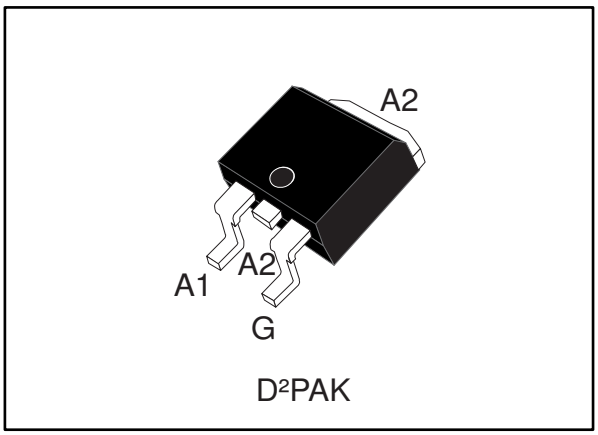
T1235T-8G

12 A Snubberless™ Triac

Datasheet -production data



D²PAK

Features

- High static dV/dt
- High dynamic turn-off commutation (dI/dt)c
- 150 °C maximum T_j
- Three quadrants
- Surge capability V_{DSM}, V_{RSM} = 900 V

Benefits

- High immunity to turn-on thanks to high static dV/dt
- Better turn-off in high temperature environments thanks to (dI/dt)c
- Increase of thermal margin due to extended working T_j up to 150 °C
- Good thermal resistance due to non-insulated tab

Applications

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

Description

Available in SMD, the T1235T-8G 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 RC circuit when the limits defined are respected.

D²PAK package is UL94-V0 flammability resin compliance.

Package environmentally friendly Ecopack®2 graded (RoHS and Halogen Free compliance).

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Figure 1: Functional diagram

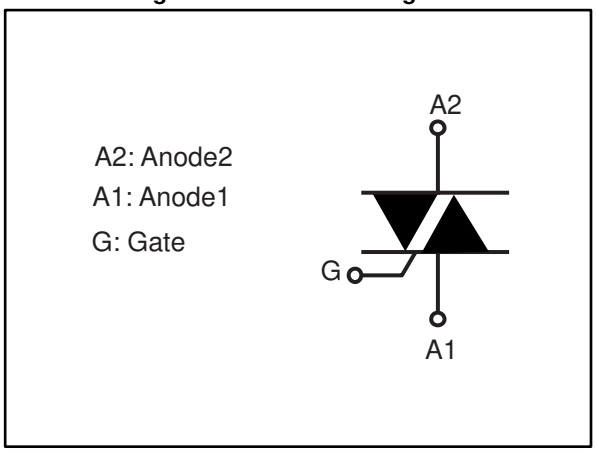


Table 1: Device summary

Symbol	Value	Unit
$I_{T(RMS)}$	12	A
V_{DRM}/V_{RRM}	800	V
V_{DSM}/V_{RSM}	900	V
I_{GT}	35	mA

This is information on a product in full production. www.st.com

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 = 124 °C	12	A
I_{TSM}	Non repetitive surge peak on-state current, T_j initial = 25 °C		t_p = 16.7 ms	95	A
			t_p = 20 ms	90	
I^2t	I^2t value for fusing		T_j initial = 25 °C	54	A^2s
dI/dt	Critical rate of rise of on-state current, I_G = 2 x I_{GT}, tr ≤ 100 ns		f = 100 Hz	100	A/µs
V_{DRM}/V_{RRM}	Repetitive peak off-state voltage		T_j = 150 °C	600	V
			T_j = 125 °C	800	V
V_{DSM}/V_{RSM}	Non Repetitive peak off-state voltage		t_p = 10 ms	900	V
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}	Storage junction temperature range			-40 to +150	°C
T_j	Operating junction temperature range			-40 to +150	°C

