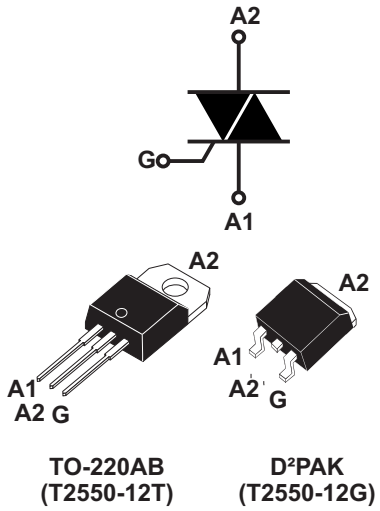
T2550-12T, T2550-12G

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 for inductive, capacitive or resistive load control. The T2550-12 is available in two packages: D²PAK and TO-220AB.

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

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

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
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

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	T_j = 25 °C	Min.	2.5	mA
				Max.	50	
V_{GT}	V_D = 12 V, R_L = 33 Ω	I - II - III	T_j = 25 °C	Max.	1.3	V
V_{GD}	V_D = V_{DRM}, R_L = 3.3 kΩ , T_j = 125 °C	I - II - III	T_j = 125 °C	Min.	0.2	V
I_H (2)	I_T = 500 mA, gate open		T_j = 25 °C	Max.	60	mA
I_L	I_G = 1.2 I_{GT}	I - II - III	T_j = 25 °C	Max.	80	mA
dV/dt	V_D = 67% V_{DRM}/V_{RRM}, gate open		T_j = 125 °C	Min.	2500	V/µs
(dI/dt)c	Without snubber		T_j = 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	T_j = 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
$R_{th(j-a)}$	Junction to ambient (AC)		TO-220AB	60	°C/W
		S = 1 cm²	D²PAK	45	

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

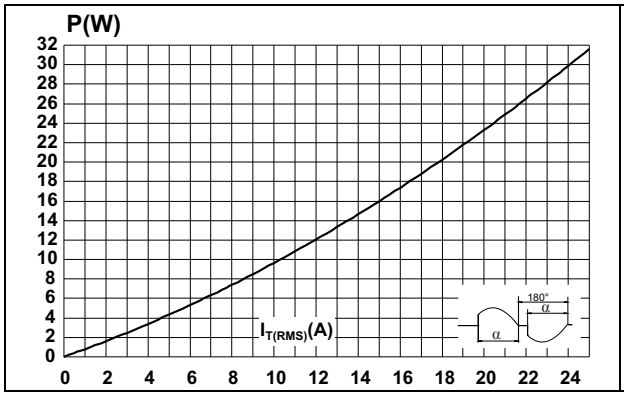


Figure 2. On-state rms current versus case temperature

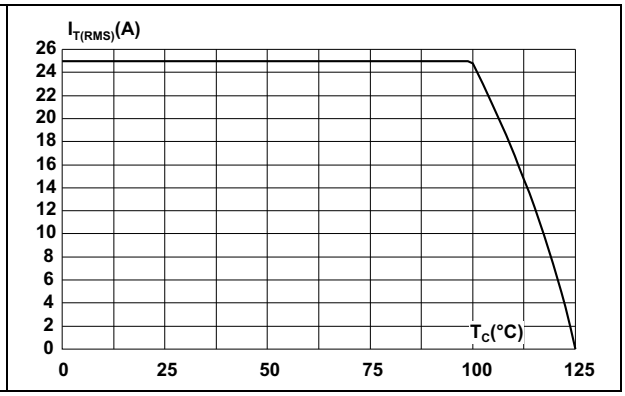


Figure 3. On-state rms current versus ambient temperature (free air convection)

