1 Characteristics

Table 2. Absolute ratings (limiting values)

Symbol	Parameter			Value	Unit
				TN1215 / TYNx12	
$I_{T(RMS)}$	On-state RMS current (180° conduction angle)		T_c = 105 °C	12	A
$I_{T(AV)}$	Average on-state current (180° conduction angle)		T_c = 105 °C	8	A
I_{TSM}	Non repetitive surge peak on-state current	t_p = 8.3 ms	T_j = 25 °C	145	A
		t_p = 10 ms		140	
I^2t	I^2t value for fusing	t_p = 10 ms	T_j = 25 °C	98	A^2S
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	50	A/µs
I_{GM}	Peak gate current	t_p = 20 µs	T_j = 125 °C	4	A
$P_{G(AV)}$	Average gate power dissipation		T_j = 125 °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. Standard electrical characteristics (T_j = 25 °C, unless otherwise specified)

Symbol	Test conditions			TN1215		TYN		Unit
				B/G	G	x12T	x12	
I_{GT}	V_D = 12 V, R_L = 33 Ω		MIN.	2		0.5	2	mA
			MAX.	15		5	15	
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.	40	30	15	30	mA
I_L	I_G = 1.2 I_{GT}		MAX.	80	60	30	60	mA
dV/dt	V_D = 67% V_{DRM}, gate open	T_j =125 °C	MIN.	200		40	200	V/µs
V_{TM}	I_{TM} = 24 A t_p = 380 µs	T_j = 25 °C	MAX.	1.6				V
V_{t0}	Threshold voltage	T_j = 125 °C	MAX.	0.85				V
R_d	Dynamic resistance	T_j = 125 °C	MAX.	30				mΩ
I_{DRM} I_{RRM}	V_{DRM} = V_{RRM}	T_j = 25 °C	MAX.	5				µA
		T_j = 125 °C		2				mA

Table 4. Thermal resistance

Symbol	Parameter			Value	Unit
$R_{th(j-c)}$	Junction to case (DC)		DPAK, IPAK, TO-220AB	1.3	°C/W
$R_{th(j-a)}$	Junction to ambient (DC)	$S^{(1)}$ = 0.5 cm^2	DPAK	70	°C/W
		$S^{(1)}$ = 1.0 cm^2	D²PAK	45	
			IPAK	100	
			TO-220AB	60	

1. S = Copper surface under tab

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

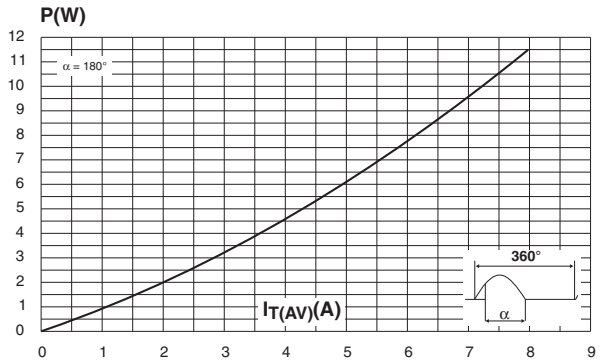


Figure 2. Average and DC on-state current versus case temperature

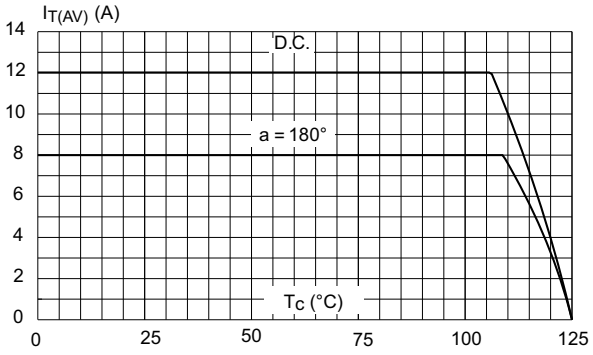


Figure 3. Average and DC on-state current versus ambient temperature (DPAK)

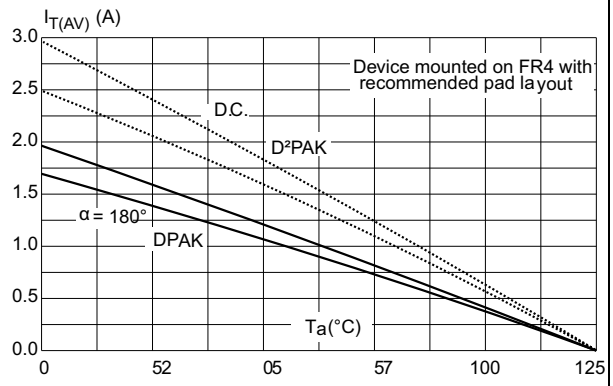


Figure 4. [Relative variation of thermal impedance junction to case versus pulse duration