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

Symbol	Test conditions	Quadrants; T_j		Value	Unit
I_{GT}	V_D = 12 V, R_L = 33 Ω	I - II - III	Min.	1.75	mA
	V_D = 12 V, R_L = 33 Ω	I - II - III	Max.	35	mA
V_{GT}	V_D = 12 V, R_L = 33 Ω	I - II - III	Max.	1.3	V
V_{GD}	V_D = V_{DRM}, R_L = 3.3 kΩ, T_j = 150 °C	I - II - III	Min.	0.2	V
I_L	I_G = 1.2 x I_{GT}	I - III	Max.	60	mA
	I_G = 1.2 x I_{GT}	II	Max.	80	mA
I_H (1)	I_T = 500 mA, gate open		Max.	40	mA
dV/dt (1)	V_D = 536 V, gate open	T_j = 125 °C	Min.	2000	V/µs
	V_D = 402 V, gate open	T_j = 150 °C	Min.	1000	V/µs
(dI/dt)c (1)	Without snubber, (dV/dt)c > 20 V/µs	T_j = 125 °C	Min.	12	A/ms
		T_j = 150 °C	Min.	6	A/ms

Notes:

(1)For both polarities of A2 referenced to A1.

Table 4: Static characteristics

Symbol	Test conditions	T_j		Value	Unit
V_{TM}(1)	I_T = 17 A, t_p = 380 µs	25 °C	Max.	1.6	V
V_{TO}(1)	Threshold on-state voltage	150 °C	Max.	0.85	V
R_D(1)	Dynamic resistance	150 °C	Max.	50	mΩ
I_{DRM}/I_{RRM}	$V_{DRM} = V_{RRM}$ = 800 V	25 °C	Max.	5	µA
		125°C		1	mA
	$V_{DRM} = V_{RRM}$ = 600 V	150 °C	Max.	3.1	mA

Notes:

(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)	D²PAK	Max.	1.6	°C/W

1.1 Characteristics (curves)

Figure 2: Maximum power dissipation versus on-state RMS current

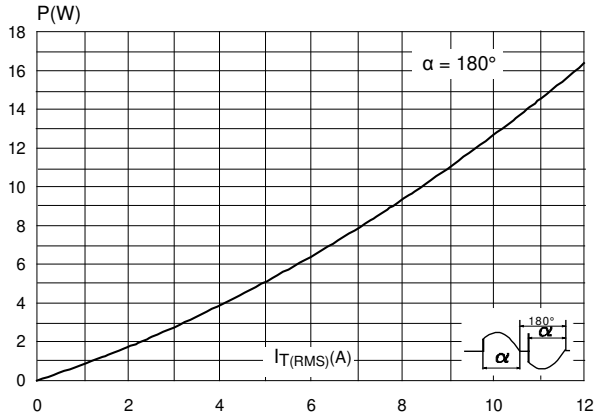


Figure 3: On-state RMS current versus case temperature

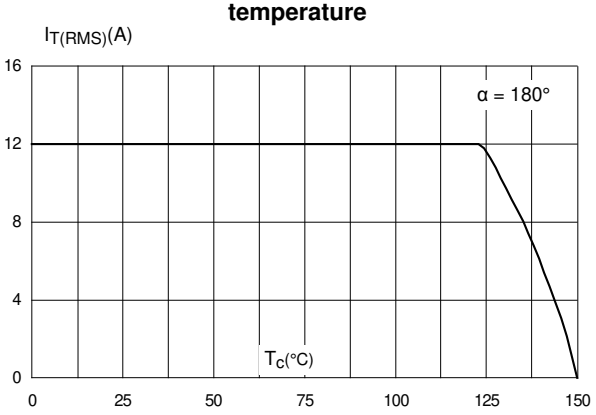


Figure 4: On-state RMS current versus ambient temperature (free air convection)

