transient voltage suppressor)

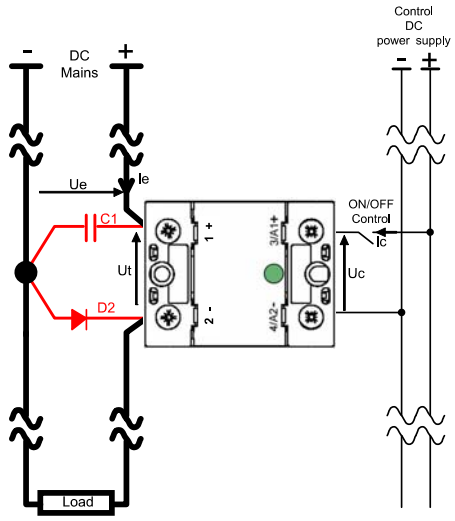
SOM06075

- Latest MOSFET technology generation.
- Ultra low on-state resistance.
- Low output leakage current.
- Low control current consumption.
- Built-in overvoltage protection (TVS)
- 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 transient peak voltage	75V
Max. DC Mains peak voltage	40VDC
Max. Load Current (with heatsink)	60ADC

DC Mains voltage range	Load current range	Control input voltage range	In & case / Out Insulation	Connections	Dimensions (WxHxD)	Weight
5-40VDC (75Vpeak)	Up to 60A (with heatsink)	3.5-32VDC	2.5kV	Screw terminals	45 x 58.5 x 30	80g

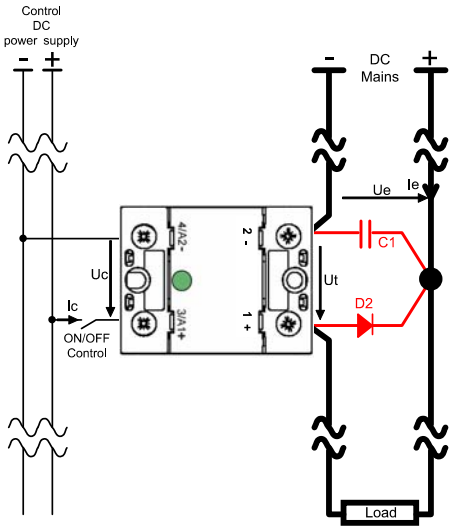
Fig. 1 HIGH SIDE WIRING DIAGRAM (Load connected to "-")



Please consult us to select the right protective components C1 & D2.
(see also accessory list page 5)

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

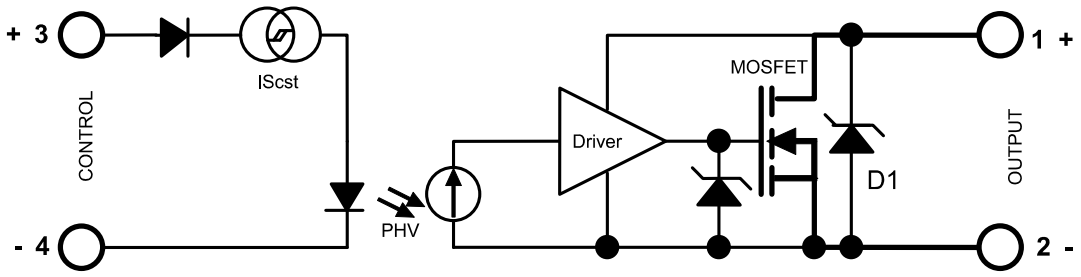
Fig. 2 LOW SIDE WIRING DIAGRAM (Load connected to "+")



Please consult us to select the right protective components C1 & D2.
(see also accessory list page 5)

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

Fig. 3 INTERNAL DIAGRAM



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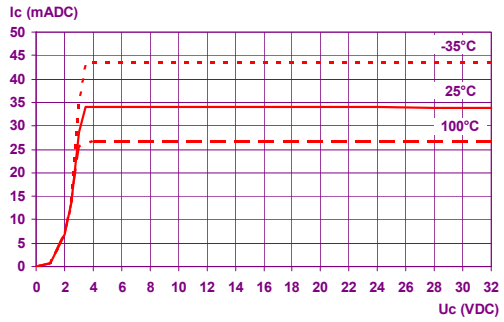
CONTROL INPUT CHARACTERISTICS

