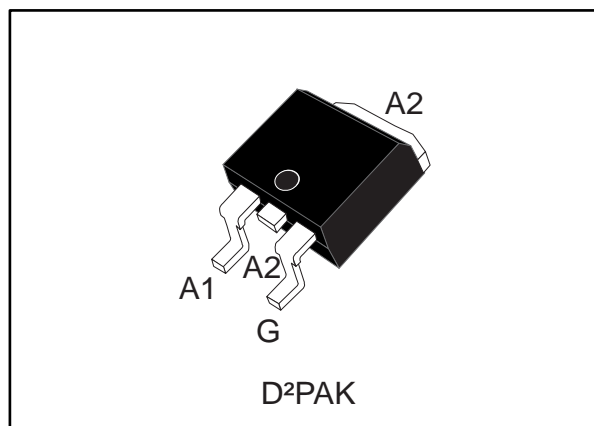


## 12 A Snubberless™ Triac

Datasheet -production data



### 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.

D<sup>2</sup>PAK package is UL94-V0 flammability resin compliance.

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

Snubberless™ is a trademark of STMicroelectronics.

### Features

- High static dV/dt
- High dynamic turn-off commutation (dI/dt)<sub>c</sub>
- 150 °C maximum T<sub>j</sub>
- Three quadrants
- Surge capability V<sub>DSM</sub>, V<sub>RSM</sub> = 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)<sub>c</sub>
- Increase of thermal margin due to extended working T<sub>j</sub> 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

Figure 1: Functional diagram

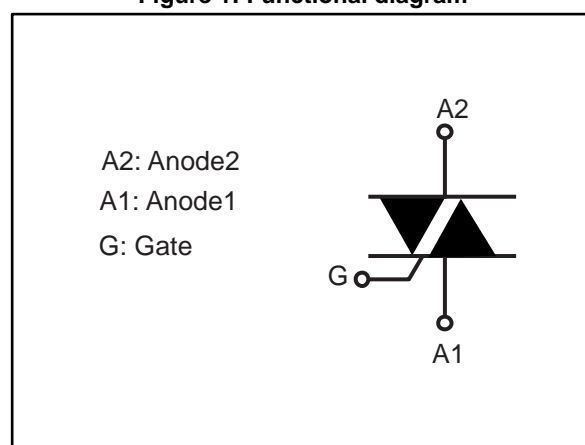


Table 1: Device summary

Symbol	Value	Unit
I <sub>T(RMS)</sub>	12	A
V <sub>DRM</sub> /V <sub>RSM</sub>	800	V
V <sub>DSM</sub> /V <sub>RSM</sub>	900	V
I <sub>GT</sub>	35	mA

# 1 Characteristics

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

Symbol	Parameter		Value	Unit
$I_{T(RMS)}$	RMS on-state current (full sine wave)	$T_c = 124\text{ °C}$	12	A
$I_{TSM}$	Non repetitive surge peak on-state current, $T_j$ initial = 25 °C	$t_p = 16.7\text{ ms}$	95	A
		$t_p = 20\text{ ms}$	90	
$I^2t$	$I^2t$ value for fusing	$T_j$ initial = 25 °C	54	A <sup>2</sup> s
$di/dt$	Critical rate of rise of on-state current, $I_G = 2 \times I_{GT}$ , $t_r \leq 100\text{ ns}$	$f = 100\text{ Hz}$	100	A/ $\mu$ s
$V_{DRM}/V_{RRM}$	Repetitive peak off-state voltage	$T_j = 150\text{ °C}$	600	V
		$T_j = 125\text{ °C}$	800	V
$V_{DSM}/V_{RSM}$	Non Repetitive peak off-state voltage	$t_p = 10\text{ ms}$	900	V
$I_{GM}$	Peak gate current	$t_p = 20\text{ }\mu$ s, $T_j = 150\text{ °C}$	4	A
$P_{G(AV)}$	Average gate power dissipation	$T_j = 150\text{ °C}$	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 ( $T_j = 25\text{ °C}$ , unless otherwise specified)**

