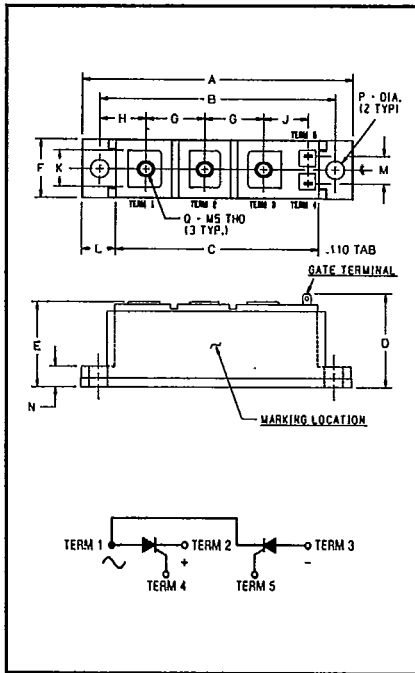




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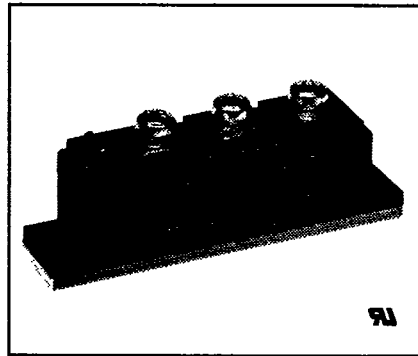
CD4A \_\_\_ 90

**Dual SCR**  
**POW-R-BLOK™ Module**  
**90 Amperes/1200-1600 Volts**



**1200-1600 Volts CD4A \_\_\_ 90**  
**Outline Drawing**

Dimension	Inches		Millimeters	
	Min.	Max.	Min.	Max.
A	3.602	3.640	91.49	92.45
B	3.146	3.154	79.91	80.11
C	2.705	2.735	68.71	69.47
D	1.24	1.28	31.50	32.51
E	1.125	1.165	28.58	29.59
F	.795	.805	20.19	20.45
G	.788	.798	19.76	20.27
H	.608	.628	15.44	15.95
J	.585	.605	14.86	15.36
K	.480	.520	12.19	13.21
L	.43	.47	10.92	11.94
M	.36	.40	9.14	10.16
N	.265	.285	6.73	7.24
P	.245	.255	6.22	6.48
Q	—	—	M5 x 0.8	



**CD4A \_\_\_ 90**  
**Dual SCR POW-R-BLOK™ Module**  
 90 Amperes/1200-1600 Volts

**Ordering Information**

Example: Select the complete eight digit rating module part number you desire from the table — i.e. CD4A1290 is a 1200 Volt, 90 Ampere Dual SCR POW-R-BLOK™ Module.

Type	V <sub>RRM</sub> Volts (x100)	Current Rating Amperes (90)
CD4A	12	90
	14	
	16	

**Description**

Powerex Dual SCR POW-R-BLOK™ Modules combine multiple power semiconductor devices in a single, electrically isolated module. This dense, cost-effective packaging is made possible by Powerex's proprietary *glass passivation* process, in which each semiconductor junction is sealed with a protective layer of glass. Exhaustive testing at high voltages and high temperatures has demonstrated the excellent parameter stability of these glass-protected products.

The POW-R-BLOK™ features a self-contained electrical isolation system. The use of BeO ceramic isolators with high thermal conductivity has achieved excellent circuit-to-baseplate isolation ( $\geq 2500$  volts RMS), while maintaining efficient cooling of the semiconductors. POW-R-BLOK™ has been tested and recognized by Underwriters Laboratories (QQX2 Power Switching Semiconductors).

**Features:**

- Glass Passivated Chips
- Hybrid Construction
- Isolated Base Plate
- Low Thermal Impedance
- Metal Base Plate
- UL Recognized
- Quick Connect Gate Terminals
- High dv/dt
- Low Gate Sensitivity

**Applications:**

- Motor Speed Control
- Battery Chargers
- Tap Changers
- Transfer Switches
- Lighting Controls
- Power Line Applications of 120, 240 or 480 Volts

**Benefits:**

- No Additional Insulating Components Required
- Easy Installation
- Reduced Engineering Time
- Improved Heat Transfer
- Voltage Stability



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CD4A — 90  
 Dual SCR POW-R-BLOK™ Module  
 90 Amperes/1200-1600 Volts

