

Part Number* Relay Description

KD00CK	5A Solid-State Relay (SSR)
KD02CK	5A SSR with Switch Status
KD20CK	5A SSR with Short-Circuit Protection
KD22CK	5A SSR with Short-Circuit Protection and Switch Status
LD00CM	10A Solid-State Relay
LD02CM	10A SSR with Switch Status
LD20CM	10A SSR with Short-Circuit Protection
LD22CM	10A SSR with Short-Circuit Protection and Switch Status

* The Y suffix denotes parameters tested to MIL-PRF-28750 specifications.
The W suffix denotes parameters tested to Teledyne specifications.

ELECTRICAL SPECIFICATIONS

(-55°C TO +105°C UNLESS OTHERWISE NOTED)

INPUT (CONTROL) SPECIFICATION

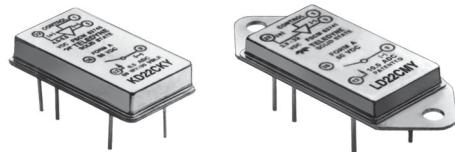
When used in 2 terminal configuration

(TTL or direct control) (See Fig. 1)	Min	Typ	Max	Units
Input Current @ $V_{BIAS} = 5$ Vdc (See Fig. 2)		15	mAdc	
Turn-Off Voltage (Guaranteed Off)		1.5	Vdc	
Turn-On Voltage (Guaranteed On)	3.8		Vdc	
Reverse Voltage Protection		-32	Vdc	
Input Supply Range (See Note 1)	3.8	32	Vdc	

INPUT (CONTROL) SPECIFICATION

When used in 3 terminal configuration

(CMOS or open collector TTL) (See Fig. 1)	Min	Typ	Max	Units
Control Current				
$V_{CONTROL} = 5$ Vdc		250	μ Adc	
$V_{CONTROL} = 18$ Vdc		1	mAdc	
Control Voltage Range	0	18	Vdc	
Bias Supply Voltage (See Note 1)	3.8	32	Vdc	
Bias Supply Current		16	mAdc	
Turn-Off Voltage (Guaranteed Off)	3.2		Vdc	
Turn-On Voltage (Guaranteed On)		0.3	Vdc	


FEATURES

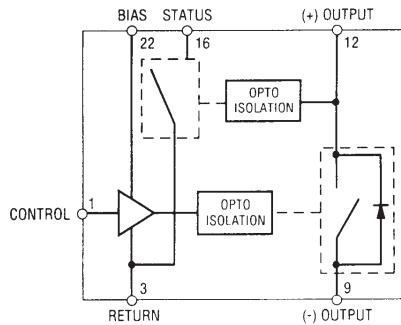
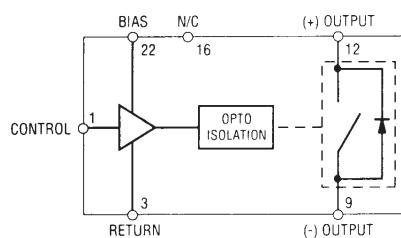
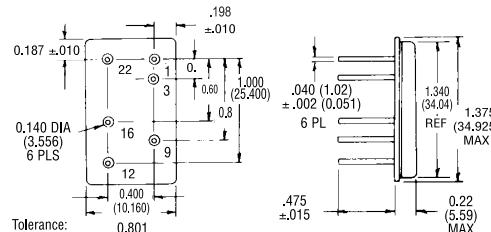
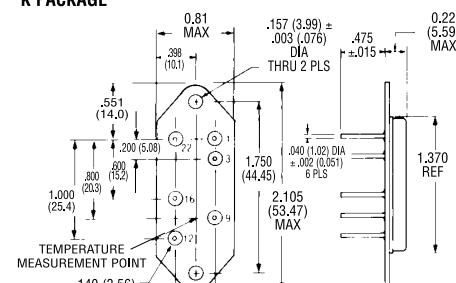
- Available with short-circuit/current overload protection
- Available with switch status output
- TTL and CMOS compatible control
- Low ON resistance power FET output
- Fast switching speed
- Meets 28 Vdc system requirements of MIL-STD-704
- Optical isolation
- Low profile hermetic package
- Built and tested to the requirements of MIL-PRF-28750

