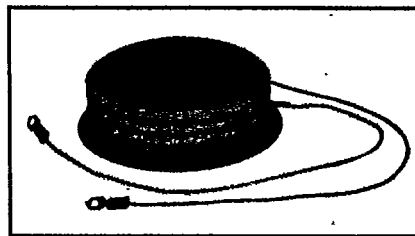
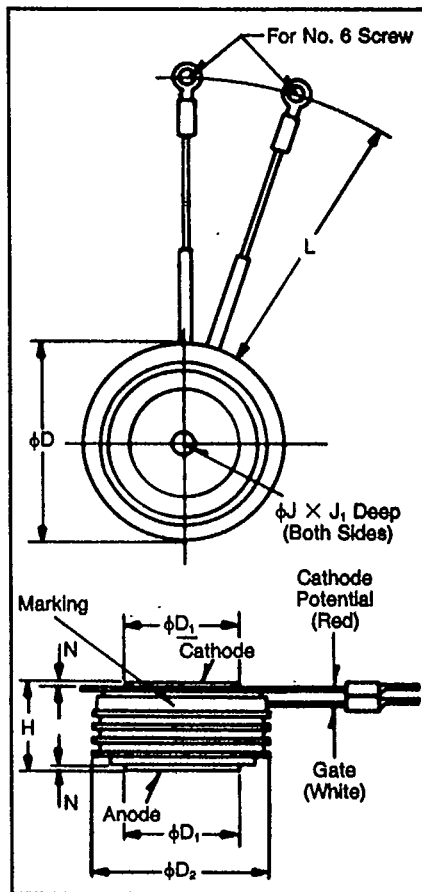


**POWEREX****TA20**

Powerex, Inc. Hillis Street, Youngwood, Pennsylvania 15697 (412) 925-7272  
 Powerex Europe, S.A., 428 Ave. G. Durand, BP107, 72003 LeMans, France (43) 72.75.15

## Phase Control SCR

1200-1400 Amperes Avg  
 2400-4000 Volts



**TA20**  
**Phase Control SCR**  
 1200-1400 Amperes/2400-4000 Volts

**Description**

Powerex Silicon Controlled Rectifiers (SCR) are designed for phase control applications. These are all-diffused, Press-Pak (Pow-R-Disc) devices employing the field-proven amplifying (di/namic) gate.

**Features:**

- Low On-State Voltage
- High di/dt
- High dv/dt
- Hermetic Packaging
- Excellent Surge and I<sup>2</sup>t Ratings

**Applications:**

- Power Supplies
- Battery Chargers
- Motor Control
- Light Dimmers
- VAR Generators

**Ordering Information**

Example: Select the complete eight digit part number you desire from the table - i.e. TA202412 is a 2400 Volt, 1200 Ampere Phase Control SCR.

Type	Voltage		Current	
	V <sub>onm</sub>	Code	I <sub>r</sub> (avg)	Code
TA20	2400	24	1200	12
	2600	26		
	2800	28	1400	14
	3000	30		
	3200	32		
	3400	34		
	3600	36		
	3800	38		
4000	40			

### TA2 Outline Drawing

Dimensions	Inches		Millimeters	
	Min.	Max.	Min.	Max.
$\phi D$	3.910	3.950	99.31	100.33
$\phi D_1$	2.470	2.480	62.74	63.00
$\phi D_2$	3.440	3.560	87.38	90.42
H	1.260	1.300	32.00	33.02
$\phi J$	.135	.145	3.43	3.68
$J_1$	.075	.090	1.91	2.29
L	11.50	12.50	292.10	317.50
N	.050	—	1.27	—

Creep Distance—1.40 in. min. (35.56 mm)  
 Strike Distance—.98 in. min. (24.89 mm).  
 (In accordance with NEMA standards.)  
 Finish—Nickel Plate.  
 Approx. Weight—2.1 lb. (950 g).

