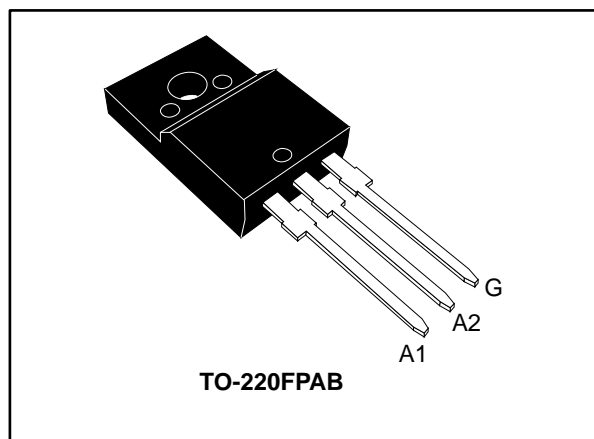


## 4 A logic level Triac

Datasheet - production data



### Description

Based on ST's logic level technology providing high commutation performance, this device is suitable for use on AC low current loads. It is recommended for motor driving, electro valves, kitchen appliances, power tools and dishwashers. Available in a fully insulated package, it complies with standard UL1557.

**Table 1: Device summary**

Symbol	Value	Unit
$I_{T(RMS)}$	4	A
$V_{DRM}/V_{RRM}$	600	V
$I_{GT}$	5	mA
$T_j \text{ max.}$	125	°C
Package	TO-220FPAB	
Ordering code	T405T-6FP	

### Features

- Three triggering quadrants Triac
- $V_{DRM} / V_{RRM} = 600 \text{ V}$
- UL certified device rated 2000  $V_{RMS}$  (ref. file E81734)
- ECOPACK®2 compliant component
- Halogen-free molding, lead-free plating

### Applications

- General purpose AC inductive loads
- Induction motor control circuits
- Small home appliances

### Benefits

- Low gate consumption
- Direct drive from microcontroller
- Direct mounting on heat sink

# 1 Characteristics

**Table 2: Absolute maximum ratings (limiting values)**

Symbol	Parameter		Value	Unit
$I_{T(RMS)}$	RMS on-state current (full sine wave)		$T_c = 104\text{ °C}$	4 A
$I_{TSM}$	Non repetitive surge peak on-state current (full sine cycle)	$t_p = 16.7\text{ ms}$	$T_j\text{ initial} = 25\text{ °C}$	31 A
		$t_p = 20\text{ ms}$		30 A
$I^2t$	$I^2t$ value for fusing	$t_p = 10\text{ ms}$	$T_j\text{ initial} = 25\text{ °C}$	5.1 A <sup>2</sup> s
$di/dt$	Critical rate of rise of on-state current	$I_G = 2 \times I_{GT}$ , $t_r \leq 100\text{ ns}$	$f = 120\text{ Hz}$	50 A/ $\mu$ s
$I_{GM}$	Peak gate current	$t_p = 20\text{ }\mu$ s	$T_j = 125\text{ °C}$	4 A
$P_{GM}$	Maximum gate power dissipation			1 W
$T_{stg}$	Storage junction temperature range			-40 to +150 °C
$T_j$	Operating junction temperature range			-40 to +125 °C
$T_L$	Maximum lead temperature for soldering during 10 s			260 °C
$V_{ins}$	Insulation RMS voltage (60 seconds)			2000 V

**Table 3: Static electrical characteristics**

Symbol	Test conditions	$T_j$		Value	Unit
$V_{TM}$	$I_{TM} = 5.5\text{ A}$ , $t_p = 380\text{ }\mu$ s	25 °C	Max.	1.56	V
$V_{TO}$	threshold on-state voltage	125 °C	Max.	0.9	V
$R_D$	Dynamic resistance	125 °C	Max.	100	m $\Omega$
$I_{DRM}$ $I_{RRM}$	$V_D = V_{DRM}$ , $V_R = V_{RRM}$	25 °C	Max.	5	$\mu$ A
		125 °C	Max.	1	mA