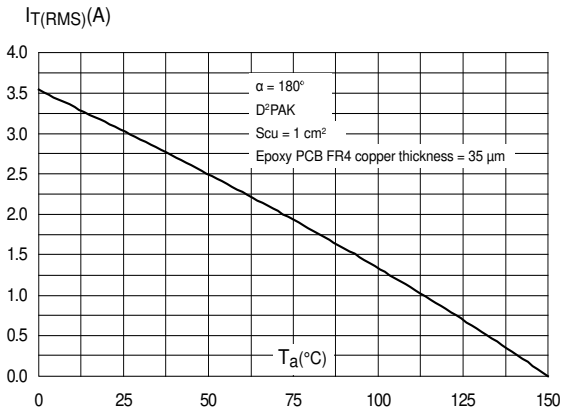


Figure 5: Relative variation of thermal impedance versus pulse duration

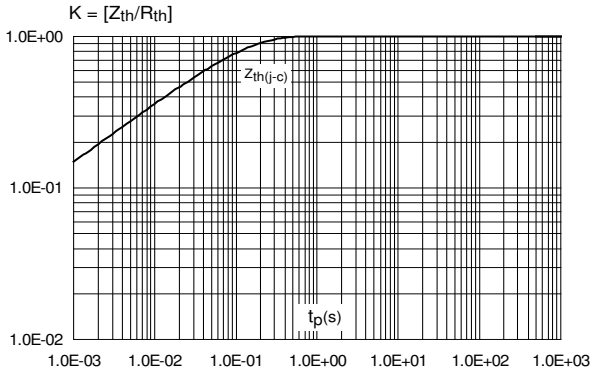


Figure 6: Relative variation of gate trigger voltage and current versus junction temperature (typical values)

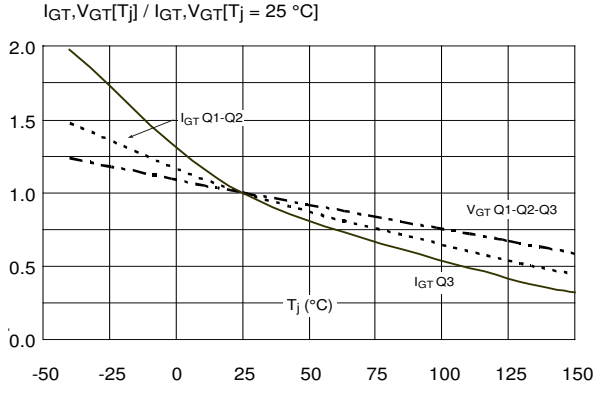


Figure 7: Relative variation of holding current and latching current versus junction temperature (typical values)

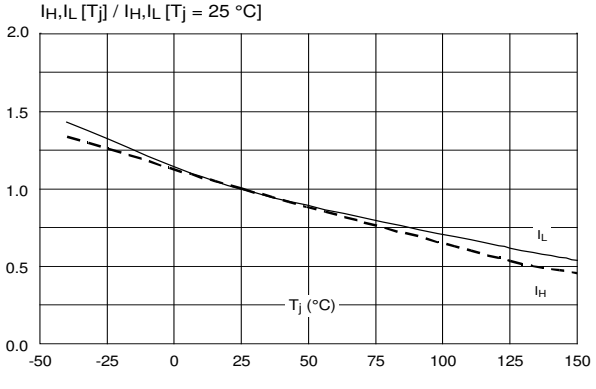


Figure 8: Surge peak on-state current versus number of cycles

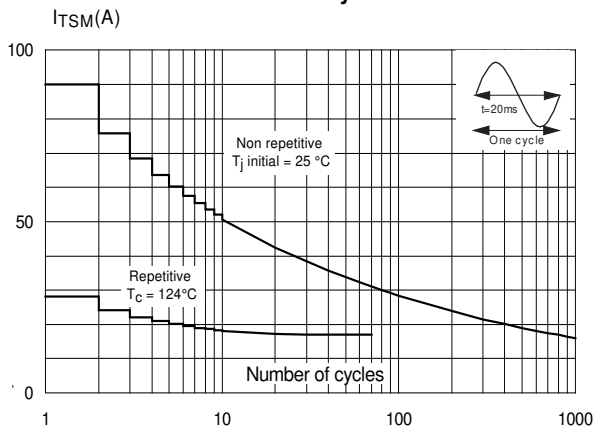


Figure 9: Non repetitive surge peak on-state current for a sinusoidal pulse with width tp < 10 ms