### Absolute Maximum Ratings

Characteristics	Symbol	CD4A1290	CD4A1490	CD4A1690	Units
Peak Forward Blocking Voltage	$V_{DRM}$	1200	1400	1600	Volts
Peak Reverse Blocking Voltage	$V_{RRM}$	1200	1400	1600	Volts
Transient Peak Reverse Blocking Voltage (Non-Repetitive) $t < 5$ ms	$V_{RSM}$	1450	1700	1950	Volts



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CD4A \_\_\_ 90  
Dual SCR POW-R-BLOK™ Module  
90 Amperes/1200-1600 Volts

### Absolute Maximum Ratings

Characteristics	Symbol	CD4A ___ 90	Units
RMS On-State Current	$I_{T(RMS)}$	145	Amperes
Average On-State Current	$I_{T(AV)}$	90	Amperes
Peak One-Cycle Surge (Non-Repetitive) On-State Current (60Hz)	$I_{TSM}$	1925	Amperes
Peak Three-Cycle Surge (Non-Repetitive) On-State Current (60Hz)	$I_{TSM}$	1390	Amperes
Peak Ten-Cycle Surge (Non-Repetitive) On-State Current (60Hz)	$I_{TSM}$	1250	Amperes
Peak One-Cycle Surge (Non-Repetitive) On-State Current (50Hz)	$I_{TSM}$	1755	Amperes
$I^2t$ (for Fusing), 8.3 milliseconds	$I^2t$	15375	A <sup>2</sup> sec
Critical Rate-of-Rise of On-State Current $\text{\textcircled{1}}$ (Non-Repetitive)	$di/dt$	800	Amperes/ $\mu$ s
Peak Gate Power Dissipation	$P_{GM}$	16	Watts
Average Gate Power Dissipation	$P_{G(AV)}$	3.0	Watts
Peak Forward Gate Voltage	$V_{GFM}$	10	Volts
Peak Reverse Gate Voltage	$V_{GRM}$	5.0	Volts
Peak Forward Gate Current	$I_{GFM}$	4.0	Amperes
Storage Temperature	$T_{STG}$	-40 to 150	°C
Operating Temperature	$T_J$	-40 to 125	°C
Maximum Mounting Torque M6 Mounting Screw	—	50	in.-lb.
Maximum Terminal Torque M5 Terminal Screw	—	35	in.-lb.
Module Weight (Typical)	—	142	Grams
V Isolation	$V_{RMS}$	2500	Volts

$\text{\textcircled{1}}$  Per JEDEC STD RS-397, 5.2.26.



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CD4A \_\_\_ 90  
Dual SCR POW-R-BLOK™ Module  
90 Amperes/1200-1600 Volts

### Electrical and Thermal Characteristics, $T_J = 25^\circ\text{C}$ unless otherwise specified

Characteristic	Symbol	Test Conditions	CD4A ___ 90	Units
<b>Blocking State Maximums</b>				
Forward Leakage Current, Peak	$I_{\text{DRM}}$	$T_J = 125^\circ\text{C}$ , $V_{\text{DRM}} = \text{rated}$	15	mA
Reverse Leakage Current, Peak	$I_{\text{RRM}}$	$T_J = 125^\circ\text{C}$ , $V_{\text{RRM}} = \text{rated}$	15	mA
<b>Conducting State Maximums</b>				
Peak On-State Voltage	$V_{\text{TM}}$	$I_{\text{TM}} = 250\text{A}$	1.55	Volts
<b>Switching Minimums</b>				
Critical Rate of Rise of Off-State Voltage	dv/dt	$T_J = 125^\circ\text{C}$ , Exponential to $V_{\text{DRM}}$	1000	Volts/ $\mu\text{sec}$
Typical Turn-Off Time	$t_q$	$I_{\text{TM}} = 50\text{A}$ , $T_J = 125^\circ\text{C}$ , $di_p/dt = 5\text{A}/\mu\text{s}$ reapplied dv/dt = $20\text{V}/\mu\text{s}$ linear to $0.8 V_{\text{DRM}}$	100	$\mu\text{sec}$
Typical Turn-On Time	$t_{\text{on}}$	$I_{\text{TM}} = 100\text{A}$ , $V_D = 100\text{V}$	4	$\mu\text{sec}$
<b>Thermal Maximums</b>				
Thermal Resistance, Junction to Case	$R_{\theta\text{JC}}$	Per Device	0.28	$^\circ\text{C}/\text{Watt}$
Thermal Resistance, Case to Sink Lubricated	$R_{\theta\text{CS}}$	Per Device	0.2	$^\circ\text{C}/\text{Watt}$
<b>Gate Parameters Maximums</b>				
Gate Current to Trigger	$I_{\text{GT}}$	$V_D = 12\text{V}$	100	mA
Gate Voltage to Trigger	$V_{\text{GT}}$	$V_D = 12\text{V}$	3.0	Volts
Non-Triggering Gate Voltage	$V_{\text{GDM}}$	$T_J = 125^\circ\text{C}$ , $V_D = V_{\text{DRM}}$	0.15	Volts