DESCRIPTION

The Series KD and LD solid-state relays are screened utilizing MIL-PRF-28750 test methods and are packaged in low profile hermetically sealed cases. These relays are constructed with state-of-the-art solid state techniques and feature fully floating power FET output technology. This allows the load to be connected to either output terminal and provides a low ON resistance. The input (control) and output are optically isolated to protect input logic circuits from output transients. Available options include short circuit and current overload protection, which provides complete protection for both the relay and system wiring. This feature not only provides protection should a short or overload occur while the relay is on, but will also provide protection should the relay be switched into a short. The second option is a status output line. Switch status returns the true status of the output switch and is optically isolated from the load. It provides status indication independent of the control circuit of the relay. The status line provides a logic 0 (low) when the relay output is off with load voltage and continuity present, and a logic 1 (high) when the output is on.

OUTPUT (LOAD) SPECIFICATIONS

(See Note 2)	Min	Typ	Max	Units
Continuous Load Current (See Fig. 3)				
KD and LD series without heat sink	5	Adc		
LD series with heat sink	10	Adc		
Leakage Current @ $V_{LOAD} = 60\text{Vdc}$				
KD00CK, KD20CK	100	μA		
LD00CM, LD20CM	100	μA		
KD02CK, KD22CK	2	mA		
LD02CM, LD22CM	2	mA		
Output Voltage Drop				
KD00CK, KD02CK	.60	Vdc		
KD20CK, KD22CK	.70	Vdc		
LD00CM, LD02CM @10A	1.2	Vdc		
LD20CM, LD22CM @10A	1.4	Vdc		
Continuous Operating Load Voltage				
	60	Vdc		
Transient Blocking Voltage @25°C				
	80	Vdc		
ON Resistance, $I_{LOAD} = 100\text{ mA}$, $T_j = 25^\circ\text{C}$, (See Note 3)				
KD00CK, KD02CK	.075	Ohm		
LD00CM, LD20CM	.075	Ohm		
KD20CK, KD22CK	.100	Ohm		
LD20CM, LD22CM	.100	Ohm		
Turn-On Time (See Fig. 5)				
	5	ms		
Turn-Off Time (See Fig. 5)				
	2	ms		
Electrical System Spike @25°C				
	± 600	Vpk		
Output Capacitance at 25 Vdc, 100 KHz				
	1600	pF		
Isolation (Input to Output)				
KD00CK, KD20CK	10	pF		
LD00CM, LD20CM	10	pF		
KD02CK, KD22CK	15	pF		
LD02CM, LD22CM	15	pF		
Dielectric Strength				
	1000	Vac		
Insulation Resistance @ 500 Vdc				
	10^9	Ohms		
Output Junction Temperature @ $I_{LOAD} = I_{max\ rated}$				
	130	°C		
Maximum Junction Temperature				
	150	°C		
Thermal Resistance Junction to Ambient (θ_{JA})				
	30	°C/W		
Thermal Resistance Junction to Case (θ_{JC})				
	7	°C/W		

BLOCK DIAGRAM

WITH STATUS

NO STATUS
MECHANICAL SPECIFICATION
DIMENSIONS ARE SHOWN IN INCHES (MILLIMETERS)

K PACKAGE

L PACKAGE

- Enclosure: Hermetically Sealed DIP
- Leak Rate: $1 \times 10^{-8}\text{ CC}/\text{Sec}$ Maximum
- Material: Header: Cold Rolled Steel
- Pins: Nickel Plated
- Can: Copper Core Grade A Nickel
- Weight: 20 grams
- Tolerance: $XXX \pm .005$

