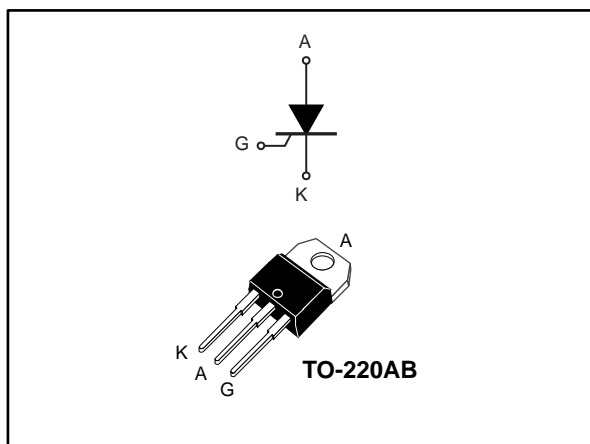


## High temperature 16 A SCRs

Datasheet - production data


**Features**

- High junction temperature:  $T_j = 150\text{ }^\circ\text{C}$
- Gate triggering current  $I_{GT} = 6\text{ mA}$
- High noise immunity  $dV/dt = 200\text{ V}/\mu\text{s}$  up to  $150\text{ }^\circ\text{C}$
- Blocking voltage  $V_{DRM}/V_{RRM} = 600\text{ V}$
- High turn-on current rise  $dI/dt: 100\text{ A}/\mu\text{s}$
- ECOPACK<sup>®</sup>2 compliant component

**Applications**

- Motorbikes voltage regulator circuits
- Inrush current limiting circuits
- Motor control circuits and starters
- Light dimmers
- Solid state relays

**Description**

Designed with high immunity switching to external surges, the device offers robust switching up to its  $150\text{ }^\circ\text{C}$  maximum  $T_j$ .

The combination of noise immunity and low gate triggering current allows to design strong and compact control circuit.

**Table 1: Device summary**

Order code	Package	$V_{DRM}/V_{RRM}$	$I_{GT}$
TN1605H-6T	TO-220AB	600	6 mA

# 1 Characteristics

**Table 2: Absolute maximum ratings (limiting values,  $T_j = 25\text{ °C}$  unless otherwise specified)**

Symbol	Parameter		Value	Unit
$I_{T(RMS)}$	RMS on-state current (180° conduction angle)		$T_c = 133\text{ °C}$	16 A
$I_{T(AV)}$	Average on-state current (180° conduction angle)		$T_c = 133\text{ °C}$	10
			$T_c = 138\text{ °C}$	8
			$T_c = 142\text{ °C}$	6
$I_{TSM}$	Non repetitive surge peak on-state current	$t_p = 8.3\text{ ms}$	$T_j\text{ initial} = 25\text{ °C}$	153
		$t_p = 10\text{ ms}$		140
$I^2t$	$I^2t$ value for fusing	$t_p = 10\text{ ms}$		98 A <sup>2</sup> s
$di/dt$	Critical rate of rise of on-state current	$I_G = 2 \times I_{GT}$ , $t_r \leq 100\text{ ns}$ ,	$f = 60\text{ Hz}$	100 A/ $\mu$ s
$V_{DRM}/V_{RRM}$	Repetitive peak off-state voltage		$T_j = 150\text{ °C}$	600 V
$V_{DSM}/V_{RSM}$	Non repetitive surge peak off-state voltage	$t_p = 10\text{ ms}$		700 V
$P_G(AV)$	Average gate power dissipation		$T_j = 150\text{ °C}$	1 W
$V_{RGM}$	Maximum peak reverse gate voltage			5 V
$I_{GM}$	Peak gate current	$t_p = 20\text{ }\mu$ s	$T_j = 150\text{ °C}$	4 A
$P_{GM}$	Peak gate power dissipation	$t_p = 20\text{ }\mu$ s	$T_j = 150\text{ °C}$	40 W
$P_G(AV)$	Average gate power dissipation		$T_j = 150\text{ °C}$	1 W
$T_{stg}$	Storage junction temperature range			-40 to +150 °C
$T_j$	Operating junction temperature range			-40 to +150 °C
$T_L$	Maximum lead temperature for soldering during 10 s			260 °C

