

## 1. General description

Pressure contact thyristor in industrial standard 60mm package for use in applications requiring high blocking voltage capability, high inrush current capability and high thermal cycling performance.

## 2. Features and benefits

- High blocking voltage capability
- High surge current capability
- High thermal cycling performance
- Pressure contact module with high reliability
- Easy mounting

## 3. Applications

- Heat and Temperature Control
- Power Converter
- Industrial Motor Drive & Soft Starter
- Lighting Control
- UPS

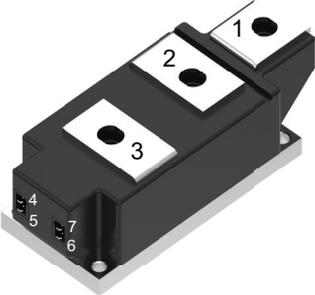
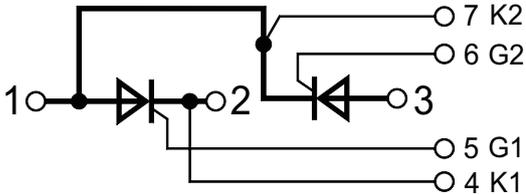
## 4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions	Notes	Values			Unit
<b>Absolute maximum rating</b>							
$V_{DRM}$	repetitive peak forward voltage			1600			V
$V_{RRM}$	repetitive peak reverse voltage			1600			V
$I_{T(AV)}$	average on-state current	half sine wave; $T_c = 85\text{ °C}$		600			A
$I_{TSM}$	non-repetitive peak on-state current	half sine wave; $T_{j(\text{init})} = 25\text{ °C}$ ; $t_p = 10\text{ ms}$		19000			A
		half sine wave; $T_{j(\text{init})} = 135\text{ °C}$ ; $t_p = 10\text{ ms}$		16000			A
		half sine wave; $T_{j(\text{init})} = 25\text{ °C}$ ; $t_p = 8.3\text{ ms}$		20900			A
		half sine wave; $T_{j(\text{init})} = 135\text{ °C}$ ; $t_p = 8.3\text{ ms}$		17600			A
Symbol	Parameter	Conditions		Min	Typ	Max	Unit
<b>Static characteristics</b>							
$I_{GT}$	gate trigger current	$V_D = 12\text{ V}$ ; $I_T = 0.1\text{ A}$ ; $T_j = 25\text{ °C}$		30	-	150	mA
$V_{GT}$	gate trigger voltage	$V_D = 12\text{ V}$ ; $I_T = 0.1\text{ A}$ ; $T_j = 25\text{ °C}$		-	-	2.5	V
$V_T$	on-state voltage	$I_T = 1500\text{ A}$ ; $T_j = 25\text{ °C}$		-	-	1.5	V

## 5. Pinning information

Table 2. Pinning information

Simplified outline	Graphic symbol
	

## 6. Ordering information

Table 3. Ordering information

Type number	Orderable part number	Packing method	Small packing quantity
WTMH600F16	WTMH600F16T	Tray	9

## 7. Marking

Table 4. Marking codes

Type number	Marking codes
WTMH600F16	WTMH600F16

## 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
$I_{T(AV)}$	average on-state current	half sine wave; $T_c = 85\text{ °C}$		600	A
$I_{T(RMS)}$	RMS on-state current	half sine wave; $T_c = 85\text{ °C}$		1000	A
$I_{TSM}$	non-repetitive peak on-state current	half sine wave; $T_{j(\text{init})} = 25\text{ °C}$ ; $t_p = 10\text{ ms}$		19000	A
		half sine wave; $T_{j(\text{init})} = 135\text{ °C}$ ; $t_p = 10\text{ ms}$		16000	A
		half sine wave; $T_{j(\text{init})} = 25\text{ °C}$ ; $t_p = 8.3\text{ ms}$		20900	A
		half sine wave; $T_{j(\text{init})} = 135\text{ °C}$ ; $t_p = 8.3\text{ ms}$		17600	A
$I^2t$	$I^2t$ for fusing	$t_p = 10\text{ ms}$ ; SIN; $T_{vj} = 25\text{ °C}$		1805	$\text{kA}^2\text{s}$
		$t_p = 10\text{ ms}$ ; SIN; $T_{vj} = 125\text{ °C}$		1280	$\text{kA}^2\text{s}$
$di_T/dt$	rate of rise of on-state current	$I_G = 300\text{ mA}$ ; $T_j = 135\text{ °C}$		250	$\text{A}/\mu\text{s}$
$I_{GM}$	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 135	$^{\circ}\text{C}$
$T_{op}$	operation temperature			-40 to 125	$^{\circ}\text{C}$
$T_{stg}$	storage temperature			-40 to 125	$^{\circ}\text{C}$

