

1. General description

Planar passivated Silicon Controlled Rectifier (SCR) module in WeEnTOP-B for use in applications requiring high blocking voltage capability, high inrush current capability and high thermal cycling performance.

2. Features and benefits

- Planar passivated thyristor chips for voltage ruggedness and reliability
- Top-side cooling
- Compact design
- One screw mounting
- Heat transfer and isolation through direct copper bonded aluminum oxide ceramic (DBC)
- Package is RoHS compliant

3. Applications

- Soft starters
- UPS
- Temperature control
- Lighting control
- AC power control

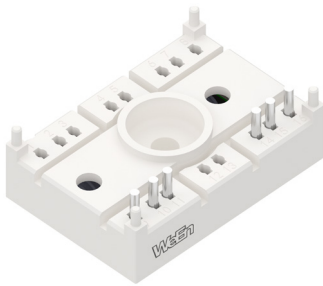
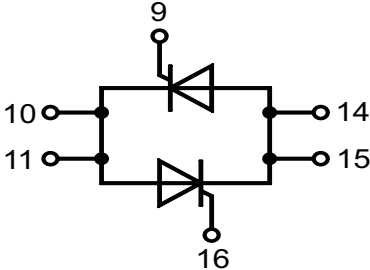
4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions	Notes	Values			Unit
Absolute maximum rating							
V _{DRM}	repetitive peak forward voltage			1600			V
V _{RRM}	repetitive peak reverse voltage			1600			V
I _{T(RMS)}	RMS on-state current	half sine wave		101			A
I _{TSM}	non-repetitive peak on-state current	half sine wave; T _{j(init)} = 25 °C; t _p = 10 ms		1500			A
		half sine wave; T _{j(init)} = 125 °C; t _p = 10 ms		1350			A
		half sine wave; T _{j(init)} = 25 °C; t _p = 8.3 ms		1650			A
		half sine wave; T _{j(init)} = 125 °C; t _p = 8.3 ms		1485			A
Symbol	Parameter	Conditions	Notes	Min	Typ	Max	Unit
Static characteristics							
I _{GT}	gate trigger current	V _D = 12 V; I _T = 0.1 A; T _J = 25 °C		30	-	100	mA
V _{GT}	gate trigger voltage	V _D = 12 V; I _T = 0.1 A; T _J = 25 °C		-	-	1.50	V
V _T	on-state voltage	I _T = 200 A; T _J = 25 °C		-	-	1.70	V

5. Pinning information

Table 2. Pinning information

Simplified outline	Graphic symbol
	

6. Ordering information

Table 3. Ordering information

Type number	Package Name	Orderable part number	Packing method	Small packing quantity	Package version	Package issue date
WAT100TBS16	WeEnTOP-B	WAT100TBS16T	EPE	30	WeEnTOP-BPAT-A	05-Nov-2024

7. Marking

Table 4. Marking codes

Type number	Marking codes
WAT100TBS16	WAT100TBS16

8. Limiting values

Table 5. Limiting values

In accordance with the Absolute Maximum Rating System (IEC 60134).

Symbol	Parameter	Conditions	Notes	Values	Unit
V_{DRM}	repetitive peak forward voltage			1600	V
V_{RRM}	repetitive peak reverse voltage			1600	V
$I_{T(RMS)}$	RMS on-state current	half sine wave		101	A
I_{TSM}	non-repetitive peak onstate current	half sine wave; $T_{J(init)} = 25\text{ }^{\circ}\text{C}$; $t_p = 10\text{ ms}$		1500	A
		half sine wave; $T_{J(init)} = 125\text{ }^{\circ}\text{C}$; $t_p = 10\text{ ms}$		1350	A
		half sine wave; $T_{J(init)} = 25\text{ }^{\circ}\text{C}$; $t_p = 8.3\text{ ms}$		1650	A
		half sine wave; $T_{J(init)} = 125\text{ }^{\circ}\text{C}$; $t_p = 8.3\text{ ms}$		1485	A
I^2t	I^2t for fusing	$t_p = 10\text{ ms}$; sine-wave pulse		11.25	kA^2s
di_T/dt	rate of rise of on-state current	$I_G = 200\text{ mA}$; $T_j = 125\text{ }^{\circ}\text{C}$		200	$\text{A}/\mu\text{s}$
I_{GM}	peak gate current			10	A
V_{RGM}	peak reverse gate voltage			5	V
P_{GM}	peak gate power			20	W
$P_{G(AV)}$	average gate power	over any 20 ms period		0.5	W
T_{vj}	virtual junction temperature			-40 to 125	$^{\circ}\text{C}$
T_{op}	operation temperature			-40 to 125	$^{\circ}\text{C}$
T_{stg}	storage temperature			-40 to 125	$^{\circ}\text{C}$

