

TECHNICAL DATA
DATA SHEET 470, REV. -

Phototransistor Optocoupler

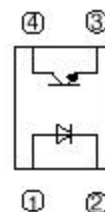
Features:

- High Current Transfer Ratio: 100% at $I_F = 1$ mA.
- Current transfer ratio guaranteed over -55°C to $+125^{\circ}\text{C}$ ambient temp. range.
- 5000 Vdc electrical isolation.
- High collector-emitter voltage, $V_{CE} = 70$ V.

Applications:

- Solid State relay circuits.
- System appliances, measuring instruments.

Outline Dimensions



- ① Anode ③ Emitter
② Cathode ④ Collector

Optocoupler Absolute Maximum Rating (at 25°C)

PARAMETER		SYMBOL	RATING	UNIT
Input	Forward Current	I_F	50	mA
	Peak Forward Current*	I_{FM}	1	A
	Reverse Voltage	V_R	6	V
	Power Dissipation	P	80	mW
Output	Collector-Emitter Voltage	V_{CEO}	70	V
	Emitter-Collector Voltage	V_{ECO}	6	V
	Collector Current	I_C	50	mA
	Collector Power Dissipation	P_C	140	mW
Total Power Dissipation		P_{tot}	190	mW
Isolation Voltage**		V_{iso}	5000	V_{rms}
Operating Temperature		T_{opr}	-30 to $+100$	$^{\circ}\text{C}$
Storage Temperature		T_{stg}	-55 to $+125$	$^{\circ}\text{C}$
Soldering Temperature***		T_{sol}	250	$^{\circ}\text{C}$

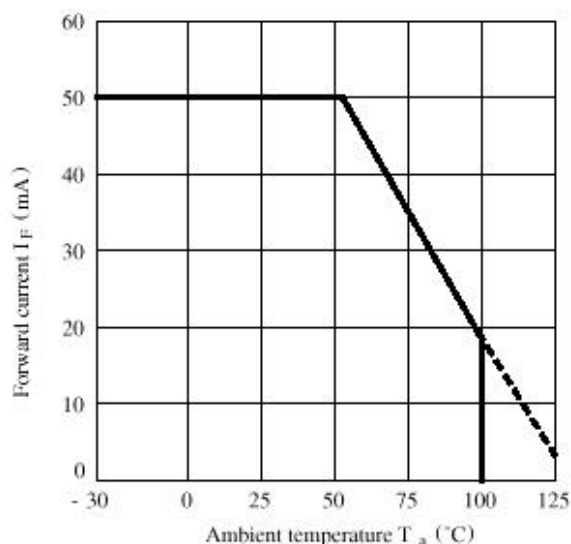
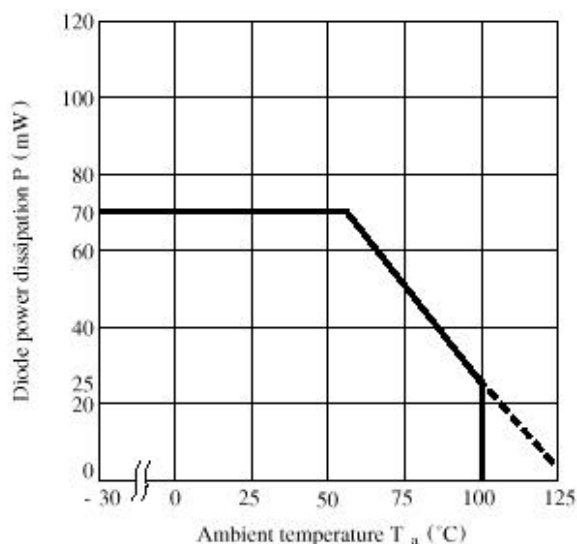
* < 1 ms duration

