

1 Characteristics

Table 2. Absolute ratings (limiting values)

Symbol	Parameter			Value	Unit
$I_{T(RMS)}$	On-state rms current (180 °Conduction angle)	TO-220AB, D ² PAK	$T_c = 100\text{ °C}$	25	A
		TO-220AB ins	$T_c = 83\text{ °C}$		
$I_{T(AV)}$	Average on-state current (180 °Conduction angle)		$T_c = 100\text{ °C}$	16	A
I_{TSM}	Non repetitive surge peak on-state current	$t_p = 8.3\text{ ms}$	$T_j = 25\text{ °C}$	314	A
		$t_p = 10\text{ ms}$		300	
I^2t	I^2t Value for fusing	$t_p = 10\text{ ms}$	$T_j = 25\text{ °C}$	450	A ² s
di/dt	Critical rate of rise of on-state current $I_G = 2 \times I_{GT}$, $t_r \leq 100\text{ ns}$	$F = 60\text{ Hz}$	$T_j = 125\text{ °C}$	50	A/ μ s
I_{GM}	Peak gate current	$t_p = 20\text{ }\mu$ s	$T_j = 125\text{ °C}$	4	A
$P_{G(AV)}$	Average gate power dissipation		$T_j = 125\text{ °C}$	1	W
T_{stg} T_j	Storage junction temperature range Operating junction temperature range			- 40 to + 150 - 40 to + 125	°C
V_{RGM}	Maximum peak reverse gate voltage			5	V

Table 3. Electrical Characteristics ($T_j = 25\text{ °C}$, unless otherwise specified)

Symbol	Test conditions			Value	Unit	
I _{GT}	V _D = 12 V R _L = 33 Ω		MIN.	4	mA	
			MAX.	40		
V _{GT}			MAX.	1.3	V	
V _{GD}	V _D = V _{DRM} R _L = 3.3 kΩ	T _j = 125 °C	MIN.	0.2	V	
I _H	I _T = 500 mA Gate open		MAX.	50	mA	
I _L	I _G = 1.2 x I _{GT}		MAX.	90	mA	
dV/dt	V _D = 67% V _{DRM} Gate open	T _j = 125 °C	MIN.	1500	V/μs	
V _{TM}	I _{TM} = 50 A tp = 380 μs	T _j = 25 °C	MAX.	1.6	V	
V _{th}	Threshold voltage		T _j = 125 °C	MAX.	0.77	V
R _d	Dynamic resistance		T _j = 125 °C	MAX.	14	mΩ
I _{DRM} I _{RRM}	V _{DRM} = V _{RRM}	T _j = 25 °C	MAX.	5	μA	
		T _j = 125 °C		4	mA	

Table 4. Thermal resistances

Symbol	Parameter		Value	Unit
$R_{th(j-c)}$	Junction to case (DC)	D ² PAK, TO-220AB	1.0	°C/W
		TO-220AB ins	2.0	
$R_{th(j-a)}$	Junction to ambient (DC)	$S^{(1)} = 1\text{ cm}^2$ D ² PAK	45	°C/W
		TO-220AB, TO-220AB ins	60	

