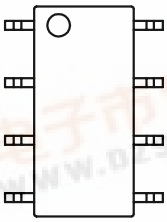
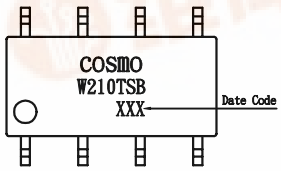
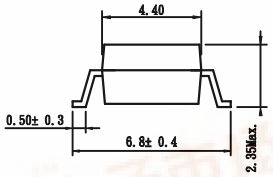
PRODUCT SPECIFICATION

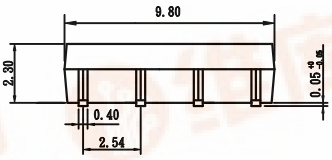
COSMO ELECTRONICS CO.,LTD.	PHOTO MOS RELAYS: KAQW210TSB	SHEET 1 OF 10

- OUTSIDE DIMENSION :



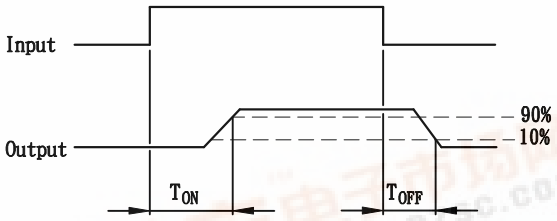


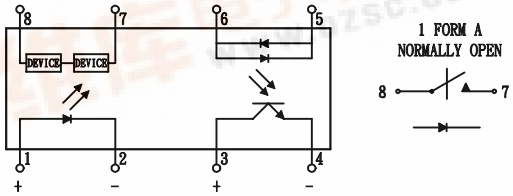




Unit:mm
Tolerance:± 0.2 mm

- Turn on/Turn off time





Absolute Maximum Ratings (T_A=25° C)

Emitter (Inpute)

Reverse Voltage 5.0V
Continuous Forward Current 50mA
Peak Forward Current (1s) 1A
Power Dissipation. 100mW
Derate Linearly from 25° C . . . . . 1.3mW/° C

Detector (Output)

Output Breakdown Voltage . . . . . .± 350V
Continous Load Current . . . . . ± 130mA
Power Dissipation 500mW

General Characteristics

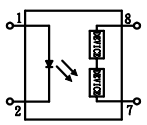
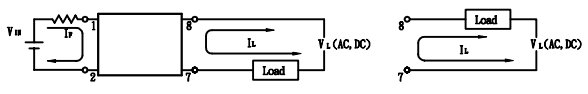
Isolation Test Voltage. . . . . .1500VAC$_{RMS}$
Isolation Resistance
V_{IO} =500V, T_A=25° C. . . . . .≥$10^{10}\Omega$
Total Power Dissipation 550mW
Derate Linearly form 25° C. . . . . .2.5mW/° C
Storage Temperature Range . . . . -40 to +150° C
Operating Temperature Range. . . . -40 to +85° C
Junction Temperature . . . . . .100° C
Soldering Temperature, 2mm from case, 10 sec. 260° C

PRODUCT SPECIFICATION

COSMO ELECTRONICS CO.,LTD.	PHOTO MOS RELAYS: KAQW210TSB	SHEET 2 OF 10

Characteristics (T_A=25° C)

Description	Symbol	Min.	Typ.	Max.	Unit	Test Condition
Emitter (Input)						
Forward Voltage	V_F		1.2	1.5	V	I_F =10mA
Operation Input Current	I_{FON}			5	mA	V_L=± 20V, I_L=100mA, t=10 ms
Recovery Input Current	I_{FOFF}	0.05			mA	V_L=± 20V, I_L =<5uA
Deterctor (Output)						
Output Breakdown Voltage	V_B	350			V	I_B=50uA
Output Off-State Leakage	$I_{T(OFF)}$		0.7	2	uA	V_T=100V, I_F=0mA
I/O Capacitance	C_{ISO}		6		pF	I_F=0, f=1MHz
ON Resistance	R_{ON}		28	35	Ω	I_L =100mA, I_F =10mA
Turn-on Time	T_{ON}		0.1	0.5	ms	I_F=10mA, V_L =± 20V
Turn-off Time	T_{OFF}		0.3	0.5	ms	t=10ms, I_L =± 100mA

