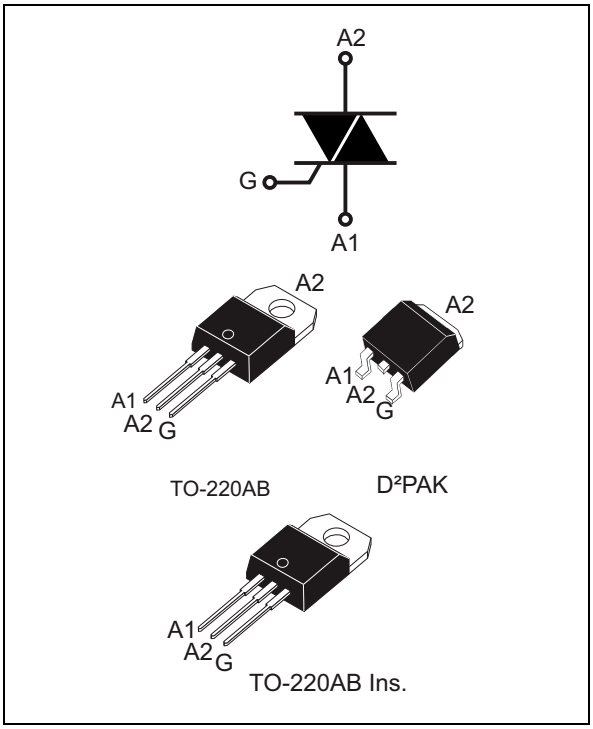
T2550-12x

1200 V 25 A Snubberless™ Triac

Datasheet – production data



Description

Its 1200 V blocking voltage enables use in 3-phase industrial application. Its noise immunity and dynamic commutation makes it suitable for either inductive, capacitive or resistive load control. The T2550-12x is available in three packages: D²PAK, TO-220AB and TO-220AB insulated.

Table 1. Device summary

Order code	Package	V_{DRM}/V_{RRM}	I_{GT}
T2550-12G	D²PAK	1200 V	50 mA
T2550-12T	TO-220AB	1200 V	50 mA
T2550-12I	TO-220AB Ins.	1200 V	50 mA

Features

- On-state current: 25 A
- Blocking voltage: 1200 V
- High static and dynamic commutation
- I_{GT} = 50 mA

Applications

- Industrial motor control circuits
- Industrial heating control circuits

Benefits

- Hight endurance reliability
- Compact high voltage device

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 (180° conduction angle)	D²PAK, TO-220AB	T_c = 100 °C	25	A
		TO-220AB Ins.	T_c = 71°C		
I_{TSM}	Non repetitive surge peak on-state current (T_j initial = 25 °C)		t_p = 16.7 ms	252	A
			t_p = 20 ms	240	
I^2t	I^2t value for fusing		t_p = 10 ms	380	A^2s
V_{RRM}, V_{DRM}	Repetitive peak off-state voltage		T_j = 125 °C	1200	V
dI/dt	Critical rate of rise of on-state current I_G = 2 x I_{GT}, $t_r \leq$ 100 ns	F = 60 Hz	T_j = 125 °C	100	A/µs
I_{GM}	Peak gate current		t_p = 20 µs	4	A
V_{GM}	Peak positive gate voltage		t_p = 20 µs	16	V
$P_{G(AV)}$	Average 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
V_{ins}	Insulation RMS voltage, 1 minute	TO-220AB Ins.		2500	V

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

Symbol	Test conditions	Quadrant	T_j		Value	Unit
I_{GT} (1)	V_D = 12 V, R_L = 33 Ω	I - II - III	25 °C	Min.	2.5	mA
				Max.	50	
V_{GT}	V_D = 12 V, R_L = 33 Ω	I - II - III	25 °C	Max.	1.3	V
V_{GD}	V_D = V_{DRM}, R_L = 3.3 k Ω	I - II - III	125 °C	Min.	0.2	V
I_H (2)	I_T = 500 mA, gate open		25 °C	Max.	60	mA
I_L	I_G = 1.2 I_{GT}	I - II - III	25 °C	Max.	80	mA
dV/dt	V_D = 67% V_{DRM}/V_{RRM}, gate open		125 °C	Min.	2500	V/µs
(dI/dt)c	Without snubber		125 °C	Min.	20	A/ms
t_{gt}	I_{TM} = 13 A, V_D = 400 V, I_G = 100 mA, dI_G/dt = 100 mA/µs, R_L = 30 Ω	I - II - III	25 °C	Typ	2	µs

