

TN12, TS12 and TYNx12 Series

SENSITIVE & STANDARD 12A SCRs

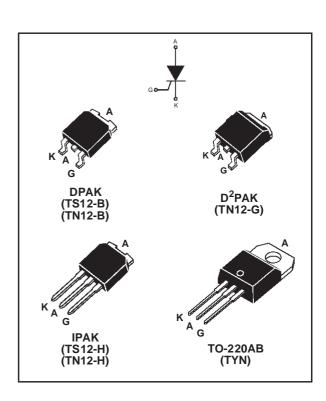
MAIN FEATURES:

Symbol	Value	Unit
I _{T(RMS)}	12	Α
V _{DRM} /V _{RRM}	600 to 1000	V
I _{GT}	0.2 to 15	mA

DESCRIPTION

Available either in sensitive (TS12) or standard (TYN, TN12...) gate triggering levels, the 12A SCR series is suitable to fit all modes of control found in applications such as overvoltage crowbar protection, motor control circuits in power tools and kitchen aids, in-rush current limiting circuits, capacitive discharge ignition, voltage regulation circuits...

Available in though-hole or surface-mount packages, they provide an optimized performance in a limited space area.



ABSOLUTE RATINGS (limiting values)

Symbol	Para	Va	lue	Unit		
I _{T(RMS)}	RMS on-state current (180° condu	ction angle)	Tc = 105°C	12		Α
IT _(AV)	Average on-state current (180° con	nduction angle)	Tc = 105°C		8	А
		DPAK / IPAK	D PAK / TO-220AB			
I _{TSM}	Non repetitive surge peak	tp = 8.3 ms	Tj = 25°C	115	146	
	on-state current	tp = 10 ms	1) = 23 0	110	140	Α
l t	I t Value for fusing	tp = 10 ms	Tj = 25°C	60	98	As
dI/dt	Critical rate of rise of on-state current $I_G = 2 \times I_{GT}$, tr $\leq 100 \text{ ns}$	Tj = 125°C	50		A/μs	
I _{GM}	Peak gate current	tp = 20 μs	Tj = 125°C	,	4	Α
P _{G(AV)}	Average gate power dissipation Tj = 125°C				1	W
T _{stg} Tj	Storage junction temperature range Operating junction temperature range) + 150) + 125	°C
V _{RGM}	Maximum peak reverse gate voltage	ge (for TN12 & TYN)		5		V

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TN12, TS12 and TYNx12 Series

ELECTRICAL CHARACTERISTICS (Tj = 25°C, unless otherwise specified)

■ SENSITIVE

Symbol	Test Condition	TS1220	Unit		
l _{GT}	V _D = 12 V R _I = 140 Ω		MAX.	200	μΑ
V _{GT}			MAX.	0.8	V
V _{GD}	$V_D = V_{DRM}$ $R_L = 3.3 \text{ k}\Omega$ $R_{GK} = 1 \text{ k}\Omega$	MIN.	0.1	V	
V _{RG}	I _{RG} = 10 μA	MIN.	8	V	
I _H	$I_T = 50 \text{ mA}$ $R_{GK} = 1 \text{ k}\Omega$	MAX.	5	mA	
ΙL	$I_G = 1 \text{ mA}$ $R_{GK} = 1 \text{ k}\Omega$		MAX.	6	mA
dV/dt	$V_{D} = 67 \% V_{DRM} R_{GK} = 220 \Omega$	Tj = 125°C	MIN.	5	V/μs
V _{TM}	I _{TM} = 24 A tp = 380 μs	Tj = 25°C	MAX.	1.6	V
V _{t0}	Threshold voltage	Tj = 125°C	MAX.	0.85	V
R _d	Dynamic resistance	Tj = 125°C	MAX.	30	mΩ
I _{DRM}	$V_{DRM} = V_{RRM}$ $R_{GK} = 220 \Omega$	Tj = 25°C	MAX.	5	μΑ
I _{RRM}	VDRM - VRRM - NGK - 220 32	Tj = 125°C		2	mA

