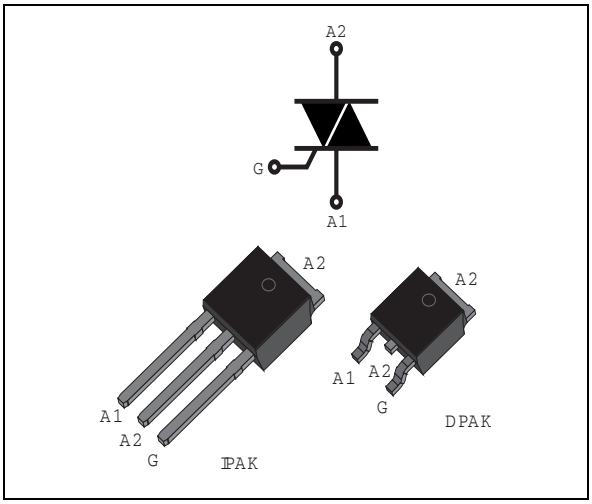
T405Q-600

4 A Triacs

Datasheet – production data



Description

The T405Q-600-TR and T405Q-600H 4 quadrants sensitive Triacs are intended in general purpose applications where high surge current capability is required, such as irrigation system. These Triacs feature a gate current capability sensitivities of 5 mA.

Table 1. Device summary

Symbol	Value	Unit
$I_{T(rms)}$	4	A
V_{DRM}, V_{RRM}	600	V
I_{GT}	5	mA

Features

- MCU direct drive
- 4 quadrants Triac
- ECOPACK®2 compliant component

Applications

- Motor control circuits
- Small home appliances
- Fan speed controller

1 Characteristics

Table 2. Absolute maximum ratings (T_j = 25 °C unless otherwise stated)

Symbol	Parameter			Value	Unit
$I_{T(rms)}$	On-state rms current (full sine wave)	IPAK, DPAK	T_c = 110 °C	4	A
I_{TSM}	Non repetitive surge peak on-state current (full cycle, T_j initial = 25 °C)	F = 50 Hz	t = 20 ms	35	A
		F = 60 Hz	t = 16.7 ms	38	
I^2t	I^2t value for fusing		t_p = 10 ms	6	A^2s
dI/dt	Critical rate of rise of on-state current I_G = 2 x I_{GT}, $t_r \leq$ 100 ns	F = 100 Hz		50	A/µs
I_{GM}	Peak gate current	t_p = 20 µs	T_j = 125 °C	4	A
$P_{G(AV)}$	Average gate power dissipation		T_j = 125 °C	0.5	W
T_{stg} T_j	Storage junction temperature range Operating junction temperature range			- 40 to + 150 - 40 to + 125	°C

Table 3. Electrical characteristics (T_j = 25 °C, unless otherwise stated)

Symbol	Test conditions	Quadrant		Value	Unit
				T405	
I_{GT}(1)	V_D = 12 V, R_L = 30 Ω	I - II - III IV	Max.	5 10	mA
V_{GT}	V_D = 12 V, R_L = 30 Ω	All	Max.	1.3	V
V_{GD}	V_D = V_{DRM}, R_L = 3.3 k Ω , T_j = 125 °C	All	Min.	0.2	V
I_H (2)	I_T = 100 mA		Max.	10	mA
I_L	I_G = 1.2 I_{GT}	I - III - IV	Max.	10	mA
		II	Max.	15	
dV/dt (2)	V_D = 67% V_{DRM}, gate open	T_j = 125 °C	Min.	10	V/µs
(dI/dt)c (2)	(dV/dt)c = 1.8 A/ms	T_j = 125 °C	Min.	2	A/ms

1. Minimum I_{GT} is guaranteed at 5% of I_{GT} max.
2. For both polarities of A2 referenced to A1

Table 4. Static characteristics

Symbol	Test conditions			Value	Unit
V_{TM} (1)	I_{TM} = 5 A, t_p = 380 µs	T_j = 25 °C	Max.	1.5	V
V_{t0} (1)	Threshold voltage	T_j = 125 °C	Max.	0.85	V
R_d (1)	Dynamic resistance	T_j = 125 °C	Max.	100	mΩ
I_{DRM} I_{RRM}	V_{DRM} = V_{RRM}	T_j = 25 °C	Max.	5	µA
		T_j = 125 °C		1	mA