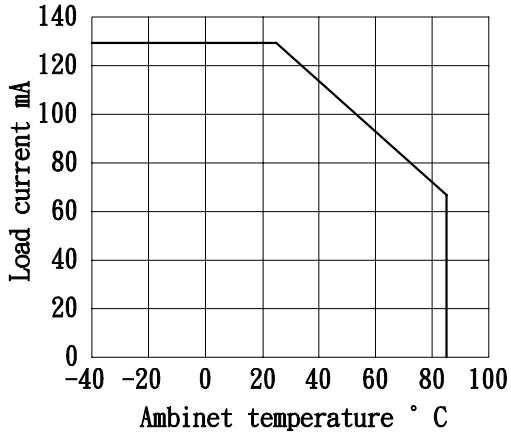
Mos Relay Schematic and Wiring Diagrams					
Type	Schematic	Output configur -ation	Load	Con- nection	Wiring diagram
KAQW210TSB		1a	AC/DC	-	

PRODUCT SPECIFICATION

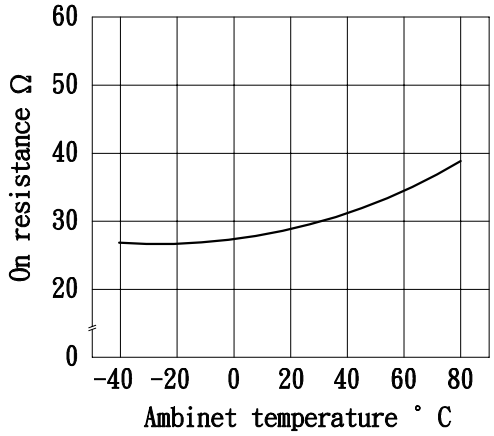
COSMO ELECTRONICS CO.,LTD.	PHOTO MOS RELAYS: KAQW210TSB	SHEET 3 OF 10

DATA CURVE

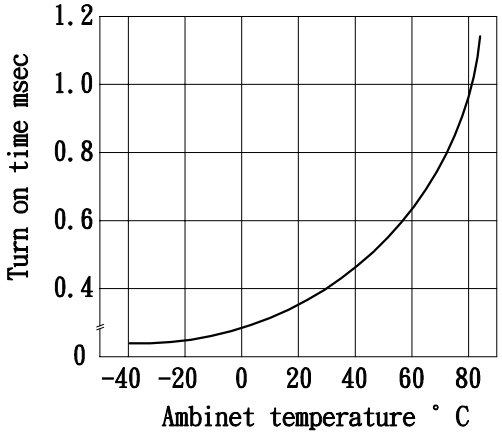
Load current vs. ambient temperature
Allowable ambient temperature:
-40° C+85° C



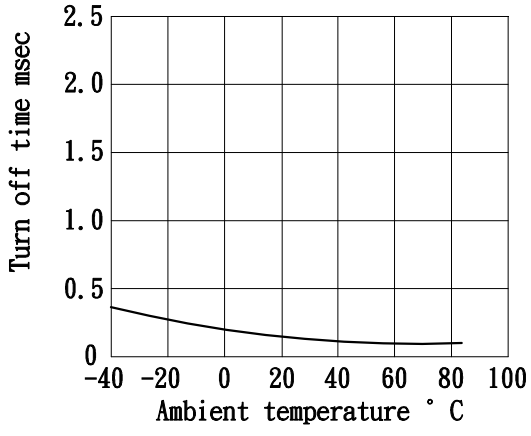
On resistance vs. ambient temperature
Across terminals 7 and 8 pin
LED current: 5mA
Continuous load current: 130 mA(DC)



Turn on time vs. ambient temperature
Load voltage 350 V(DC)
LED current :5mA
Continuous load current: 130mA(DC)



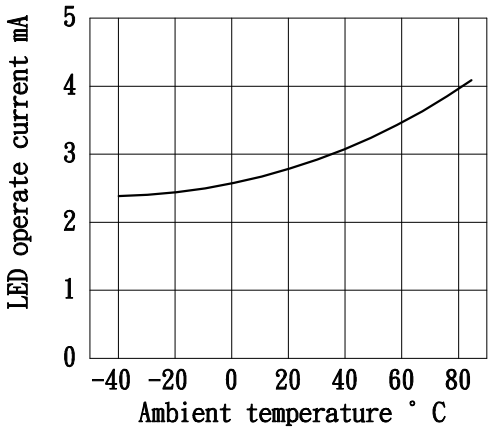
Turn off time vs. ambient temperature
LED current: 5mA;Load voltage: 350V(DC)
Continuous load current: 130mA(DC)



