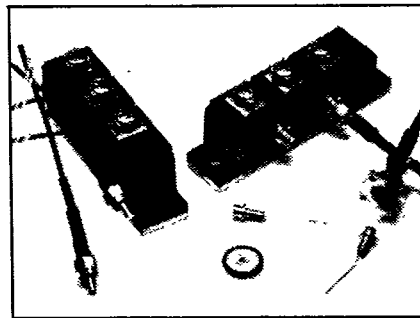
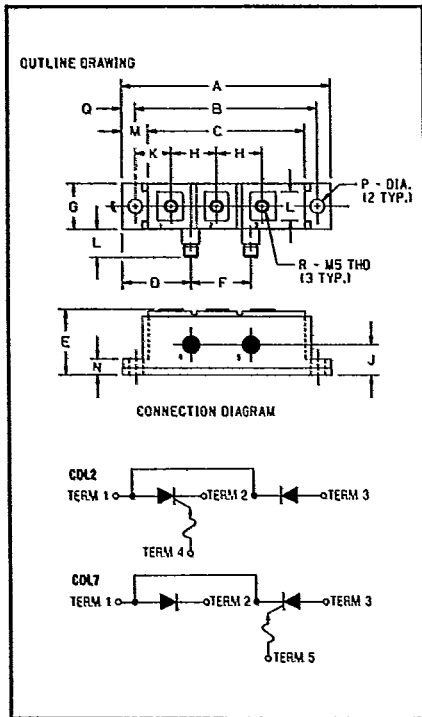




CDL2 \_\_\_ 40  
 CDL7 \_\_\_ 40 Tentative

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

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



CDL2 \_\_\_ 40, CDL7 \_\_\_ 40  
**SCR/Diode Light-Triggered  
 POW-R-BLOK™ Modules**  
 40 Amperes/100-1400 Volts

**100-1400 Volts**  
**CDL2 \_\_\_ 40, CDL7 \_\_\_ 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	1.180	1.200	29.97	30.48
E	1.125	1.165	28.58	29.59
F	1.025	1.055	26.04	26.80
G	.795	.805	20.19	20.45
H	.788	.798	19.76	20.27
J	.650	.670	16.51	17.02
K	.608	.628	15.44	15.95
L	.480	.520	12.19	13.21
M	.43	.47	10.92	11.94
N	.265	.285	6.73	7.24
PØ	.245	.255	6.22	6.48
Q	.227	.246	5.59	6.25
R	—	—	M5 x 0.8	

**Description**

Powerex SCR/Diode CDL2 and CDL7 are light-triggered isolated POW-R-BLOK™ modules. The directly light-triggered thyristor module is gated on with a Gallium Arsenide (GaAs) laser diode or a high-power Gallium Aluminum Arsenide (GaAlAs) light emitting diode (LED).

**Features:**

- Glass Passivated Chips
- Hybrid Construction
- Fiber Optic Receptacles
- Fiber Optic Pigtails

**Applications:**

- High Degree of Gate Isolation
- Remote Location of Thyristor From Gate Circuits
- High Immunity from Deleterious Effects of Electromagnetic Interference (EMI)

**Ordering Information**

Example: Select the complete eight digit rating module part number you desire from the table — i.e. CDL21240 is a 1200 Volt, 40 Ampere SCR/Diode Light-Triggered POW-R-BLOK™ Module.

Type	V <sub>RRM</sub> Volts (x100)	Current Rating Amperes (40)
CDL2	01	40
CDL7	02	
	04	
	06	
	08	
	10	
	12	
	14	



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CDL2 \_\_\_ 40, CDL7 \_\_\_ 40

SCR/Diode

Light-Triggered POW-R-BLOK™ Modules

40 Amperes/100-1400 Volts

## Absolute Maximum Ratings

Characteristics	Symbol	CDL20140	CDL20240	CDL20440	CDL20640	Units
		CDL70140	CDL70240	CDL70440	CDL70640	
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
		CDL20840	CDL21040	CDL21240	CDL21440	
		CDL70840	CDL71040	CDL71240	CDL71440	
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
		CDL2 ___ 40 CDL7 ___ 40				
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 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 <sup>2</sup> sec
Critical Rate-of-Rise of On-State Current $\text{Ⓞ}$ (Non-Repetitive)	$di/dt$		100			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 125			°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

Ⓞ Per JEDEC STD RS-397, 5.2.2.6.



