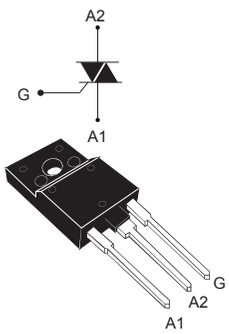
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T2650-6PF

Datasheet

26 A 600 V Snubberless Triac in TO-3PF



TO-3PF

Features

- High current Triac
- Max. blocking voltage = V_{DRM}, V_{RRM} = 600 V
- Max. surge voltage = V_{DSM}, V_{RSM} = 700 V
- Snubberless high static and dynamic commutation:
  - (dI/dt)c = 22 A/ms
  - dV/dt = 1000 V/µs
- UL recognized component at 2.5 kV for UL-1557 (File Ref. 81734)
- ECOPACK2 compliant (RoHS and HF compliance)
- UL-94, V0 flammability package resin compliance

Applications

- On/off function in static relays, heating regulation, induction motor starting circuit
- Phase control operations in light dimmers, motor speed controller and SMPS inrush current limiter

Description

Available in power package TO-3PF, the T2650-6PF Snubberless Triac is suitable for general purpose AC switching.

When used with the properly dimensioned heatsink, the T2650-6PF can enable AC switching systems up to 3 kW for 120 V AC mains. Refer to ST Application Note AN533 for thermal management of Triacs.

A Snubberless Triac, the T2650-6PF is recommended for industrial applications where high immunity and high surge current are required.

The T2650-6PF provides an insulated tab (rated at 2500 V rms). Recognized by UL, representative samples of this component have been evaluated by UL and meet applicable UL requirements for UL-1557 standard (File Ref. 81734).

Product status link
T2650-6PF

Product summary	
$I_{T(RMS)}$	26 A
I_{TSM}	260 A
V_{DRM}, V_{RRM}	600 V
V_{DSM}, V_{RSM}	700 V
I_{GT}	50 mA

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1 Characteristics

Table 1. Absolute maximum ratings (limiting values)

Symbol	Parameter			Value	Unit
$I_{T(RMS)}$	RMS on-state current (full sine wave)		T_c = 78 °C	26	A
I_{TSM}	Non repetitive surge peak on-state current (full cycle, T_j initial = 25 °C)	t = 16.7 ms	T_j = 25 °C	270	A
		t = 20 ms		260	
I^2t	I^2t value for fusing	t_p = 10 ms	T_j = 25 °C	447	A^2s
dI/dt	Critical rate of rise of on-state current, I_G = 2 x I_{GT}, tr ≤ 100 ns	F = 50 Hz	T_j = 25 °C	50	A/µs
V_{DRM}/V_{RRM}	Repetitive peak off-state voltage		T_j = 125 °C	600	V
V_{DSM}/V_{RSM}	Non repetitive peak off-state voltage	t_p = 10 ms	T_j = 25 °C	700	V
I_{GM}	Peak gate current	t_p = 20 µs	T_j = 125 °C	4	A
V_{GM}	Peak gate voltage			8	V
$P_{G(AV)}$	Average gate power dissipation		T_j = 125 °C	1	W
T_{stg}	Storage temperature range			-40 to +150	°C
T_j	Operating junction temperature range			-40 to +125	°C

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

Symbol	Test conditions	Quadrants; T_j		Value	Unit
I_{GT} (1)	V_D = 12 V, R_L = 33 Ω	I - II - III	Max.	50	mA
V_{GT}			Max.	1.3	V
V_{GD}	V_D = V_{DRM}, R_L = 3.3 kΩ, T_j = 125 °C	I - II - III	Min.	0.2	V
I_L	I_G = 1.2 x I_{GT}	I - III	Max.	80	mA
		II	Max.	100	mA
I_H (2)	I_T = 500 mA, gate open		Max.	75	mA
dV/dt (2)	V_D = 67% V_{DRM}, gate open	T_j = 125 °C	Min.	1000	V/µs
(dI/dt)c (2)	Without snubber. (dV/dt)c > 20 V/µs	T_j = 125 °C	Min.	22	A/ms