1. Dimension "H" is a clamped dimension.



Powerex, Inc., Hillis Street, Youngwood, Pennsylvania 15697 (412) 925-7272

Powerex Europe, S.A., 428 Ave. G. Durand, BP107, 72003 LeMans, France (43) 72.75.15

### TA20

Phase Control SCR

1200-1400 Amperes Avg/2400-4000 Volts

### Absolute Maximum Ratings

	Symbol	TA20 -- 12	TA20 -- 14	Units
RMS On-State Current	$I_{T(RMS)}$	1800	2200	Amperes
Average On-State Current	$I_{T(av)}$	1200	1400	Amperes
Peak One-Cycle Surge (Non Repetitive) On-State Current (60Hz) <sup>①</sup>	$I_{TSM}$	23,500	25,000	Amperes
Peak One-Cycle Surge (Non-Repetitive) On-State Current (50Hz) <sup>①</sup>	$I_{TSM}$	21,450	22,800	Amperes
Critical Rate-of-Rise of On-State Current (Non-Repetitive) <sup>① ② ③</sup>	di/dt	400	400	Amperes/ $\mu$ s
Critical Rate-of-Rise of On-State Current (Repetitive)	di/dt	150	150	Amperes/ $\mu$ s
I <sup>2</sup> t (for Fusing), One Cycle at 60Hz	I <sup>2</sup> t	$1.67 \times 10^6$	$2.6 \times 10^6$	A <sup>2</sup> sec
Peak Gate Power Dissipation	$P_{GM}$	16	16	Watts
Average Gate Power Dissipation	$P_{G(av)}$	3	3	Watts
Storage Temperature	$T_{STG}$	-40 to 150	-40 to 150	°C
Operating Temperature	$T_J$	-40 to 125	-40 to 125	°C
Mounting Force <sup>④</sup>		9000 to 11,000	9000 to 11,000	lb.
Mounting Force <sup>④</sup>		4100 to 5000	4100 to 5000	kg

### Electrical and Thermal Characteristics

	Symbol	Test Conditions	TA20 -- 12	TA20 -- 14	Units
<b>Current—Conducting State Maximums</b>					
Peak On-State Voltage	$V_{TM}$	$I_{TM} = 3000A, T_J = 25^\circ C$	3.15	2.50	Volts
TA20					
<b>Voltage—Blocking State Maximums<sup>①</sup></b>					
Forward Leakage, Peak	$I_{DRM}$	$T_J = 125^\circ C, V_{DRM} = \text{rated}$	250		mA
Reverse Leakage, Peak	$I_{RRM}$	$T_J = 125^\circ C, V_{RRM} = \text{rated}$	250		mA
<b>Switching</b>					
Typical Turn-Off Time	$t_q$	$I_T = 250A, T_J = 125^\circ C,$ $di_r/dt = 50A/\mu\text{sec}, \text{reapplied}$ $dv/dt = 20V/\mu\text{sec linear to } 0.8V_{DRM}$	400		$\mu\text{sec}$
Typical Turn-On Time <sup>②</sup>	$t_{on}$	$I_{TM} = 1000A, V_D = 1500V$	8.0		$\mu\text{sec}$
Min. Critical dv/dt exponential to $V_{DRM}$ <sup>③</sup>	dv/dt	$T_J = 125^\circ C$	300		V/ $\mu\text{sec}$
<b>Thermal</b>					
Maximum Thermal Resistance, <sup>④</sup> double sided cooling					
Junction to Case	$R_{\theta JC}$		.015		°C/Watt
Case to Sink, Lubricated	$R_{\theta CS}$		.007		°C/Watt
<b>Gate—Maximum Parameters</b>					
Gate Current to Trigger	$I_{GT}$	$T_J = 25^\circ C, V_D = 12V$	200		mA
Gate Voltage to Trigger	$V_{GT}$	$T_J = 25^\circ C, V_D = 12V$	3.0		Volts
Non-Triggering Gate Voltage	$V_{GDM}$	$T_J = 125^\circ C, \text{rated } V_{DRM}$	.15		Volts
Peak Forward Gate Current	$I_{GTM}$		4		Amperes
Peak Reverse Gate Voltage	$V_{GRM}$		5		Volts

① Consult recommended mounting procedures.