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CDL2 \_\_\_ 40, CDL7 \_\_\_ 40

SCR/Diode

Light-Triggered POW-R-BLOK™ Modules

40 Amperes/100-1400 Volts

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

Characteristics	Symbol	Test Conditions	CDL2 ___ 40	CDL7 ___ 40	Units
<b>Blocking State Maximums</b>					
Forward Leakage Current, Peak	$I_{DRM}$	$T_J = 125^\circ\text{C}$ , $V_{DRM} = \text{rated}$	15		mA
Reverse Leakage Current, Peak	$I_{RRM}$	$T_J = 125^\circ\text{C}$ , $V_{RRM} = \text{rated}$	15		mA
<b>Conducting State Maximums</b>					
Peak On-State Voltage	$V_{TM}$	$I_{TM} = 250\text{A}$	2.6		Volts
Peak On-State Voltage	$V_{FM}$	$I_{FM} = 250\text{A}$	1.3		Volts
<b>Switching Minimums</b>					
Critical Rate of Rise of Off-State Voltage	dv/dt	$T_J = 125^\circ\text{C}$ , Exponential to $V_{DRM}$	300		Volts/ $\mu\text{sec}$
Typical Turn-Off Time	$t_q$	$I_{TM} = 50\text{A}$ , $T_J = 125^\circ\text{C}$ , $di_T/dt = 5\text{A}/\mu\text{s}$ reapplied dv/dt = 20V/ $\mu\text{s}$ linear to 0.8 $V_{DRM}$	100		$\mu\text{sec}$
Typical Turn-On Time	$t_{on}$	$I_{TM} = 100\text{A}$ , $V_D = 100\text{V}$	4		$\mu\text{sec}$
<b>Thermal Maximums</b>					
Thermal Resistance, Junction to Case	$R_{\theta JC}$	Per Device	0.28		$^\circ\text{C}/\text{Watt}$
Thermal Resistance, Case to Sink Lubricated	$R_{\theta CS}$	Per Device	0.2		$^\circ\text{C}/\text{Watt}$
<b>Gate Parameters Maximums</b>					
Optical Energy to Trigger	$E_{LT}$	Trigger at $V_D = 40\text{V}$ , Wavelength = 094 nm $t_p = 0.2 \mu\text{s}$	0.500		$\mu\text{J}$
Recommended Optical Gate Drive Energy	$E_{LTrec}$	—	0.750		$\mu\text{J}$
Interconnecting Optical Fiber Diameter					
Fiber Optical Pigtail	—	—	600		$\mu\text{m}$
Integral Fiber Optic Connector	—	—	1000		$\mu\text{m}$
Interconnecting Optical Fiber Numerical Aperture	—	—	.37		NA

**CAUTION:**

The user should be careful not to over-tighten the nut on the fiber optic plug when coupling it to the module.

After insertion of the fiber optic plug into the receptacle, the nut should be tightened finger tight. If additional tightening is required, the nut may be turned a maximum of 1/16th of a turn or a maximum torque of 4 inch pounds applied. Damage to the fiber optic receptacle, internal optical fiber and fiber optic plug may result if the nut is overtightened.

It is recommended that a high pressure air jet be used to remove any particles from the inside of the fiber optic receptacle prior to insertion of the fiber optic plug in order to prevent damage to the glass fibers.