1. S = Copper surface under tab.

Figure 1. Maximum average power dissipation versus average on-state current

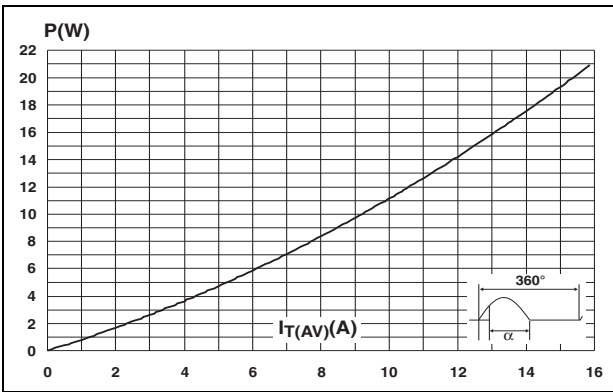


Figure 2. Average and DC on-state current versus case temperature

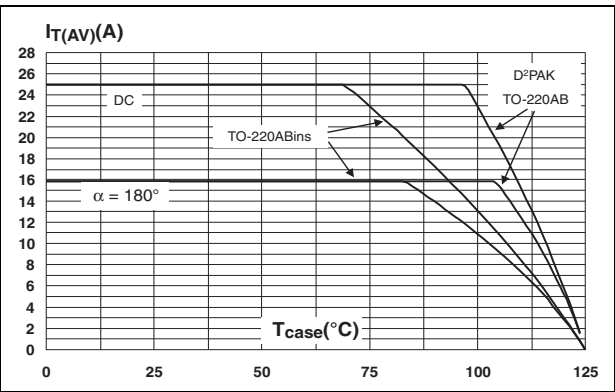


Figure 3. Average and DC on-state current versus ambient temperature

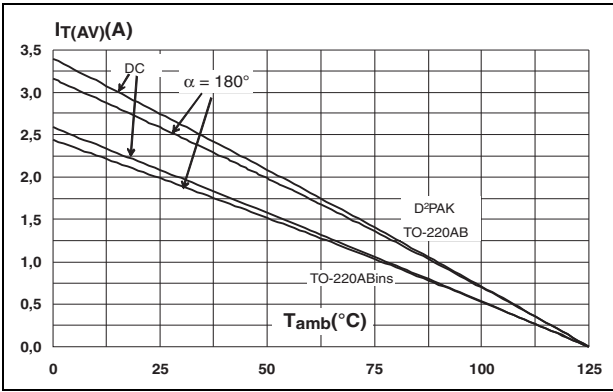


Figure 4. Relative variation of thermal impedance versus pulse duration (D²PAK, and TO-220AB)

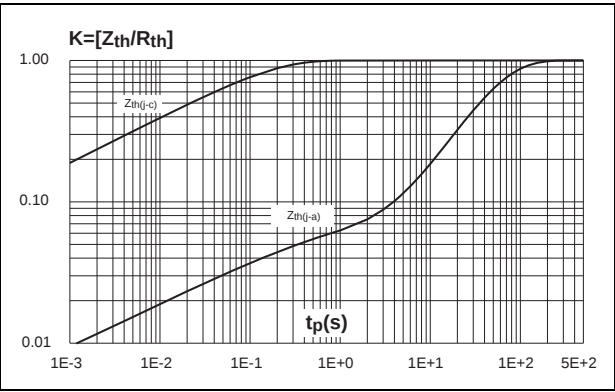


Figure 5. Relative variation of thermal impedance versus pulse duration (TO-220AB ins)

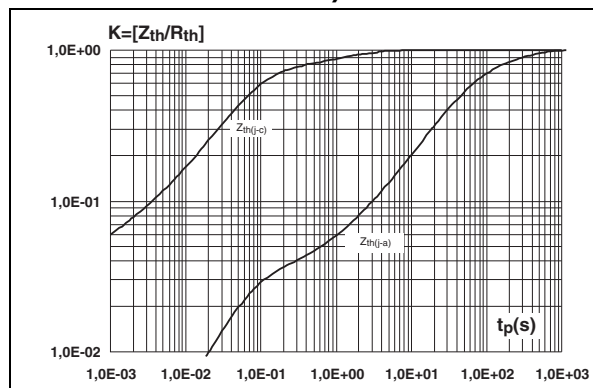


Figure 6. Relative variation of gate trigger, holding, and latching currents versus junction temperature

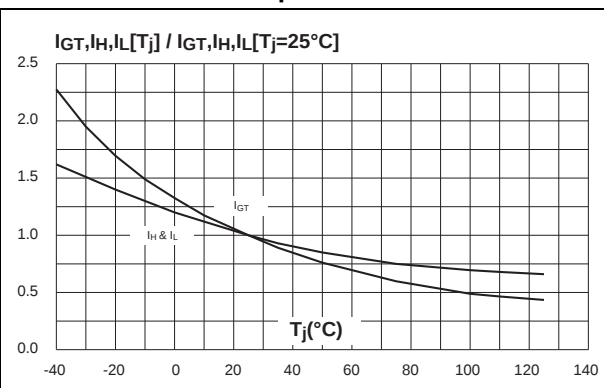


Figure 7. Surge peak on-state current versus number of cycles

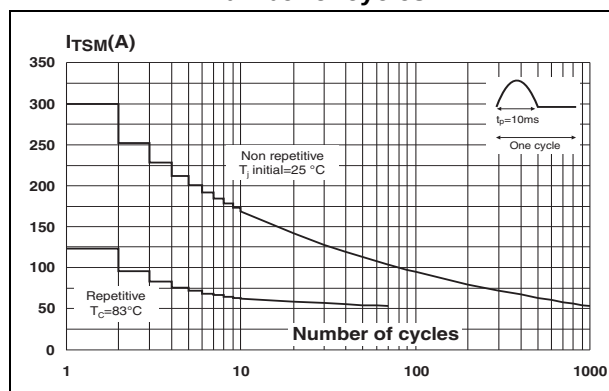


Figure 8. Non-repetitive surge peak on-state current, and corresponding values of I^2t