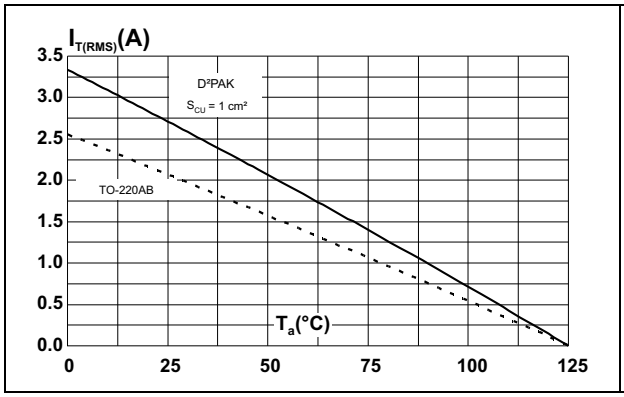


Figure 4. Relative variation of thermal impedance versus pulse duration

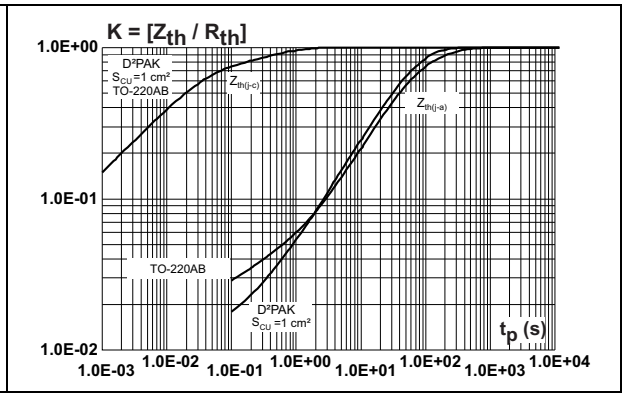


Figure 5. Relative variation of gate trigger current and gate voltage versus junction temperature (typical values)

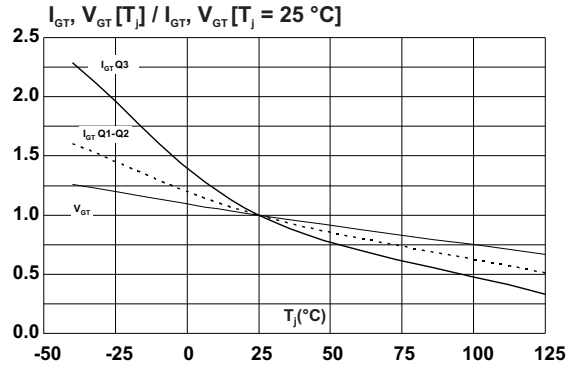


Figure 6. Relative variation of holding current and latching current versus junction temperature (typical values)

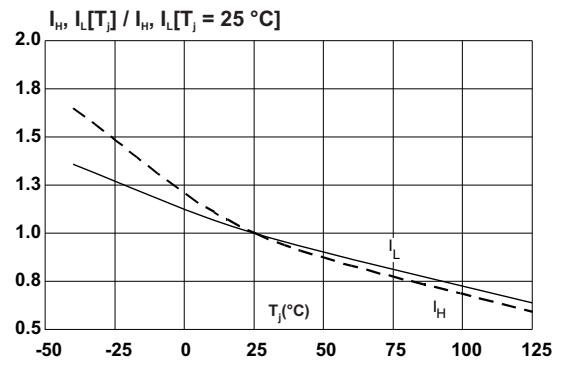


Figure 7. Relative variation of critical rate of decrease of current (dI/dt)c versus junction temperature (typical values)

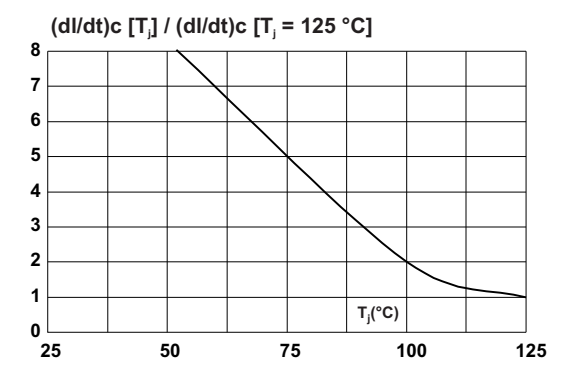


Figure 8. Relative variation of critical rate of decrease of current (dI/dt)c versus reapplied (dV/dt)

