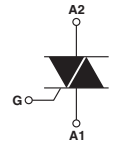
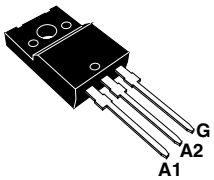
T1635T-8FP

16 A Snubberless™ Triac

Datasheet – production data





TO-220FPAB
(T1635T-8FP)

Table 1. Device summary

Symbol	Value	Unit
$I_{T(rms)}$	16	A
V_{DRM}, V_{RRM}	800	V
V_{DSM}, V_{RSM}	900	V
I_{GT}	35	mA

Features

- Medium current Triac
- High static and dynamic commutation
- Three quadrants
- ECOPACK®2 compliant component
- Complies with UL standards (File ref: E81734)

Applications

- General purpose AC line load switching
- Motor control circuits
- Small home appliances
- Lighting
- Inrush current limiting circuits
- Overvoltage crowbar protection

Description

Available in through-hole full pack package, the T1635T-8FP Triac can be used for the on/off or phase angle control function in general purpose AC switching where high commutation capability is required. This device can be used without a snubber circuit when the limits defined in this datasheet are respected.

Provides UL certified insulation rated at 2 kV.

TM: Snubberless is a trademark of STMicroelectronics

1 Characteristics

Table 2. Absolute ratings (limiting values, T_j = 25 °C unless otherwise stated)

Symbol	Parameter			Value	Unit
$I_{T(rms)}$	On-state rms current (full sine wave)		T_c = 87 °C	16	A
I_{TSM}	Non repetitive surge peak on-state current (full cycle, T_j initial = 25 °C)	F = 50 Hz	t = 20 ms	120	A
		F = 60 Hz	t = 16.7 ms	126	
I^2t	I^2t value for fusing, T_j initial = 25 °C		t_p = 10 ms	95	A^2s
V_{DRM}, V_{RRM}	Repetitive surge peak off-state voltage		T_j = 150 °C	600	V
			T_j = 125 °C	800	
V_{DSM}, V_{RSM}	Non repetitive surge peak off-state voltage		t_p = 10 ms	900	V
dI/dt	Critical rate of rise of on-state current I_G = 2 x I_{GT}, $t_r \leq$ 100 ns		F = 100 Hz	100	A/µs
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
T_{stg} T_j	Storage junction temperature range Operating junction temperature range			- 40 to + 150 - 40 to + 150	°C
T_L	Maximum lead temperature for soldering during 10 s			260	°C
V_{ins}	Insulation rms voltage, 1 minute			2	kV

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

Symbol	Test conditions	Quadrant		Value	Unit
I_{GT} (1)	V_D = 12 V, R_L = 30 Ω	I - II - III	Min.	1.75	mA
			Max.	35	
V_{GT}	V_D = 12 V, R_L = 30 Ω	I - II - III	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_H (2)	I_T = 500 mA		Max.	40	mA
I_L	I_G = 1.2 I_{GT}	I - III	Max.	60	mA
		II		65	
dV/dt	V_D = 536 V, gate open	T_j = 125 °C	Min.	2000	V/µs
	V_D = 402 V, gate open	T_j = 150 °C		1000	V/µs
(dI/dt)c	Without snubber (dV/dt)c > 20 V/µs)	T_j = 125 °C	Min.	16	A/ms
		T_j = 150 °C		8	

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_T (1)	I_{TM} = 22.6 A, t_p = 380 µs	T_j = 25 °C	Max.	1.55	V
V_{t0} (1)	Threshold voltage	T_j = 150 °C	Max.	0.85	V
R_d (1)	Dynamic resistance	T_j = 150 °C	Max.	27	mΩ
I_{DRM} I_{RRM}	V_{DRM} = V_{RRM} = 800 V	T_j = 25 °C	Max.	7.5	µA
		T_j = 125 °C		1	mA
	V_{DRM} = V_{RRM} = 600 V	T_j = 150 °C	Max.	3.0	

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)	3.3	°C/W
$R_{th(j-a)}$	Junction to ambient	60	°C/W