1. For both polarities of A2 referenced to A1

Table 5. Thermal resistance

Symbol	Parameter			Value	Unit
$R_{th(j-c)}$	Junction to case (AC)			3	°C/W
$R_{th(j-a)}$	Junction to ambient	$S^{(1)}$ = 0.5 cm²	DPAK	70	°C/W
			IPAK	100	

1. S = Copper surface under tab.

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

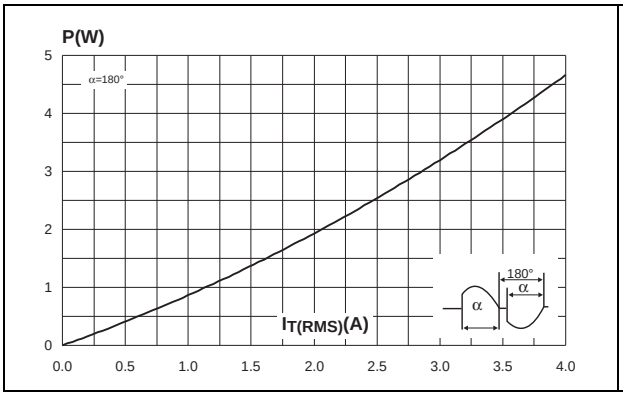


Figure 2. RMS on-state current versus case temperature

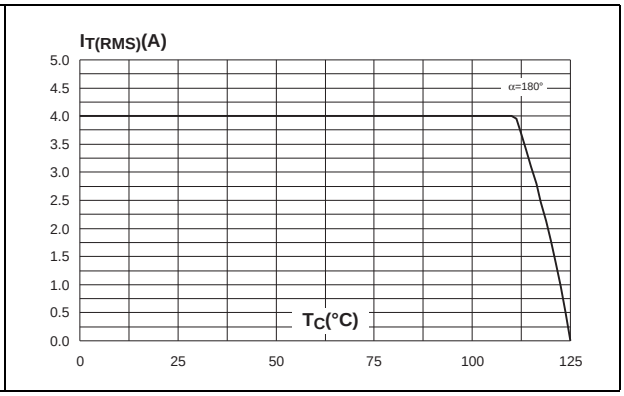


Figure 3. Relative variation of thermal impedance versus pulse duration

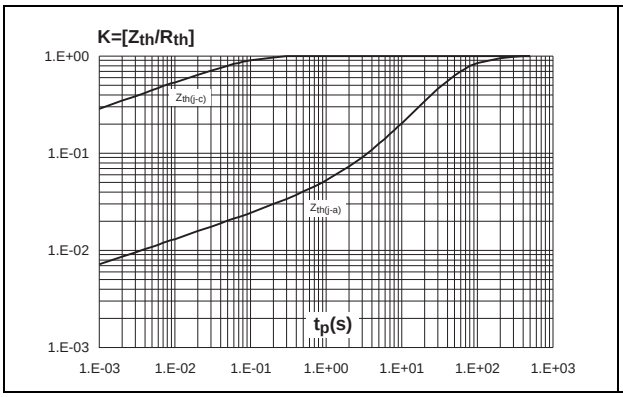


Figure 4. On-state characteristics (maximum values)