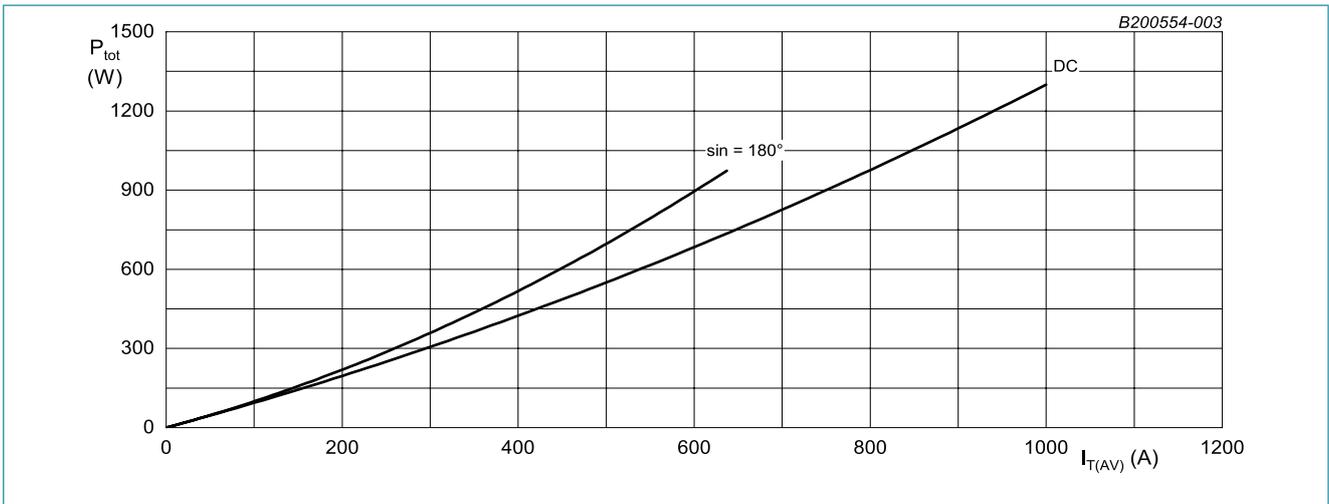


Fig. 1. Total power dissipation as a function of average on-state current; maximum values; per thyristor