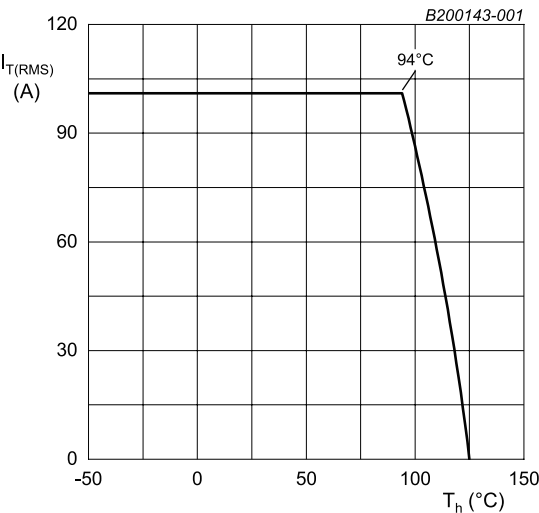
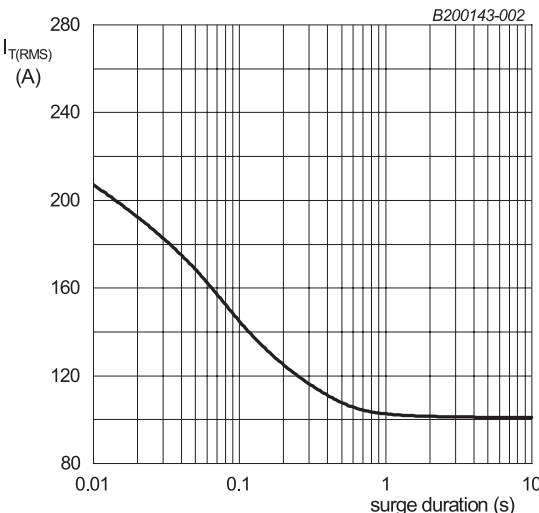


Fig. 1. RMS on-state current as a function of heatsink temperature; maximum values



f = 50 Hz; $T_h = 94\text{ }^{\circ}\text{C}$
Fig. 2. RMS on-state current as a function of surge duration; maximum values