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

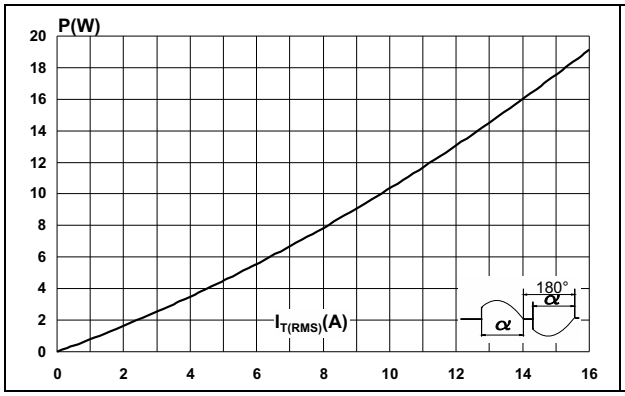


Figure 2. On-state rms current versus case temperature (full cycle)

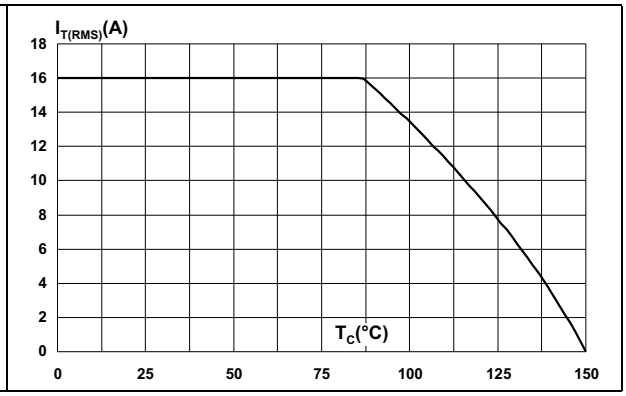


Figure 3. On-state rms current versus ambient temperature (free air convection)

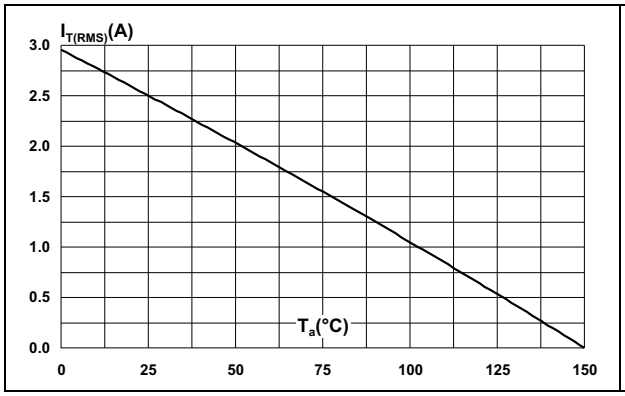


Figure 4. Relative variation of thermal impedance versus pulse duration

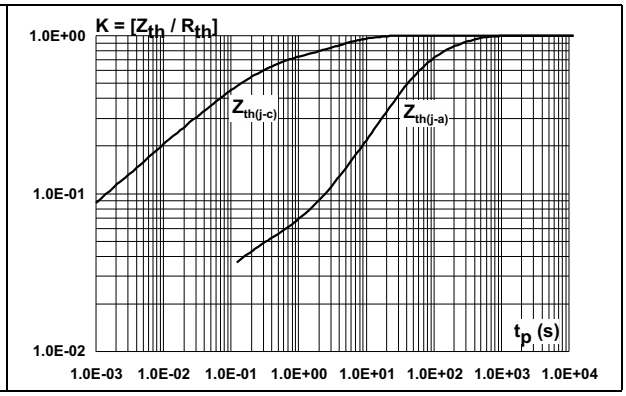


Figure 5. On-state characteristics (maximum values)