#### WARNING:

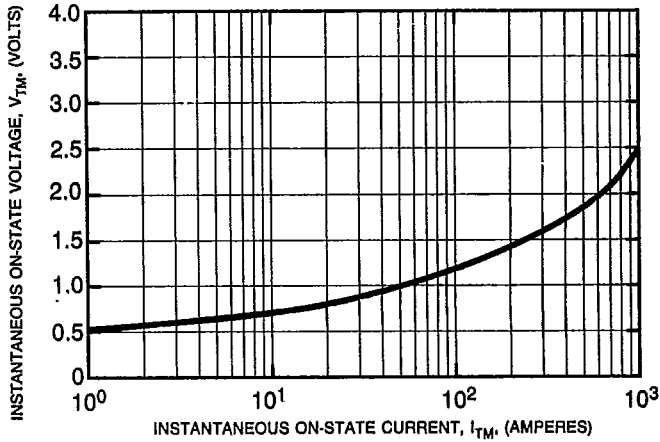
Internal insulation used is Beryllium Oxide. User should avoid grinding, crushing or abrading these portions. Care must be exercised in properly disposing of unwanted modules.



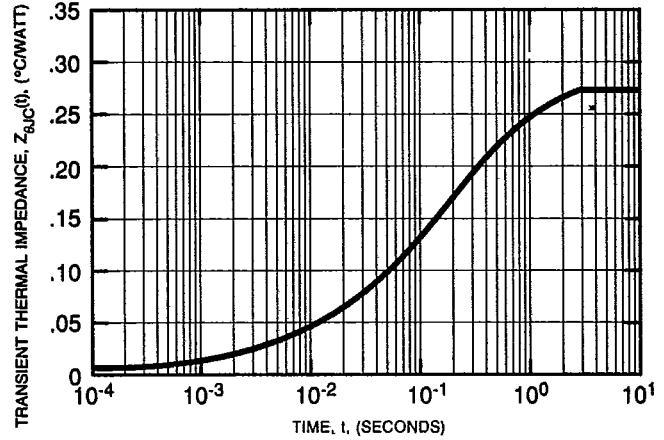
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CD4A 90  
 Dual SCR POW-R-BLOK™ Module  
 90 Amperes/1200-1600 Volts

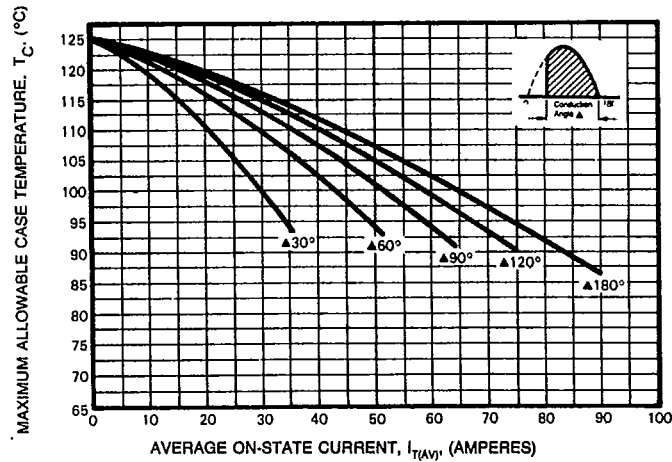
MAXIMUM ON-STATE CHARACTERISTICS



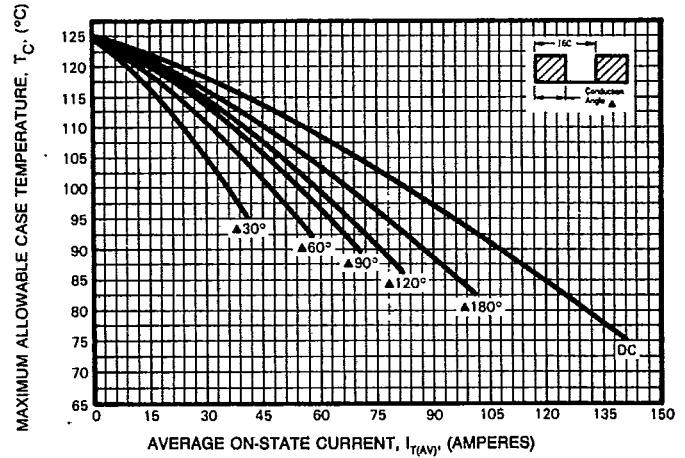
TRANSIENT THERMAL IMPEDANCE CHARACTERISTICS (JUNCTION TO CASE)