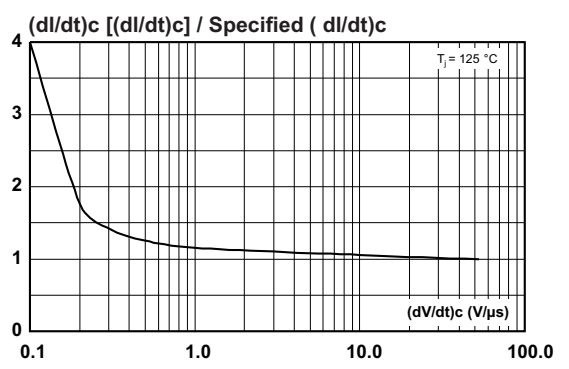


Figure 9. Surge peak on-state current versus number of cycles

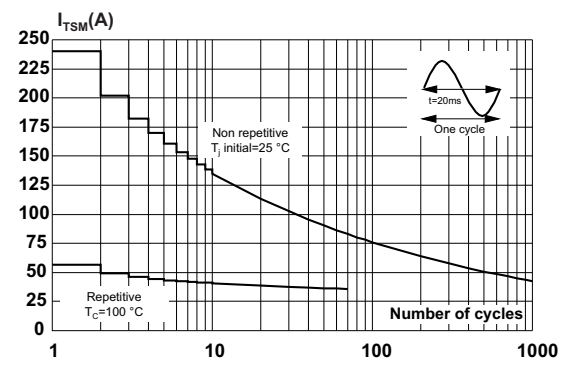


Figure 10. Non repetitive surge peak on-state current and corresponding values of I^2t

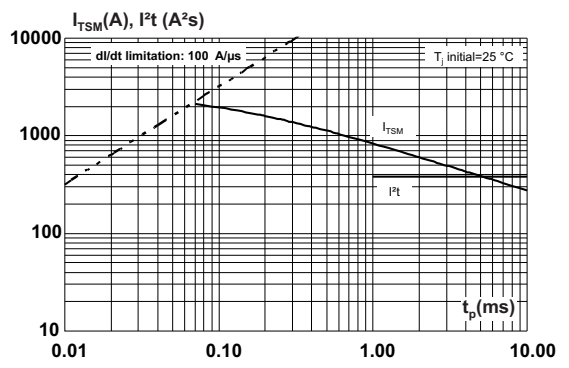


Figure 11. On-state characteristics (maximum values)

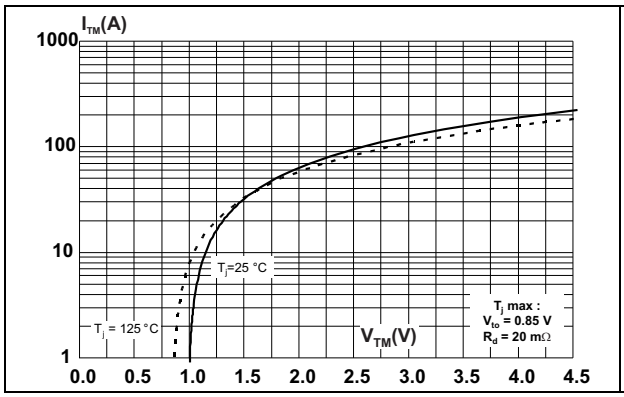


Figure 12. Relative variation of leakage current versus junction temperature for different values of blocking voltage (typical values)

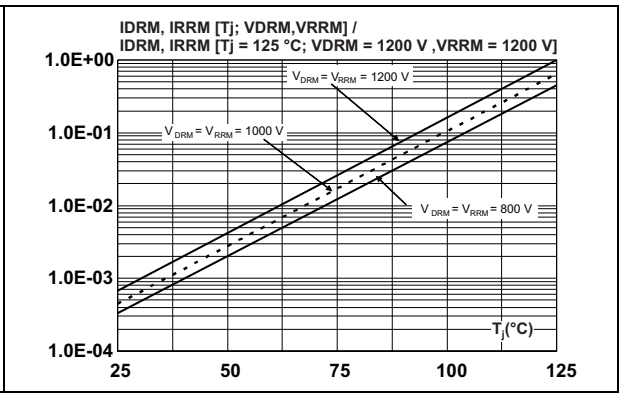
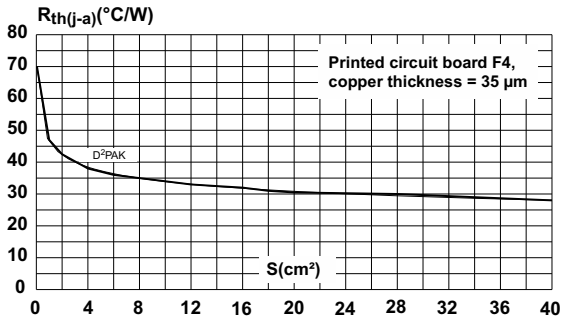


