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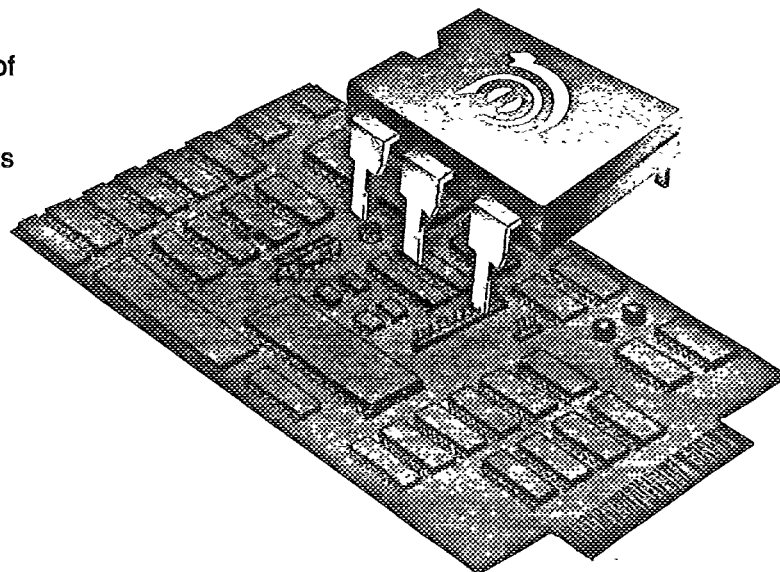
T-41-83

OptoMOS® Form A Solid-State Switch Family

Form A (Single Pole Normally-open) OptoMOS Solid-State Switches are part of Theta-J's larger family of Solid-state Switching Devices. The devices switch loads up to 350 volts AC or DC at currents up to 400 mA. As a replacement for form "A" electromechanical relays, the devices use a proprietary photovoltaic input circuit and MOS switching elements for reliable bounce-free switching operations.

Normally-Open

LCA 110
LCA 120
LCA 125
XCA 110
XCA 120
OMA 130
OMA 160



Features:

- Small 6-pin DIP package/machine
- Insertable/wave solderable
- 2 milliwatt logic-compatible drive power
- No moving parts
- Loads up to 350 Volts AC/DC and 400 mA.
- Lifetime in excess of 15 billion operations
- Arc-free with no snubbing circuits
- Optimal switching speeds
- 3,750 Volt input/output isolation
- UL Recognized: File No. E76270
- VDE File #14843-4880-1001/A2I Pending
- CSA Compatible
- TO-5 Package Available
- MIL Processing Available
- Other configurations available
- BABT (BS 6301) Approval Pending

Applications:

Because of their unique features, solid-state switches service a wide range of applications where reliability, small size and low cost are important. Several typical applications are listed below:

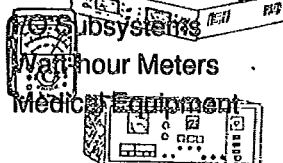
Telecom

Tip/Ring Ckts
Modem Switching
Telephone Switches
E&M Switching
Hookswitch
Dial Pulsing
Ground Start
Ringer Injection



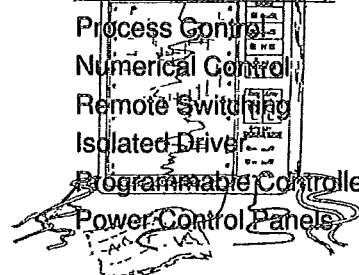
Instrumentation

Multiplexers
Sample and Hold
Data Acquisition
Electronic Switching
VCR Subsystems
Vapor-hour Meters
Medical Equipment



Industrial Controls

Process Control
Numerical Control
Remote Switching
Isolated Drive
Programmable Controllers
Power Control Panels



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CORPORATION

THETA-J

Solid State Products Division
8 Corporate Place
107 Audubon Road
Wakfield, MA 01880
617/246-4000
Telex: 6817300
Fax: 617/246-1356

ABSOLUTE MAXIMUM RATINGS

PARAMETER	MIN	MAX	UNITS
INPUT/OUTPUT ISOLATION:	2500	-	V _{RMS}
OPTIONAL "E" SUFFIX:	3750	-	V _{RMS}
OPERATING TEMPERATURE †	-40	85	°C
STORAGE TEMPERATURE	-40	125	°C
SOLDERING TEMPERATURE (10 SECONDS ON LEADS)	-	260	°C

†OMA160 operates at temperatures up to 115°C.