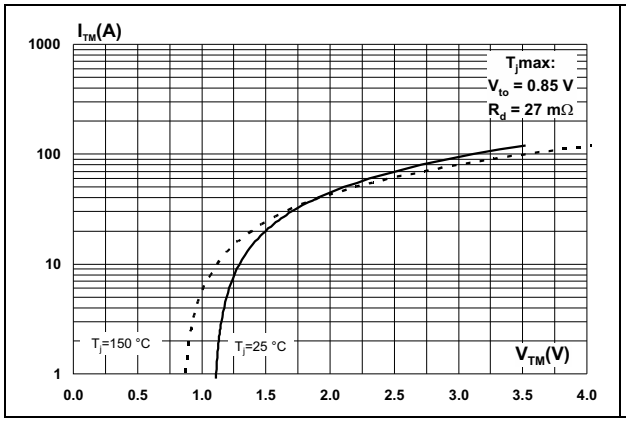


Figure 6. Surge peak on-state current versus number of cycles

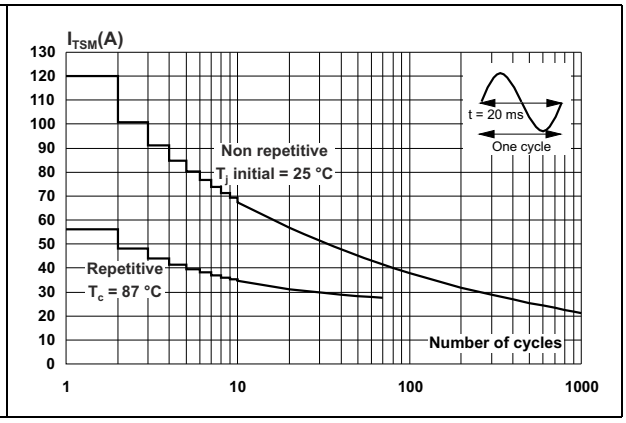


Figure 7. Non repetitive surge peak on-state current and corresponding values of I^2t

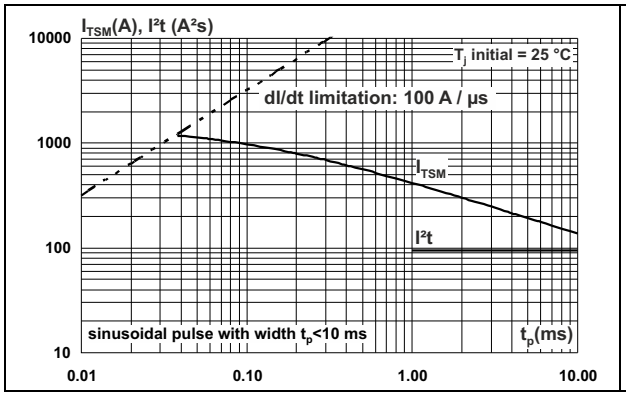


Figure 8. Relative variation of gate trigger current and gate voltage versus junction temperature (typical values)

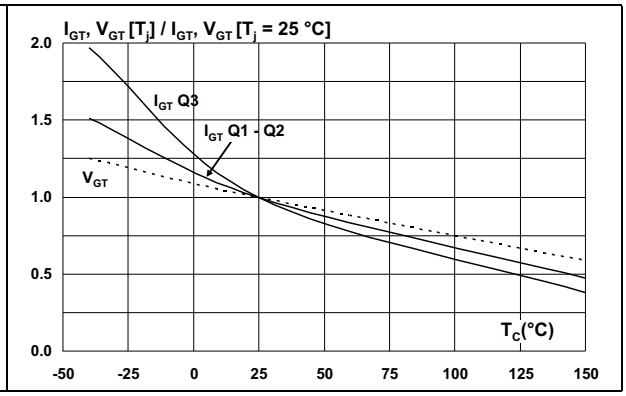


Figure 9. Relative variation of static dV/dt immunity versus junction temperature (typical values)

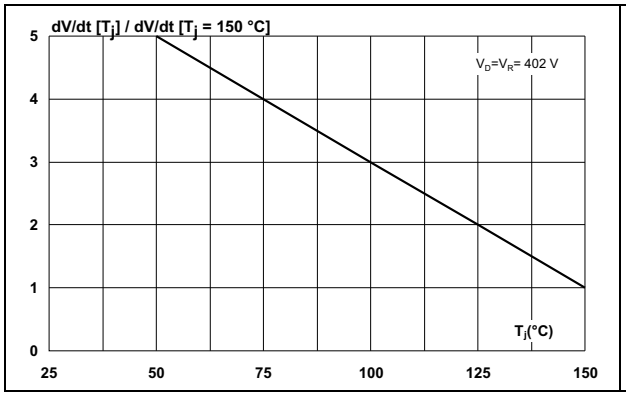


Figure 10. Relative variation of holding current and latching current versus junction temperature (typical values)

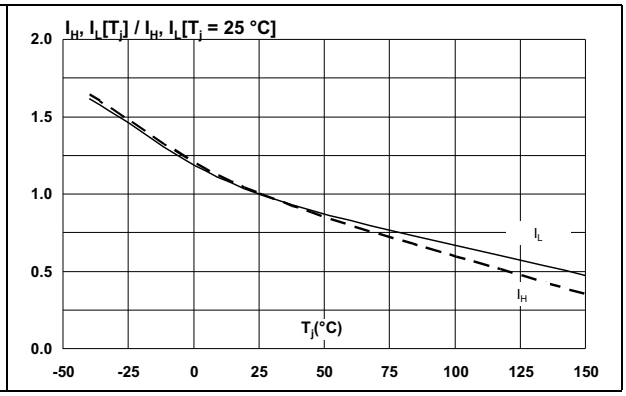


Figure 11. Relative variation of critical rate of decrease of main current (di/dt)c versus reapplied (dV/dt)c