**Table 3: Dynamic characteristics**

Symbol	Parameter	$T_j$		Value	Unit
$I_{GT}$	$V_D = 12\text{ V}$ , $R_L = 33\text{ }\Omega$	25 °C	Min.	3.5	mA
			Typ.	4.5	
			Max.	6	
$V_{GT}$			Max.	1.3	V
$V_{GD}$	$V_D = 600\text{ V}$ , $R_L = 3.3\text{ k}\Omega$	150 °C	Min.	0.15	V
$I_L$	$I_G = 1.2 \times I_{GT}$	25 °C	Max.	40	mA
$I_H$	$I_T = 500\text{ mA}$ , gate open		Max.	20	
$dV/dt$	$V_D = 402\text{ V}$ , gate open	150 °C	Min.	200	V/ $\mu$ s
$t_{gt}$	$I_{TM} = 32\text{ A}$ , $V_D = 402\text{ V}$ , $I_G = 12\text{ mA}$ , ( $dI_G/dt$ ) max = 0.2 A/ $\mu$ s	25 °C	Typ.	1.9	$\mu$ s
$t_q$	$I_{TM} = 32\text{ A}$ , $V_D = 402\text{ V}$ , ( $dI/dt$ ) <sub>off</sub> = 30 A/ $\mu$ s, $V_R = 25\text{ V}$ , $dV_D/dt = 20\text{ V}/\mu$ s	150 °C	Typ.	70	$\mu$ s