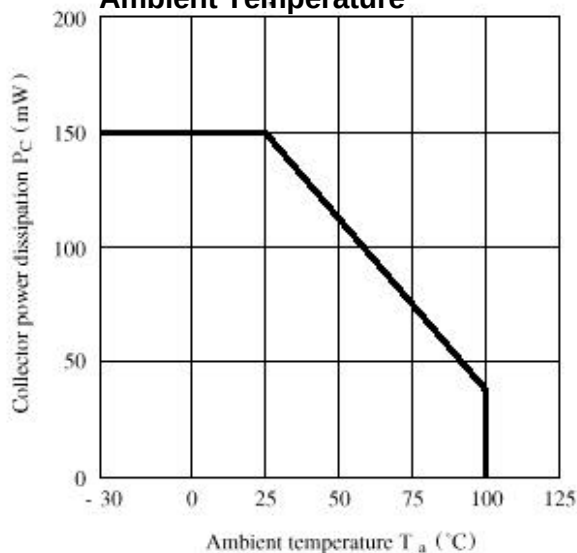
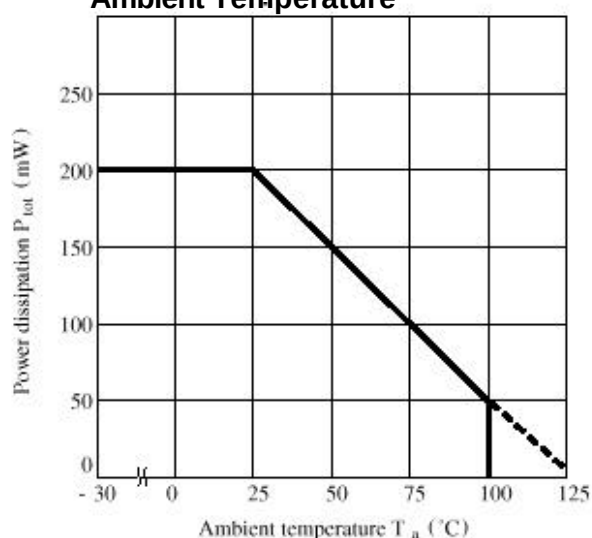
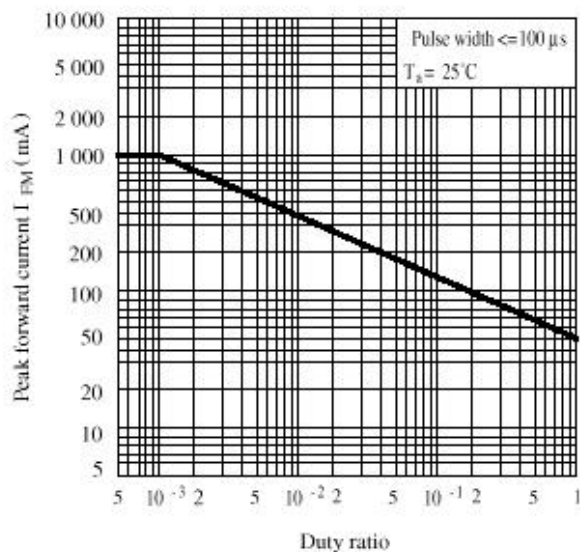
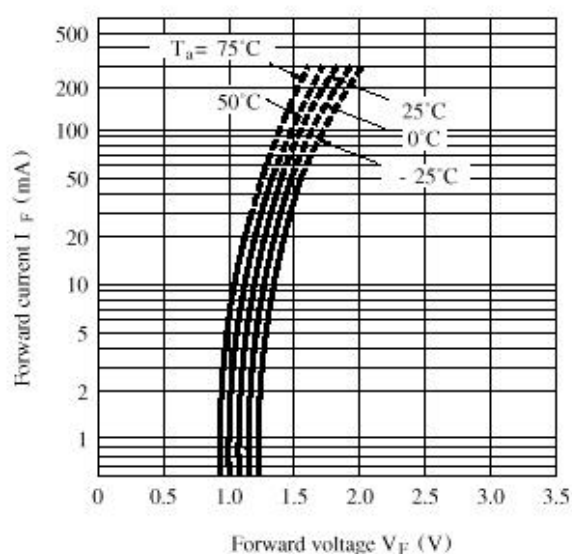
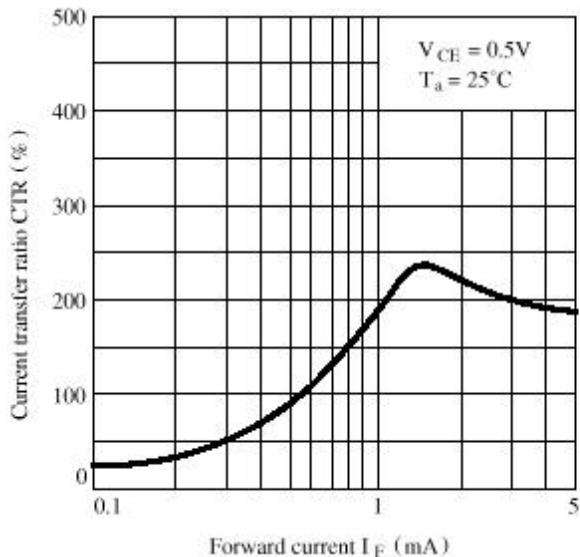
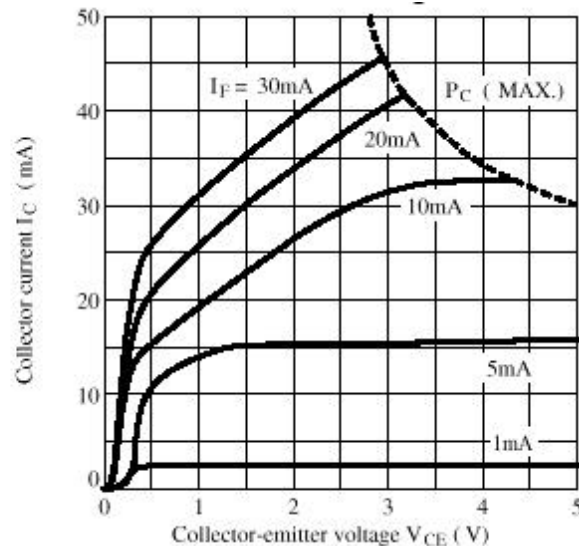
** AC for 1 min, 40 to 60% RH

