

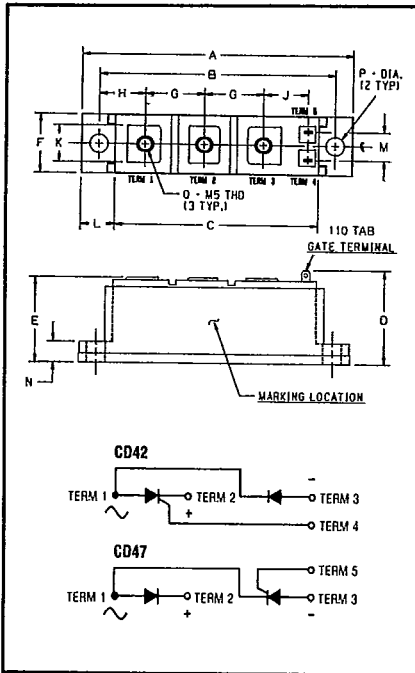


Powerex, Inc., Hillis Street, Youngwood, Pennsylvania 15697 (412) 925-7272
 Powerex Europe, S.A., 428 Avenue G. Durand, BP107, 72003 Le Mans, France (43) 72.75.15

CD42 — — 40

CD47 — — 40

SCR/Diode POW-R-BLOK™ Modules 40 Amperes/100-1400 Volts

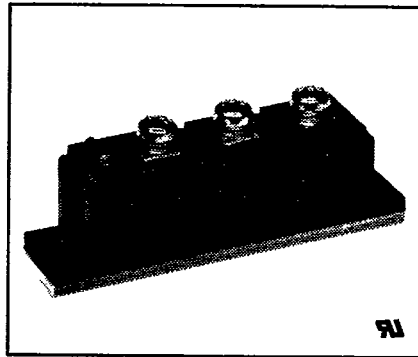


100-1400 Volts

CD42 — — 40, CD47 — — 40

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	



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 40 Amperes/100-1400 Volts

Ordering Information

Example: Select the complete eight digit rating module part number you desire from the table — i.e. CD420840 is an 800 Volt, 40 Ampere SCR/Diode POW-R-BLOK™ Module.

Type	V _{RRM} Volts (x100)	Current Rating Amperes (40)
CD42	01	40
CD47	02	
	04	
	06	
	08	
	10	
	12	
	14	

Description

Powerex SCR/Diode 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 (≥ 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

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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Absolute Maximum Ratings

Characteristics	Symbol	CD420140 CD470140	CD420240 CD470240	CD420440 CD470440	CD420640 CD470640	Units
Peak Forward Blocking Voltage	V_{DRM}	100	200	400	600	Volts
Peak Reverse Blocking Voltage	V_{RRM}	100	200	400	600	Volts
Transient Peak Reverse Blocking Voltage (Non-Repetitive) $t < 5$ ms	V_{RSM}	200	300	500	700	Volts

Characteristics	Symbol	CD420840 CD470840	CD421040 CD471040	CD421240 CD471240	CD421440 CD471440	Units
Peak Forward Blocking Voltage	V_{DRM}	800	1000	1200	1400	Volts
Peak Reverse Blocking Voltage	V_{RRM}	800	1000	1200	1400	Volts
Transient Peak Reverse Blocking Voltage (Non-Repetitive) $t < 5$ ms	V_{RSM}	950	1200	1450	1700	Volts



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CD42 — 40, CD47 — 40
SCR/Diode POW-R-BLOK™ Modules
40 Amperes/100-1400 Volts

Absolute Maximum Ratings

Characteristics	Symbol	CD42 — 40 CD47 — 40	Units
RMS On-State Current	$I_{T(RMS)}, I_{F(RMS)}$	63	Amperes
Average On-State Current	$I_{T(AV)}, I_{F(AV)}$	40	Amperes
Peak One-Cycle Surge (Non-Repetitive) On-State Current (60Hz)	I_{TSM}, I_{FSM}	1200	Amperes
Peak Three-Cycle Surge (Non-Repetitive) On-State Current (60Hz)	I_{TSM}, I_{FSM}	950	Amperes
Peak Ten-Cycle Surge (Non-Repetitive) On-State Current (60Hz)	I_{TSM}, I_{FSM}	800	Amperes
Peak One-Cycle Surge (Non-Repetitive) On-State Current (50Hz)	I_{TSM}, I_{FSM}	1095	Amperes
I^2t (for Fusing), 8.3 milliseconds	I^2t	6000	A ² sec
Critical Rate-of-Rise of On-State Current ① (Non-Repetitive)	di/dt	800	Amperes/ μ 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

① Per JEDEC STD RS-397, 5.2.2.6.