Symbol	Test conditions	Quadrants; $T_j$		Value	Unit
$I_{GT}$	$V_D = 12\text{ V}$ , $R_L = 33\text{ }\Omega$	I - II - III	Min.	1.75	mA
	$V_D = 12\text{ V}$ , $R_L = 33\text{ }\Omega$	I - II - III	Max.	35	mA
$V_{GT}$	$V_D = 12\text{ V}$ , $R_L = 33\text{ }\Omega$	I - II - III	Max.	1.3	V
$V_{GD}$	$V_D = V_{DRM}$ , $R_L = 3.3\text{ k}\Omega$ , $T_j = 150\text{ °C}$	I - II - III	Min.	0.2	V
$I_L$	$I_G = 1.2 \times I_{GT}$	I - III	Max.	60	mA
	$I_G = 1.2 \times I_{GT}$	II	Max.	80	mA
$I_H^{(1)}$	$I_T = 500\text{ mA}$ , gate open		Max.	40	mA
$dV/dt^{(1)}$	$V_D = 536\text{ V}$ , gate open	$T_j = 125\text{ °C}$	Min.	2000	V/ $\mu$ s
	$V_D = 402\text{ V}$ , gate open	$T_j = 150\text{ °C}$	Min.	1000	V/ $\mu$ s
$(di/dt)_c^{(1)}$	Without snubber, $(dV/dt)_c > 20\text{ V}/\mu$ s	$T_j = 125\text{ °C}$	Min.	12	A/ms
		$T_j = 150\text{ °C}$	Min.	6	A/ms

**Notes:**

<sup>(1)</sup>For both polarities of A2 referenced to A1.

Table 4: Static characteristics

Symbol	Test conditions	T <sub>j</sub>		Value	Unit
V <sub>TM</sub> <sup>(1)</sup>	I <sub>T</sub> = 17 A, t <sub>p</sub> = 380 μs	25 °C	Max.	1.6	V
V <sub>TO</sub> <sup>(1)</sup>	Threshold on-state voltage	150 °C	Max.	0.85	V
R <sub>D</sub> <sup>(1)</sup>	Dynamic resistance	150 °C	Max.	50	mΩ
I <sub>DRM</sub> /I <sub>RPM</sub>	V <sub>DRM</sub> = V <sub>RPM</sub> = 800 V	25 °C	Max.	5	μA
		125 °C		1	mA
	V <sub>DRM</sub> = V <sub>RPM</sub> = 600 V	150 °C	Max.	3.1	mA