■ STANDARD

Symbol	Test Condit	TN1215		TY	/N	Unit		
Cymbol	rest donait	В/Н	G	x12T	x12	Onit		
I _{GT}			MIN.	2	2	0.5	2	mA
	$V_D = 12 V$ $R_L = 33 \Omega$		MAX.	1:	5	5	15	
V _{GT}		MAX.		1	.3		V	
V _{GD}	$V_D = V_{DRM}$ $R_L = 3.3 \text{ k}\Omega$	MIN.	0.2				V	
IН	I _T = 500 mA Gate open	MAX.	40	30	15	30	mA	
IL	I _G = 1.2 I _{GT}		MAX.	80	60	30	60	mA
dV/dt	V _D = 67 % V _{DRM} Gate open	Tj = 125°C	MIN.	20	00	40	200	V/μs
V _{TM}	$I_{TM} = 24 \text{ A}$ tp = 380 μ s	Tj = 25°C	MAX.	1.6				V
V _{t0}	Threshold voltage Tj = 125°C		MAX.	0.85				V
R _d	Dynamic resistance Tj = 125°C		MAX.	30				mΩ
I _{DRM}	$V_{DRM} = V_{RRM}$	Tj = 25°C	MAX.			5		μΑ
I _{RRM}	I *DKM − *KKM	Tj = 125°C			2	2		mA

THERMAL RESISTANCES

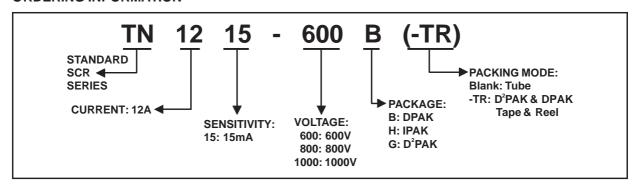
Symbol	Para	ımeter		Value	Unit
R _{th(j-c)}	Junction to case (DC)			1.3	°C/W
R _{th(j-a)}	Junction to ambient	ion to ambient			°C/W
			IPAK	100	1 1
		S = 1 cm	D PAK	45	
		S = 0.5 cm	DPAK	70	

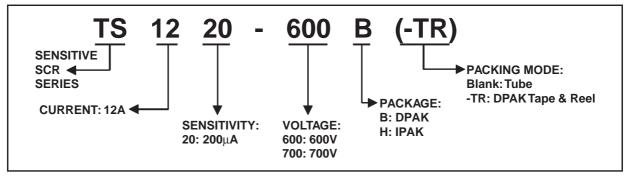
S = Copper surface under tab

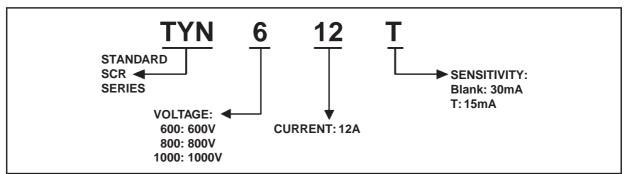
PRODUCT SELECTOR

Part Number		Voltag	e (xxx)		Sensitivity	Package	
T dit italiise	600 V	700 V	800 V	1000 V	Constitution	1 ackage	
TN1215-xxxB	Х		Х		15 mA	DPAK	
TN1215-xxxG	Х		Х	Х	15 mA	D PAK	
TN1215-xxxH	Х		Х		15 mA	IPAK	
TS1220-xxxB	Х	Х			0.2 mA	DPAK	
TS1220-xxxH	Х	Х			0.2 mA	IPAK	
TYNx12	Х		Х	Х	30 mA	TO-220AB	
TYNx12T	Х		Х	Х	15 mA	TO-220AB	

ORDERING INFORMATION







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TN12, TS12 and TYNx12 Series

OTHER INFORMATION

Part Number	Marking	Weight	Base Quantity	Packing mode
TN1215-x00B	TS1215x00	0.3 g	75	Tube
TN1215-x00B-TR	TS1215x00	0.3 g	2500	Tape & reel
TN1215-x00G	TS1215x00G	1.5 g	50	Tube
TN1215-x00G-TR	TS1215x00G	1.5 g	1000	Tape & reel
TN1215-x00H	TN1215x00	0.4 g	75	Tube
TS1220-x00B	TS1220x00	0.3 g	75	Tube
TS1220-x00B-TR	TS1220x00	0.3 g	2500	Tape & reel
TS1220-x00H	TS1220x00	0.4 g	75	Tube
TYNx12	TYNx12	2.3 g	250	Bulk
TYNx12RG	TYNx12	2.3 g	50	Tube
TYNx12T	TYNx12T	2.3 g	250	Bulk
TYNx12TRG	TYNx12T	2.3 g	50	Tube

Note: x = voltage

Fig. 1: Maximum average power dissipation versus average on-state current.

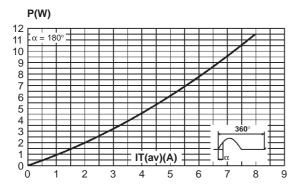


Fig. 2-2: Average and D.C. on-state current versus ambient temperature (device mounted on FR4 with recommended pad layout) (DPAK and D^2PAK).

D²PAK

Tamb(°C)

100

50



125

Fig. 2-1: Average and D.C. on-state current versus case temperature.