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40 Amperes/100-1400 Volts

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

Characteristics	Symbol	Test Conditions	CD42 — 40 CD47 — 40	Units
Blocking State Maximums				
Forward Leakage Current, Peak	I_{DRM}	$T_J = 125^\circ\text{C}$, $V_{\text{DRM}} = \text{rated}$	15	mA
Reverse Leakage Current, Peak	I_{RRM}	$T_J = 125^\circ\text{C}$, $V_{\text{RRM}} = \text{rated}$	15	mA
Conducting State Maximums				
Peak On-State Voltage	V_{TM}	$I_{\text{TM}} = 250\text{A}$	2.6	Volts
Peak On-State Voltage	V_{FM}	$I_{\text{FM}} = 250\text{A}$	1.3	Volts
Switching Minimums				
Critical Rate of Rise of Off-State Voltage	dv/dt	$T_J = 125^\circ\text{C}$, Exponential to V_{DRM}	300	Volts/ μsec
Typical Turn-Off Time	t_q	$I_{\text{TM}} = 50\text{A}$, $T_J = 125^\circ\text{C}$, $di/dt = 5\text{A}/\mu\text{s}$ reapplied $dv/dt = 20\text{V}/\mu\text{s}$ linear to $0.8 V_{\text{DRM}}$	100	μsec
Typical Turn-On Time	t_{on}	$I_{\text{TM}} = 100\text{A}$, $V_D = 100\text{V}$	4	μsec
Thermal Maximums				
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	$^\circ\text{C}/\text{Watt}$
Gate Parameters Maximums				
Gate Current to Trigger	I_{GT}	$V_D = 12\text{V}$	100	mA
Gate Voltage to Trigger	V_{GT}	$V_D = 12\text{V}$	3.0	Volts
Non-Triggering Gate Voltage	V_{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.