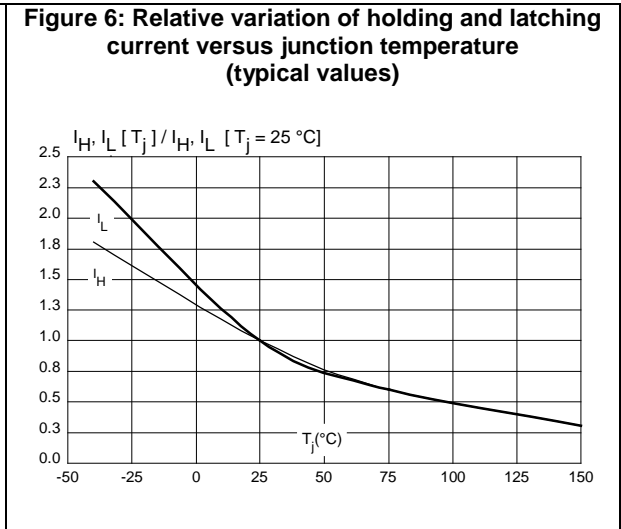
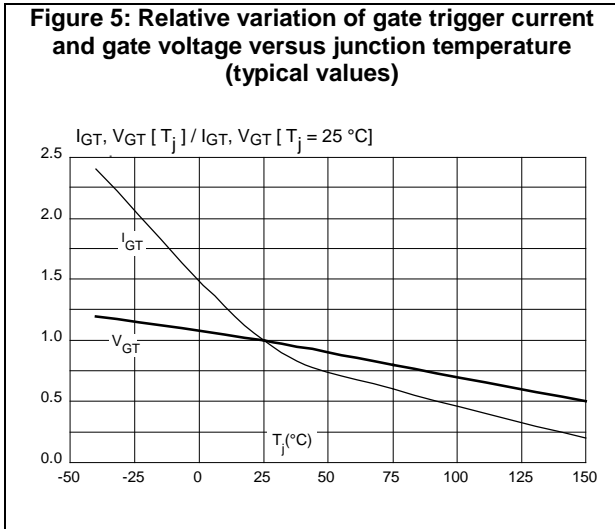
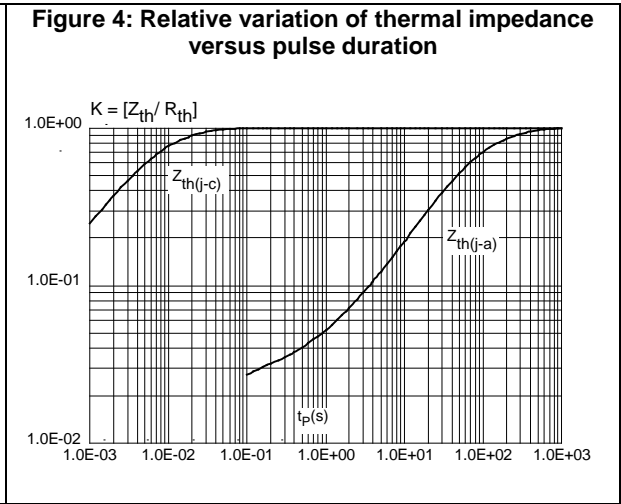
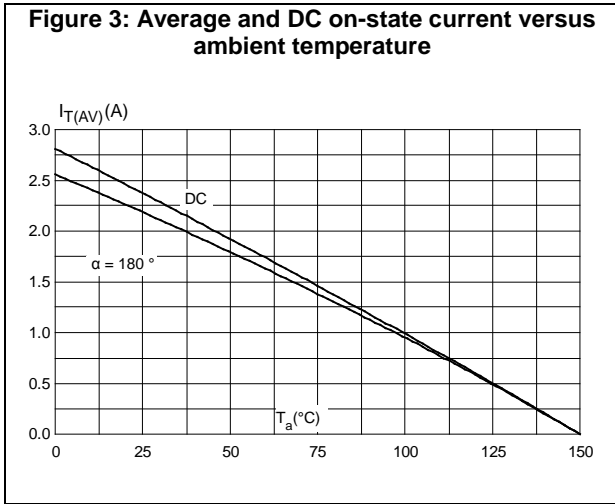
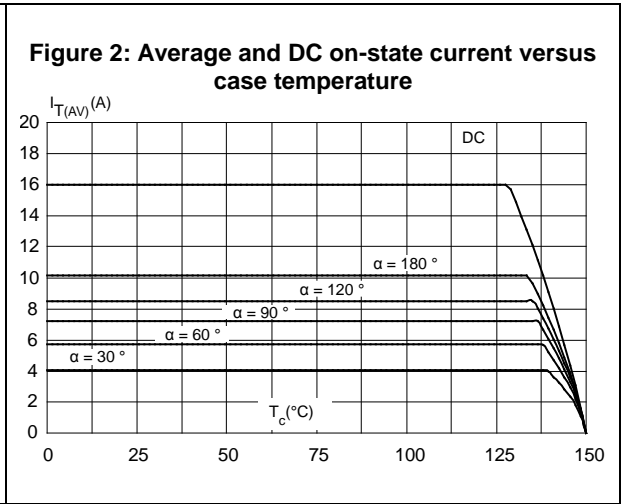
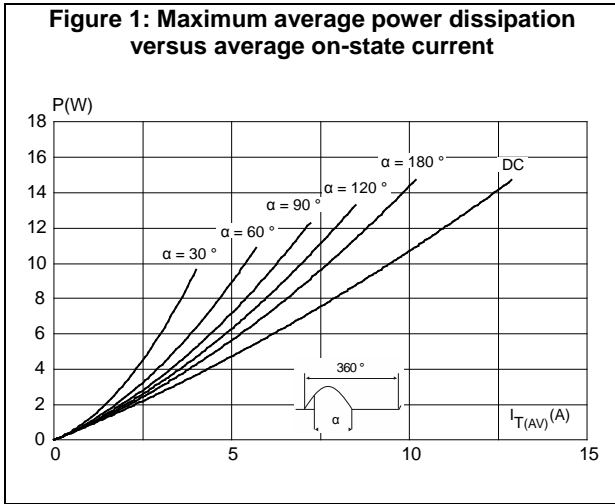
Table 4: Static electrical characteristics

