

CT Concept: made in Russia

For today the basic manufacturer of IGBT and MOSFET transistors is «CT Concept» manufacture. Of course, there are other driver manufacturers besides «CT Concept», which production is better - «Semikron» or «InPower», for example. However, we should accept the fact that «CT Concept» drivers are easier, they are compatible with power transistors (plug-n-play principle) and available. That helps this manufacture to take lead positions in market of power operating electronics. Russian company “Electrum AV” mastered analogue production of the most popular “CT Concept” drivers.

These drivers are compatible with CT Concept drivers, the dimensions and connection diagram are similar to them too. Initially during the development was a requirement of full compliance of turning on “Electrum AV” driver to «CT Concept» driver; no changes in the scheme or in typology were permitted.

In principle of drivers describing there is one scheme with small changes for every driver (except for 1SP0635 analogue which is based on another scheme). This scheme is designed on base of DM280P-B driver by “Electrum AV”, which is spread all over the world in thousands items and which is used now in hundreds different converters types. The basic driver structure is shown in figure 1.

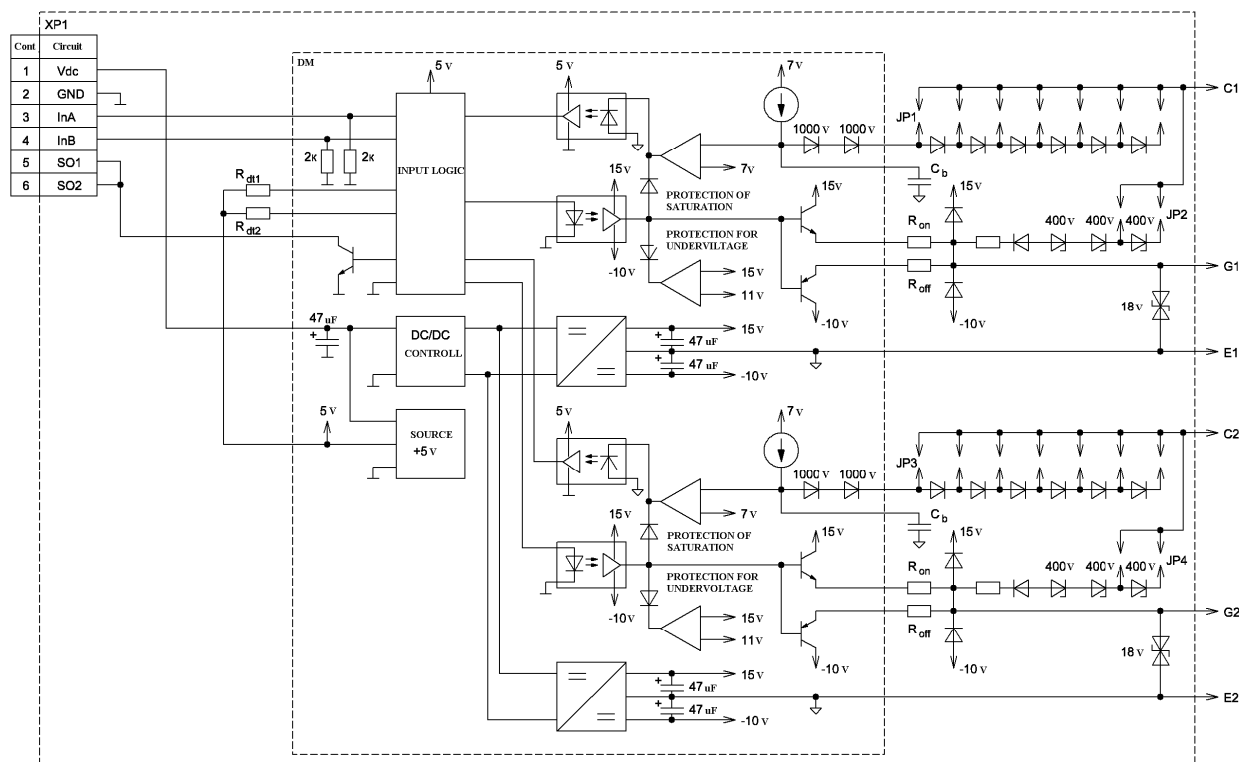


Figure 1 – Block diagram of basic driver-analogue

As it shown in the structure diagram, there is no full similarity in the electric schemes of «Electrum AV» and «CT Concept». Schematically these are different drivers but it does not prevent to say that they are analogues. More than that no one of the drivers-analogues has full accordance to characteristics of driver-prototype. One of the main tasks during the developing these drivers were getting full compatible by settings. Really, for example, «CT Concept» driver for special power module has such characteristics as on / off impulse currents – 10/15 A, “dead time” for switching 5 µs, lag of protection on unsaturation 8 µs and etc. If provides same characteristics on the driver-analogue the opportunity of getting such characteristics (impulse current – 1...8A, “dead time” 2...20 µs, lag of protection on unsaturation 2...20 µs and etc.) For full similarity we have to get setting elements in accordance to graphics which are shown in passport under the values of “CT Concept”. All these settings do not affect typology and

connection diagram of the driver; all necessary setting elements are not involved. Here is a the technique of tuning analog driver for «CT Concept» driver.

To get driver which is completely the same to plug-n-play «CT Concept» driver recommended to set it using the following method:

1. Turn off «CT Concept» driver from power module, connect the DC power supply between collector and emitter driver pins, to control the signal on the gates.

2. To give control signals and to measure “dead” time for switching over (the level of 0V)

3. To measure voltage of protection operation smoothly raising the voltage on sources for simulating the saturation voltage of the transistor.