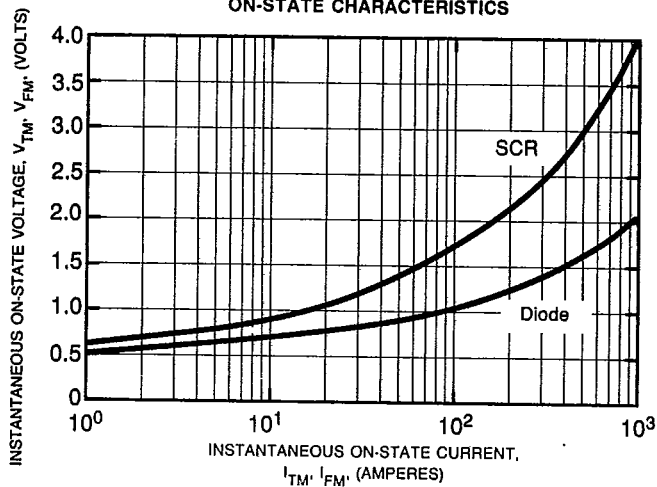


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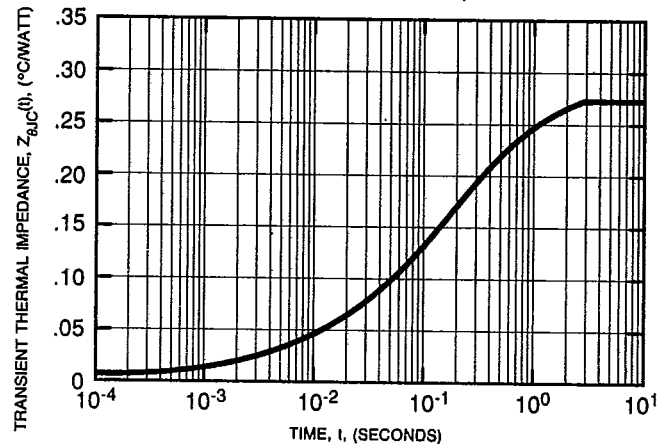
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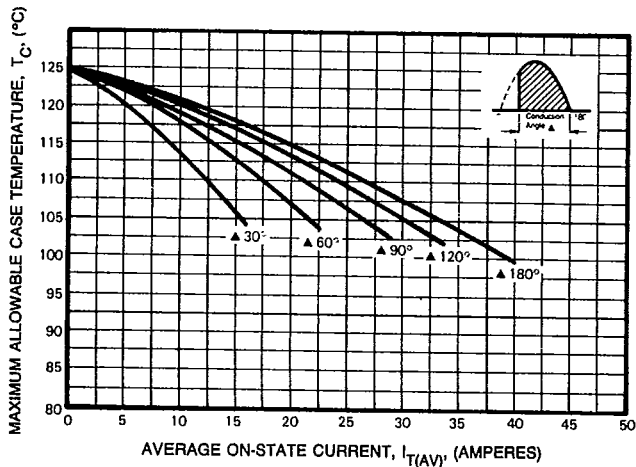
MAXIMUM
ON-STATE CHARACTERISTICS



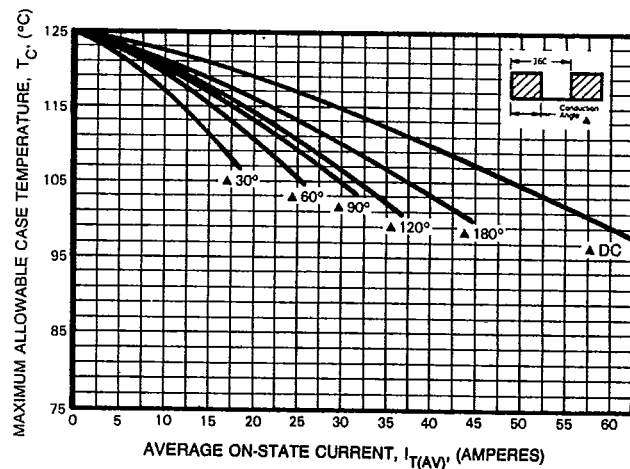
TRANSIENT THERMAL IMPEDANCE CHARACTERISTICS
(JUNCTION TO CASE)