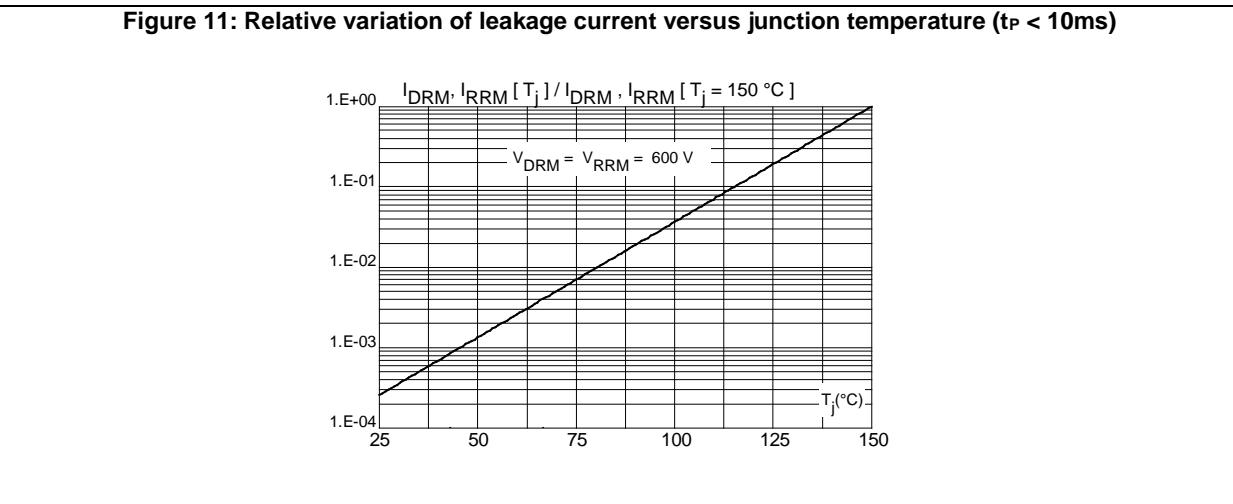
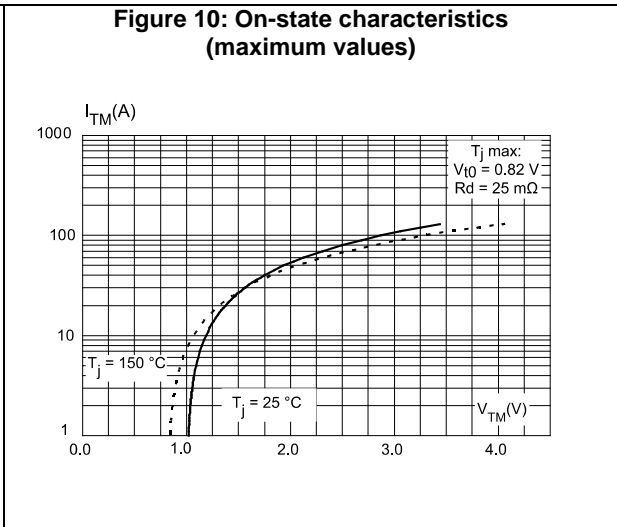
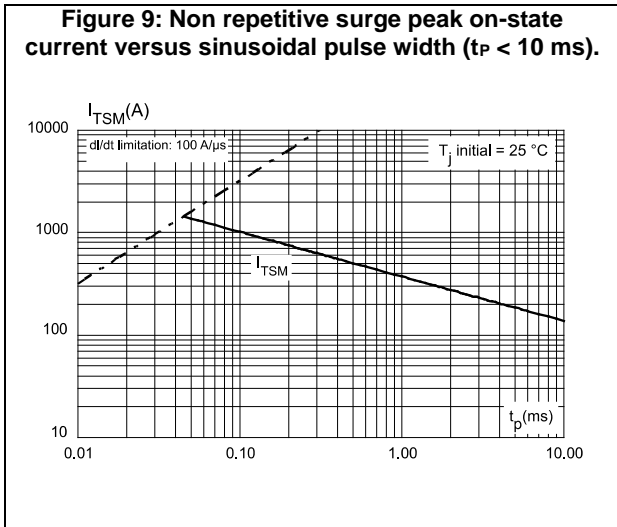
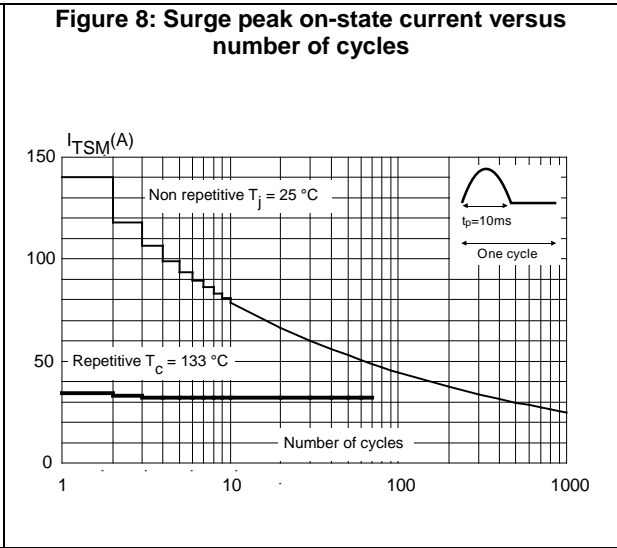
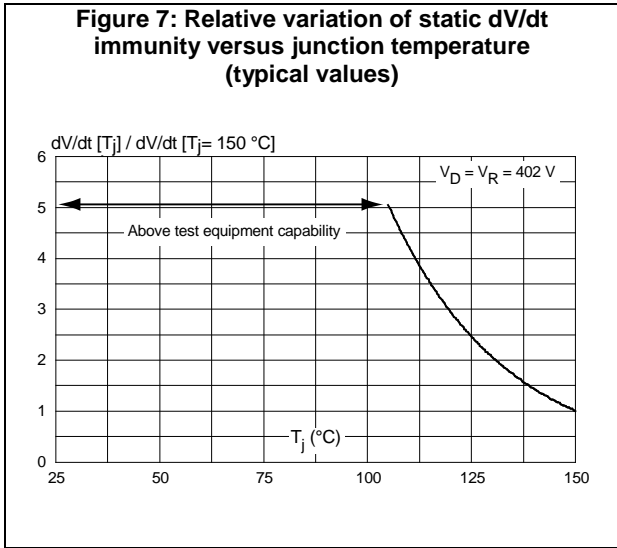
Symbol	Test Conditions	T <sub>j</sub>		Value	Unit
V <sub>TM</sub>	I <sub>TM</sub> = 32 A, t <sub>p</sub> = 380 μs	25 °C	Max.	1.6	V
V <sub>TO</sub>	Threshold on-state voltage	150 °C	Max.	0.82	V
R <sub>D</sub>	Dynamic resistance	150 °C	Max.	25	mΩ
I <sub>DRM</sub> /I <sub>RDM</sub>	V <sub>DRM</sub> = V <sub>RDM</sub>	25 °C	Max.	5	μA
		125 °C		1.5	mA
		150 °C		3.1	