ENVIRONMENTAL SPECIFICATIONS

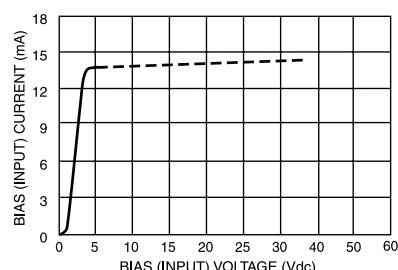
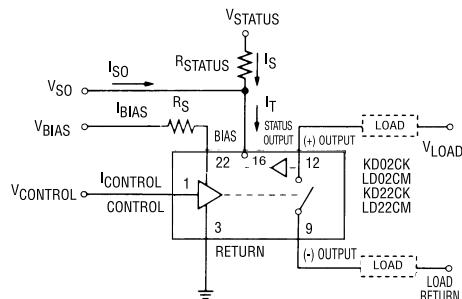
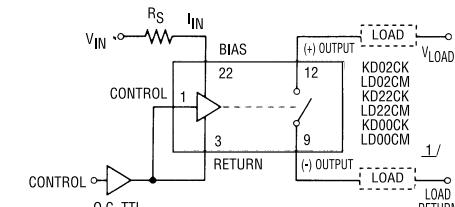
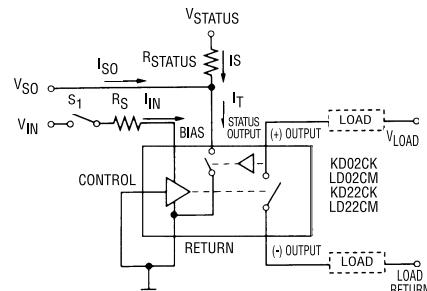
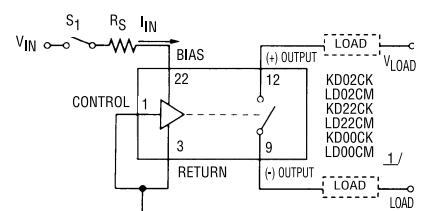
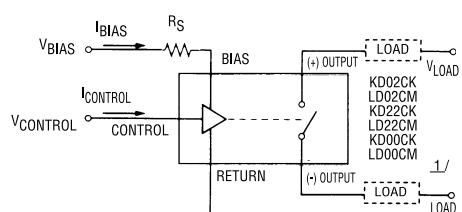
	Min	Typ	Max	Units
Temperature Range				
Operating	-55		+105	°C
Storage	-55		+125	°C
Vibration 100 g	10		3000	Hz
Constant Acceleration			5000	g
Shock 0.5 ms pulse			1500	g

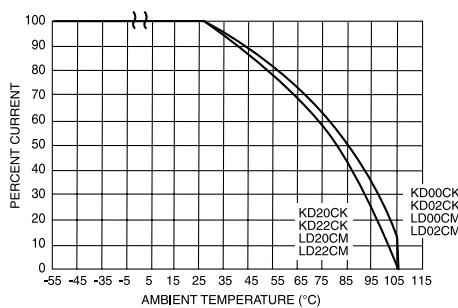
STATUS OUTPUT TRUTH TABLE
(KD02CK, LD02CM, KD22CK, LD22CM)

Control Voltage	Relay Output	State Status Output Level
High	Off	Low ($V_{SO} \leq 0.4$ Vdc)
Low	On	High ($V_{SO} = V_{STATUS}$)

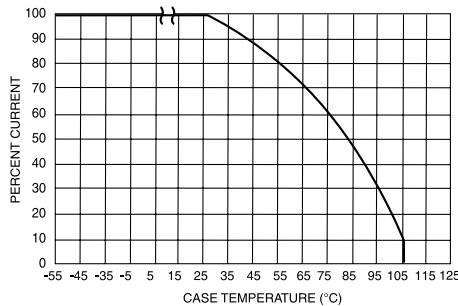
STATUS OUTPUT SPECIFICATIONS
(KD02CK, LD02CM, KD22CK, LD22CM)

	Min	Typ	Max	Units
Status Supply Voltage	30			Vdc
Status Leakage Current				
@16Vdc	10			μAdc
@30Vdc	100			μAdc
Status (sink) Current ($V_{SO} < 0.4$ Vdc)	600			μAdc
Status Turn-On Time (See Fig. 6)	3.5			ms
Status Turn-Off Time (See Fig. 6)	8.0			ms