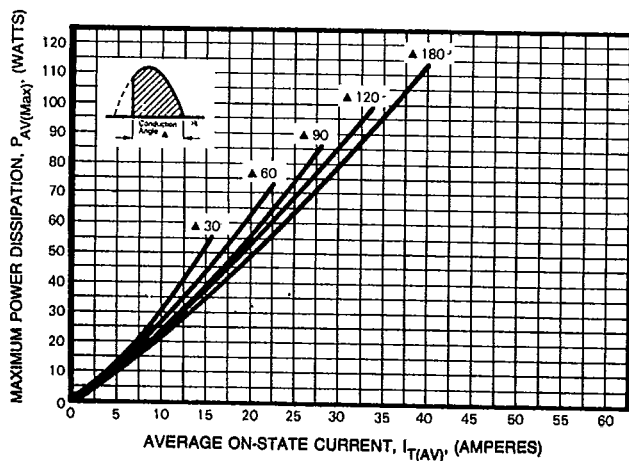
MAXIMUM ALLOWABLE CASE TEMPERATURE



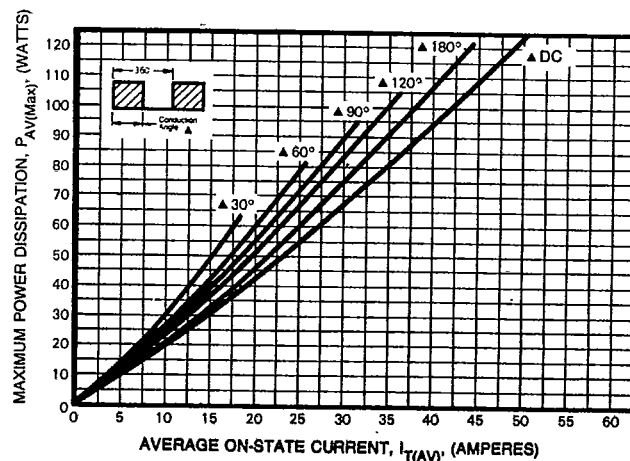
MAXIMUM ALLOWABLE CASE TEMPERATURE



MAXIMUM ON-STATE POWER DISSIPATION



MAXIMUM ON-STATE POWER DISSIPATION





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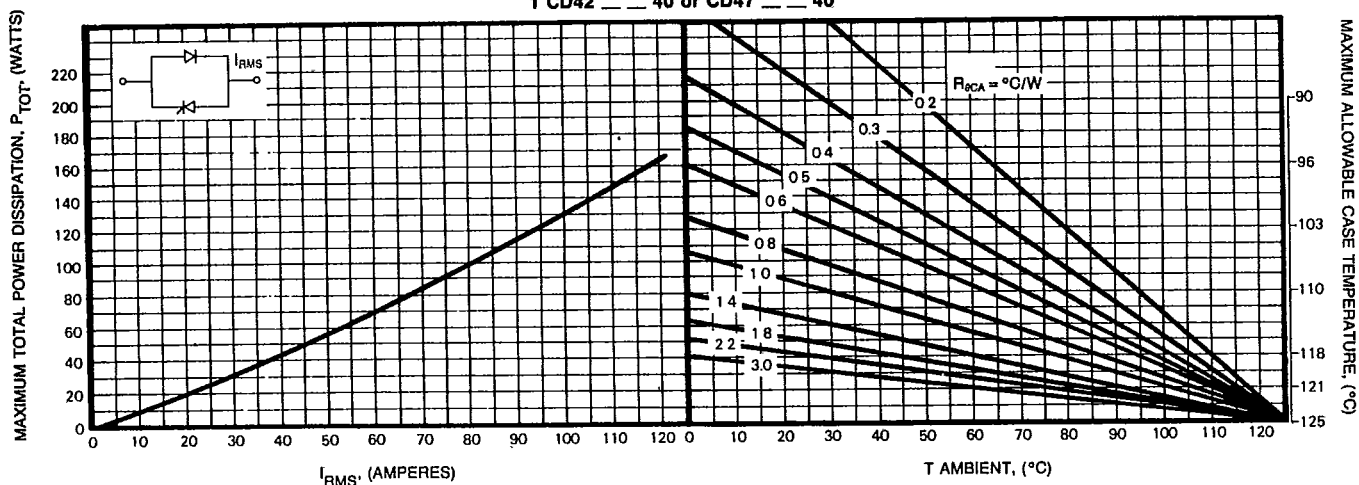
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MAXIMUM TOTAL POWER DISSIPATION AND MAXIMUM AMBIENT TEMPERATURES