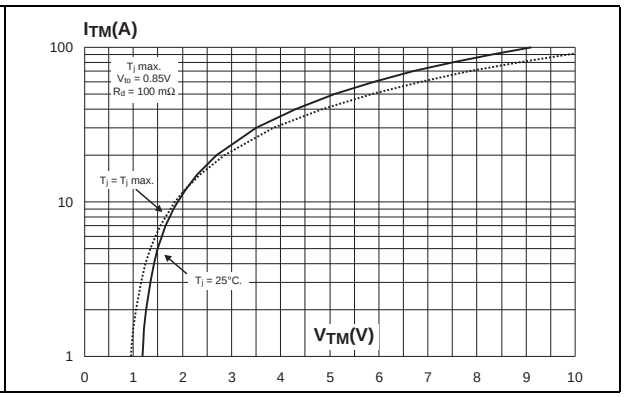


Figure 5. Surge peak on-state current versus number of cycles

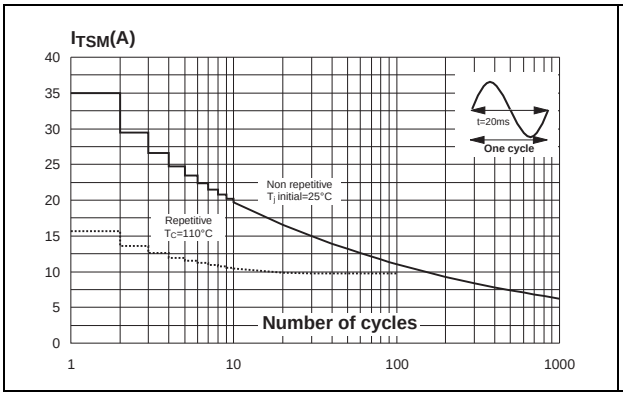


Figure 6. Non-repetitive surge peak on-state current for a sinusoidal pulse with width t_p < 10 ms and corresponding value of I^2t

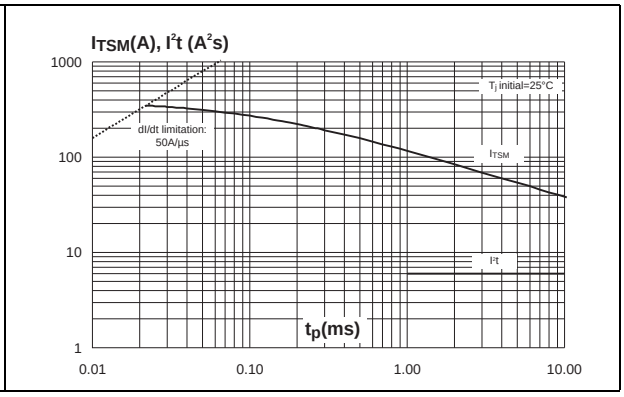


Figure 7. Relative variation of gate trigger current, holding current and latching current versus junction temperature (typical values)

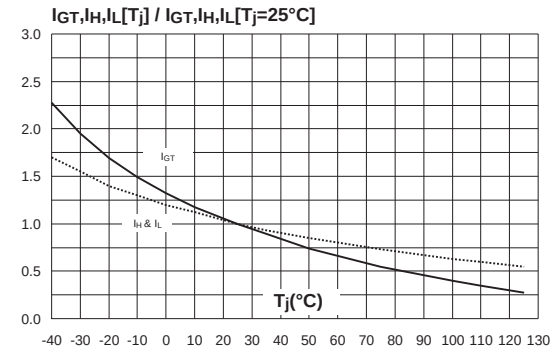


Figure 8. Relative variation of critical rate of decrease of main current versus (dV/dt) (typical values)

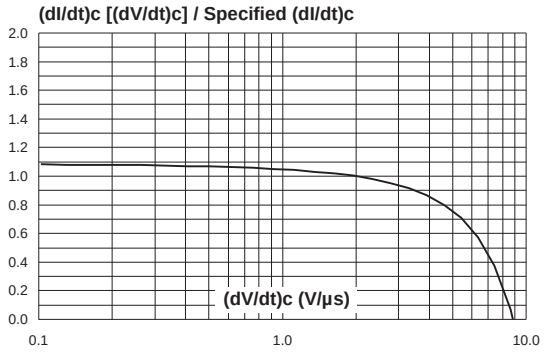


Figure 9. Relative variation of critical rate of decrease of main current versus junction temperature

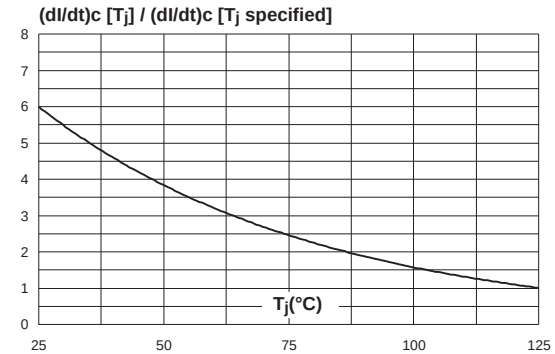


Figure 10. Relative variation of static dV/dt immunity versus junction temperature

