

ELECTRUM



**power
electronics**

ELECTRUM

NEW SEMICONDUCTOR POWER IS COMING...



Electric power industry



Transport



Industry



Converter equipment



Military equipment

More 10 years we have been in all fields of power electronics use



Certificate
IQNet



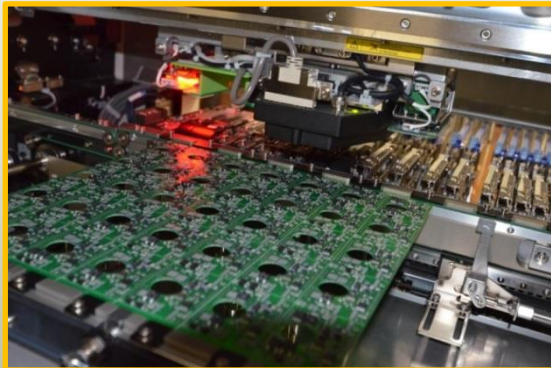
Certificate
GOST RV 15.002



Certificate
ISO 9001:2008



LINE FOR INSTALLING THE CHIP-COMPONENTS ON PCB WITH PERFORMANCE UP TO SEVERAL THOUSAND CHIPS PER SHIFT



LINE FOR INSTALLING THE CHIP-COMPONENTS:

- **MINIMUM SIZE OF THE COMPONENTS – 01005**
- **PERFORMANCE – UP TO 40000 COMPONENTS PER HOUR**
- **INSTALLING PITCH – UP TO 0.3 MM**
- **MOUNTING OF ANY MODERN BASE OF CHIP-COMPONENTS FOR SMD**



LINE FOR SOLDERING IN NITROGEN BLANKET

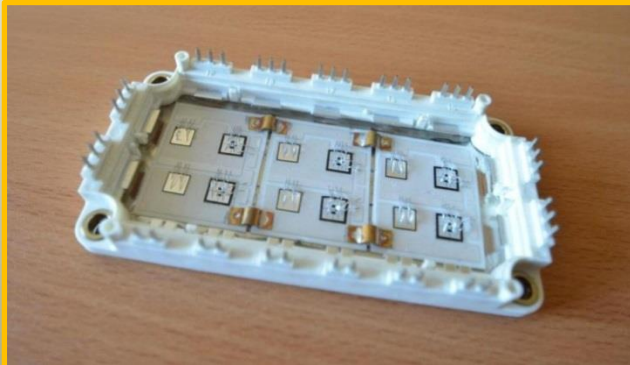
10-ZONE OVEN FOR MELTING ALLOWS SETTING DIFFERENT MODES TO SOLDER DIFFERENT ELECTRONIC BLOCKS

NEW SEMICONDUCTOR POWER IS COMING...



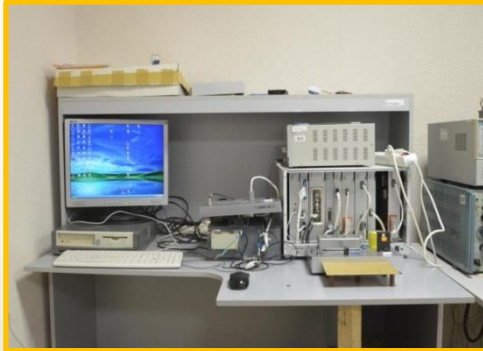
**MACHINE FOR SPLICING OF ALUMINUM OUTPUTS TO POWER CRYSTALS BY
METHODE OF ULTRASOUND SOLDERING**

**THE MACHINE ALLOWS PROVIDING THE SPLICING WITH A WIRE HAVING
DIAMETER 100, 300 OR 500 μm**



**AN EXAMPLE OF ASSEMBLY OF POWER IGBT-MODULE OF SECOND
GENERATION**

NEW SEMICONDUCTOR POWER IS COMING...



THE EQUIPMENT TO CHECK THE PARAMETERS FRD, BJT, MOSFET, IGBT-MODULES

- VOLTAGE MEASURED FROM 1 μ V TO 4500 V
- MEASURABLE CURRENT FROM 1 nA TO 1000 A
- DISCRETIZATION AT CHECKING OF DYNAMIC PARAMETERS – FROM 1 ns



CAMERA OF HEAT AND COLD TO CHECK PRODUCT IN THE TEMPERATURE RANGE FROM -70 TO +125 °C

THE CAMERAS ALLOW TESTING IN HUMIDITY, HOARFROST, DEW



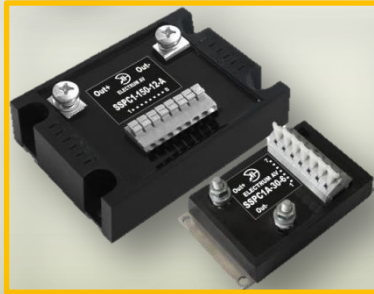
IT IS USED DIFFERENT EQUIPMENT TO CARRY OUT MEASUREMENTS INCLUDING THAT ALLOWS CARRYING OUT LONG-TIME RELIABILITY TESTS

NEW SEMICONDUCTOR POWER IS COMING...



MODULES WITHOUT BUILT-IN CONTROL

- MODULES OF IGBT-TRANSISTORS UP TO 6500 V / 400 A
- MODULES OF MOSFET-TRANSISTORS UP TO 250 V / 500 A
- MODULES OF THYRISTORS AND RECTIFIER DIODES UP TO 1600 V / 320 A
- MODULES OF SCHOTTKY DIODES UP TO 200 V / 400 A



MODULES WITH BUILT-IN CONTROL

- DC AND AC RELAY UP TO 1600 V / 400 A
- DC CONTROL MODULES UP TO 1200 V / 320 A
- MODULES OF POWER CONTROL UP TO 1600 V / 320 A
- MODULES OF REGULATED RECTIFIERS UP TO 1600 V / 320 A
- MODULES OF CONTROL BY ELECTRIC MOTORS UP TO 1200 V / 100 A