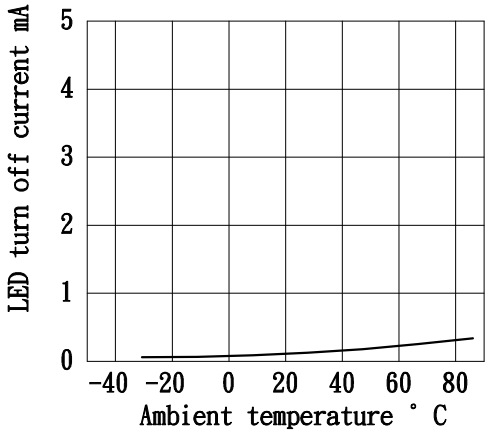
PRODUCT SPECIFICATION

COSMO ELECTRONICS CO.,LTD.	PHOTO MOS RELAYS: KAQW210TSB	SHEET 4 OF 10

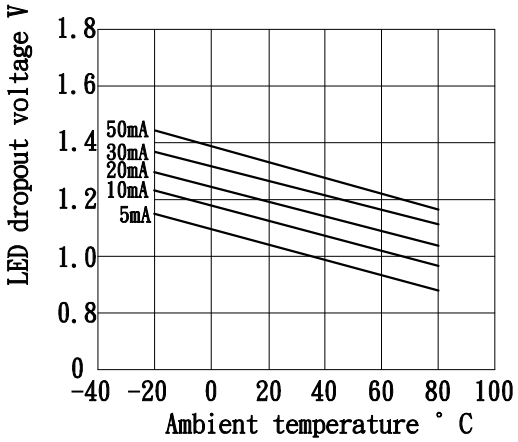
LED operate vs. ambient temperature
Load voltage: 350V(DC)
Continuous load current: 130mA(DC)



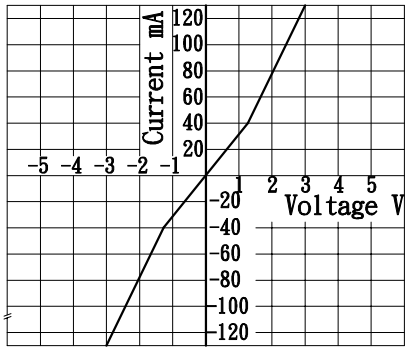
LED turn off current vs. ambient temperature
Load voltage: 350V(DC)
Continuons load current: 130mA(DC)



LED dropout voltage vs. ambient temperature
LED current: 5 to 50mA



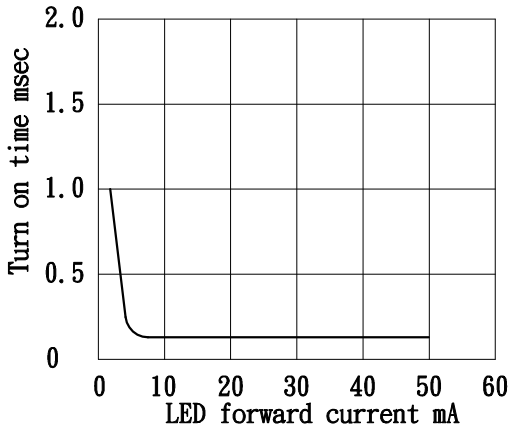
Voltage vs. current characteristics of output at MOS FET portion
Measured portion: across terminals 7 and 8 pin
Ambient temperature: 25° C