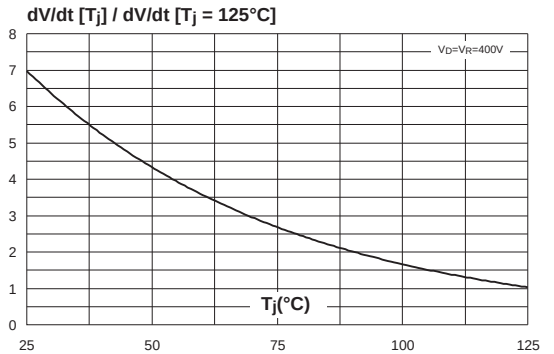
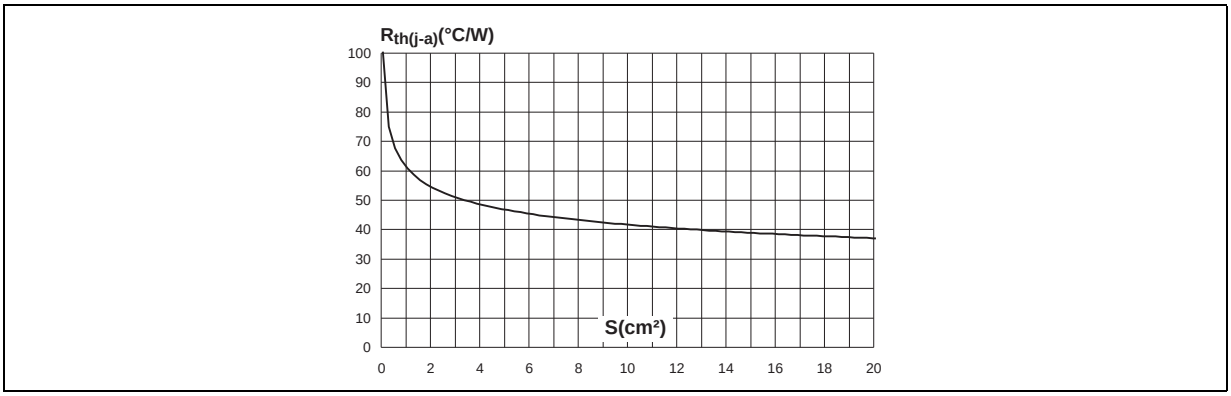


Figure 11. DPAK thermal resistance junction to ambient versus copper surface under tab (printed circuit board FR4, copper thickness: 35 µm)

