1 Characteristics

Table 2. Absolute ratings (limiting values)

Symbol	Parameter			Value		Unit
				TN1215-x00B TN1215-x00H (1) (2)	TN1215-x00G(1)(2) TYNx12(2)(3) TYNx12T(2)(3)	
$I_{T(RMS)}$	On-state RMS current (180° conduction angle)	TO-220AB ins. D^2PAK DPAK IPAK	T_c = 110 °C	12		A
$I_{T(AV)}$	Average on-state current (180° conduction angle)			8		
I_{TSM}	Non repetitive surge peak on-state current	t_p = 8.3 ms	$T_{jinitial}$ = 25 °C	115	145	A
		t_p = 10 ms		110	140	
I^2t	I^2t value for fusing		$T_{jinitial}$ = 25 °C	60	98	A^2S
dI/dt	Critical rate of rise of on-state current I_G = 2 x I_{GT}, t_r ≤ 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

1. x00= 600, 800
2. Check *Table 1* for devices availability
3. x= 6,8,10

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

Symbol	Test conditions			TN1215-x00(1)(2)		TYN(2)		Unit
				-B/-H	-G	x12T(3)	x12(3)	
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_{to}	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_D = V_R = V_{DRM} = V_{RRM}	T_j = 25 °C	Max.	5				µA
		T_j = 125 °C		2				mA

1. x00= 600, 800
2. Check *Table 1* for devices availability
3. x= 6,8,10

Table 4. Thermal resistance

Symbol	Parameter			Value	Unit
$R_{th(j-c)}$	Junction to case (DC)	D^2PAK, 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

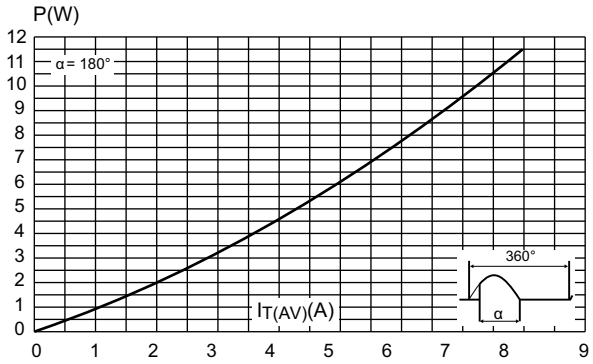


Figure 2. Average and DC on-state current versus case temperature

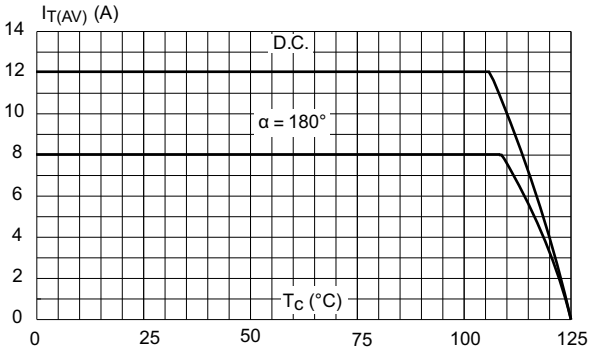


Figure 3. Average and DC on-state current versus ambient temperature (DPAK, D²PAK)

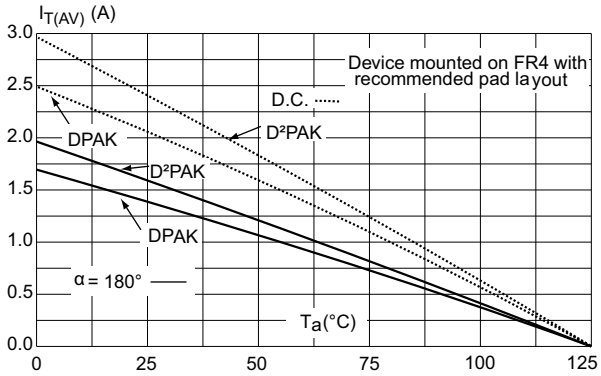


Figure 4. Relative variation of thermal impedance junction to case versus pulse duration

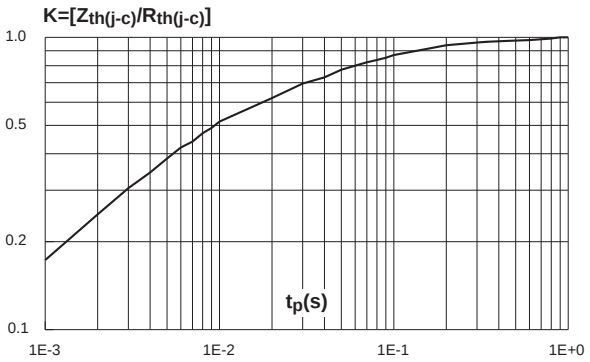


Figure 5. Relative variation of thermal impedance junction to ambient versus pulse duration

