

## TN1205T-600

#### **12 A SCR**

#### **Features**

■ High current density per square mm

#### **Applications**

- Overvoltage crowbar protection
- Motor control circuits in power tools and kitchen aids
- Inrush current limiting circuits

### **Description**

This device is mounted in DPAK and intended for use in applications such as voltage regulators circuits for motorbikes, overvoltage crowbar protection, motor control circuits in power tools and capacitive discharge ignition.

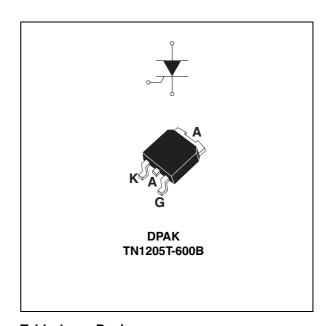


Table 1. Device summary

	=
I <sub>T(rms)</sub>	12 A
V <sub>DRM</sub> /V <sub>RRM</sub>	600 V
I <sub>GT</sub>	2 to 5 mA

Characteristics TN1205T-600

## 1 Characteristics

Table 2. Absolute ratings<sup>(1)</sup>

Symbol	Parameter	Value	Unit		
I <sub>T(RMS)</sub>	On-state rms current (180 °C conduction angle) $T_c = 103$ °C			12	Α
I <sub>T(AV)</sub>	Average on-state current(180 °C conduction angle) T <sub>c</sub> = 103 °C			8	Α
I <sub>TSM</sub>	Non repetitive surge peak on-state current $ t_p = 8.3 \text{ ms} $ $ t_p = 10 \text{ ms} $			120 115	Α
I <sup>2</sup> T	$l^2T$ value for fusing $t_p = 10 \text{ r}$		t <sub>p</sub> = 10 ms	66	A <sup>2</sup> s
di/dt	Critical rate of rise of on-state current $I_G = 2 \times I_{GT}$ , tr $\leq 100 \text{ ns}$	F = 60 Hz	T <sub>j</sub> = 125 °C	50	A/μs
I <sub>GM</sub>	Peak gate current $t_p = 20 \mu s$		T <sub>c</sub> = 125 °C	4	Α
P <sub>G(AV)</sub>	Average gate power dissipation $T_j = 125 ^{\circ}\text{C}$			1	W
T <sub>stg</sub>	Storage junction temperature range			-40 to + 150	٥̈́
T <sub>j</sub>	Operating junction temperature range			-40 to + 125	J

<sup>1.</sup>  $T_j = 25$  °C, unless otherwise specified

Table 3. Electrical characteristics<sup>(1)</sup>

Symbol	Test conditions			Тур.	Max.	Unit
I <sub>GT</sub>	$V_D = 12 \text{ V}, R_L = 33 \Omega$		2		5	mA
V <sub>GT</sub>	$V_D = 12 \text{ V}, \text{ R}_L = 33 \Omega$				1.3	V
$V_{GD}$	$V_D = V_{DRM}$ , $R_L = 3.3 \text{ k}\Omega$	T <sub>j</sub> = 125 °C	0.2			V
I <sub>H</sub>	I <sub>T</sub> = 500 mA gate open				15	mA
IL	I <sub>G</sub> = 1.2 I <sub>GT</sub>				30	mA
dV/dt	$V_D = 67\% V_{DRM}$ gate open $T_i = 125 \degree C$		100			V/µs
t <sub>GT</sub>	Gate controlled turn on time $I_{TM}=40~A,~V_D=V_{DRM(MAX)},~I_{GT}=100~mA$ $dI_G/dt=5~A/\mu s,~R_G=68~\Omega$			1.2		μs
t <sub>q</sub>	Circuit commutated turn off time $V_D=67\%~V_{DRM(MAX)},~T_j=125~^{\circ}C,~I_{TM}=20~A,~V_R=25~V$ dI_T/dt = 30 A/µS, dV_D/dt = 50 V/µs, R_GK = 100 $\Omega$			55		μs
V <sub>TM</sub>	$I_{TM} = 24 \text{ A}, T_p = 380  \mu\text{s}$				1.6	V
V <sub>T0</sub>	Threshold voltage $T_j = 125 ^{\circ}\text{C}$				0.85	V
R <sub>d</sub>	Dynamyc restistance $T_j = 125 ^{\circ}\text{C}$				30	mΩ
I <sub>DRM</sub>	V V	T <sub>j</sub> = 25 °C			5	μΑ
I <sub>RRM</sub>	$\mathbf{V}_{DRM} = \mathbf{V}_{RRM}$				2	mA

<sup>1.</sup>  $T_j = 25$  °C, unless otherwise specified

TN1205T-600 Characteristics

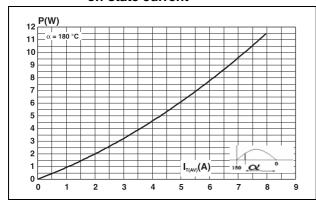
Table 4. Thermal resistance

Symbol	Parameter		Value	Unit
R <sub>th(j-c)</sub>	Junction to case (DC)		1.8	°C/W
R <sub>th(j-a)</sub>	Junction to ambient (DC)	$S^{(1)} = 0.5 \text{ cm}^2$	70	°C/W

<sup>1.</sup> S = Copper surface under tab.