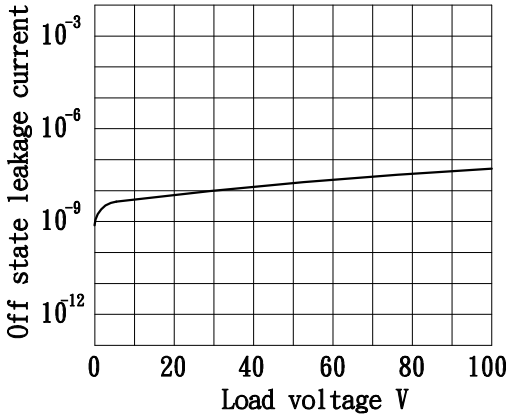
PRODUCT SPECIFICATION

COSMO ELECTRONICS CO.,LTD.	PHOTO MOS RELAYS: KAQW210TSB	SHEET 5 OF 10

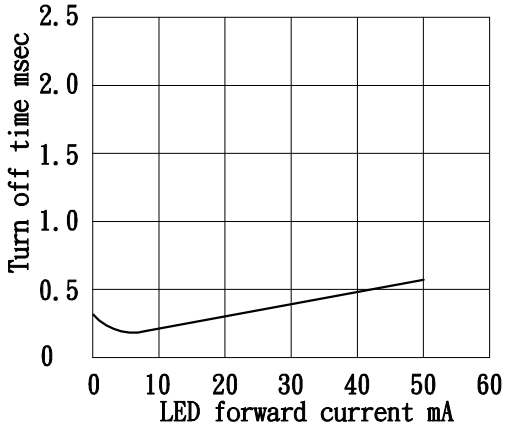
LED forward current vs. turn on time
Across terminals 7 and 8pin;Load voltage: 350V(DC);Continuous load current: 130mA(DC);Ambient temperature: 25° C



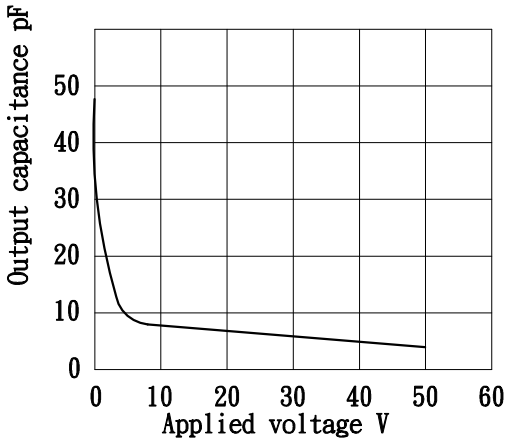
Off state leakage current
Across terminals 7 and 8pin
Ambient temperature: 25° C



LED forward current vs. turn off time
Across terminals 7 and 8pin;Load voltage: 350V(DC);Continuous load current: 130 mA(DC);Ambient temperature: 25° C



Applied voltage vs. output capacitance
Across terminals 7 and 8pin
Frequency: 1MHz;Ambient temperature: 25° C



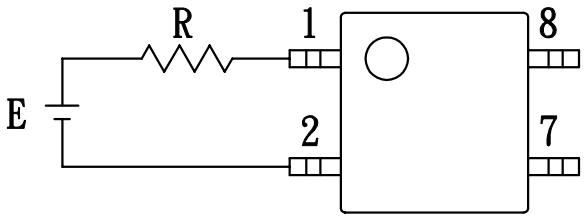
PRODUCT SPECIFICATION

COSMO ELECTRONICS CO.,LTD.	PHOTO MOS RELAYS: KAQW210TSB	SHEET 6 OF 10

USING METHODS

Examples of resistance value to control LED forward current I_F

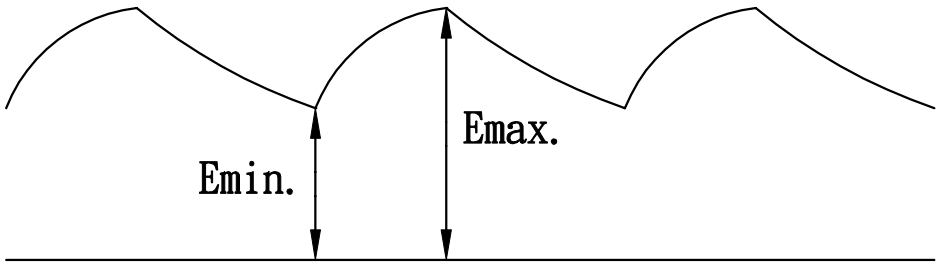
Photo MOSRELAY (I_F =5mA)



E	R
3.3V	Approx. 240 ohm
5V	Approx. 540 ohm
12V	Approx. 1.8K ohm
15V	Approx. 2.4K ohm
24V	Approx. 4K ohm

(1) LED forward current must be more than 5mA, at E min.