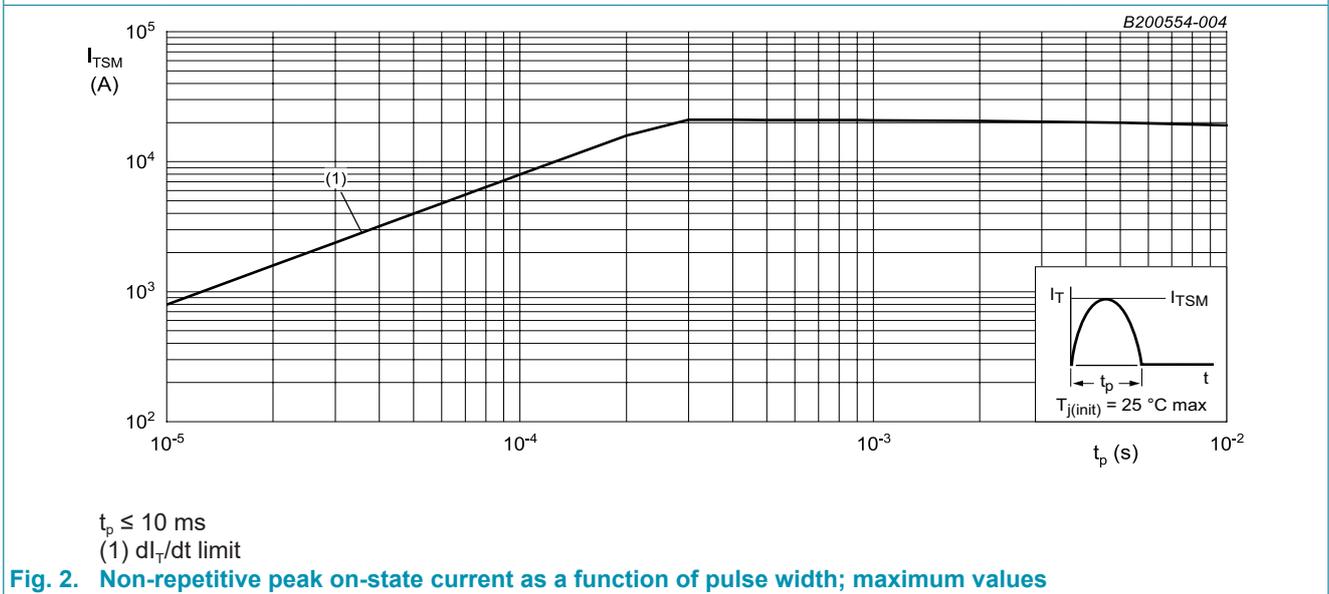


Fig. 2. Non-repetitive peak on-state current as a function of pulse width; maximum values

## 9. Thermal characteristics

Table 6. Thermal characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$R_{th(j-c)}$	thermal resistance from junction to case	per thyristor	-	-	0.071	K/W
$R_{th(j-h)}$	thermal resistance from junction to heatsink	per thyristor	-	-	0.024	K/W

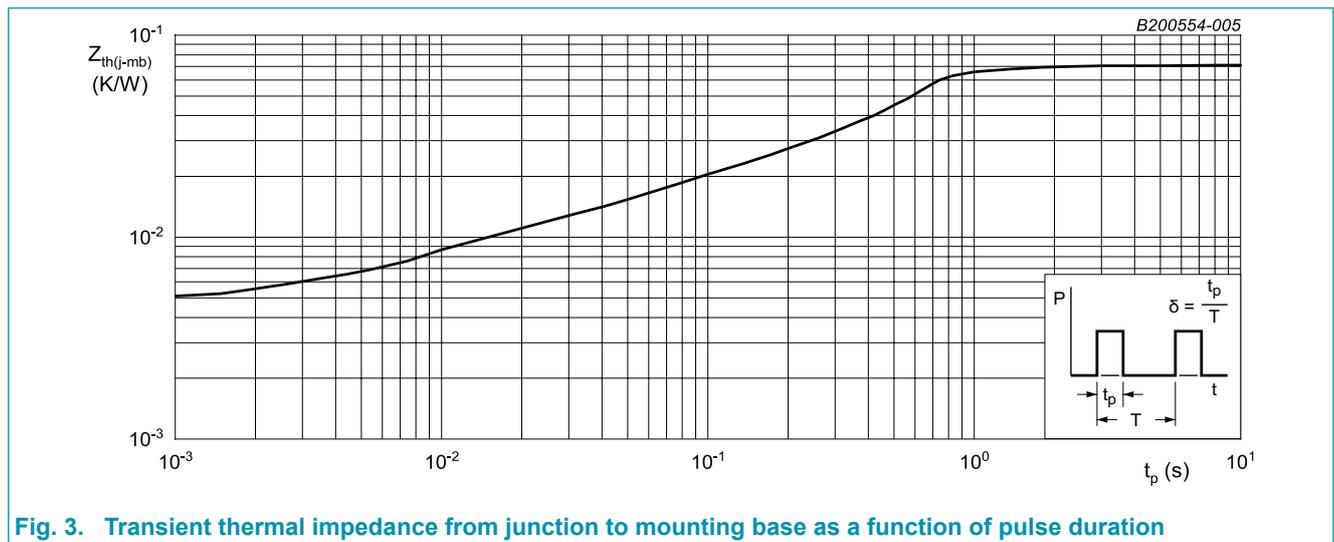


Fig. 3. Transient thermal impedance from junction to mounting base as a function of pulse duration