② Applies for zero or negative gate bias.

③ Per JEDEC RS-397, 5.2.2.1.

④ With recommended gate drive.

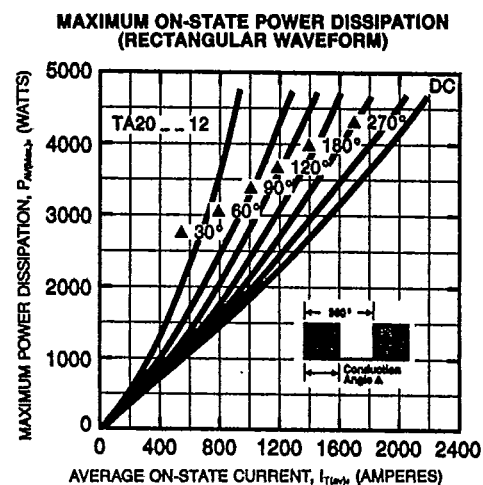
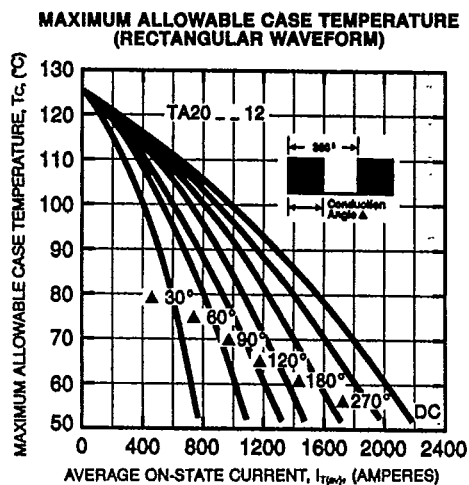
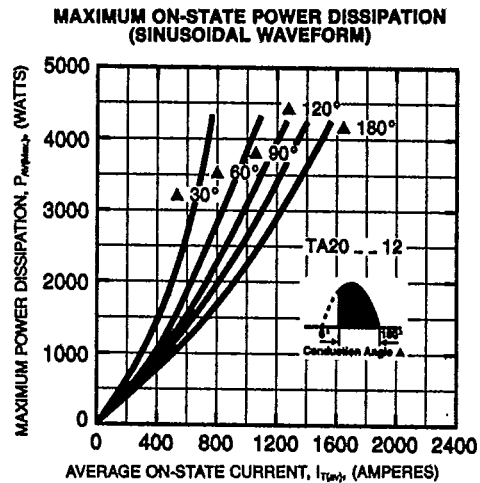
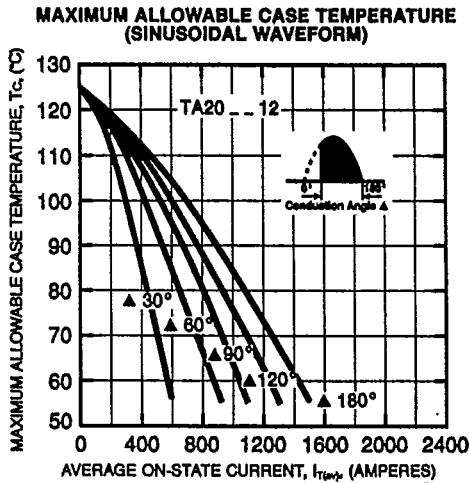
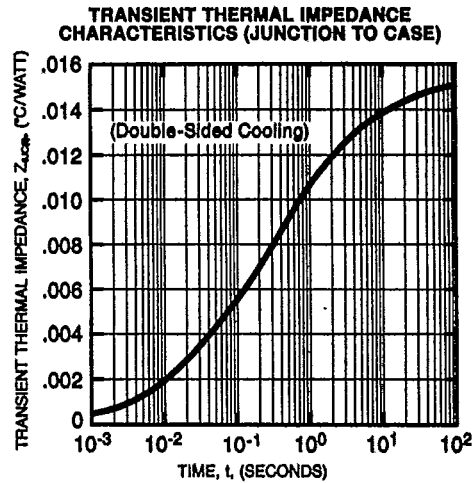
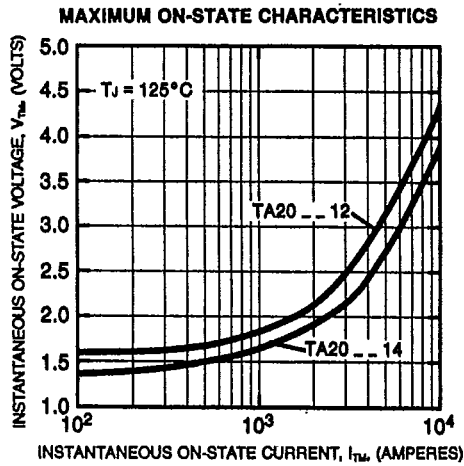
⑤ Higher dv/dt ratings available, consult factory.