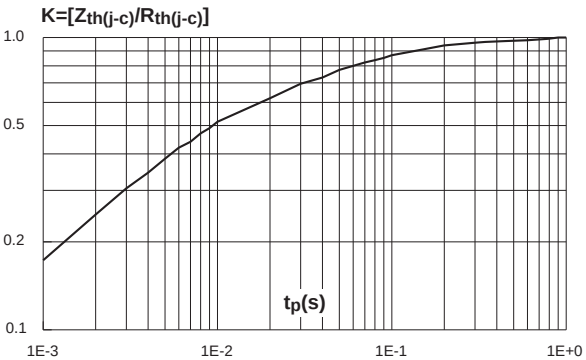


Figure 5. Relative variation of thermal impedance junction to ambient versus pulse duration

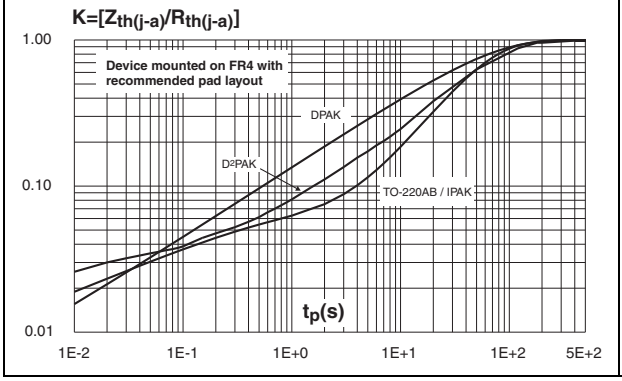


Figure 6. Relative variation of gate trigger and holding current versus junction temperature

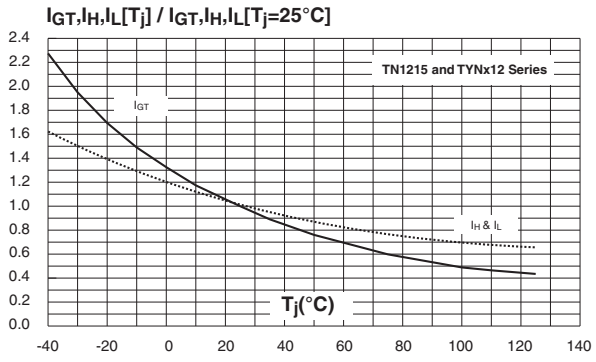


Figure 7. Surge peak on-state current versus number of cycles

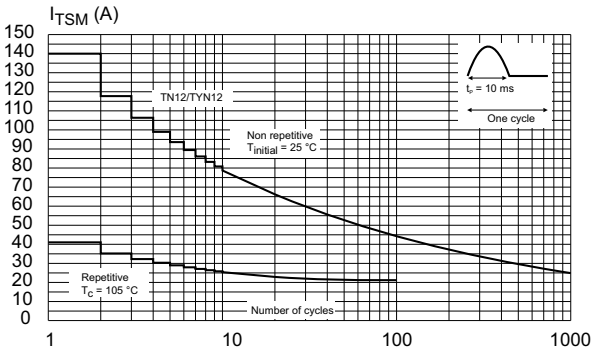


Figure 8. Non-repetitive surge peak on-state current and corresponding values of I^2t versus sinusoidal pulse width

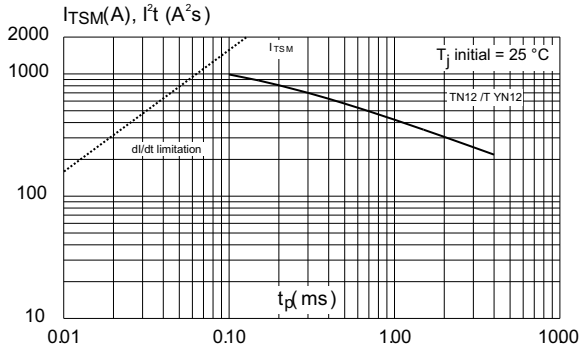


Figure 9. On-state characteristics (maximum values)