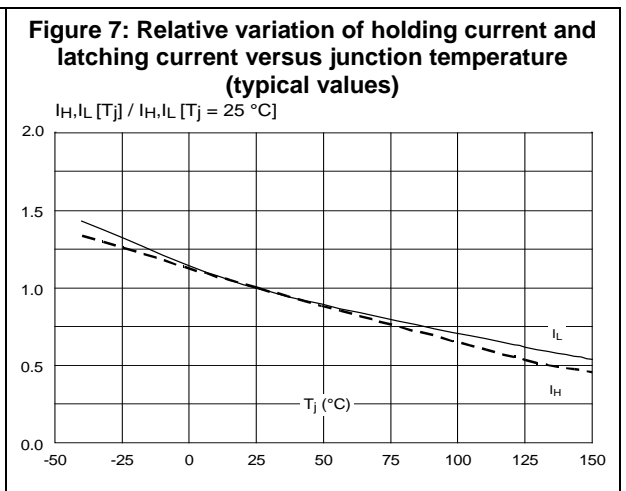
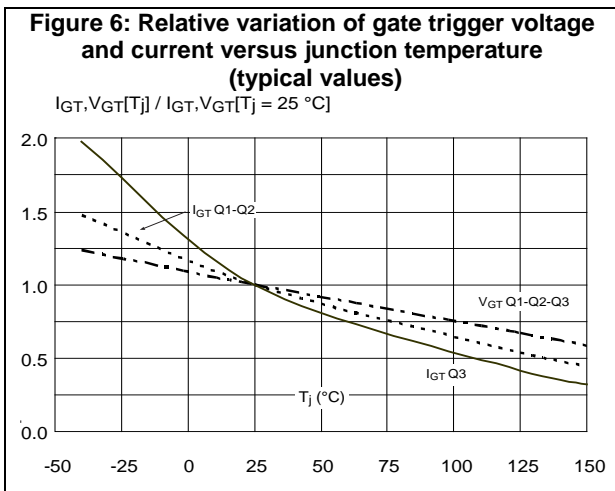
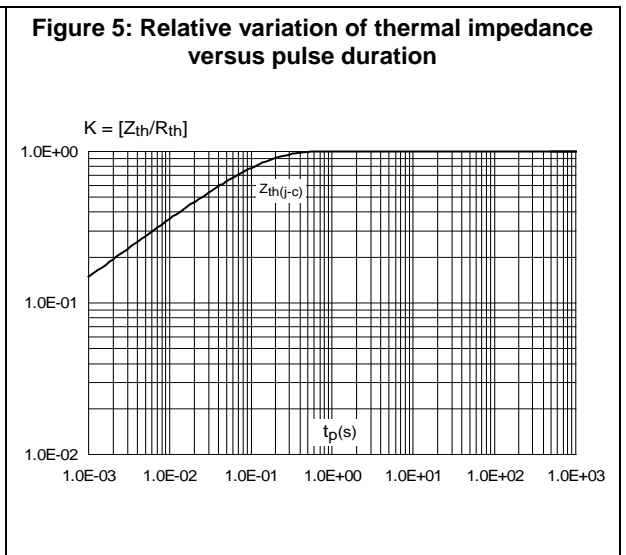
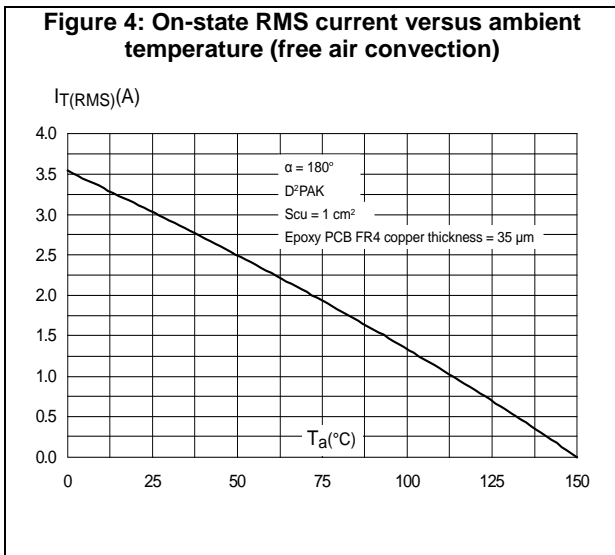
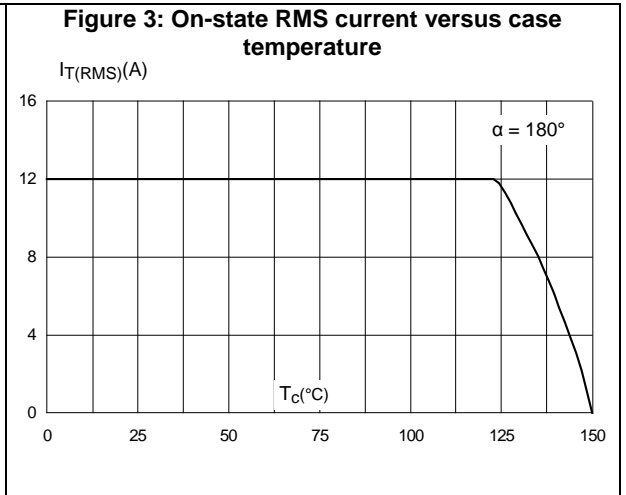
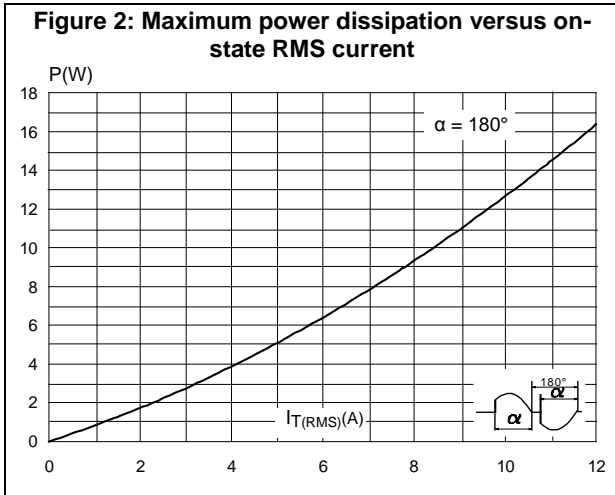
**Notes:**

