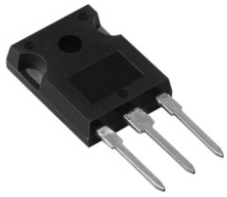
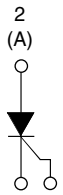
Phase Control SCR, 20 A



TO-247AC



PRODUCT SUMMARY	
V_T at 20 A	< 1.3 V
I_{TSM}	300 A
V_{RRM}	800/1200 V

DESCRIPTION/FEATURES

Pb-free Available

RoHS* COMPLIANT

The 30TPS...PbF High Voltage Series of silicon controlled rectifiers are specifically designed for medium power switching and phase control applications. The glass passivation technology used has reliable operation up to 125 °C junction temperature.

Typical applications are in input rectification (soft start) and these products are designed to be used with Vishay HPP input diodes, switches and output rectifiers which are available in identical package outlines.

This product has been designed and qualified for industrial level and lead (Pb)-free ("PbF" suffix).

MAJOR RATINGS AND CHARACTERISTICS			
PARAMETER	**TEST CONDITIONS**	**VALUES**	**UNITS**
$I_{T(AV)}$	Sinusoidal waveform	20	A
I_{RMS}		30	
V_{RRM}/V_{DRM}		800/1200	V
I_{TSM}		300	A
V_T	20 A, T_J = 25 °C	1.3	V
dV/dt		500	V/µs
dI/dt		150	A/µs
T_J		- 40 to 125	°C

VOLTAGE RATINGS			
PART NUMBER	**V_{RRM}/V_{DRM}, MAXIMUM REPETITIVE PEAK AND OFF-STATE VOLTAGE V**	**V_{RSM}, MAXIMUM NON-REPETITIVE PEAK REVERSE VOLTAGE V**	**I_{RRM}/I_{DRM} AT 125 °C mA**
30TPS08PbF	800	900	10
30TPS12PbF	1200	1300	

* Pb containing terminations are not RoHS compliant, exemptions may apply

ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	TEST CONDITIONS		VALUES	UNITS
Maximum average on-state current	$I_{T(AV)}$	T_C = 95 °C, 180° conduction half sine wave		20	A
Maximum RMS on-state current	I_{RMS}			30	
Maximum peak, one-cycle non-repetitive surge current	I_{TSM}	10 ms sine pulse, rated V_{RRM} applied		250	
		10 ms sine pulse, no voltage reapplied		300	
Maximum I^2t for fusing	I^2t	10 ms sine pulse, rated V_{RRM} applied		310	A^2s
		10 ms sine pulse, no voltage reapplied		442	
Maximum $I^2\sqrt{t}$ for fusing	$I^2\sqrt{t}$	t = 0.1 to 10 ms, no voltage reapplied		4420	$A^2\sqrt{s}$
Maximum on-state voltage drop	V_{TM}	20 A, T_J = 25 °C		1.3	V
On-state slope resistance	r_t	T_J = 125 °C		12	mΩ
Threshold voltage	$V_{T(TO)}$			1.0	V
Maximum reverse and direct leakage current	I_{RM}/I_{DM}	T_J = 25 °C	V_R = Rated V_{RRM}/V_{DRM}	0.5	mA
		T_J = 125 °C		10	
Maximum holding current	I_H	Anode supply = 6 V, resistive load, initial I_T = 1 A		100	
Maximum latching current	I_L	Anode supply = 6 V, resistive load		200	
Maximum rate of rise of off-state voltage	dV/dt			500	V/µs
Maximum rate of rise of turned-on current	dI/dt			150	A/µs

TRIGGERING

PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Maximum peak gate power	P_{GM}		8.0	W
Maximum average gate power	$P_{G(AV)}$		2.0	
Maximum peak positive gate current	+ I_{GM}		1.5	A
Maximum peak negative gate voltage	- V_{GM}		10	V
Maximum required DC gate current to trigger	I_{GT}	Anode supply = 6 V, resistive load, T_J = - 10 °C	60	mA
		Anode supply = 6 V, resistive load, T_J = 25 °C	45	
		Anode supply = 6 V, resistive load, T_J = 125 °C	20	
Maximum required DC gate voltage to trigger	V_{GT}	Anode supply = 6 V, resistive load, T_J = - 10 °C	2.5	V
		Anode supply = 6 V, resistive load, T_J = 25 °C	2.0	
		Anode supply = 6 V, resistive load, T_J = 125 °C	1.0	
Maximum DC gate voltage not to trigger	V_{GD}	T_J = 125 °C, V_{DRM} = Rated value	0.25	
Maximum DC gate current not to trigger	I_{GD}		2.0	mA