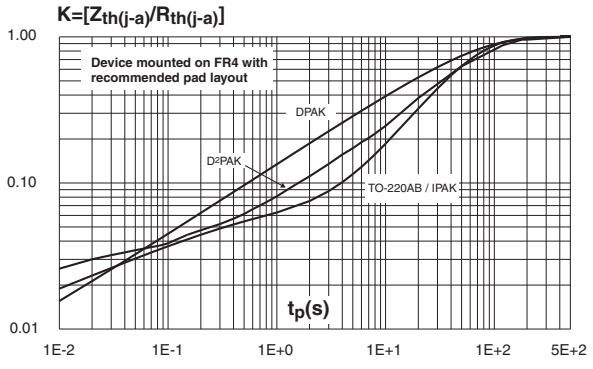


Figure 6. Relative variation of gate trigger, latching and holding current versus junction temperature

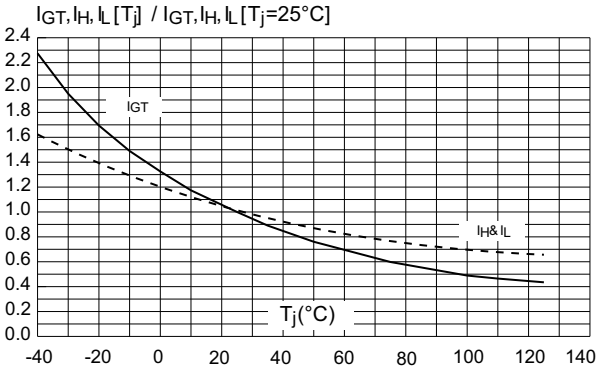


Figure 7. Surge peak on-state current versus number of cycles

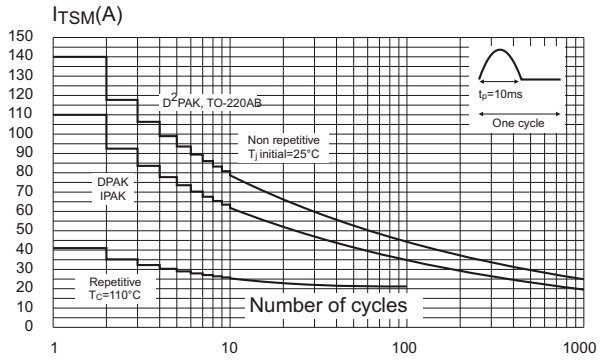


Figure 8. Non repetitive surge peak on-state current for a sinusoidal pulse with width tp<10 ms

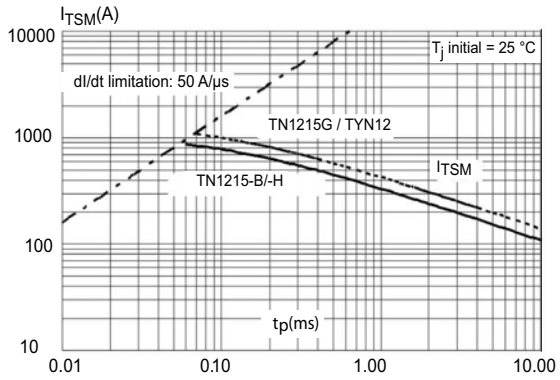


Figure 9. On-state characteristics (maximum values)

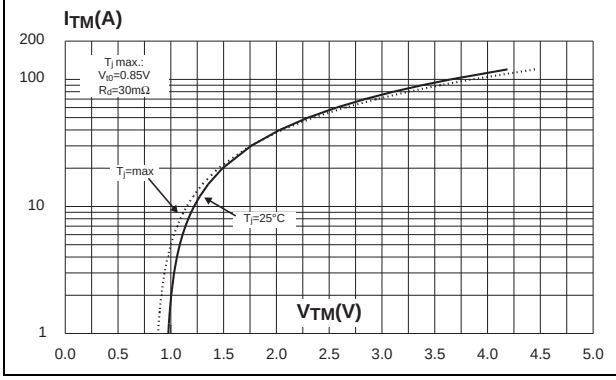
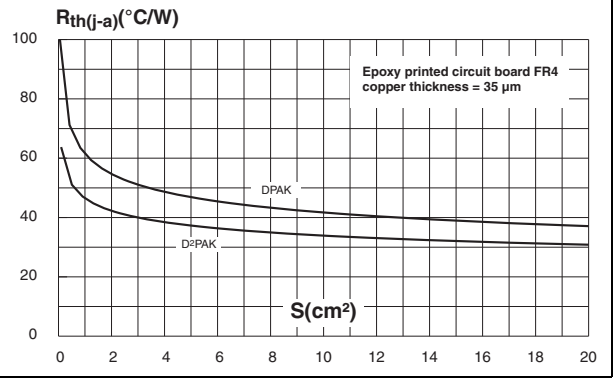