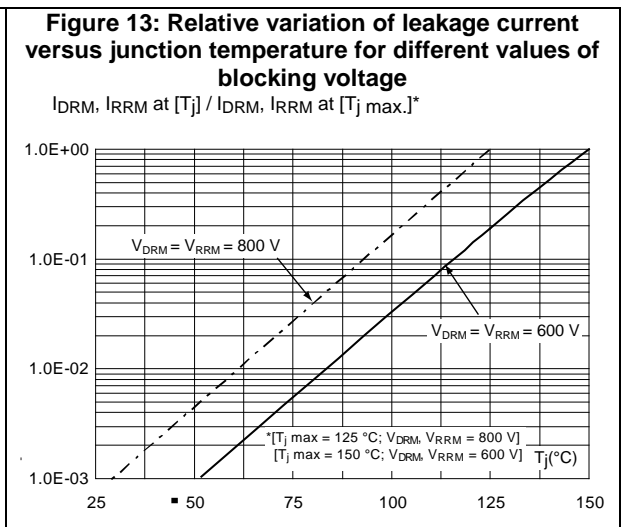
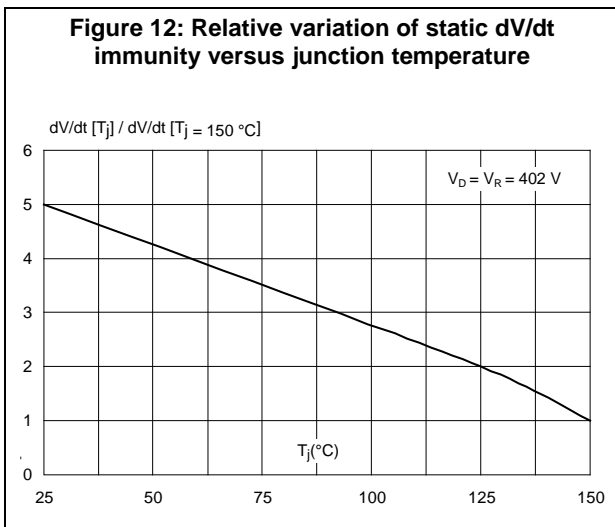
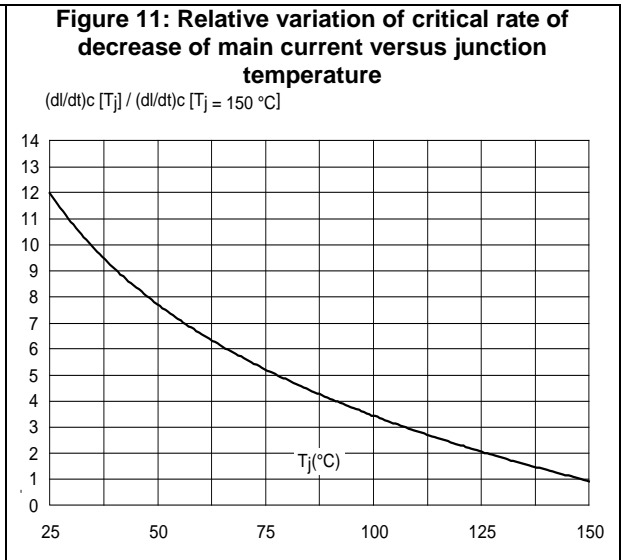
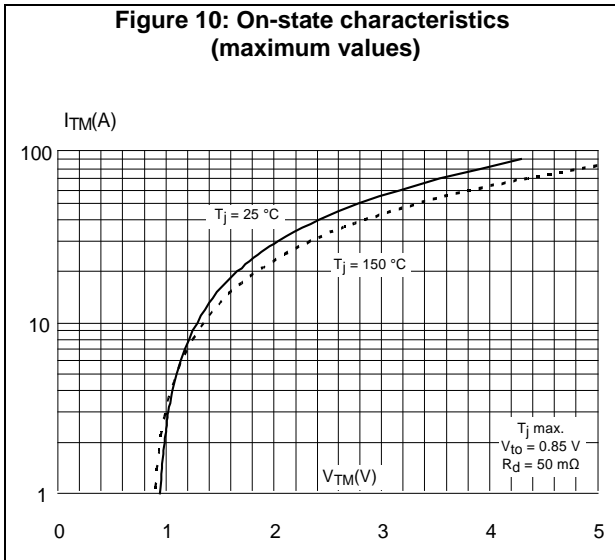
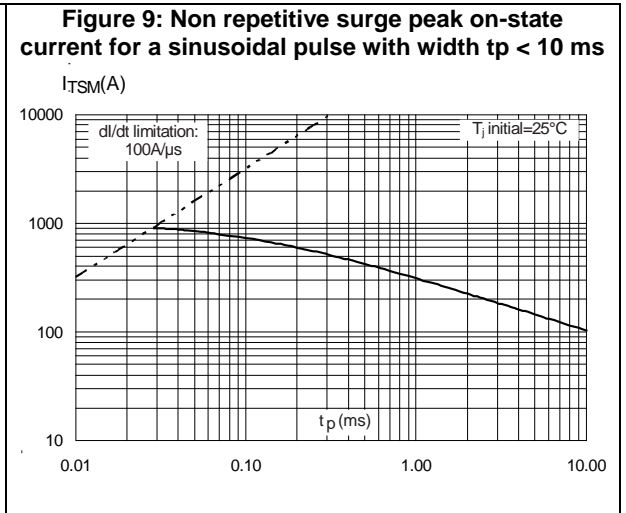
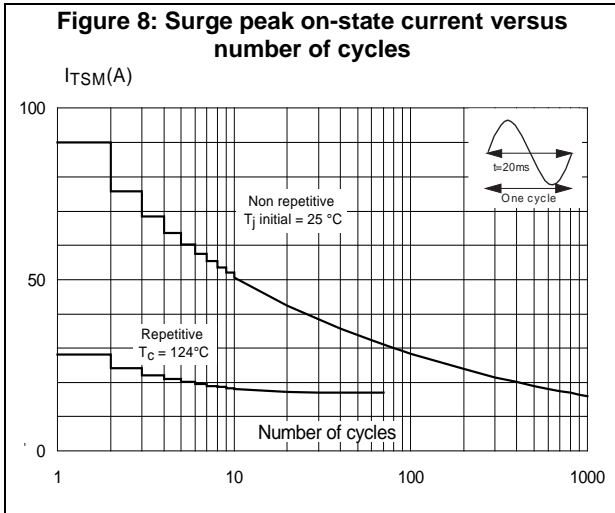
<sup>(1)</sup>For both polarities of A2 referenced to A1.