BIAS (INPUT) CURRENT VS BIAS (INPUT) VOLTAGE
FIGURE 2 (See Note 1)

(A) 3 TERMINAL INPUT WITH STATUS (See Note 5)

(B) 2 TERMINAL INPUT (OPEN COLLECTOR TTL DRIVE)

(C) 2 TERMINAL INPUT (DIRECT DRIVE) WITH STATUS

(D) 2 TERMINAL INPUT (DIRECT DRIVE)

1/ KD02CK, KD22CK, LD02CM and LD22CM may be wired without the status line as shown in (B), (D) and (E) above.
(E) 3 TERMINAL INPUT WITHOUT STATUS
WIRING CONFIGURATIONS
FIGURE 1 (See Note 1)



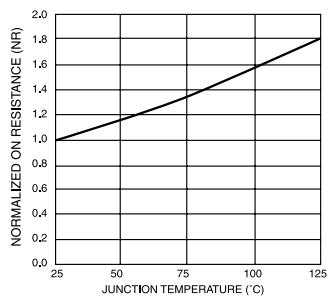
**LOAD CURRENT DERATING CURVE FOR
KD/LD SERIES WITHOUT A HEAT SINK
(A)**



**LOAD CURRENT DERATING CURVE FOR
LD SERIES
(B)**

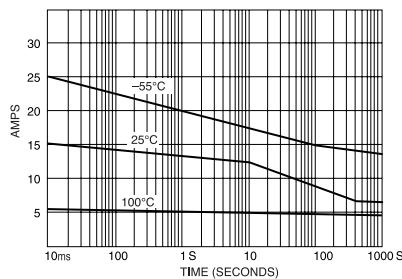
THERMAL DERATING CURVES

FIGURE 3



**NORMALIZED ON RESISTANCE VS
JUNCTION TEMPERATURE**

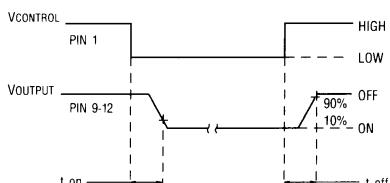
FIGURE 4 (See Note 3)



**OVERLOAD CURRENT VS TIME TO
TRIP (TYPICAL)**

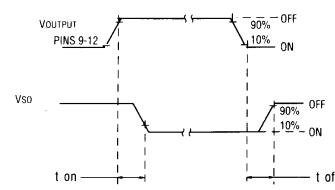
KD20CK, KD22CK, LD20CM, LD22CM

FIGURE 7



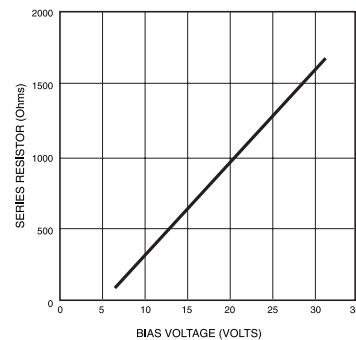
**OUTPUT TURN-ON AND TURN-OFF
TIMING**

FIGURE 5



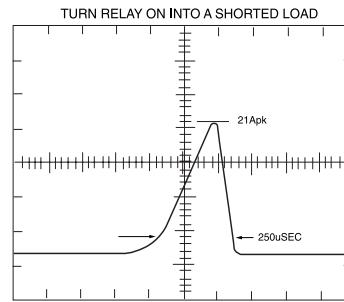
**STATUS TURN-ON AND TURN-OFF
TIMING**

FIGURE 6

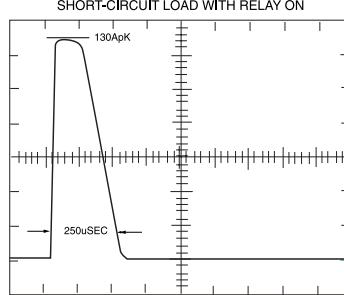


**SERIES LIMIT BIAS RESISTOR VS
BIAS VOLTAGE**

FIGURE 8 (See Note 1)