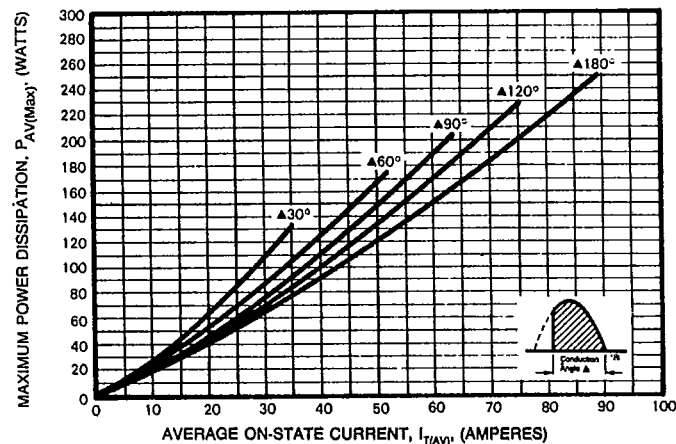
MAXIMUM ALLOWABLE CASE TEMPERATURE



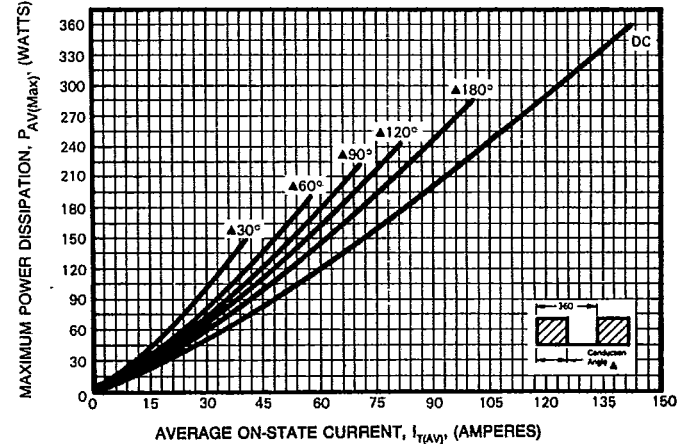
MAXIMUM ALLOWABLE CASE TEMPERATURE



MAXIMUM ON-STATE POWER DISSIPATION



MAXIMUM ON-STATE POWER DISSIPATION





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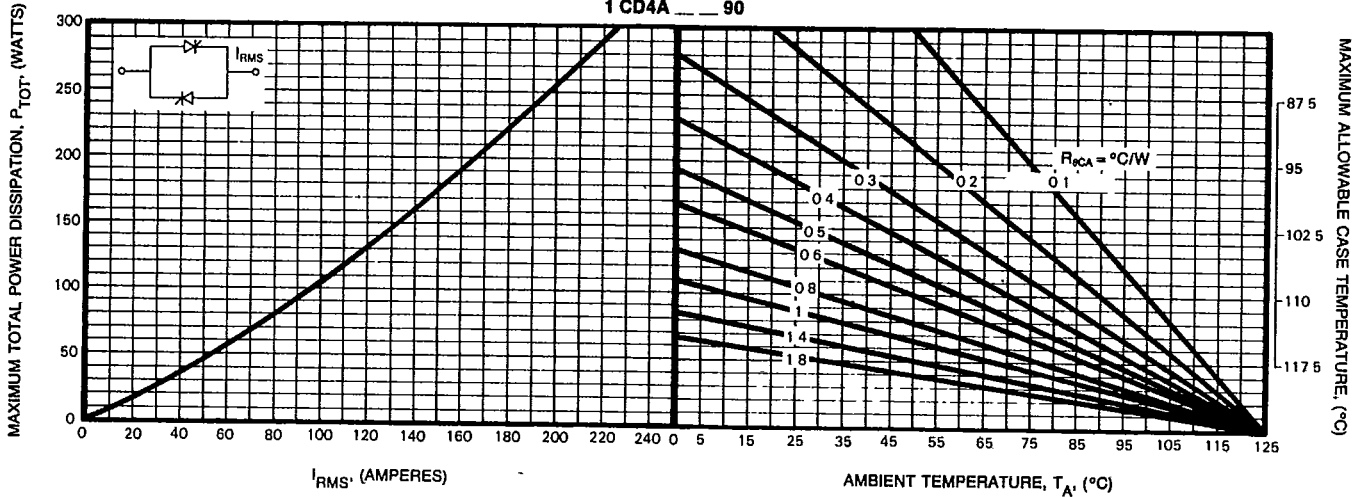
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CD4A — 90  
Dual SCR POW-R-BLOK™ Module  
90 Amperes/1200-1600 Volts