Table 5: Thermal resistance

Symbol	Parameter			Value	Unit
R <sub>th(j-c)</sub>	Junction to case (AC)	D <sup>2</sup> PAK	Max.	1.6	°C/W

# 1.1 Characteristics (curves)





## 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 UL standard level V0

### 2.1 D<sup>2</sup>PAK package information

Figure 14: D<sup>2</sup>PAK package outline

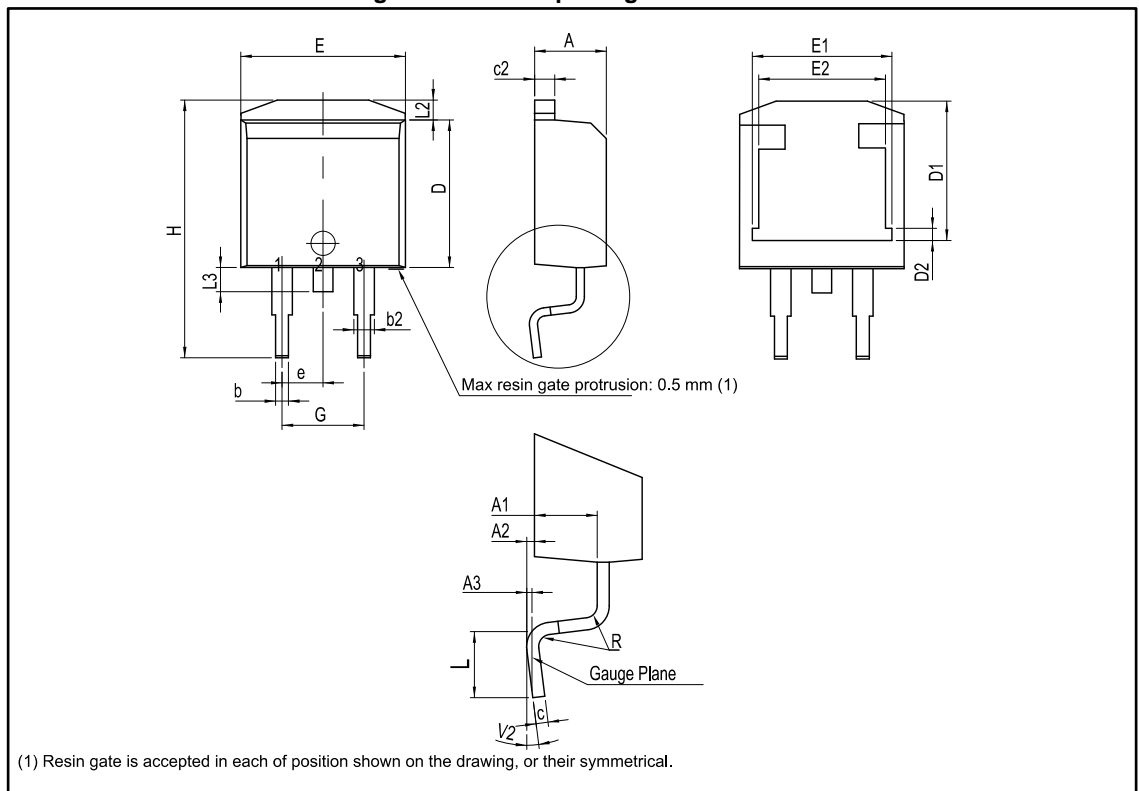