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

Table 3. Static electrical characteristics

Symbol	Test conditions	T_j		Value	Unit
V_{TM} (1)	I_{TM} = 36.8 A, t_p = 380 µs	25 °C	Max.	1.55	V
V_{TO} (1)	Threshold voltage	125 °C	Max.	0.85	V
R_D (1)	Dynamic resistance	125 °C	Max.	14	mΩ
I_{DRM}, I_{RRM}	V_D = V_{DRM}, V_R = V_{RRM}	25 °C	Max.	5	µA
		125°C		4	mA

1. *For both polarities of A2 referenced to A1.*

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Table 4. **Thermal resistance**

Symbol	Parameter		Value	Unit
$R_{th(j-c)}$	Junction to case (AC)	Max.	1.60	°C/W
		Typ.	1.25	
$R_{th(j-a)}$	Junction to ambient	Typ.	50	

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1.1 Characteristics (curves)

Figure 1. Maximum power dissipation versus RMS on-state current (full cycle)

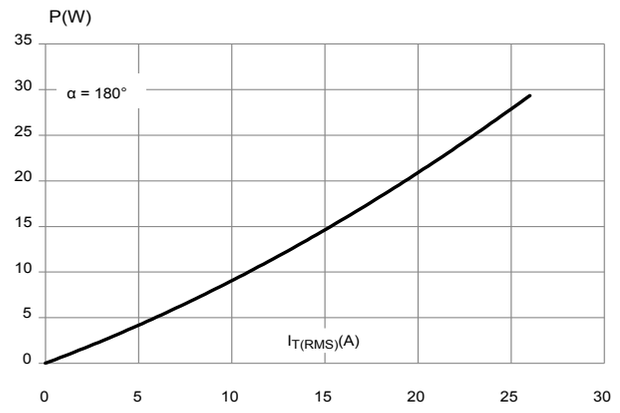


Figure 2. RMS on-state current versus case temperature (full cycle)

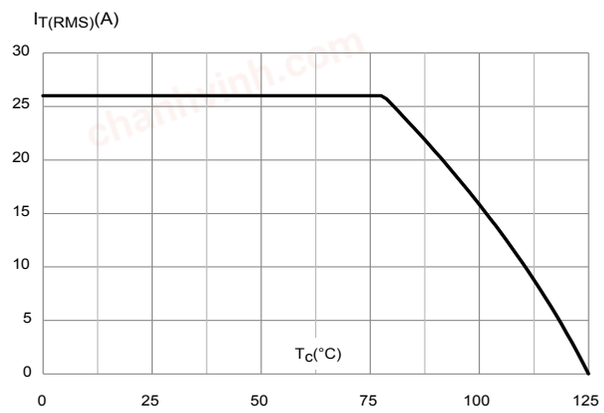


Figure 3. Relative variation of thermal impedance versus pulse duration

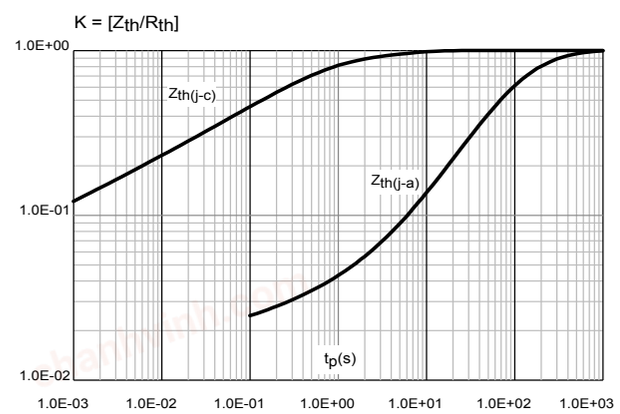


Figure 4. On-state characteristics (maximum values)