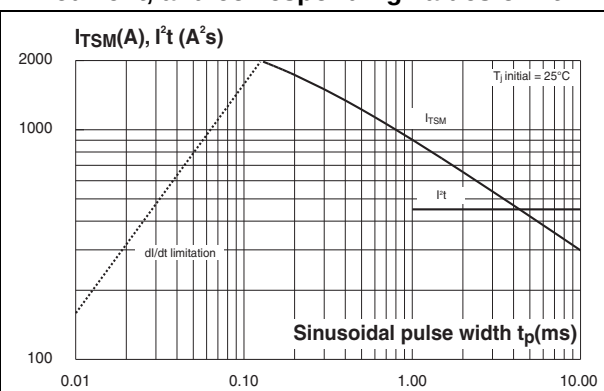


Figure 9. On-state characteristics (maximum values)

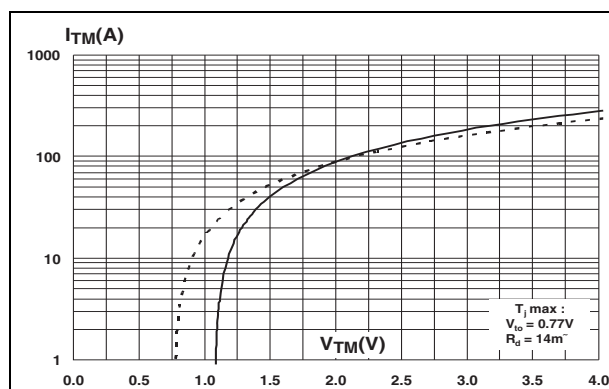
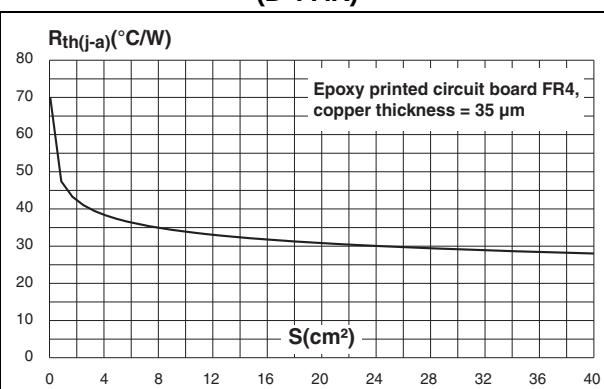


Figure 10. Thermal resistance junction to ambient versus copper surface under tab (D^2PAK)



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Ordering information schemes

