


PHASE CONTROL SCR
Lead-Free ("PbF" suffix)

	$V_T < 1.45V @ 40A$ $I_{TSM} = 500A$ $V_{RRM} = 1200V$
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Description/ Features

The 40TPS12APbF **SAFEIR** 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.

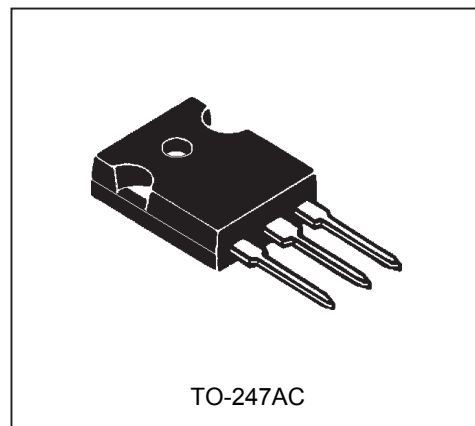
Low lgt parts available.

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

Major Ratings and Characteristics

Characteristics	Values	Units
$I_{T(AV)}$ Sinusoidal waveform	35	A
I_{RMS}	55	A
V_{RRM}/V_{DRM}	1200	V
I_{TSM}	500	A
$V_T @ 40A, T_J = 25^\circ C$	1.45	V
dv/dt	1000	V/ μs
di/dt	100	A/ μs
T_J	-40 to 125	°C

Package Outline



Voltage Ratings

Part Number	V_{RRM}/V_{DRM} max. repetitive peak and off-state voltage V	V_{RSM} , maximum non repetitive peak reverse voltage V	I_{RRM}/I_{DRM} 125°C mA
40TPS12APbF	1200	1300	10

Absolute Maximum Ratings

Parameters	40TPS..	Units	Conditions	
$I_{T(AV)}$ Max. Average On-state Current	35	A	@ $T_C = 79^\circ\text{C}$, 180° conduction half sine wave	
$I_{T(RMS)}$ Max. Continuous RMS On-state Current As AC switch	55			
I_{TSM} Max. Peak One Cycle Non-Repetitive Surge Current	500	A	10ms Sine pulse, rated V_{RRM} applied	Initial $T_J = T_J \text{ max.}$
	600		10ms Sine pulse, no voltage reapplied	
I^2t Max. I^2t for Fusing	1250	A^2s	10ms Sine pulse, rated V_{RRM} applied	
	1760		10ms Sine pulse, no voltage reapplied	
$I^2\sqrt{t}$ Max. $I^2\sqrt{t}$ for Fusing	12500	$A^2\sqrt{s}$	$t = 0.1$ to 10ms, no voltage reapplied	
$V_{T(TO)1}$ Low Level Value of Threshold Voltage	1.02	V	$T_J = 125^\circ\text{C}$	
$V_{T(TO)2}$ High Level Value of Threshold Voltage	1.23			
r_{t1} Low Level Value of On-state Slope Resistance	9.74	$m\Omega$		
r_{t2} High Level Value of On-state Slope Resistance	7.50			
V_{TM} Max. Peak On-state Voltage	1.85	V	@ 110A, $T_J = 25^\circ\text{C}$	
di/dt Max. Rate of Rise of Turned-on Current	100	$A/\mu s$	$T_J = 25^\circ\text{C}$	
I_H Max. Holding Current	150	mA		
I_L Max. Latching Current	300			
I_{RRM}/I_{DRM} Max. Reverse and Direct Leakage Current	0.5 10	mA	$T_J = 25^\circ\text{C}$	$V_R = \text{rated } V_{RRM}/V_{DRM}$
			$T_J = 125^\circ\text{C}$	
dv/dt Max. Rate of Rise of Off-state Voltage	1000	$V/\mu s$	$T_J = T_J \text{ max.}$, linear to 80% V_{DRM} , R_g -k = open	

Triggering

Parameters	40TPS..	Units	Conditions	
P_{GM} Max. peak Gate Power	10	W		
$P_{G(AV)}$ Max. average Gate Power	2.5			
I_{GM} Max. peak Gate Current	2.5	A		
$-V_{GM}$ Max. peak negative Gate Voltage	10	V	$T_J = -40^{\circ}C$	Anode supply = 6V resistive load
V_{GT} Max. required DC Gate Voltage to trigger	4.0		$T_J = 25^{\circ}C$	
	2.5		$T_J = 125^{\circ}C$	
	1.7			
I_{GT} Max. required DC Gate Current to trigger	80	mA	$T_J = -40^{\circ}C$	
	40		$T_J = 25^{\circ}C$	
	20		$T_J = 125^{\circ}C$	
V_{GD} Max. DC Gate Voltage not to trigger	0.25	V	$T_J = 125^{\circ}C, V_{DRM} = \text{rated value}$	
I_{GD} Max. DC Gate Current not to trigger	6	mA		