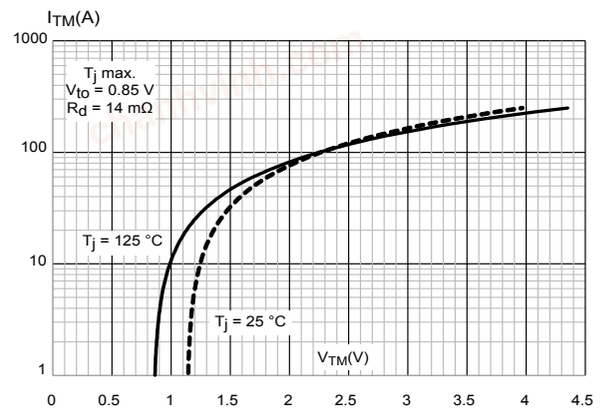


Figure 5. Surge peak on-state current versus number of cycles

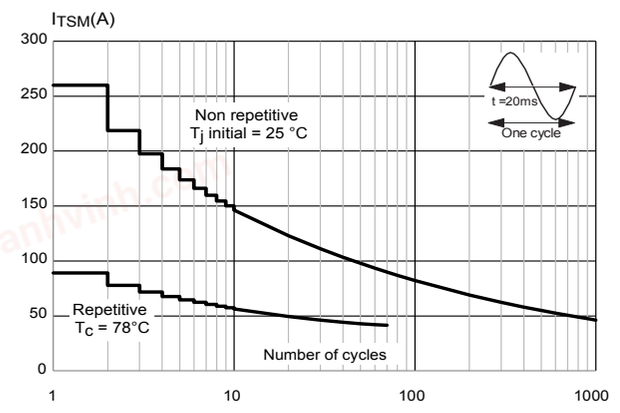
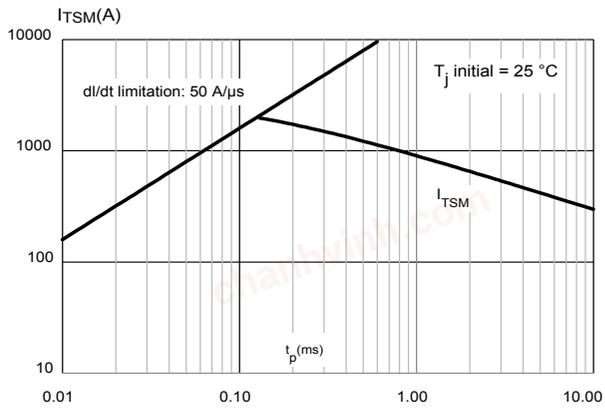


Figure 6. Non-repetitive surge peak on-state current for a sinusoidal pulse (t_p < 10 ms)



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

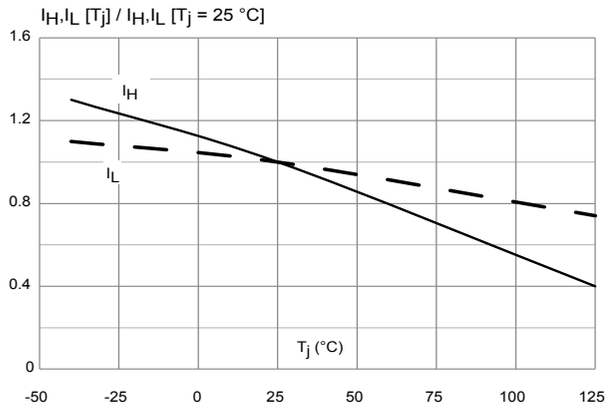


Figure 8. Relative variation of gate trigger voltage and current versus junction temperature (typical values)