**MAXIMUM TOTAL POWER DISSIPATION AND MAXIMUM AMBIENT TEMPERATURES**

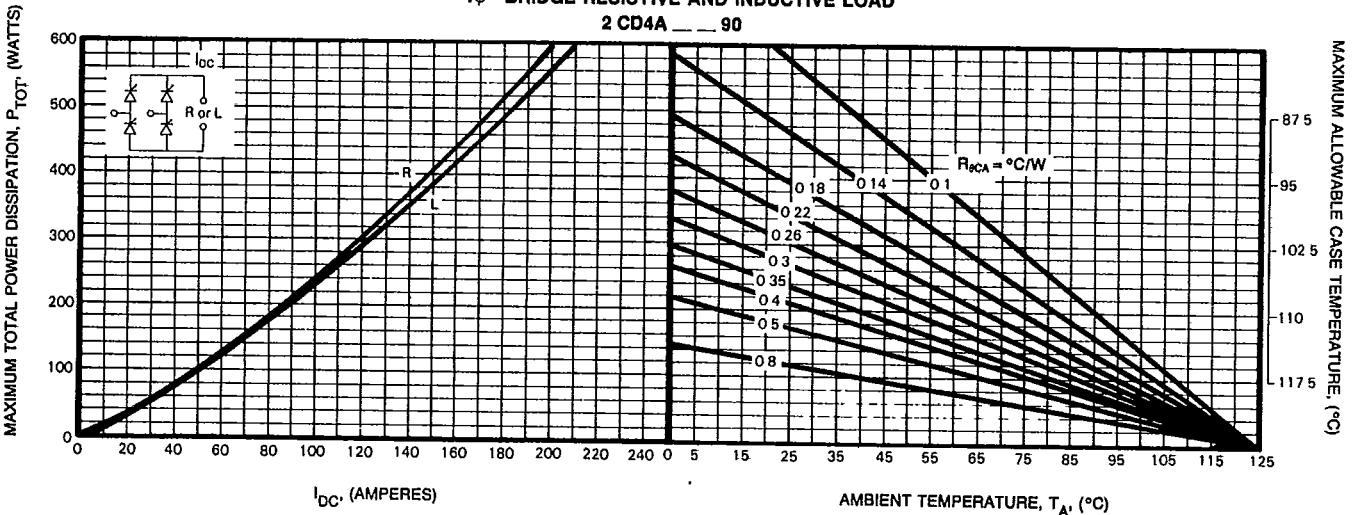
AC SWITCH

1 CD4A — 90



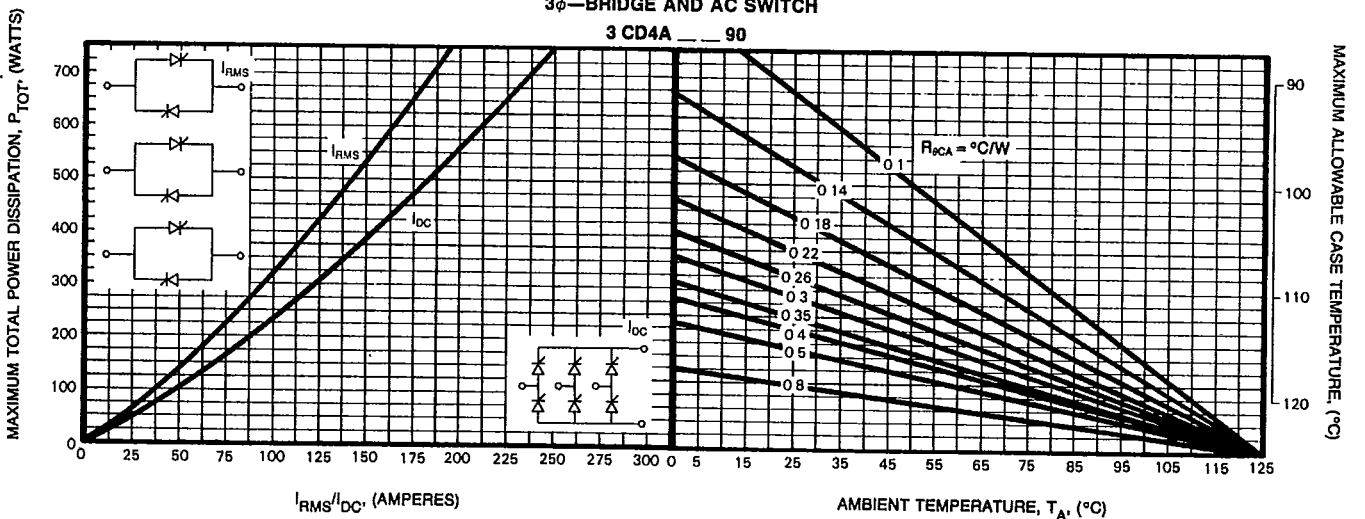
1φ—BRIDGE RESISTIVE AND INDUCTIVE LOAD

2 CD4A — 90



3φ—BRIDGE AND AC SWITCH

3 CD4A — 90





T-91-01

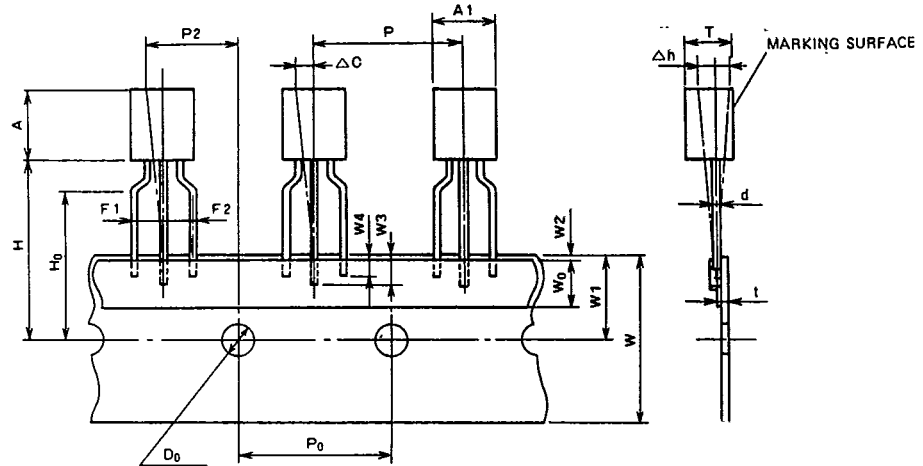
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## Taping

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

