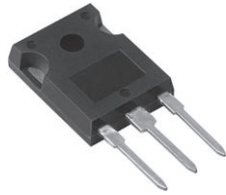
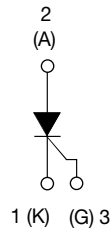




## High Voltage Phase Control Thyristor, 30 A



TO-247AC



### FEATURES

- Designed and qualified according to JEDEC-JESD47
- Compliant to RoHS Directive 2002/95/EC
- 125 °C max. operating junction temperature
- Halogen-free according to IEC 61249-2-21 definition (-M3 only)



**RoHS**  
COMPLIANT  
HALOGEN  
**FREE**  
Available

PRODUCT SUMMARY	
Package	TO-247AC
Diode variation	Single SCR
$I_{T(AV)}$	20 A
$V_{DRM}/V_{RRM}$	800 V, 1200 V
$V_{TM}$	1.3 V
$I_{GT}$	45 mA
$T_J$	- 40 °C to 125 °C

### APPLICATIONS

- Typical usage is in input rectification crowbar (soft start) and AC switch in motor control, UPS, welding and battery charge

### DESCRIPTION

The VS-30TPS... 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.

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, $T_J = 25\text{ °C}$	1.3	V
dV/dt		500	V/ $\mu$ s
dI/dt		150	A/ $\mu$ s
$T_J$		- 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
VS-30TPS08PbF, VS-30TPS08-M3	800	900	10
VS-30TPS12PbF, VS-30TPS12-M3	1200	1300	



ABSOLUTE MAXIMUM RATINGS					
PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS	
Maximum average on-state current	$I_{T(AV)}$	$T_C = 95\text{ }^\circ\text{C}$ , 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, $T_J = 25\text{ }^\circ\text{C}$	1.3	V	
On-state slope resistance	$r_t$	$T_J = 125\text{ }^\circ\text{C}$	12	$m\Omega$	
Threshold voltage	$V_{T(TO)}$		1.0	V	
Maximum reverse and direct leakage current	$I_{RM}/I_{DM}$	$V_R = \text{Rated } V_{RRM}/V_{DRM}$	$T_J = 25\text{ }^\circ\text{C}$	0.5	mA
			$T_J = 125\text{ }^\circ\text{C}$	10	
Maximum holding current	$I_H$	Anode supply = 6 V, resistive load, initial $I_T = 1\text{ A}$	100		
Maximum latching current	$I_L$	Anode supply = 6 V, resistive load	200		
Maximum rate of rise of off-state voltage	$dV/dt$		500	$V/\mu s$	
Maximum rate of rise of turned-on current	$dI/dt$		150	$A/\mu s$	

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, $T_J = -10\text{ }^\circ\text{C}$	60	mA
		Anode supply = 6 V, resistive load, $T_J = 25\text{ }^\circ\text{C}$	45	
		Anode supply = 6 V, resistive load, $T_J = 125\text{ }^\circ\text{C}$	20	
Maximum required DC gate voltage to trigger	$V_{GT}$	Anode supply = 6 V, resistive load, $T_J = -10\text{ }^\circ\text{C}$	2.5	V
		Anode supply = 6 V, resistive load, $T_J = 25\text{ }^\circ\text{C}$	2.0	
		Anode supply = 6 V, resistive load, $T_J = 125\text{ }^\circ\text{C}$	1.0	
Maximum DC gate voltage not to trigger	$V_{GD}$	$T_J = 125\text{ }^\circ\text{C}$ , $V_{DRM} = \text{Rated value}$	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	$t_{gt}$	$T_J = 25\text{ }^\circ\text{C}$	0.9	$\mu s$
Typical reverse recovery time	$t_{rr}$	$T_J = 125\text{ }^\circ\text{C}$	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	