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} = 35 A, t_p = 380 µs	T_j = 25 °C	Max.	1.55	V
V_{t0} (1)	Threshold voltage	T_j = 125 °C	Max.	0.85	V
R_d (1)	Dynamic resistance	T_j = 125 °C	Max.	20	m Ω
I_{DRM} I_{RRM}	V_{DRM} = V_{RRM} = 1200 V	T_j = 25 °C	Max.	10	µA
		T_j = 125 °C		6	mA

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, TO-220AB	0.8	°C/W
			TO-220AB Ins.	1.7	
$R_{th(j-a)}$	Junction to ambient		TO-220AB, TO-220AB Ins.	60	°C/W
		S = 1 cm²	D²PAK	45	

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

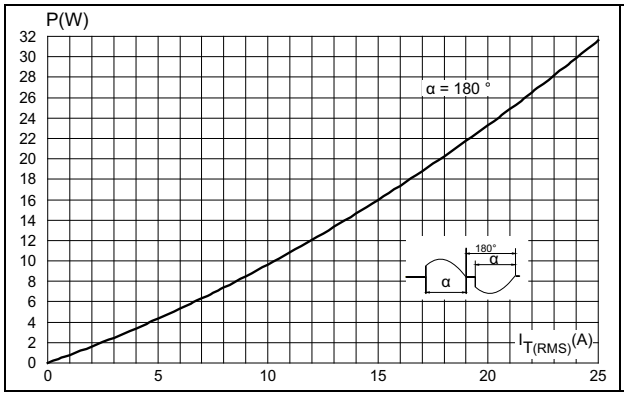


Figure 2. On-state RMS current versus case temperature

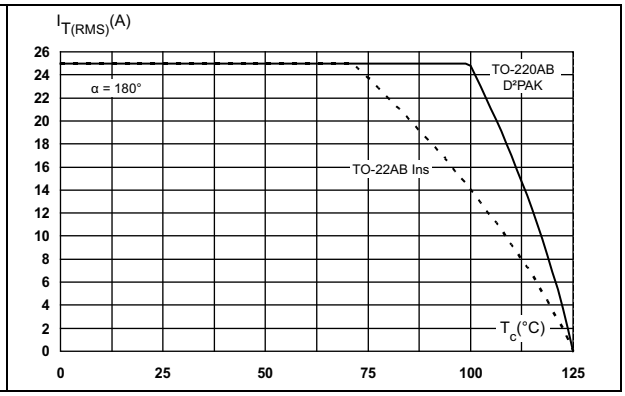


Figure 3. On-state RMS current versus ambient temperature (free air convection)