Figure 10. Thermal resistance junction to ambient versus copper surface under tab (DPAK and D²PAK)



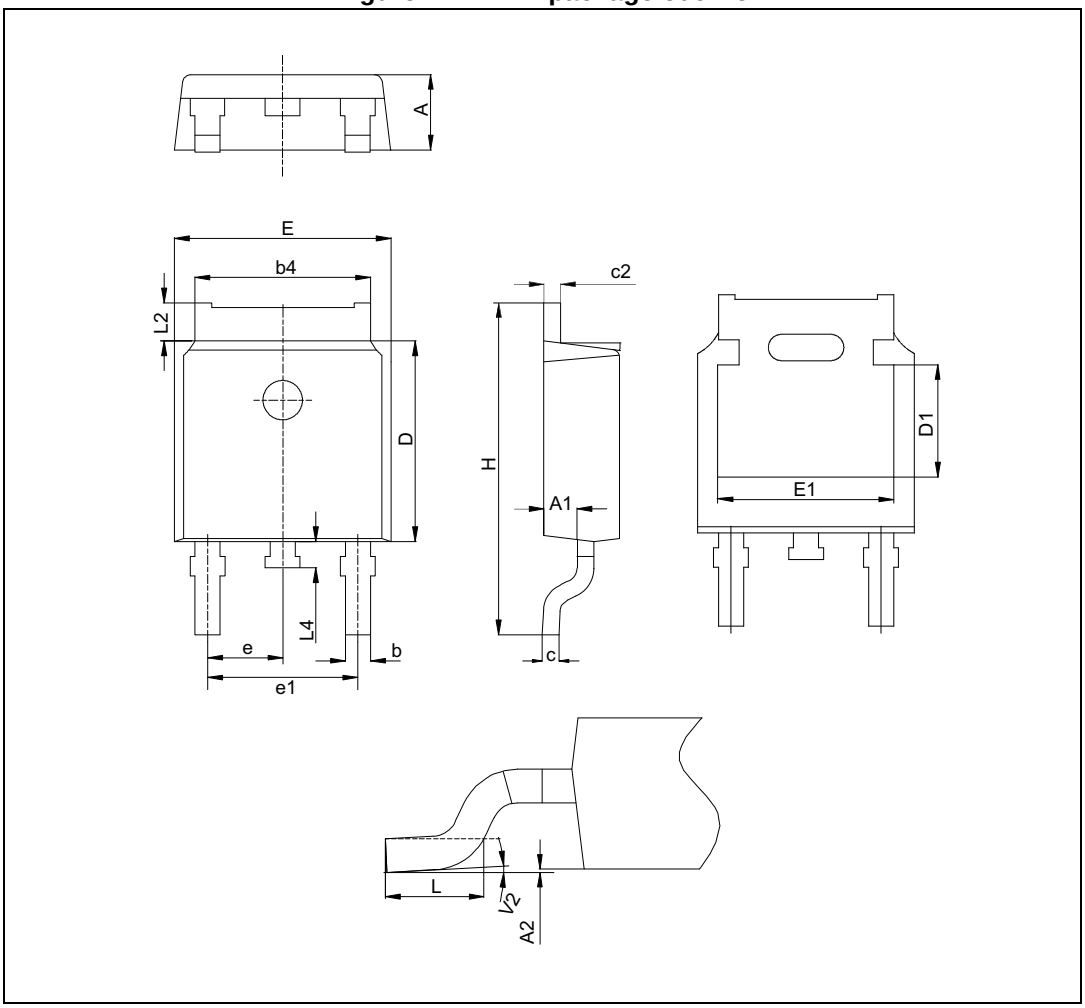
2 Package information

- Halogen free molding resin
- Epoxy meets UL94, V0
- Lead-free packages
- Recommended torque: 0.4 to 0.6 N·m (TO-220AB)