**Table 4: Dynamic characteristics**

Symbol	Parameter	Quadrant	$T_j$		Value	Unit
$I_{GT}^{(1)}$	$V_D = 12\text{ V}$ , $R_L = 30\text{ }\Omega$	I - II - III	25 °C	Max.	5	mA
$V_{GT}$				Max.	1.3	V
$V_{GD}$	$V_D = V_{DRM}$ , $R_L = 3.3\text{ k}\Omega$		125 °C	Min.	0.2	V
$I_L$	$I_G = 1.2 \times I_{GT}$		25 °C	Max.	15	mA
$I_H$	$I_{TM} = 100\text{ mA}$	Max.		10		
$dV/dt^{(2)}$	$V_D = V_R = 402\text{ V}$ , gate open		125 °C	Min.	20	V/ $\mu$ s
$(di/dt)_c^{(2)}$	$(dV/dt)_c = 0.1\text{ V}/\mu$ s			Min.	1.8	A/ms

**Notes:**

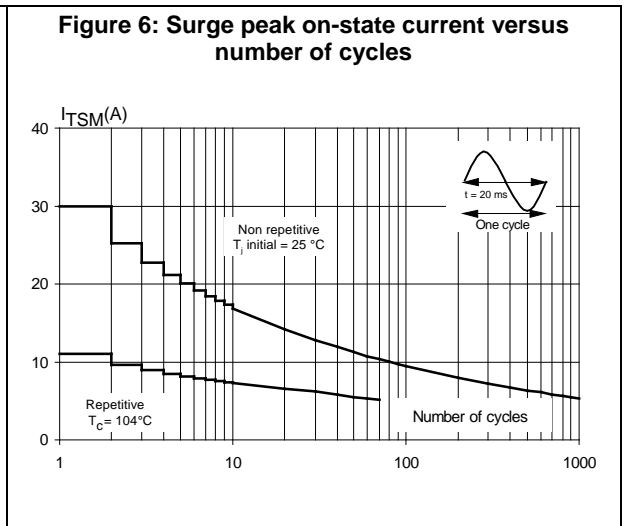