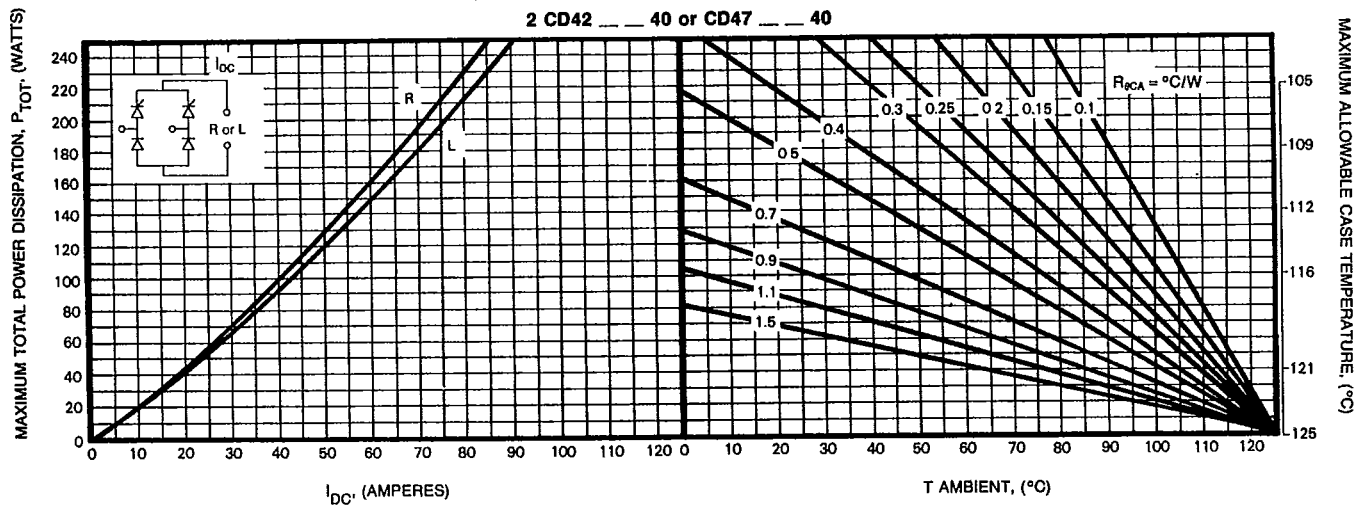
AC SWITCH

1 CD42 — 40 or CD47 — 40



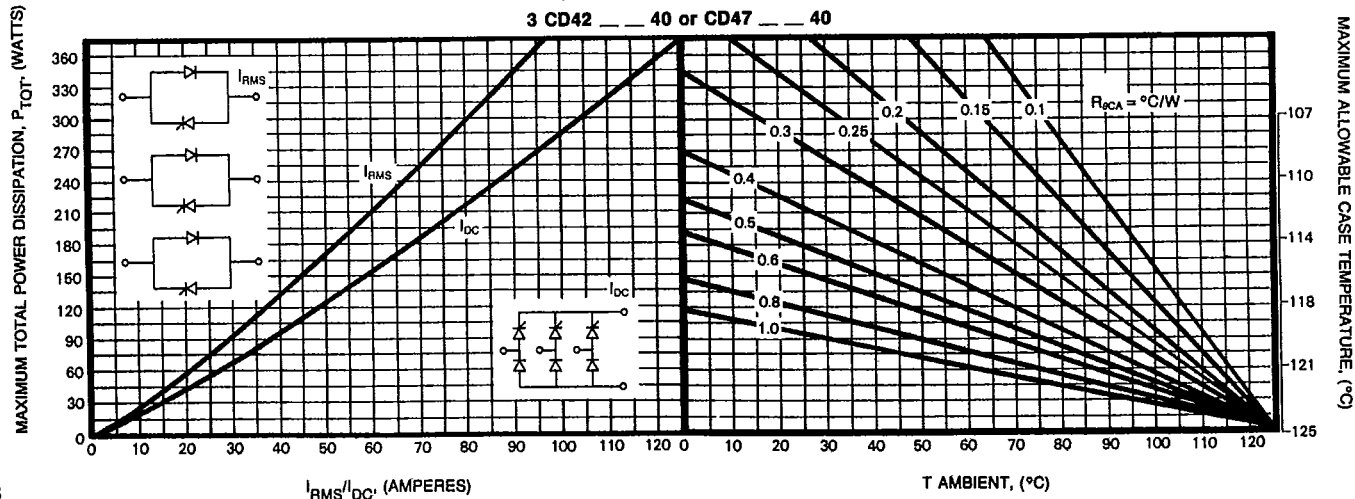
1 ϕ —BRIDGE RESISTIVE AND INDUCTIVE LOAD