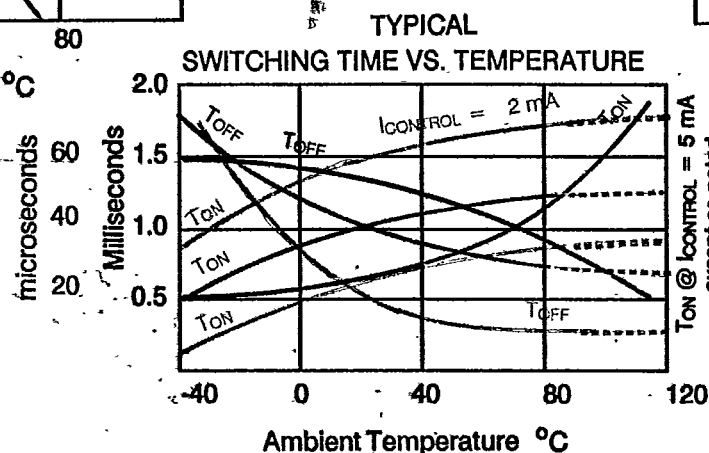
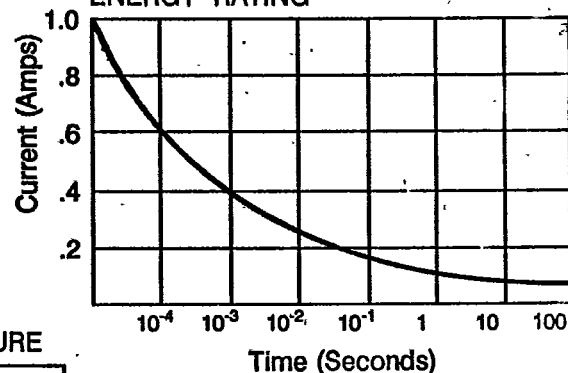
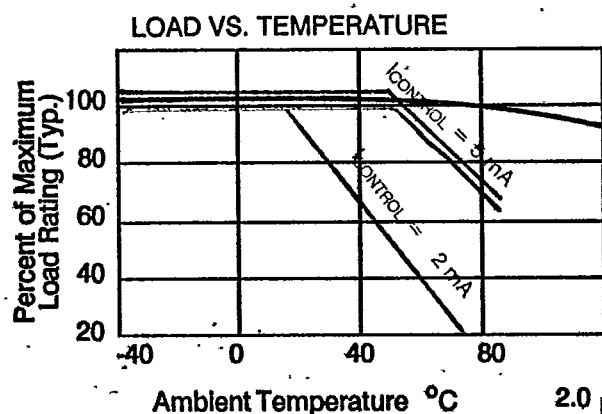
COMMON INPUT CHARACTERISTICS

CONTROL CURRENT (mA) ‡		VOLTAGE DROP (VOLTS)		REVERSE VOLTAGE (VOLTS)	REVERSE LEAKAGE (μA)
MIN	MAX	MIN	MAX	MAX	MAX
2	50	.9	1.4	10	10

‡ I_{CONTROL} represents the forward LED current used to activate the device.

OUTPUT CHARACTERISTICS 2

PART NUMBER	CONFIG	PEAK BLOCKING (VOLTS)	CONTINUOUS RATED LOAD (mA)	PEAK LOAD (10msec) (mA)	ON RESISTANCE OHMS (Ω)		SWITCHING TIME (TYP)			OFF STATE LEAKAGE (MAX) AT FULL RATED VOLTAGE (μA)
					MIN	MAX	I _{CONTROL} (mA)	T _{ON} (msec)	T _{OFF} (msec)	
LCA110	X	350	120	350	15	35	5 ⁽¹⁾	1	1	1
	Y		200		5	10				
LCA120	X	250	170	400	7	20	5	3	3	1
	Y		300		2	6				
LCA125	X	300	170	400	7	16	5	3	3	1
	Y		300		2	6				
XCA110	X	300	100	350	15	40	5	2	2	1
	Y		150		5	15				
XCA120	X	200	150	400	7	25	8	3	3	1
	Y		250		2	10				
OMA130	X	60	250	500	4	10	10	3	3	1
	Y		400		1	3				
OMA160	X	250	20	100	100	225	10	.085	.085	.025

¹also operates with I_{CONTROL} = 2 mA; T_{ON} ENERGY RATINGCP Clare
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ICS 25°C

PACKAGE	INPUT/ OUTPUT
	CAPACITANCE (pF)
	3

ie switch.