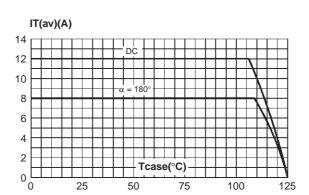
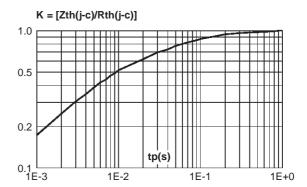


Fig. 3-1: Relative variation of thermal impedance junction to case versus pulse duration.



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IT(av)(A)

3.0

2.5

2.01.51.0

0.5

0.0 L

25

Fig. 3-2: Relative variation of thermal impedance junction to ambient versus pulse duration (recommended pad layout, FR4 PC board).

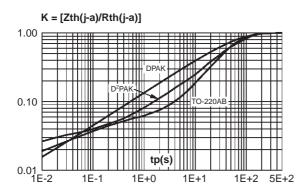


Fig. 4-2: Relative variation of gate trigger current, holding current and latching current versus junction temperature for TN12 & TYN series.

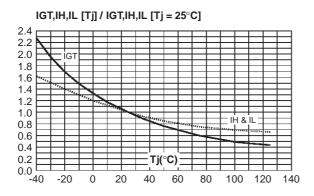


Fig. 6: Relative variation of dV/dt immunity versus gate-cathode resistance (typical values) for TS12 series.

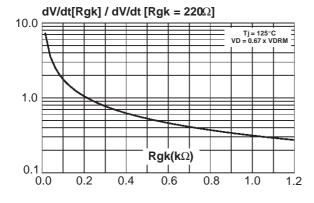


Fig. 4-1: Relative variation of gate trigger current, holding current and latching versus junction temperature for TS12 series.

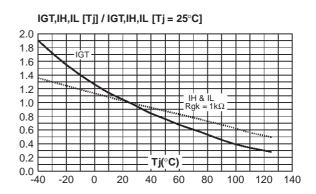


Fig. 5: Relative variation of holding current versus gate-cathode resistance (typical values) for TS12 series.

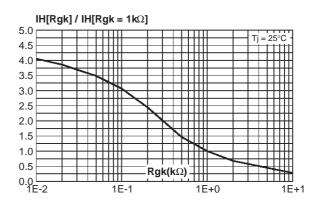
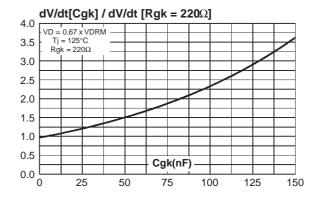


Fig. 7: Relative variation of dV/dt immunity versus gate-cathode capacitance (typical values) for TS12 series.



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Fig. 8: Surge peak on-state current versus number of cycles (TS12/TN12/TYN).

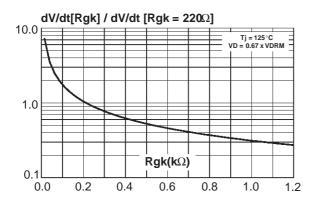


Fig. 10: On-state characteristics (maximum values).

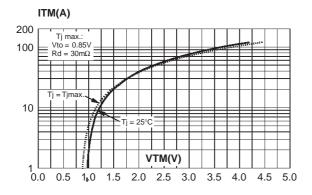


Fig. 9: Non-repetitive surge peak on-state current for a sinusoidal pulse with width tp < 10 ms, and corresponding values of I t.

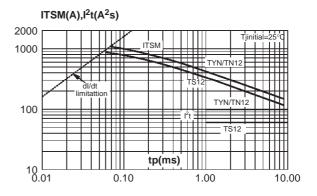
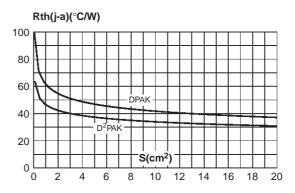
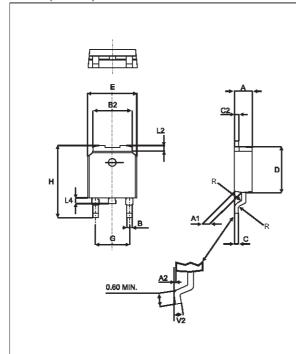


Fig. 11: Thermal resistance junction to ambient versus copper surface under tab (Epoxy printed circuit board FR4, copper thickness: $35 \mu m$).