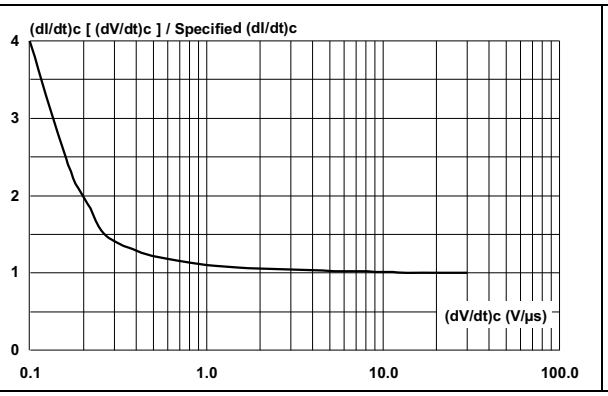


Figure 12. Relative variation of critical rate of decrease of main current (di/dt)c versus junction temperature (typical values)

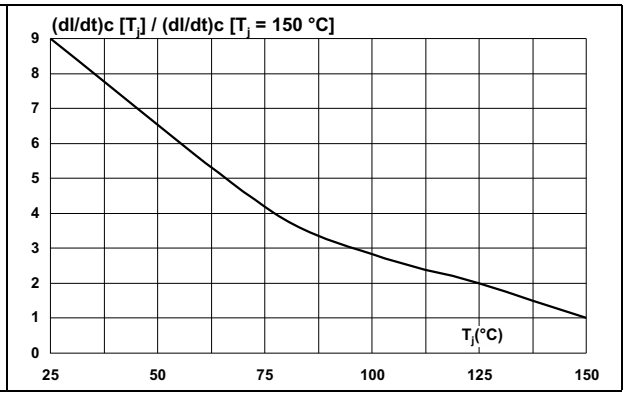
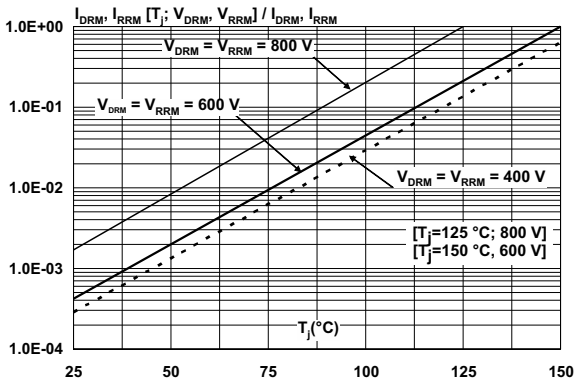


Figure 13. Relative variation of leakage current versus junction temperature for different values of blocking voltage (typical values)



2 Package information

- 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 14. TO-220FPAB dimension definitions