Thermal-Mechanical Specifications

Parameters	40TPS..	Units	Conditions	
T_J Max. Junction Temperature Range	- 40 to 125	$^{\circ}C$		
T_{stg} Max. Storage Temperature Range	- 40 to 125			
R_{thJC} Max. Thermal Resistance Junction to Case	0.6	$^{\circ}C/W$	DC operation	
R_{thJA} Max. Thermal Resistance Junction to Ambient	40			
R_{thCS} Max. Thermal Resistance Case to Heatsink	0.2		Mounting surface, smooth and greased	
wt Approximate Weight	6 (0.21)	g (oz.)		
T Mounting Torque	Min. 6 (5)	Kg-cm (lbf-in)		
	Max. 12 (10)			
Case Style	TO-247AC			
Marking Device	40TPS12A			

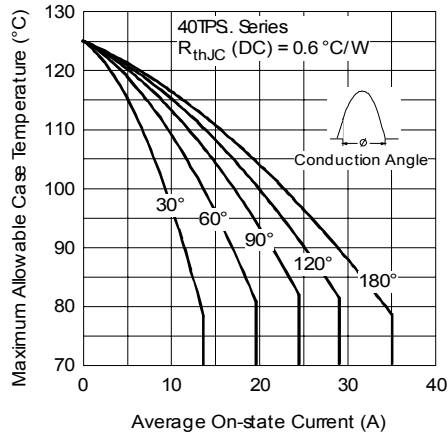


Fig. 1 - Current Rating Characteristics

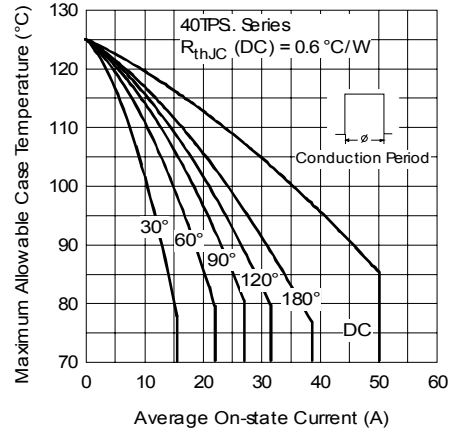