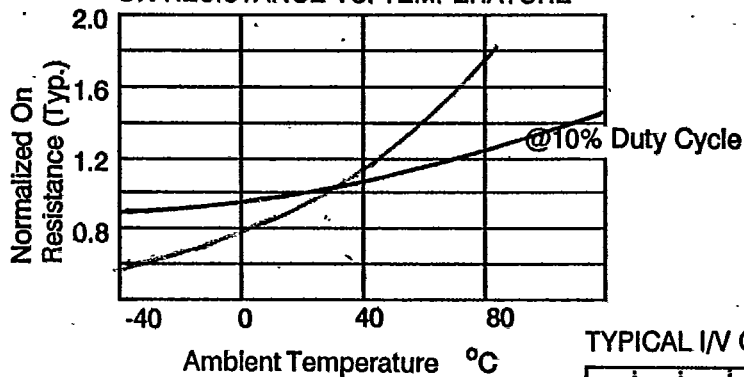
5°C

TYPICAL CAPACITANCE AT 0 VOLTS CONFIG X (pF)	TYPICAL OFFSET VOLTAGE (μV)
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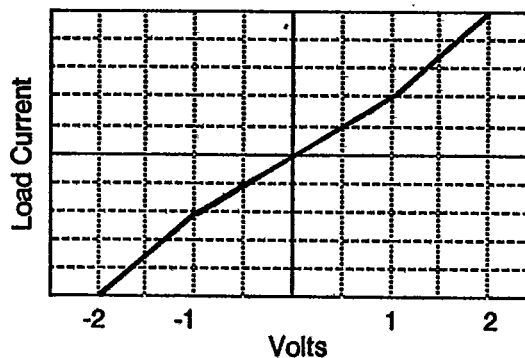
25	1
50	1
50	1
25	1
50	1
50	1

= 5 msec.; T_{OFF} = 2 msec.

ON RESISTANCE VS. TEMPERATURE



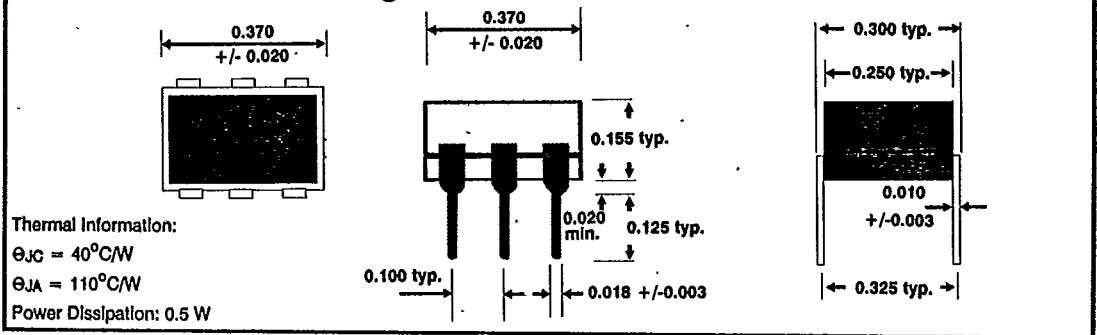
TYPICAL I/V CHARACTERISTICS



THETA-J

Solid State Products Division
8 Corporate Place
107 Audubon Road
Wakefield, MA 01880
617/246-4000
Telex: 6817300
Fax: 617/246-1356

Package Mechanical Dimensions

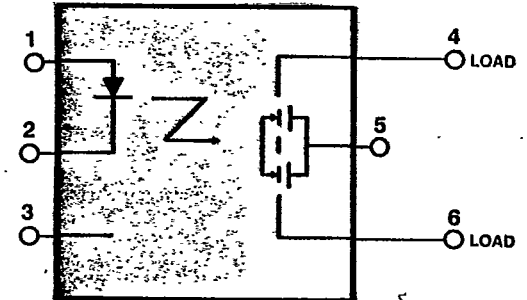


This is the preferred configuration for AC circuits.