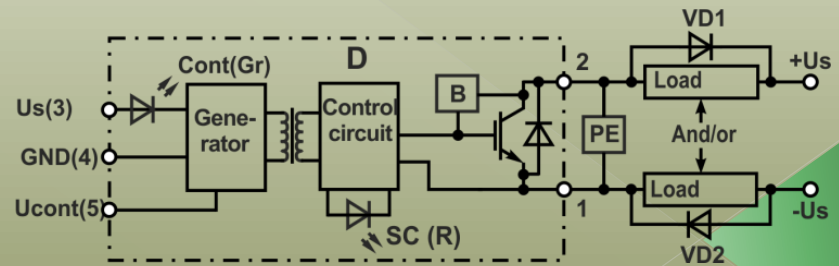
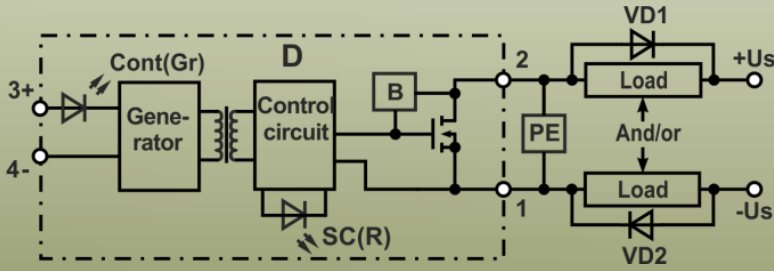
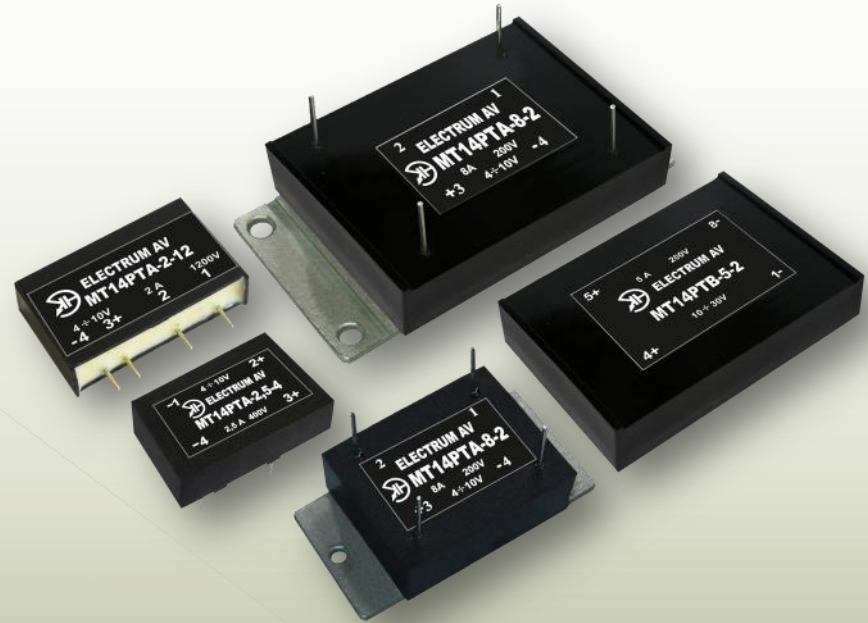
CONTROL CIRCUITS

- DRIVERS OF IGBT- AND MOSFET-TRANSISTORS UP TO 6500 V / 400 A
- DRIVERS OF POWERFUL TRANSISTORS
- DRIVERS OF TYPICAL THYRISTOR UNITS
- AC/DC VOLTAGE CONVERTERS

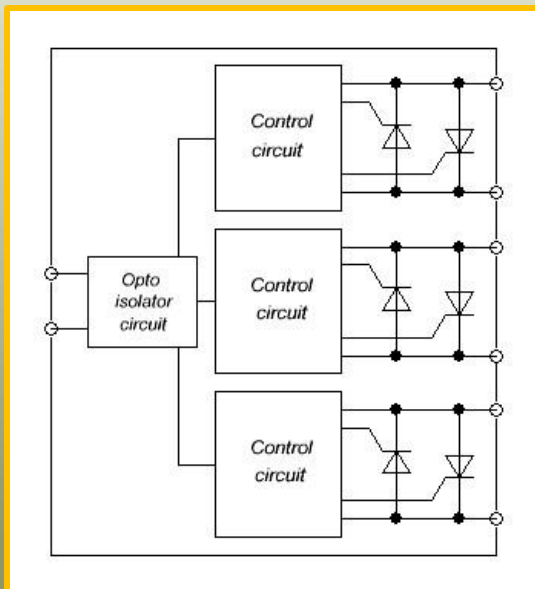
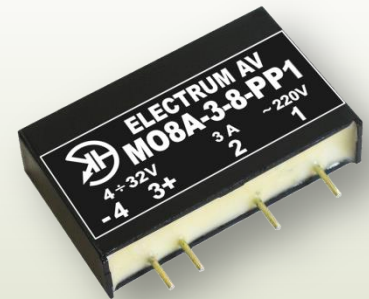


POWER BLOCKS

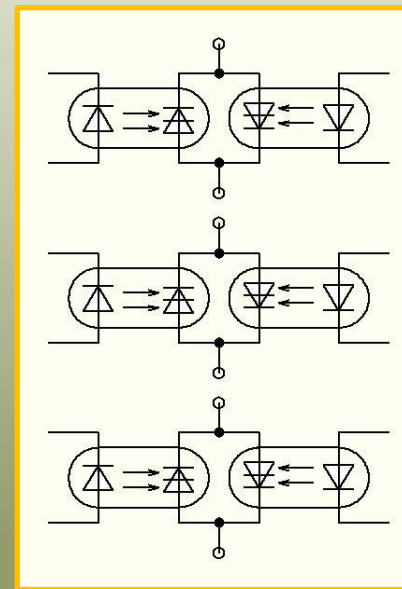
- BLOCKS OF POWER REGULATORS UP TO 1200 V / 1000 A
- BLOCKS OF ELECTRIC MOTORS CONTROL