Table 5: Thermal resistance

Symbol	Parameter	Value	Unit
R <sub>th(j-c)</sub>	Junction to case (DC)	1.1	°C/W
R <sub>th(j-a)</sub>	Junction to ambient (DC)	60	

# 1.1 Characteristics (curves)





## 2 Package information

In order to meet environmental requirements, ST offers these devices in different grades of ECOPACK® packages, depending on their level of environmental compliance. ECOPACK® specifications, grade definitions and product status are available at: [www.st.com](http://www.st.com). ECOPACK® is an ST trademark.

- Epoxy meets UL 94,V0
- Lead-free package

### 2.1 TO-220AB (NIns. and Ins.) package information

Figure 12: TO-220AB (NIns. & Ins.) package outline

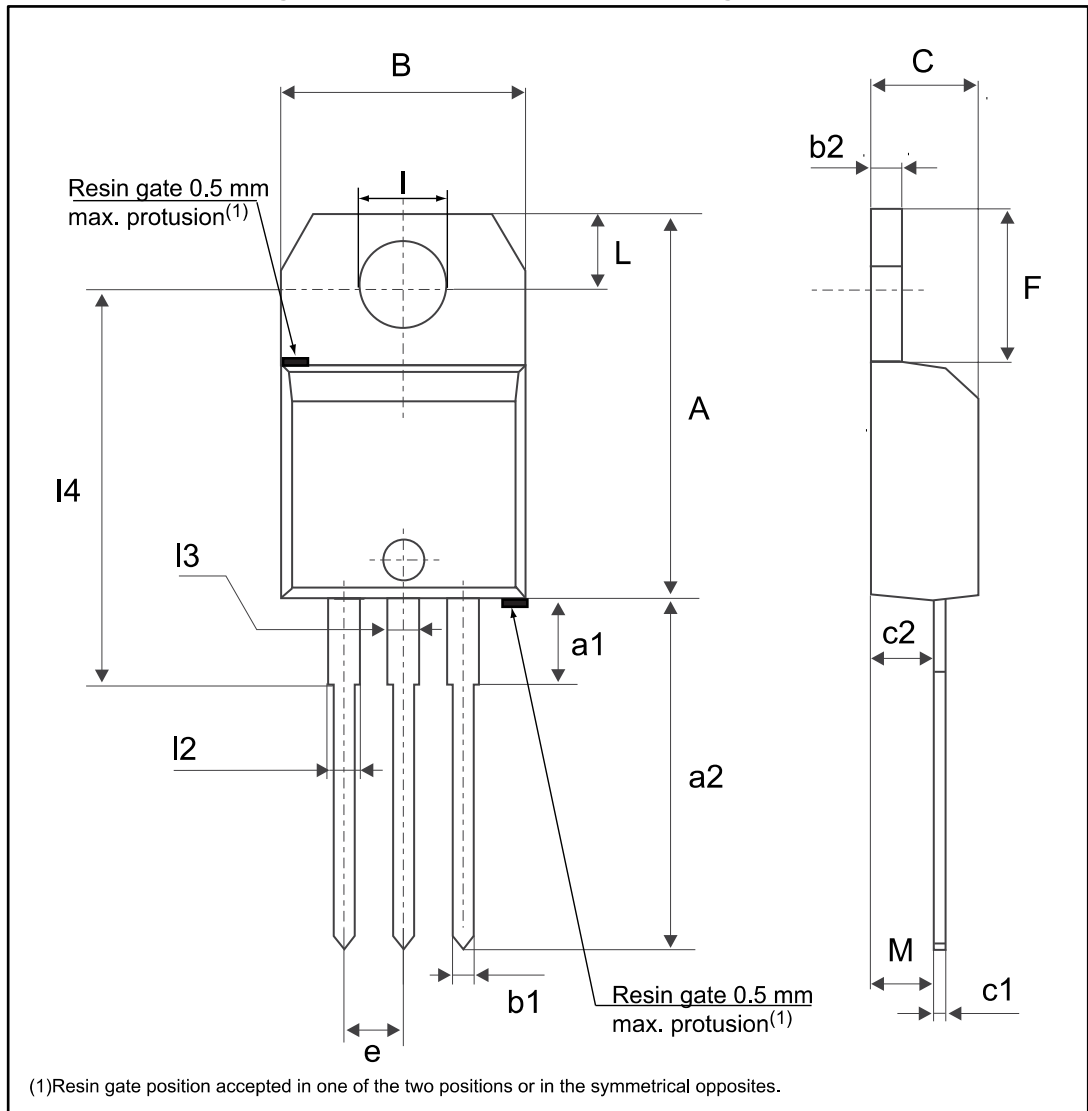


Table 6: TO-220AB (NIns. &amp; Ins.) package mechanical data

Ref.	Dimensions					
	Millimeters			Inches <sup>(1)</sup>		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	15.20		15.90	0.5984		0.6260