Figure 13. D²PAK thermal resistance junction to ambient versus copper surface under tab



2 Package information

- Epoxy meets UL94, V0
- Lead-free package
- Recommended torque: 0.4 to 0.6 N·m

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Figure 14. TO-220AB dimension definitions

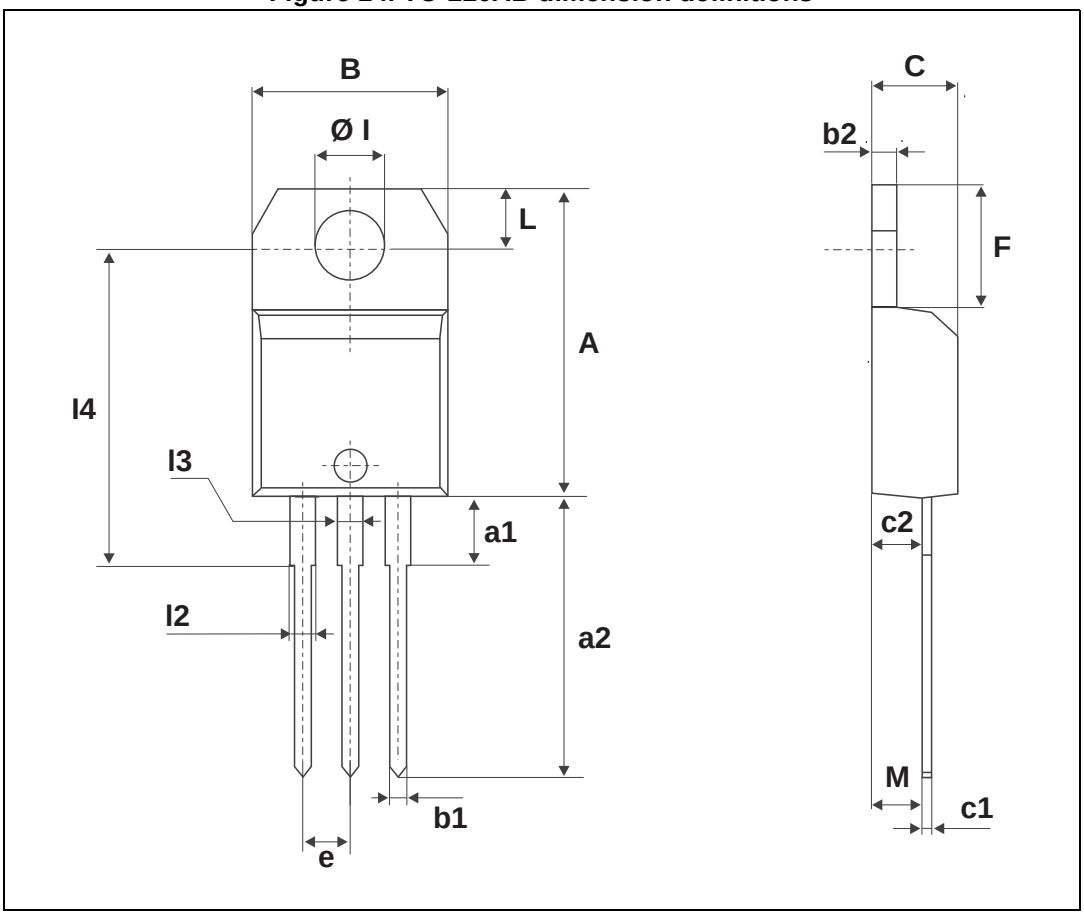


Table 6. TO-220AB dimension values

Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	15.20		15.90	0.598		0.625
a1		3.75			0.147	
a2	13.00		14.00	0.511		0.551
B	10.00		10.40	0.393		0.409
b1	0.61		0.88	0.024		0.034
b2	1.23		1.32	0.048		0.051
C	4.40		4.60	0.173		0.181
c1	0.49		0.70	0.019		0.027
c2	2.40		2.72	0.094		0.107
e	2.40		2.70	0.094		0.106
F	6.20		6.60	0.244		0.259
ØI	3.75		3.85	0.147		0.151
l4	15.80	16.40	16.80	0.622	0.646	0.661
L	2.65		2.95	0.104		0.116
l2	1.14		1.70	0.044		0.066
l3	1.14		1.70	0.044		0.066
M		2.60			0.102	