*** For 10 seconds

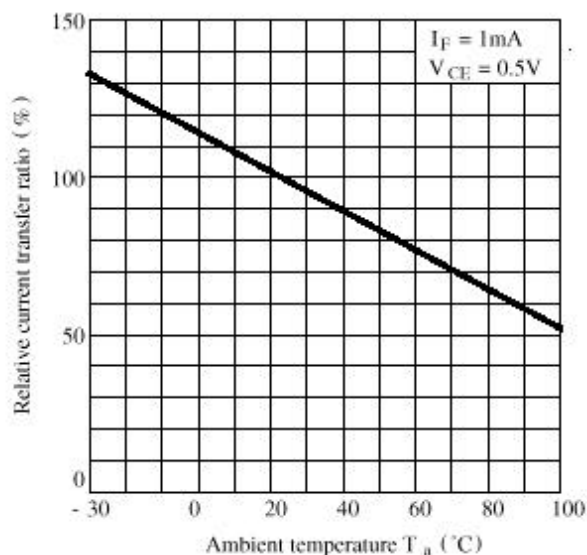
Electro-Optical Characteristics (at 25 °C)

	PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
Input	Forward Voltage	V_F	$I_F = 1 \text{ mA}$	-	1.1	1.4	V
	Peak Forward Voltage	V_{FM}	$I_{FM} = 0.5 \text{ A}$	-	-	2.8	V
	Reverse Breakdown Voltage	BV_R	$I_R = 15 \text{ } \mu\text{A}$	6	-	-	V
	Reverse Current	I_R	$V_R = 4 \text{ V}$	-	-	12	μA
	Terminal Capacitance	C_t	$V = 0, f = 1 \text{ kHz}$	-	35	240	pF
Output	Collector-Emitter Breakdown Voltage	BV_{CEO}	$I_C = 0.1 \text{ mA}, I_F = 0$	70	-	-	V
	Emitter- Collector Breakdown Voltage	BV_{ECO}	$I_E = 10 \text{ } \mu\text{A}, I_F = 0$	6	-	-	V
	Collector Dark Current	I_{CEO}	$V_{CE} = 24 \text{ V}, I_F = 0$	-	-	100	nA
	Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	$I_F = 1 \text{ mA}, I_C = 0.2 \text{ mA}$	-	-	0.4	V
Current Transfer Ratio		CTR	$I_F = 10 \text{ mA}, V_{CE} = 0.5 \text{ V}$	100	-	-	%
Input to Output Leakage Current		I_{I-O}		-	-	0.8	μA
Isolation Resistance		R_{ISO}	$500 V_{DC}, 40\text{--}60\% \text{ RH}$	4×10^{10}	10^{11}	-	Ω
Floating Capacitance		C_F	$V = 0, f = 1 \text{ MHz}$	-	0.6	1.0	pF
Response Time		t_r, t_f	$V_{CE} = 2 \text{ V}, I_C = 2 \text{ mA}, R_L = 100 \Omega$	-	8	-	μs
Cut-off Frequency		f_c	$V_{CE} = 5 \text{ V}, I_C = 2 \text{ mA}, R_L = 100 \Omega$	-	50	-	kHz