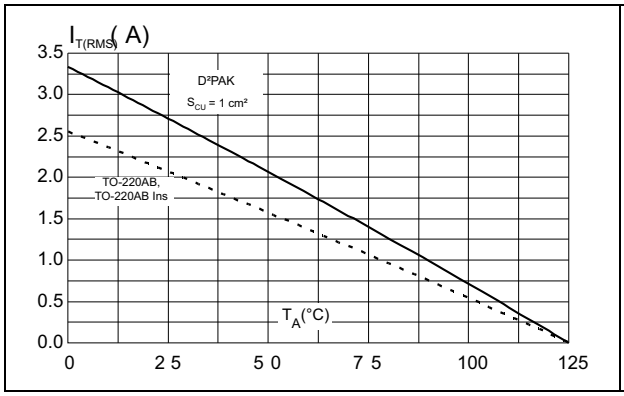


Figure 4. Surge peak on-state current versus number of cycles

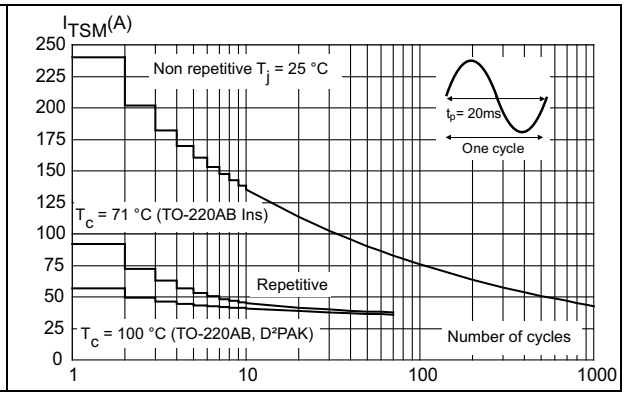


Figure 5. Relative variation of thermal impedance versus pulse duration (T2550-12I)

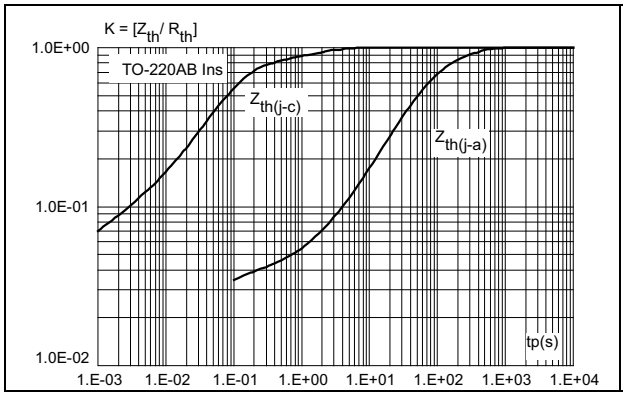


Figure 6. Relative variation of thermal impedance versus pulse duration

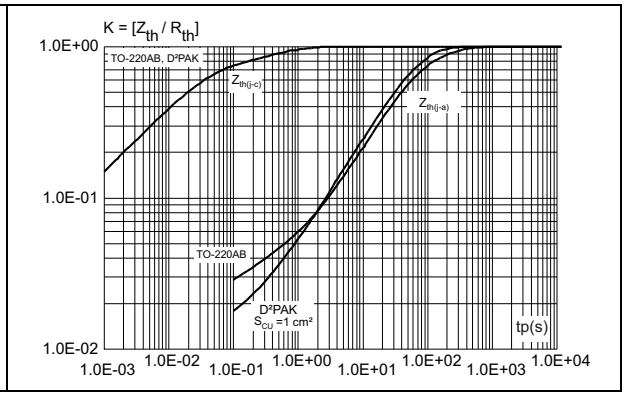


Figure 7. Relative variation of gate trigger current and gate voltage versus junction temperature (typical values)

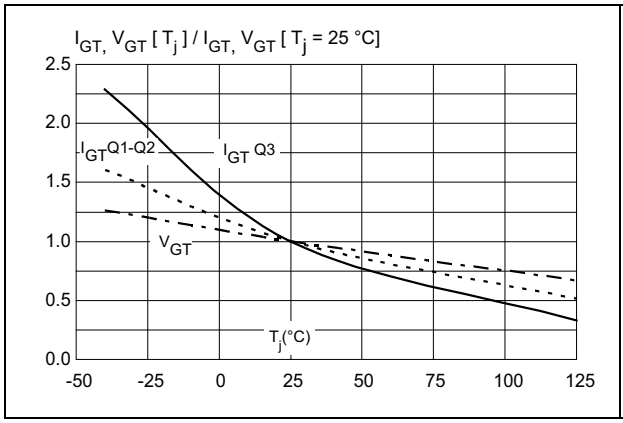


Figure 8. Relative variation of holding current and latching current versus junction temperature (typical values)

