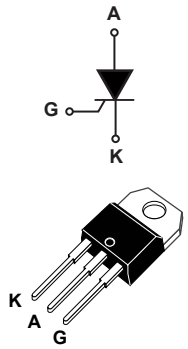
TN3015H-6I

Datasheet

High temperature 30 A, 600 V TO220 insulated thyristor SCRs



TO-220AB insulated

Features

- High junction temperature: T_j = 150 °C
- High noise immunity dV/dt = 1000 V/µs up to 150 °C
- Peak off-state voltage V_{DRM}/V_{RRM} = 600 V
- High turn-on current rise dI/dt = 100 A/µs
- ECOPACK2 compliant
- Insulated package TO-220AB:
  - Insulated voltage: 2500 V_{RMS}
  - Complies with UL 1557 (File ref : E81734)

Applications

- General purpose AC line load switching
- Motorbike voltage regulator circuits
- Inrush current limiting circuits
- Motor control circuits and starters
- Heating resistor control, Solid State Relays
- Lighting

Description

Thanks to its operating junction temperature up to 150°C, the TN3015H-6I offers high thermal performance operation up to 30 A rms.

Its trade-off noise immunity (dV/dt = 1000 V/µs) versus its gate triggering current (I_{GT} = 15 mA) and its turn-on current rise (dI/dt = 100 A/µs) allows to design robust and compact control circuit for voltage regulator in motorbikes and industrial drives, overvoltage crowbar protection, motor control circuits in power tools and kitchen appliances and inrush current limiting circuits.

Product status
TN3015H-6I

Product summary	
Order code	TN3015H-6I
Package	TO-220AB Ins.
V_{DRM}/V_{RRM}	600 V
T_j	150 °C
I_{GT}	15 mA

1 Characteristics

Table 1. Absolute maximum ratings (limiting values)

Symbol	Parameter			Value	Unit
$I_{T(RMS)}$	RMS on-state current (180 ° conduction angle)		T_c = 96 °C	30	A
$I_{T(AV)}$	Average on-state current (180 ° conduction angle)		T_c = 96 °C	19	A
			T_c = 111 °C	15	
			T_c = 127 °C	10	
I_{TSM}	Non repetitive surge peak on-state current (T_j initial = 25 °C)		t_p = 8.3 ms	295	A
			t_p = 10 ms	270	
I^2t	I^2t value for fusing (T_j initial = 25 °C)		t_p = 10 ms	364	A^2s
dI/dt	I_G = 2 x I_{GT}, tr ≤ 100 ns Critical rate of rise of on-state current	f = 60 Hz	T_j = 25 °C	100	A/µs
V_{DRM}/V_{RRM}	Repetitive peak off-state voltage			600	V
V_{DSM}/V_{RSM}	Non repetitive surge peak off-state voltage	t_p = 10 ms	T_j = 25 °C	V_{DRM}/V_{RRM} + 100	V
I_{GM}	Peak gate current	t_p = 20 µs	T_j = 150 °C	4	A
$P_{G(AV)}$	Average gate power dissipation		T_j = 150 °C	1	W
V_{RGM}	Maximum peak reverse gate voltage		T_j = 25 °C	5	V
T_{stg}	Storage junction temperature range			-40 to +150	°C
T_j	Maximum operating junction temperature			-40 to +150	°C
T_l	Maximum lead temperature soldering during 10 s			260	°C
V_{ins}	Insulation RMS voltage, 1 minute			2500	V

Table 2. Electrical characteristics (T_j = 25 °C unless otherwise specified)

Symbol	Test conditions			Value	Unit
I_{GT}	V_D = 12 V, R_L = 33 Ω		Min.	6	mA
			Max.	15	
V_{GT}			Max.	1.3	V
V_{GD}	V_D = V_{DRM}, R_L = 3.3 kΩ	T_j = 150 °C	Min.	0.15	V
I_H	I_T = 500 mA, gate open		Max.	60	mA
I_L	I_G = 1.2 x I_{GT}		Max.	75	mA
dV/dt	V_D = 402 V, gate open	T_j = 150 °C	Min.	1000	V/µs
t_{gt}	I_T = 60 A, V_D = 600 V, I_G = 100 mA, (dI_G/dt) max = 0.2 A/µs		Typ.	1.9	µs
t_q	I_T = 30 A, V_D = 402 V,(di/dt)off = 30 A/µs, V_R = 25 V, dV_D/dt = 50 V/µs	T_j = 150 °C	Typ.	80	µs