SWITCHING

PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Typical turn-on time	t_{gt}	T_J = 25 °C	0.9	µs
Typical reverse recovery time	t_{rr}	T_J = 125 °C	4	
Typical turn-off time	t_q		110	

THERMAL AND MECHANICAL SPECIFICATIONS					
PARAMETER		**SYMBOL**	**TEST CONDITIONS**	**VALUES**	**UNITS**
Maximum junction and storage temperature range		T_J, T_{Stg}		- 40 to 125	°C
Maximum thermal resistance, junction to case		R_{thJC}	DC operation	0.8	°C/W
Maximum thermal resistance, junction to ambient		R_{thJA}		40	
Maximum thermal resistance, case to heatsink		R_{thCS}	Mounting surface, smooth and greased	0.2	
Approximate weight				6	g
				0.21	oz.
Mounting torque	minimum			6 (5)	kgf · cm (lbf · in)
	maximum			12 (10)	
Marking device			Case style TO-247AC (JEDEC)	30TPS08	
				30TPS12	

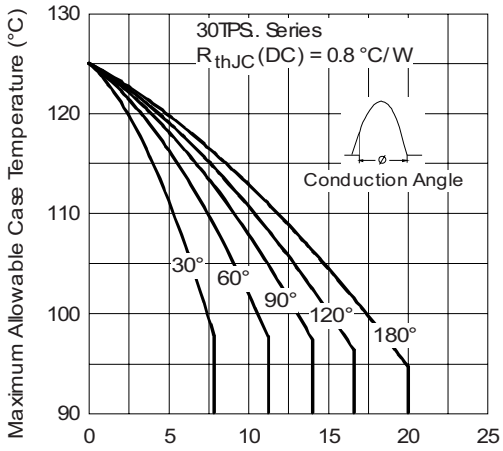


Fig. 1 - Current Rating Characteristics

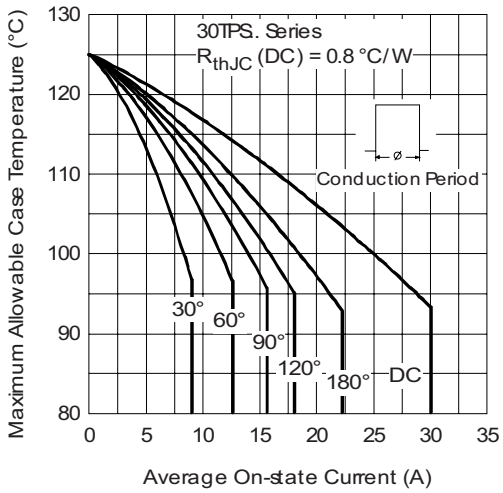