4. Increase voltage in 2 times on the protecting operation threshold and to measure protecting operation delay by unsaturation.

5. Take off the alarm mode, set the frequency control signal 0,1...1 kHz, connect RC-chain(by resistor to shutter) between shutter and emitter par value of 0.1 ohms / 1 μ F (non-polar capacitor).

6. To set up “Electrum AV” driver in accordance with characteristics «CT Concept» driver, specifically:

- in accordance with schedule establish “dead” time by Rdt resistors;

-establish voltage of protection operation in accordance with table by JP1, JP3 jumpers;

-establish duration of protection operation delay in accordance with schedule by Cb capacitor;

-establish output impulse current in accordance with schedule by Rg on (off) resistors.

7. Measure obtained parameters “Electrum AV” driver analogically verification of «CT Concept» driver; make sure about their correspondence.

8. To connect driver to the power module and make sure that converter works like version with «CT Concept» drivers.

As it can be seen from the scheme and as it was said, these settings elements are established on the driver card. The “dead” time is regulated by two transistors on each channel separately. Delay of desaturation protection operation and output impulse current are also regulated standardly. Threshold of protection operation controlled transistor set by jumpers (JP2, JP4 jumpers); such realization of “active protection” configuration eliminating the need of dividing drivers on types, what simplify task of choosing driver and enhance opportunities of setting it on place. Setting of voltage desaturation protection operation doing in following way: a certain number of diode is established by jumpers, where on each decrease 0.5 W. This way it is possible to select the threshold in 0,5 W in diapason from 2,8W to 5,8W.

For today “Electrum AV” domesticated manufacture of following «CT Concept» drivers’ analogues (table 1):

Table 1 – «CT Concept» drivers and its «Electrum AV» analogues

«CT Concept» driver	«Electrum AV» driver
1SD1548AI	DR1480P-B1
2SD315AI	DR2180P-B1
2SD300C	DR2180P-B2
2SD0320T	DR2180P-B3
2SP0115	DR2180P-B4
2SB315A	DR2180P-B5
2SB315B	DR2180P-BF
1SP0635, 1SD536F2, 1SD418F2	DR1280P-BF

The main characteristics of these drivers are shown in Table 2.

Table 2 – The main characteristics of «Electrum AV» driver analogues.

device type	channels number	U_S v	U_{CONT} v	U_{ISOL} V	$I_{OUT P}$ A	$P_{OUT W}$	fcom kHz	$U_{ce max}$ V	U_{ac} V
DR1480P-B1	1	15	15	4000	48	10	50	1700	≤ 1200
DR1280P-BF	1	15	FOCL	15000	28	6	50	6500	≤ 4400
DR2180P-B1	2 П/М	15	5	7500	18	2x3	100	3300	-
DR2180P-B2	2 П/М	15	5	4000	18	2x3	100	1700	-
DR2180P-B3	2 П/М	15	5	4000	18	2x3	100	1700	≤ 1200
DR2180P-B4	2 П/М	15	5	4000	18	2x3	100	1700	≤ 1200
DR2180P-B5	2 П/М	15	5	7500	18	2x3	100	3300	≤ 2400
DR2180P-BF	2 П/М	15	FOCL	7500	18	2x3	100	3300	≤ 2400

DR1480P-B1 driver – analogue of 1SD1548AI. Maximally similar driver to its prototype; its algorithm configuration is closer to «CT Concept», than to other “Electrum AV” driver-analogues that not display it from others.

DR2180P-B1(2) drivers – analogues of 2SD315AI and 2SD300C. In fact these drivers are similar. Their difference is in slightly different slots (also input socket is moved on one contact, otherwise the findings did not change); first is high-voltage, but weaker; the second is more powerful but on the main circuit voltage up to 2000 V.

DR2180P-B3 drivers – analogues of 2SD0320T. It is the simplest and is the most approximate to base scheme driver. In contrast of «CT Concept» only variant with logical control is available.

DR2180P-B4 driver – analogue of 2SP0115. The main difference from basic scheme is presence temperature protection of controlled power module. Temperature protection configured to the temperature rating 90...100 °C (temperature of control module), herewith this protection may not be used. Otherwise driver has no other differences from basic scheme.

DR2180P-B5(F) driver – analogue of 2SB315A and 2SB315B. Driver is different from basic scheme because of the presence of control opportunity by FOCL through transceivers HFBR type. At the same time realized first and second type of controlling on the same card as it on the «CT Concept» drivers. Main difference of DR2180P-BF driver from 2SB315B is one big mutual optical transmitter signal status, when «CT Concept» has two transmitters (separate findings for the status of each channel). Besides, DR2180P-B5(F) drivers in contrast to same «CT Concept» drivers allow to control power transistors with collector-emitter voltage to 3300V («CT Concept» to 1700 V).

DR1280P-BF driver – analogue of 1SP0635, 1SD536F2, 1SD418F2 drivers. The only driver which stand out from the total series. In Its base was laid not DM280, but special high-voltage module, which was used before in power high-voltage drivers. That allows without any interference in scheme get high output power (pulse current not less than 28 A, the average output power not less than 6 W) and high isolation voltage (1500 DC). Also in contrast to other drivers, this one is analogue of group of «CT Concept» drivers. Including drivers of the first and the second generation.

Of course these drivers do not cover the entire range of «CT Concept» products and may be such applications where “Electrum AV” drivers don’t fit. But on ninety per cent mentioned drivers can satisfy replacement «CT Concept» drivers by “Electum AV” analogues.