# MOSFET BASED DC SOLID-STATE RELAY

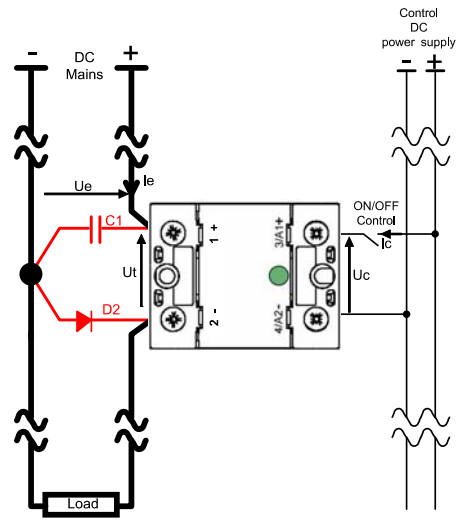
## SOM040200

- 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 | 110VDC |
| Max. load current with heatsink | 40ADC |

| Load voltage range | Load current range | Control input voltage range | In & case / Out Insulation | Connections | Dimensions (WxHxD) | Weight |
|---|---|---|---|---|---|---|
| 5-110VDC | Up to 40A (with heatsink) | 3.5-32VDC | 2.5kV | Screw terminals | 45 x 58.5 x 30 | 80g |

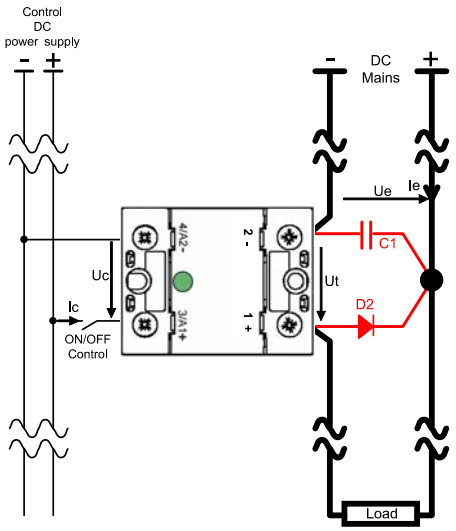
**Fig. 1** HIGH SIDE WIRING DIAGRAM (Load connected to "-")




See Instruction sheet to select the right protective components

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

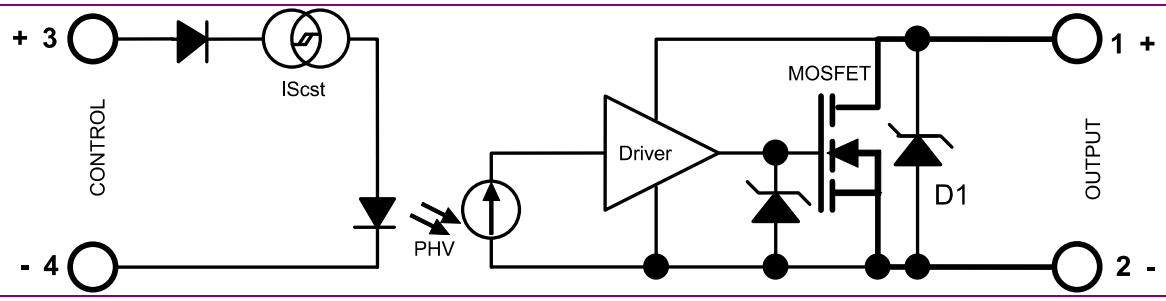
**Fig. 2** LOW SIDE WIRING DIAGRAM (Load connected to "+")




See Instruction sheet for selective the right protective components

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

**Fig. 3** INTERNAL DIAGRAM




*Proud to serve you*

celduc® relais

## 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

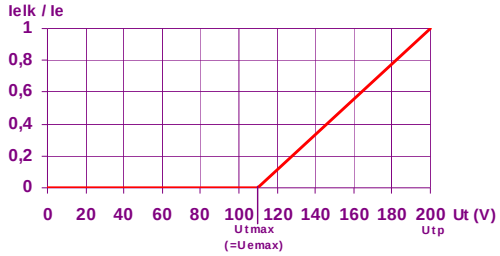
POWER CIRCUIT

| CHARACTERISTIC | LABEL | VALUE | | INFO. |
|---|---|---|---|---|
| Nominal voltage | Uenom | **90VDC** | | |
| Voltage range | Ut Ue | **5-110VDC** | | |
| Non-repetitive peak voltage | Utp | 200V | | |
| Overvoltage protection | D1 | Varistor 75V size 20 | | |
| Max reverse voltage drop (internal diode at OFF state) | -Ut | 1.5V | | @Ie=-56A @Uc=0 |
| Maximum nominal currents | Ie max | Resistive | Motor | **See fig. 7 (limits)** |
| | | 40A | Please contact us | |
| Non-repetitive peak overload current | Id max | 380A | | **See fig. 8** |
| Min. load current | Iemin | 5mA | | |
| Max. leakage current | Ielk max | 3mA | | @Utmax @Tjmax |
| Max. on-state resistance | RDSon | 46mΩ | | @Iemax @Tjmax |
| Typ. output capacitance | Cout | 1.1nF | | |
| Junction/case thermal resistance per power element | Rthjc | 0.7K/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