INPUT CIRCUIT

CHARACTERISTIC	LABEL	VALUE	INFO.
Nom. Control voltage	U_{cnom}	12-24VDC	
Nom. Control current	I_{cnom}	35mADC	-100µA/°C
Control voltage range	Uc	3.5 – 32VDC	typical=3.3V
Control current consumption	Ic	32 – 35mADC	See curve
Releasing control voltage	$U_{coffmax}$	1VDC	Typical= 2.6V
Max. reverse control voltage	$-U_{cmax}$	32VDC	-Icmax <100µA
Input impedance	Rin	Current limitation	See curve

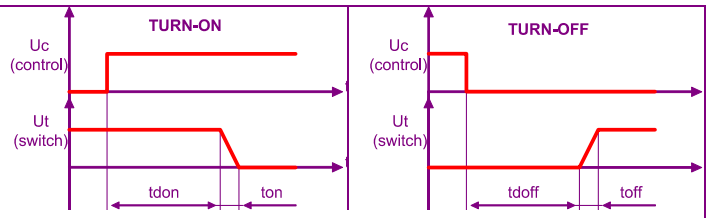
Fig. 4 CONTROL CURRENT vs. CONTROL VOLTAGE



TIME CHARACTERISTICS

TIME CHARACT.

CHARACTERISTIC	LABEL	VALUE
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. Please consult us if any.

POWER OUTPUT CHARACTERISTICS

POWER CIRCUIT

CHARACTERISTIC	LABEL	VALUE	INFO.
Nominal voltage	Uenom	24VDC	
Voltage range	Ut Ue	5-40VDC	Utmax=40VDC
Non-repetitive peak voltage	Utp	75V	
Overvoltage protection	D1	39V (Transient voltage suppressor)	1500W / 1ms See fig.10 & 11
Off-state max reverse voltage drop (internal diode)	-Ut	0.92V	@Ie=75A & @Uc=0 See fig. 6
Maximum nominal currents	Ie max	Resistive: 60A; Motor: Please contact us	See fig. 9
Max. non-repetitive peak current	Iepeak	Switch OFF D<1%: 294A; Switch OFF Fmax: 60A; ON-state: 750A	@Tc=100°C @Tj=175°C @Utp (See fig. 8)
Min. load current	Iemin	5mA	
Max. leakage current	Ielk max	3mA	@Utmax @Tjmax
Max. on-state resistance	RDSon	4.5mOhms @Tj=25°C; 8.2mOhms @Tj=125°C	@Iemax
Typ. output capacitance	Cout	1.5nF	@Utp
Junction/case thermal resistance per power element	Rthjc	1.2K/W	
Built-in heatsink thermal resistance vertically mounted	Rthra	10K/W	@ΔTra=75°C
Heatsink thermal time constant	Tthra	10 minutes	@ΔTra=60°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. 9
Max. case temperature	Tc	100°C	