Table 3. Static characteristics

Symbol	Test conditions			Value	Unit
V_{TM}	I_{TM} = 60 A, t_p = 380 µs	T_j = 25 °C	Max.	1.6	V
V_{TO}	Threshold voltage	T_j = 150 °C	Max.	0.84	
R_D	Dynamic resistance	T_j = 150 °C	Max.	14	mΩ
I_{DRM}, I_{RRM}	$V_D = V_{DRM}$, $V_R = V_{RRM}$	T_j = 25 °C	Max.	10	µA
		T_j = 150 °C		5	mA

Table 4. Thermal parameters

Symbol	Parameter		Value	Unit
$R_{th(j-c)}$	Junction to case	Max.	1.9	°C/W
$R_{th(j-a)}$	Junction to ambient	Typ.	60	

1.1 Characteristics curves

Figure 1. Maximum power dissipation versus average on-state current

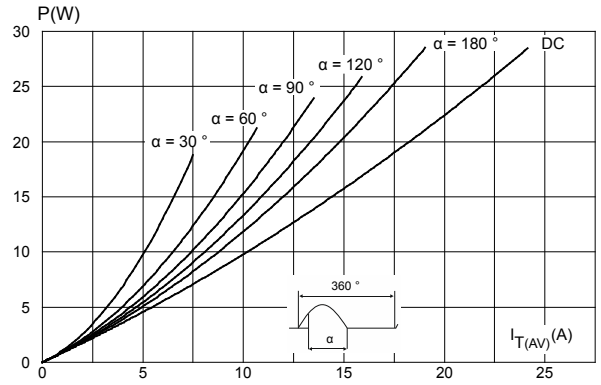


Figure 2. Average and DC on-state current versus case temperature

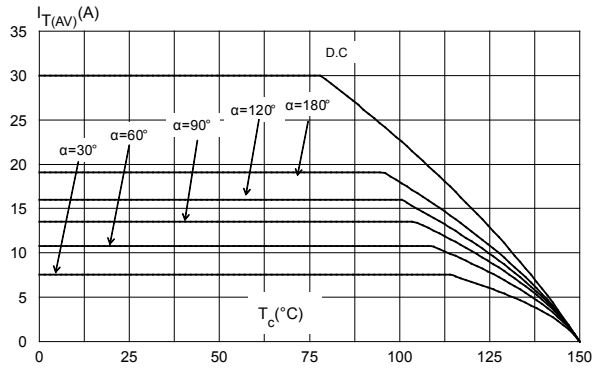


Figure 3. Average and D.C. on state current versus ambient temperature

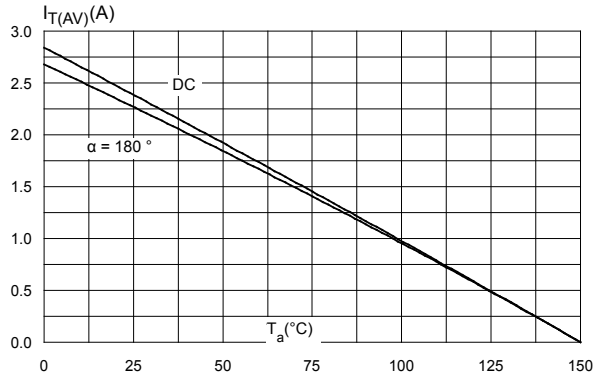


Figure 4. On-state characteristics (maximum values)

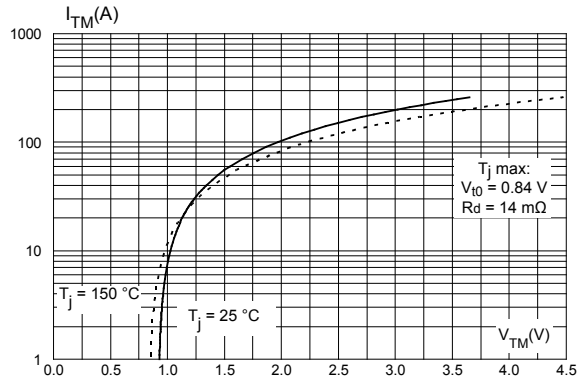


Figure 5. Relative variation of thermal impedance junction to case and junction to ambient versus pulse duration

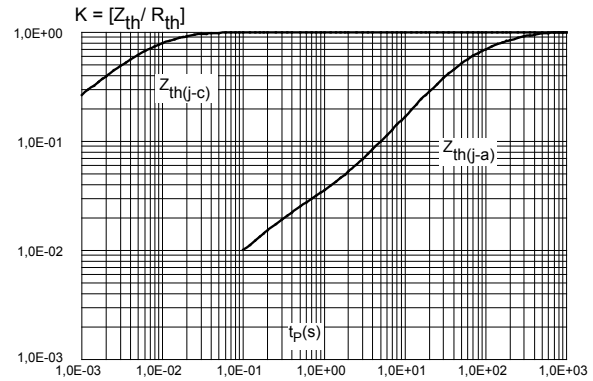


Figure 6. Relative variation of gate trigger current and gate voltage versus junction temperature (typical values)