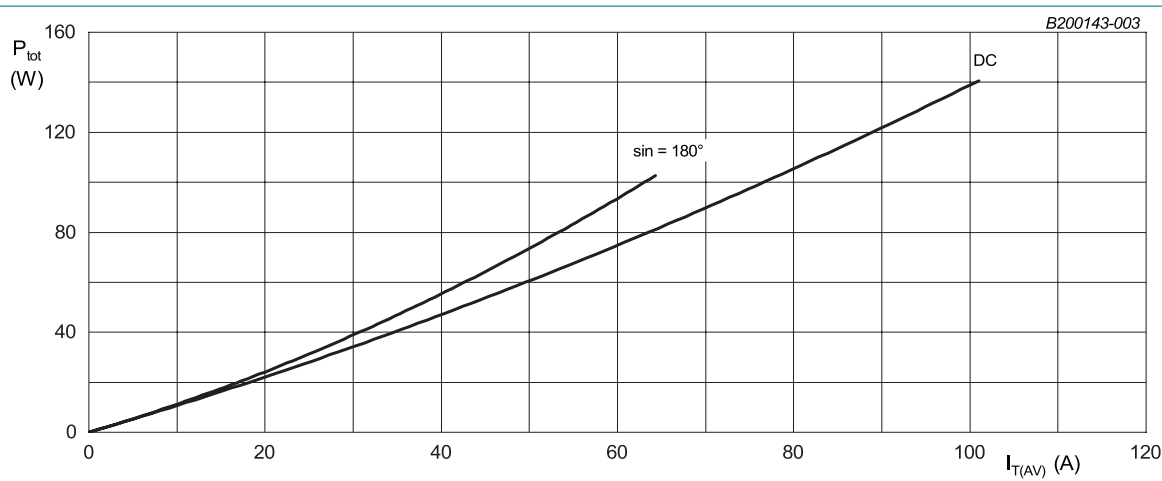
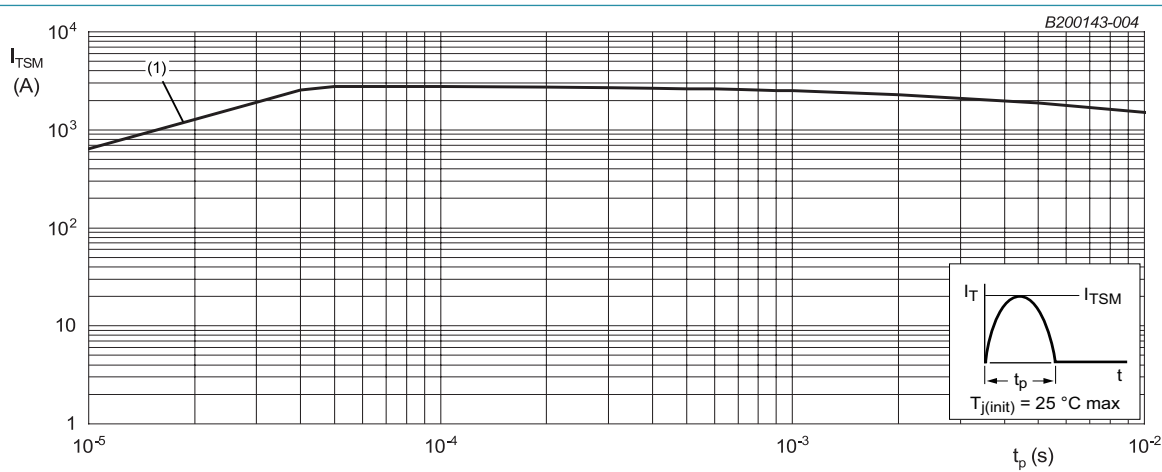


Fig. 3. Total power dissipation as a function of average on-state current; maximum values



$t_p \leq 10\text{ ms}$
(1) di_T/dt limit

Fig. 4. Non-repetitive peak on-state current as a function of pulse width; maximum values

9. Thermal characteristics

Table 6. Thermal characteristics

Symbol	Parameter	Conditions	Notes	Min	Typ	Max	Unit
$R_{th(j-h)}$	thermal resistance from junction to heatsink	per thyristor		-	-	0.6	K/W
		per module		-	-	0.3	K/W