2 CD42 — 40 or CD47 — 40



3 ϕ —BRIDGE AND AC SWITCH

3 CD42 — 40 or CD47 — 40





T-91-01

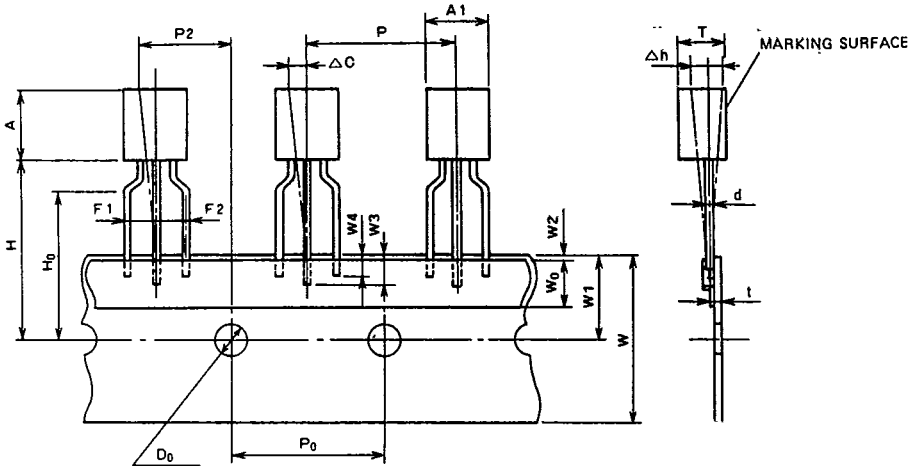
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Taping

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 ₀	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 ± ^{1.0} _{0.5}	
Sticker tape width	W ₀	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 ₀	16.0 ± 0.5	
Feed hole diameter	D ₀	4.0 ± 0.2	
Tape thickness	t	0.7 ± 0.2	
Defective product (2)	ΔC	0 ± 1.0	

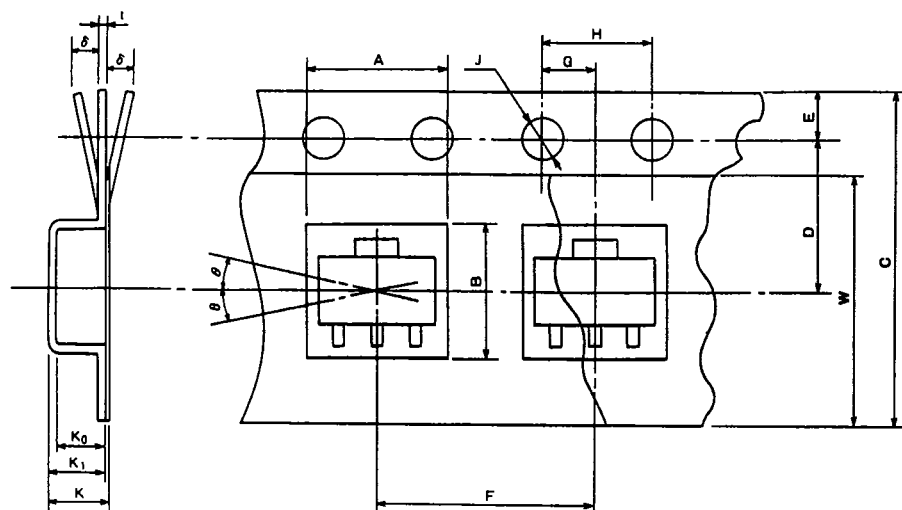


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Powerex Semiconductor Data Book

Taping



SOT-89 Package

Thyristor
CR08AS

Taping dimensions

Description of symbol		Symbol	Dimensions/angles Unit:mm	Remark
Parts Insertion	Height	A	5.0 ± 0.1	Cross-section of the surface 0.5mm above the inner bottom
	Width	B	4.6 ± 0.1	Cross-section of the surface 0.5mm above the inner bottom
Concave square hole	Depth	K ₀	1.8 ± 0.1	Inner space
	Pitch	F	8.0 ± 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 ± 0.1	Cumulative error +0.1/-0.3 MAX/10 pitches
	Position	E	1.5 ± 0.1	Distance between the tape edge and the hole center
Distance between center lines	Vertical	G	2.0 ± 0.5	Center line of concave square hole and round feed hole
	Horizontal	D	5.65 ± 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 ± 0.2	Warp ± 0.3 MAX
	Thickness	t	0.3 ± 0.05	
	Package hole depth	K ₁	2.1 ± 0.1	
Device	Package dimensions	—	—	As shown in (e)
	Inclination	θ	30° MAX.	
Total Thickness		K	2.3 ± 0.1	Total thickness including cover and carrier tapes