TURN RELAY ON INTO A SHORTED LOAD



SHORT-CIRCUIT LOAD WITH RELAY ON

**TYPICAL TRIP CURRENT
CHARACTERISTICS FOR SHORT
CIRCUIT CONDITIONS**

FIGURE 9

NOTES:

- Control input is compatible with CMOS or open collector TTL (with pull up resistor). For bias voltages above 6V, a series resistor is required. Use the standard resistor value equal to or less than the value found in Figure 8.
 - The rated input voltage is 5V for all tests unless otherwise specified.
 - To calculate the maximum ON resistance for a given junction temperature, find the normalized ON resistance factor (NR) from Figure 4. Calculate the new ON resistance as follows:
- $$R_{(ON)} = NR \cdot R_{(ON)} @ 25^\circ C$$
- (KD00CK, LD00CM, KD02CK, LD02CM)
- $$R_{(ON)} = NR(R_{(ON)} @ +25^\circ C) + .025 \text{ ohm}$$
- (KD20CK, LD20CM, KD22CK, LD22CM)
- Overload testing to the requirements of MIL-PRF-28750 is constrained to the limits imposed by the short circuit protection characteristics as defined in this specification. System series inductance for "shorted-load" mode of operation should be 50 μH. Maximum repetition rate into a shorted load should not exceed 10 Hz.
 - A status pull up resistor is required for proper operation of the status output. Determine the current (Is0) required by the status interface. Calculate the current (Is) through the status resistor such that the sink current through the status output is 0.6 mA. Select the status resistor such that it does not allow more than 0.6 mA to flow through the status output.

$$R_{(STATUS)} = \frac{V_{(STATUS)} - 0.4V}{I_{(SO)}}$$

- Inductive loads should be diode suppressed. Input transitions should be ≤1 ms duration and the input drive should be a bounceless contact type.



OCEAN CHIPS

Океан Электроники

Поставка электронных компонентов

Компания «Океан Электроники» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

Наши преимущества:

- Поставка оригинальных импортных электронных компонентов напрямую с производств Америки, Европы и Азии, а так же с крупнейших складов мира;
- Широкая линейка поставок активных и пассивных импортных электронных компонентов (более 30 млн. наименований);
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Помощь Конструкторского Отдела и консультации квалифицированных инженеров;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Поставка электронных компонентов под контролем ВП;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- При необходимости вся продукция военного и аэрокосмического назначения проходит испытания и сертификацию в лаборатории (по согласованию с заказчиком);
- Поставка специализированных компонентов военного и аэрокосмического уровня качества (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Actel, Aeroflex, Peregrine, VPT, Syfer, Eurofarad, Texas Instruments, MS Kennedy, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits, General Dynamics и др.);

Компания «Океан Электроники» является официальным дистрибутором и эксклюзивным представителем в России одного из крупнейших производителей разъемов военного и аэрокосмического назначения «JONHON», а так же официальным дистрибутором и эксклюзивным представителем в России производителя высокотехнологичных и надежных решений для передачи СВЧ сигналов «FORSTAR».



JONHON

«JONHON» (основан в 1970 г.)

Разъемы специального, военного и аэрокосмического назначения:

(Применяются в военной, авиационной, аэрокосмической, морской, железнодорожной, горно- и нефтедобывающей отраслях промышленности)

«FORSTAR» (основан в 1998 г.)

ВЧ соединители, коаксиальные кабели, кабельные сборки и микроволновые компоненты:

(Применяются в телекоммуникациях гражданского и специального назначения, в средствах связи, РЛС, а так же военной, авиационной и аэрокосмической отраслях промышленности).



Телефон: 8 (812) 309-75-97 (многоканальный)

Факс: 8 (812) 320-03-32

Электронная почта: ocean@oceanchips.ru

Web: <http://oceanchips.ru/>

Адрес: 198099, г. Санкт-Петербург, ул. Калинина, д. 2, корп. 4, лит. А