

# R&D Electronics Newsletter (2016 Issue 1)

Welcome to our 1st issue of newsletters in 2016! We wish you a Happy, Healthy and Successful New Year!

R&D Electronics is the exclusive marketing and sales channel for TECHSEM, which is the leading Chinese developer and manufacturer of diode / thyristor modules and capsules with 50 years experience.

Firstly we are pleased to announce some good news for our customers:

- From now on we deliver TECHSEM power modules with screws and gaskets. The screws and gaskets are free of charge for our customers.



Fig. 1: Screw and Gaskets

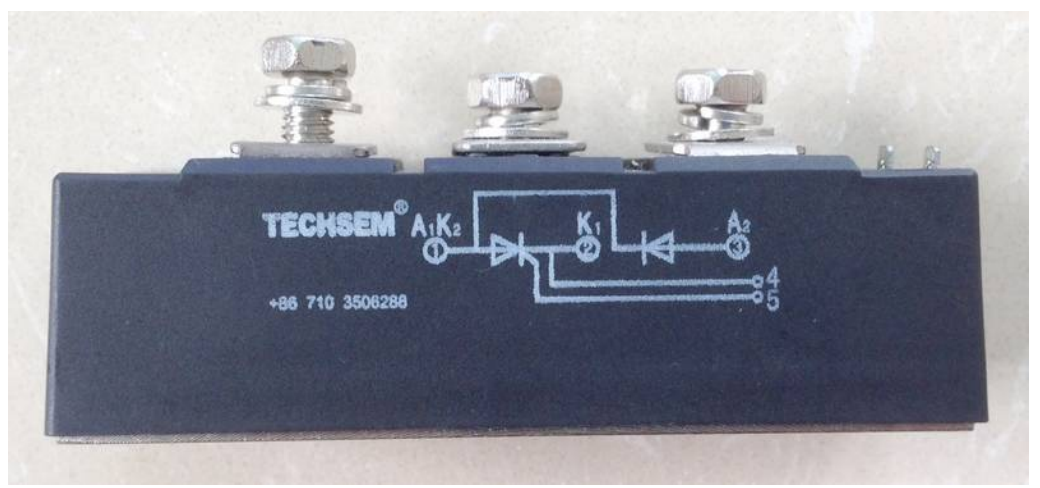


Fig. 2: TECHSEM Power Module with Screws and Gaskets

- As auxiliaries for TECHSEM power modules, we supply immediately the suitable gate leads as twisted pairs with a molded connector keyed for each half of the module. Having a "keyed" type connector makes sense to ensure a proper fit of the gate leads on the power modules. From now on, no mistakes will occur during the gate leads assembly.

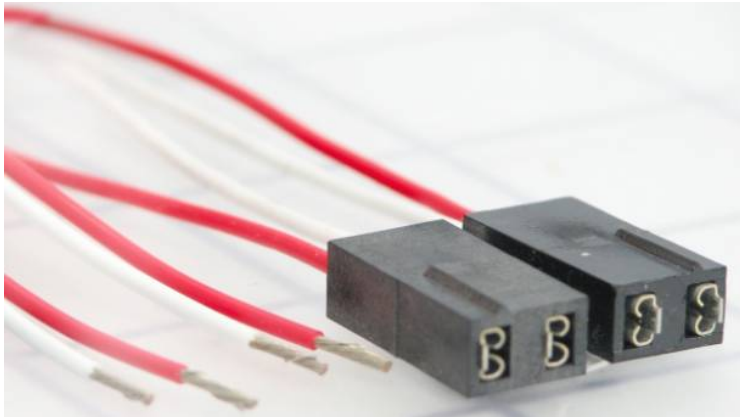


Fig. 3: Gate Leads with Keyed Connectors

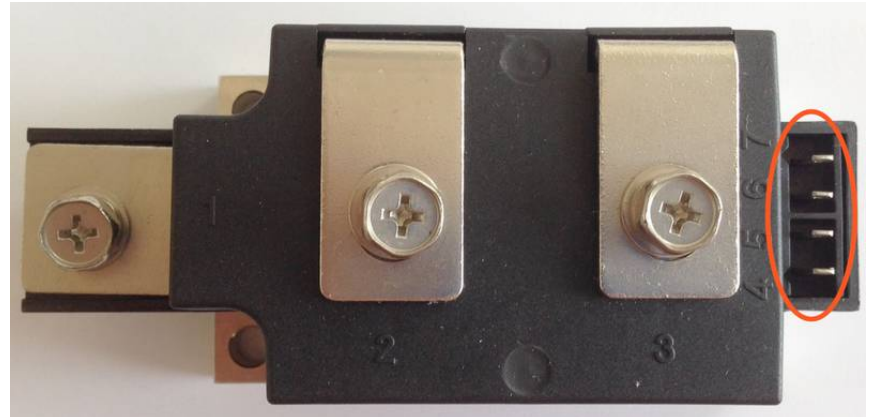


Fig. 4: Gate Sockets with Indentation (Red Circle)

Furthermore, we will present in this issue an overview of the main parameters of a SCR (thyristor). Meanwhile, Some hints will be given about what you must look out for if you compare the parameters in the data sheets of different vendors.