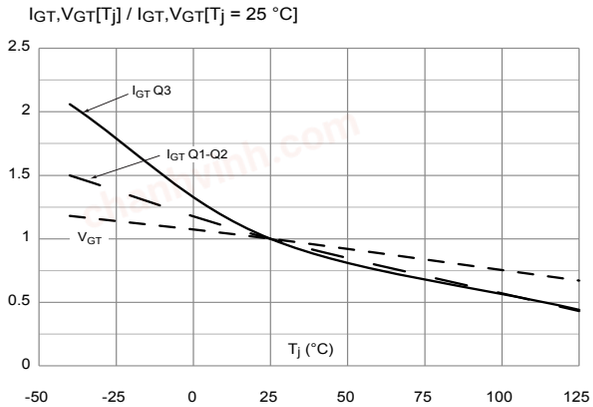


Figure 9. Relative variation of critical rate of decrease of main current (dI/dt)c versus (dV/dt)c (typical values

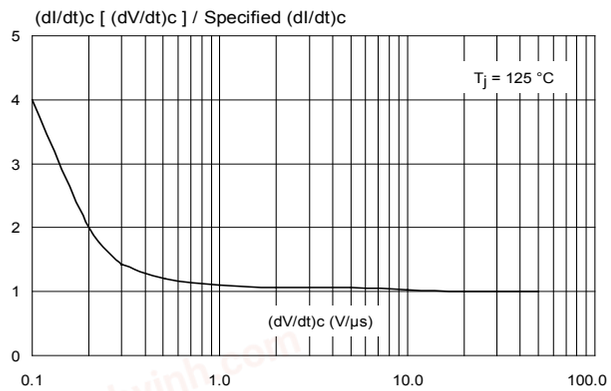


Figure 10. Relative variation of critical rate of decrease of main current versus junction temperature

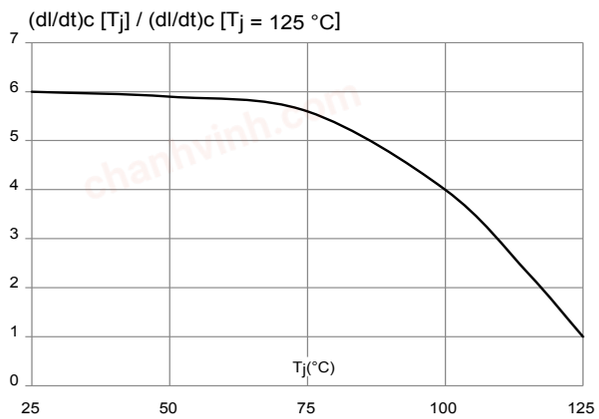


Figure 11. Relative variation of static dV/dt immunity versus junction temperature

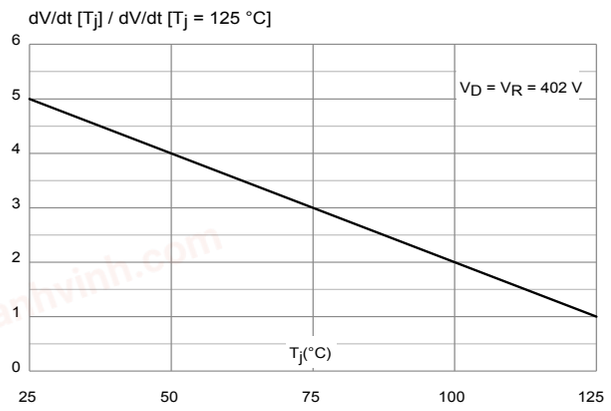
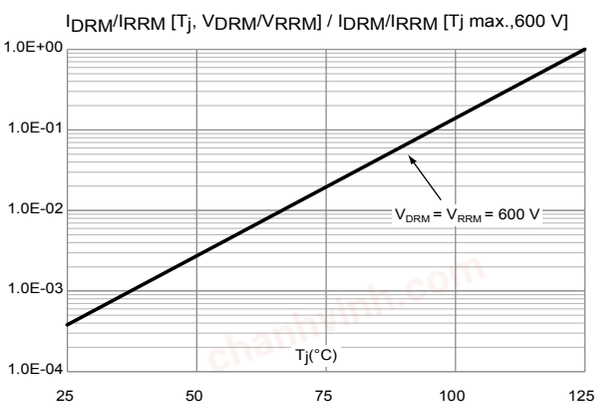