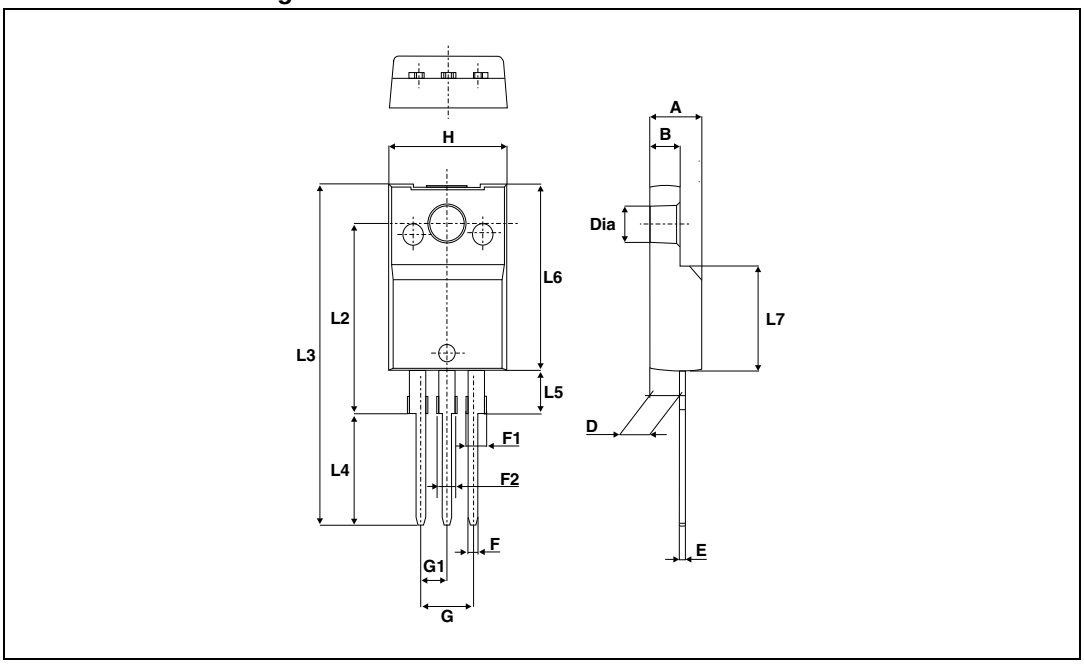


Table 6. TO-220FPAB dimension values

Ref.	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	4.4	4.6	0.173	0.181
B	2.5	2.7	0.098	0.106
D	2.5	2.75	0.098	0.108
E	0.45	0.70	0.018	0.027
F	0.75	1	0.030	0.039
F1	1.15	1.70	0.045	0.067
F2	1.15	1.70	0.045	0.067
G	4.95	5.20	0.195	0.205
G1	2.4	2.7	0.094	0.106
H	10	10.4	0.393	0.409
L2	16 Typ.		0.63 Typ.	
L3	28.6	30.6	1.126	1.205
L4	9.8	10.6	0.386	0.417
L5	2.9	3.6	0.114	0.142
L6	15.9	16.4	0.626	0.646
L7	9.00	9.30	0.354	0.366
Dia.	3.00	3.20	0.118	0.126

3 Ordering information

Figure 15. Ordering information scheme

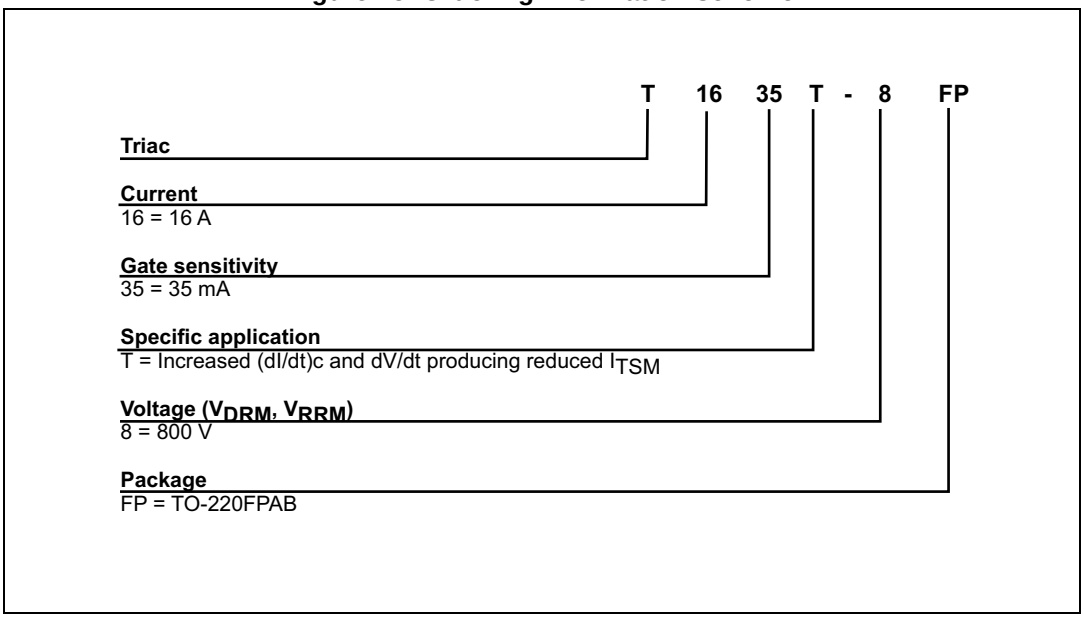


Table 7. Ordering information

Order code	Marking	Package	Weight	Base qty	Delivery mode
T1635T-8FP	T1635T-8FP	TO-220FPAB	2.0 g	50	Tube

4 Revision history

Table 8. Document revision history

Date	Revision	Changes
27-May-2013	1	Initial release.
12-June-2013	2	Added UL certification information.
08-Jan-2015	3	Updated *Features*, *Table 2* and *Table 5*.