**WARNING:**

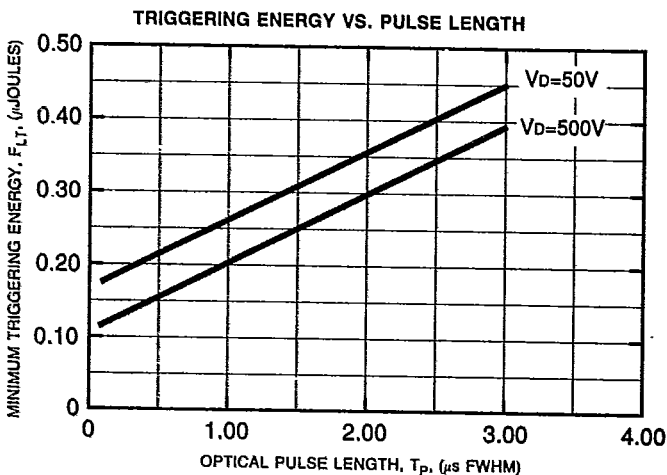
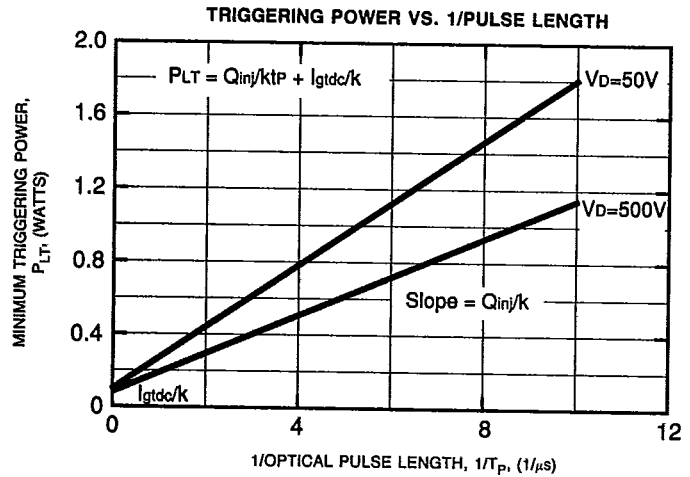
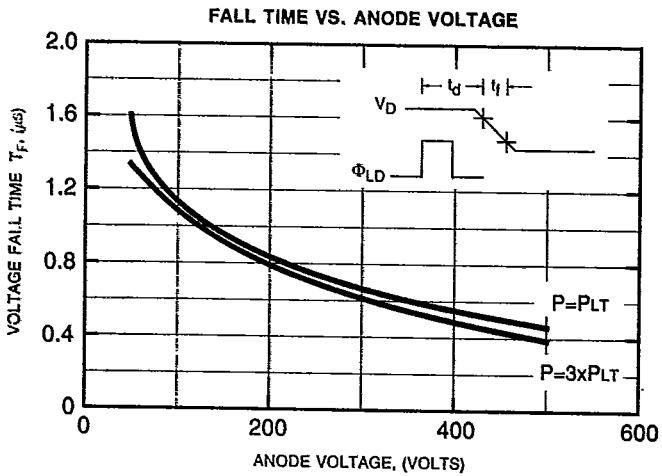
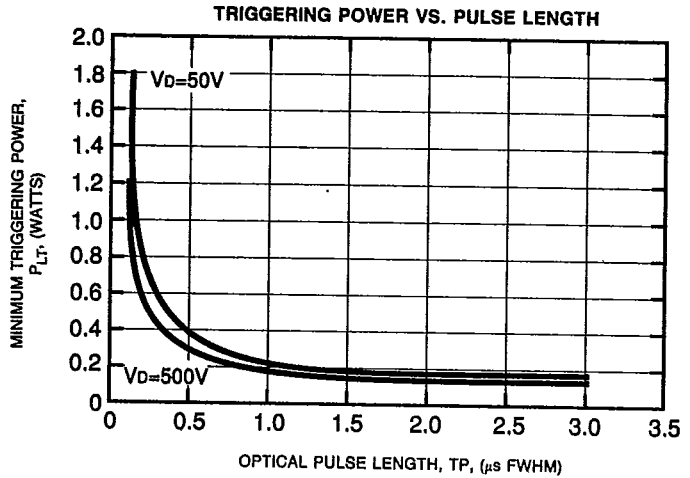
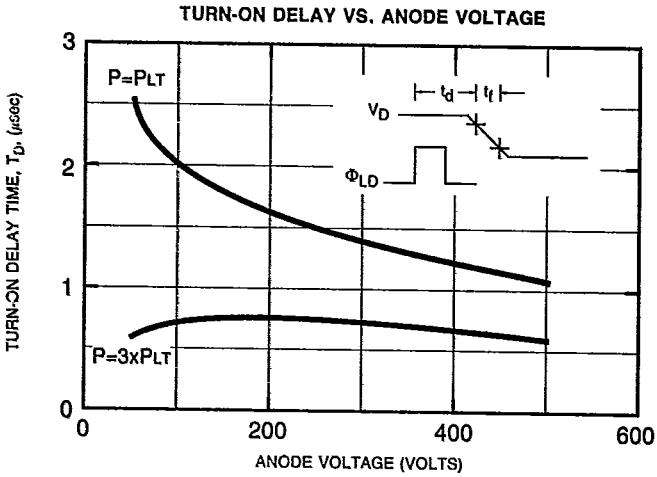
Internal insulation used is Beryllium Oxide. User should avoid grinding, crushing or abrading these portions. Care must be exercised in properly disposing of unwanted modules.