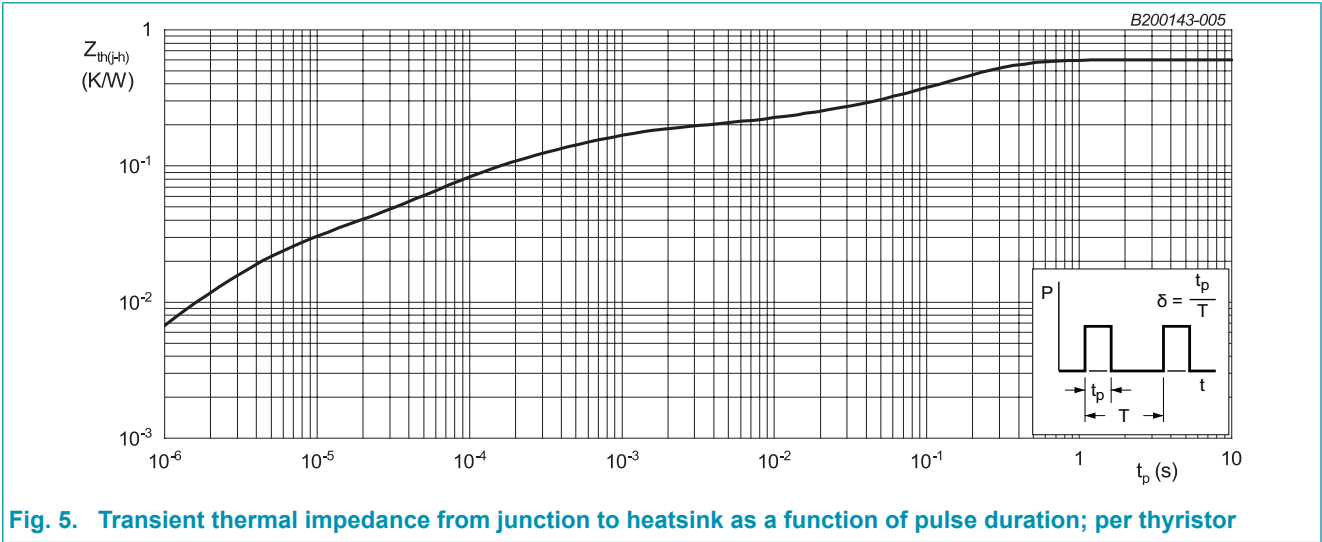


Fig. 5. Transient thermal impedance from junction to heatsink as a function of pulse duration; per thyristor

10. Package characteristics

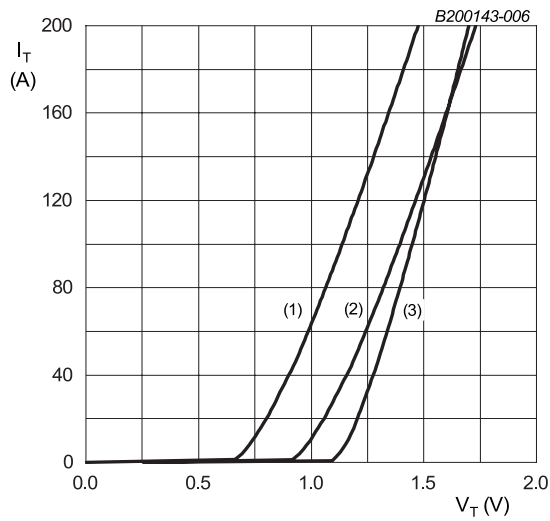
Table 7. Isolation characteristics

Symbol	Parameter	Conditions	Notes	Min	Typ	Max	Unit
V_{isol}	isolation voltage	50/60 Hz; RMS; $I_{ISOL} \leq 1$ mA; $t = 1$ second; AC		-	-	3600	V
		50/60 Hz; RMS; $I_{ISOL} \leq 1$ mA; $t = 1$ minute; AC		-	-	2500	V

11. Characteristics

Table 8. Characteristics

Symbol	Parameter	Conditions	Notes	Min	Typ	Max	Unit
Static characteristics							
I _{GT}	gate trigger current	V _D = 12 V; I _T = 0.1 A; T _J = 25 °C		30	-	100	mA
V _{GT}	gate trigger voltage	V _D = 12 V; I _T = 0.1 A; T _J = 25 °C		-	-	1.50	V
		V _D = 2/3 V _{DRM} ; I _T = 0.1 A; T _J = 125 °C		0.25	-	-	V
I _{GD}	gate non-trigger current	T _J = 125 °C		-	-	8.5	mA
V _{GD}	gate non-trigger voltage	T _J = 125 °C		-	-	0.2	V
I _L	latching current	V _D = 12 V; I _T = 0.1 A; T _J = 25 °C		-	-	300	mA
I _H	holding current	V _D = 12 V; T _J = 25 °C		-	-	200	mA
V _T	on-state voltage	I _T = 200 A; T _J = 25 °C		-	-	1.70	V
V _{TO}	threshold voltage	T _J = 125 °C		-	-	1.0	V
r _T	slope resistance	T _J = 125 °C		-	-	3.5	mΩ
I _D	off-state current	V _D = 1600 V; T _J = 25 °C		-	-	100	μA
		V _D = 1600 V; T _J = 125 °C		-	-	15	mA
I _R	reverse current	V _R = 1600 V; T _J = 25 °C		-	-	100	μA
		V _R = 1600 V; T _J = 125 °C		-	-	15	mA
Dynamic characteristics							
dV _D /dt	rate of rise of off-state voltage	V _{DM} = 1072 V; T _J = 125 °C; (V _{DM} = 67% of V _{DRM}); exponential waveform; gate open circuit		1500	-	-	V/μs
t _{gt}	gate-controlled turn-on time	I _{TM} = 40 A; V _D = 800 V; I _G = 100 mA; (dI _G /dt) _M = 1 A/μs; T _J = 25 °C		-	2	-	μs
t _q	commutated turn-off time	I _{TM} = 2 A; t _p = 50 μs; dV/dt = 5 V/μs; dI/dt = 30 A/μs; T _i = 25 °C		-	150	-	μs