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AC RELAYS



OPTO THYRISTOR
MODULES



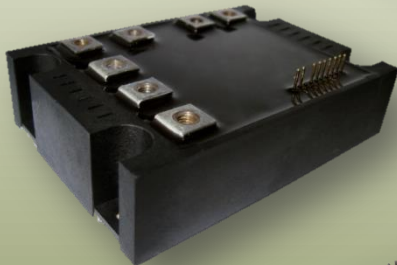
MODULES FOR CONTROL OF SWITCHED CURRENT

THEY ARE INTENDED TO SWITCH DC AND PROTECTION OF LOAD AGAINST CURRENT OVERLOAD WITH CRITERION I2T



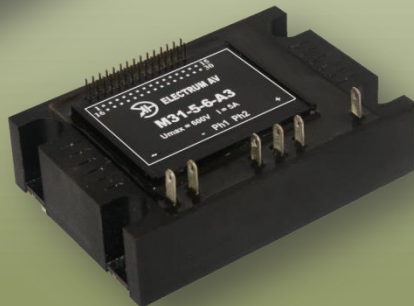
MODULES OF THYRISTOR POWER REGULATOR

THEY ARE INTENDED TO SWITCH ALTERNATING VOLTAGE AND TO ADJUST LOAD POWER BY PHASE METHOD



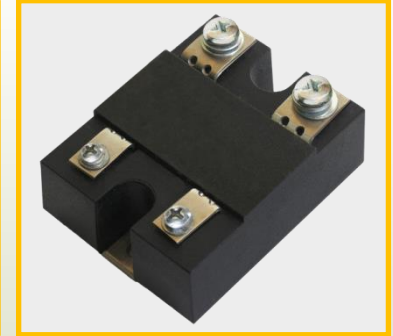
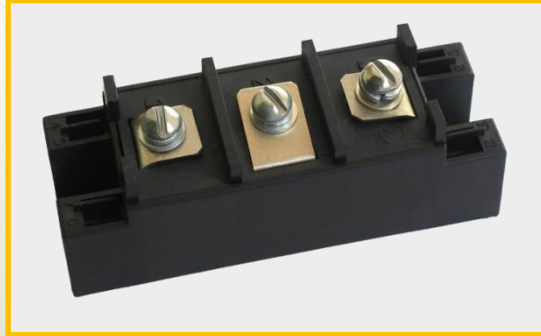
MODULES FOR CONTROL OF SWITCHED VOLTAGE

THEY ARE INTENDED TO RECTIFY ALTERNATING VOLTAGE AND TO PROVIDE VOLTAGE CONTROL OF ELECTRIC MOTOR CONTROL FREQUENCY CONVERTER VOLTAGE CONTROL



MODULES FOR ELECTRIC MOTORS CONTROL

THEY ARE INTENDED TO CONTROL BRUSHLESS, COLLECTOR AND ASYNCHRONOUS ELECTRIC MOTORS



E1

TRANSISTOR MODULES OF HALF-BRIDGES, SINGLE, UPPER, LOWER ARMS

DIODE AND THYRISTOR ASSEMBLIES

VOLTAGE – UP TO 1600 V
MEAN CURRENT – UP TO 100 A

E2

TRANSISTOR MODULES OF HALF-BRIDGES, SINGLE, UPPER, LOWER ARMS

DIODE AND THYRISTOR ASSEMBLIES

OPTOTHYRISTOR MODULES AND AC RELAYS

VOLTAGE – UP TO 1600 V
MEAN CURRENT – UP TO 200 A

DM

TRANSISTOR MODULES OF HALF-BRIDGES, SINGLE, UPPER, LOWER ARMS, H-BRIDGES AND SKEW ONES, INVERTORS' ASSEMBLIES

DIODE AND THYRISTOR ASSEMBLIES, 1-PH AND 3-PH BRIDGES

OPTOBYRISTOR MODULES, AC AND DC RELAYS

SPECIALIZED MODULES

VOLTAGE – UP TO 6500 V
MEAN CURRENT – UP TO 500 A

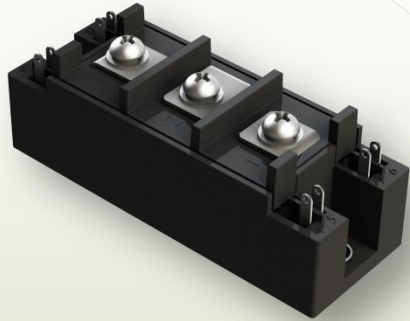
VM

AC AND DC RELAYS

1-PH RECTIFIER BRIDGES

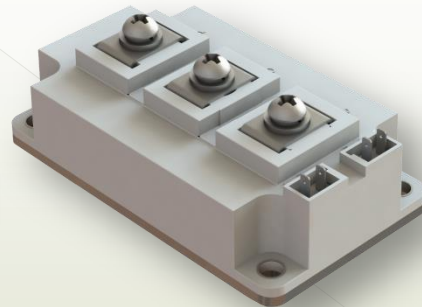
VOLTAGE – UP TO 1600 V
MEAN CURRENT – UP TO 200 A

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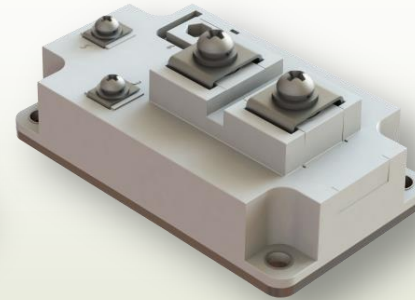
E2 – ANALOGUE OF
Semitrans 2

(SEMIKRON, INFINEON)



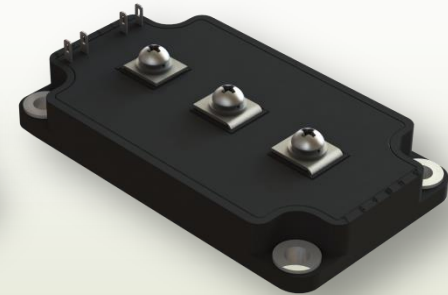
E3-1 – ANALOGUE OF
Semitrans 3

(SEMIKRON, INFINEON)



E3-2 – ANALOGUE OF
Semitrans 4

(SEMIKRON, INFINEON)

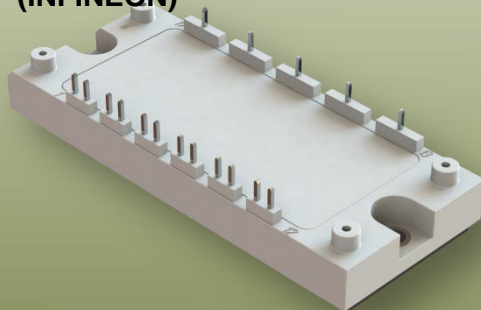


M1 – ANALOGUE OF SP6

(MICROSEMI)

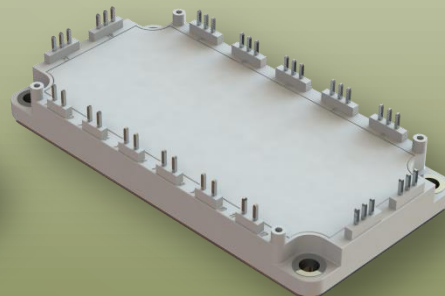
S1,2 – ANALOGUE OF
Econopack 2

(INFINEON)



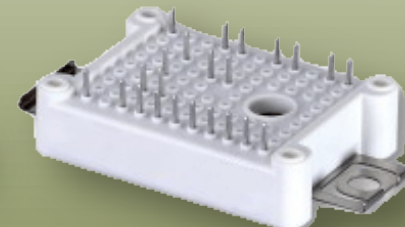
S3 – ANALOGUE OF
Econopack 3

(INFINEON)