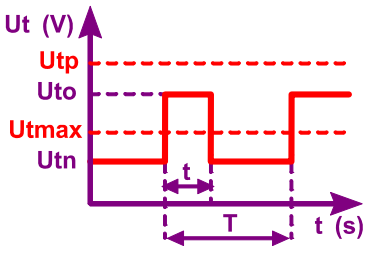
PROTECTION

Leakage current (Ielk) vs DC voltage (Ut)




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

Absolute limits




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

$$Uto < Utp$$

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

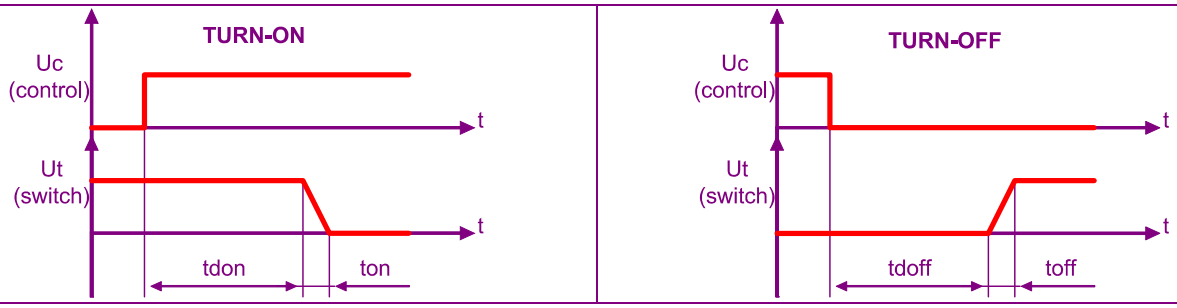
$$P_{(protection)} = 1W_{max}$$

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

**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

| | | | | | |
|---|---|---|---|---|---|
| CONNEC-TIONS | Connections | | Power | Control | |
| | Screwdriver advised | | POZIDRIV2 | | |
| | Min and max tightening torque | | 2 N.m | 1.2 N.m | |
| | Insulated crimp terminals (round tabs, eyelet type) | | M5 | M4 | |

| | | | | |
|---|---|---|---|---|
| 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 | |

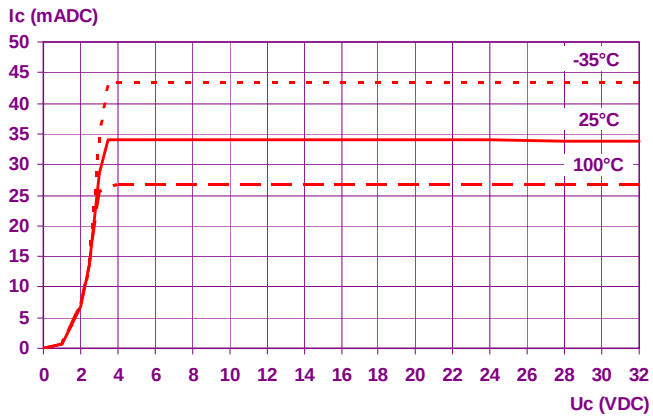
## STANDARDS

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

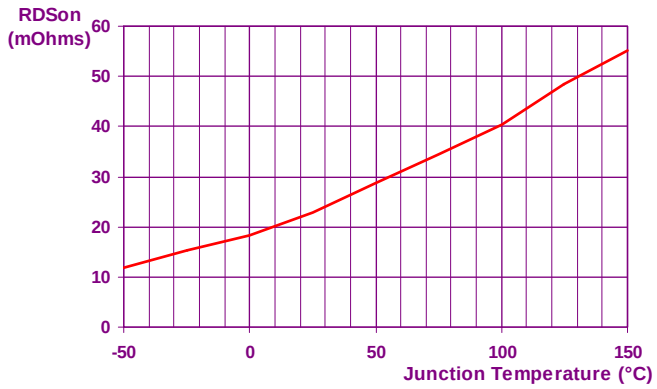
| E.M.C. IMMUNITY | TYPE OF TEST | STANDARD | LEVEL | EFFECT |
|---|---|---|---|---|
| | Fast transients bursts | EN61000-4-4 | 4kV criterion B | |
| | Electric chocks | EN61000-4-5 | 1kV criterion B | |
| | Voltage drop | EN61000-4-11 | - | |