Figure 12. Relative variation of leakage current versus junction temperature



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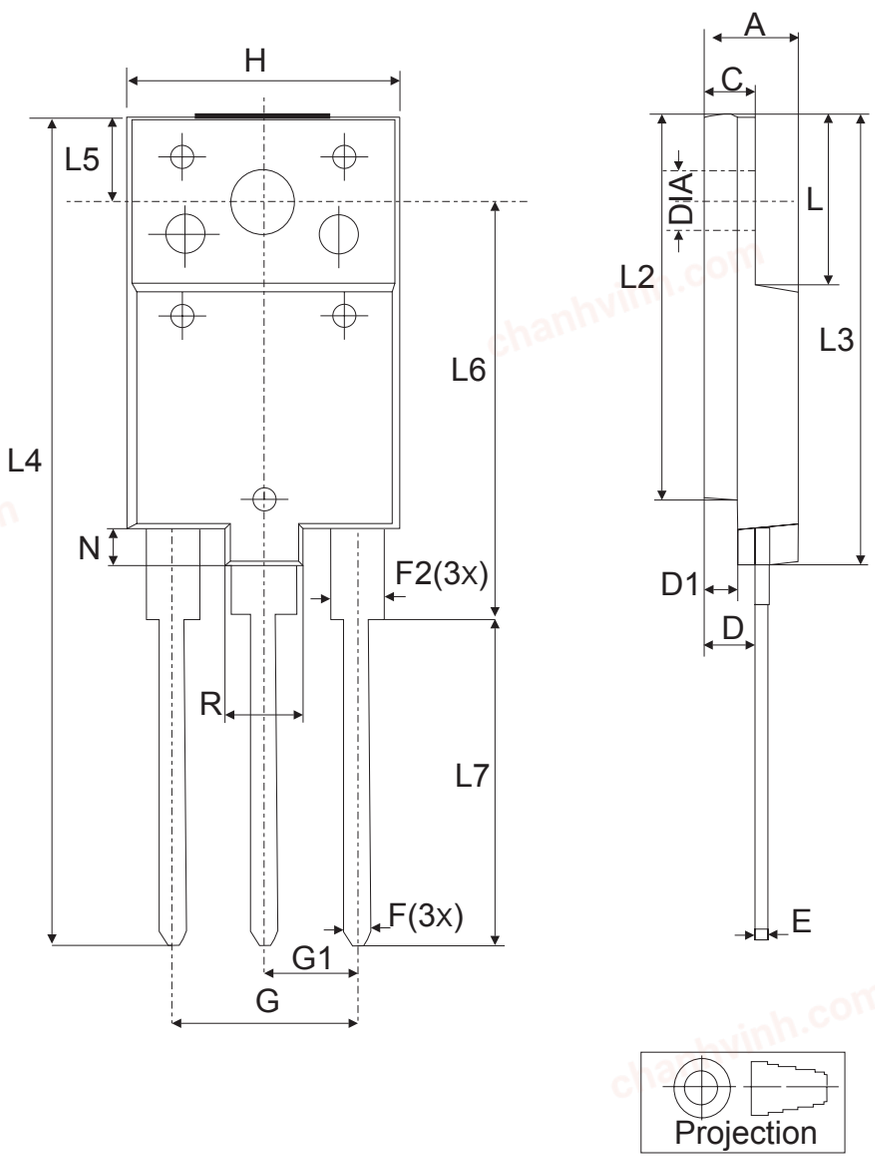
2 Package information

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-3PF package information

- Epoxy meets UL94, V0
- Lead-free package and HF package
- Recommended torque: 0.8N·m (max. 1.0 N·m)