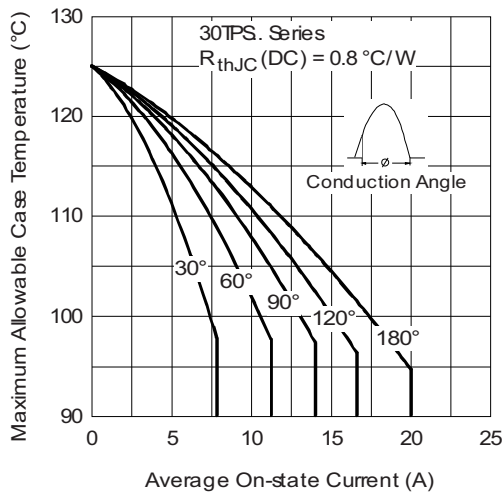


Fig. 1 - Current Rating Characteristics

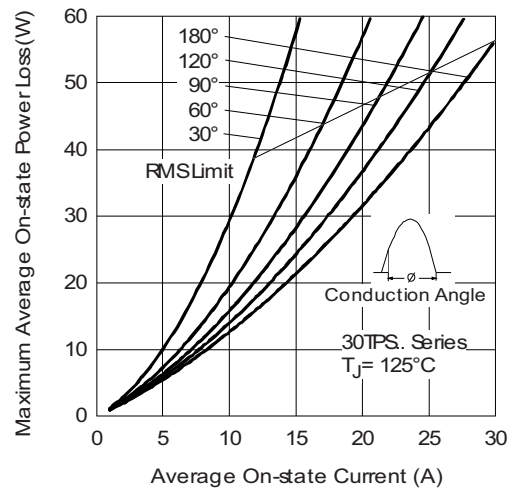


Fig. 3 - On-State Power Loss Characteristics

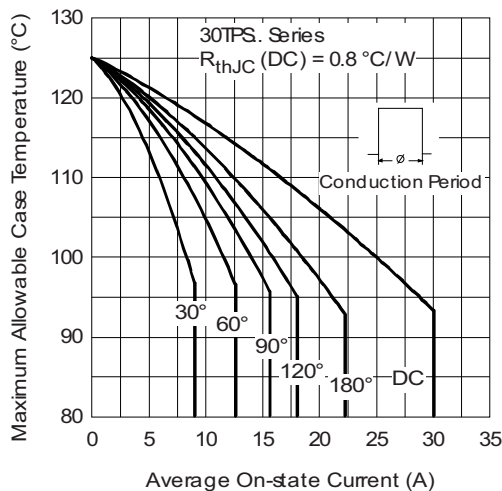


Fig. 2 - Current Rating Characteristics

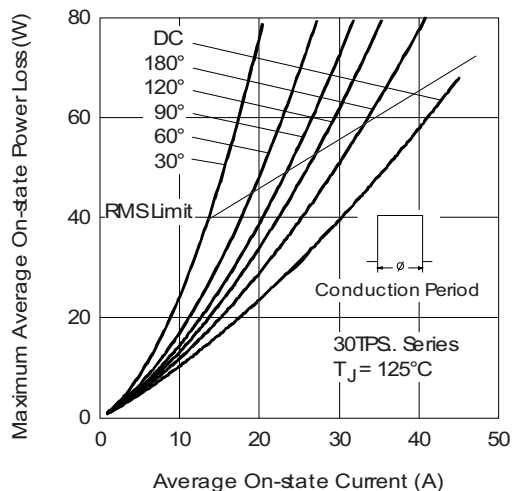


Fig. 4 - On-State Power Loss Characteristics

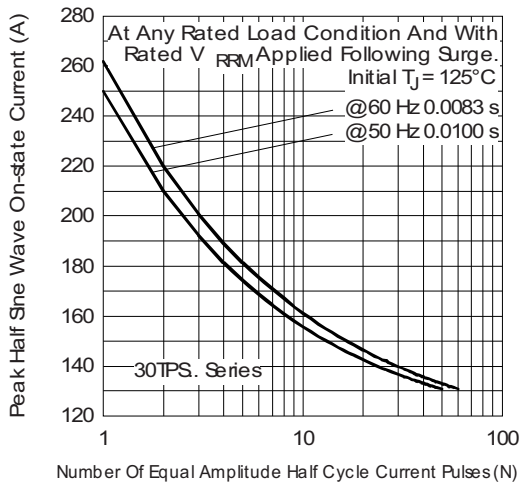