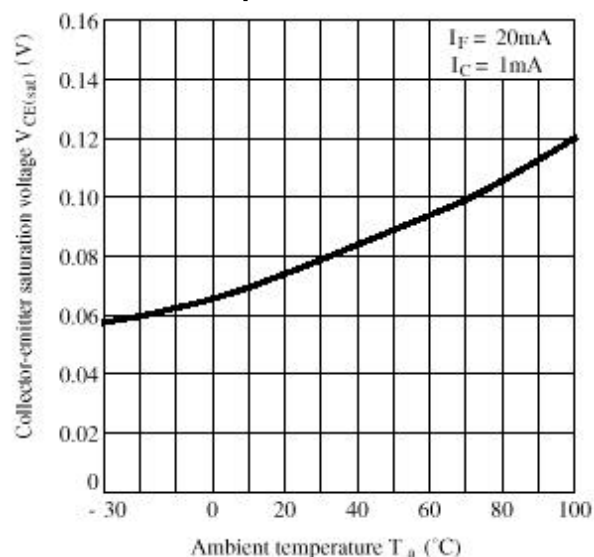
Forward Current vs. Ambient Temperature**Diode Power Dissipation vs. Ambient Temperature**

Collector Power Dissipation vs. Ambient Temperature**Power Dissipation vs. Ambient Temperature****Peak Forward Current vs Duty Ratio****Forward Current vs. Forward Voltage****CTR vs. Forward Current****Collector Current vs. C-E Voltage**

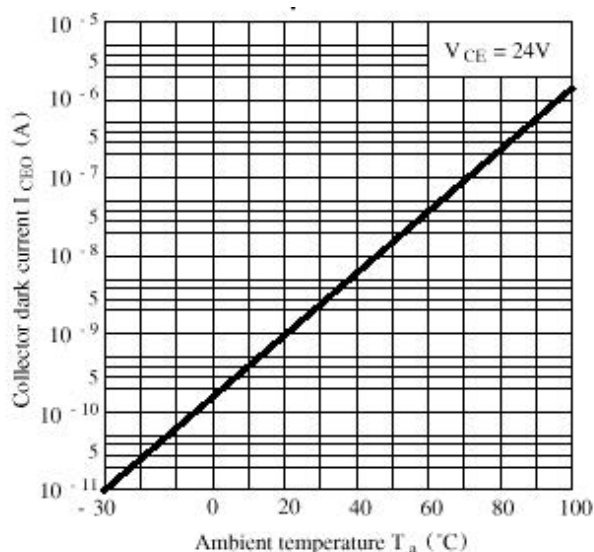
Relative CTR vs. Ambient Temperature



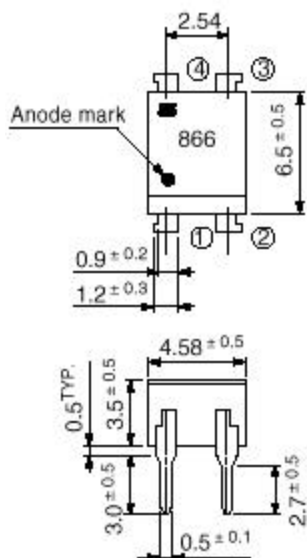
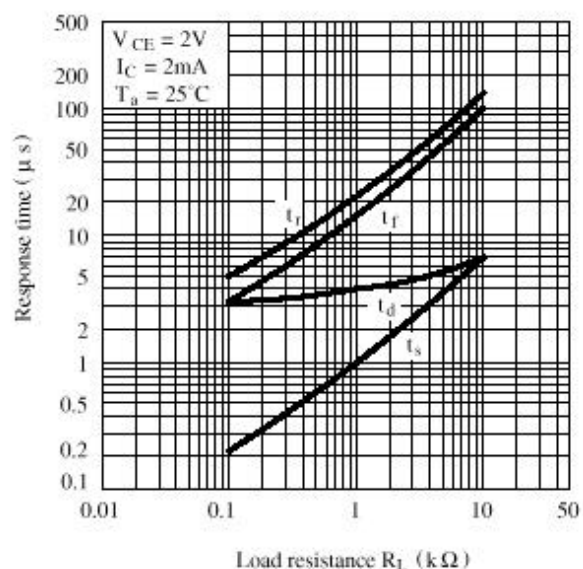
C-E Saturation Voltage vs. Ambient Temperature



Collector Dark Current vs. Ambient Temperature



Response Time vs. Load Resistance



MECHANICAL DIMENSIONS: In mm