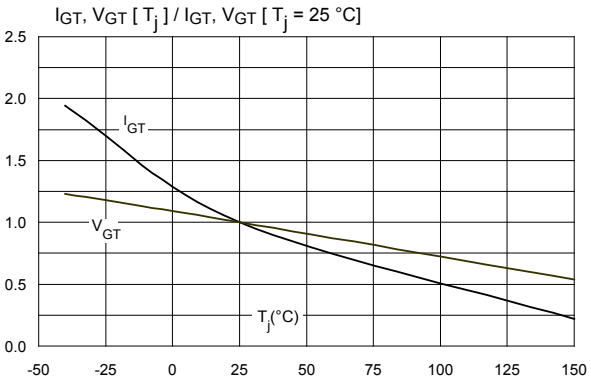


Figure 7. Relative variation of holding and latching current versus junction temperature (typical values)

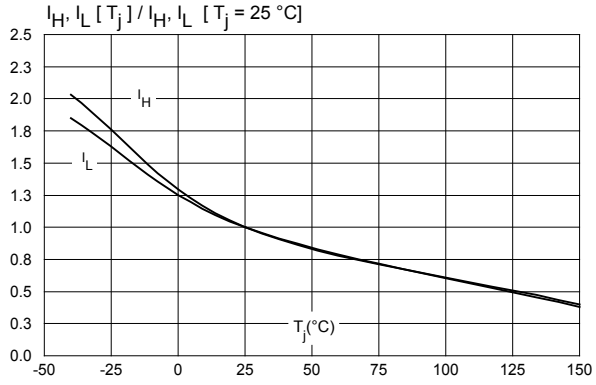


Figure 8. Relative variation of static dV/dt immunity versus junction temperature (typical values)

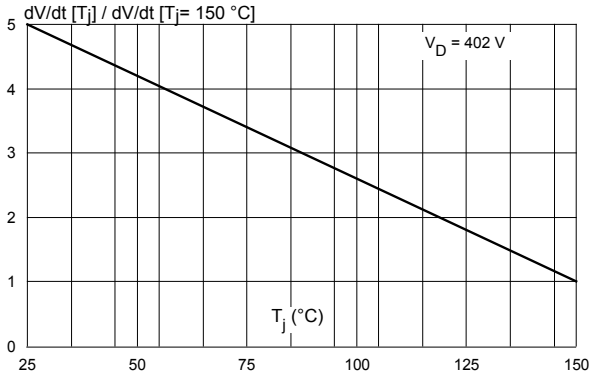


Figure 9. Surge peak on-state current versus number of cycles

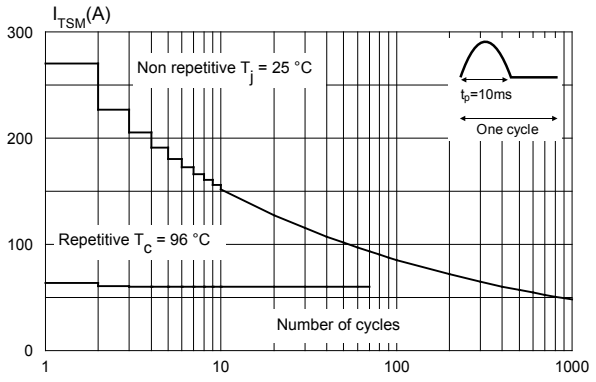


Figure 10. Non repetitive surge peak on-state current for a sinusoidal pulse with width t_p < 10 ms

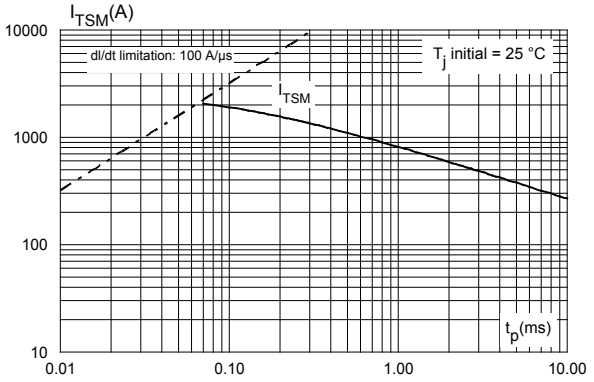
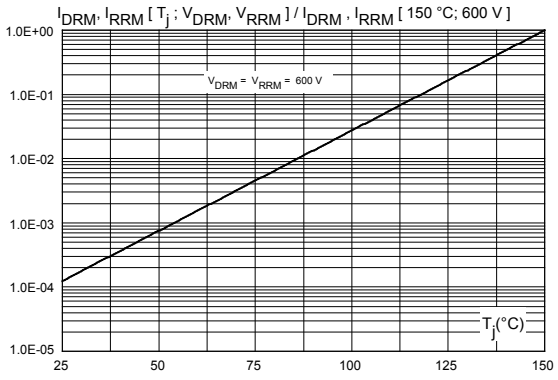