Fig. 2 - Current Rating Characteristics

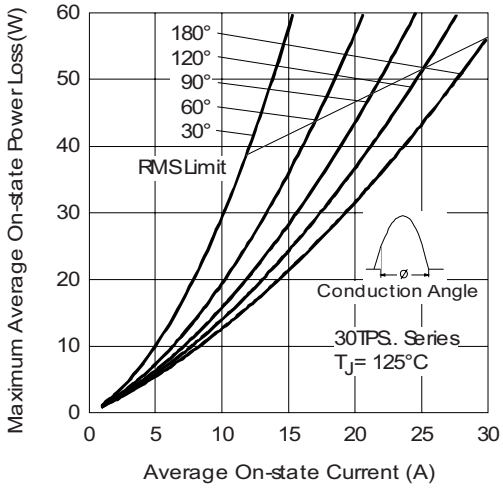


Fig. 3 - On-State Power Loss Characteristics

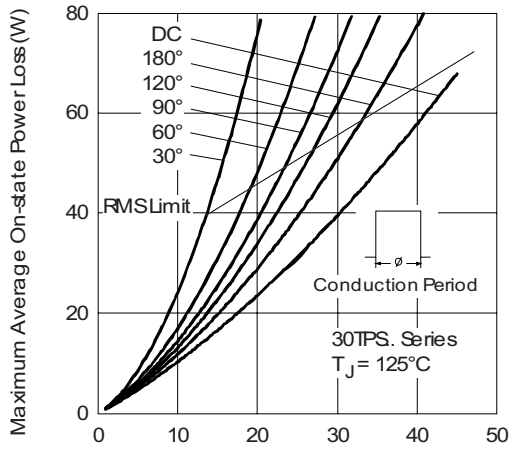


Fig. 4 - On-State Power Loss Characteristics

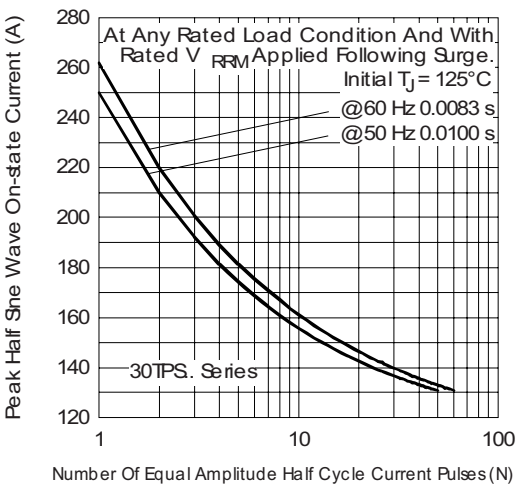


Fig. 5 - Maximum Non-Repetitive Surge Current

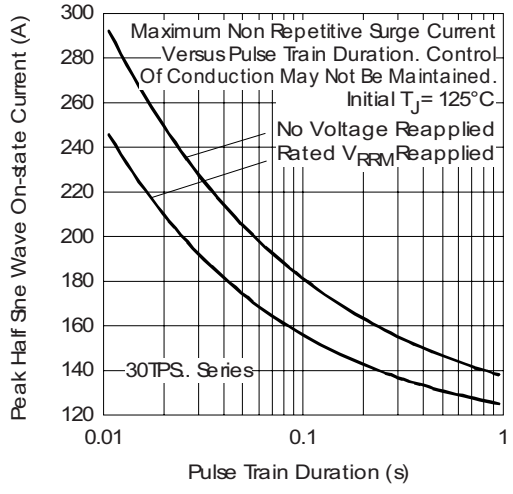


Fig. 6 - Maximum Non-Repetitive Surge Current

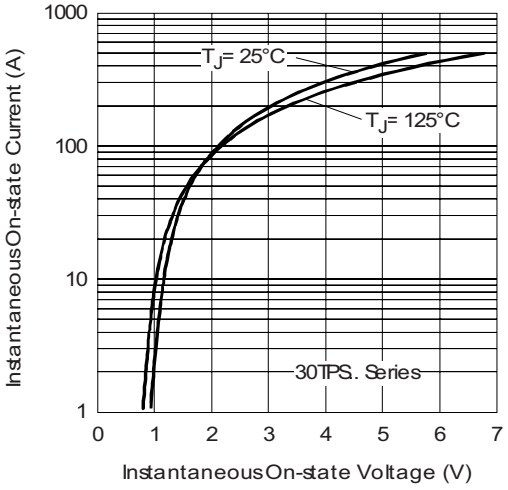


Fig. 7 - On-State Voltage Drop Characteristics

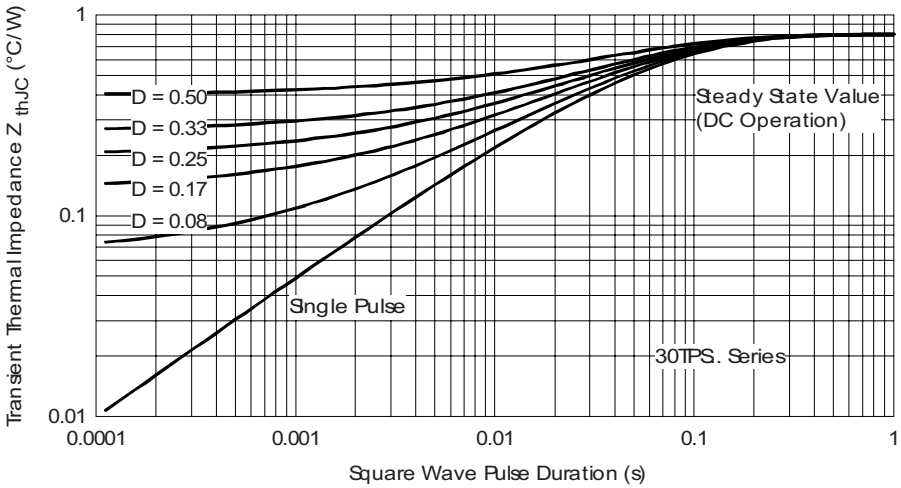


Fig. 8 - Thermal Impedance Z_{thJC} Characteristics

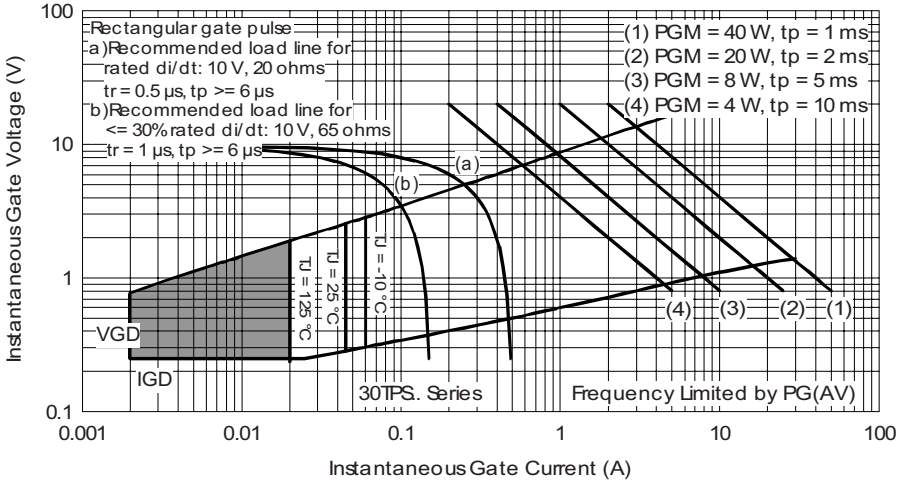


Fig. 9 - Gate Characteristics

ORDERING INFORMATION TABLE

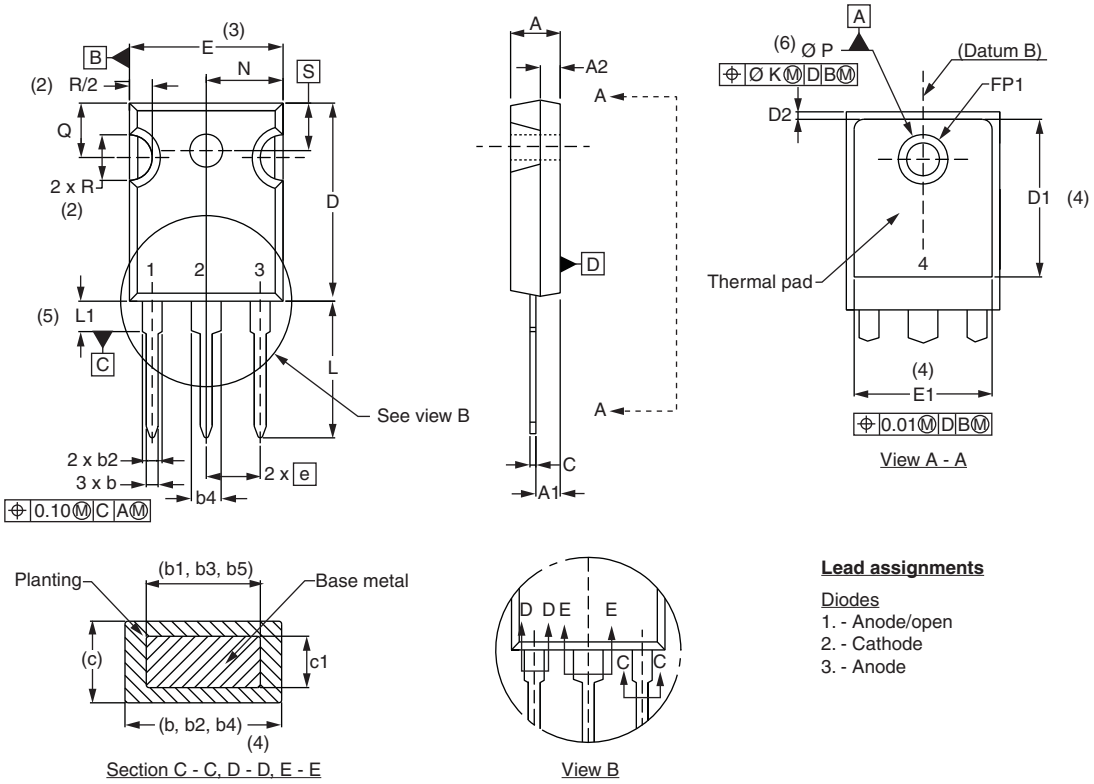
Device code

30	T	P	S	12	PbF
1	2	3	4	5	6

- 1 - Current rating (30 = 30 A)
- 2 - Circuit configuration:
  T = Thyristor
- 3 - Package:
  P = TO-247
- 4 - Type of silicon:
  S = Standard recovery rectifier