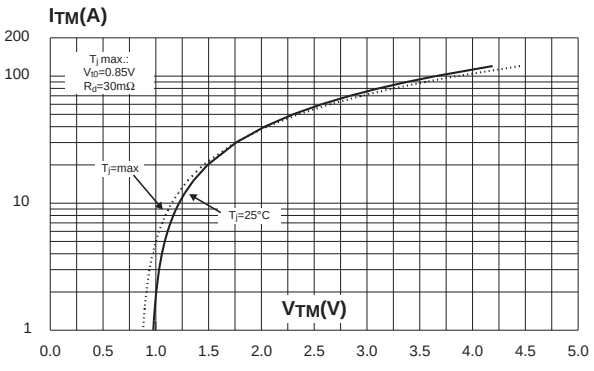
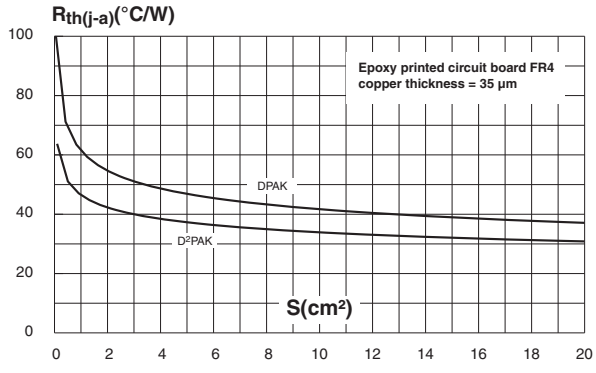


Figure 10. Thermal resistance junction to ambient versus copper surface under tab (DPAK and D²PAK)



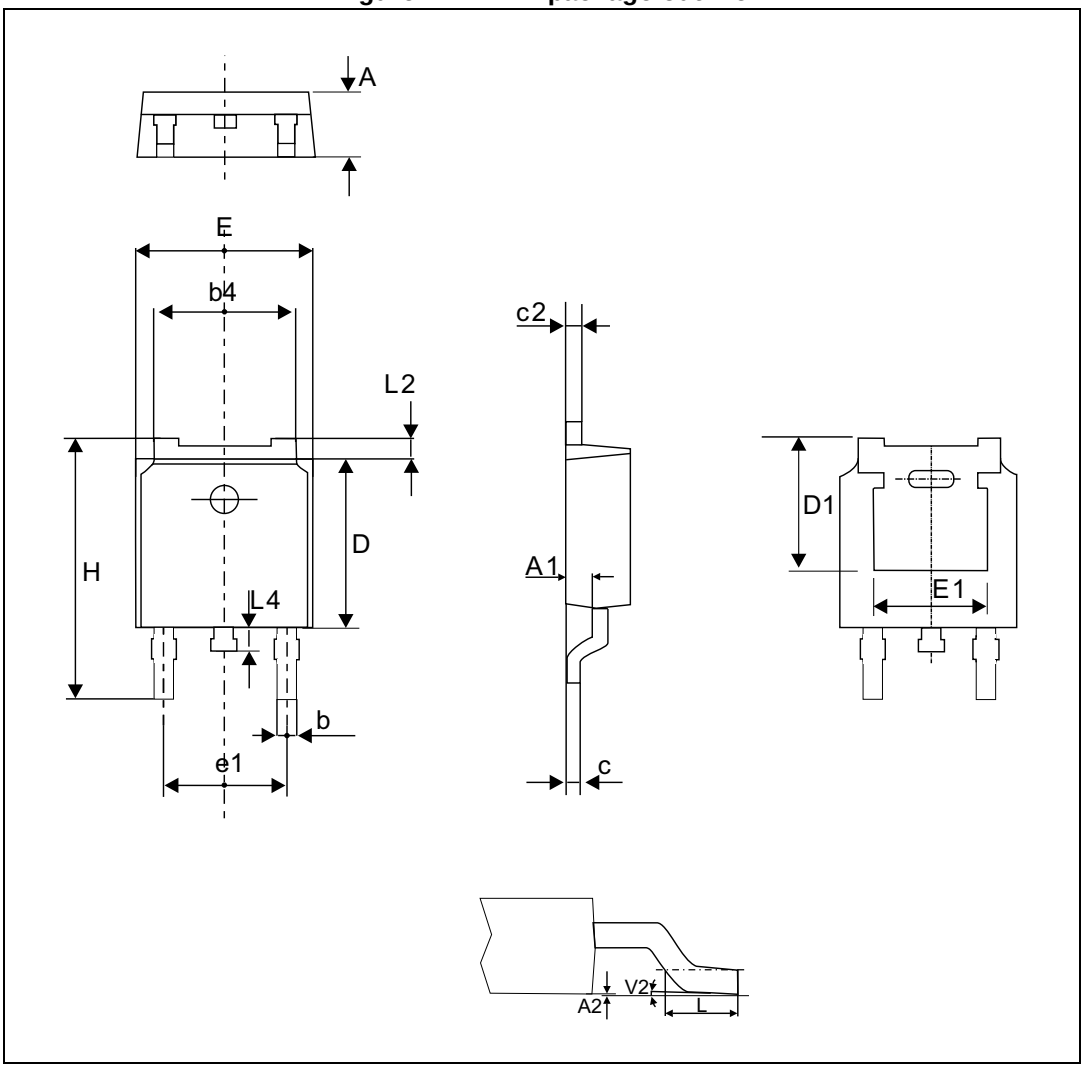
2 Package information

- Epoxy meets UL94, V0
- Lead-free packages
- 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 DPAK package information