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

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



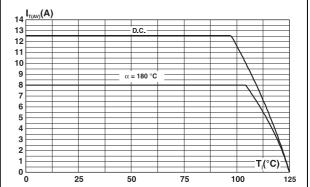
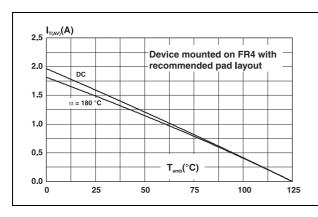
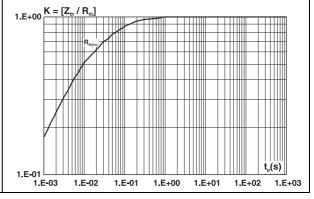


Figure 3. Average DC on-state current versus ambient temperature

Figure 4. Relative variation of thermal impedance junction to case versus pulse duration





Characteristics TN1205T-600

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

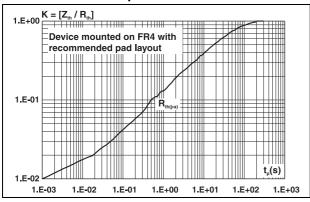


Figure 6. Relative variation of gate trigger current and voltage, holding and latching current versus T<sub>i</sub>

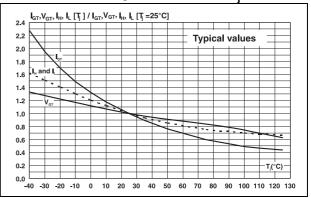
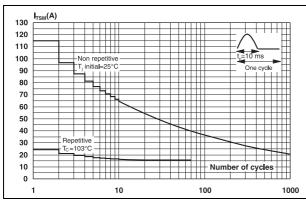


Figure 7. Surge peak on-state current versus number of cycles

Figure 8. Non-repetitive surge peak on-state current for a sinusoidal pulse, and corresponding values of l<sup>2</sup>t



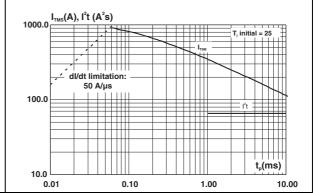
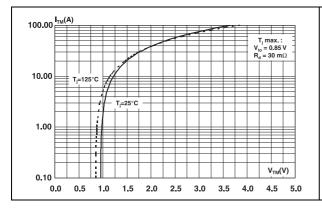
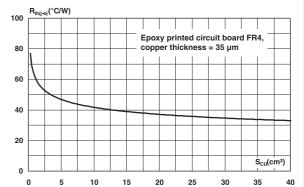


Figure 9. On-state characteristics (maximum values)

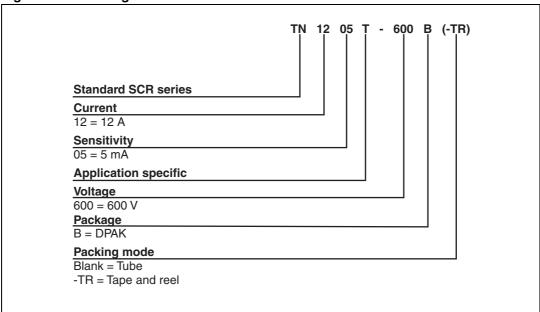
Figure 10. Thermal resistance junction to ambient versus copper surface under tab





## 2 Ordering information scheme

Figure 11. Ordering information scheme



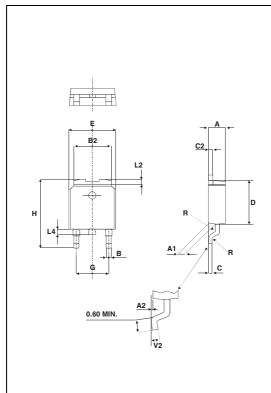
Package information TN1205T-600

## 3 Package information

- Epoxy meets UL94, V0
- Lead-free package

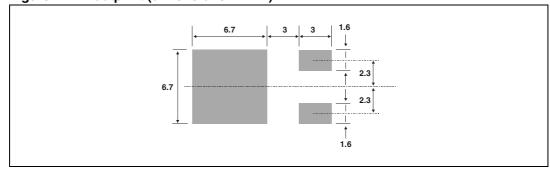
In order to meet environmental requirements, ST offers these devices in different grades of ECOPACK<sup>®</sup> packages, depending on their level of environmental compliance. ECOPACK<sup>®</sup> specifications, grade definitions and product status are available at: <a href="https://www.st.com">www.st.com</a>. ECOPACK<sup>®</sup> is an ST trademark.

Table 5. DPAK dimensions



	Dimensions				
Ref.	Millimeters		Inches		
	Min.	Max.	Min.	Max.	
Α	2.20	2.40	0.086	0.094	
A1	0.90	1.10	0.035	0.043	
A2	0.03	0.23	0.001	0.009	
В	0.64	0.90	0.025	0.035	
B2	5.20	5.40	0.204	0.212	
С	0.45	0.60	0.017	0.023	
C2	0.48	0.60	0.018	0.023	
D	6.00	6.20	0.236	0.244	
Е	6.40	6.60	0.251	0.259	
G	4.40	4.60	0.173	0.181	
Τ	9.35	10.10	0.368	0.397	
L2	0.80 typ.		0.031 typ.		
L4	0.60	1.00	0.023	0.039	
V2	0°	8°	0°	8°	

Figure 12. Footprint (dimensions in mm)



# 4 Ordering information

Table 6. Ordering information

Order code	Marking	Package	ckage Weight		Delivery mode
TN1205T-600B	TN12 05T6	DPAK	0.3q	75	Tube
TN1205T-600B-TR	TN12 05T6	DEAR	0.39	2500	Tape and reel

# 5 Revision history

Table 7. Document revision history

Date	Revision	Changes
01-Oct-2009	1	Initial release.

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