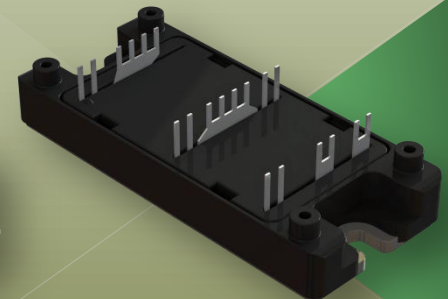
S4 – ANALOGUE OF
Easypack

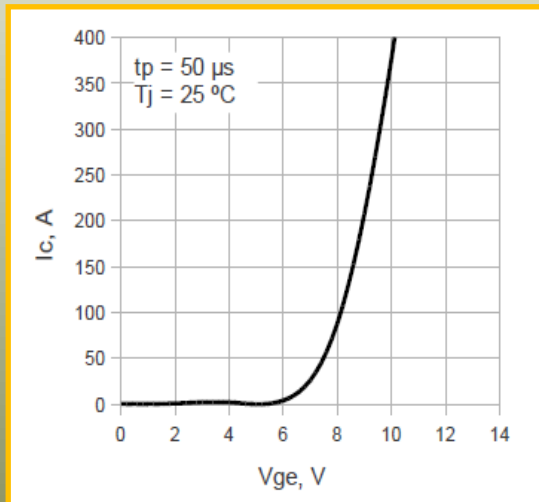
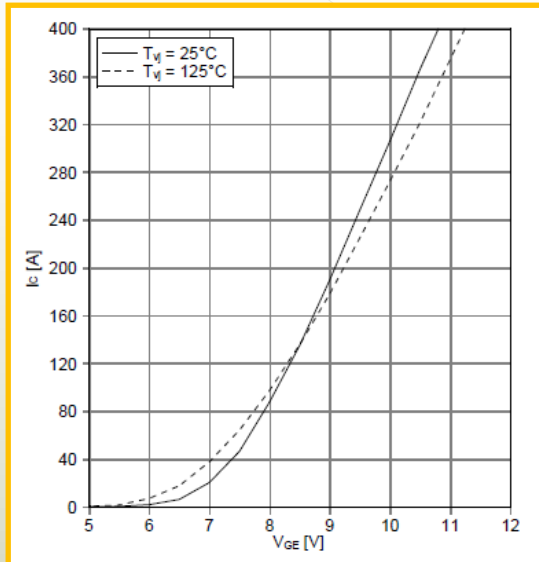
(INFINEON)



M2 – ANALOGUE OF SP4

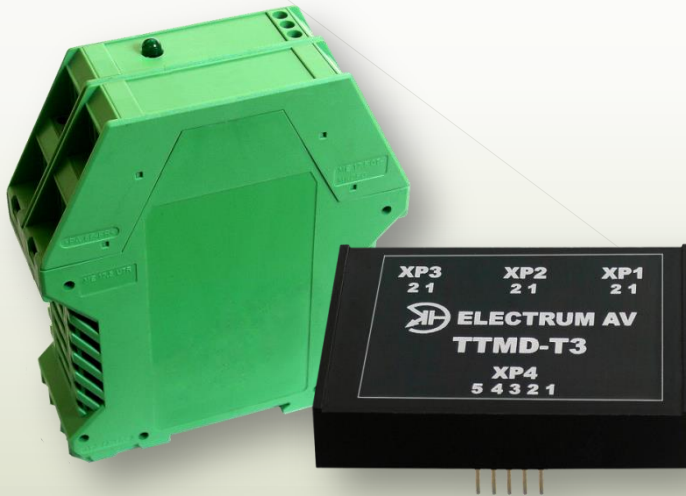
(MICROSEMI)





Parameter name, unit	Symbol	Value		
		min	typ.	max
Static parameters				
Collector-emitter breakdown voltage (min), V	$V_{(BR)CES}$	1200 (1200)		
Collector DC at $T_c=25^\circ\text{C}$ (max), A	I_C			295 (240)
Collector DC at $T_c=100^\circ\text{C}$ (max), A	I_C			200 (200)
Chip-radiator thermal resistance IGBT, $^\circ\text{C}/\text{W}$	$R_{T(j-c)}$			0.12 (0.15)
Collector-emitter saturation voltage (max), V	$V_{CE(on)}$		1.7 (1.7)	2.15 (2.2)
Collector leakage current (max), μA	I_{CES}			500 (100)
Dynamic parameters				
Switch-on delay time (max), ns	$t_{d(on)}$			250 (200)
Rise time (max), ns	t_r			90 (200)
Switch-off delay time (max), ns	$t_{d(off)}$			550 (700)
Fall time (max), ns	t_f			130 (150)

**WITHOUT BRACKETS – VALUES FOR FF200R12KE3 PRODUCED BY «INFINEON»
IN BRACKETS – VALUES FOR M12-200-12-E3 PRODUCED BY «ELECTRUM AV»**