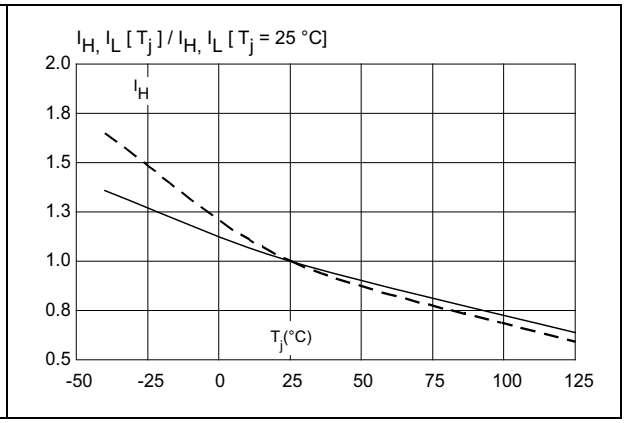


Figure 9. Relative variation of critical rate of decrease of main current versus junction temperature (typical values)

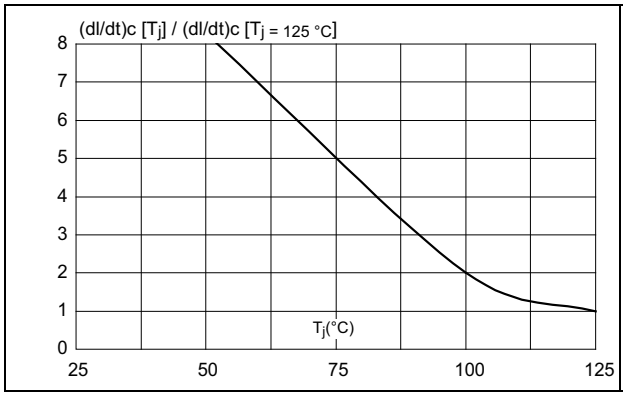


Figure 10. Relative variation of critical rate of decrease of main current versus reapplied dV/dt

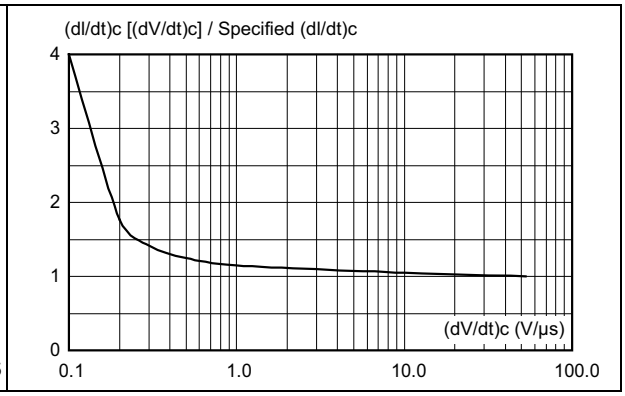


Figure 11. Non repetitive surge peak on-state current for a sinusoidal pulse with width tp<10 ms

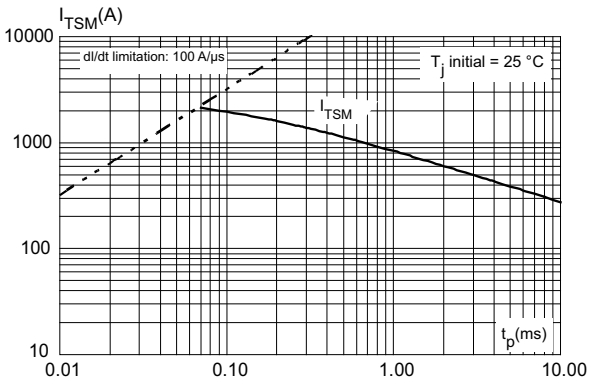


Figure 12. On-state characteristics (maximum values)

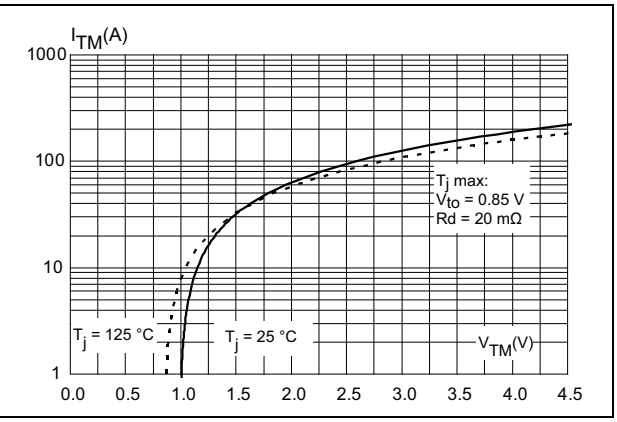


Figure 13. Relative variation of leakage current versus junction temperature for different values of blocking voltage (typical values)