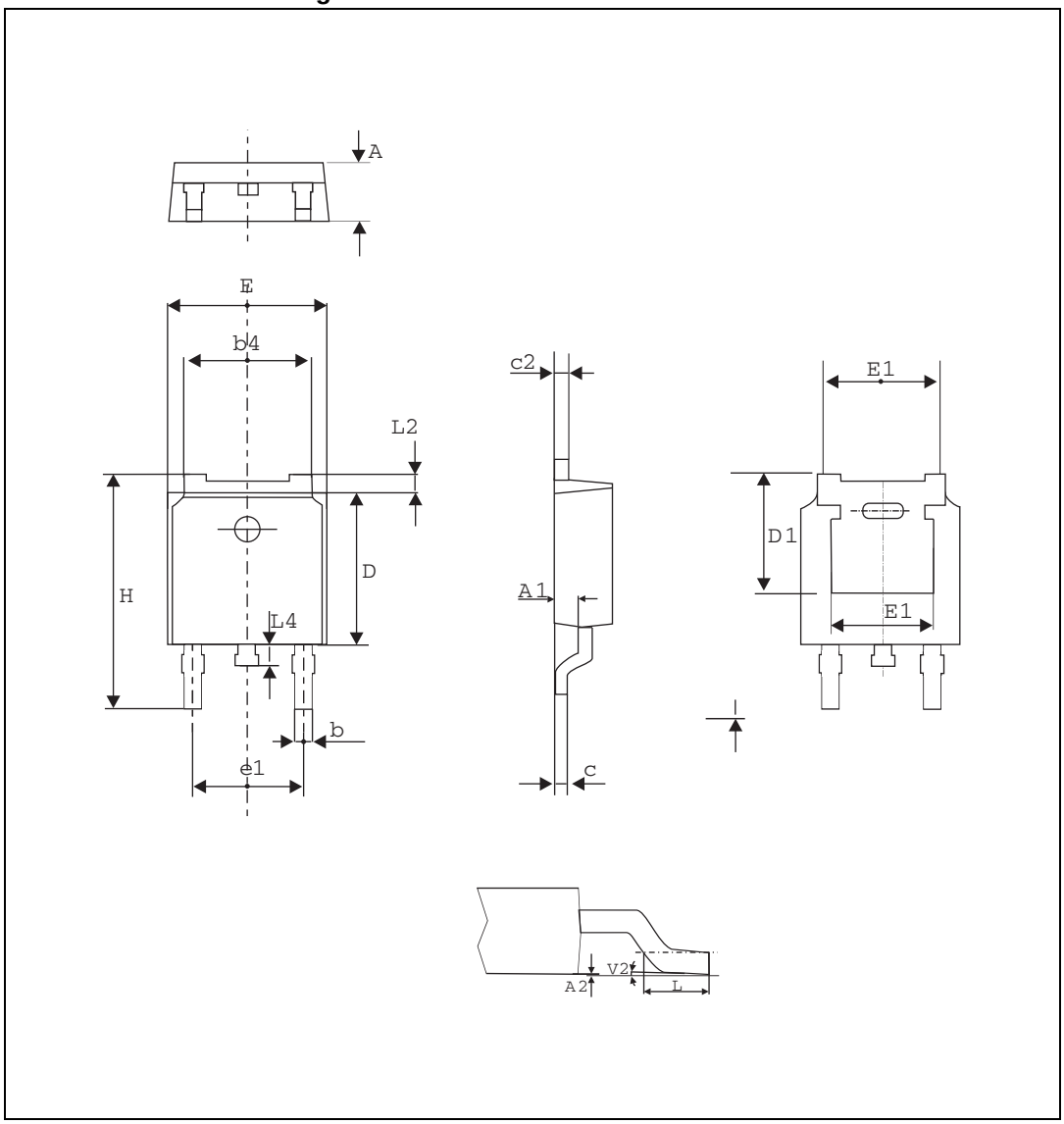


2 Package information

- Epoxy meets UL94, V0
- Lead-free package
- Recommended torque: 0.4 to 0.6 N·m

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.

Figure 12. DPAK dimension definitions



Note: This package drawing may slightly differ from the physical package. However, all the specified dimensions are guaranteed.

Table 6. DPAK dimension values

Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	2.18		2.40	0.086		0.094
A1	0.90		1.10	0.035		0.043
A2	0.03		0.23	0.001		0.009
b	0.64		0.90	0.025		0.035
b4	4.95		5.46	0.195		0.215
c	0.46		0.61	0.018		0.024
c2	0.46		0.60	0.018		0.023
D	5.97		6.22	0.235		0.244
D1		5.10			0.201	
E	6.35		6.73	0.250		0.264
E1		4.32			0.170	
e1	4.40		4.70	0.173		0.185
H	9.35		10.40	0.368		0.409
L	1.00		1.78	0.039		0.070
L2		1.27			0.05	
L4	0.60		1.02	0.023		0.040
V2	0°		8°	0°		8°

Figure 13. Footprint (dimensions in mm)