NON-SPECIALIZED DRIVERS

THEY ARE INTENDED TO CONVERT INPUT LOGICAL SIGNAL INTO SIGNAL OF THYRISTOR CONTROL

DT – SINGLE-CHANNEL DRIVER

OUTPUT CURRENT – 1 A

THYRISTOR VOLTAGE – UP TO 6500 V

TTMD – 3-CHANNEL DRIVER

OUTPUT CURRENT – 0.2 A

THYRISTOR VOLTAGE – UP TO 1700 V

SPECIALIZED DRIVERS

THEY ARE INTENDED TO CONTROL BY TYPICAL THYRISTOR UNITS

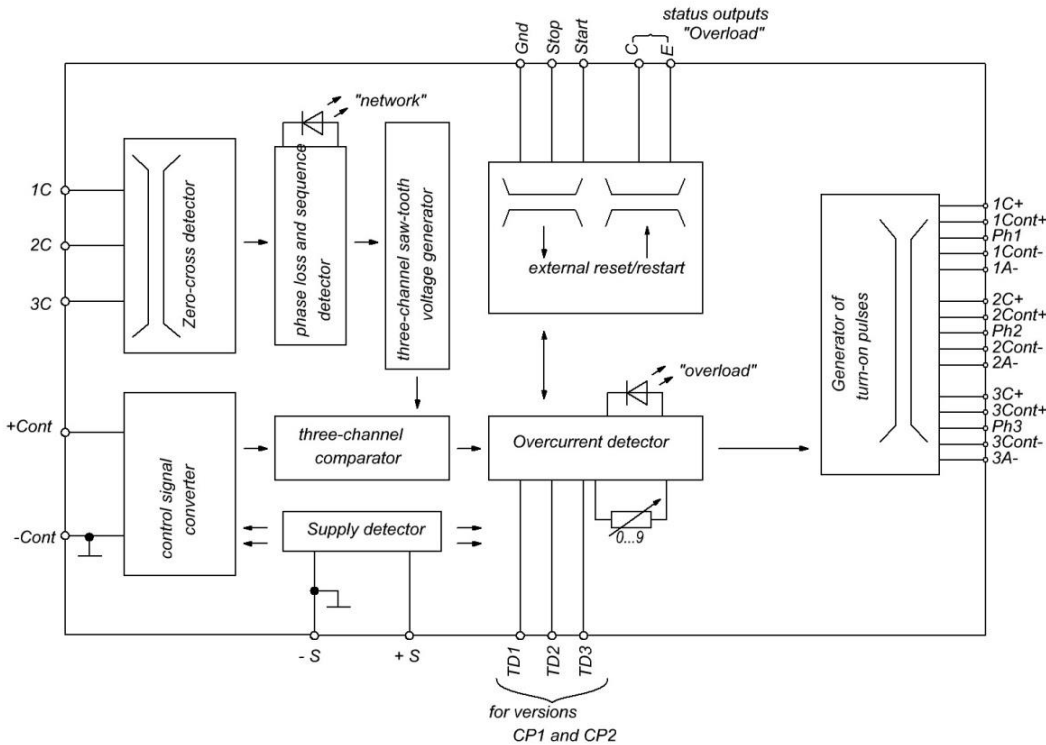
3PHCRD – THREE THYRISTORS DRIVER OF 3-PH RECTIFIER BRIDGE

3PHCRD-6 – DRIVER OF FULL THYRISTOR 3-PH RECTIFIER BRIDGE

3PHPRD – DRIVER OF 3-PH THYRISTOR POWER REGULATOR

3PHPRD-FB – DRIVER OF SINGLE-PHASE POWER REGULATOR WITH FEEDBACK

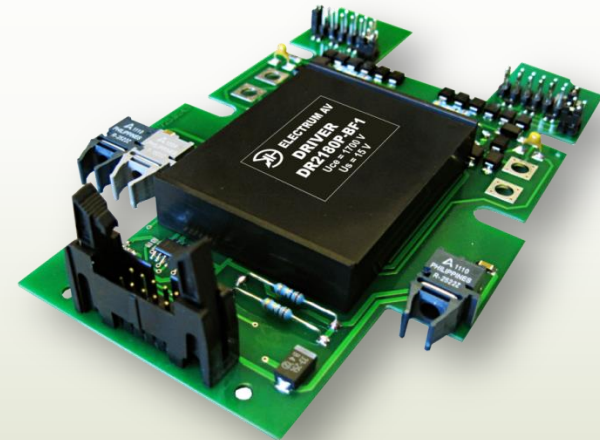
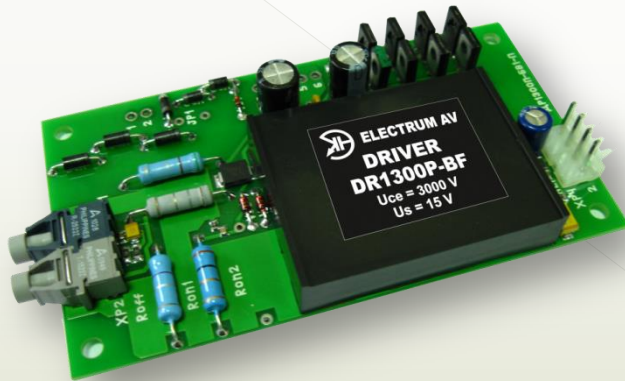
An example of specialized driver 3phCRD-6-Din



The driver provides the following functions:

- control of power thyristors;
- change of power by phase method;
- smooth start when switch on the power;
- protection against current overload;
- indication of current protection operation;
- external or automatic reset of current overload mode.

The driver of 3-phase thyristor rectifier 3phCRD-6-DIN is intended to control the power thyristors or thyristor drivers and allows creating a 3-phase regulated 6-pulse rectifier to operate in 3-ph AC circuits with frequency 50 Hz.

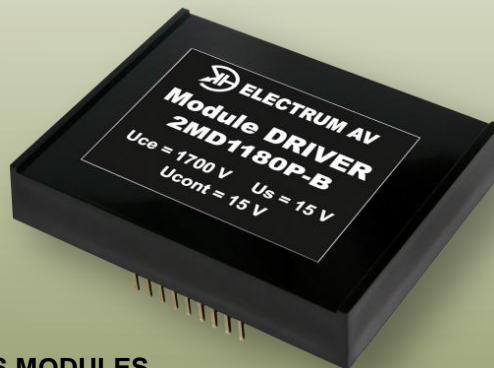


DRIVERS

- OUTPUT CURRENT UP TO 30 A
- OPERATING FREQUENCY UP TO 200 kHz
- TRANSISTOR CONTROL UP TO 3300 V

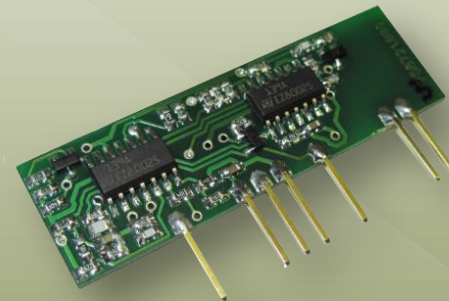
DRIVERS-ANALOGUES «CT CONCEPT» AND «SEMIKRON»

- OUTPUT CURRENT UP TO 48 A
- OPERATING FREQUENCY UP TO 100 kHz
- TRANSISTOR CONTROL UP TO 6500 V



DRIVERS MODULES

- OUTPUT CURRENT UP TO 18 A
- OPERATING FREQUENCY UP TO 100 kHz
- TRANSISTOR CONTROL UP TO 1700 V



DRIVERS MODULES – ANALOGUES «POWEREX»