Figure 11. DPAK package outline

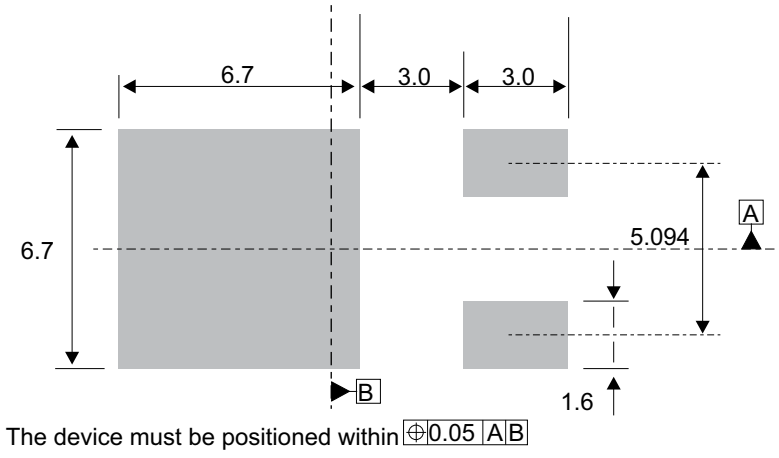


Note: This package drawing may slightly differ from the physical package. However, all the specified dimensions are guaranteed.

Table 5. DPAK package mechanical data

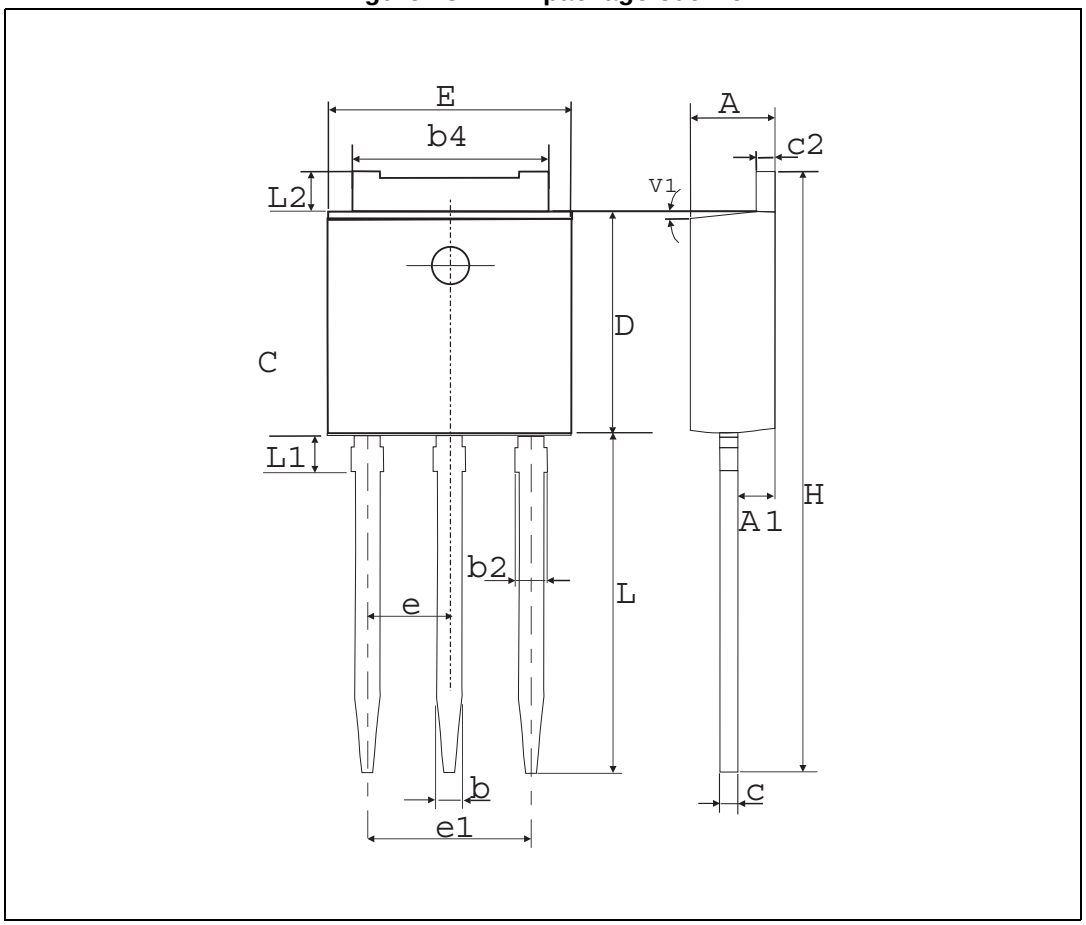
Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	2.18		2.40	0.086		0.094
A1	0.90		1.10	0.035		0.043
A2	0.03		0.23	0.001		0.009
b	0.64		0.90	0.025		0.035
b4	4.95		5.46	0.195		0.215
c	0.46		0.61	0.018		0.024
c2	0.46		0.60	0.018		0.023
D	5.97		6.22	0.235		0.244
D1	5.10			0.201		
E	6.35		6.73	0.250		0.264
E1		4.32			0.170	
e1	4.40		4.70	0.173		0.185
H	9.35		10.40	0.368		0.409
L	1.00		1.78	0.039		0.070
L2			1.27			0.05
L4	0.60		1.02	0.023		0.040
V2	0°		8°	0°		8°