(2) LED forward current must be less than 50mA, at E max.

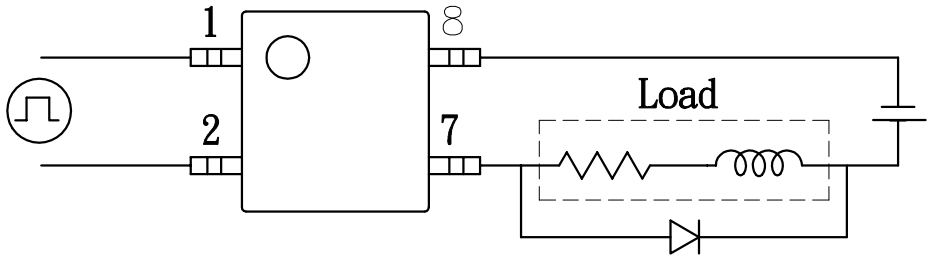


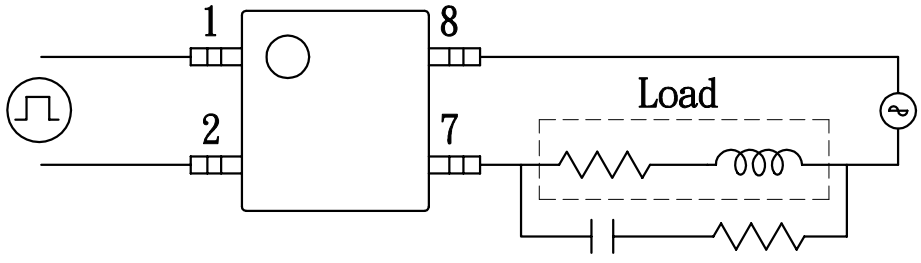
PRODUCT SPECIFICATION

COSMO ELECTRONICS CO.,LTD.	PHOTO MOS RELAYS: KAQW210TSB	SHEET 7 OF 10

USING METHODS

Regulate the spike voltage generated on the inductive load as follows





R-C Snubber

PRODUCT SPECIFICATION

COSMO ELECTRONICS CO.,LTD.	PHOTO MOS RELAYS: KAQW210TSB	SHEET 8 OF 10

• Absolute Maximum Ratings

(Ta=25°C)

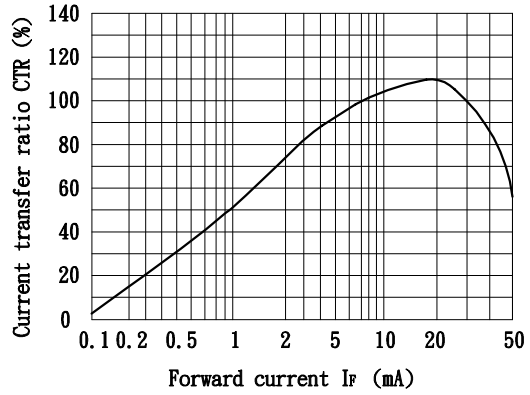
Parameter		Symbol	Rating	Unit
Input	Forward current	I_F	± 50	mA
	Peak forward current	I_{FM}	± 1	A
	Power dissipation	P_D	70	mW
Output	Collector-emitter voltage	V_{CEO}	60	V
	Emitter-collector voltage	V_{ECO}	6	V
	Collector current	Ic	50	mA
	Collector power dissipation	Pc	150	mW
Total power dissipation		P_{tot}	200	mW
Isolation voltage 1 minute		Viso	3750	Vrms
Operating temperature		Topr	-30 to +100	° C
Storage temperature		Tstg	-55 to +125	° C
Soldering temperature 10 second		Tsol	260	° C

• Electro-optical Characteristics

(Ta=25°C)