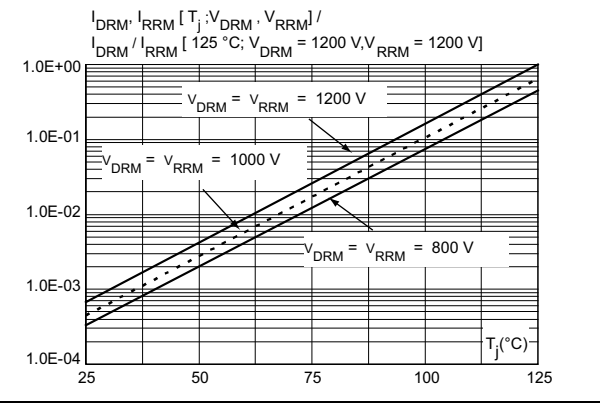
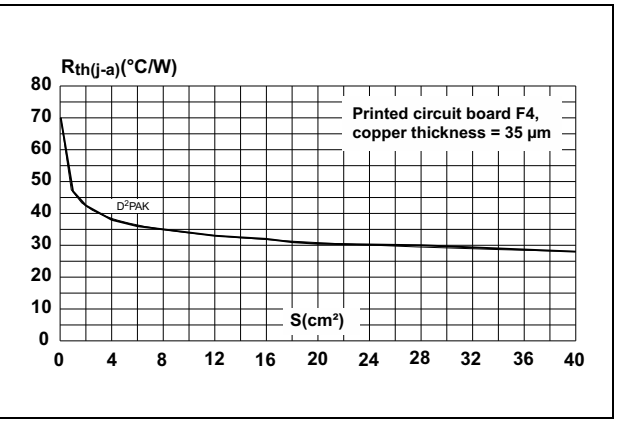


Figure 14. D²PAK thermal resistance junction to ambient versus copper surface under tab



2 Package information

- Epoxy meets UL94, V0
- Lead-free package leads, halogen-free molding resin
- 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.