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



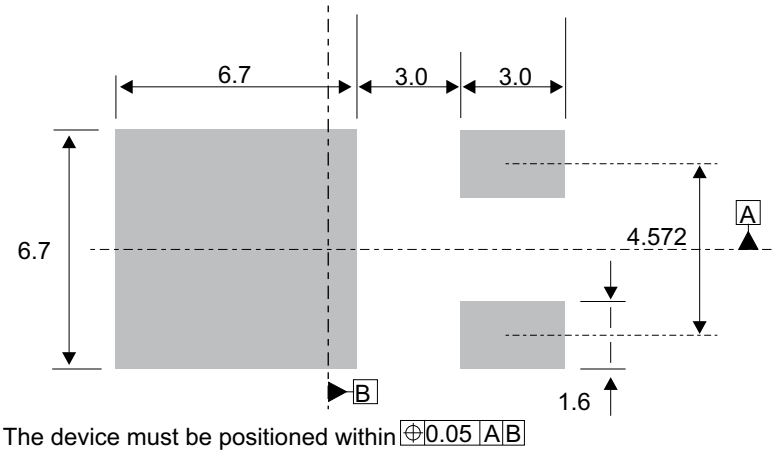
Note: This package drawing may slightly differ from the physical package. However, all the specified dimensions are guaranteed.

Table 5. DPAK package mechanical data

Ref.	Dimensions					
	Millimeters			Inches[1]		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	2.18		2.40	0.0858		0.0945
A1	0.9		1.10	0.0354		0.0433
A2	0.03		0.23	0.0012		0.0091
b	0.64		0.90	0.0252		0.0354
b4	4.95		5.46	0.1949		0.2150
c	0.46		0.61	0.0181		0.0236
c2	0.46		0.60	0.0181		0.0236
D	5.97		6.22	0.2350		0.2449
D1	4.95		5.60	0.1949		0.2205
E	6.35		6.73	0.2500		0.2650
E1	4.32		5.50	0.1701		0.2165
e		2.286			0.0900	
e1	4.40		4.70	0.1732		0.1850
H	9.35		10.40	0.3681		0.4094
L	1.0		1.78	0.0394		0.0701
L2			1.27			0.0500
L4	0.6		1.02	0.0236		0.0402
V2	-8°		+8°	-8°		+8°

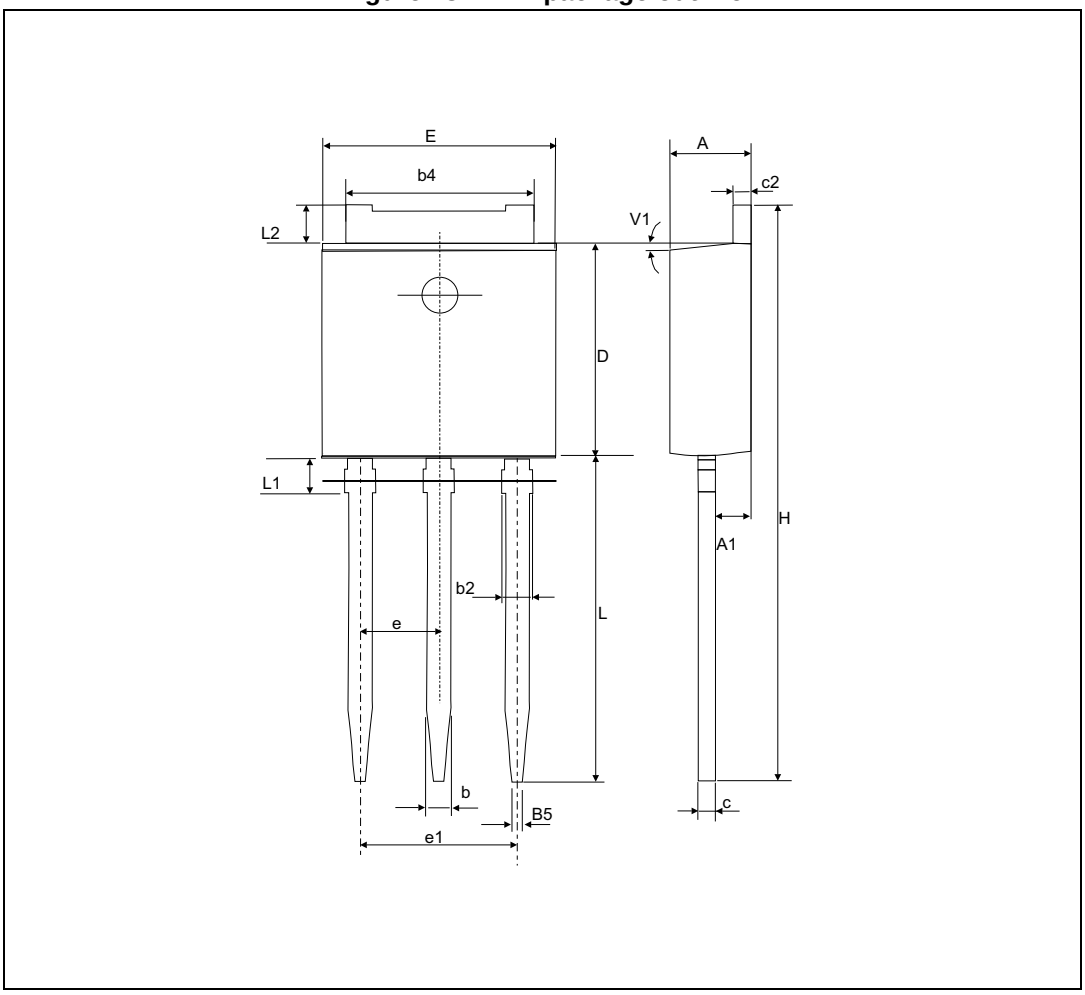
1. Inches only for reference.