OUTPUT SWITCH CHARACTERISTIC CURVES

Fig. 5 ON RESISTANCE VS JUNCTION TEMPERATURE

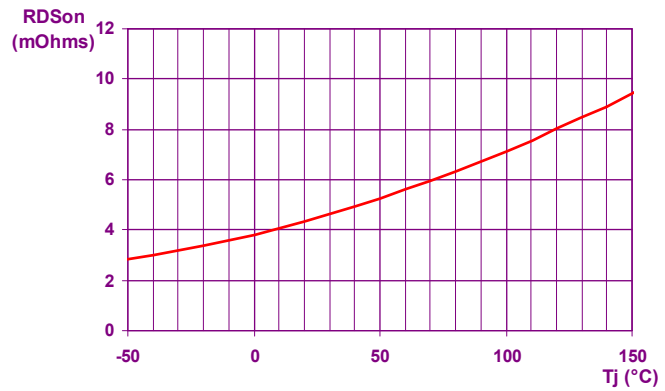


Fig. 6 REVERSE VOLTAGE DROP VS REVERSE CURRENT

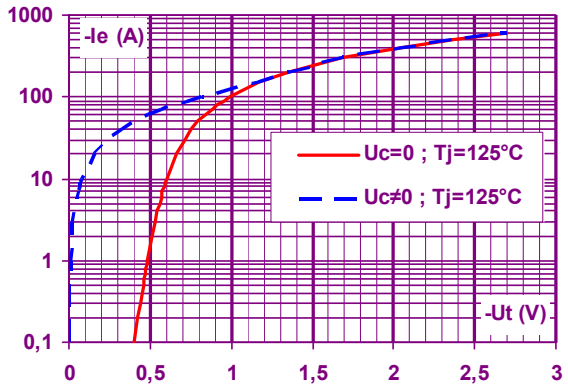


Fig. 7 POWER ELEMENT TRANSIENT THERMAL IMPEDANCE vs. PULSE DURATION

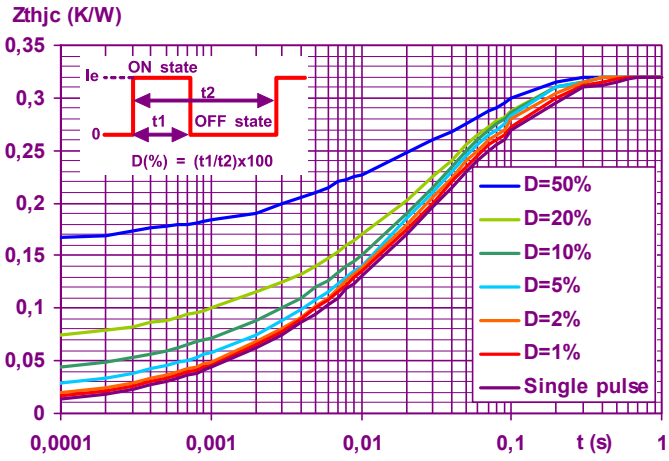


Fig. 8 ON-STATE PEAK OVERLOAD CURRENT vs. PULSE DURATION

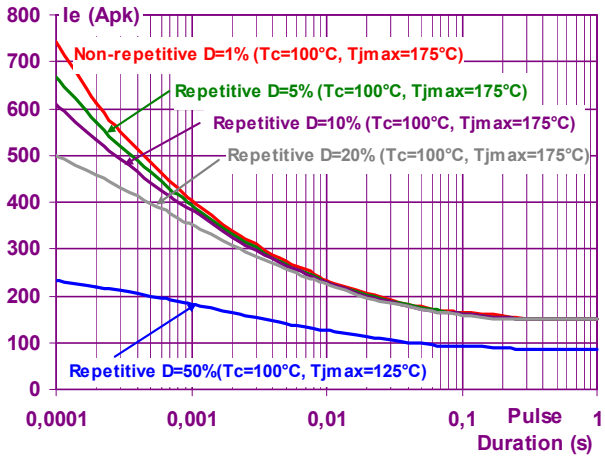
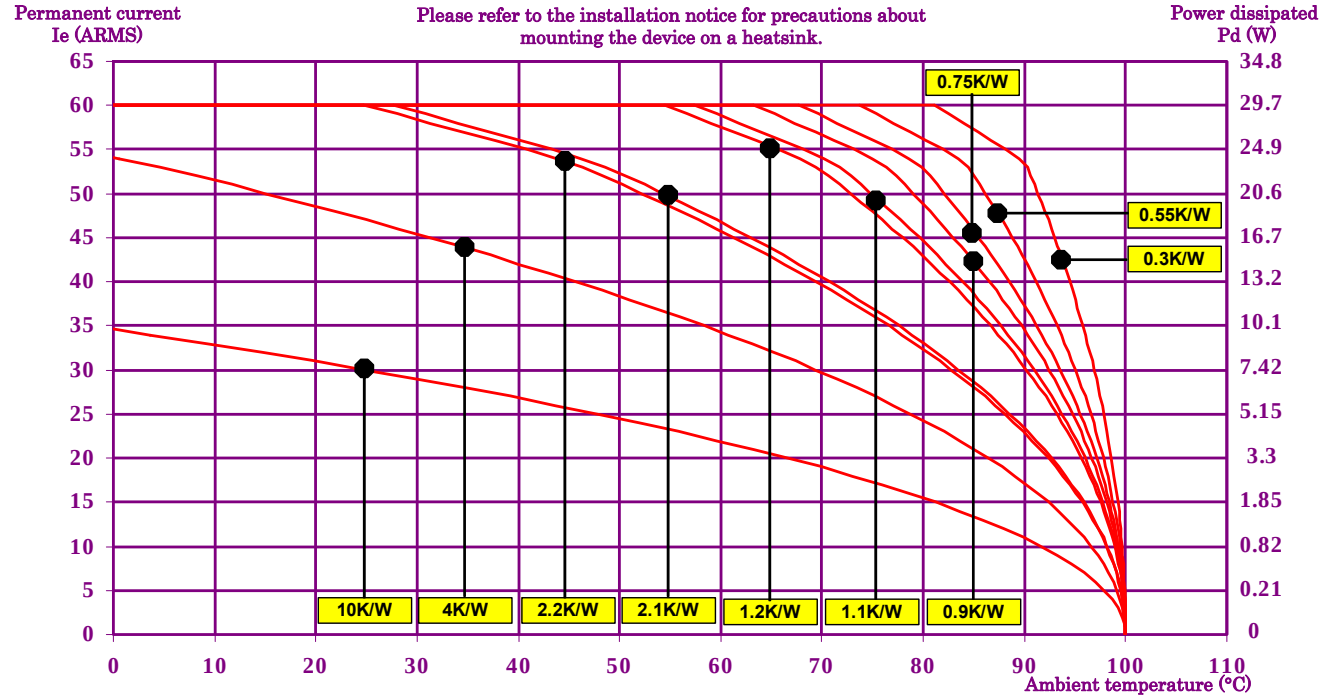


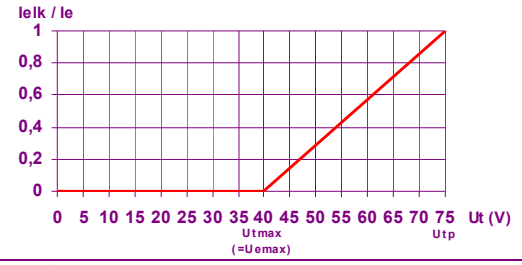
Fig. 9 POWER DISSIPATED AND LOAD CURRENT LIMIT VS TEMPERATURE



10K/W = No Heatsink / 1LD12020
4K/W = 150x150x3mm aluminium sheet
2.2K/W = WF262100 / WF151200
2.1K/W = WF210000
1.2K/W = WF121000
1.1K/W = WF131100
0.9K/W = WF115100
0.75K/W = WF070000
0.55K/W = WF050000
0.3K/W = WF031100

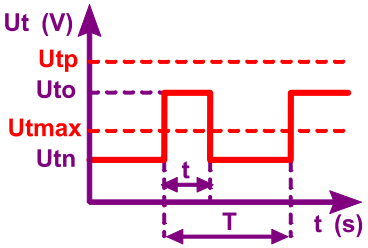
BUILT-IN OVERVOLTAGE PROTECTION CHARACTERISTICS

Fig. 10 — LEAKAGE CURRENT (Ielk) VS DC OUTPUT SWITCH VOLTAGE (Ut)



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

Fig. 11 — OVERVOLTAGE DURATION AND FREQUENCY ABSOLUTE LIMITS



$$Uto < Utp$$

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

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

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

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

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	

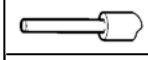
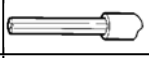
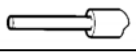
	TYPE OF TEST	STANDARD	LEVEL	EFFECT
E.M.C. IMMUNITY	Fast transients bursts	EN61000-4-4	4kV criterion B	
	Electric chocks	EN61000-4-5	1kV criterion B	
	Voltage drop	EN61000-4-11	-	