2.1 TO-220AB (insulated and non-insulated) information

Figure 15. TO-220AB (insulated and non-insulated) package outline

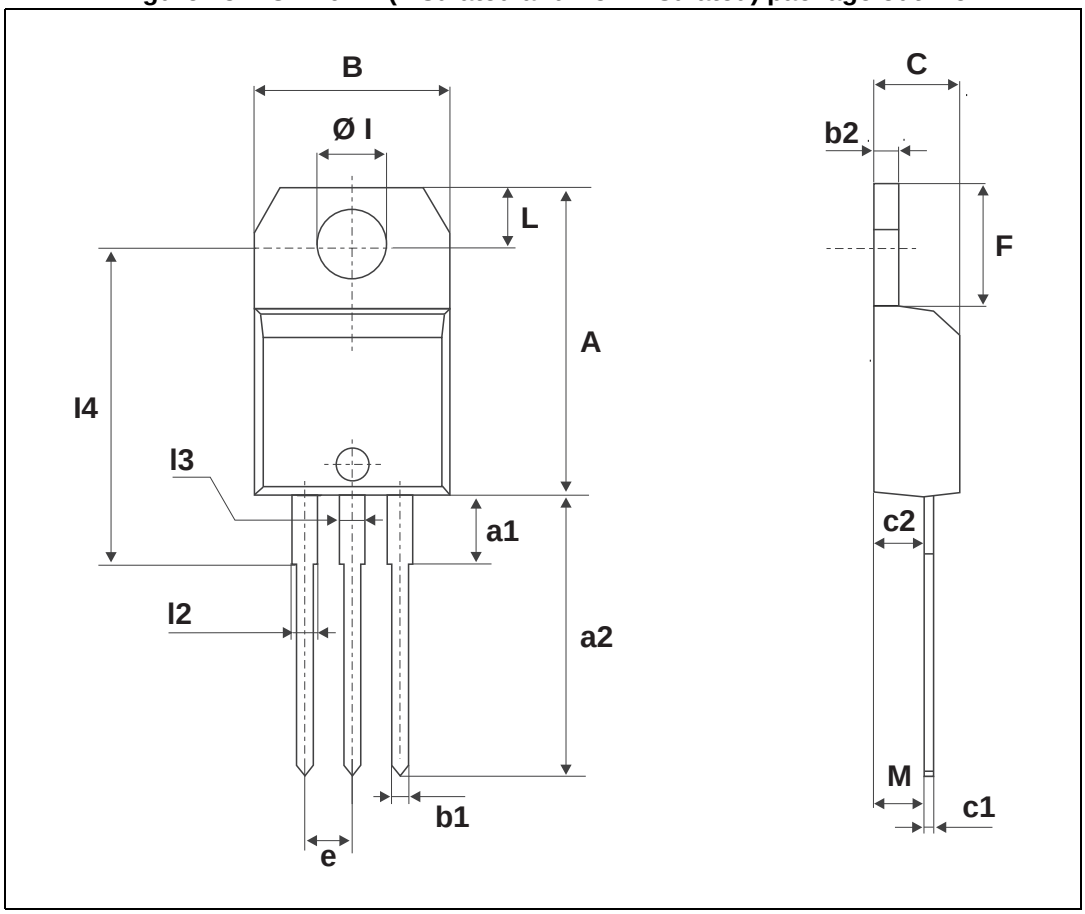


Table 6. TO-220AB (insulated and non-insulated) package mechanical data

Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	15.20		15.90	0.5984		0.6259
a1		3.75			0.1476	
a2	13.00		14.00	0.5118		0.5511
B	10.00		10.40	0.3937		0.4094
b1	0.61		0.88	0.0240		0.0346
b2	1.23		1.32	0.0484		0.0519
C	4.40		4.60	0.1732		0.1811
c1	0.49		0.70	0.0192		0.0275
c2	2.40		2.72	0.0944		0.1070
e	2.40		2.70	0.0944		0.1062
F	6.20		6.60	0.2440		0.2598
ØI	3.73		3.88	0.1468		0.1527
l4	15.80	16.40	16.80	0.6220	0.6456	0.6614
L	2.65		2.95	0.1043		0.1161
l2	1.14		1.70	0.0448		0.0669
l3	1.14		1.70	0.0448		0.0669
M		2.60			0.1023	