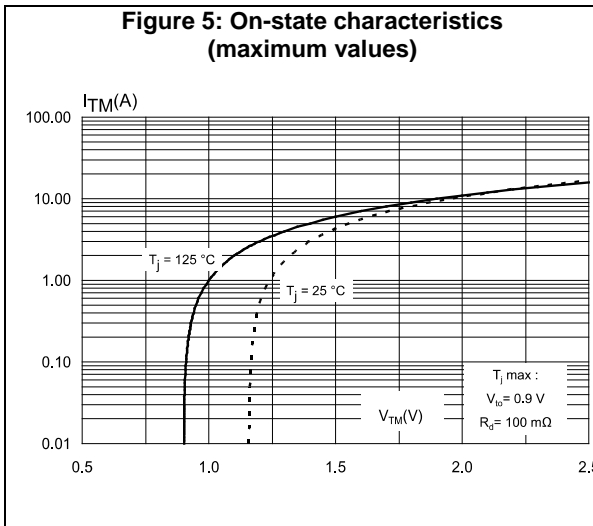
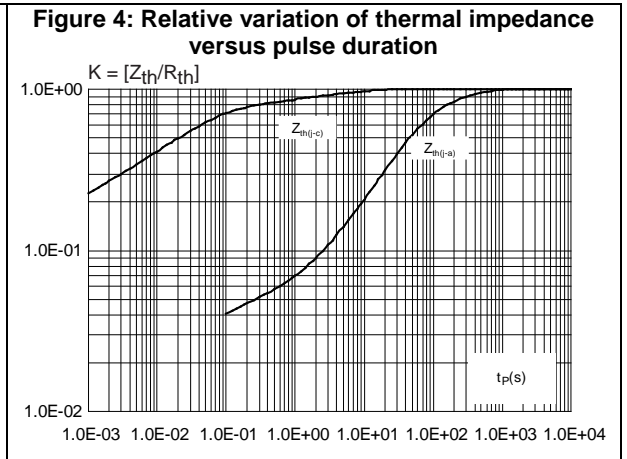
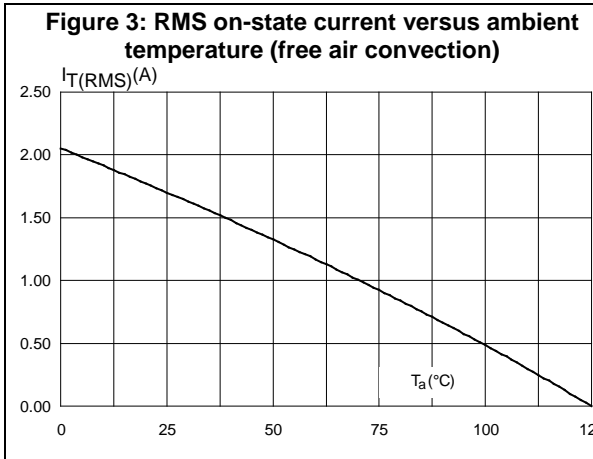
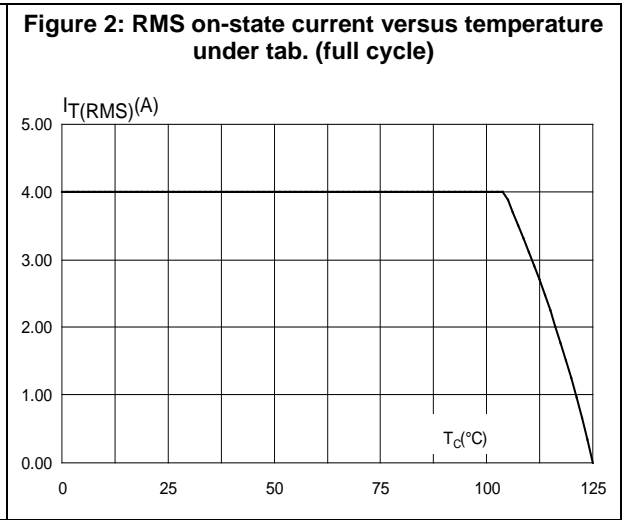
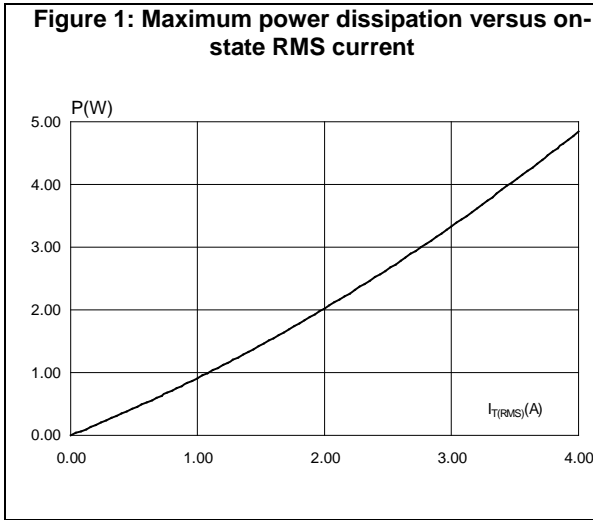
(1) Minimum  $I_{GT}$  is guaranteed at 5 % of  $I_{GT}$  max.

(2) For both polarities of A2 referenced to A1

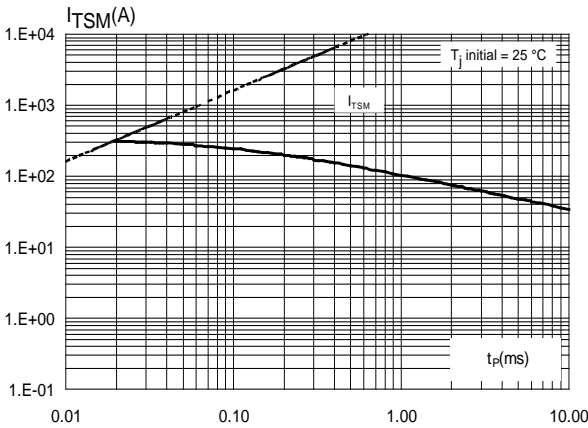
Table 5: Thermal resistance

Symbol	Parameter	Value	Unit
$R_{th(j-c)}$	Max. junction to case thermal resistance (AC)	4.3	°C/W
$R_{th(j-a)}$	Typical junction to ambient thermal resistance	60	