## 10. Package characteristics

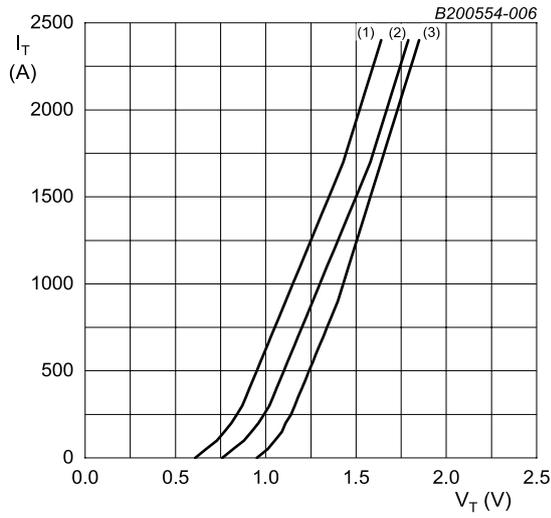
Table 7. Isolation characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$V_{isol}$	isolation voltage	50/60 Hz; RMS; $t = 1$ minute; AC	-	-	2500	V

## 11. Characteristics

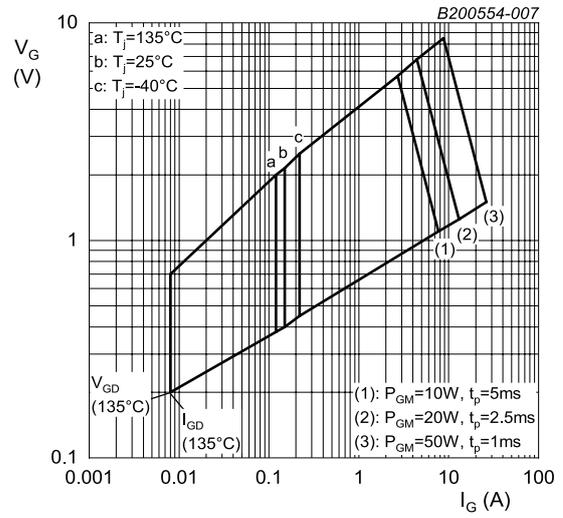
Table 8. Characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b>Static characteristics</b>						
$I_{GT}$	gate trigger current	$V_D = 12\text{ V}; I_T = 0.1\text{ A}; T_j = 25\text{ }^\circ\text{C}$	30	-	150	mA
$V_{GT}$	gate trigger voltage	$V_D = 12\text{ V}; I_T = 0.1\text{ A}; T_j = 25\text{ }^\circ\text{C}$	-	-	2.5	V
$I_{GD}$	gate non-trigger current	$T_j = 135\text{ }^\circ\text{C}$	-	-	10	mA
$V_{GD}$	gate non-trigger voltage	$T_j = 135\text{ }^\circ\text{C}$	-	-	0.25	V
$I_L$	latching current	$V_D = 12\text{ V}; I_T = 0.1\text{ A}; T_j = 25\text{ }^\circ\text{C}$	-	-	500	mA
$I_H$	holding current	$V_D = 12\text{ V}; T_j = 25\text{ }^\circ\text{C}$	-	-	150	mA
$V_T$	on-state voltage	$I_T = 1500\text{ A}; T_j = 25\text{ }^\circ\text{C}$	-	-	1.5	V
$V_{TO}$	threshold voltage	$T_j = 135\text{ }^\circ\text{C}$	-	-	0.9	V
$r_T$	slope resistance	$T_j = 135\text{ }^\circ\text{C}$	-	-	0.4	m $\Omega$
$I_D$	off-state current	$V_D = 1600\text{ V}; T_j = 25\text{ }^\circ\text{C}$	-	-	1	mA
		$V_D = 1600\text{ V}; T_j = 135\text{ }^\circ\text{C}$	-	-	100	mA
$I_R$	reverse current	$V_R = 1600\text{ V}; T_j = 25\text{ }^\circ\text{C}$	-	-	1	mA
		$V_R = 1600\text{ V}; T_j = 135\text{ }^\circ\text{C}$	-	-	100	mA
<b>Dynamic characteristics</b>						
$dV_D/dt$	rate of rise of off-state voltage	$V_{DM} = 1072\text{ V}; T_j = 125\text{ }^\circ\text{C}; (V_{DM} = 67\% \text{ of } V_{DRM}); \text{exponential waveform; gate open circuit}$	1500	-	-	V/ $\mu\text{s}$
$t_{gt}$	gate-controlled turn-on time	$V_D = 800\text{ V}; I_G = 300\text{ mA}; (dI_G/dt)_M = 1\text{ A}/\mu\text{s}; T_j = 25\text{ }^\circ\text{C}$	-	5	-	$\mu\text{s}$
$t_q$	commutated turn-off time	$I_{TM} = 2\text{ A}; t_p = 50\text{ } \mu\text{s}; dV_D/dt = 5\text{ V}/\mu\text{s}; dI/dt = 30\text{ A}/\mu\text{s}; T_j = 25\text{ }^\circ\text{C}$	-	150	-	$\mu\text{s}$