Figure 13. TO-3PF package outline



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Table 5. **TO-3PF mechanical data**

Ref.	Dimensions					
	mm			Inches[1]		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	5.30		5.70	0.2087		0.2244
C	2.80		3.20	0.1102		0.1260
D	3.10		3.50	0.1220		0.1378
D1	1.80		2.20	0.0709		0.0866
E	0.80		1.10	0.0315		0.0433
F	0.65		0.95	0.0256		0.0374
F2	1.80		2.20	0.0709		0.0866
G	10.30		11.50	0.4055		0.4528
G1		5.45			0.2146	
H	15.30		15.70	0.6024		0.6181
L	9.80	10.00	10.20	0.3858	0.3937	0.4016
L2	22.80		23.20	0.8976		0.9134
L3	26.30		26.70	1.0354		0.0512
L4	43.20		44.40	1.7008		1.7480
L5	4.30		4.70	0.1693		0.1850
L6	24.30		24.70	0.9567		0.9724
L7	14.60		15.00	0.5748		0.5906
N	1.80		2.20	0.0709		0.0866
R	3.80		4.20	0.1496		0.1654
Dia	3.40		3.80	0.1339		0.1496

1. *Inches given for reference only*

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3 Ordering information

Figure 14. **Ordering information scheme**

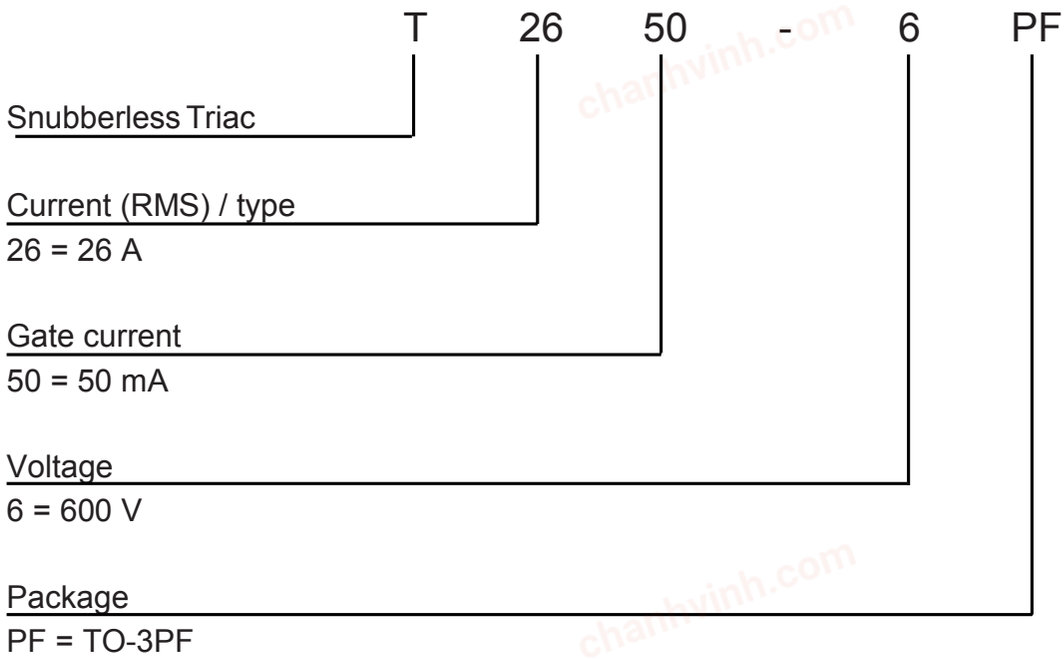


Table 6. **Ordering information**

Order code	Marking	Package	Weight	Base qty.	Delivery mode
T2650-6PF	T2650-6PF	TO-3PF	5.2 g	30	Tube

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Revision history

Table 7. **Document revision history**

Date	Version	Changes
03-Dec-2020	1	Initial release.

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