Figure 15. D²PAK dimension definitions

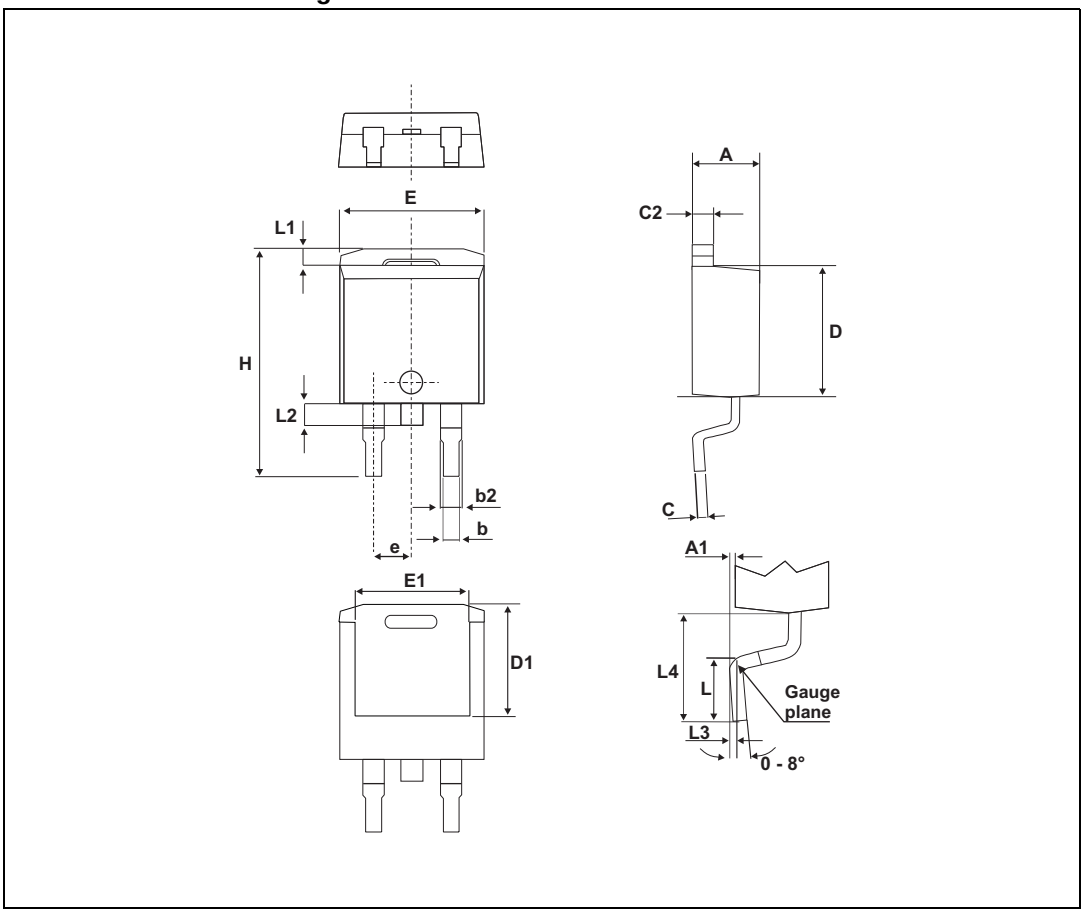
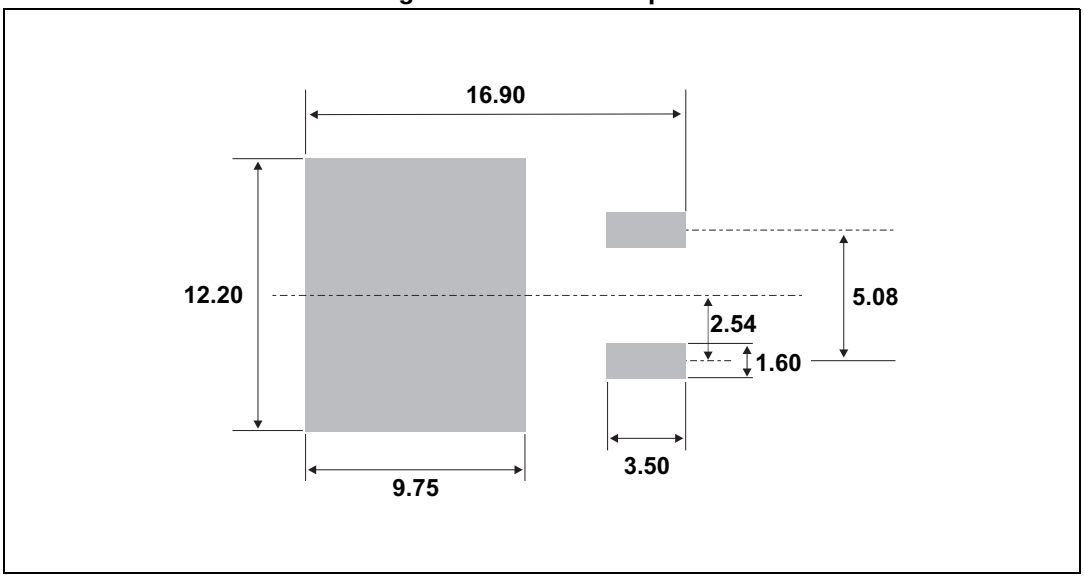