⑥ Per JEDEC standard RS-397, 5.2.2.6.



Powerex, Inc., Hillis Street, Youngwood, Pennsylvania 15697 (412) 925-7272  
 Powerex Europe, S.A., 428 Ave. G. Durand, BP107, 72003 LeMans, France (43) 72.75.15

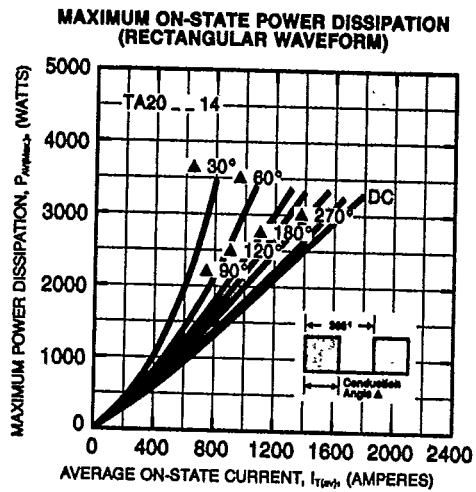
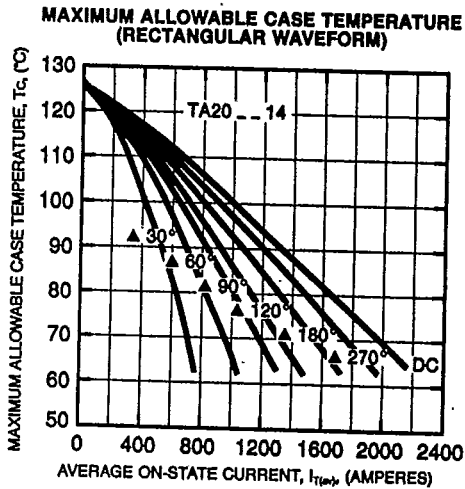
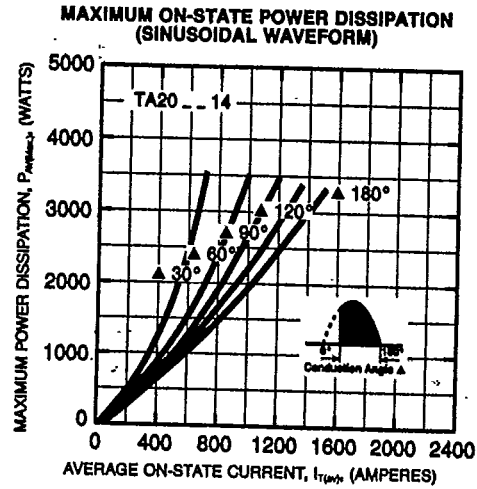
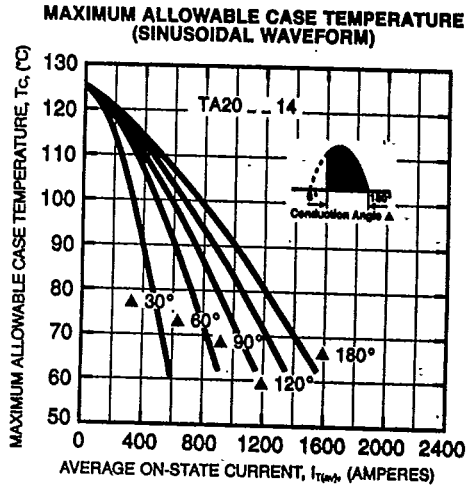
**TA20**  
 Phase Control SCR  
 1200-1400 Amperes Avg/2400-4000 Volts