Pin Connections

- 1 + Control
- 2 - Control
- 3 Do not use
- 4 Load
- 5 Do not use
- 6 Load

CONFIGURATION X

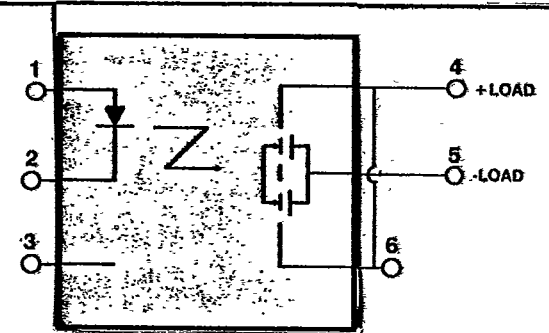


This configuration is most useful for DC circuits where the direction of the current does not change.

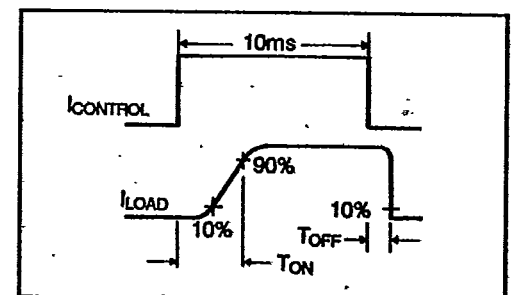
Pin Connections

- 1 + Control
- 2 - Control
- 3 Do not use
- 4,6 + Load
- 5 - Load

CONFIGURATION Y



SWITCHING CHARACTERISTICS



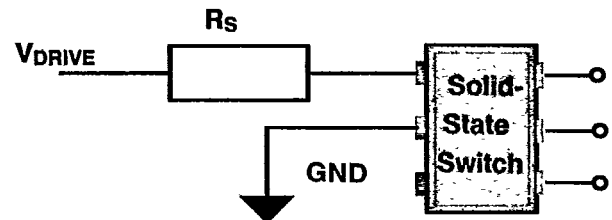
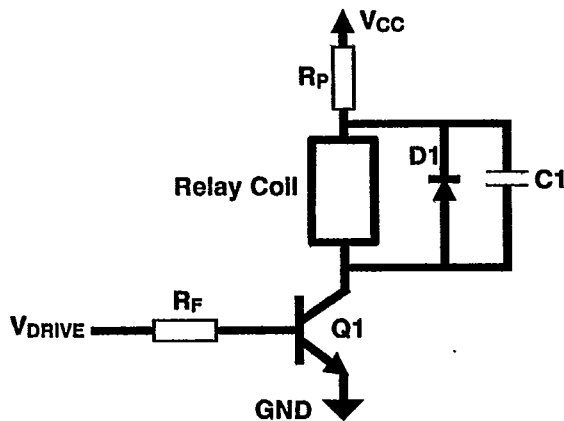
Electromechanical Relay Replacement Guide

Most applications can utilize a Theta-J solid-state switch as a replacement for an electromechanical device. Reliability is greatly enhanced since the solid-state device has a lifetime expectancy well beyond that of an electromechanical device. As shown in the typical circuits below, four or more components are eliminated when using the solid-state device. Aside from the obvious advantage of board real estate savings, there is significant cost savings due to the elimination of components. The following information can be used as a general guide for implementing a replacement.

1. Select the appropriate Theta-J solid-state device.
2. Select a resistor R_S according to the following formula:

$$R_S = (V_{DRIVE} - 1) / 10 \times 10^{-3}$$

where V_{DRIVE} is the nominal driving voltage that was used to provide relay coil current. The value of R_S may be altered by approximately 20% to optimize circuit operation.



Please note that Theta-J provides applications assistance as well as a complete range of application notes and briefs to assist in the specification and use of solid-state switches. Please consult the factory or any of our world-wide representatives for further information.

Ordering Information

Theta-J solid-state switches may be ordered simply by using the part number indicated on this data sheet. A suffix may be added to the part number to specify the following options:

SUFFIX	OPTION
E	3,750 Isolation Voltage
S	Gull-Wing Package*
B	Butt End-Cut Package*
T/R	Tape and Reel Package*

Please note that special devices are available on an application/request basis.

* Please request Application Brief 114 for more information about these package styles.

CP Clare
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8 CORPORATE PLACE ■ 107 AUDUBON RD.
WAKEFIELD ■ MA 01880

617-246-4000 • TWX 310 681-7300 • FAX 617-246-1356

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