Figure 11. Relative variation of leakage current versus junction temperature



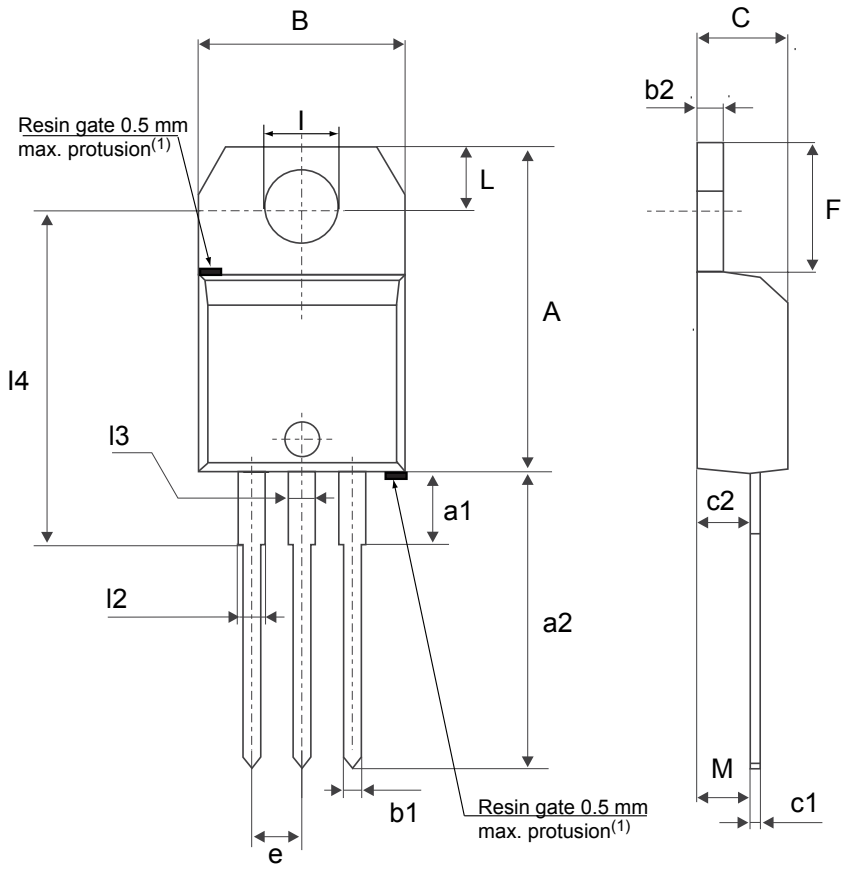
2 Package information

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. ECOPACK is an ST trademark.

2.1 TO-220AB insulated package information

- Molding compound resin is halogen-free and meets flammability standard UL94 level 0
- Lead-free package leads finishing
- ECOPACK2 compliant
- Recommended torque: 0.4 to 0.6 N.m

Figure 12. TO-220AB insulated package outline



(1)Resin gate position accepted in one of the two positions or in the symmetrical opposites.

Table 5. TO-220AB insulated package mechanical data

Ref.	Dimensions					
	Millimeters			Inches[1]		
	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
l2	1.14		1.70	0.0449		0.0669
l3	1.14		1.70	0.0449		0.0669
l4	15.80	16.40	16.80	0.6220	0.6457	0.6614
M		2.6			0.1024	

1. *Inch dimensions are for reference only.*

3 Ordering information

Figure 13. Ordering information scheme

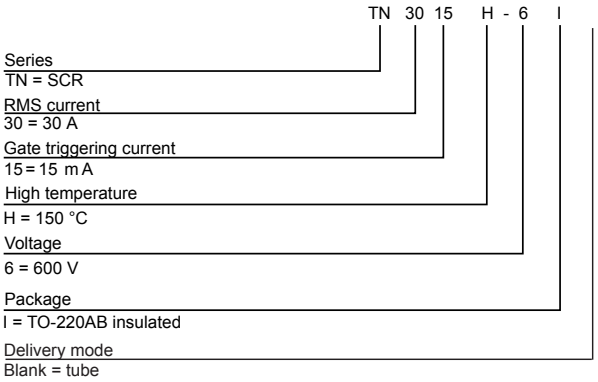


Table 6. Ordering information

Order code	Marking	Package	Weight	Base qty.	Delivery mode
TN3015H-6I	TN3015H6I	TO-220AB ins.	2.3 g	50	Tube

Revision history

Table 7. **Document revision history**

Date	Revision	Changes
22-May-2019	1	Initial release.