## CHARACTERISTIC CURVES

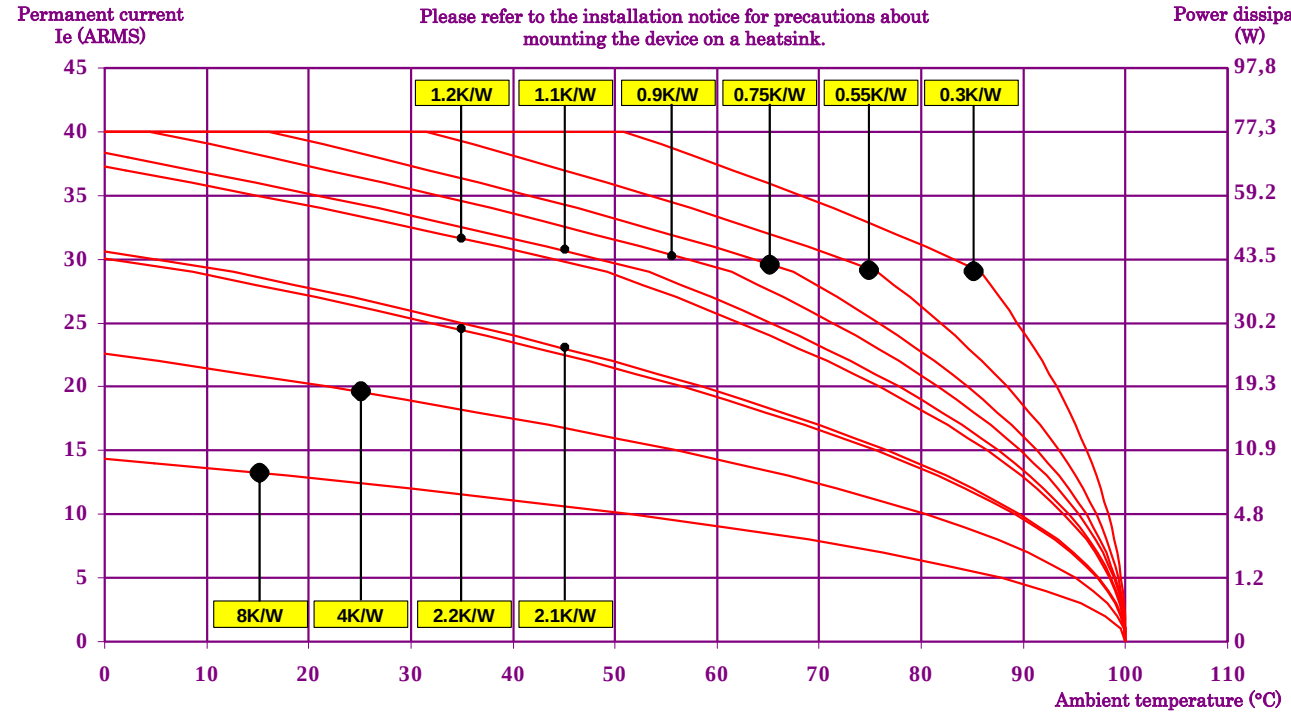
### Fig. 5 INPUT CHARACTERISTIC




### Fig. 6 ON RESISTANCE VS JUNCTION TEMPERATURE

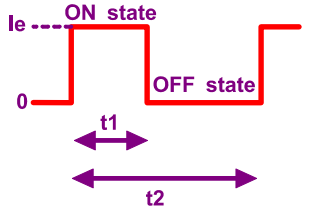



### Fig. 7 POWER DISSIPATED AND LOAD CURRENT LIMIT VS TEMPERATURE

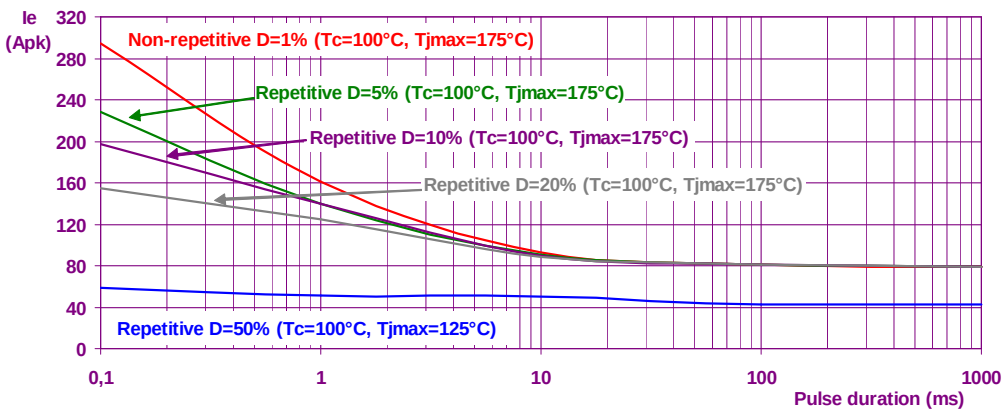



10K/W = No Heatsink
2.1K/W = WF210000
0.75K/W = WF070000
4K/W = 150x150x3mm aluminium sheet
1.2K/W = WF121000
0.55K/W = WF050000
2.2K/W = WF262100
1.1K/W = WF131100
0.3K/W = WF031100
2.2K/W = WF151200
0.9K/W = WF115100