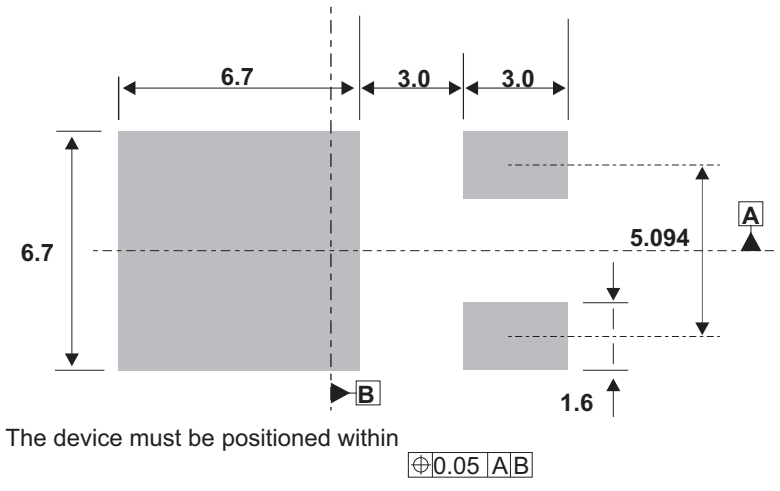
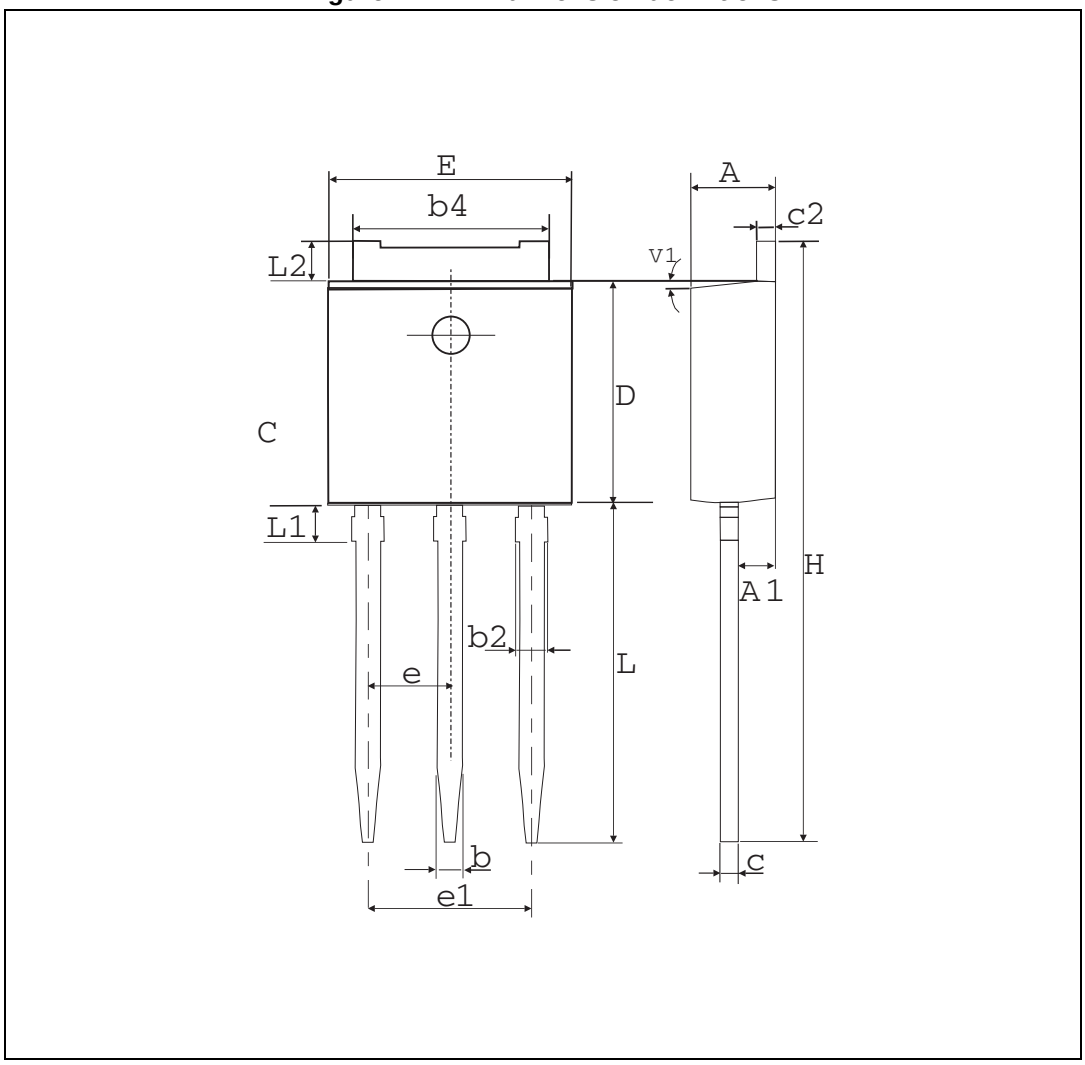


Figure 14. IPAK dimension definitions



Note: This package drawing may slightly differ from the physical package. However, all the specified dimensions are guaranteed.