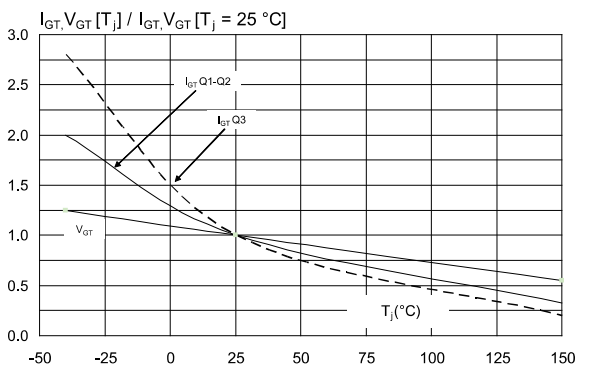
# 1.1 Characteristics (curves)



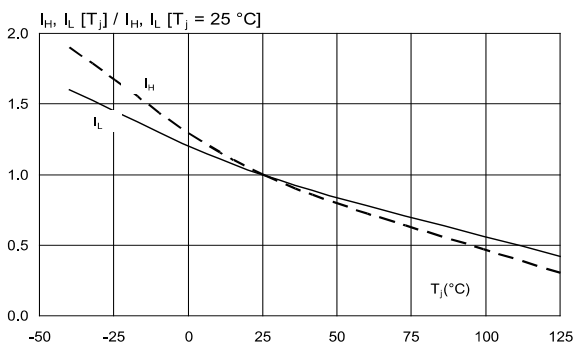
**Figure 7: Non repetitive surge peak on-state current for a sinusoidal pulse with width  $t_p < 10$  ms**



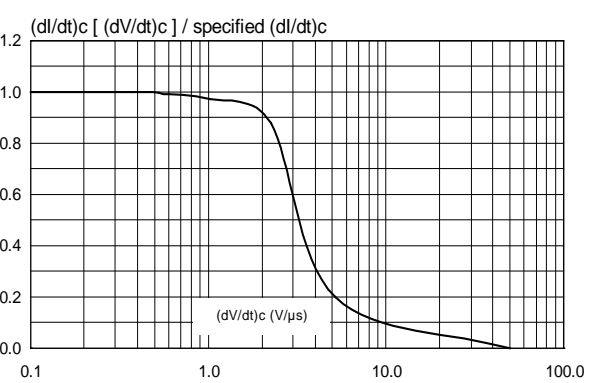
**Figure 8: Relative variation of gate trigger current and gate trigger voltage versus junction temperature (typical values)**



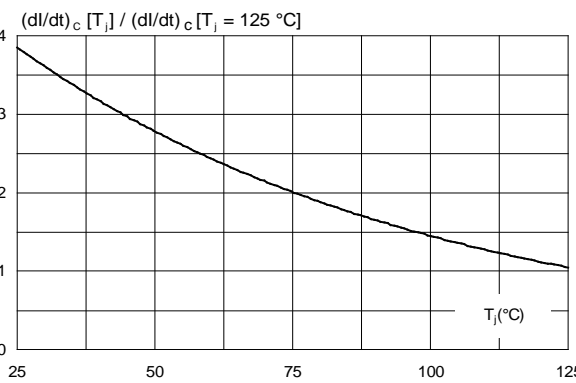
**Figure 9: Relative variation of holding current and latching current versus junction temperature (typical values)**