Figure 11. TN2540-x00G ordering information scheme

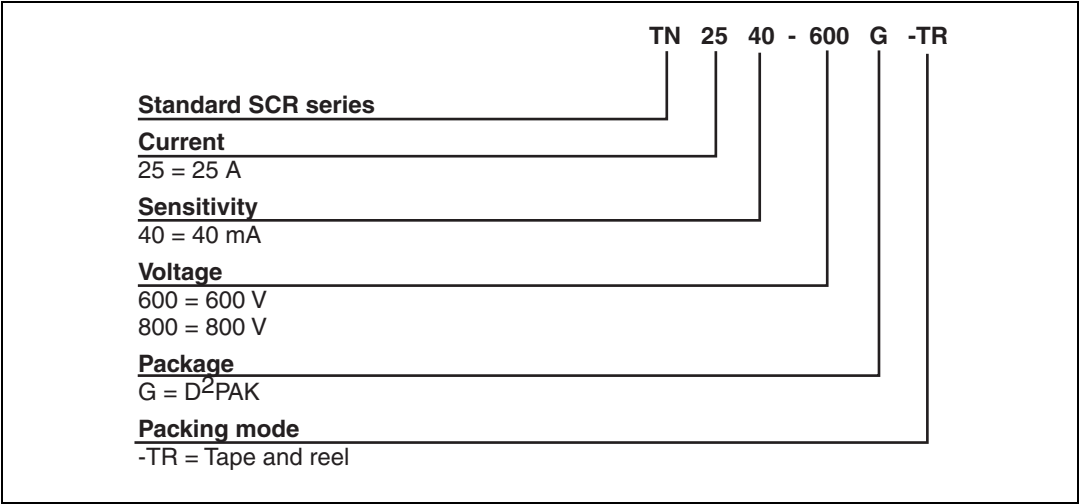


Figure 12. TXN625RG ordering information scheme

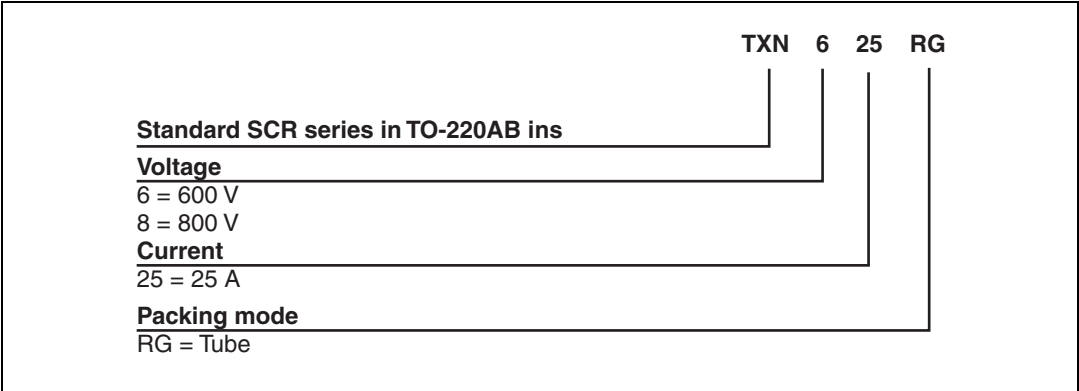
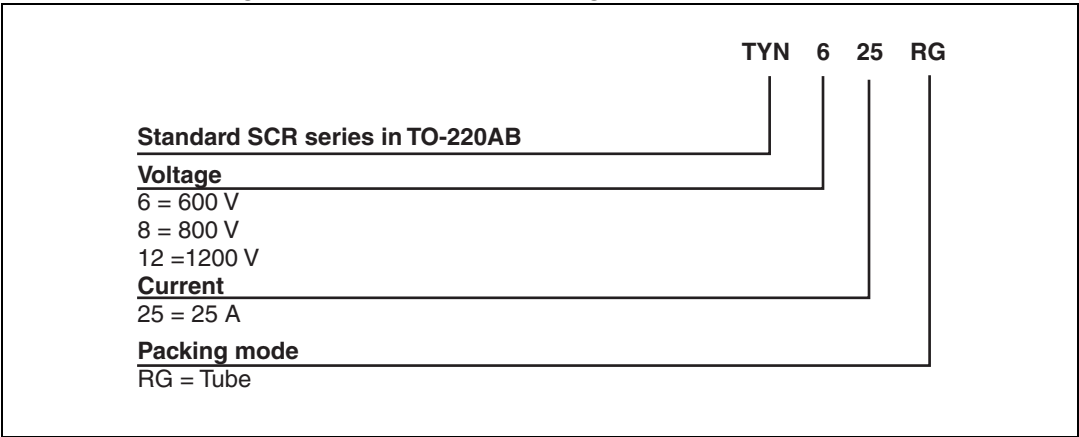


Figure 13. TYNx25RG ordering information scheme



3 Package information

- Epoxy meets UL94, V0
- Lead-free package
- Recommended torque values (TO-220AB, and TO220AB ins): 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-220AB (NIns. & Ins. 20-up) dimension definitions