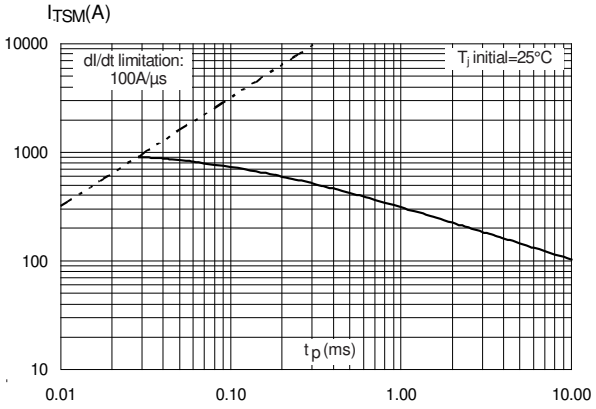


Figure 10: On-state characteristics (maximum values)

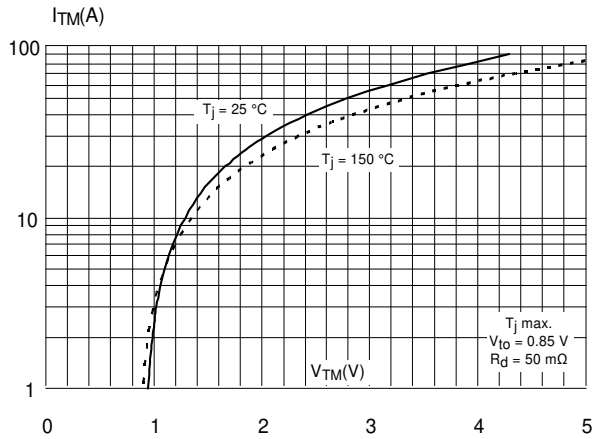


Figure 11: Relative variation of critical rate of decrease of main current versus junction temperature

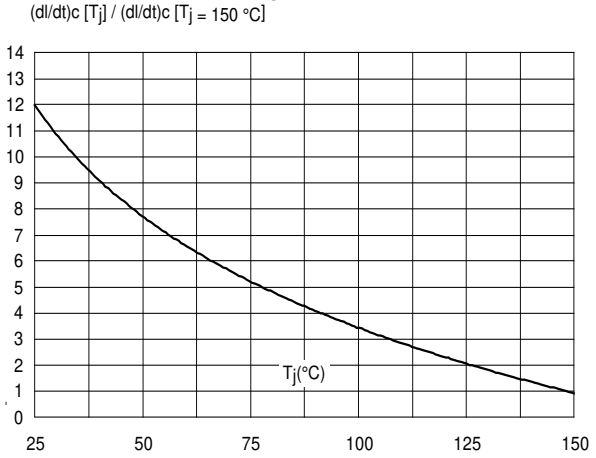


Figure 12: Relative variation of static dV/dt immunity versus junction temperature

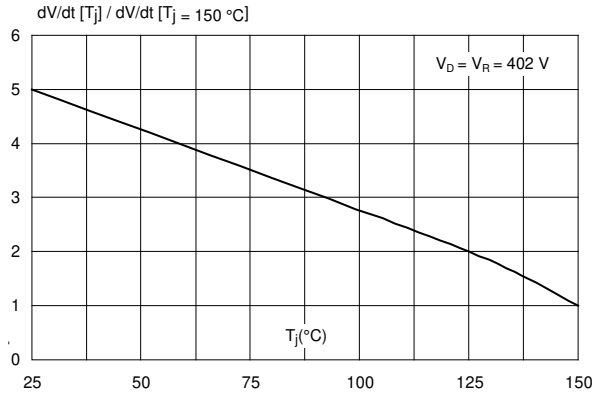
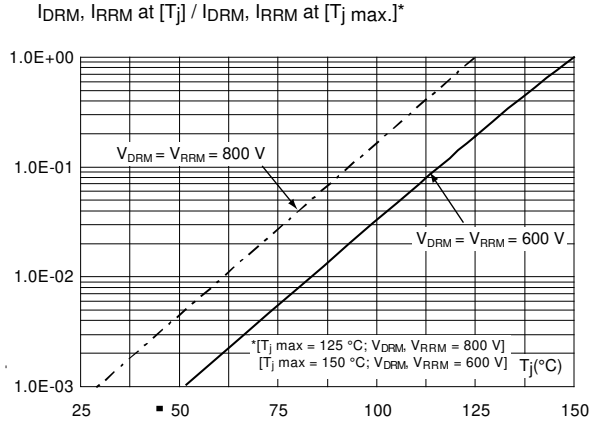