Powerex, Inc., Hillis Street, Youngwood, Pennsylvania 15697 (412) 925-7272  
 Powerex Europe, S.A., 428 Ave. G. Durand, BP107, 72003 LeMans, France (43) 72:75.15

TA20  
 Phase Control SCR  
 1200-1400 Amperes Avg/2400-4000 Volts





T-91-01

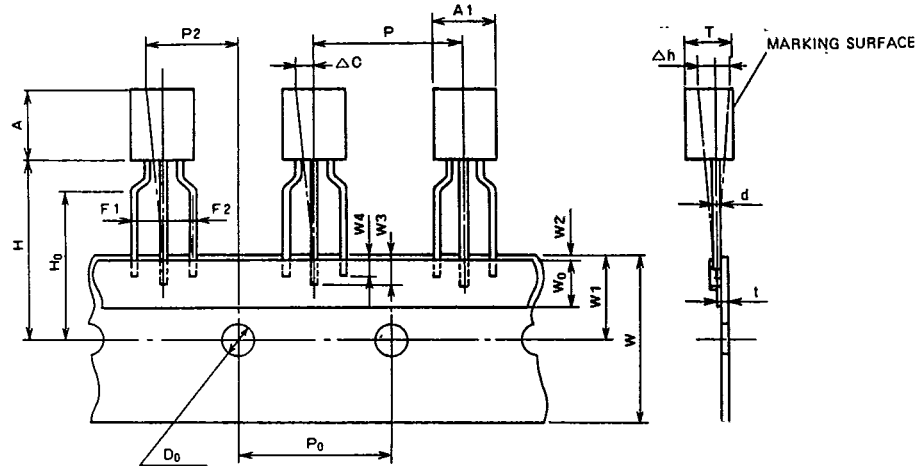
Powerex, Inc., Hillis Street, Youngwood, Pennsylvania 15697 (412) 925-7272  
 Powerex Europe, S.A., 428 Avenue G. Durand, BP107, 72003 Le Mans, France (43) 41.14.14