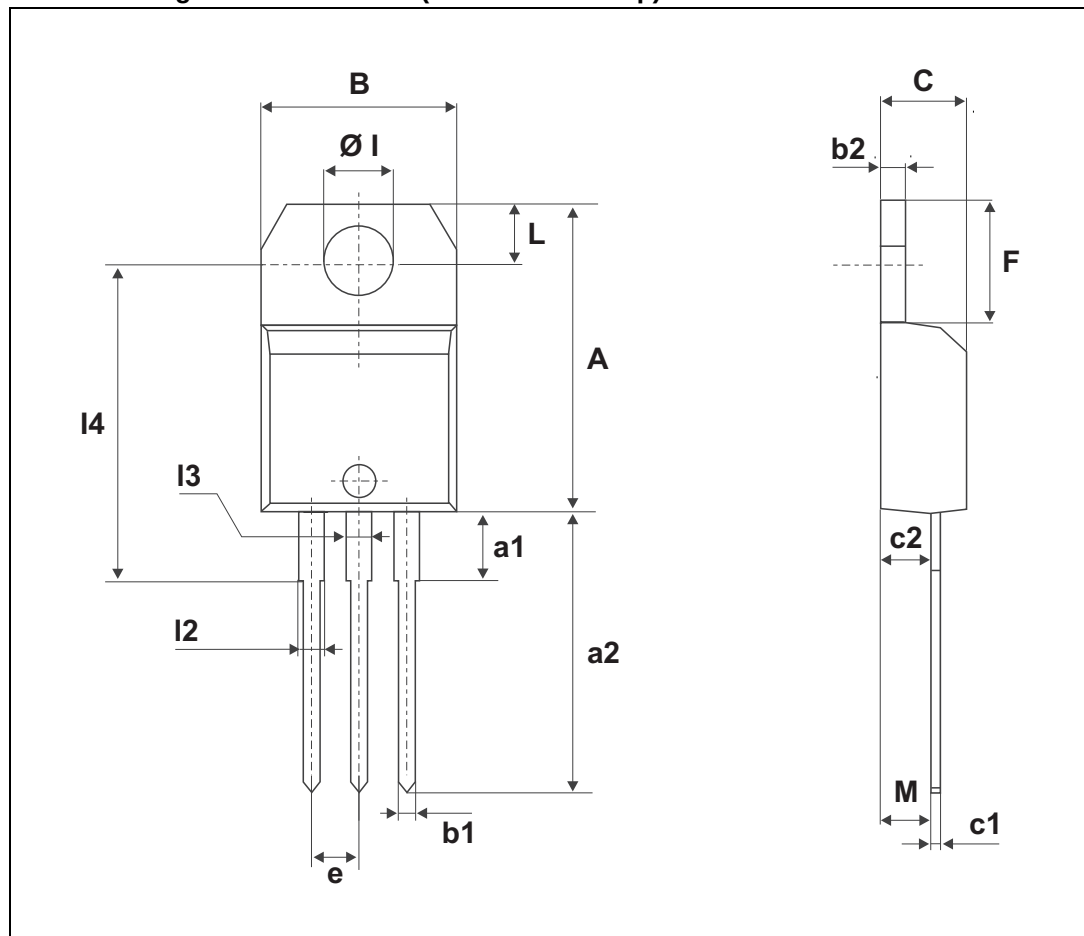


Table 5. TO-220AB (NIns. & Ins. 20-up) dimension values

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		2.70	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	