Figure 13: Relative variation of leakage current versus junction temperature for different values of blocking voltage



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.

- ECOPACK®2 compliant
- Lead-free package leads finishing
- Molding compound resin is halogen-free and meets UL standard level V0

2.1 D²PAK package information

Figure 14: D²PAK package outline

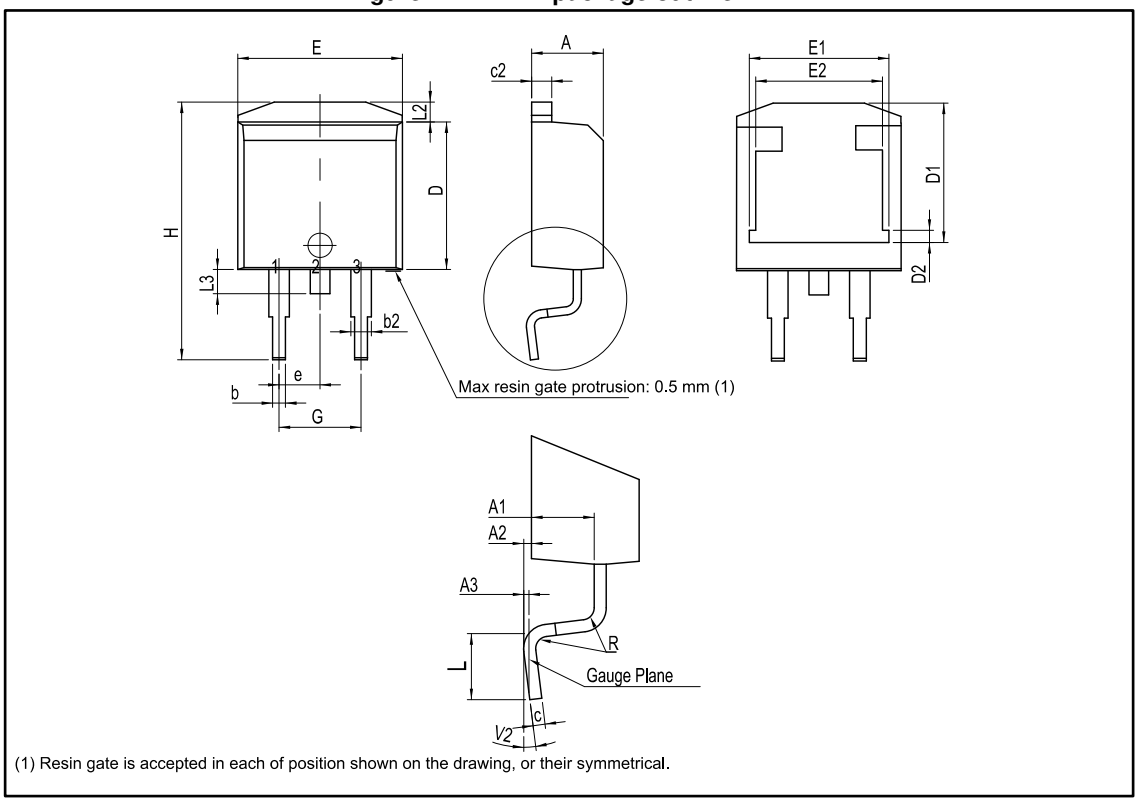


Table 6: D²PAK package mechanical data

Ref.	Dimensions					
	Millimeters			Inches[1]		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	4.30		4.60	0.1693		0.1811
A1	2.49		2.69	0.0980		0.1059
A2	0.03		0.23	0.0012		0.0091
A3		0.25			0.0098	