2.2 D²PAK package information

Figure 16. D²PAK package outline

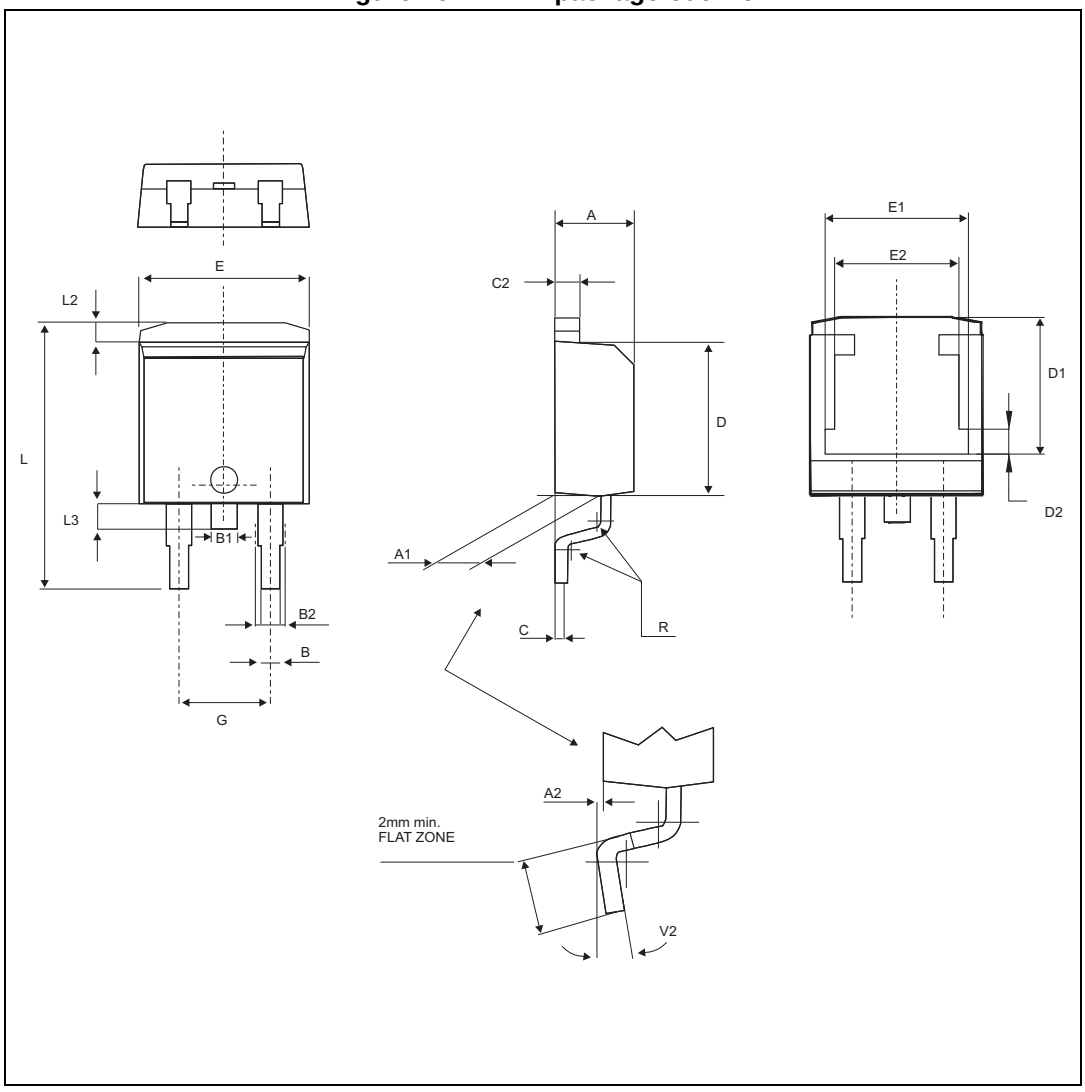
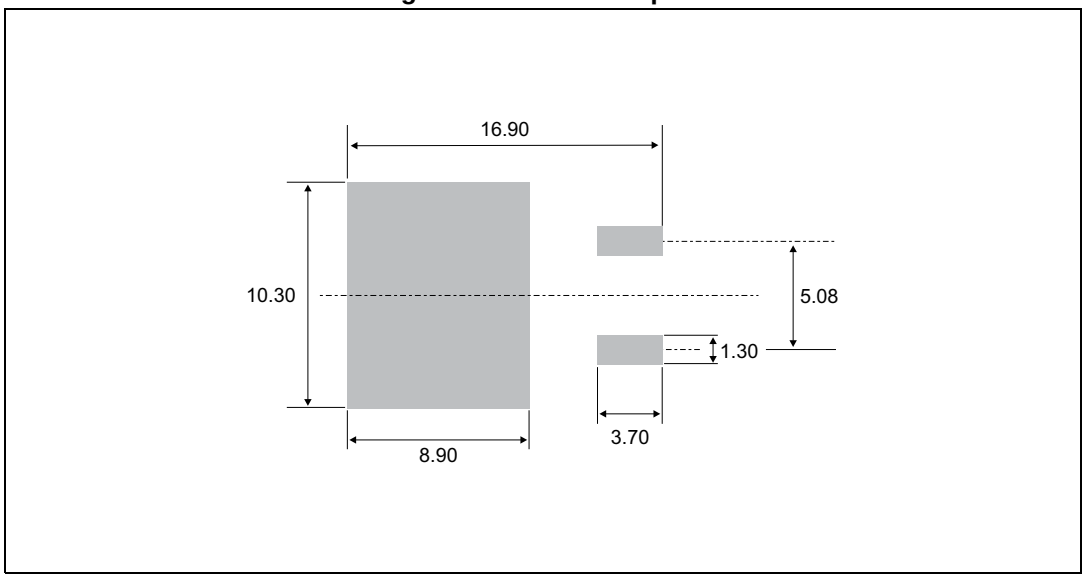