Figure 12. Footprint (dimensions in mm)



2.2 IPAK package information

Figure 13. IPAK package outline



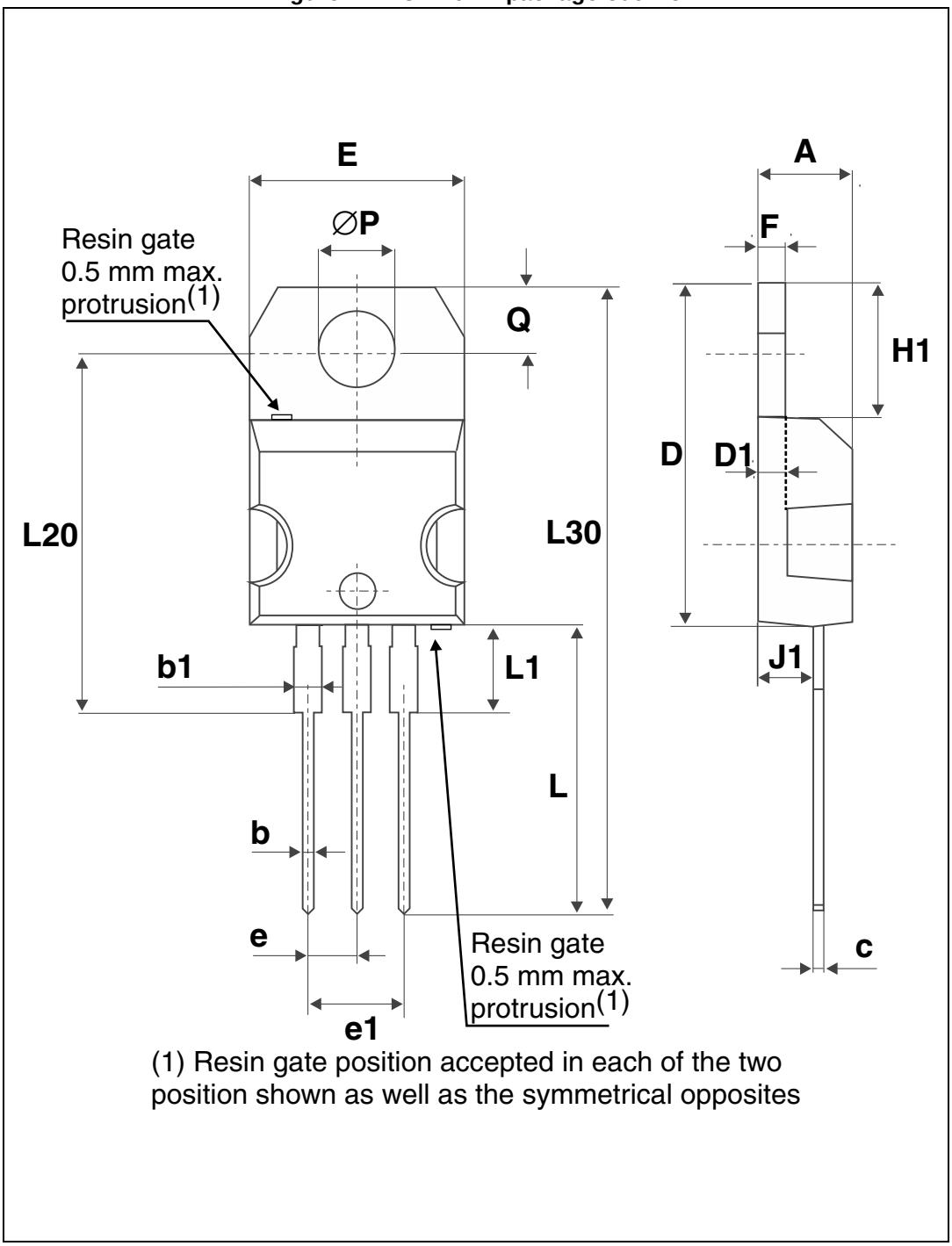
Note: This package drawing may slightly differ from the physical package. However, all the specified dimensions are guaranteed.