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CDL2 \_\_\_ 40, CDL7 \_\_\_ 40  
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 Light-Triggered POW-R-BLOK™ Modules  
 40 Amperes/100-1400 Volts





T-91-01

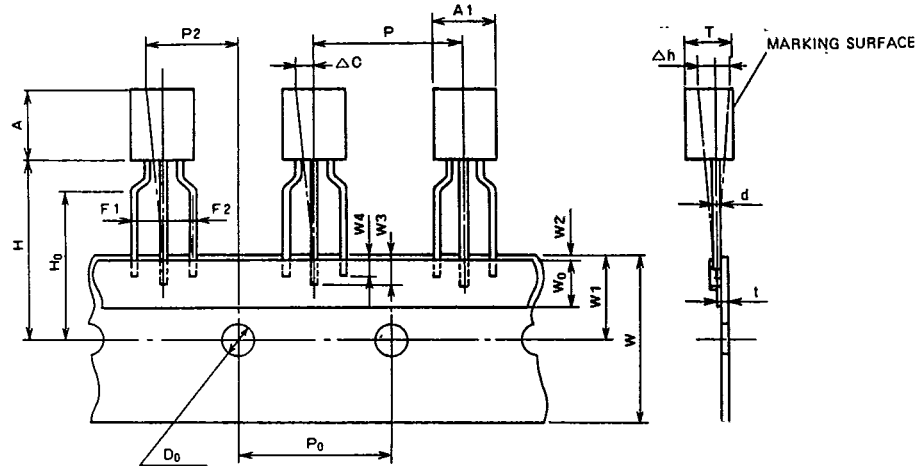
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## Taping

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

#### TO-92 Package

Thyristor  
CR02AM, CR03AM, CR04AM  
Triac  
BCR1AM



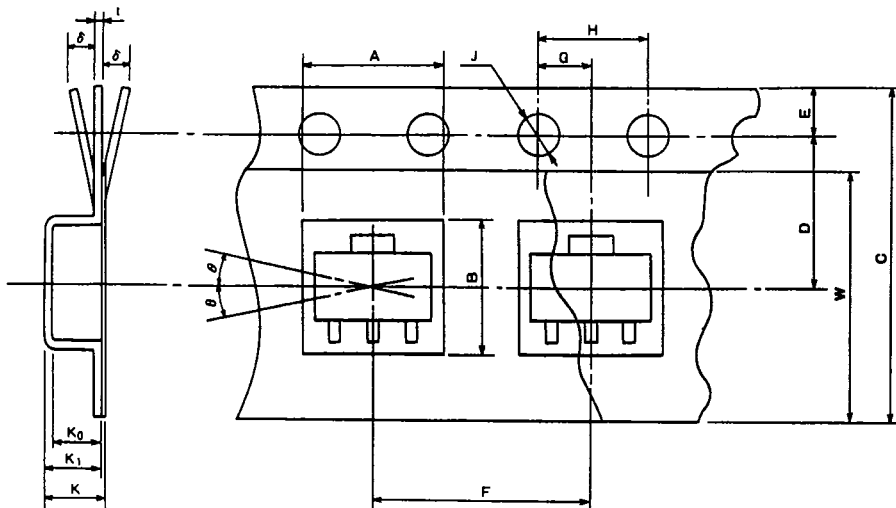
Taping dimensions

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