- OUTPUT CURRENT UP TO 12 A
- OPERATING FREQUENCY UP TO 20 kHz
- TRANSISTOR CONTROL UP TO 1200 V

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Driver type	Quantity of channels	U _s V	U _{in} V	U _{is} V	I _{out} _{pu} A	P _{out} W	F _{com} kHz	U _{ce} V	U _{ap} V	Analogues
Drivers modules										
DM180P-B(1)	1	15	5(15)	4000	8	4	50	1700	-	
DM280P-B(1)	2 h/b	15	5(15)	4000	8	2x4	50	1700	-	
2DM180P-B(1)	2 i	15	5(15)	4000	8	2x4	50	1700	-	
DM2160P-B	2 u	15	5	4000	16	2x4	50	1700	-	
DM150A	1	15/ -10	5 mA	4000	5	-	25	1700	-	M57962
DM1120P-A(1)	1	15	5 mA	4000	12	3	25	1700	-	VLA500-01
Drivers										
DR180P-B(1)	1	15	5(15)	4000	8	4	50	1700	-	
DRA180P-B(1)	1	15	5(15)	7500	8	4	50	3300	≤3200	
DR280P-B(1)	2 h/b	15	5(15)	4000	8	2x4	50	1700	-	
2DR180P-B(1)	2 i	15	5(15)	4000	8	2x4	50	1700	-	
DRB280P-B(1)	2 u	15	5(15)	4000	8	2x4	200	1700	≤1200	
DR1300P-BF	1	15	FOCL	7500	30	10	50	1700	≤1200	
DR2160P-B1	2 h/b	15	15	4000	16	2x4	50	1700	-	SKHI22
DR280P-B4	2 u	15	15	4000	16	2x4	50	1700	-	Skyper32 Pro
DR1480P-B1	1	15	15	4000	48	10	50	1700	≤1200	1SD1548AI
DR1280P-BF	1	15	FOCL	15000	28	6	50	6500	≤4400	1SP0635
DR2180P-B1	2 h/b	15	5	4000	18	2x3	100	3300	-	2SD315AI
DR2180P-B2	2 h/b	15	5	4000	18	2x3	100	1700	-	2SD300C
DR2180P-B3	2 h/b	15	5	4000	18	2x3	100	1700	≤1200	2SP0320T
DR2180P-B4	2 h/b	15	5	4000	18	2x3	100	1700	≤1200	2SP0115
DR2180P-B5	2 h/b	15	5	7500	18	2x3	100	3300	≤2400	2SB315A
DR2180P-BF	2 h/b	15	FOCL	7500	18	2x3	100	3300	≤2400	2SD315B
DR2180P-BF1	2 h/b	15	FOCL	4000	18	2x3	100	1700	≤1200	2SP0320V(S)
DR6120P-A	6 (3 h/b)	15	5	4000	12	6x3	25	1700	-	

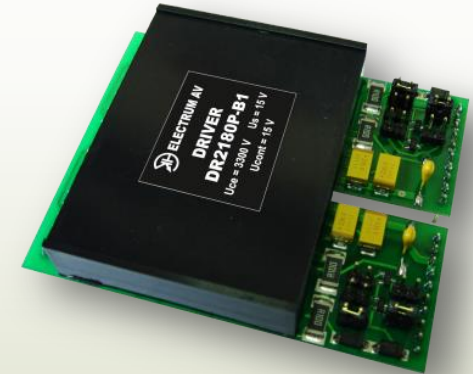
h/b – half-bridge; i – independent control; u – universal control



ANALOGUE OF 2SP0115

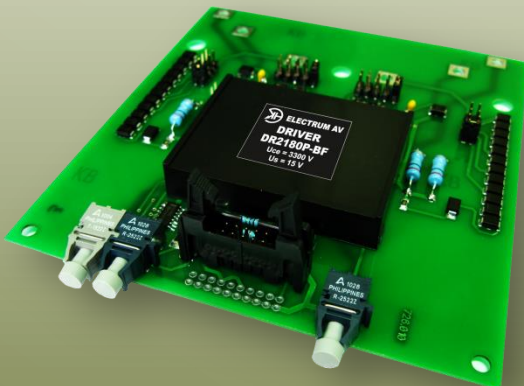


ANALOGUE OF 2SD1548

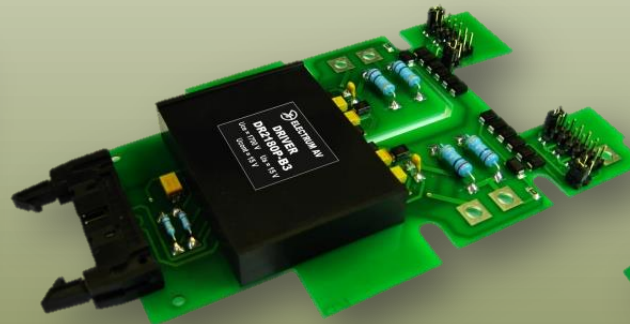


ANALOGUE OF 2SD315AI

ANALOGUE OF 2SB315A(B)



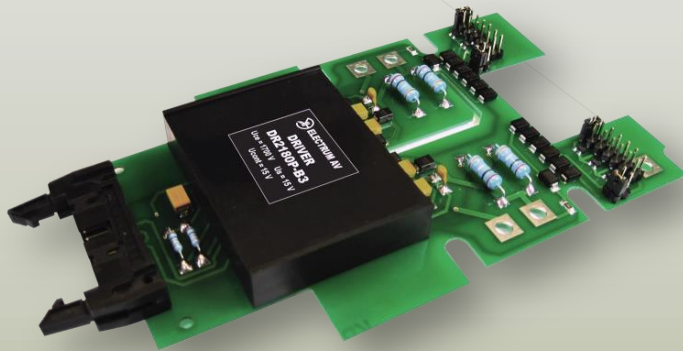
ANALOGUE OF 2SP0320T(V)



ANALOGUE OF 1SP0635



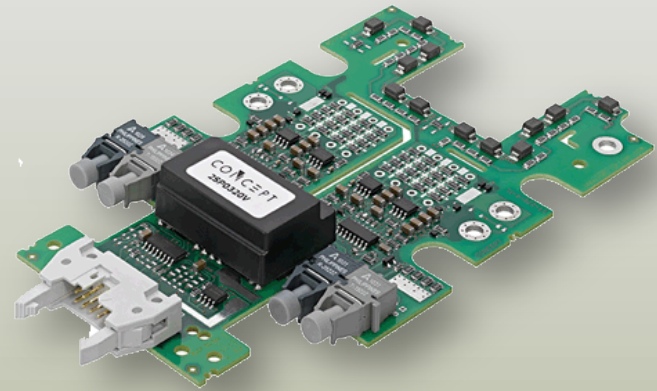
DR2180P-B3(V1)