b	0.70		0.93	0.0276		0.0366
b2	1.25		1.7	0.0492		0.0669
c	0.45		0.60	0.0177		0.0236
c2	1.21		1.36	0.0476		0.0535
D	8.95		9.35	0.3524		0.3681
D1	7.50		8.00	0.2953		0.3150
D2	1.30		1.70	0.0512		0.0669
e	2.54			0.1		
E	10.00		10.28	0.3937		0.4047
E1	8.30		8.70	0.3268		0.3425
E2	6.85		7.25	0.2697		0.2854
G	4.88		5.28	0.1921		0.2079
H	15		15.85	0.5906		0.6240
L	1.78		2.28	0.0701		0.0898
L2	1.27		1.40	0.0500		0.0551
L3	1.40		1.75	0.0551		0.0689
R		0.40			0.0157	
V2	0°		8°	0°		8°

Notes:

[1]Dimensions in inches are given for reference only

Figure 15: D²PAK recommended footprint (dimensions are in mm)

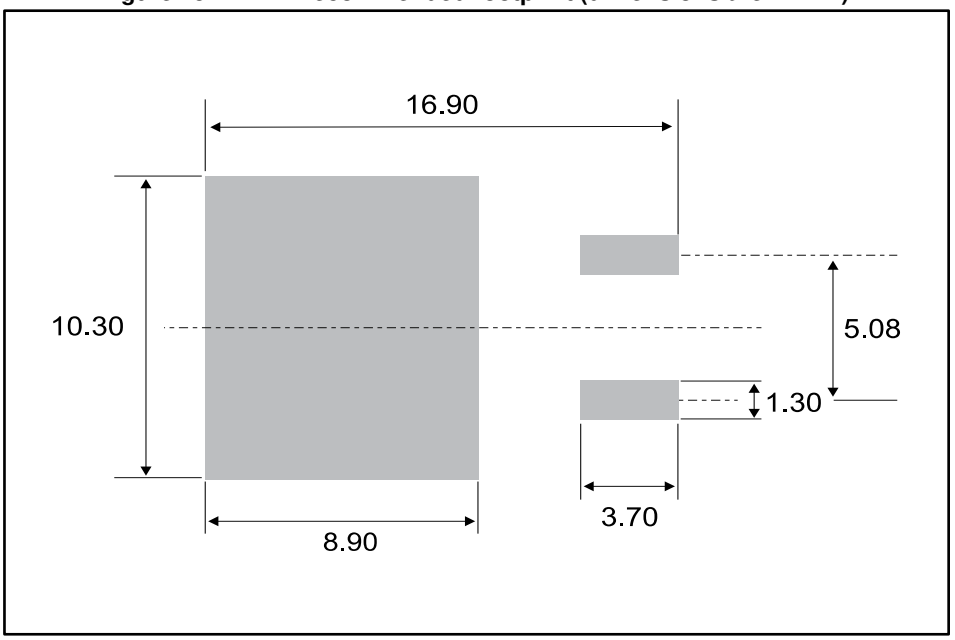
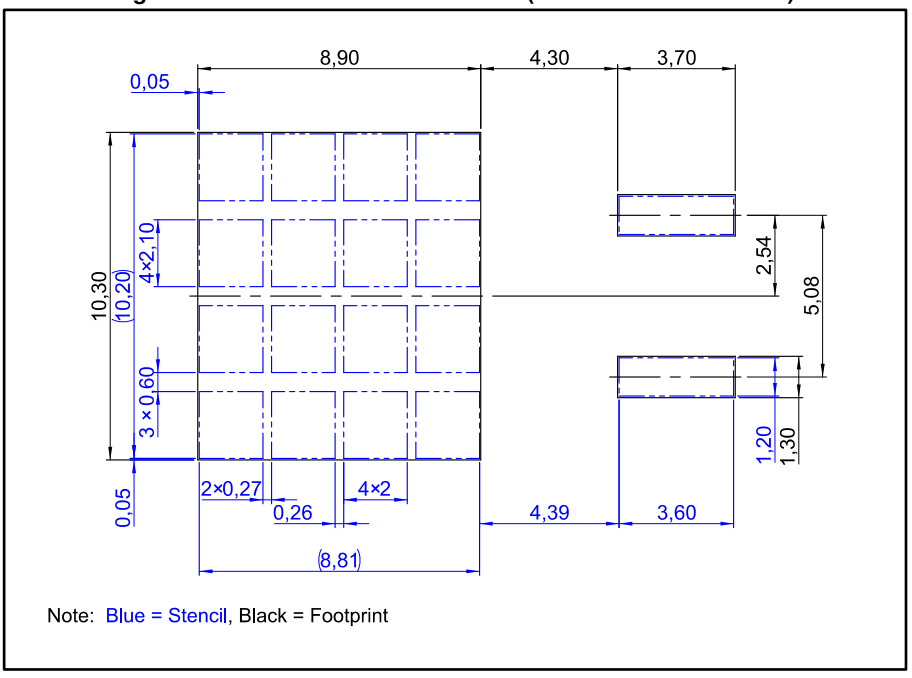