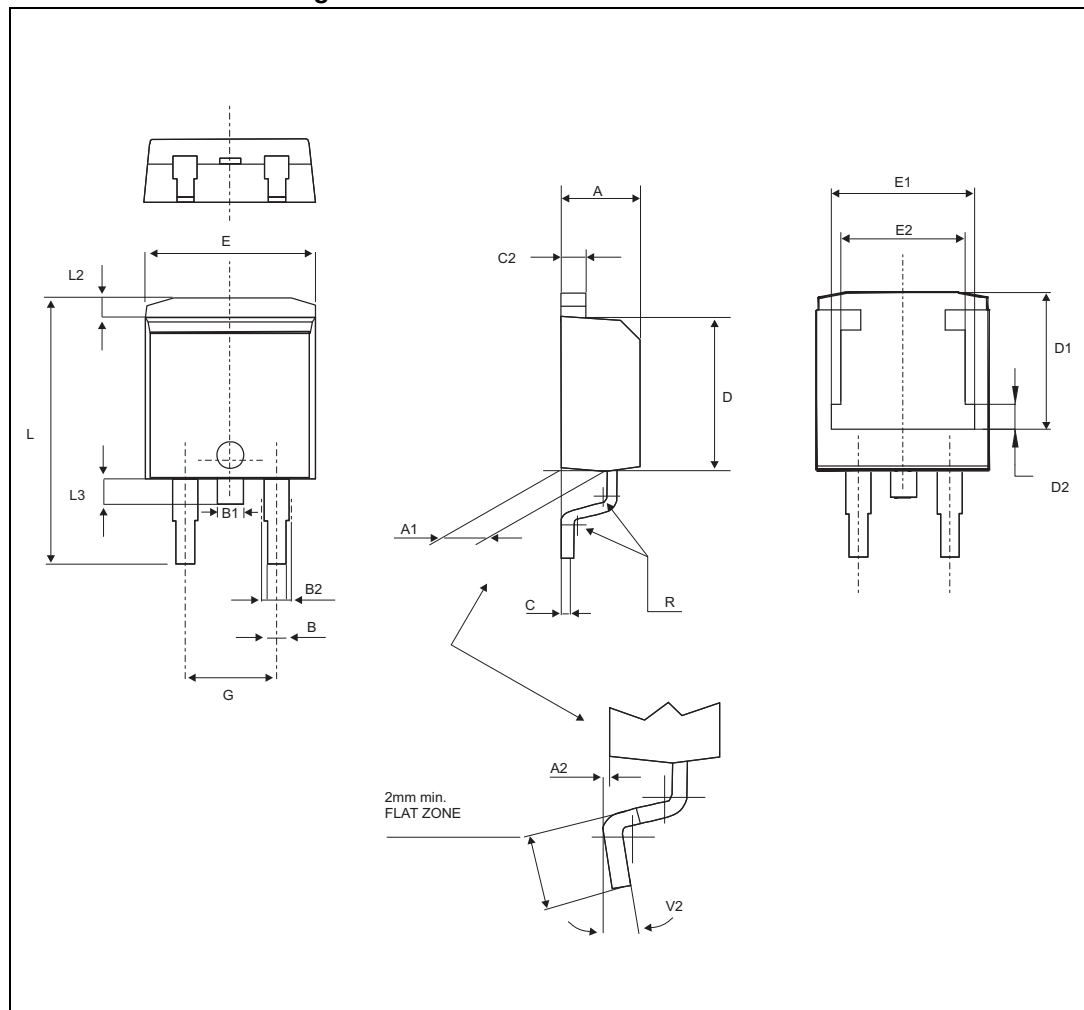
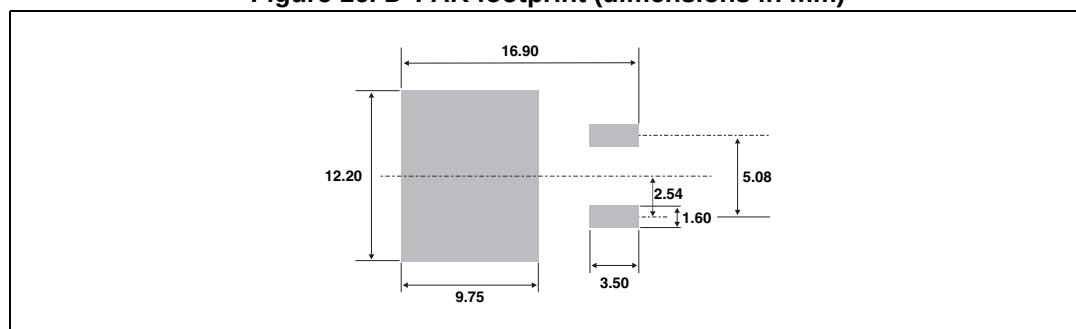
Figure 15. D²PAK dimensions definitions

Table 6. D²PAK dimensions 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
B1	1.20		1.38	0.047		0.054
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
D1	7.5		8.0	0.295		0.314
D2	1.3		1.7	0.051		0.067
E	10.00		10.28	0.393		0.405
E1	8.3		8.7	0.326		0.342
E2	6.85		7.25	0.269		0.285
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
R	0.40			0.016		
V2	0°		8°	0°		8°

Figure 16. D²PAK footprint (dimensions in mm)

4 Ordering information

Table 7. Ordering information

Order code	Voltage	Sensitivity	Marking	Package	Weight	Base qty	Delivery mode
TN2540-600G-TR	600 V	40 mA	TN2540600G	D ² PAK	1.5 g	1000	Tape & reel
TN2540-800G-TR	800 V	40 mA	TN2540800G	D ² PAK	1.5 g	1000	Tape & reel
TXN625RG	600 V	40 mA	TXN625	TO-220AB ins	2.3 g	50	Tube
TYN625RG	600 V	40 mA	TYN625	TO-220AB	2.3 g	50	Tube
TYN825RG	800 V	40 mA	TYN825	TO-220AB	2.3 g	50	Tube
TYN1225RG	1200 V	40 mA	TYN1225	TO-220AB	2.3 g	50	Tube

5 Revision history

Table 8. Document revision history

Date	Revision	Changes
Apr-2002	4A	Previous update
13-Feb-2006	5	TO-220AB delivery mode changed from bulk to tube. ECOPACK statement added.
17-Jun-2011	6	Added TXN625.
13-Sep-2011	7	Added UL certification in Features .
07-Feb-2012	8	Added TYN1225.
20-Aug-2014	9	Updated Section 3: Package information .

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