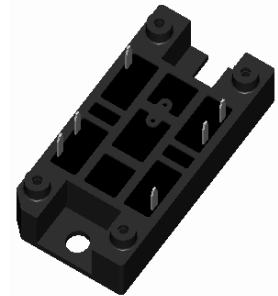
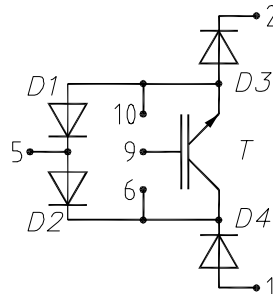


# Rectifier Module for Three Phase Power Factor Correction

## Typical Rectified Mains Power

**P<sub>n</sub> = 15 kW**

at V<sub>n</sub> = 400 V 3~; f<sub>T</sub> = 15 kHz; T<sub>C</sub> = 80°C



### Transistor T

Symbol	Conditions	Maximum Ratings	
V <sub>CES</sub>	T <sub>VJ</sub> = 25°C to 150°C	1200	V
V <sub>GES</sub>		± 20	V
I <sub>C25</sub>	T <sub>C</sub> = 25°C	95	A
I <sub>C80</sub>	T <sub>C</sub> = 80°C	65	A
I <sub>CM</sub>	V <sub>GE</sub> = ±15 V; R <sub>G</sub> = 22 Ω; T <sub>VJ</sub> = 125°C	100	A
V <sub>CEK</sub>	RBSOA; L = 100 μH	V <sub>CES</sub>	
t <sub>SC</sub> (SCSOA)	V <sub>CE</sub> = V <sub>CES</sub> ; V <sub>GE</sub> = ±15 V; R <sub>G</sub> = 22 Ω; T <sub>VJ</sub> = 125°C non-repetitive	10	μs

Symbol	Conditions	Characteristic Values (T <sub>VJ</sub> = 25°C, unless otherwise specified)			
		min.	typ.	max.	
V <sub>CE(sat)</sub>	I <sub>C</sub> = 20 A; V <sub>GE</sub> = 15 V; T <sub>VJ</sub> = 25°C T <sub>VJ</sub> = 125°C		1.7 1.9	V V	
V <sub>GE(th)</sub>	I <sub>C</sub> = 2 mA; V <sub>GE</sub> = V <sub>CE</sub>	4.5		6.5 V	
I <sub>CES</sub>	V <sub>CE</sub> = V <sub>CES</sub> ; V <sub>GE</sub> = 0 V; T <sub>VJ</sub> = 25°C T <sub>VJ</sub> = 125°C		1.8	1.6 mA mA	
I <sub>GES</sub>	V <sub>CE</sub> = 0 V; V <sub>GE</sub> = ± 20 V			400 nA	
t <sub>d(on)</sub> t <sub>r</sub> t <sub>d(off)</sub> t <sub>f</sub> E <sub>on</sub> E <sub>off</sub>	Inductive load, T <sub>VJ</sub> = 125°C V <sub>CE</sub> = 600 V; I <sub>C</sub> = 20 A V <sub>GE</sub> = ±15 V; R <sub>G</sub> = 22 Ω		100 70 500 70 3.0 2.2	ns ns ns ns mJ mJ	
C <sub>ies</sub>		V <sub>CE</sub> = 25 V; V <sub>GE</sub> = 0 V; f = 1 MHz		3.3	nF
Q <sub>Gon</sub>		V <sub>CE</sub> = 600 V; V <sub>GE</sub> = 15 V; I <sub>C</sub> = 50 A		240	nC
R <sub>thJC</sub> R <sub>thJH</sub>		with heatsink transfer paste		0.6	0.3 KW KW

### Features

- NPT IGBT with low saturation voltage
- fast recovery epitaxial diodes (FRED)
- module package:
  - high level of integration
  - solder terminals for PCB mounting
  - isolated DCB ceramic base plate
  - large creepage and strike distances

### Applications

Three phase rectifier with power factor correction, set up as follows:

- input from three phase mains
  - wide range of input voltage
  - mains currents approximately sinusoidal in phase with mains voltage
  - topology permits to control overcurrent such as in case of input voltage peaks
- output
  - direct current link
  - buck type converter - reduced output voltage
  - possibility to supply boost converter, inverter etc.
- required components
  - one power semiconductor module per phase
  - one inductor and one capacitor per phase on mains side
  - output inductor, depending on supplied circuit

**Diodes D1 - D4**

Symbol	Conditions	Maximum Ratings	
$V_{RRM}$	$T_{VJ} = 25^{\circ}\text{C}$ to $150^{\circ}\text{C}$	1200	V
$I_{F25}$	$T_C = 25^{\circ}\text{C}$	40	A
$I_{F80}$	$T_C = 80^{\circ}\text{C}$	25	A

Symbol	Conditions	Characteristic Values		
		min.	typ.	max.
$V_F$	$I_F = 20\text{ A}; T_{VJ} = 25^{\circ}\text{C}$ $T_{VJ} = 125^{\circ}\text{C}$	2.2	2.4	V
		1.9		V
$I_R$	$V_R = V_{RRM}; T_{VJ} = 25^{\circ}\text{C}$ $V_R = 0.8V_{RRM}; T_{VJ} = 125^{\circ}\text{C}$		0.75	mA
		2		mA
$I_{RM}$ $t_{rr}$	$I_F = 30\text{ A}; di_F/dt = -250\text{ A}/\mu\text{s}; T_{VJ} = 125^{\circ}\text{C}$ $V_R = 540\text{ V}$	16		A
		400		ns
$R_{thJC}$ $R_{thJH}$	with heat transfer paste	2.6	1.3	K/W K/W

**Module**

Symbol	Conditions	Maximum Ratings	
$T_{VJ}$		-40...+150	$^{\circ}\text{C}$
$T_{stg}$		-40...+125	$^{\circ}\text{C}$
$V_{ISOL}$	$I_{ISOL} \leq 1\text{ mA}; 50/60\text{ Hz}; t = 1\text{ min}$	3600	V~
$M_d$	Mounting torque (M5)	2 - 2.5	Nm

Symbol	Conditions	Characteristic Values		
		$(T_{VJ} = 25^{\circ}\text{C}, \text{ unless otherwise specified})$		
		min.	typ.	max.
$d_A, d_S$		5		mm
Weight			35	g

Dimensions in mm (1 mm = 0.0394")