Table 6. IPAK package mechanical data

Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	2.20		2.40	0.086		0.094
A1	0.90		1.10	0.035		0.043
b	0.64		0.90	0.025		0.035
b2			0.95			0.037
b4	5.20		5.43	0.204		0.213
c	0.45		0.60	0.017		0.023
c2	0.46		0.60	0.018		0.023
D	6		6.20	0.236		0.244
E	6.40		6.70	0.252		0.263
e		2.28			0.090	
e1	4.40		4.60	0.173		0.181
H		16.10			0.634	
L	9		9.60	0.354		0.377
L1	0.8		1.20	0.031		0.047
L2		0.80	1.25		0.031	0.049
V1		10°			10°	

2.3 TO-220AB package information

Figure 14. TO-220AB package outline



(1) Resin gate position accepted in each of the two position shown as well as the symmetrical opposites

Table 7. TO-220AB package mechanical data

Ref.	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	4.40	4.60	0.17	0.18
b	0.61	0.88	0.024	0.035
b1	1.14	1.70	0.045	0.067
c	0.48	0.70	0.019	0.027
D	15.25	15.75	0.60	0.62
D1	1.27 typ.		0.05 typ.	
E	10	10.40	0.39	0.41
e	2.40	2.70	0.094	0.106
e1	4.95	5.15	0.19	0.20
F	1.23	1.32	0.048	0.052
H1	6.20	6.60	0.24	0.26
J1	2.40	2.72	0.094	0.107
L	13	14	0.51	0.55
L1	3.50	3.93	0.137	0.154
L20	16.40 typ.		0.64 typ.	
L30	28.90 typ.		1.13 typ.	
∅P	3.75	3.85	0.147	0.151
Q	2.65	2.95	0.104	0.116