- 5 - Voltage code x 100 = V_{RRM} — 08 = 800 V, 12 = 1200 V
- 6 - • None = Standard production
  • PbF = Lead (Pb)-free

LINKS TO RELATED DOCUMENTS	
Dimensions	http://www.vishay.com/doc?95223
Part marking information	http://www.vishay.com/doc?95226

DIMENSIONS in millimeters and inches



Lead assignments

Diodes
1. - Anode/open
2. - Cathode
3. - Anode

SYMBOL	MILLIMETERS		INCHES		NOTES
	MIN.	MAX.	MIN.	MAX.	
A	4.65	5.31	0.183	0.209	
A1	2.21	2.59	0.087	0.102	
A2	1.50	2.49	0.059	0.098	
b	0.99	1.40	0.039	0.055	
b1	0.99	1.35	0.039	0.053	
b2	1.65	2.39	0.065	0.094	
b3	1.65	2.37	0.065	0.094	
b4	2.59	3.43	0.102	0.135	
b5	2.59	3.38	0.102	0.133	
c	0.38	0.86	0.015	0.034	
c1	0.38	0.76	0.015	0.030	
D	19.71	20.70	0.776	0.815	3
D1	13.08	-	0.515	-	4

SYMBOL	MILLIMETERS		INCHES		NOTES
	MIN.	MAX.	MIN.	MAX.	
D2	0.51	1.30	0.020	0.051	
E	15.29	15.87	0.602	0.625	3
E1	13.72	-	0.540	-	
e	5.46 BSC		0.215 BSC		
FK	2.54		0.010		
L	14.20	16.10	0.559	0.634	
L1	3.71	4.29	0.146	0.169	
N	7.62 BSC		0.3		
ΦP	3.56	3.66	0.14	0.144	
ΦP1	-	6.98	-	0.275	
Q	5.31	5.69	0.209	0.224	
R	4.52	5.49	1.78	0.216	
S	5.51 BSC		0.217 BSC		

Notes

(1) Dimensioning and tolerancing per ASME Y14.5M-1994
(2) Contour of slot optional
(3) Dimension D and E do not include mold flash. Mold flash shall not exceed 0.127 mm (0.005") per side. These dimensions are measured at the outermost extremes of the plastic body
(4) Thermal pad contour optional with dimensions D1 and E1
(5) Lead finish uncontrolled in L1
(6) Ø P to have a maximum draft angle of 1.5 to the top of the part with a maximum hole diameter of 3.91 mm (0.154")
(7) Outline conforms to JEDEC outline TO-247 with exception of dimension c

For technical questions within your region: DiodesAmericas@vishay.com, DiodesAsia@vishay.com, DiodesEurope@vishay.com

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