$U_s = 15 \text{ V}$
 $I_s = 80 \text{ mA}$
 $U_{\text{out}} = +15 \text{ /-} 10 \text{ V}$
 $I_g = 18 \text{ A}$
 $P_{\text{out}} = 3 \text{ W}$
 $F_{\text{max}} = 100 \text{ kHz}$
 $U_{\text{ce}} = 1700 \text{ V}$

$U_{\text{des}} = 5.8 \text{ V}$
 $T_d = 2 \dots 10 \text{ } \mu\text{s}$
 $T_{\text{off}} = 1.4 \text{ } \mu\text{s}$
 $T_b = 70 \text{ ms}$

2SP0320T(V,S)



$U_s = 15 \text{ V}$
 $I_s = 37 \text{ mA}$
 $U_{\text{out}} = +15 \text{ /-} 10 \text{ V}$
 $I_g = 20 \text{ A}$
 $P_{\text{out}} = 3 \text{ W}$
 $F_{\text{max}} = 100 \text{ kHz}$
 $U_{\text{ce}} = 1700 \text{ V}$

$U_{\text{des}} = 10.2 \text{ V}$
 $T_d = 6.9 \text{ } \mu\text{s}$
 $T_{\text{off}} = 1.5 \text{ } \mu\text{s}$
 $T_b = 90 \text{ ms}$