#### TO-92 Package

Thyristor  
CR02AM, CR03AM, CR04AM  
Triac  
BCR1AM



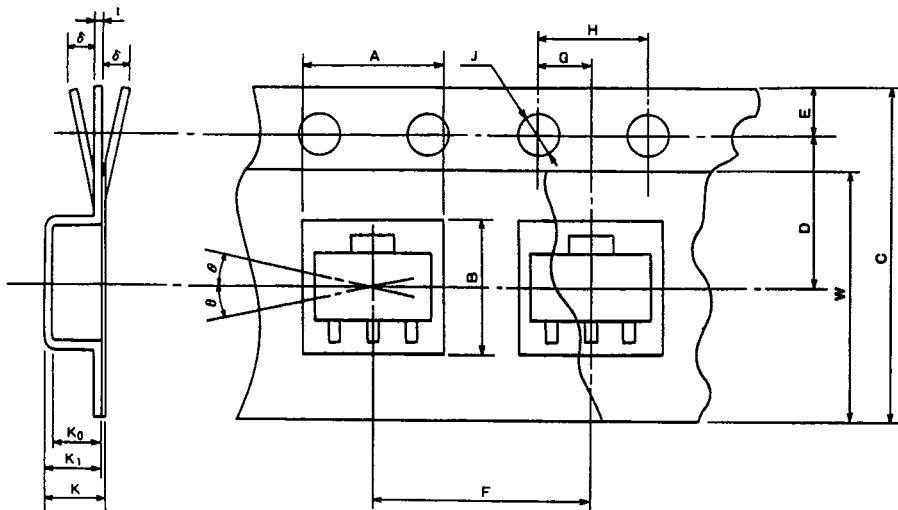
Taping dimensions

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	



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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 <sub>0</sub>	$1.8 \pm 0.1$	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 <sub>1</sub>	$2.1 \pm 0.1$	
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