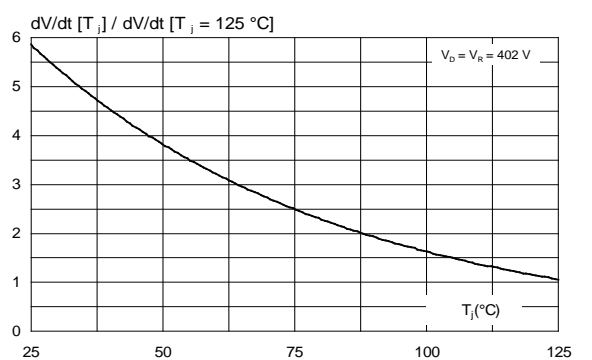
**Figure 10: Relative variation of critical rate of decrease of main current ( $di/dt$ )<sub>c</sub> versus reapplied ( $dV/dt$ )<sub>c</sub>**



**Figure 11: Relative variation of critical rate of decrease of main current versus junction temperature (typical values)**



**Figure 12: Relative variation of static  $dV/dt$  immunity 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](http://www.st.com). ECOPACK® is an ST trademark.

- ECOPACK®2 compliant
- Lead-free package leads finishing
- Molding compound resin is halogen-free and meets UL94 level V0
- Recommended torque (for through-hole package): 0.4 to 0.6 N·m