M24



SSPC



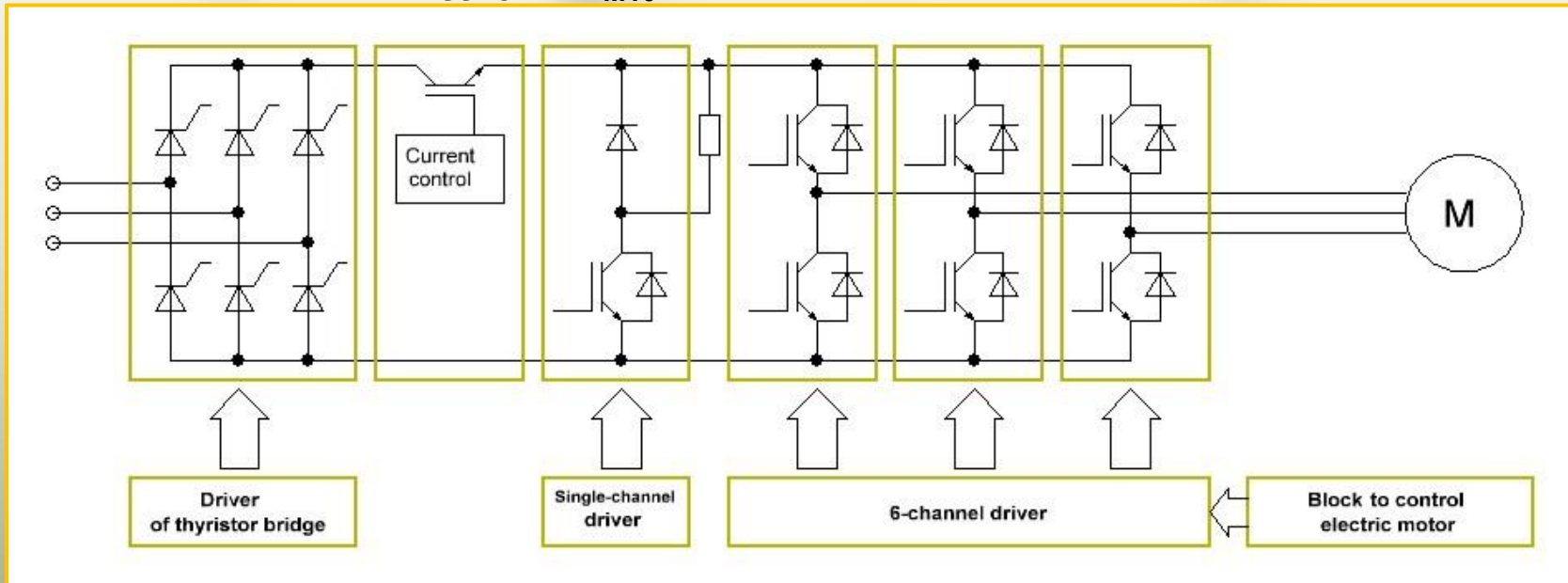
M10



M12

M12

M12



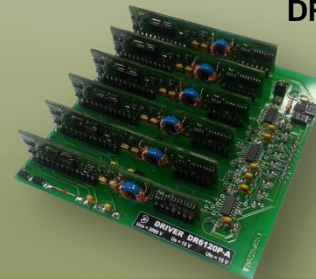
3PHCRD-6



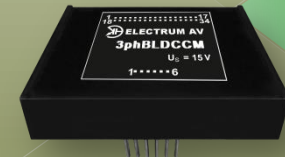
DRA180



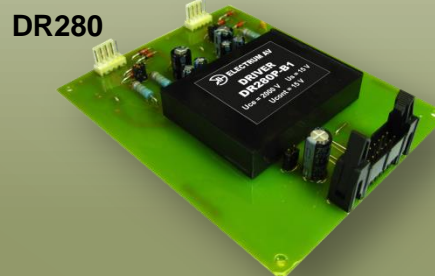
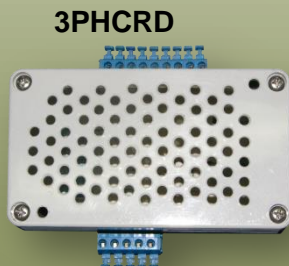
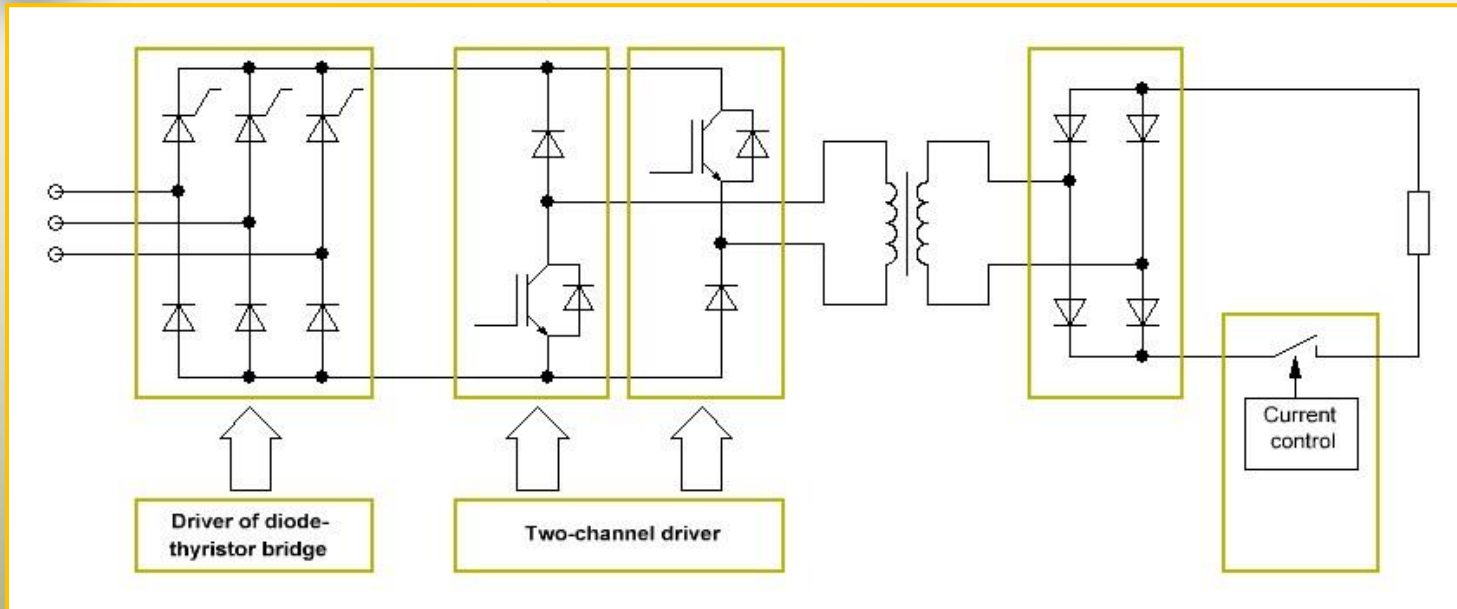
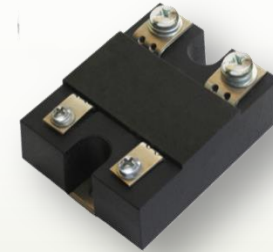
DR6120

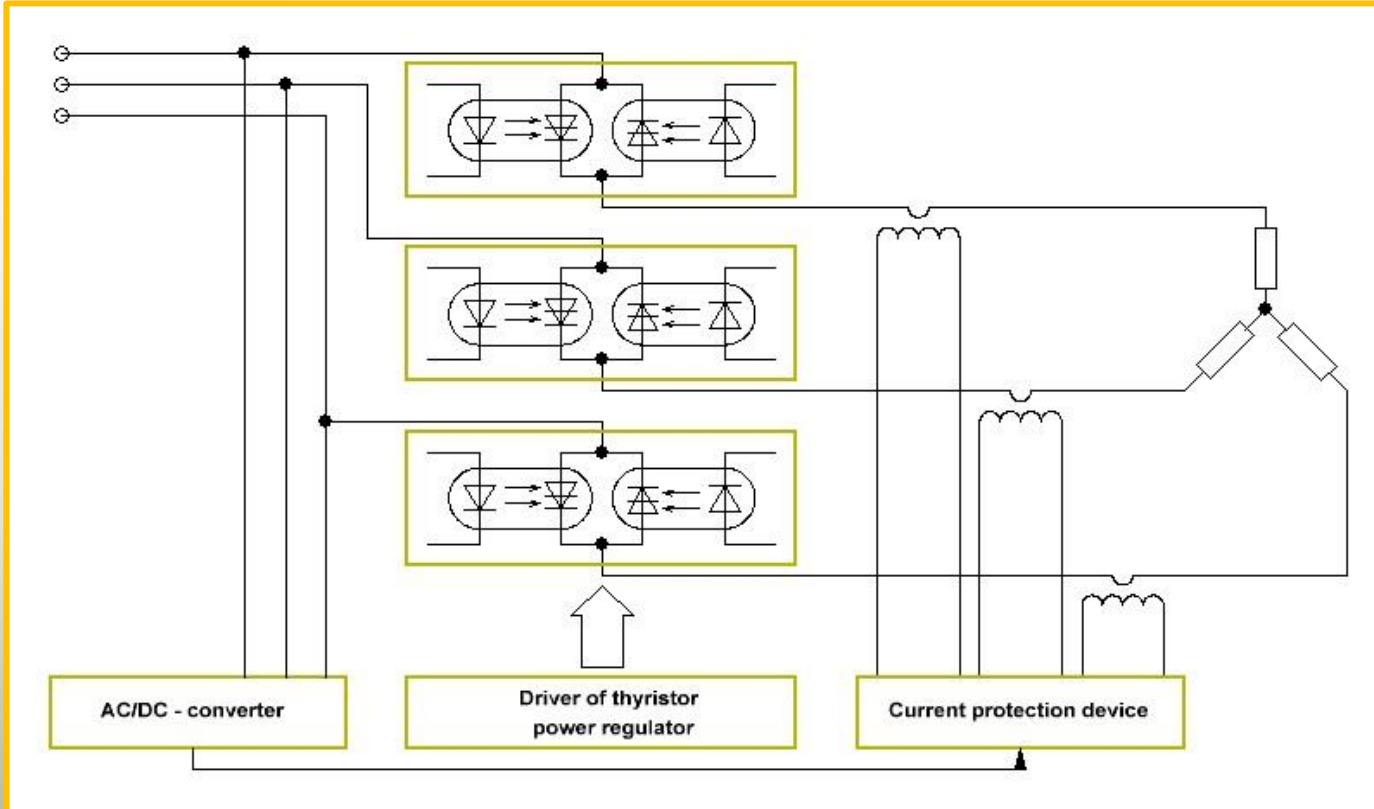


3PHBLDCCM



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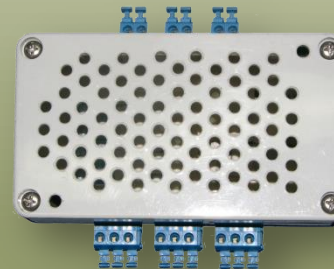
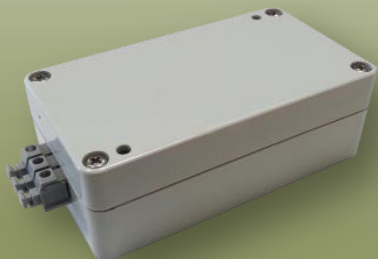




PSM 380-15

3PHPRD

MPT-200MK



POWER MODULES -

SINGLE-PHASE OPTOTHYRISTOR MODULES MO8D



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