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.

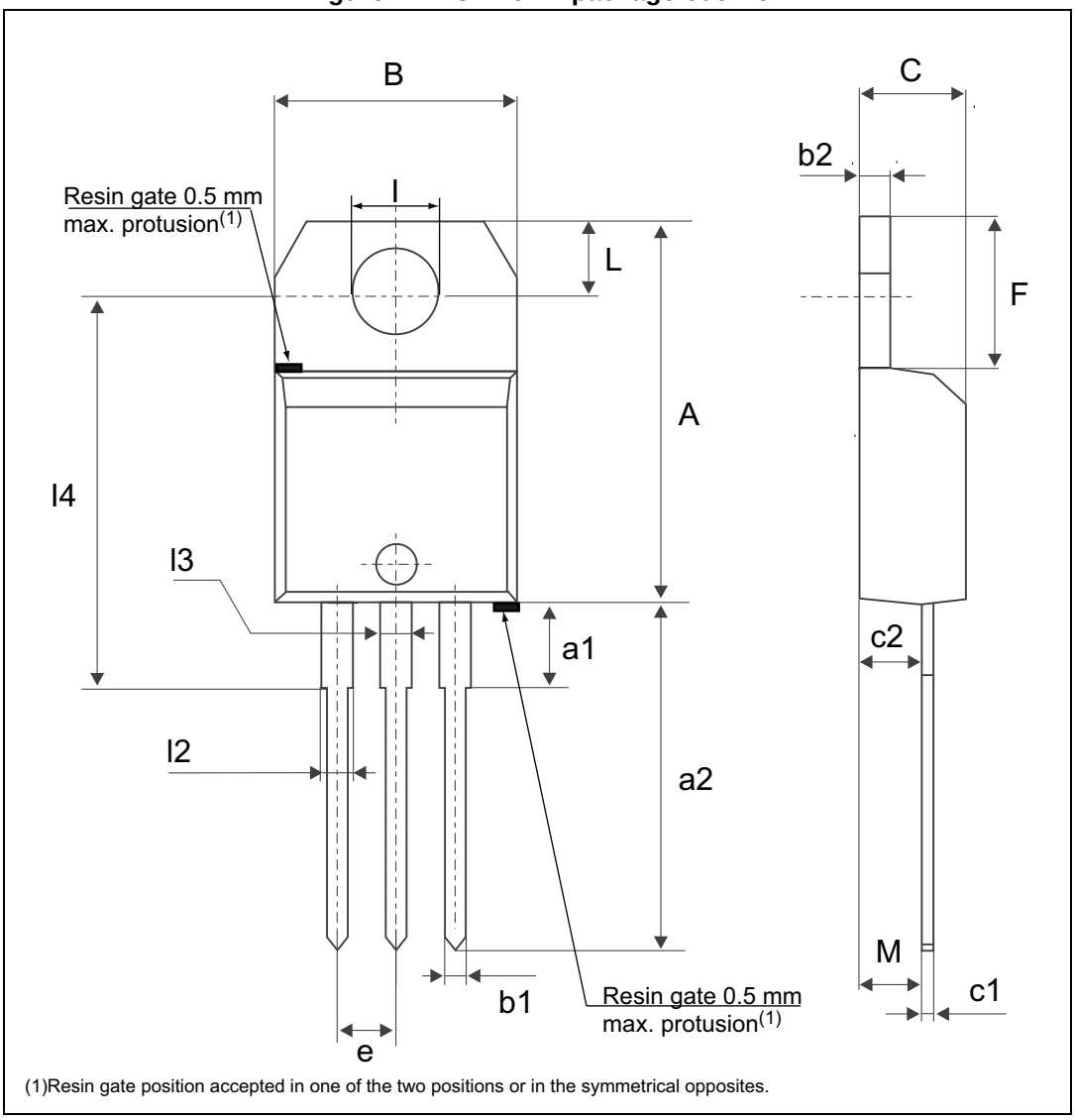
Table 6. IPAK package mechanical data

Ref.	Dimensions					
	Millimeters			Inches[1]		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	2.20		2.40	0.0866		0.0945
A1	0.90		1.10	0.0354		0.0433
b	0.64		0.90	0.0252		0.0354
b2			0.95			0.0374
b4	5.20		5.43	0.2047		0.2138
B5		0.30			0.0118	
c	0.45		0.60	0.0177		0.0236
c2	0.46		0.60	0.0181		0.0236
D	6.00		6.20	0.2362		0.2441
E	6.40		6.65	0.2520		0.2618
e		2.28			0.0898	
e1	4.40		4.60	0.1732		0.1811
H		16.10			0.6339	
L	9.00		9.60	0.3543		0.3780
L1	0.80		1.20	0.0315		0.0472
L2		0.80	1.25		0.0315	0.0492
V1		10°			10°	

1. Inches dimensions given only for reference.

2.3 TO-220AB package information