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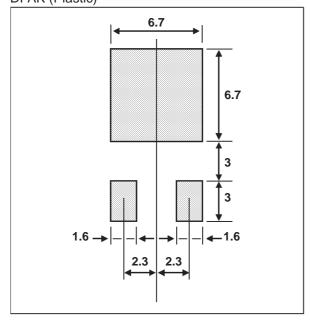
DPAK (Plastic)



	DIMENSIONS							
REF.	Millim	neters	Inc	hes				
	Min.	Max	Min.	Max.				
Α	2.20	2.40	0.086	0.094				
A1	0.90	1.10	0.035	0.043				
A2	0.03	0.23	0.001	0.009				
В	0.64	0.90	0.025	0.035				
B2	5.20	5.40	0.204	0.212				
С	0.45	0.60	0.017	0.023				
C2	0.48	0.60	0.018	0.023				
D	6.00	6.20	0.236	0.244				
Е	6.40	6.60	0.251	0.259				
G	4.40	4.60	0.173	0.181				
Н	9.35	10.10	0.368	0.397				
L2	0.80 typ.		0.03	l typ.				
L4	0.60	1.00	0.023	0.039				
R	0.2	typ.	0.007 typ.					
V2	0°	8°	0°	8°				

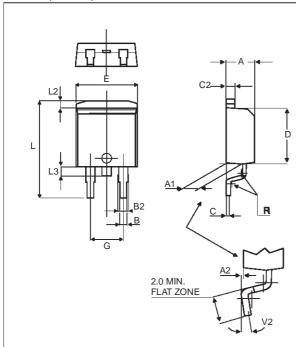
FOOTPRINT DIMENSIONS (in millimeters)

DPAK (Plastic)



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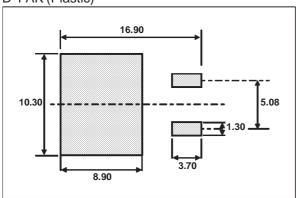
D²PAK (Plastic)



	DIMENSIONS								
REF.	М	Millimeters			Inches				
·	Min.	Тур.	Max.	Min.	Тур.	Max.			
Α	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			
В	0.70		0.93	0.027		0.037			
B2	1.25	1.40		0.048	0.055				
С	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°			

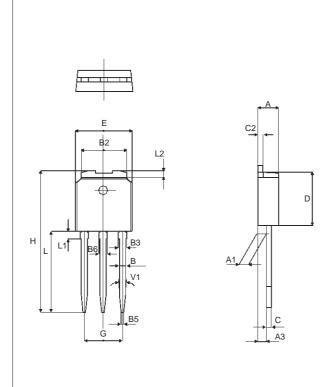
FOOTPRINT DIMENSIONS (in millimeters)

D²PAK (Plastic)



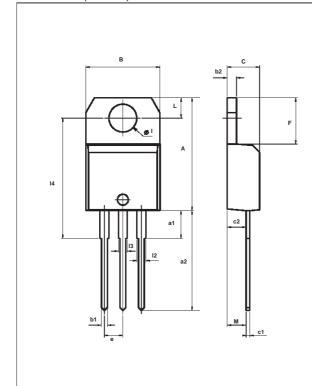
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IPAK (Plastic)



	DIMENSIONS							
REF.	М	illimete	rs	Inches				
·	Min.	Тур.	Max.	Min.	Тур.	Max.		
А	2.2		2.4	0.086		0.094		
A1	0.9		1.1	0.035		0.043		
А3	0.7		1.3	0.027		0.051		
В	0.64		0.9	0.025		0.035		
B2	5.2		5.4	0.204		0.212		
В3			0.85			0.033		
B5		0.3			0.035			
B6			0.95			0.037		
С	0.45		0.6	0.017		0.023		
C2	0.48		0.6	0.019		0.023		
D	6		6.2	0.236		0.244		
E	6.4		6.6	0.252		0.260		
G	4.4		4.6	0.173		0.181		
Н	15.9		16.3	0.626		0.641		
L	9		9.4	0.354		0.370		
L1	0.8		1.2	0.031		0.047		
L2		0.8	1		0.031	0.039		
V1		10°			10°			

TO-220AB (Plastic)



	DIMENSIONS							
REF.	М	illimete	rs		Inches			
	Min.	Тур.	Max.	Min.	Тур.	Max.		
А	15.20		15.90	0.598		0.625		
a1		3.75			0.147			
a2	13.00		14.00	0.511		0.551		
В	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		
С	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		
е	2.40		2.70	0.094		0.106		
F	6.20		6.60	0.244		0.259		
I	3.75		3.85	0.147		0.151		
14	15.80	16.40	16.80	0.622	0.646	0.661		
L	2.65		2.95	0.104		0.116		
12	1.14		1.70	0.044		0.066		
I3	1.14		1.70	0.044		0.066		
М		2.60			0.102			

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