$V_{TO} = 0.900 \text{ V}$ ;  $r_T = 0.0004 \ \Omega$   
 (1)  $T_j = 135 \text{ }^\circ\text{C}$ ; typical values  
 (2)  $T_j = 135 \text{ }^\circ\text{C}$ ; maximum values  
 (3)  $T_j = 25 \text{ }^\circ\text{C}$ ; maximum values

**Fig. 4. On-state current as a function of on-state voltage**

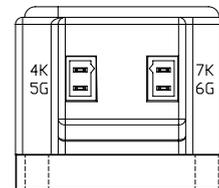
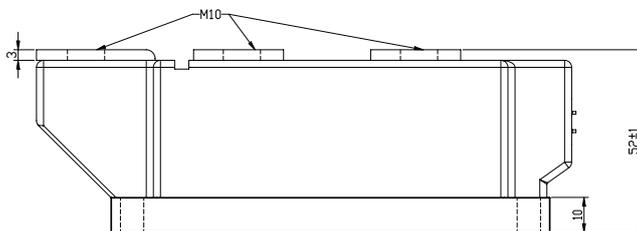
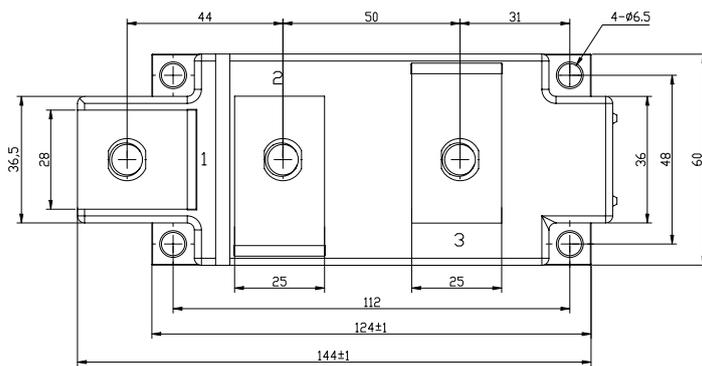
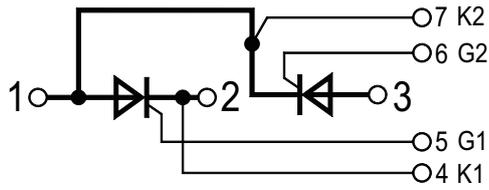


**Fig. 5. Gate voltage as a function of gate current**

12. Package outline

Package Outline

Dimensions in mm



General tolerance ±0.5mm

## 13. Legal information

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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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