Table 6: D<sup>2</sup>PAK package mechanical data

Ref.	Dimensions					
	Millimeters			Inches <sup>(1)</sup>		
	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:**

<sup>(1)</sup>Dimensions in inches are given for reference only

Figure 15: D<sup>2</sup>PAK recommended footprint (dimensions are in mm)

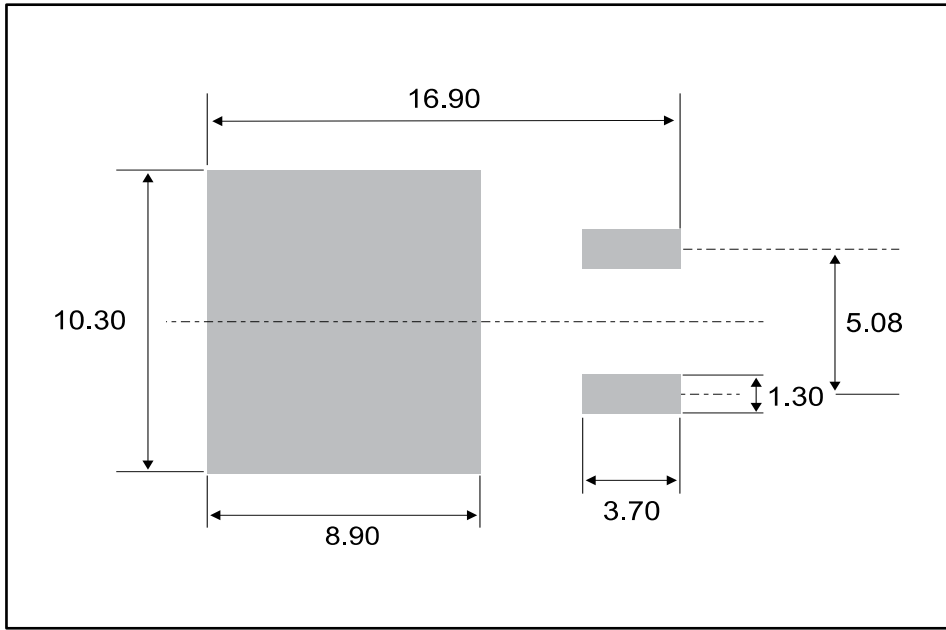
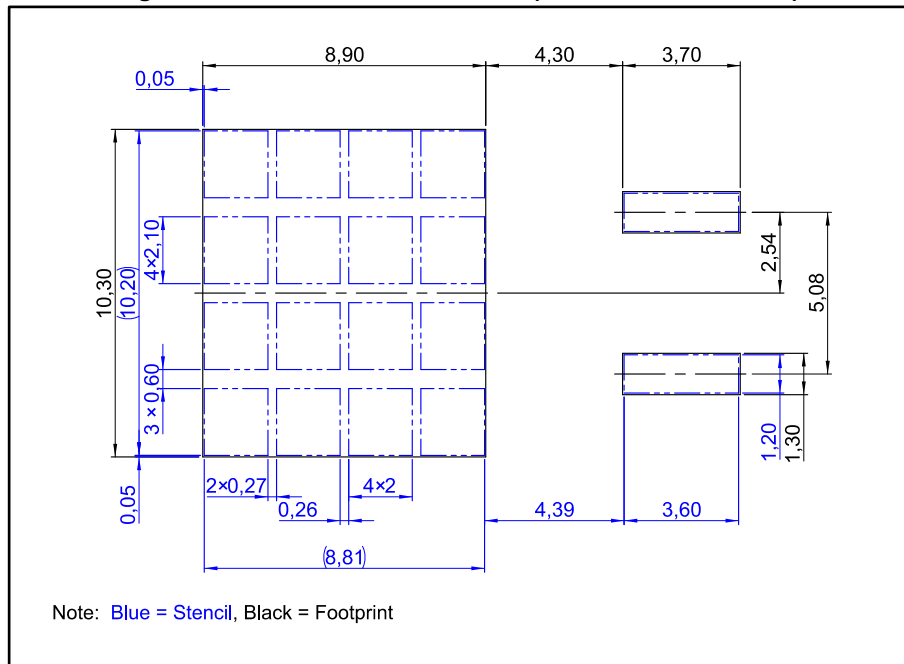