Figure 14. TO-220AB package outline



(1)Resin gate position accepted in one of the two positions or in the symmetrical opposites.

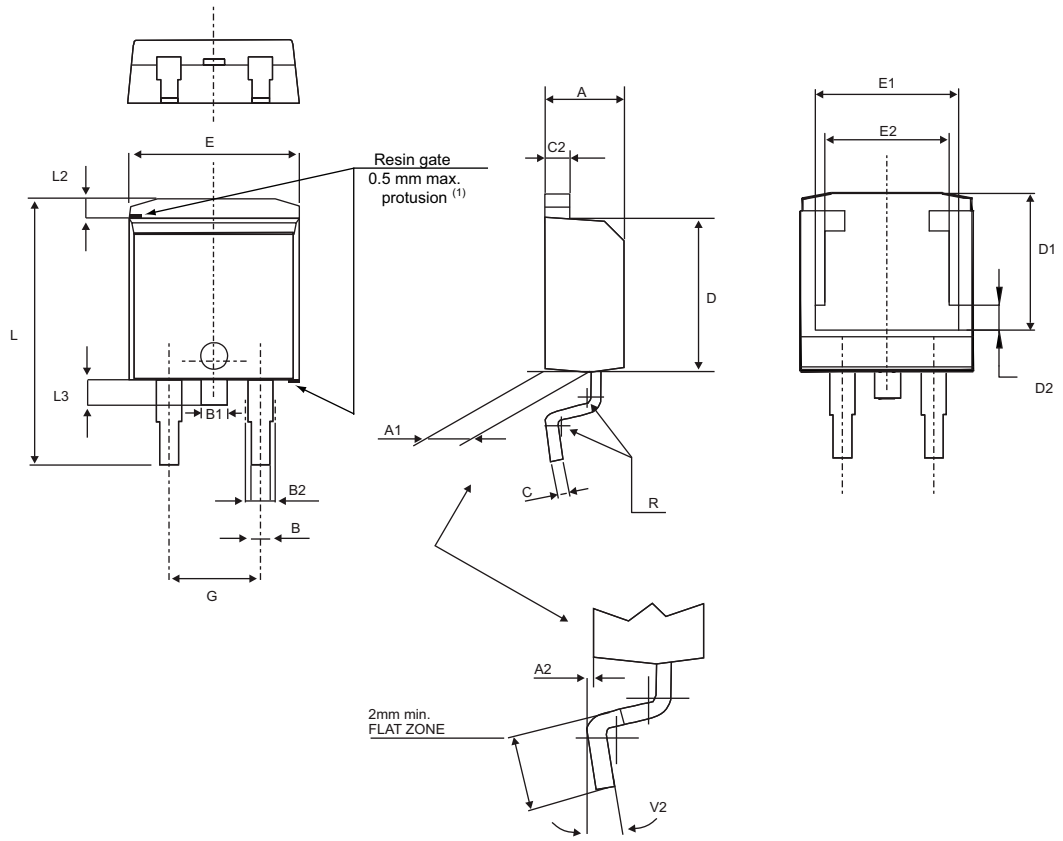
Table 7. TO-220AB package mechanical data

Ref.	Dimensions					
	Millimeters			Inches[1]		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	15.2		15.9	0.5984		0.6260
a1		3.75			0.1476	
a2	13		14	0.5118		0.5512
B	10		10.4	0.3937		0.4094
b1	0.61		0.88	0.0240		0.0346
b2	1.23		1.32	0.0484		0.0520
C	4.4		4.6	0.1732		0.1811
c1	0.49		0.7	0.0193		0.0276
c2	2.4		2.72	0.0945		0.1071
e	2.40		2.70	0.0945		0.1063
F	6.2		6.6	0.2441		0.2598
I	3.73		3.88	0.1469		0.1528
L	2.65		2.95	0.1043		0.1161
l2	1.14		1.7	0.0449		0.0669
l3	1.14		1.7	0.0449		0.0669
l4	15.8	16.4	16.8	0.6220	0.6457	0.6614
M		2.6			0.1024	