CONNECTIONS

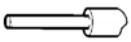
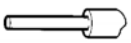
Direct connection with wires with or without ferrules

With ring terminals

okpac® — Control wiring

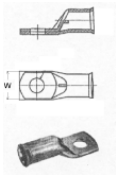
Number of wires				Screwdriver type	Recommended tightening torque M4 screw
1		2			
SOLID (No ferrule)	FINE STRANDED (With ferrule)	SOLID (No ferrule)	FINE STRANDED (With ferrule)		
					N.m
0,75 ... 2,5 mm² AWG18....AWG14	0,75 ... 2,5 mm² AWG18....AWG14	0,75 ... 2,5 mm² AWG18....AWG14	0,75 ... 2,5 mm²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

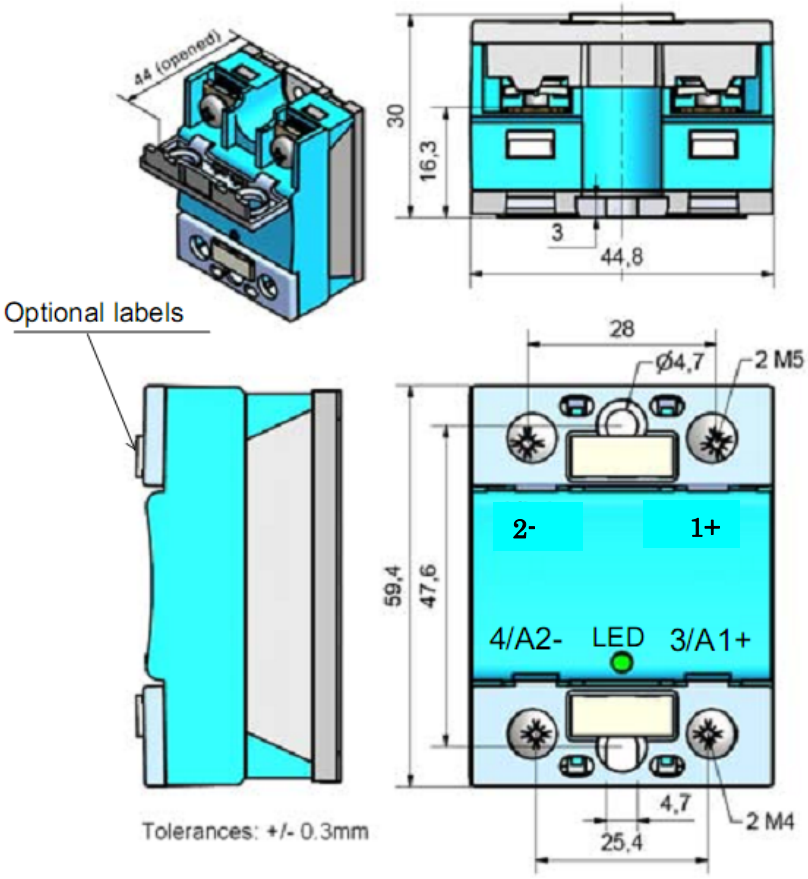
Labels
Marking labels are available, for mounting on flaps.
Part number : 1MZ09000
(delivered per 200 parts)

FASTONS : Consult us

DIMENSIONS AND ACCESSORIES

Fig. 12 DIMENSIONS (mm)

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



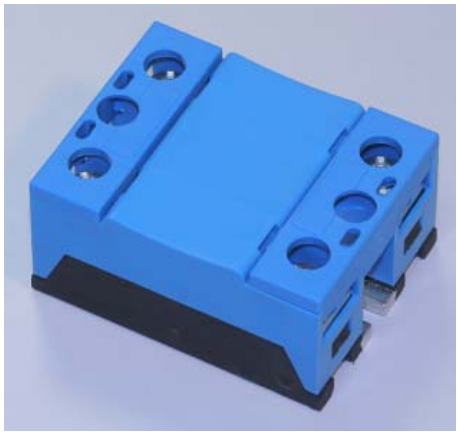
ACCESSORIES

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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