Parameter		Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Input	Forward voltage	V_F	I_F=± 20mA	-	1.2	1.4	V
	Peak forward voltage	V_{FM}	I_{FM}=± 0.5A	-	-	3.5	V
	Terminal capacitance	C_t	V=0, f=1kHz	-	30	-	pF
Output	Collector dark current	I_{CEO}	V_{CE}=20V, I_F=0	-	-	0.1	uA
Transfer characteristics	Current transfer ratio	CTR	I_F=± 1mA, V_{CE}=5V	30	100	-	%
	Collector-emitter saturation voltage	$V_{CE(sat)}$	I_F=± 20mA, Ic=1mA	-	0.1	0.3	V
	Isolation resistance	Riso	DC500V	$5x10^{10}$	10^{11}	-	ohm
	Floating capacitance	C_f	V=0, f=1MHz	-	0.6	1.0	pF
	Cut-off frequency	fc	V_{CC}=5V, Ic=2mA, R_L=100ohm	-	80	-	kHz
	Response time (Rise)	tr	V_{CC}=2V, Ic=2mA, R_L=100ohm	-	5	20	us
	Response time (Fall)	tf		-	4	20	us

Fig.1 Current Transfer Ratio vs. Forward Current



PRODUCT SPECIFICATION

COSMO ELECTRONICS CO.,LTD.	PHOTO MOS RELAYS: KAQW210TSB	SHEET 9 OF 10

Fig.2 Collector Power Dissipation vs. Ambient Temperature