Table 7. IPAK dimension values

Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	2.20		2.40	0.086		0.094
A1	0.90		1.10	0.035		0.043
b	0.64		0.90	0.025		0.035
b2			0.95			0.037
b4	5.20		5.43	0.204		0.213
c	0.45		0.60	0.017		0.023
c2	0.46		0.60	0.018		0.023
D	6		6.20	0.236		0.244
E	6.40		6.70	0.252		0.263
e		2.28			0.090	
e1	4.40		4.60	0.173		0.181
H		16.10			0.634	
L	9		9.60	0.354		0.377
L1	0.8		1.20	0.031		0.047
L2		0.80	1.25		0.031	0.049
V1		10°			10°	

3 Ordering information

Figure 15. Order information scheme

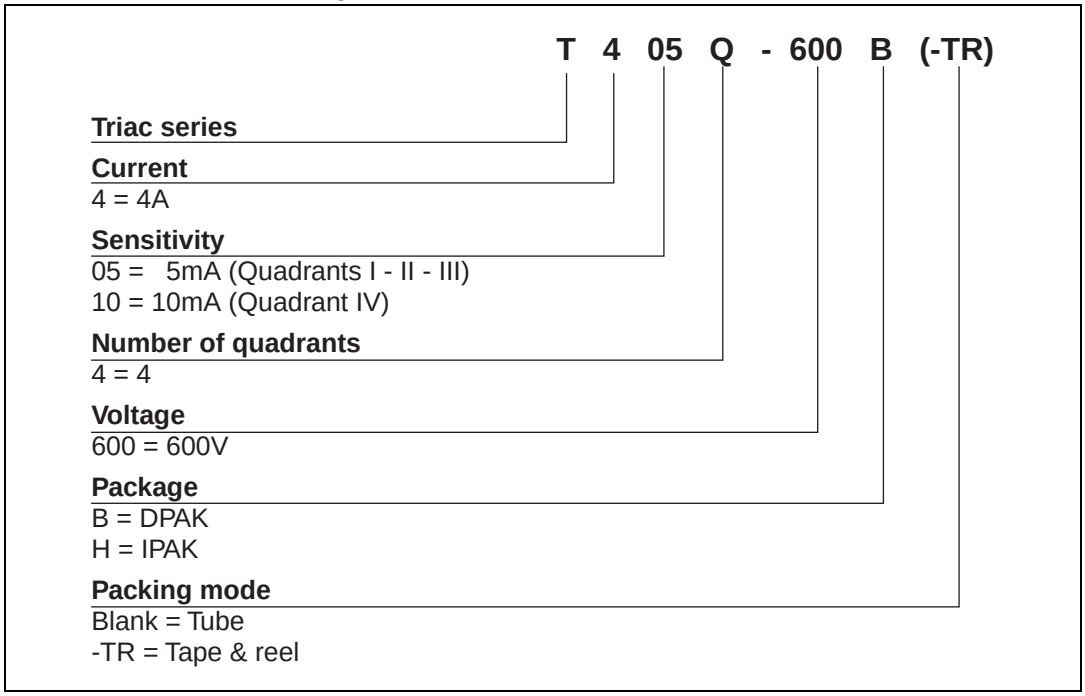


Table 8. Product selector

Part Number	Voltage	Sensitivity	Type	Package
T405Q-600B-TR	600 V	5 mA	Sensitive	DPAK
T405Q-600H	600 V	5 mA	Sensitive	IPAK

Table 9. Ordering information

Order code	Marking	Package	Weight	Base qty	Delivery mode
T405Q-600B-TR	T405Q600	DPAK	0.3 g	2500	Tape and reel
T405Q-600H	T405Q600	IPAK	0.4 g	75	Tube

4 Revision history

Table 10. Document revision history

Date	Revision	Changes
July-2002	1	First issue.
29-May-2014	2	Updated DPAK and IPAK package information and reformatted to current standard.

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