$$V_{TO} = 1.034 \text{ V}; r_T = 0.0035 \Omega$$

(1) $T_j = 125\text{ }^{\circ}\text{C}$; typical values

(2) $T_j = 125^\circ\text{C}$; maximum values

(3) $T_j = 25^\circ\text{C}$; maximum values

Fig. 6. On-state current as a function of on-state voltage

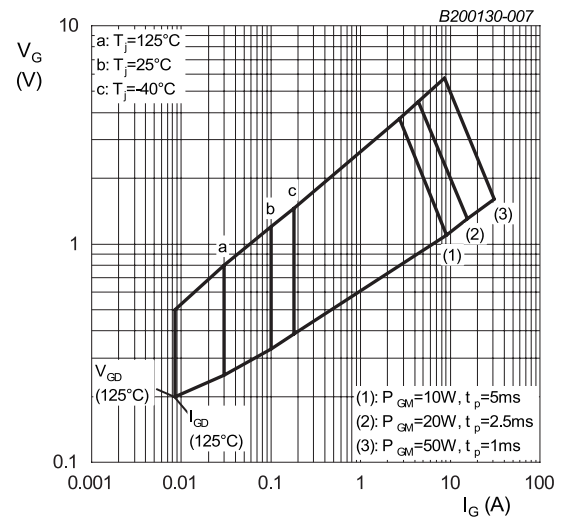
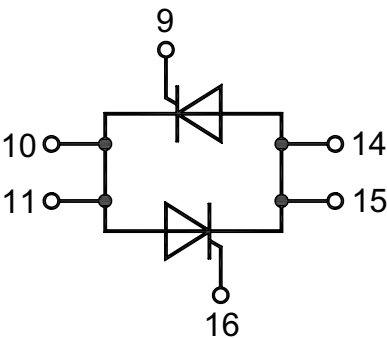
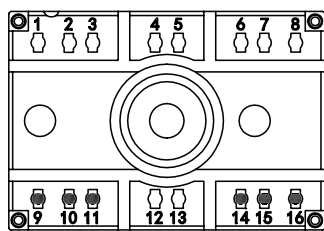


Fig. 7. Gate voltage as a function of gate current

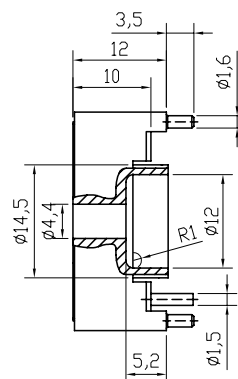
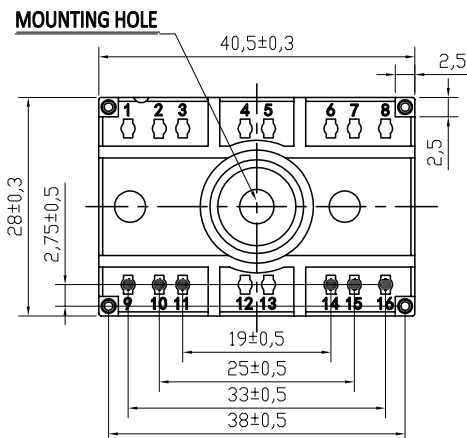
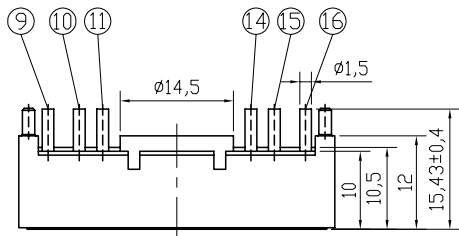
12. Package outline

Dimensions in mm

Pinout



Package Outline



Suggested hole diameter in the PCB for solder pins and mounting pins: 2mm

13. Legal information

Data sheet status

Document status [1][2]	Product status [3]	Definition
Objective [short] data sheet	Development	This document contains data from the objective specification for product development.
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Product [short] data sheet	Production	This document contains the product specification.

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- [2] The term 'short data sheet' is explained in section "Definitions".
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