Table 7. D²PAK dimension values

Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	4.30		4.60	0.169		0.181
A1	2.49		2.69	0.098		0.106
A2	0.03		0.23	0.001		0.009
B	0.70		0.93	0.027		0.037
B2	1.25	1.40		0.048	0.055	
C	0.45		0.60	0.017		0.024
C2	1.21		1.36	0.047		0.054
D	8.95		9.35	0.352		0.368
E	10.00		10.28	0.393		0.405
G	4.88		5.28	0.192		0.208
L	15.00		15.85	0.590		0.624
L2	1.27		1.40	0.050		0.055
L3	1.40		1.75	0.055		0.069
R	0.40			0.016		
V2	0°		8°	0°		8°

Figure 16. D²PAK footprint



3 Ordering information

Figure 17. Ordering information scheme

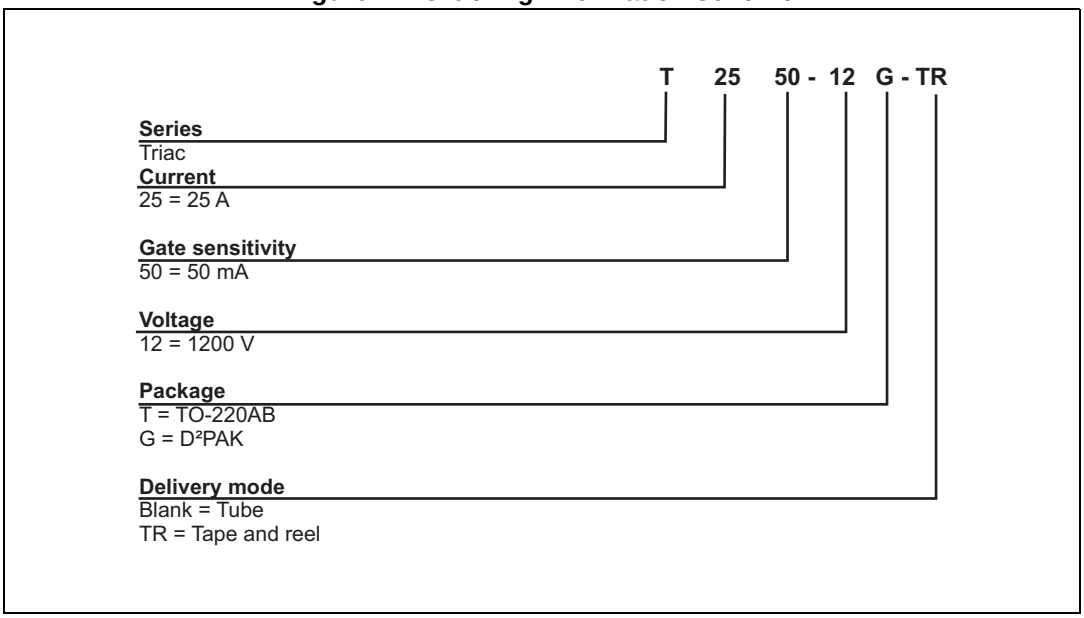


Table 8. Ordering information

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

4 Revision history

Table 9. Document revision history

Date	Revision	Changes
09-Jan-2014	1	Initial release.
30-Jan-2014	2	Updated *Table 4*.

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