### Fig. 8 PEAK OVERLOAD CURRENT vs. PULSE DURATION CHARACTERISTIC




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



## DIMENSIONS AND ACCESSORIES

**Fig. 9** DIMENSIONS (mm)

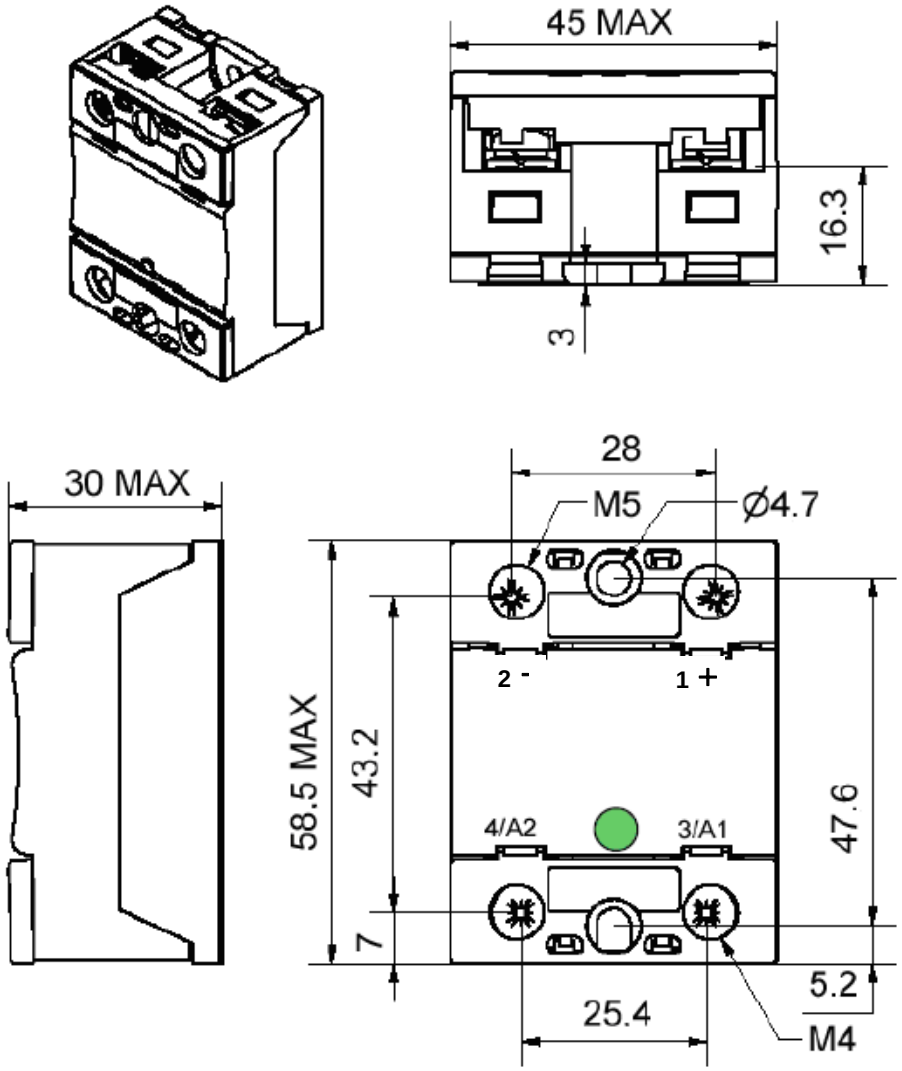



**Fig. 10** ACCESSORIES

FASTON : Please contact us


5 Rue Ampère B.P. 30004 42290 SORBIERS - FRANCE E-Mail : celduc-relais@celduc.com
Fax +33 (0) 4 77 53 85 51 Service Commercial France Tél. : +33 (0) 4 77 53 90 20
Sales Dept.For Europe Tel. : +33 (0) 4 77 53 90 21 Sales Dept. Asia : Tél. +33 (0) 4 77 53 90 19