Fig. 2 - Current Rating Characteristics

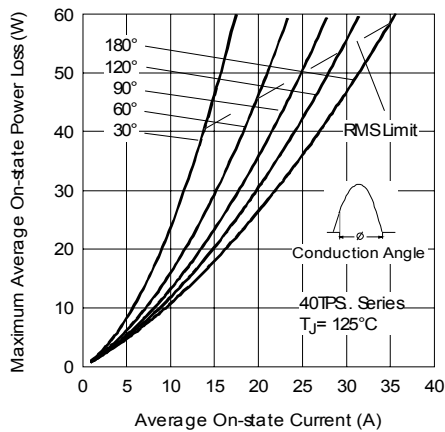


Fig. 3 - On-state Power Loss Characteristics

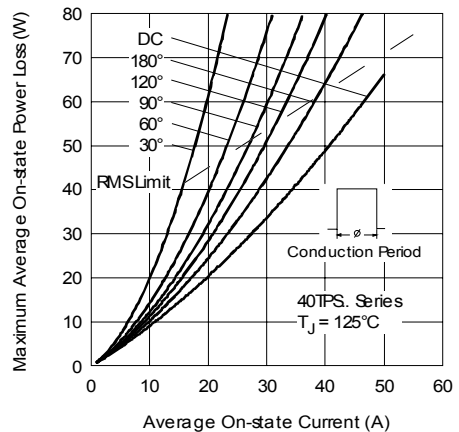


Fig. 4 - On-state Power Loss Characteristics

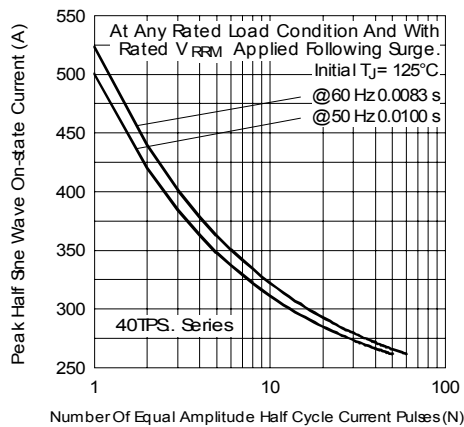


Fig. 5 - Maximum Non-Repulsive Surge Current

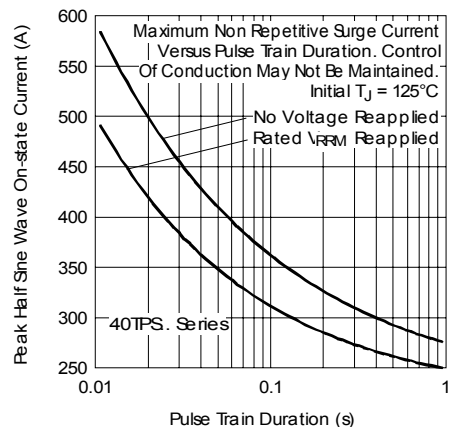


Fig. 6 - Maximum Non-Repulsive Surge Current

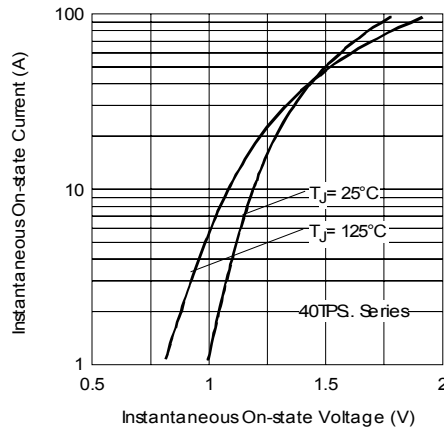


Fig. 7 - On-state Voltage Drop Characteristics

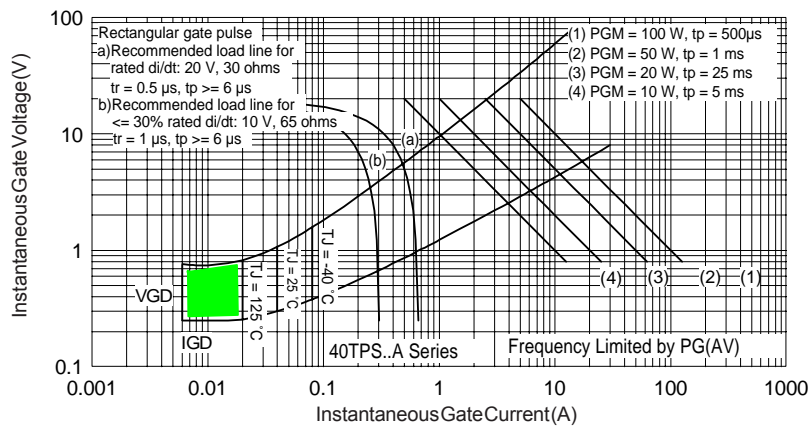


Fig. 8 - Gate Characteristics

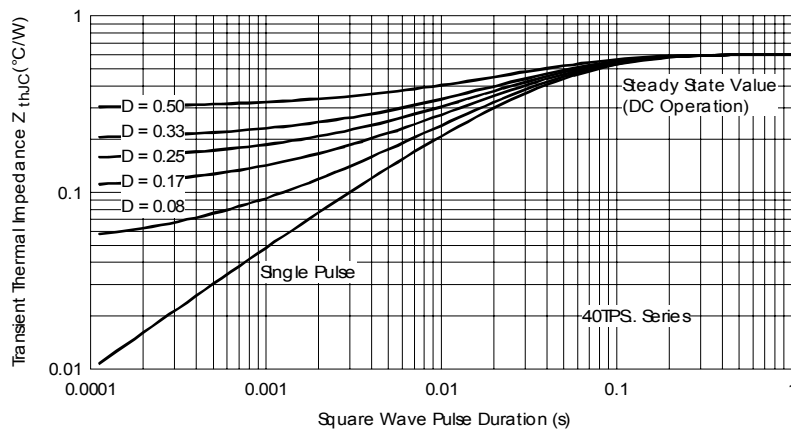
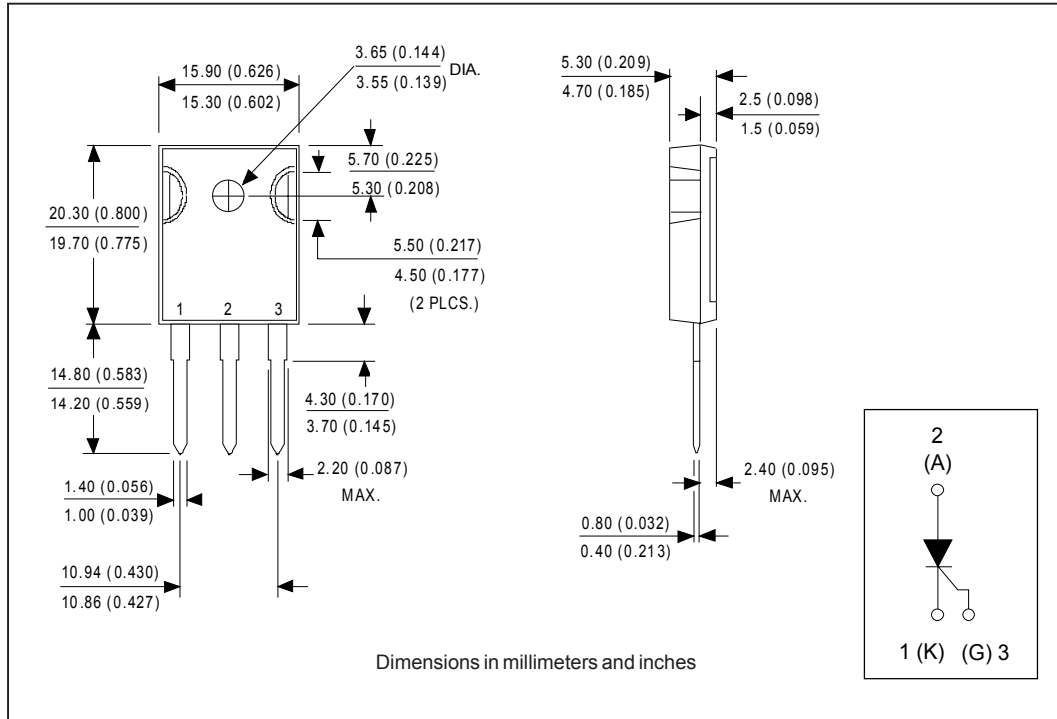
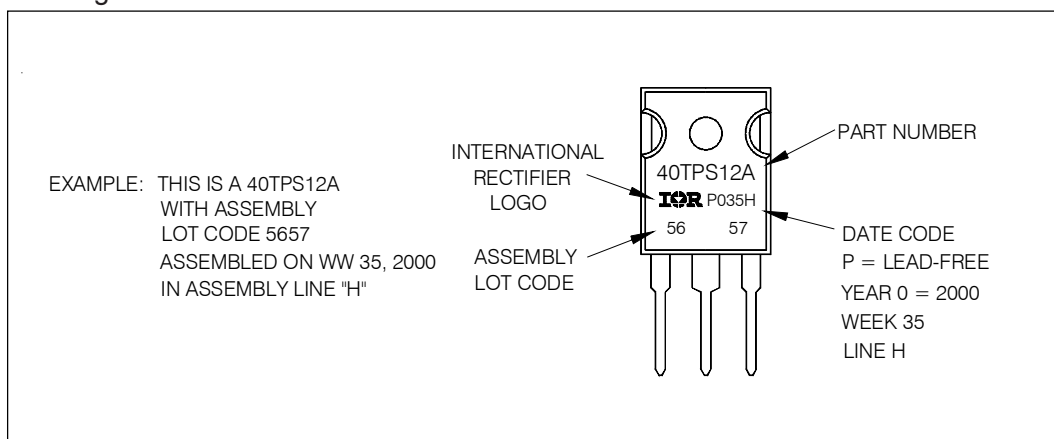


Fig. 9 - Thermal Impedance Z_{thjC} Characteristics

Outline Table



Marking Information



Ordering Information Table

Device Code	40	T	P	S	12	A	PbF
	①	②	③	④	⑤	⑥	⑦
1	-	Current Rating (40 = 40A)					
2	-	Circuit Configuration:					
		T = Thyristor					
3	-	Package:					
		T = TO-247					
4	-	Type of Silicon:					
		S = Standard Recovery Rectifier					
5	-	Voltage Rating (12 = 1200V)					
6	-	A = Low Igt selection 40mA max.					
7	-	• none = Standard Production					
		• PbF = Lead-Free					

Data and specifications subject to change without notice.
 This product has been designed and qualified for Industrial Level and Lead-Free.
 Qualification Standards can be found on IR's Web site.