Fig. 5 - Maximum Non-Repetitive Surge Current

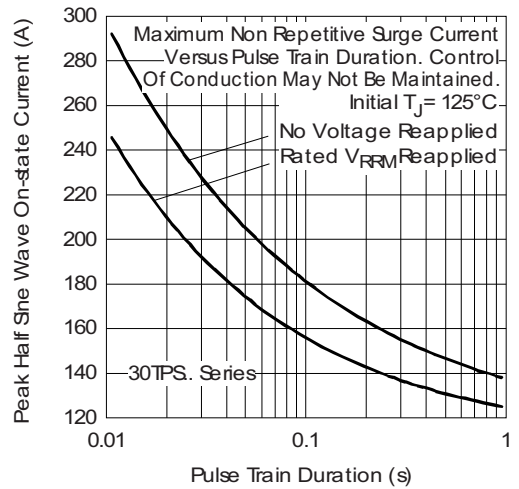


Fig. 6 - Maximum Non-Repetitive Surge Current

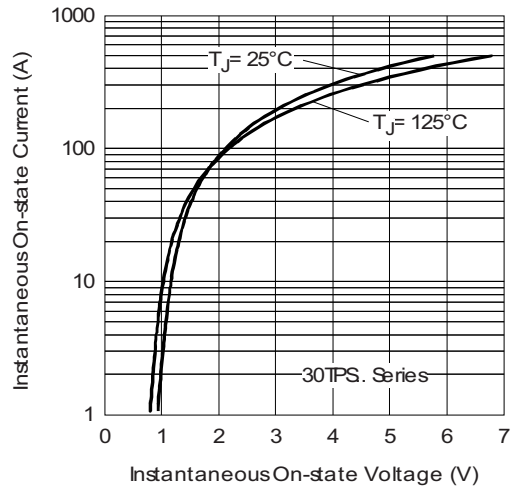


Fig. 7 - On-State Voltage Drop Characteristics

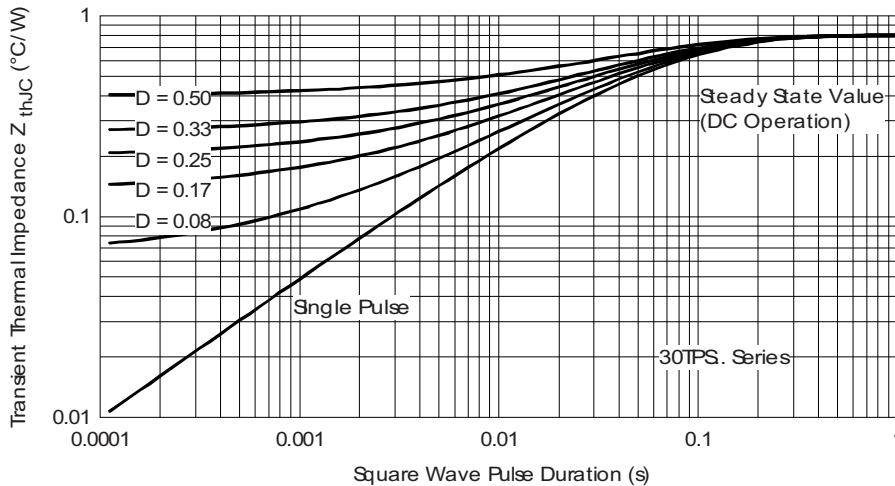


Fig. 8 - Thermal Impedance  $Z_{thJC}$  Characteristics







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