## Taping

### STANDARD SPECIFICATIONS FOR TAPING OF MOLDED PACKAGE THYRISTORS AND TRIACS

#### TO-92 Package

Thyristor  
CR02AM, CR03AM, CR04AM  
Triac  
BCR1AM



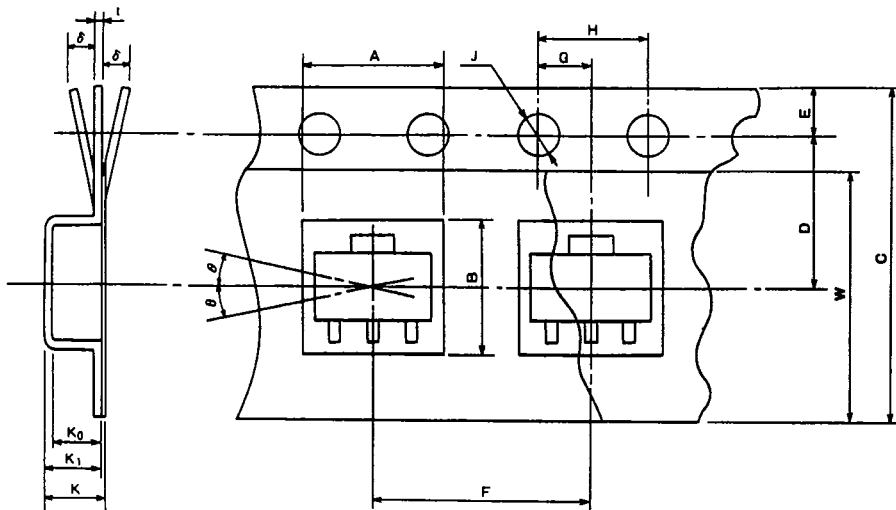
Taping dimensions

Description of symbol	Symbol	Dimensions (Unit:mm)	Remark
Product width	A1	5.0 MAX	
Product height	A	5.0 MAX	
Product thickness	T	3.7 MAX	
Lead wire diameter	d	0.6 MAX	
Sticker lead wire length (1)	W3	2.5 MIN	
Sticker lead wire length (2)	W4	2.0 MIN	
Pitch between products	P	12.7 ± 1.0	
Feed hole pitch	P <sub>0</sub>	12.7 ± 0.3	The cumulative pitch error is ± 1mm per 20 pitches.
Feed hole deviation (1)	P2	6.35 ± 1.3	
Distance between lead wires	F1, F2	2.5 ± 0.4	
Defective product (1)	Δh	0 ± 2.0	
Tape width	W	18.0 ± <sup>1.0</sup> / <sub>0.5</sub>	
Sticker tape width	W <sub>0</sub>	6.0 ± 0.5	
Feed hole deviation (2)	W1	9.0 ± 0.5	
Sticker tape deviation	W2	0.5 MAX	
Position of product bottom surface	H	17.5 MIN	
Lynch height of lead wire	H <sub>0</sub>	16.0 ± 0.5	
Feed hole diameter	D <sub>0</sub>	4.0 ± 0.2	
Tape thickness	t	0.7 ± 0.2	
Defective product (2)	ΔC	0 ± 1.0	



Powerex, Inc., Hills Street, Youngwood, Pennsylvania 15697 (412) 925-7272  
 Powerex Europe, S.A., 428 Avenue G. Durand, BP107, 72003 Le Mans, France (43) 41.14.14

Powerex Semiconductor Data Book  
 Taping



SOT-89 Package

Thyristor  
 CR08AS

Taping dimensions

Description of symbol		Symbol	Dimensions/angles Unit:mm	Remark
Parts Insertion	Height	A	$5.0 \pm 0.1$	Cross-section of the surface 0.5mm above the Inner bottom
	Width	B	$4.6 \pm 0.1$	Cross-section of the surface 0.5mm above the inner bottom
Concave square hole	Depth	$K_0$	$1.8 \pm 0.1$	Inner space
	Pitch	F	$8.0 \pm 0.1$	Cumulative error +0.1/-0.3 MAX/10 pitches
Round feed hole	Diameter	J	$\phi 1.5 \pm 0.05$	
	Pitch	H	$4.0 \pm 0.1$	Cumulative error +0.1/-0.3 MAX/10 pitches
	Position	E	$1.5 \pm 0.1$	Distance between the tape edge and the hole center
Distance between center lines	Vertical	G	$2.0 \pm 0.5$	Center line of concave square hole and round feed hole
	Horizontal	D	$5.65 \pm 0.05$	Center line of concave square hole and round feed hole
Cover tape	Width	W	$9.5 + 0.3/-0$	Thickness: 0.1 MAX
Carrier tape	Width	C	$12 \pm 0.2$	Warp $\pm 0.3$ MAX
	Thickness	t	$0.3 \pm 0.05$	
	Package hole depth	$K_1$	$2.1 \pm 0.1$	
Device	Package dimensions	—	—	As shown in (e)
	Inclination	$\theta$	30° MAX.	
Total Thickness		K	$2.3 \pm 0.1$	Total thickness including cover and carrier tapes