All of our newsletters have been achieved in our online shop. For more information please visit:

[www.rd-ebusiness.com](http://www.rd-ebusiness.com)

Yours faithfully  
R&D Electronics Team

## Main Parameters of SCR (Thyristor)

- Repetitive Peak Off-state Voltage  $V_{DRM}$** : this is the maximum off-state peak voltage pulses (less than 1 ms) allowed across the SCR device.
- Repetitive Peak Reverse Voltage  $V_{RRM}$** : this is the maximum reverse peak voltage pulses (less than 1 ms) allowed across the SCR device.
- Mean On-state Current  $I_{T(AV)}$** : This is the maximum average forward current allowed in the SCR at a specified case temperature  $T_C$ . This value depends on the current characteristic, the current conduction angle and the cooling conditions. In TECHSEM data sheets, an orientation value for one half sine wave of half a load cycle (current conduction angle  $180^\circ$ ) at a case temperature of approx.  $85^\circ\text{C}$  has been given.
- RMS On-state Current  $I_{T(RMS)}$** : this is the maximum effective forward current allowed in the SCR at a specified case temperature  $T_C$ . This value depends on the current carrying capacity of the connections inside the SCR case and the external terminals.
- Surge On-state Current  $I_{TSM}$** : this is the maximum peak current allowed in the device under the pulse condition (half sine wave of 10 or 8.3 ms). If the absolute rating is exceeded, the component may be damaged. For a surge duration of 8.3 ms, this value will be 10% higher than for a surge duration of 10 ms. Thanks to TECHSEM unique pressure contact technology,  $I_{TSM}$  of TECHSEM power modules is at approx. 10% higher than the solder contact modules from other vendors. Thus, higher reliability and longer service time can be guaranteed.
- Critical Rate of Rise of Off-state Voltage  $dv/dt$** : this is the maximum value of rate of rising voltage that can be applied across anode and cathode of the SCR without risking turning it on spuriously. This value depends on the maximum junction temperature  $T_j$  which is a condition of the given value. If  $T_j$  decreases,  $dv/dt$  will increase.
- Critical Rate of Rise of On-state Current  $di/dt$** : during turn-on, the maximum rate of rise of current should not exceed this maximum value. Above this limit, the SCR may be damaged.
- Thermal Resistance Junction to Case  $R_{th(j-c)}$** : this is the thermal resistance between junction and case. This value can be given for different current waveforms as well as for the entire module or for a single chip. In TECHSEM data sheets, this value has been given for a half sine wave with conduction angle  $180^\circ$  and for a single chip.
- Thermal Resistance Case to Heatsink  $R_{th(j-h)}$** : the thermal resistance between module base plate and heatsink is also given for entire module or for a single chip. This value applies to the use of thermal paste in the recommended thickness.
- Isolation Voltage  $V_{iso}$** : this is the RMS value of a 50 Hz AC voltage at which 100% of the modules are tested. The value in TECHSEM data sheets refers to a test-duration of 1 minute. For a test-duration of 1 second, the isolation voltage will be 20% higher.



- Features:**
- Isolated mounting base 3000V~
  - Pressure contact technology with increased power cycling capability
  - Space and weight saving
- Typical Applications**
- AC/DC motor drives
  - Various rectifiers
  - DC supply for PWM inverter

$V_{DSM}, V_{RSM}$	$V_{DRM}, V_{RRM}$	Type & Outline
900V	800V	MTx110-08-223F3
1100V	1000V	MTx110-10-223F3
1300V	1200V	MTx110-12-223F3
1500V	1400V	MTx110-14-223F3
1700V	1600V	MTx110-16-223F3
1900V	1800V	MTx110-18-223F3

SYMBOL	CHARACTERISTIC	TEST CONDITIONS	$T_j(^{\circ}\text{C})$	VALUE			UNIT
				Min	Type	Max	
$I_{T(AV)}$	Mean on-state current	$180^\circ$ half sine wave 50Hz Single side cooled, $T_c=85^\circ\text{C}$	125			110	A
$I_{T(RMS)}$	RMS on-state current		125			173	A
$I_{DRM}$ $I_{RRM}$	Repetitive peak current	at $V_{DRM}$ at $V_{RRM}$	125			12	mA
$I_{TSM}$	Surge on-state current	10ms half sine wave $V_R=60\%V_{RRM}$	125			2.20	KA
$I^2t$	$I^2T$ for fusing coordination					24.2	$\text{A}^2\text{s}\cdot 10^{-3}$
$V_{TO}$	Threshold voltage		125			0.8	V
$r_T$	On-state slope resistance					2.29	m $\Omega$
$V_{TM}$	Peak on-state voltage	$I_{TM}=330\text{A}$	25			1.69	V
$dv/dt$	Critical rate of rise of off-state voltage	$V_{DM}=67\%V_{DRM}$	125			1000	V/ $\mu\text{s}$
$di/dt$	Critical rate of rise of on-state current	Gate source 1.5A $t_r \leq 0.5\mu\text{s}$ Repetitive	125			200	A/ $\mu\text{s}$
$I_{GT}$	Gate trigger current			30		100	mA
$V_{GT}$	Gate trigger voltage	$V_A=12\text{V}, I_A=1\text{A}$	25	1.0		2.5	V
$I_H$	Holding current			20		120	mA
$V_{GD}$	Non-trigger gate voltage	$V_{DM}=67\%V_{DRM}$	125	0.2			V
$R_{th(j-c)}$	Thermal resistance Junction to case	Single side cooled per chip				0.250	$^{\circ}\text{C}/\text{W}$
$R_{th(c-h)}$	Thermal resistance case to heatsink	Single side cooled per chip				0.15	$^{\circ}\text{C}/\text{W}$
$V_{iso}$	Isolation voltage	50Hz, R.M.S, $t=1\text{min}, I_{iso}:1\text{mA}(\text{MAX})$		3000			V

Fig. 5: Main Parameters in TECHSEM Data Sheet of 110A Thyristor Module

## Free Samples

You want to test our products? No problem. We provide now for certain types of products with limited quantities as free samples at your disposal. For the available products, you only need to pay for the shipping costs from Hong Kong to your delivery address. Do not hesitate to register as customer in our shop and contact us for free samples of your choice: [www.rd-ebusiness.com](http://www.rd-ebusiness.com).

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