Table 7. D²PAK package mechanical data

Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	4.30		4.60	0.1692		0.1811
A1	2.49		2.69	0.0980		0.1059
A2	0.03		0.23	0.0011		0.0090
B	0.70		0.93	0.0275		0.0366
B2	1.25	1.40		0.0492	0.0551	
C	0.45		0.60	0.0177		0.0236
C2	1.21		1.36	0.0476		0.0535
D	8.95		9.35	0.3523		0.3681
D1	7.5		8.0	0.295		0.314
D2	1.3		1.7	0.051		0.066
E	10.00		10.28	0.3937		0.4047
E1	8.3		8.7	0.326		0.342
E2	6.85		7.25	0.2696		0.2854
G	4.88		5.28	0.1921		0.2078
L	15.00		15.85	0.5905		0.6240
L2	1.27		1.40	0.05		0.0551
L3	1.40		1.75	0.0551		0.0688
R	0.40			0.0157		
V2	0°		8°	0°		8°

Figure 17. D²PAK footprint



3 Ordering information

Figure 18. Ordering information scheme

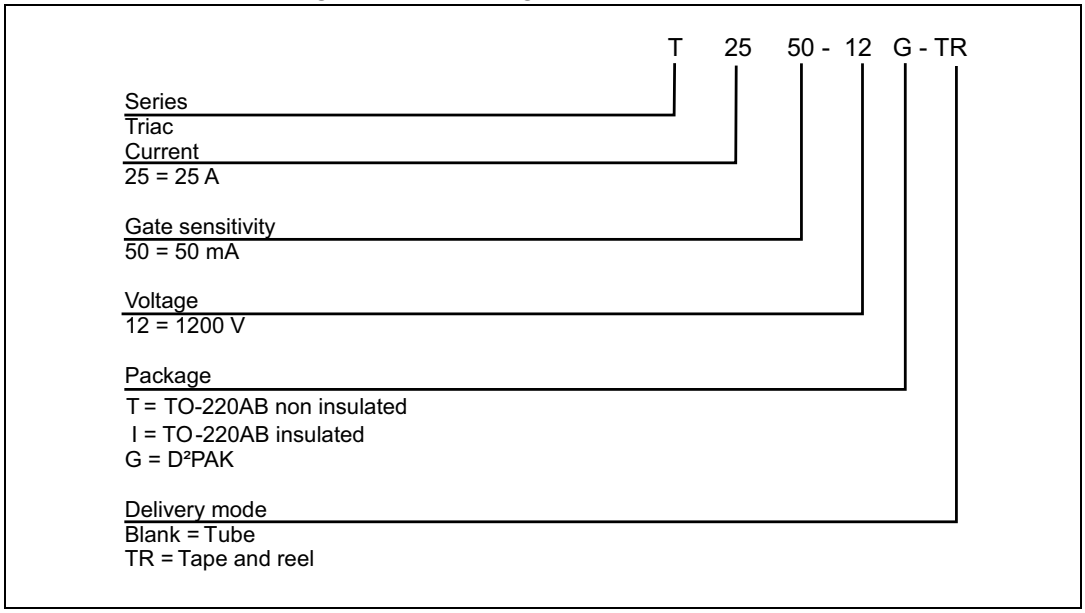


Table 8. Ordering information

Order code	Marking	Package	Weight	Base qty	Delivery mode
T2550-12G	T2550-12G	D²PAK	1.5 g	50	Tube
T2550-12G-TR			1.5 g	1000	Tape and reel 13”
T2550-12T	T2550-12T	TO-220AB	2.3	50	Tube
T2550-12I	T2550-12I	TO-220AB Ins.	2.3 g	50	Tube

4 Revision history

Table 9. Document revision history

Date	Revision	Changes
09-Jan-2014	1	Initial release.
30-Jan-2014	2	Updated Table 4.
10-Dec-2015	3	Inserted TO-220AB insulated package information and reformatted to current standard.