Figure 16: D<sup>2</sup>PAK stencil definitions (dimensions are in mm)





### 3 Ordering information

Figure 17: Ordering information scheme

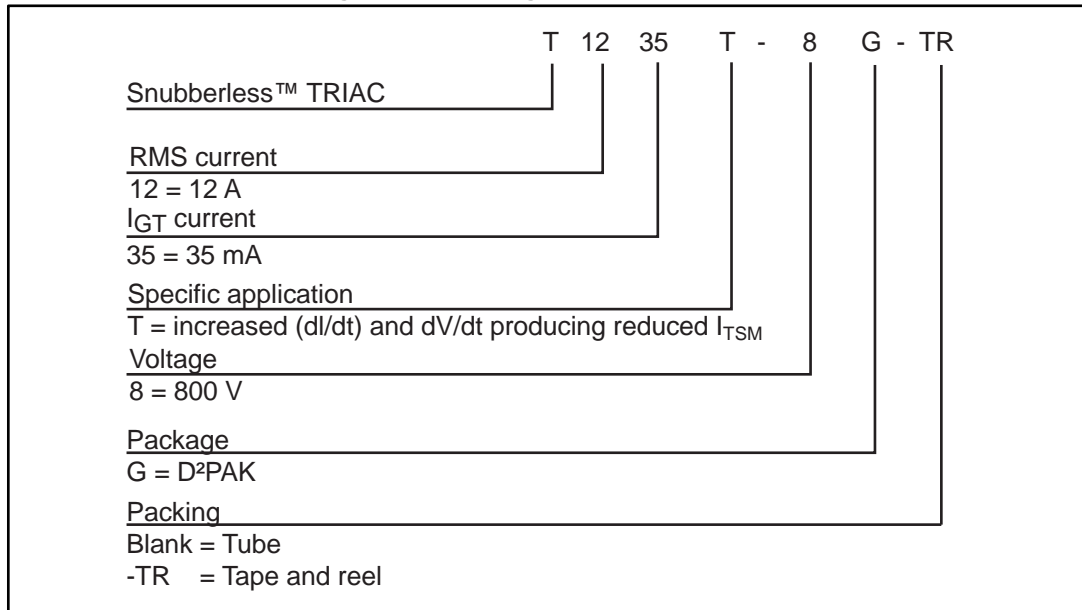


Table 7: Ordering information

Order code	Marking	Package	Weight	Base qty.	Delivery mode
T1235T-8G-TR	T1235T-8G	D <sup>2</sup> PAK	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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