2.4 D²PAK package information

Figure 15. D²PAK package outline

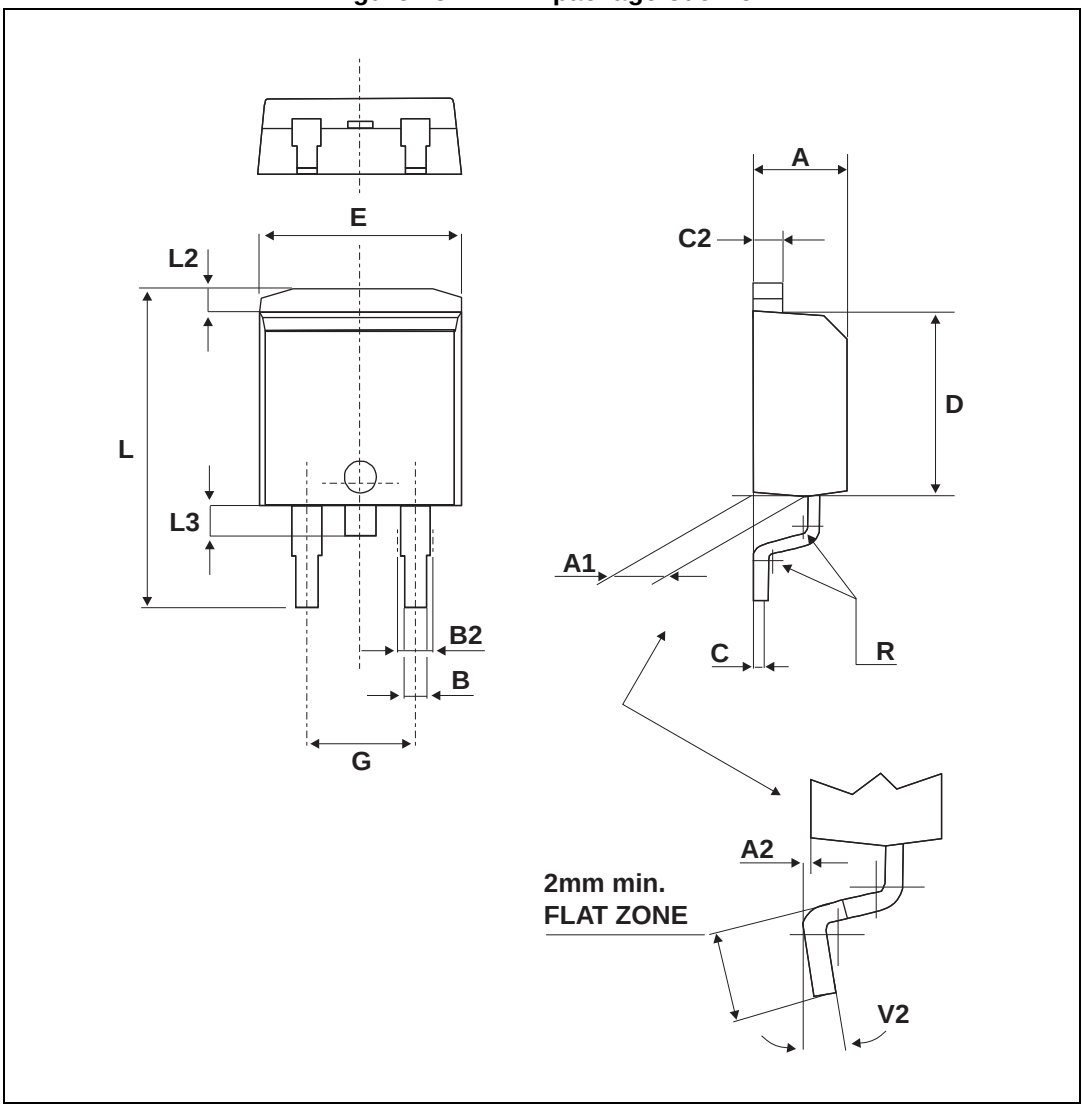
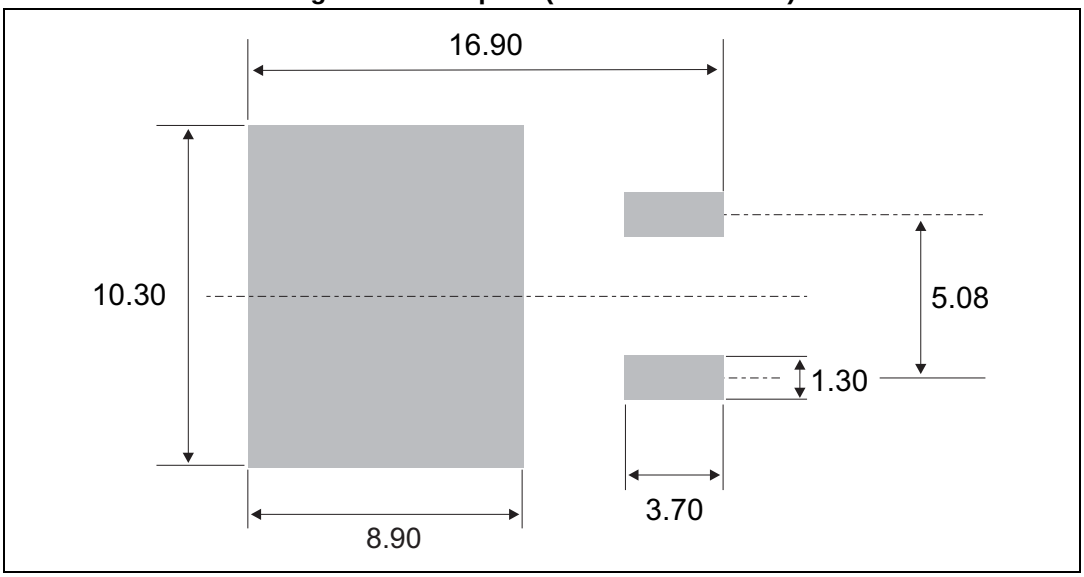


Table 8. D²PAK package mechanical data

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. Footprint (dimensions in mm)