1. Inches dimensions given only for reference.

2.4 D²PAK package information

Figure 15. D²PAK package outline



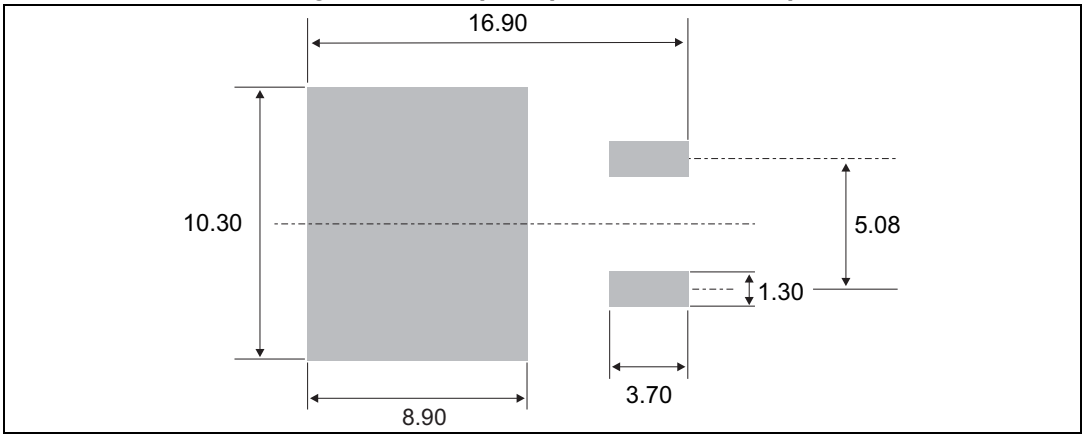
(1)Resin gate position accepted in one of the two positions or in the symmetrical opposites.

Table 8. D²PAK package mechanical data

Ref.	Dimensions					
	Millimeters			Inches[1]		
	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
B	0.70		0.93	0.0276		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	0.3524		0.3681
D1	7.50		8.0	0.2953		0.3150
D2	1.3		1.7	0.0512		0.0669
E	10.00		10.28	0.3937		0.4047
E1	8.3		8.7	0.3268		0.3425
E2	6.85		7.25	0.2697		0.2854
G	4.88		5.28	0.1921		0.2079
L	15.00		15.85	0.5906		0.6240
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°

1. *Inches dimensions given only for reference.*

Figure 16. Footprint (dimensions in mm)