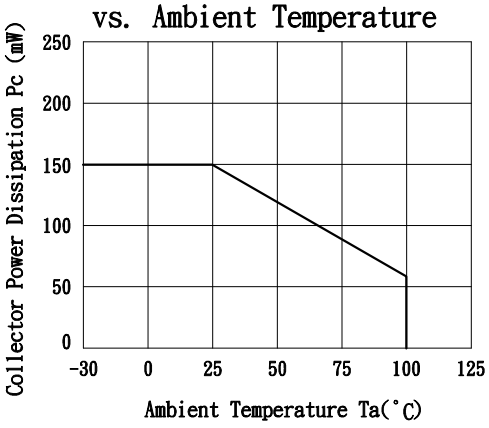


Fig.3 Collector Dark Current vs. Ambient Temperature

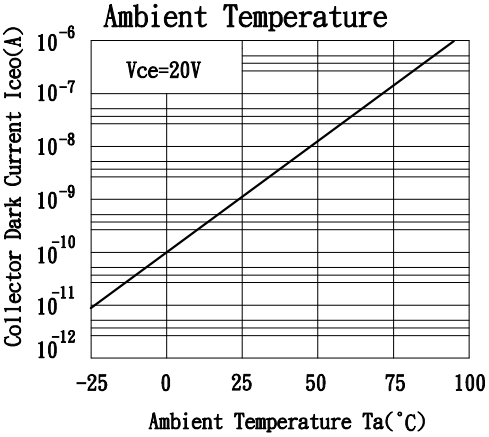


Fig.4 Forward Current vs. Ambient Temperature

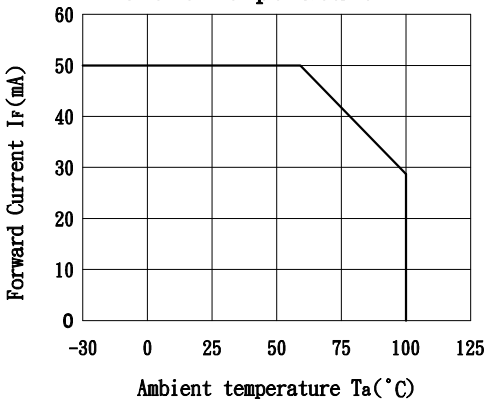


Fig.5 Forward Current vs. Forward Voltage

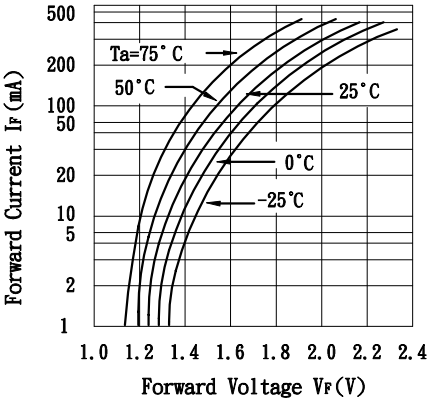


Fig.6 Collector Current vs. Collector-emitter Voltage

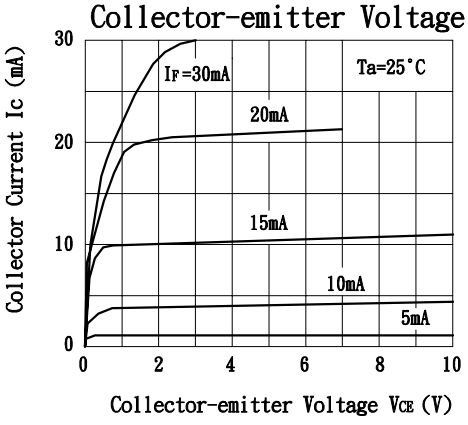
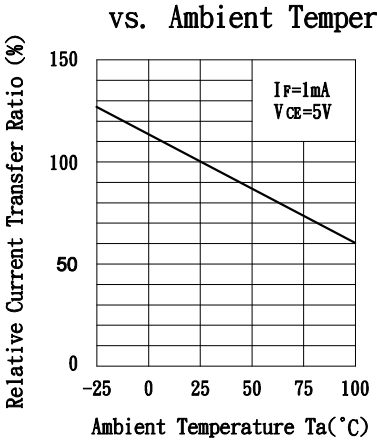


Fig.7 Relative Current Transfer Ratio vs. Ambient Temperature



PRODUCT SPECIFICATION

COSMO ELECTRONICS CO.,LTD.	PHOTO MOS RELAYS: KAQW210TSB	SHEET 10 OF 10

Fig.8 Collector-emitter Saturation Voltage vs. Ambient Temperature

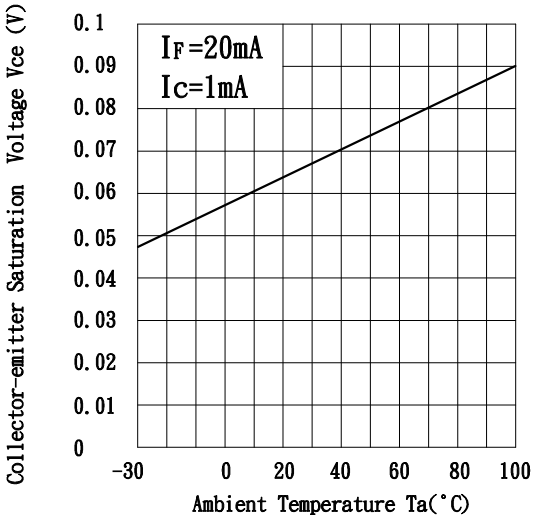


Fig.9 Collector-emitter Saturation Voltage vs. Forward Current

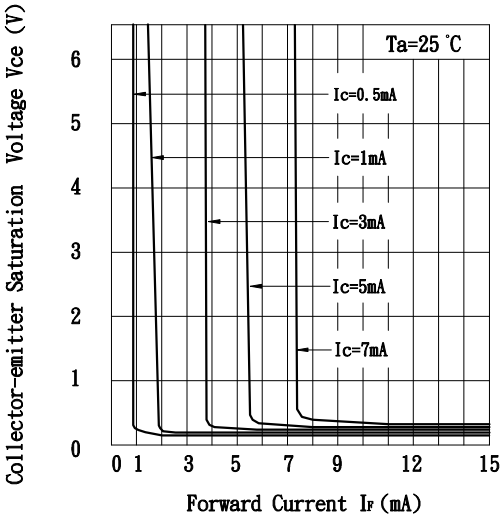


Fig.10 Response Time vs. Load Resistance

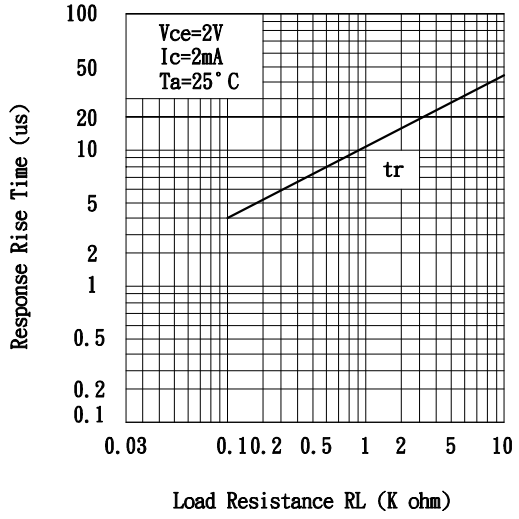


Fig.11 Response Time vs. Load Resistance