3 Ordering information

Figure 17. TN1215 series

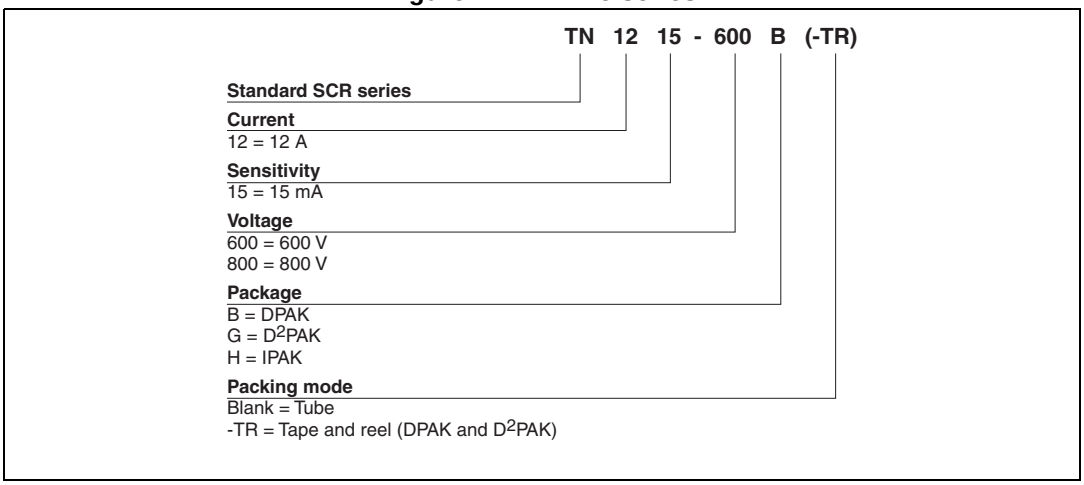


Figure 18. TYNx12 series

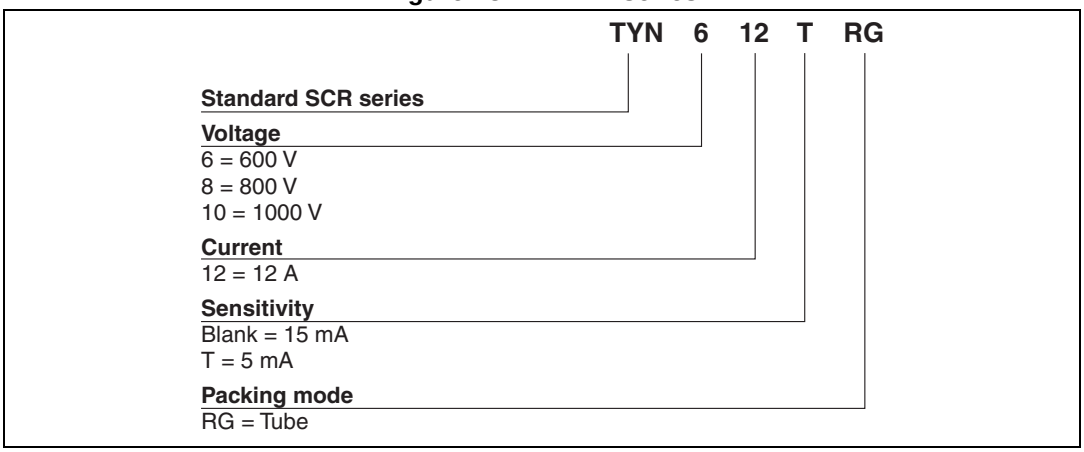


Table 9. Ordering information

Order code[1]	Marking[1]	Package	Weight	Base qty	Delivery mode
TN1215-x00B	TN12 15x00	DPAK	0.3 g	75	Tube
TN1215-x00B-TR	TN12 15x00	DPAK	0.3 g	2500	Tape and reel
TN1215-x00G	TN1215x00G	D^2PAK	1.5 g	50	Tube
TN1215-x00G-TR	TN1215x00G	D^2PAK	1.5 g	1000	Tape and reel
TN1215-x00H	TN12 15x00	IPAK	0.3 g	75	Tube
TYNx12RG	TYNx12	TO-220AB	2.3 g	50	Tube
TYNx12TRG	TYNx12T	TO-220AB	2.3 g	50	Tube

1. x (6, 7, 8, 10) depends upon voltage

4 Revision history

Table 10. Document revision history

Date	Revision	Changes
Sep-2000	3	Last update.
25-Mar-2005	4	TO-220AB delivery mode changed from bulk to tube.
14-Oct-2005	5	Changed sensitivity values in *Table 1* for TYNx12 (30 to 15 mA) and TYNx12T (15 to 5 mA). Added ECOPACK statement.
08-Mar-2007	6	Reformatted to current standard. *Figure 17: TN1215 series* product name corrected. Figure 23: TS1220 series product name corrected.
23-Oct-2009	7	Added TS1220-xxxT device.
03-Jun-2014	8	Updated DPAK and IPAK package information and reformatted to current standard.
25-Fev-2015	9	The part number TS1220 series has been moved to a separate document.Removed TO-220AB insulated package information.
29-Jul-2015	10	Updated *Figure 11*.