Figure 16: D²PAK stencil definitions (dimensions are in mm)



3 Ordering information

Figure 17: Ordering information scheme

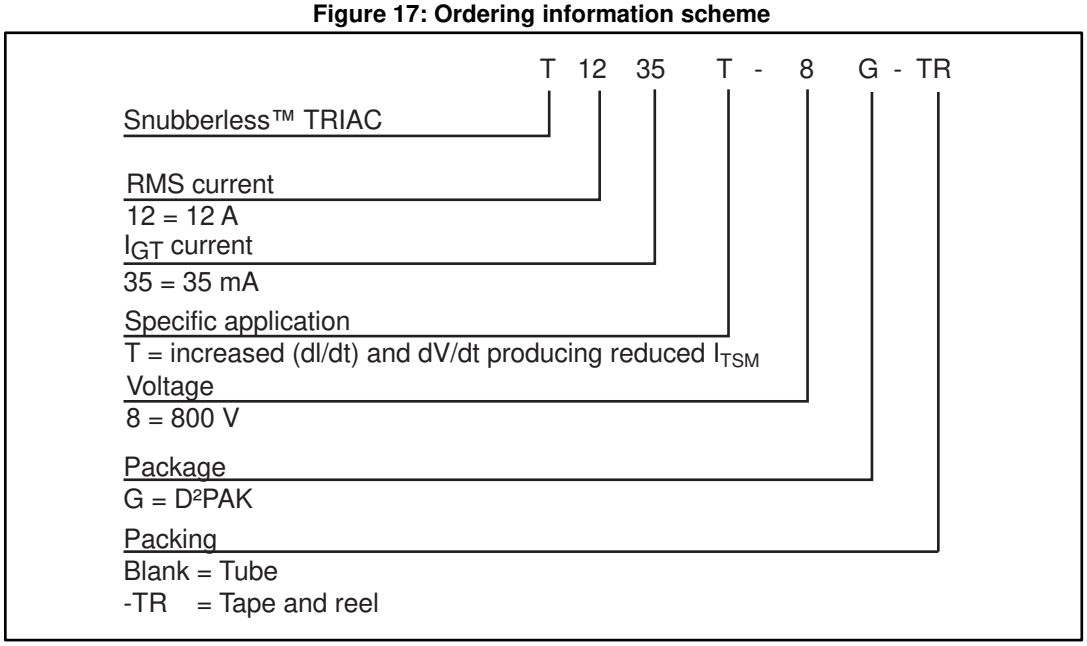


Table 7: Ordering information

Order code	Marking	Package	Weight	Base qty.	Delivery mode
T1235T-8G-TR	T1235T-8G	D²PAK	1.38 g	1000	Tape and reel
T1235T-8G				50	Tube

4 Revision history

Table 8: Document revision history

Date	Revision	Changes
19-Dec-2017	1	Initial release.

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