a1		3.75			0.1476	
a2	13.00		14.00	0.5118		0.5512
B	10.00		10.40	0.3937		0.4094
b1	0.61		0.88	0.0240		0.0346
b2	1.23		1.32	0.0484		0.0520
C	4.40		4.60	0.1732		0.1811
c1	0.49		0.70	0.0193		0.0276
c2	2.40		2.72	0.0945		0.1071
e	2.40		2.70	0.0945		0.1063
F	6.20		6.60	0.2441		0.2598
I	3.73		3.88	0.1469		0.1528
L	2.65		2.95	0.1043		0.1161
I2	1.14		1.70	0.0449		0.0669
I3	1.14		1.70	0.0449		0.0669
I4	15.80	16.40	16.80	0.6220	0.6457	0.6614
M		2.6			0.1024	

**Notes:**

<sup>(1)</sup>Inch dimensions are for reference only.

### 3 Ordering information

Figure 13: Ordering information scheme

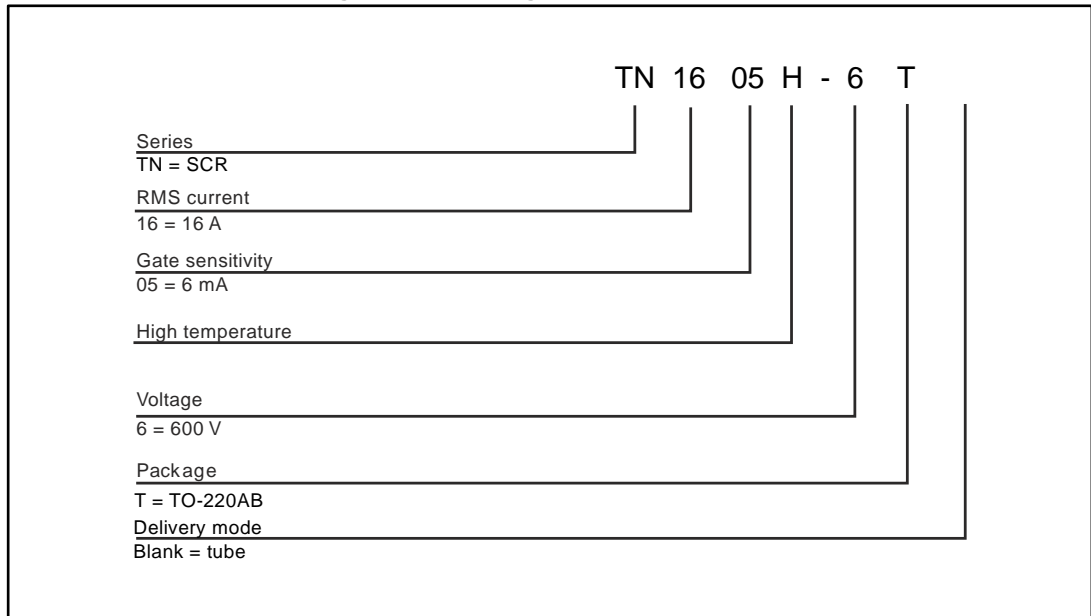


Table 7: Ordering information

Order code	Marking	Package	Weight	Base qty.	Delivery mode
TN1605H-6T	TN1605H6	TO-220AB	2.3 g	50	Tube

### 4 Revision history

Table 8: Document revision history

Date	Revision	Changes
19-May-2017	1	Initial release.



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