3 Ordering information

Figure 17. TN1215 series

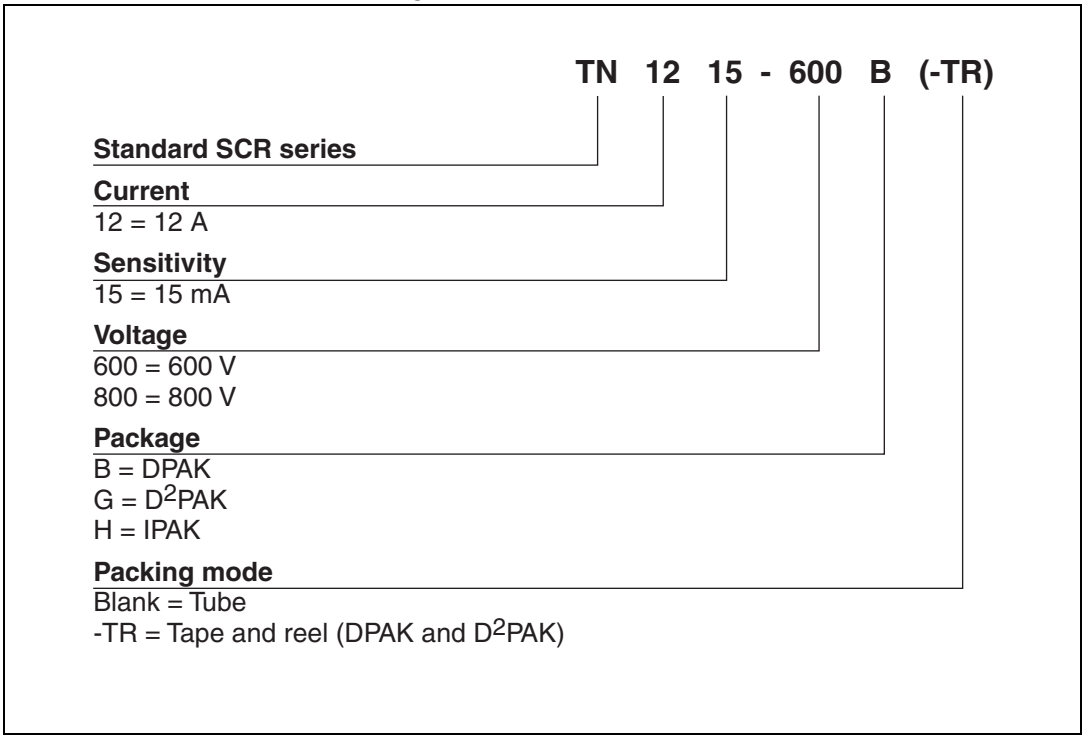


Figure 18. TYNx12 series

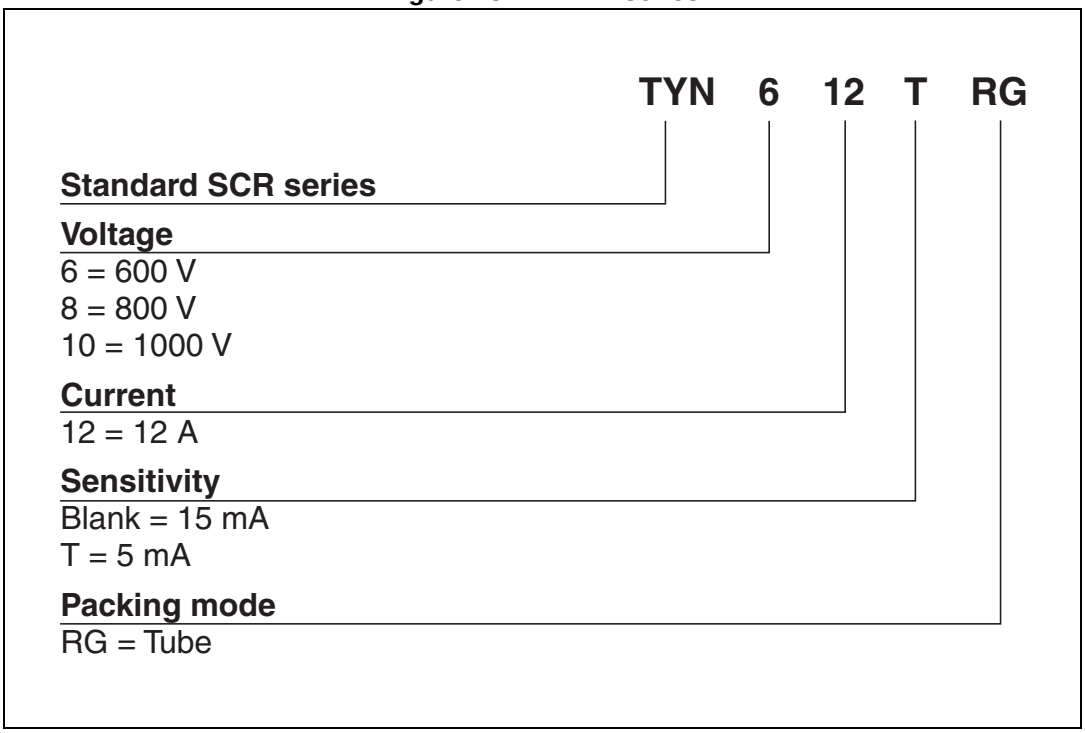


Table 9. Ordering information

Order code	Voltage V_{DRM} / V_{RRM} (v)			$I_{GT\ (mA)}$	Package	Weight (g)	Base qty. (pc)	Delivery mode
	600	800	1000					
TYN1012RG			x	15	TO-220AB	2.3	50	Tube
TYN1012TRG			x	5	TO-220AB	2.3	50	Tube
TYN612RG	x			15	TO-220AB	2.3	50	Tube
TYN612TRG	x			5	TO-220AB	2.3	50	Tube
TYN812RG		x		15	TO-220AB	2.3	50	Tube
TYN812TRG		x		5	TO-220AB	2.3	50	Tube
TN1215-600B	x			15	DPAK	0.3	75	Tube
TN1215-600B-TR	x			15	DPAK	0.3	2500	Tape and reel
TN1215-600G	x			15	D^2PAK	1.5	50	Tube
TN1215-600G-TR	x			15	D^2PAK	1.5	1000	Tape and reel
TN1215-600H	x			15	IPAK	0.3	75	Tube
TN1215-800B-TR		x		15	DPAK	0.3	2500	Tape and reel
TN1215-800G-TR		x		15	D^2PAK	1.5	1000	Tape and reel
TN1215-800H		x		15	IPAK	0.3	75	Tube

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-Feb-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.*
05-Oct-2016	11	Updated *Section 2: Package information*. Minor text changes.