### 2.1 TO-220FPAB package information

Figure 13: TO-220FPAB package outline

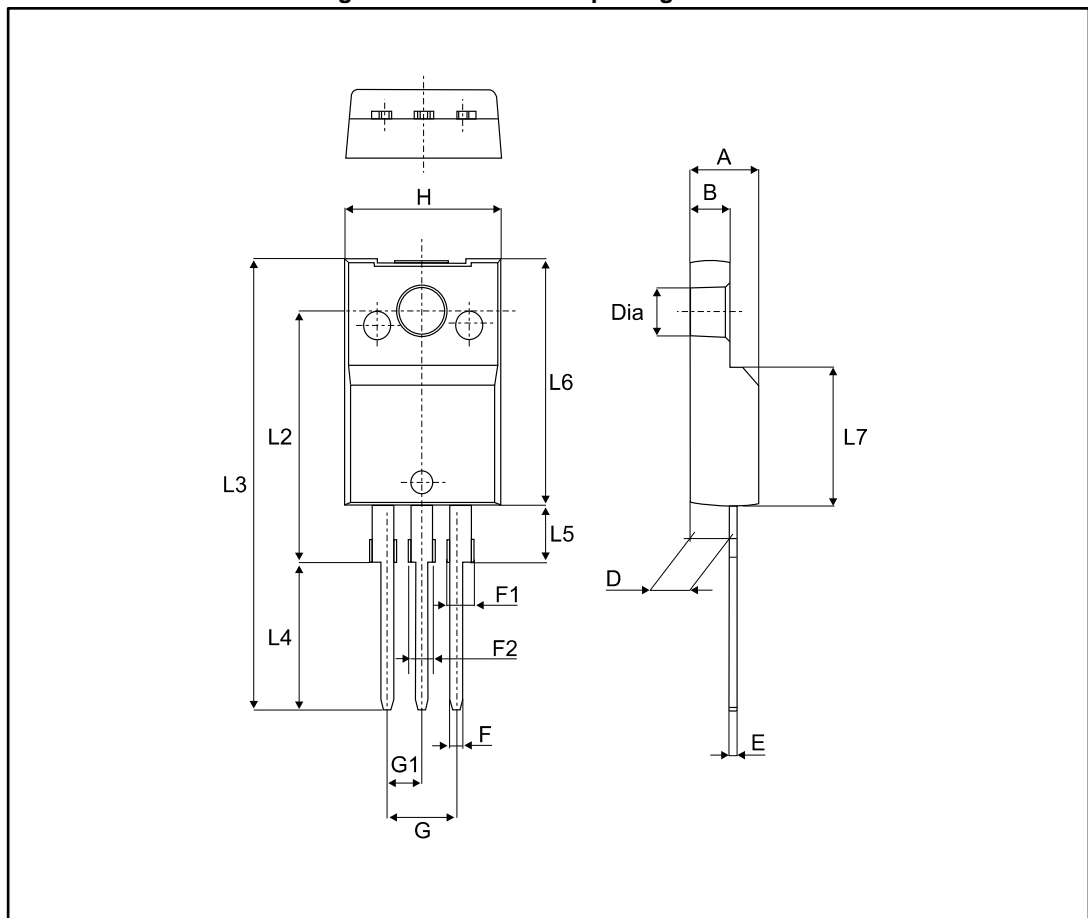


Table 6: TO-220FPAB package mechanical data

Ref.	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	4.40	4.60	0.1739	0.1818
B	2.5	2.7	0.0988	0.1067
D	2.50	2.75	0.0988	0.1087
E	0.45	0.70	0.0178	0.0277
F	0.75	1.0	0.0296	0.0395
F1	1.15	1.70	0.0455	0.0672
F2	1.15	1.70	0.0455	0.0672
G	4.95	5.20	0.1957	0.2055
G1	2.40	2.70	0.0949	0.1067
H	10.00	10.40	0.3953	0.4111
L2	16.00 typ.		0.6324 typ.	
L3	28.60	30.60	1.1304	1.2095
L4	9.80	10.6	0.3874	0.4190
L5	2.90	3.60	0.1146	0.1423
L6	15.90	16.40	0.6285	0.6482
L7	9.00	9.30	0.3557	0.3676
Dia	3.0	3.20	0.1186	0.1265

### 3 Ordering information

Figure 14: Ordering information scheme

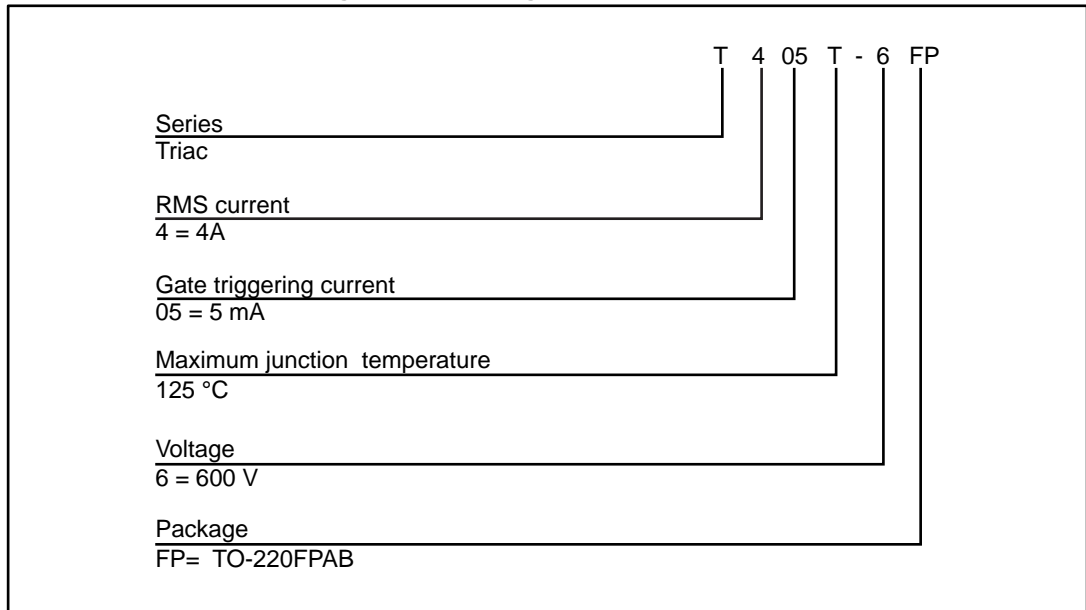


Table 7: Ordering information

Order code	Marking	Package	Weight	Base qty.	Delivery mode
T405T-6FP	T405T-6FP	TO-220FPAB	2.0 g	50	Tube

### 4 Revision history

Table 8: Document revision history

Date	Revision	Changes
04-Nov-2016	1	Initial release.



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